ROYAL VISTA RESIDENTIAL PROJECT

Final Environmental Impact Report

Prepared for

County of Los Angeles
Department of Regional Planning
Subdivision Section
320 West Temple Street, 13th Floor
Los Angeles, CA 90012

May 2024

ESA

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320 West Temple Street, 13th Floor
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May 2024

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CHAPTER 9
Introduction to the Final EIR

9.1 Overview of the Final EIR

As described in California Environmental Quality Act Guidelines (CEQA Guidelines) Section 15089, California Code of Regulations, title 14, Section 15089, a lead agency must prepare a Final Environmental Impact Report (Final EIR) before approving a project. This Final EIR for the Royal Vista Residential Project (Project) has been prepared in accordance with CEQA Guidelines Section 15132, which lists the required contents for a Final EIR. As required by that section, this Final EIR consists of the following: the October 2023 Draft EIR (DEIR) for the Project; copies of the comment letters received; a list of persons, organizations, and public agencies commenting on the DEIR; responses to all comments received; corrections, clarifications, and additions to the DEIR, a Mitigation Monitoring and Reporting Program (MMRP); each described further below.

9.2 Environmental Review Process

As defined in CEQA Guidelines Section 15050, the County of Los Angeles is the Lead Agency responsible for preparing the EIR for the Project. The County determined that preparation of an EIR was required for the Project after conducting preliminary review in accordance with CEQA Guidelines Sections 15060. In compliance with CEQA Guidelines Section 15082, a Notice of Preparation (NOP) was issued on October 13, 2022, to the State Clearinghouse, various public agencies, and other interested parties for the required 30 days, plus an additional 14-day extension for a total of 44-day review and comment period. Additionally, two public scoping meetings were held to provide additional opportunities for the public to provide input on the scope and content of the DEIR and to generally describe the Project and the CEQA process for the DEIR. The notification of the scoping meeting was included within the NOP and advertised in two local newspapers, the La Opinion and the Daily Journal. In addition, the notice was also posted at the Project Site. The first public scoping meeting was held virtually on November 1, 2022, from 6 p.m. to 8 p.m. A second scoping meeting was held in person on December 6, 2022, from 6 p.m. to 8 p.m. at the Rowland Heights Community Center within Pathfinder Community Regional Park at 18150 Pathfinder Road, Rowland Heights, CA 91748. All NOP comments relating to the DEIR were reviewed and the issues raised in those comments were considered in the preparation of the DEIR. The NOP comments received by the County, and the Scoping Meeting comments, are contained in Appendix A of the DEIR. The DEIR was circulated for a 67-day public review period, which is 22 days longer than required by CEQA, from October 30, 2023, to January 5, 2024.

9.3 Commenters on the DEIR

The following agencies, organizations and individuals commented on the DEIR. Chapter 10 contains the bracketed comment letters and responses to these comments. In addition, Appendix P includes Glenn Lukos Associates (GLA) technical memorandum that directly responds to Attachment C of the Channel Law Group, LLC, Comments from Biological Resource Consultant Scott Cashen, MS on the EIR.

TABLE 9-1
LIST OF COMMENTERS

Comment Letter	Commenters	Date of Letter or Date Received
Agencies		
AG 1	County of Los Angeles Fire Department	12-14-2023
AG 2	Walnut Valley Water District	12-19-2023
AG 3	City of Diamond Bar California	12-22-2023
AG 4	California Department of Transportation	01-03-2024
AG 5	Watershed Conservation Authority	01-05-2024
AG 6	California Department of Fish and Wildlife	01-10-2024
Organizations		
ORG 1a	Royal Vista Open Space (RVOP)	01-05-2024
ORG 1b	South Coast Air Quality Management District submitted by RVOP	12-12-2022 submitted 01-04-2024
ORG 2	Rowland Heights Community Coordinating Council	01-01-2024
ORG 3a	Pierce Law Firm submitted by RVOP	11-01-2022 submitted 01-04-24
ORG 3b	Pierce Law Firm email submitted by RVOP	03-30-2022 submitted 01-04-24
ORG 4	Pavone & Fonner, LLP submitted by RVOP	02-03-2023 submitted 01-04-24
ORG 5	Allen Matkins Leck Gamble Mallory & Natsis LLP, rep. Fairway Industrial Company, LLC	12-15-2023
ORG 6	Channel Law Group, LLP (Attachments A, B and C)	01-05-2024
General Public Comment Letters		
FORM 1	General Public Comment Letter 1	See list of commentors below
	Redacted Name	12-09-2023
	Todd Hsu	12-13-2023
	Quinnie Wong, Alice Da Luz, Alan Lee	12-14-2023
	Charlene Hobbs	12-26-2023
	Bruce Thompson	12-28-2023
	Hannah C Charng	12-29-2023
	James Osowski	12-30-2023
	Daniel Bodine	01-0-2024
	Lisa Marie	01-03-2024
	Jennifer Chen	01-05-2024
	Nancy Fox	01-05-2024

Comment Letter	Commenters	Date of Letter or Date Received
	Rick Wong	01-05-2024
	Amy Huang	01-05-2024
	Eileen Lu	01-05-2024
	Lissett Mondragon	01-04-2024
	Armando Carrillo	01-04-2024
	Lana Tran	01-04-2024
	Fabian Cheng	01-04-2024
	1945 Radclay Dr.	01-05-2024
	Winnie Lee	01-06-2024
FORM 2	General Public Comment Letter 2	See list of commentors below
	Justine Bell	01-04-24
	LadyAnn Sabalburo	12-1-2023
	Martha Alcala	12-26-2023
	Tess Charng	12-29-2023
	Michael Caliendo	12-31-2023
	Jim Galvey	01-04-2024
	Mingjue Shi	01-05-2024
	Peter K Lee	01-05-2024
	Linda White	01-05-2024
	Peter Tran	01-04-2024
	1951 Radclay Dr.	01-04-2024
	Patricia C.	01-04-2024
	Adele Prince	01-05-2024
	Karen Allison	01-05-2024
FORM 3	General Public Comment Letter 3	See list of commentors below
	Bonnie Duenas	12-29-23
	Greg Chiang	01/05/24
	William Edwards	01/05/24
	Asif Siddiqi	12-26-2023
	Jerry Hsieh	12-25-2023
	Makenzie King	12-27-2023
	Liuyu Xin	12-28-2023
	Barry Gould	12-29-2023
	Sarah Wang	12-29-2023
	Wei-Chun Wu	12-29-2023
	Jim Lin	01-03-2024
	Tim Chan	01-03-2024
	Chris Chen	01-05-2024
	Karen Gerloff	01-05-2024

Comment Letter	Commenters	Date of Letter or Date Received
	1645 Chapel Hill	01-05-2024
	1945 Radclay Dr.	01-04-2024
	1951 Radclay Dr.	01-04-2024
	Irene Tores Garcia	01-05-2024
	Gilbert Garcia	01-05-2024
FORM 4	General Public Comment Letter 4	See list of commentors below
	Anh Thu Nguyen	01/04/24
	Julian and Zulai Sanchez	01/04/24
	Michelle Coppel	12-12-2023
	Katie Tucker	12-12-2023
	Caroline Lam	12-15-2023
	Craig Johnson	12-27-2023
	Johnny Charng	12-29-2023
	Gisela Connelly	01-01-2024
	Machelle Hernandez	01-01-2024
	Mary Baker	01-01-2024
	James Chu	01-03-2024
	Jack Qi	01-05-2024
	Jing Yang	01-05-2024
	Jack Yao	01-05-2024
	Yusef D.	01-04-2024
	Vincent Ferrara	01-04-2024
	Rochelle Kellur	01-04-2024
	Keith Garcia	01-05-2024
	Louis Anders	01-05-2024
	Beatrix Lau	01-06-2024
	Sharon Bowler	01-07-2024
Individuals		
IND 1	Monica Marcelo	12-01-2023
IND 2	Vincent Ferrara	12-04-2023
IND 3	Earlene Smith	12-07-2023
IND 4	George Funk	12-14-2023
IND 5	Coleen Garcia	12-25-2023
IND 6	CL	12-26-2023
IND 7	Mannjye Wu	12-27-2023
IND 8	Monique Marcelo	12-29-2023
IND 9	Henry Shih	12-30-2023
IND 10	Woolley Family	12-30-2023
IND 11	Chin-Chien W. Kuo	01-01-2024

Comment Letter	Commenters	Date of Letter or Date Received
IND 12	Teresa Liu	01-02-2024
IND 13	Victor Chen	01-02-2024
IND 14	Frances Wright	01-03-2024
IND 15	Abez	01-03-2024
IND 16	Beverly Pekar	01-03-2024
IND 17	Linda Kuo	01-03-2024
IND 18	Fina Segura	01-04-2024
IND 19	Charles Li	01-04-2024
IND 20	M. Breton	01-04-2024
IND 21	Naveen Reddy	01-04-2024
IND 22	Shelley Gentry	01-04-2024
IND 23	Wanda Ewing	01-04-2024
IND 24	Linda Himes	01-04-2024
IND 25	Edward O. Ewing	01-05-2024
IND 26a	Karen Gerloff	01-05-2024
IND 26b	Karen Gerloff	01-05-2024
IND 27	Thomas Prince	01-05-2024
IND 28	1435 Fairlance Dr.	01-05-2024
IND 29	Derrick and Susan Trautz	01-05-2024
IND 30	Edmundo Asuncion	01-05-2024
IND 31	Lisa Valladares	01-05-2024
IND 32	Luis Avalos	01-05-2024
IND 33	Mary Price	01-05-2024
IND 34	Teri Malkin	01-05-2024
IND 35	Karen Gerloff	01-07-2024
IND 36	Jo Ann Cromer	10-04-2023
IND 37	Jo Ann Cromer	02-14-2023

9.4 Contents of the Final EIR

Chapter 9: Introduction. This section summarizes the Project under consideration and describes the contents of the Final EIR. This chapter also contains a list of all agencies or persons who submitted comments on the DEIR during the public review period, presented in the following order: agencies, organization, form letters, individual; and date received.

Chapter 10: Responses to Written Comments. This section contains the comment letters received by Los Angeles County Department of Regional Planning (LA County Planning) on the DEIR, followed by responses to individual comments. Each comment letter is numbered and identified for reference, and the individual comments in each letter are also identified by number. Each comment letter is followed by written responses to each of the comments in that letter.

Some comments that were submitted to DRP do not pertain to substantial environmental issues or do not address the adequacy of the analysis contained in the DEIR. Responses to such comments, though not required, are included to provide additional information. When a comment does not directly pertain to environmental issues analyzed in the DEIR, does not ask a question about the adequacy of the analysis contained in the DEIR, expresses an opinion related to the merits of the Project, or does not question an element of or conclusion of the DEIR, the response notes the comment and may provide additional information where appropriate. Many comments express opinions about the merits or specific aspects of the Project and these are included in the Final EIR for consideration by the decision-makers.

Chapter 11: Corrections, Clarifications, and Additions to the DEIR. This section describes changes and refinements made to the Project since publication of the DEIR. These refinements, clarifications, amplifications, and corrections, which are described in the beginning of the section, would not change the environmental analysis and conclusions presented in the DEIR for the reasons discussed in this section. This section also summarizes text changes made to the DEIR in response to comments. Changes to the text of the DEIR are shown by either strikethrough where text has been deleted, or underline where new text has been inserted.

Chapter 12: Mitigation Monitoring and Reporting Program. This section contains the Mitigation Monitoring and Reporting Program (MMRP) required by Public Resources Code section 21081.6(a).

CHAPTER 10

Response to Comments

This section includes copies of the comment letters received by the LA County Planning on the Draft Environmental Impact Report (EIR). Each letter is numbered and identified for reference and the individual comments in each letter are also identified by number. Each comment letter is bracketed and numbered by individual comments followed by written responses to each of the bracketed comments in that letter.

10.1 Introduction

This section of the Final EIR contains the comment letters that DRP received on the Draft EIR during the 67-day public review period, from October 30, 2023, to January 5, 2024. The letters and responses are organized by Agencies, Organizations, Form and Individuals. Following each comment letter there is a response by LA County Planning that supplements, clarifies, or amends information provided in the Draft EIR, that refers the reader to the appropriate place in the Draft EIR where the requested information can be found, or that otherwise responds to the comment. Where text changes in the Draft EIR are warranted based upon comments on the Draft EIR, those changes are included in the response following the comment; changes to the text of the Draft EIR as a result of comments are also shown in Chapter 11.0: Corrections, Clarifications, and Additions to the Draft EIR, where all text changes to the Draft EIR can be found. Where updates to mitigation measures are warranted based upon comments on the Draft EIR, those changes are included in the response following the comment letter and are also shown in Chapter 12: Mitigation Monitoring and Reporting Program of this Final EIR.

If a comment does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The commenter is encouraged to submit a Project opinion letter when the Notice of Public Hearing for the project is issued. All comment letters will be available to the decision-makers for their review and consideration as part of the Final EIR.

10.2 Agencies Responses

The following comment letters were received from agencies on the Royal Vista Residential Project Draft Environmental Impact Report (DEIR). The comment letters are grouped together and are followed by all responses as indicated in Table 10-1.

TABLE 10-1
LIST OF DEIR COMMENT LETTERS: AGENCY

Letter Code	Commenting Party	Response Page Number
AG 1	County of Los Angeles Fire Department	Page 10-5
AG 2	Walnut Valley Water District	Page 10-11
AG 3	City of Diamond Bar California	Page 10-17
AG 4	California Department of Transportation	Page 10-26
AG 5	Watershed Conservation Authority	Page 10-35
AG 6	California Department of Fish and Wildlife	Page 10-44

COUNTY OF LOS ANGELES
FIRE DEPARTMENT

1320 NORTH EASTERN AVENUE
LOS ANGELES, CALIFORNIA 90063-3294
(323) 881-2401
www.fire.lacounty.gov

ANTHONY C. MARRONE
FIRE CHIEF
FORESTER & FIRE WARDEN

"Proud Protectors of Life, the Environment, and Property"

December 14, 2023

Marie Pavlovic, Senior Regional Planner
Department of Regional Planning
320 W. Temple Street
Los Angeles, CA 90012

Dear Ms. Pavlovic:

The County of Los Angeles Fire Department's Planning Division, Land Development Unit, Forestry Division, and Health Hazardous Materials Division have reviewed the following case **RPPL2021007150.** AG 1-1

Royal Vista Residential Project - EIR related to Tentative Tract Map Submittal

The following are their comments:

PLANNING DIVISION:

We have no comments.

For any questions regarding this response, please contact Kien Chin, Planning Analyst, at (323) 881-2404 or Kien.Chin@fire.lacounty.gov.

LAND DEVELOPMENT UNIT:

Fire conditions for RPPL2021007149 must be addressed prior to map clearance.

The development of this project must comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows and fire hydrants. AG 1-2

Should any questions arise, please contact Joseph Youman at (323) 890-4125 or Joseph.Youman@fire.lacounty.gov.

FORESTRY DIVISION – OTHER ENVIRONMENTAL CONCERNS:

The statutory responsibilities of the County of Los Angeles Fire Department, Forestry Division include erosion control, watershed management, rare and endangered species, brush clearance, vegetation management, fuel modification for Fire Hazard Severity Zones, archeological and cultural resources, and the County Oak Tree Ordinance.

The County of Los Angeles Fire Department, Forestry Division has no further comments regarding this project.

For any questions regarding this response, please contact Forestry Assistant, Matthew Ermino at (818) 890-5719.

AG 1-3

HEALTH HAZARDOUS MATERIALS DIVISION:

The Health Hazardous Materials Division of the Los Angeles County Fire Department has no comments or requirements for the project at this time.

Please contact HHMD Hazardous Materials Specialist III, Jennifer Levenson at (323) 890-4114 or Jennifer.Levenson@fire.lacounty.gov if you have any questions.

Very truly yours,

RONALD M. DURBIN, CHIEF, FORESTRY DIVISION
PREVENTION SERVICES BUREAU

RMD:pg

AG 1-4

Response to Comment Letter AG 1

County of Los Angeles Fire Department

Response AG 1-1

Comment noted.

Response AG 1-2

Comment noted. The Project will comply with all applicable code and ordinance requirements for construction, access, water mains, fire flows and fire hydrants.

Response AG 1-3

Comment noted.

Response AG 1-4

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

WALNUT VALLEY WATER DISTRICT

271 South Brea Canyon Road • Walnut, California 91789-3002
(909) 595-7554 • Fax: (909) 444-5521
WALNUTVALLEYWATER.GOV

December 19, 2023

Marie Pavlovic
LA County Planning
Subdivisions Section
320 W. Temple Street, Room #160
Los Angeles, CA 90012

RE: Draft Environmental Impact Report
Royal Vista Residential Project

Dear Ms. Pavlovic:

AG 2-1

Thank you for the opportunity to review and provide comments to be considered for the Draft Environmental Impact Report (EIR) to the subject project.

The Walnut Valley Water District ("District") is a California Water District and the agency that will be supplying water to the development. The District purchases imported water from Three Valleys Municipal Water District, a member agency of the Metropolitan Water District of Southern California (MWD).

As you have indicated within the EIR, the District is completely dependent on imported water from MWD as its sole supplier of water for domestic purposes and does not guarantee specific pressures or flows. Consequently, water service for the proposed development within the District's boundary shall be subject to the availability of water from MWD. Also, the "project" or "subdivision" consists of fewer than 500 dwelling units; therefore, the requirements for reliable water supply stipulated under Senate Bills SB 221 and SB 610 do not apply. However, the District believes there to be sufficient supply for the proposed development.

AG 2-2

The District has completed the review of the EIR and has the following comments:

As the streets are proposed to be private, the District will require an easement encompassing all streets within the development for water line construction, operation, and maintenance. Please note that the District will construct all District maintained and operated water mainlines and appurtenances within the development.

The District has an existing 12-inch PVC recycled water line along Colima Road and 6-inch PVC recycled water line along East Walnut Drive South terminating at the northwest corner of the project's property. To comply with the water conservation requirements under California State Law and Section 4.07 Water Conservation in the District's Rules and Regulations, the District intends to service the proposed development with recycled water. Recycled water will provide service for any landscaping to be maintained by a Homeowner's Association (HOA), park and open-space. In addition, recycled water will be used during construction activities.

AG 2-3

Table 4.19-4 shows multiple dry year supply and demand comparisons based on the District's 2020 Urban Water Management Plan. It should be noted that supply and demand estimates for future years are significantly impacted by new water use efficiency regulations adopted by the California State Legislature in 2018 (i.e. AB 1668, SB 606, and SB 1157). When adopted by the State Water Resources Control Board in 2024, these objectives will decrease the amount of water allowed for residential, commercial, industrial, and institutional customers.

Please make corrections to the Draft EIR according to the attached redlined Sections (Section 4.19.1 Existing Conditions under Water Supply on Page 4.19-1 and Section 4.19.5 Environmental Impact Analysis under Water-Construction on Page 4.19-14 and Table 4.19-4 on Page 4.19-7).

AG 2-4

If you have any questions or need additional information, please contact me at Ext. 234.

Very truly yours,

WALNUT VALLEY WATER DISTRICT

Sheryl L Shaw

Sheryl L. Shaw, P.E.
Director of Engineering

SLS:TD:cf

AG 2-5

4.19 Utilities and Service Systems

This section analyzes the Project's impacts related to Utilities and Service Systems. This section is based, in part, on the Royal Vistal Residential Project Infrastructure Assessment for Water and Sewer (Fuscoe 2022a) and the Sewer Area Study Report for Vesting Tentative Tract No. 83534 PC9051, PC6594, PC6788, PC10811, PC7851 Hydraulic Calculations and Existing System Analysis prepared by Fuscoe Engineering (Fuscoe 2022b), Royal Vista Residential and Parks Project Water Demand Memorandum (Fuscoe 2023c), for the Project (**Appendix L** of this Draft EIR), and will-serve letters provided by Los Angeles County Sanitation Districts (LACSD) and Walnut Valley Water District (WVWD) (see Appendix L of this Draft EIR). In addition, multiple planning documents, such as the WVWD 2020 Urban Water Management Plan, the County of Los Angeles General Plan, and the County of Los Angeles Integrated Waste Management Program were reviewed as part of this section.

Electrical usage is addressed in Section 4.6, *Energy*, of this Draft EIR.

4.19.1 Existing Conditions

Water Supply

The Project Site is located within the Walnut Valley Water District (WVWD) boundary. ~~WVWD is a subagency of Three Valleys Municipal Water District (TVMWD), and~~ WVWD is a California Special Water District and is a sub-agency of Three Valleys Municipal Water District (TVMWD). WVWD maintains ~~510~~ 426 miles of distribution mains, ~~31~~ 32 reservoirs and ~~17~~ 19 pump stations throughout southern California ~~regulated by the California Public Utilities Commission (CPUC).~~ Located in Los Angeles County, the WVWD serves the City of Diamond Bar, portions of the cities of Walnut, Industry, West Covina, and Pomona, as well as the part of easterly unincorporated Rowland Heights in Los Angeles County. WVWD water supply sources include treated and untreated, imported surface water purchased from Metropolitan Water District of Southern California through TVMWD and recycled water supplies (from recycled water purchased from LACSD and from groundwater pumped from the Puente Basin and Spadra Basin).

The northern portion of the Project Site along East Walnut Drive South is currently adjacent to a WVWD 12-inch domestic water line that runs underneath East Walnut Drive South. The middle portions and southern portions of the site along Colima Road are currently adjacent to a WVWD 12-inch domestic water line and a 12-inch recycled water line. There are seven (7) fire hydrants located within the public right-of-way along portions of the Project Site on Colima Road, East Walnut Drive South, and Iluso Avenue. Each fire hydrant is approximately 40-50 feet away from the Project boundary as they are located on the opposite side of the street as the Project Site. These fire hydrants connect to WVWD water lines.

The Project Site currently receives its water supply from local, offsite groundwater pumping wells for irrigation purposes of the golf course. Once constructed, the Project Site would no longer require groundwater, as the Project's water would be supplied by the Walnut Valley Water District. There is currently one building within the Project Site (a maintenance facility building), which lacks internal plumbing and therefore does not create water demand. The existing golf course clubhouse and associated structures are all on offsite parcels that are separate from the

4.19.4 Methodology

The water supply analysis is based on the UWMP completed by the WVWD, the Infrastructure Assessment for Water and Sewer, and a will-serve letter provided by WVWD. The wastewater capacity analysis is based on analyzing the receiving facility's capacity to receive wastewater from the proposed Project and a will-serve letter provided by LACSD. The solid waste analysis is based on an estimated waste stream analysis from demolition, construction, and operation of the proposed Project, adherence to applicable regulations, and the remaining capacity at solid waste receiving facilities.

As previously stated under subsection 4.19.1, *Existing Conditions*, the Project Site is currently occupied by a portion of an existing golf course. The Project Site includes a maintenance facility building and a driving range, both of which will be demolished. The maintenance facility building does not have interior plumbing and is not habitable, and therefore does not generate any appreciable amount of wastewater or solid waste. The Project Site does not contain any other structures. Any wastewater and solid waste demand is assumed to be net new to the Project Site.

4.19.5 Environmental Impact Analysis

Impact UTL-1: The proposed Project would not require or result in the relocation or construction of new or expanded water, wastewater treatment or storm water drainage, electric power, natural gas or telecommunications facilities, the construction or relocation of which could cause significant environmental effects. (Less than Significant)

As previously noted, electrical and natural gas are addressed in Section 3.6, *Energy,* of this Draft EIR, and stormwater infrastructure is addressed in Section 4.10, *Hydrology and Water Quality,* of this Draft EIR. Section 3.6, *Energy,* concluded that impacts related to electric power and natural gas would be less than significant. Section 4.10, *Hydrology and Water Quality,* concluded that impacts related to stormwater infrastructure would be less than significant.

Water

Construction

During construction, water will be required intermittently for dust control, equipment cleaning, soil grading and preparation during the early phases of the Project. The latter phases of construction normally require less water usage. Construction water demands are typically less than the long-term operational water demand of a project and are temporary. ~~There are seven fire hydrants located within the public Right-of-Way along portions of the Project Site on Colima Road, Walnut Drive and Iluso Avenue. Each fire hydrant is approximately 40-50 feet away from the Project Site boundary. These fire hydrants connect to WVWD water lines. Construction demands will be met using existing water infrastructure that surrounds the Project Site (e.g., existing fire hydrants).~~

Due to the proximity to recycled mainlines, temporary service(s) will provide construction water to the Project Site.

The Project will require construction of new on-site water distribution lines to serve new buildings, as well as the potential relocation and extension of existing lines. Construction impacts associated with the installation of water distribution lines would primarily involve trenching in order to place the lines below surface. When considering impacts resulting from the installation

TABLE 4.19-4
WALNUT VALLEY WATER DISTRICT MULTIPLE DRY YEAR SUPPLY AND DEMAND COMPARISON

Water Sources	2025	2030	2035	2040	2045
First Year					
Supply Totals	22,300	22,574	22,853	23,113	23,377
Demand Totals	22,300	22,574	22,853	23,113	23,377
Difference	0	0	0	0	0
Second Year					
Supply Totals	22,965	23,247	23,534	23,801	24,073
Demand Totals	22,965	23,247	23,534	23,801	24,073
Difference	0	0	0	0	0
Third Year					
Supply Totals	23,580	23,869	24,164	24,439	24,718
Demand Totals	23,580	23,869	24,164	24,439	24,718
Difference	0	0	0	0	0
Fourth Year				21,641	
Supply Totals	21,118	21,378	~~21,841~~	21,888	22,138
Demand Totals	21,118	21,378	~~21,841~~	21,888	22,138
Difference	0	0	0	0	0
Fifth Year					
Supply Totals	17,896	18,116	18,340	18,548	18,760
Demand Totals	17,896	18,116	18,340	18,548	18,760
Difference	0	0	0	0	0

SOURCE: Walnut Valley Water District, 2021

Local

County of Los Angeles General Plan Public Service and Facilities Element

Chapter 13 of Los Angeles County General Plan 2035 is the Public Service and Facilities Element. This element, adopted in 2015, outlines goals and policies for major public services and facilities that serve the unincorporated areas, and establishes policies that guide the provision of public services and facilities, as outlined below (County of Los Angeles Department of Regional Planning, 2015a).

Goal PS/F 2: Increased water conservation efforts

- Topic: Water Conservation
  - Policy PS/F 2.1: Support water conservation measures.
  - Policy PS/F 2.2: Support educational outreach efforts that discourage wasteful water consumption.
  - Policy PS/F 5.3: Discourage incompatible land uses near or adjacent to solid waste disposal facilities identified in the Countywide Integrated Waste Management Plan.

Response to Comment Letter AG 2

Walnut Valley Water District

Response AG 2-1

Comment noted.

Response AG 2-2

This comment does not raise an environmental issue concerning the DEIR. If easements are needed, the District will need to work with the subdivider to secure the easements.

Response AG 2-3

This commenter requests revisions to the DEIR clarifying the description of existing WVWD water lines. The requested revisions do not affect the analysis of environmental impacts in the DEIR or require any additional changes in the DEIR.

Chapter 9 Additions and Corrections has been updated to include the following revisions:

Page 4.19-1:

The northern portion of the Project Site along East Walnut Drive South is currently adjacent to a WVWD 12-inch domestic water line that runs underneath East Walnut Drive South. The middle portions and southern portions of the site along Colima Road are currently adjacent to a WVWD 12-inch domestic water line and ~~a 12-inch recycled water line~~ <u>an existing 12-inch PVC recycled water line along Colima Road and 6-inch PVC recycled water line along East Walnut Drive South terminating at the northwest corner of the project’s property</u>. There are seven (7) fire hydrants located within the public right-of-way along portions of the Project Site on Colima Road, East Walnut Drive South, and Iluso Avenue. Each fire hydrant is approximately 40-50 feet away from the Project boundary as they are located on the opposite side of the street as the Project Site. These fire hydrants connect to WVWD water lines.

Response AG 2-4

Comment noted. This comment requests revisions to the DEIR clarifying the description of the WVWD and the source for water during Project construction and correcting typographic errors in Table 4.19-4. The requested revisions do not affect the analysis or conclusions of environmental impacts in the DEIR or require any additional changes in the DEIR.

Chapter 9 Additions and Corrections has been updated to include the following revisions:

Page 4.19-1:

Existing Conditions

Water Supply

The Project Site is located within the Walnut Valley Water District (WVWD) boundary. <u>WVWD is a Special Water District and is a sub-agency of Three Valleys Municipal</u>

Water District (TVMWD) ~~WVWD is a subagency of Three Valleys Municipal Water District (TVMWD), and~~ WVWD maintains ~~510~~ 426 miles of distribution mains, ~~31~~ 32 reservoirs and ~~17~~ 19 pump stations throughout southern California ~~regulated by the California Public Utilities Commission (CPUC)~~. Located in Los Angeles County, the WVWD serves the City of Diamond Bar, portions of the cities of Walnut, Industry, West Covina, and Pomona, as well as the part of easterly unincorporated Rowland Heights in Los Angeles County. WVWD water supply sources include treated and untreated, imported surface water purchased from Metropolitan Water District of Southern California through TVMWD and recycled water supplies (from recycled water purchased from LACSD and from groundwater pumped from the Puente Basin and Spadra Basin).

Page 4.19-7:

TABLE 4.19-4
WALNUT VALLEY WATER DISTRICT MULTIPLE DRY YEAR SUPPLY AND DEMAND COMPARISON

Water Sources	2025	2030	2035	2040	2045
First Year					
Supply Totals	22,300	22,574	22,853	23,113	23,377
Demand Totals	22,300	22,574	22,853	23,113	23,377
Difference	0	0	0	0	0
Second Year					
Supply Totals	22,965	23,247	23,534	23,801	24,073
Demand Totals	22,965	23,247	23,534	23,801	24,073
Difference	0	0	0	0	0
Third Year					
Supply Totals	23,580	23,869	24,164	24,439	24,718
Demand Totals	23,580	23,869	24,164	24,439	24,718
Difference	0	0	0	0	0
Fourth Year					
Supply Totals	21,118	21,378	~~21,841~~ 21,641	21,888	22,138
Demand Totals	21,118	21,378	~~21,841~~ 21,641	21,888	22,138
Difference	0	0	0	0	0
Fifth Year					
Supply Totals	17,896	18,116	18,340	18,548	18,760
Demand Totals	17,896	18,116	18,340	18,548	18,760
Difference	0	0	0	0	0

SOURCE: Walnut Valley Water District, 2021

Page 4.19-14

Water

Construction

During construction, water will be required intermittently for dust control, equipment cleaning, soil grading and preparation during the early phases of the Project. The latter phases of construction normally require less water usage. Construction water demands are typically less than the long-term operational water demand of a project and are temporary. ~~There are seven fire hydrants located within the public Right-of-Way along portions of the Project Site on Colima Road, Walnut Drive and Iluso Avenue. Each fire hydrant is approximately 40-50 feet away from the Project Site boundary. These fire hydrants connect to WVWD water lines. Construction demands will be met using existing water infrastructure that surrounds the Project Site (e.g., existing fire hydrants).~~ Due to the proximity to recycled mainlines, temporary service(s) will provide construction water to the Project Site.

Response AG 2-5

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

CITY OF
DIAMOND BAR
CALIFORNIA

December 22, 2023 **SENT VIA EMAIL to mpavlovic@planning.lacounty.gov**

Marie Pavlovic
LA County Planning
Subdivisions Section
320 West Temple Street
Los Angeles, CA 90012

Subject: THE CITY OF DIAMOND BAR'S COMMENTS ON THE DRAFT ENVIROMENTAL IMPACT REPORT (DEIR) FOR THE ROYAL VISTA RESIDENTIAL AND PARKS PROJECT

Dear Ms. Pavlovic:

Thank you for the opportunity to review the DEIR for the proposed Royal Vista Residential and Parks Project ("Project"). The City of Diamond Bar ("City") hereby submits the following comments, and respectfully requests that they be addressed in the Final EIR (FEIR):

AG 3-1

1. **Blight.** As previously stated in the City's Notice of Preparation (NOP) comments, the Project will almost certainly lead to the closure of those portions of the golf course currently not planned for development. If there are no plans to repurpose or manage the approximately 80 acres of remaining golf course land that lies outside of the Project boundaries, and the land remains unutilized for an indefinite period of time, there is a potential risk for blight.

   The DEIR does not adequately address the potential blight impacts resulting from the inevitable discontinuation of golf course operations beyond the Project boundaries, concluding only that future uses within the corresponding areas to be "speculative." The City finds this conclusion to be insufficient in that it does not consider the potential for these areas to fall into disrepair and negatively impact the quality of life for the surrounding residents.

The City requests that the FEIR directly address potential blight impacts, and identify mitigation measures to minimize the effects of neglect and/or misuse within the portions of the golf course property outside of the Project boundaries while such land remains fallow.

2. **Land Use and Public Safety.** As previously stated in the City's NOP comments, the DEIR should analyze the impact of converting portions of the Project site from privately-managed, secured open space to public parks and trails. Specifically, the DEIR should consider how changes in land use, including the addition of publicly accessible trails and playgrounds, may affect public safety and the quality of life for the neighboring residences.

Many of the surrounding homes—including those in Diamond Bar—were developed or adapted to coexist with the golf course, which was established nearly 60 years ago. For example, there are homes that do not have solid, six-foot tall rear yard walls or fences that would typically be provided for homes located at the perimeters of subdivisions or when abutting public parks. The proposed land use changes may thus result in those existing homes becoming more vulnerable to property crimes, and generate more calls for service to the L.A. County Sheriff's Department.

AG 3-2

The DEIR does not address how unrestricted public access to the Project's parks and trails will increase the potential exposure of such homes to trespassing and other property crimes. Perhaps most notably, the DEIR does not acknowledge or address how the Diamond Bar residents adjacent to the proposed open space in Planning Area 4 are potentially impacted by the minimal barrier between their rear property lines and the adjacent linear park. At a minimum, the DEIR should have recognized this potential land use impact, and identify project design features and/or mitigation measures (e.g., new six-foot block walls or wrought iron fencing along those common property lines) so that these properties do not become more vulnerable to property crime than they currently are.

3. **Transportation.** The City concurs with the DEIR conclusion that VMT impacts are significant and unavoidable, and generally concurs that the proposed project design features and mitigation measures adequately reduce VMT to the greatest extent feasible. The City also acknowledges that the proposed replacement of the existing golf cart/pedestrian crossing with a four-way signalized intersection at Colima/Tierra Luna to facilitate crossings will greatly enhance pedestrian and vehicular safety in the immediate area.

AG 3-3

The City requests that the following analyses and mitigation measures be incorporated into the FEIR:

a. Notify the City of any changes to the access plan that deviates from what is depicted on the Conceptual Site Plan (Figures ES-2 and 2-3), as the City is concerned about increased traffic on residential streets in Diamond Bar.

AG 3-4

b. Provide direct access from Planning Area 3 (PA-3) via a direct extension of Tierra Luna, as this will provide access to the new signal at Tierra Luna/Colima and minimize any increase in traffic volume on Calbourne Drive. AG 3-5

c. The Conceptual Site Plan shows a primary connection for Planning Area 1 (PA-1) to be a new fourth leg at Walnut Leave Drive/Colima Road, which is unsignalized. The City recommends that the primary connection for PA-1 be relocated to a fourth leg opposite the signalized intersection at Colima Road/Lake Canyon Drive. Although neither intersection is in Diamond Bar, relocating this access point would improve public safety for both Rowland Heights and Diamond Bar residents. AG 3-6

d. It is not clear how Project Design Feature (PDF) T-3 would be accomplished without widening, as restriping the exclusive right-turn lane to a through/right lane would necessitate a third through lane under the SR-60 bridge. Please provide a diagram to show how this restriping would be accomplished. AG 3-7

4. **Cumulative Impacts.** For the purposes of evaluating cumulative effects for the Project, the County has opted to use the list approach. This list includes 12 projects that are proposed, recently approved, under construction, and/or reasonably foreseeable, which collectively could result in cumulative environmental impacts (DEIR, Section 3.1.5). The community group, Royal Vista Open Space, posted on its website (https://saveroyalvista.com/) a purported preliminary concept plan depicting 419 residential units on several of the golf course parcels outside of the Project boundaries, and purports "Sunjoint" to be the developer. According to the Los Angeles County Assessor's Office, the sale of four of those parcels (APNs 8762-022-005, 8762-022-008, 8764-002-004 and 8764-002-017) to Sunjoint was recorded on March 31, 2023. It thus appears that the submittal of a development application involving these parcels in the near future is "reasonably foreseeable."

   Based on the foregoing, the City believes that it is reasonable and appropriate to include the potential development of the golf course parcels outside of the Project boundaries to the list of cumulative projects (DEIR, Table 3-1), and that the cumulative impact analyses be revised to include this additional contemplated development. AG 3-8

Thank you again for the opportunity to comment on the Royal Vista Residential and Parks Project. We look forward to reviewing the FEIR when it becomes available.

Sincerely,

Greg Gubman
Community Development Director

cc: City Council
Dan Fox, City Manager

AG 3-9

Response to Comment Letter AG 3

City of Diamond Bar California

Response AG 3-1

At the time of NOP issuance, as well as at the time of the public release of the DEIR, the Royal Vista Golf Course was in use as a golf course. Following NOP issuance, and public release of the DEIR, the privately owned golf course closed[1]; however, as with all privately owned property, it remains the responsibility of the property owner to maintain the property. The adjacent properties are not owned by the Royal Vista Project applicant (or subdivider) and the subdivider has no control over what may or may not happen on this adjacent property. The owners of this adjacent property will be required to maintain their property just like any other private landowner within unincorporated LA County and will be subject to enforcement actions if they fail to comply with LA County Code requirements or otherwise engage in unlawful neglect or misuse of the property.

Response AG 3-2

As described in Section 2.0, Project Description, of the DEIR, the Project does not include any public parks, but does include publicly accessible open space in Planning Areas 4 and 6 totaling approximately 7 acres, which will remain in their current improved/developed state with the exception of planting additional trees and the incorporation of exercise stations, picnic tables and seating as shown in Figure 2-4 of the DEIR. The publicly accessible open space in Planning Areas 1, 2, 3, 4, 5 and 6 totals over 28 acres including a publicly accessible trail system over 2 miles in length which meanders throughout the proposed Project. The commenter's reference to public parks is presumably referring to an earlier version of the Project, which did include proposed public parks. However, the proposed public parks were removed as part of a design change that was made prior to public release of the DEIR in response to concerns from neighboring homeowners and direction from the Los Angeles County Department of Parks and Recreation.

As concluded in the DEIR, Section 4-15.5, impacts to sheriff protection services during Project operation would be less than significant. As discussed in Section 4.15, Public Services, Impact PS-2, the Los Angeles County Sheriff's Department (LASD) has indicated that any increase in service calls as a result of the population increase associated with the Project would be within LASD's goal of response times. In the City of Hayward v. Board of Trustee of California State University (2015) 242 Cal. App. 4th 833, the court found that Section 35 of Article XIII of the California Constitution requires local agencies to provide public safety services, including fire protection and emergency medical services, and it is reasonable to conclude that the County will comply with that provision to ensure that public safety services are provided. Furthermore, the Project would include general principles of Crime Prevention Thru Environmental Design (CPTED) as recommended by the Walnut-Diamond Bar Sheriff Station, such as lighting and landscaping. The CPTED reduces opportunities for criminal activities by employing physical design features that discourage anti-social behavior, while encouraging legitimate use of the Site. The incorporation of CPTED design principles is an element of the Project Description, but

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[1] https://www.koreadailyus.com/royal-vista-favored-golf-course-among-korean-golfers-in-socal-closes-on-feb-29/, accessed 5/1/2024.

would also be secured through Project conditions of approval. In addition, the Project Homeowners Association will maintain Project open space areas, landscaping, and lighting throughout the Project Site to minimize overgrown vegetation and prevent dark hiding places, void of light. There are no proposed land use changes to Planning Area 4 adjacent to the City of Diamond Bar. The land use will remain as OS - Open Space. The same is true for the land adjacent to the City of Diamond Bar, which is designed as a landscaped open space buffer, in Planning Area 5. It will also remain as OS – Open Space. Replacement of existing off-site private fences is not required, and adjacent residents may opt to make modifications to their properties according to their individual preferences.

Response AG 3-3

Comment noted.

Response AG 3-4

The commenter requests a new mitigation measure be added to the FEIR; however, the mitigation measure is not necessary or appropriate because it does not address any significant environmental impact created by the Project. The decision makers may opt to include courtesy notification to the commenter as a condition of approval.

Response AG 3-5

An extension of Tierra Luna to Planning Ares 3 is not feasible due to the change in elevation between the existing end of Tierra Luna and Planning Area 3 directly below. In addition, the requested street extension would not avoid or substantially lessen a significant environmental impact under CEQA. Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. Evaluation of traffic volumes on a subject roadway, including volumes considered “cut-through” traffic, is an evaluation of vehicular capacity, which by statute cannot be considered an environmental impact under CEQA. Section 4.17 of the DEIR therefore appropriately evaluates Vehicle Miles Traveled (VMT) in lieu of vehicular capacity and congestion in order to determine the significance of transportation impacts. The specific thresholds of significance used to evaluate the potential transportation impacts of the Project are provided on page 4.17-13 of the DEIR.

Furthermore, the proposed street extension is not warranted based on the “non-CEQA” guidelines of the Los Angeles County Public Works (“Transportation Impact Analysis Guidelines” (“TIA Guidelines”). Pursuant to the TIA Guidelines, a “non-CEQA” Local Residential Street Cut-Through Analysis was conducted for the proposed Project, beginning on page 96 of the “Transportation Impact Analysis” (TIA) included in Appendix M of the DEIR. The Guidelines state: “The objective of this analysis is to determine potential increases in average daily traffic (ADT) volumes on designated Local Streets near a project that can be classified as cut-through trips generated by the project, and that can adversely affect the character and function of those streets.” In the transportation engineering profession, cut-through trips refer to trips which travel along a local residential street and which do not have an origin or destination in the neighborhood in which the local street is located. The Guidelines indicate that cut-through trips may result from development projects that add vehicle trips to congested arterial streets segments, which then results in trip diversion from the arterial roadway to a parallel and reasonably adjacent route utilizing local streets.

The assumed assignment of Project-related trips in the TIA for Planning Areas 1, 2 and 3 are shown on TIA Figures 2-4, 2-5, and 2-6, respectively. As shown in TIA Figures 2-4 and 2-5, Project related trips destined to and from the east via Colima Road/Golden Springs Drive are reasonably assumed to access Colima Road via the Project's on-site roadway network opposite Walnut Leaf Drive, and not utilize Calbourne Drive for travel. It is noted in TIA Figures 2-4 and 2-5 that only 15% of vehicles related to Planning Area 1 are forecast to travel to the east via Golden Springs Road. TIA Figure 2-6 shows no forecast Project-related trips traveling to and from the east via Colima Road/Golden Springs Drive because this portion of the Project Site does not have direct access to Colima Road as is the case with Planning Areas 1 and 2. Instead, TIA Figure 2-6 reasonably assumes that vehicles destined to and from the east would utilize SR-60 and Fairway Drive north of SR-60 to reach these destinations. Table 2-2 in the TIA provides the vehicular trip generation forecast for the Project. Table 2-2 shows, for example, that Planning Area 3 is forecast to generate 22 outbound vehicle trips in the weekday morning (AM) peak hour and 23 inbound vehicle trips in the weekday afternoon (PM) peak hour. Assuming the commenter is correct and all forecast vehicle trips destined to and from the east (15%) generated by Planning Area 3 were to utilize Calbourne Drive for travel instead of SR-60 and Fairview Drive, it would result in approximately 3 (23 vehicle trip x .15= 3) additional outbound trips in the AM peak hour and 3 additional trips during the PM peak hour, or approximately one additional vehicle on Calbourne Drive every 20 minutes during the highest hours of travel during the day. This nominal increase in vehicle traffic would not warrant any changes to the Project or to Calbourne Drive based on the LACPW Guidelines. Further, as previously noted, changes in traffic volume or congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development projects under CEQA.

Response AG 3-6

The commenter suggests relocating the Project driveway connection to Planning Area 1 from the intersection of Walnut Leaf Drive/Colima Road to the intersection of Lake Canyon Drive/Colima Road. The suggestion is infeasible because the Project Site boundary does not extend a sufficient distance to the west along the north side of Colima Road so as permit the construction of a Project access roadway directly across from Lake Canyon Drive. A new northerly leg constructed within the Project Site would be located east of the existing intersection, resulting in an offset alignment to Lake Canyon Drive (i.e., an approximate 40 to 50-foot separation between the centerline of Lake Canyon Drive and the centerline of the new roadway into the Project Site), thereby creating undesirable operational and safety conditions for motorists, bicyclists and pedestrians traveling through the modified intersection. In addition, the creation of this offset intersection is not necessary to avoid or substantially lessen a significant environmental impact under CEQA, given that access to Planning Area 1 is facilitated via the Project's proposed access to Colima Road opposite Walnut Leaf Drive. The DEIR concluded that the Project would not substantially increase hazards due to the establishment of new driveways or queuing on surrounding intersections.

Further, Project Design Feature (PDF) T-6, which is described on page 4.17-27 of the DEIR, consists of restriping Walnut Leaf Drive in order to provide one southbound departure lane as well as one shared left-through lane and one right-turn lane on the northbound approach. The LOS at the subject intersection with implementation of PDF T-6 is presented in Table 8-2 on page 104 of the TIA. As shown in Table 8-2, the proposed restriping is expected to result in LOS D or better on the Walnut Leaf Drive approach. PDF T-6 is voluntarily included as a component of the Project to further facilitate traffic flow.

Response AG 3-7

PDF T-3 is described on pages 4.17-23 and 4.17-24 of the DEIR. It is not anticipated that any roadway widening would be required in order to accommodate the proposed lane configuration. A conceptual plan of the proposed PDF T-3 improvement at the SR-60 Freeway/Fairway Drive interchange is provided as Appendix Figure F-1 of the TIA. See DEIR Appendix M for the TIA. A striped 12-foot channelization island is installed immediately north of the exclusive northbound right-turn lane which currently prohibits through movements from the curb lane. The current striping would be removed in order to accommodate the restriping proposed by PDF T-3.

Response AG 3-8

No general plan amendment, zone change, subdivision or other discretionary development application has been filed with the LA County Planning for a project on the aforementioned properties (Sunjoint Property), nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. See Response FORM 1-2. The sale of the Sunjoint Property and the website posting by the community group Save Royal Vista Open Space (not the Sunjoint Property owner or developer) do not establish that a project on that site is “reasonably foreseeable.” In addition, according to the commenter, the sale of the Sunjoint Property occurred on March 31, 2023, which is after the release of the Notice of Preparation (NOP) for the Project. CEQA Guidelines Section 15125(a) requires EIRs to contain a description of the physical environmental conditions in the vicinity of the project as they exist at the time the NOP is published, or if no NOP is published, at the time environmental analysis is commenced. The NOP release date for the Royal Vista Residential Project was October 13, 2022, which establishes the cut-off date for consideration of cumulative projects. The comment does not provide any evidence that a project on the Sunjoint Property was proposed, officially announced or otherwise identified prior to the release of the NOP for the Project.

Response AG 3-9

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

STATE OF CALIFORNIA—CALIFORNIA STATE TRANSPORTATION AGENCY GAVIN NEWSOM, Governor

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GOVERNOR'S OFFICE OF PLANNING AND RESEARCH
Jan 03 2024
STATE OF CALIFORNIA

January 3, 2024

Marie Pavlovic
LA County Planning
Subdivisions Section
320 W. Temple Street, Room #160
Los Angeles, CA 90012

RE: Royal Vista Residential Project
SCH # 2022100204
Vic. LA-60/PM R21.477
GTS # LA-2022-04356-DEIR

Dear Marie Pavlovic:

AG 4-1

Thank you for including the California Department of Transportation (Caltrans) in the environmental review process for the above-referenced environmental document. The Project would redevelop six parcels of the existing golf course into four residential planning areas (1, 2, 3, 5) and two open space planning areas (4 and 6), for a total of 360 dwelling units and includes a private trail system that will be open to the public. Planning Areas 1, 2, and 5 would include 200 detached single-family residential (SFR) units on individual lots; 88 duplex or triplex units on 34 lots; and 10 open space lots. Planning Area 3 would include Seventy-two (72) townhouse units and 10 additional units scattered among the triplex units (equaling 82 [22.7%] of the total units), which will be dedicated for sale to moderate- or middle-income households, consistent with the County's inclusionary affordable housing ordinance.

Caltrans is aware of the challenges that the region faces in identifying viable solutions to alleviating congestion on State and Local facilities. With limited room to expand vehicular capacity, all future developments should incorporate multi-modal and complete street transportation elements that will actively promote alternatives to car use and better manage existing parking assets. Prioritizing and allocating space to efficient modes of travel such as bicycling and public transit can allow streets to transport more people in a fixed amount of right-of-way.

Caltrans supports the implementation of complete streets and pedestrian safety measures such as road diets and other traffic calming measures. Please note the Federal Highway Administration (FHWA) recognizes the road diet treatment as a proven safety countermeasure, and the cost of a road diet can be significantly reduced if implemented in tandem with routine street resurfacing. Overall, the environmental report should ensure all modes are served well by planning and development activities. This includes reducing single occupancy vehicle trips, ensuring safety, reducing vehicle miles traveled, supporting accessibility, and reducing greenhouse gas emissions.

AG 4-2

SCAG's 2020-2045 RTP/SCS, the County of Los Angeles General Plan, and the Rowland Heights Community General Plan

The project would be consistent with the 2020-2045 RTP/SCS goals to improve mobility, accessibility, reliability, and travel safety for people and goods; reduce GHG emissions and improve air quality; support healthy and equitable communities; and encourage the development of diverse housing types in areas that are supported by multiple transportation options.

For the County of Los Angeles General Plan, the Project would be consistent with the Mobility Element and would ensure that safety, street design, and circulation are maintained for the duration of the Project. The Project's trail system would provide a unique opportunity to accommodate pedestrians and bicycles in a safe manner by avoiding walking/riding on public streets. The recreational trails would also provide connectivity to the existing sidewalk and bike lane systems adjacent to the Project Site. Streets within the Project Site will be private and have been designed consistent with County roadway design criteria for private drives, which would create a low-speed environment with reduced trips by discouraging cut-through traffic.

The Project would be consistent with the Rowland Heights Community Plan. The Project would construct two new driveways along Colima Road and one along East Walnut Drive South. Streets within the Project Site will be private, which will create a low-speed environment with reduced trips by discouraging cut-through traffic. This will result in reduced motor vehicle accidents and improved function of existing roadways.

AG 4-3

Transit

The existing transit service is within approximately 0.5-miles of the project site. Public bus stops located at the northwest and southeast corners of the Fairway Drive-Brea Canyon Cutoff Road/Colima Road intersection serve Foothill Transit Lines 482 and 493. It is also noted that the Heights Hopper Shuttle, operated by Los Angeles County Public Works, provides service in the Hacienda Heights and Rowland Heights communities. The nearest stops along the Heights Hopper shuttle route are located on Banida Avenue north of Colima Road, which is an approximately one-mile walk from the proposed project site.

AG 4-4

Pedestrian

Pedestrian access throughout the Project Site would be accommodated by ADA-compliant sidewalks as well as a proposed recreational multi-use trail network. Public sidewalks are provided along most roadways within the vicinity of the project site, including along Fairway Drive, Brea Canyon Cutoff Road, Lake Canyon Drive, Walnut Leaf Drive, Tierra Luna, and Colima Road. It is noted that the proposed project site frontage along East Walnut Drive South does not currently provide public sidewalks separated from the roadway by curb and gutter, although public sidewalks are provided elsewhere along the roadway. The proposed project will construct new sidewalk, curb, and gutter to comply with Los Angeles County Public Works standards.

Project Supporting Design Measures
The following supporting measures are expected to enhance the ability to achieve the qualified VMT reductions as project design features:

T-1 Increase Residential Density
This measure accounts for the VMT reduction achieved by a project that is designed with a higher density of dwelling units (DU) compared to the average residential density in the country. When reductions are calculated from a baseline derived from a travel demand model, the residential density of the relevant TAZ is used for the comparison instead. Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing residential density results in shorter and fewer trips by single-occupancy vehicles and thus a reduction in VMT.

T-32 Locate Project near Bike Path/Bike Lane
The proposed project site is located within a 0.5-mile distance of the existing bicycle lanes along Fairway Drive and Golden Springs Road. Future bicycle lanes are planned for Colima Road and Brea Canyon Cutoff Road in the immediate vicinity of the project site, which would provide connections to the existing bicycle lanes west and south of the site. Upon installation of the planned bicycle lanes, the project site would be served by regional-serving bicycle facilities that connect to work/retail destinations and facilitate bicycle commuting.

AG 4-5

The proposed project is planned to provide recreational multi-use trails within the project site which are expected to accommodate pedestrians, bicycles, and other non-motorized modes of travel. The multi-use trail system will connect to the internal project roadways as well as public sidewalks and roadways at various places, including along Colima Road. Therefore, the proposed project site is planned to provide convenient connections to the future bicycle lanes for residents of the project site as well as the general public. It is expected that providing connections throughout the project site to regional bicycle facilities will result in greater substitution of bicycle trips for vehicle trips.

Telecommuting
The proposed project is designed to accommodate the teleworking needs of future residents through features, technology, finishes, and filters that help contribute to improved working conditions, increased convenience, healthier indoor air quality, and energy efficiency. The proposed residential units are planned and sized appropriately to provide dedicated home office spaces (e.g., through the inclusion of home office rooms, home office lofts, and home office nooks), and the proposed development is planned to provide high-speed internet connections to each residential unit as well as high speed

internet and wi-fi network infrastructure within each unit. The residential units will also feature additional data connections, power outlets, and USB charging outlets which will facilitate the use of teleworking equipment, along with smart home technology such as smart thermostats, locks, and video doorbells. Therefore, the proposed project is well designed to accommodate the space, technology, indoor environmental conditions, and energy demands of telework.

VMT

The project proposes to incorporate the above supporting design measures to reduce VMT. After the application of the VMT reductions due to project design features, the proposed project is expected to result in a significant residential VMT impact. The summary of the project-level VMT impact analysis is presented in Table 4-1 of the Appendix M Traffic Impact Assessment.

CEQA Transportation Mitigation Measures

1. T-9 Implement Subsidized or Discounted Transit Program
2. Electric Bicycles

The mitigation measures (i.e., provision of transit subsidies and electric bicycles) are expected to result in a quantifiable VMT reduction of 0.45%. Application of the 0.45% VMT reduction would therefore result in a project VMT of 16.2 residential VMT per capita for Planning Areas 1, 2, and 3 (i.e., 16.3 VMT/Capita * [1.00 – 0.0045] = 16.2 VMT/Capita), and a project VMT of 21.0 residential VMT per capita for Planning Area 5 (i.e., 21.1 VMT/Capita * [1.00 – 0.0045] = 21.0 VMT/Capita). The VMT reductions due to mitigation measures and the resulting project level VMT per capita are summarized in *Table 4-1*. The proposed project's VMT would continue to exceed the threshold of 10.0 residential VMT per capita after mitigation, therefore the project-level VMT impacts will remain significant and unavoidable. AG 4-6

For additional TDM options, please refer to the Federal Highway Administration's *Integrating Demand Management into the Transportation Planning Process: A Desk Reference* (Chapter 8). This reference is available online at:

http://ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf

Caltrans Safety Analysis

Referenced to Caltrans' November 21, 2022 letter, Caltrans requested queuing analysis with actual signal timing at the northbound/southbound off-ramps on SR-57 to Pathfinder Rd. and Brea Canyon Road/S Diamond Bar Blvd. and westbound/eastbound off-ramps on SR-60 to Fairway Dr. and to S Lemon Ave. Nevertheless, only SR-60 to Fairway Dr. off-ramps queuing analysis was prepared. Currently, with the potential project traffic from Lemon Avenue to WB SR-60 on-ramp, there are some safety concerns at this location as potential safety improvement may be needed. We would like the opportunity to discuss any possible improvement with the Lead Agency. AG 4-7

The addition of project traffic at the Fairway Drive/SR-60 Freeway WB Ramps will result in additional vehicle queuing for the northbound left-turn movement. While the queue currently exceeds the available turn-lane storage capacity, the project is forecast to result in additional queuing under the existing with project and future cumulative with project conditions which is expected to continue to spill back into the adjacent through travel lane. The current dual left-turn lanes provide a total of 400 feet of queue storage space, however under future cumulative with project conditions, the total queue is expected to require up to 616 feet of queue storage space.

In order to adequately accommodate the forecast queues without blocking other traffic movements at the intersection, it is proposed that the northbound approach along Fairway Drive be restriped to provide additional left-turn queue storage. The exclusive northbound right-turn lane at the SR-60 Freeway EB on-ramp would be restriped to accommodate a shared through/right-turn lane, and the other northbound lanes would be restriped to accommodate the full extent of the forecast northbound left-turn queue. The proposed improvement would be reviewed in detail and approved in the encroachment permit process.

Please be reminded that any work performed within the State Right-of-way will require an Encroachment Permit from Caltrans. Any modifications to State facilities must meet all mandatory design standards and specifications.

Others
Any transportation of heavy construction equipment and/or materials that requires the use of oversized transport vehicles on State highways will need a Caltrans transportation permit. We recommend that large-size truck trips be limited to off-peak commute periods. Any debris on the construction truck must be covered by a tarpaulin cover. AG 4-8

If you have any questions, please feel free to contact Mr. Alan Lin the project coordinator at (213) 269-1124 and refer to GTS # LA-2022-04356-DEIR.

Sincerely,

Frances Duong

FRANCES DUONG
Acting LDR/CEQA Branch Chief

AG 4-9

email: State Clearinghouse

Response to Comment Letter AG 4

California Department of Transportation

Response AG 4-1

Comment noted.

Response AG 4-2

Comment noted. The comment expresses Caltrans' agreement with the consistency analysis as set forth in the DEIR regarding mobility.

Response AG 4-3

Comment noted. The comment expresses Caltrans' agreement with the existing transit conditions described in the Environmental Setting Chapter of the DEIR.

Response AG 4-4

Comment noted.

Response AG 4-5

Comment noted. The comment expresses Caltrans' agreement that PDF T-1, PDF T-2, and Telecommuting are strategies to reduce VMT.

Response AG 4-6

Comment noted. The comment expresses Caltrans' agreement that even with the implementation of Transportation Mitigation Measures, the Project will result in a significant and unavoidable VMT impact. The comment references the Federal Highway Administration's Integrating Demand Management into the Transportation Planning Process: A Desk Reference (Chapter 8) as potential source for additional TDM options, but does not identify any specific TDM options recommended for the Project or identify any such recommendations as feasible mitigation for the Project. As discussed in Section 4.17.5 of the DEIR, no further mitigation is feasible to reduce VMT impacts, and the comment does not provide any evidence to the contrary.

Response AG 4-7

A supplemental analysis was prepared in January 2023 in response to the request for queuing analyses at additional off-ramp locations along the SR-60 and SR-57 Freeways included in Caltrans' letter dated November 21, 2022. The supplemental analysis, "Royal Vista Residential and Parks Project – Supplemental Caltrans Off-Ramp Analysis," prepared by Linscott, Law, and Greenspan, Engineers on January 31, 2023, was inadvertently omitted from the DEIR, however, it is provided in response to this comment, included as Appendix R to the FEIR and incorporated into Chapter 11 Corrections, Clarifications, and Additions. The supplemental analysis did not identify any safety impacts resulting from off-ramp queuing. Since no new safety impacts are anticipated to occur on the State Highway System due to the addition of project-generated traffic, no mitigation measures are required or proposed.

Response AG 4-8

Any necessary permits will be obtained, and Mitigation Measure TR-3 will address the scheduling of large-size truck trips to ensure safety, and site access. Mitigation Measure TR-3, presented on page 4.17-30 and 4.17-31 of the DEIR, requires the proposed Project to implement a Construction Staging and Traffic Management Plan (CSTMP). As stated in the DEIR, the CSTMP includes requirements, among other things, to:

“limit any potential roadway lane closure/s to off-peak travel periods, to the extent feasible;”

“provide traffic control for any potential roadway lane closure, detour, or disruption to traffic circulation;”

“schedule delivery of construction materials and hauling/transport of oversize loads to nonpeak travel periods, to the extent possible;”

The CSTMP ensures that temporary construction activities would be appropriately coordinated so as not to result in conflicts with existing traffic.

Response AG 4-9

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Watershed
Conservation
Authority

January 5, 2023

Marie Pavlovic
Los Angeles County Dept of Regional Planning
Subdivisions Section
320 W. Temple Street, Room #160
Los Angeles, CA 90012
mpavlovic@planning.lacounty.gov

RE: Comments on Draft EIR for the Royal Vista Residential Project No. PRJ2021-002011-(1)

Dear Ms. Pavlovic,

I am providing comments in response to the Draft Environmental Impact Report (DEIR) for the Royal Vista Residential Development on behalf of Watershed Conservation Authority (WCA). WCA is a joint powers authority of the Rivers and Mountains Conservancy and the Los Angeles County Flood Control District, whose mission is to expand the open space and recreational opportunities in the San Gabriel and Lower Los Angeles Rivers Watershed area consistent with the goals of flood protection, water supply, and groundwater recharge. WCA offers the comments below to assist decisionmakers in undertaking an environmental review of the project and its potential impacts on local and regional environmental and hydrological resources. The comments are focused on the areas of sustainability planning, ecosystem services, and climate change.

AG 5-1

The 75-acre site is currently zoned as Light Agricultural and is designated as Open Space in the Rowland Heights Community Plan. If the proposed zoning changes and entitlements are approved, the Project would develop a total of 360 residential units, consisting of 200 detached single-family homes with a minimum net lot size of 5,000 sf, 88 attached residential units (58 duplex units, 30 triplex units) and 72 townhomes. All 72 townhomes and 10 triplex units would be set aside for sale to middle- and moderate-income households. The Project would include approximately 28 acres of publicly accessible open space areas.

The California Environmental Quality Act (CEQA) requires discussion and analysis of a range of alternatives that could feasibly attain the basic objectives of the Project while avoiding or lessening the effects of the Project. The Project Objectives are stated to be: Provision of new housing, Provision of a diverse variety of housing types, Create a Healthy Community with opportunities for recreation, Integrate Environmentally Responsible Practices (conserve natural resources), and Create Connectivity (community interaction via trail system connecting amenities and open space). Project Alternatives considered were Alternative Site, Maximum Density, No Project, Mixed Use, Existing Zoning, and 322 Residential Units. The Alternatives differ in the quantity and types of housing units provided, presence or absence of trail, open space, and commercial retail areas. All the considered Alternatives have in common that Single Family Detached homes make up the majority of the Project footprint. Despite the stated goal of "Integrate Environmentally Responsible Practices" (conserve natural resources), all Project Alternatives have in common the siting of Single Family Detached homes and roads over historical paths of surface water flow. It is surprising that even the Project Alternatives that offer trails and open space have sited open space amenities at some distance from known paths of surface water flow.

In light of our concerns regarding the respective environmental impacts of current Project Alternatives, it is recommended that a Fifth Project Alternative that accommodates higher density clustered housing on those portions of the site that are least suitable to provide hydrology and ecosystem services be considered. This Alternative addresses the need for providing housing while minimizing impact to regional natural resources in an era of climate change. The Fifth Project Alternative would fulfill all Project Objectives, and provide for long term community benefits that align with the Los Angeles County Sustainability Plan.

The Royal Vista location has potential to play a key role in increasing hydrological continuity between the San Jose Creek and Puente Hills. The Puente Hills continue to be home to Coastal California Gnatcatcher (CAGN) and globally important coastal sage scrub habitat. Historical USGS maps show two intermittent blue line streams that run through the site. Though it is likely that the development of most of the upper watershed of these streams has impacted the amount of water available to replenish these streams in most years, these natural drainage paths may be expected to play an important role as climate patterns shift towards storms which drop unprecedented amounts of precipitation.

The gentle slope/topography of the site is a critically important feature that allows the site to slow stormwater. Because of its gentle topography and key location between the Puente Hills and San Jose Creek, the site may be uniquely situated to host a variety of potential ecosystem benefits including buffering some climate change impacts. Protection of some of the open space value of the site and enhancing the ecosystem services provided by the site will be a long-term investment in placemaking and livable communities.

The Fifth Project Alternative proposed would allow for new housing while enhancing the open space on site to improve hydrological function and restore some of the ecosystem benefits that were once provided by the surrounding lands before development. The following are recommendations that can guide the development of a Fifth Project Alternative.

1. **Examine Project impacts in relation to the Los Angeles County Sustainability Plan goals and strategies. Any zoning change granted should align with the County Sustainability Plan.**

Though the Project Alternatives considered include a mix of housing types, they largely follows a model of development described in the Los Angeles County Sustainability Plan as unsustainable: "single-family homes strictly separated from commercial districts and a transportation system centered around cars." Such low-density sprawl creates "significant air pollution and greenhouse gas emissions as well as destroy our remaining natural and working lands…"

AG 5-2

All considered Project Alternatives have in common that Single Family Detached homes make up the majority of the Project footprint. The Alternatives are designed around car dependence, in opposition to Los Angeles County Sustainability Plan's Strategy 7A, "Transitioning to a zero-emission energy and transportation system."

It is possible that impacts of the Project may be multiplied by California's ADU ordinance. California's ADU ordinance and Senate Bill 9 (2022) were passed in order to address our state's housing and climate change crises. A development of single family homes may potentially accommodate four times the proposed number of buildings. Not only might this added density potentially increase resource use and traffic, but it may also increase impermeable surface area on the subject site, as well as the volume of run-on from surrounding neighborhoods. The ADU ordinance is an important tool to promote increased density in areas already developed with detached single family homes. However, application of the ordinance to a new Project built on some of the only remaining undeveloped and low slope land in the Puente Hills would be concerning, since it would negate the potential ecosystem benefits the Royal Vista site is uniquely suited to provide.

A more sustainable strategy is suggested by Strategy 3A in the Los Angeles County Sustainability Plan: "Increase housing density and limit urban sprawl." An example target offered is: "75% of new housing built within half mile of high frequency transit."

If a zoning change is granted by the County, any change should align with the County Sustainability Plan. On the Royal Vista site, higher density development may accommodate the same number of units on a smaller footprint, maximizing the areas of open space available to address climate change and open space equity goals, and maximizing ecological benefits that may be uniquely provided by the site due to its situation along historical paths of surface water. The Fifth Project Alternative proposed addresses strategies described in the County Sustainability Plan by providing clustered higher density housing on a smaller footprint.

2. **The Royal Vista site is uniquely situated to provide ecosystem benefits associated with its gentle topography and natural drainages. These benefits have regional consequences. Include consideration of Project Alternatives that optimize the environmental benefits that are uniquely provided by the site.**

The Los Angeles Basin is so densely developed that any undeveloped lands that are not steep slopes are extremely rare. The gentle slope of the site (4-7% as described in the Hydrology Report, p. 15) currently allows the site to slow storm water flow and serve a role in flood attenuation downstream. This function can be optimized by restoring vegetation cover, especially if deep rooted native plants are used.

AG 5-3

A cluster development Fifth Project Alternative will reduce Project impacts by concentrating higher density housing a compact footprint on the portion of the site least suitable to provide the above listed ecosystem services. At the same time, the larger available area for open space will optimize opportunities for storm water management through 'Nature Based Solutions,' i.e. designing "with", not "against" natural patterns of water flow on site. Multiple benefits of integrating open space with storm flow management include water quality improvements downstream, healthier habitat, and lowered maintenance costs over time. Restored tree canopy can contribute shade, and deep-rooted native vegetation cover builds healthy soils which retain moisture, and which can partially attenuate the extreme heat and flooding that are predicted consequences of climate change.

3. **The analysis should more carefully consider the consequences of climate change.**

AG 5-4

Climate change is widely expected to bring storms of greater intensity and increased extremes of heat and drought. Replacing the majority of current (vegetated) land cover on the site with the proposed homes, streets, and impermeable surfaces of the Project will reduce ecosystem services currently provided by the golf course while increasing the burden on public flood control infrastructure.

- During large storms, the golf course currently detains some storm water, reducing storm water flow on nearby properties. Replacement of this site's vegetated footprint with development would reduce the ecosystem functions currently provided by the current golf course, while increasing the burden on public flood control infrastructure.

- Although the Project's hydrology design for a 25-year storm event fulfills the County requirements, these design standards were developed during an era before the impacts of climate change were clear. The site hydrology should be considered in light of climate change, which is expected to increase the magnitude of storms. AG 5-5

- The natural path of storm flow drainage over the site is suggested by the historical flows shown in the Jurisdictional Delineation (page 37). Several ephemeral drainages existed prior to golf course development (Concrete Ditch 1 and Eastern Earthen V Ditch, Southern Concrete V Ditch). These hydrological patterns may persist even after the proposed grading and development of the site, because they are determined to some degree by geological features extending beyond the site boundary itself. Recognition of historical drainage patterns in a design may enable the Project to better weather storms of increased severity which are predicted with climate change. AG 5-6

- Despite the stated goal of "Integrate Environmentally Responsible Practices" (conserve natural resources), all current Project Alternatives site Single Family Detached homes and roads over historical paths of surface water flow. The Project Alternatives that offer trails and open space site open space amenities away from historical paths of surface water flow, causing the very topographical features that have potential to provide regional ecosystem services to become potential hazards, rather than environmental resources. AG 5-7

- A Fifth Project Alternative may site all housing away from historical drainage courses to reduce impact of flooding on homes during large storm events.

- A Fifth Project Alternative that clusters denser housing on a compact footprint could mitigate some of the negative impacts of development by restoring tree canopy and deep rooted native vegetation over the rest of the site to increase the site's current capacity to retain moisture and provide ecosystem services. AG 5-8

- Though retaining and revegetating open space is only one tool in our toolbox for detaining and slowing storm water, the large storms of unprecedented magnitude that are the predicted consequence of climate change warrant use of all tools available. AG 5-9

4. Include consideration of Project Alternatives that optimize the ecosystem services of vegetated landscapes.

Ecosystem benefits of vegetated landscapes include absorbing water, slowing of water during intense storms, temperature moderation, wildlife habitat, biodiversity, improved air and water quality, carbon sequestration, and improved quality of life. AG 5-10

- Ecosystem benefits of vegetated landscapes are multiplied when the largest possible area is preserved and when the vegetated landscape's perimeter to area ratio is minimized.

- Soil that is potentially compressible may have potential to slow stormwater and reduce peak flows. Yet, the Project is slated to remove and/or compact soils on site. This can be expected to further compromise the ability of the land to provide ecosystem services like flood attenuation. The Geotechnical Report states: "The majority of the site is underlain by potentially compressible, older artificial fill, which in turn is underlain by potentially compressible native soils. The depth of potentially compressible materials recommended for removal and recompaction during site remedial grading are estimated to be on the order of approximately 25 feet below existing grades in the low-lying areas of the site" (Geotechnical Report, p. 5) The compaction/removal of soil throughout the site will compromise the ability of the site to slow and detain water, even if they are planted with landscaping. In contrast to this approach, a Fifth Project Alternative which maximizes the area of vegetated landscape on the site, would instead build soil quality, if deep rooted native plants are used, and leaf drop maintained as mulch.

- The Royal Vista site is one of the only remaining vegetated areas of substantial size along some small tributaries to San Jose Creek. Sites with gentle topography are particularly valuable in providing ecosystem services, because gentle topography allows precipitation to soak into the land to replenish base flow, support the growth of riparian vegetation, filter water, and attenuate downstream flooding. Because it is one of the only undeveloped sites of significant size along those tributaries, any reduction of the footprint of vegetation on this site must be carefully considered. Development, which will increase impermeable surfaces, is likely to make the flows even more flashy: more intense during periods of storm, and drier during the dry season. Similarly, restoration of native vegetation cover over the site would ameliorate those extremes.

AG 5-11

5. Consider the site's unique potential to contribute to regional biodiversity, and to Goal 5 of the County Sustainability Plan: Thriving Ecosystems, Habitats, and Biodiversity.

The Biological Assessment considers the potential occurrence of special status species and habitats on the site, and concludes there are no species of conservation concern on the site. This is not a surprising conclusion given that the site has been maintained as a golf course for more than half a century. However, the presence or absence of species of conservation concern at present on the site is not an accurate reflection of the biological significance of the site in a larger context.

The Puente Hills contain significant acreage of California Gnatcatcher (CAGN) habitat. The habitat value of the Puente Hills (not limited to their role as CAGN habitat) is evidenced by designation of a LA County Significant Ecological Area over most undeveloped portions of the hills. Coastal sage scrub and its associated species are globally rare and threatened by habitat fragmentation as well as climate change.

For most of the special status animal species listed in the report, potential to occur on the project site is described as "Low" or "None, *due to absence of suitable habitat*." However, due to the continued loss of biodiversity, and loss of Coastal Sage Scrub throughout the County, restoration of native vegetation over portions of the site that are least suitable for development (for example, along historic drainage courses) has potential to provide significant habitat connectivity and ecological benefits.

Juglans californica, Southern California black walnut, is absent from the site, but present on nearby hills. Yet the site's north-facing aspect and proximity to sites populated with the species would suggest walnuts are

AG 5-12

likely to have grown there before historical lands uses. The documented historical drainages on site suggest a level of moisture consistent with habitat suitability. The site has been actively maintained as a golf course for over half a century, but numerous animal species listed as absent in the report might be expected to make use of habitat on site if the current mowing and artificial irrigation ceased.

In the larger context, the site is one of only a few relatively undeveloped site of substantial size that has potential to contribute to continuity of habitat and hydrology between San Jose Creek and the undeveloped portions of the Puente Hills. A Fifth Project Alternative which provides denser housing on a smaller footprint, may restore some of the historical habitat types that have been otherwise removed or fragmented on the north face of the Puente Hills. These are the same ecological resources recognized by the designation of a County SEA in the Puente Hills. A Fifth Project Alternative thus addresses the County Sustainability Plan's Goal 5, Thriving Ecosystems, Habitats, and Biodiversity.

Historical drainages documented by the Jurisdictional Delineation may be seen as an important asset to support a healthy native ecosystem (once restored). The line of delineation doesn't mean that only the area within that line should be protected. Healthy streams are fed by their upland watersheds. Protecting a vegetated buffer of substantial size around these water courses will optimize both water quality and habitat benefits, and celebrate our globally rare biodiversity resources. If habitat is restored along historical drainages, the site has potential to play an important role in addressing local and regional biodiversity loss.

The purpose of a Jurisdictional Delineation is to determine which regulatory bodies have jurisdiction over portions of a site. A Jurisdictional Delineation should not be seen as a direct indication of habitat potential. Lack of wetlands vegetation should not be used diagnostically in landscapes which have been maintained in an artificial state (green lawn) for more than half a century.

6. Consider the impact of the Project on quality of life of surrounding communities.

The Project Site is designated as Open Space in the Rowland Heights Community Plan. Allowable uses within the Open Space designation are recreation (with no more than 10 percent of a site covered by structures), hiking and equestrian trails, agriculture, scientific study, utility easements, and mineral extraction.

The LA County Park Needs Assessment Plus study show the site's Population Vulnerability score as "Moderate to High vulnerability for 2-3 dimensions." "In these areas, multi-faceted approaches to reducing the barriers and increasing the benefits of access to parks and open space are considered critical to positively influencing the health and well-being of residents." The site has a high percentile score for "Linguistic Isolation," moderate-high scores for Diesel PM pollution, and poor scores for OM 2.5 pollution.

AG
5-13

By maximizing the acreage of Open Space benefits provided, the Fifth Project Alternative proposed would protect some of the public health values and community values associated with Open Space. These values were originally protected by zoning in the Rowland Heights Community Plan in order to support the wellbeing of all community members.

7. Other Recommendations

The health of waterways is best managed by minimizing impermeable surfaces as well as maximizing native vegetation cover. The site is situated along tributaries that feed San Jose Creek. The following recommendations are made for all Project Alternatives considered:

AG
5-14

A) High density or cluster development which concentrates housing units on a smaller footprint is proposed as a Fifth Project Alternative. This Alternative addresses the need for housing while minimizing impact to ecosystem services that the site is uniquely situated to provide, due to its topography and hydrology. Los Angeles County Significant Ecological Area implementation guide recommends to "cluster structures and infrastructure within 25% or less of the lot area (including roads, utilities, landscaping, and fire management requirements) and maintain the remaining portions of the site in a natural undisturbed state." Though the project site is not within the boundary of a County SEA, the SEA guide provides a basic standard that was designed to protect local natural resources.

Hydrological analysis may be used to determine the most effective portion of the site for the creation of a seasonal water quality basin whose design not only maximizes storage volume of seasonal surface water but which fully integrates this function with provision of ecosystem and habitat services and public enjoyment. This may be sited on the widest portion of the property, along each historical water course. Since benefits are multiplied by maximizing the size and minimizing the perimeter to area ratio, Planning Areas 1 and 5 (the largest parcels along historical surface waters paths) are possible locations for such features.

Clustered development may be situated on the portions of the property that are least suited to provide hydrological and ecosystem services, such as the narrowest portions of the site close to roads. Situating most housing close to existing roads minimizes "edge" effect and maximizes ecosystem services provided by the rest of the site.

B) It is recommended that Project Alternatives incorporate standards for all site landscaping (including residential landscaping) to slow water's flow over the ground and support native biodiversity. Recommended standards include:

AG 5-15

- Promote the use of native trees and shrubs with deep roots.
- Note that mowed turf should not be considered part of a vegetative buffer, because it has fewer water retention and water quality benefits than native vegetation under which leaf drop has been retained as mulch. Maximizing the amount of area in which native plant leaf drop may be retained as groundcover will optimize ecosystem health and water quality benefits.
- A minimum quota of native trees (for example, 70% of all trees planted) will contribute to the continuity of regional wildlife habitat and preservation of local natural heritage.
- Prohibit the use of chemical fertilizers that would drain into waterways, and rodenticides that could result in direct or secondary poisoning to wildlife.
- Adhere to guidelines on protecting breeding and nesting birds.

Thank you for your consideration of practices that support the health of our regional watersheds. If you have any questions regarding these comments, please feel free to contact me at 626-815-1019 x103 or at jtsong@wca.ca.gov.

AG 5-16

Sincerely

DocuSigned by:

Jane Tsong

DF3367DFC34D4F0...

Jane Tsong
Project Manager

Response to Comment Letter AG 5

Watershed Conservation Authority

Response AG 5-1

The commenter does not provide any evidence that the DEIR did not analyze a reasonable range of alternatives, or that the proposed alternative would avoid or substantially lessen a significant environmental impact of the Proposed project.

As discussed in Section 5.0 Alternatives, CEQA does not prescribe fixed rules governing the type of alternatives to a project that should be analyzed in an EIR; the nature of alternatives varies depending on the context of the project being analyzed and left to the discretion of the lead agency to formulate a reasonable range of alternatives to be considered. As expressed by the California Supreme Court: “CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its facts, which in turn must be reviewed in light of the statutory purpose.” (Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564).

Section 15126.6(a) of the CEQA Guidelines provides that:

> [a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

Under these principles, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and “to foster meaningful public participation and informed decision making” (State CEQA Guidelines Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or substantially reduce them; alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of the project objectives (State CEQA Guidelines Section 15126.6[b]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project. Rather, the discussion of alternatives must include sufficient information about each alternative to allow “meaningful evaluation, analysis, and comparison with the proposed project” (State CEQA Guidelines Section 15126.6[d]).

The range of alternatives required in an EIR is therefore governed by a “rule of reason” that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice (CEQA Guidelines Section 15126.6 [f]). An EIR need not consider every conceivable alternative to a project. Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are not feasible, or do not avoid or substantially lessen any significant environmental effects (State CEQA Guidelines Section 15126.6[c]). Moreover, under CEQA, a lead agency may structure its alternatives analysis around a reasonable definition of a fundamental underlying purpose, and need not study alternatives that cannot achieve that basic goal (In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings [2008] 43 Cal.4th 1143, 1165).

CEQA also requires that alternatives evaluated in an EIR be potentially feasible. Feasible is defined in CEQA as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors” (PRC Section 21061.1). The CEQA Guidelines elaborate that factors that may be taken into account when addressing the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, other plans or regulatory limitations, and jurisdictional boundaries and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (State CEQA Guidelines Section 15126.6[f]).

As discussed above, alternatives should avoid or substantially lessen one or more significant environmental impact that would occur under the proposed project.

The commenter asserts that the proposed alternative would “improve hydrological function and restore some of the ecosystem benefits that were once provided by the surrounding lands before development.” However, as discussed in Sections 4.10 and 4.4 of the DEIR, Project impacts to hydrology and water quality and biological resources would be less than significant with mitigation. In addition, the baseline for analysis under CEQA is the existing conditions. The commenter does not provide any evidence that the Project would adversely impact existing conditions, or any evidence to support use of a historical baseline that reflects conditions existing prior to development of the golf courses or other uses on the Project Site.

Response AG 5-2

The Project would be consistent with the County Sustainability Plan (OurCounty Plan) (See DEIR Section 4.8.5). The Project would comply with CALGreen and Title 24 requirements, would locate housing near public transit and promote alternative modes of transportation, and include publicly accessible open space. The Project is also consistent with the specific goals of Strategy 3A of the OurCounty Plan. The Project is an infill project that would promote increased density and would not contribute to urban sprawl or promote development on the periphery of the built environment and the natural environment. Further Strategy 7A is not applicable to private projects, rather it is a strategy for the County to reduce energy usage as part of operating the supply/infrastructure system (e.g., transport of water supply).

In addition, as discussed in DEIR Section 4.11.5, the Project would be consistent with the General Plan’s Land Use Element and Housing Element, and would provide infill housing through the provision of 360 residential units with a diverse mix of for-sale dwelling types, containing both single-family and multi-family units of varying types and sizes, both market rate and below market / affordable. These characteristics of the Project would support Land Use and

Housing objectives and policies for enhancing communities, encouraging a mix of residential densities, providing resources for recreational open spaces trails and bikeways, and increasing the housing supply. The Project will assist the County in addressing the current State Housing Crisis and help meet Los Angeles County's Regional Housing Needs Allocation (RHNA) of +/- 90,000 units including +/- 14,100 moderate units and +/- 36,500 above moderate / market rate units.

As discussed in Response AG 5-1, alternatives should avoid or substantially lessen one or more significant environmental impact that would occur under the proposed project. However, the commenter has not provided evidence that the proposed alternative would avoid or substantially lessen a significant environmental impact of the Project. As discussed above in Response AG 5-1, CEQA does not require a Project to evaluate an endless variety of alternatives.

The commenter appears to express a concern about additional density and/or building structures that could result if ADU's are developed on the Project's single family lots. However, ADU's are not proposed as part of the proposed Project, and it is not reasonably foreseeable that the individual purchasers of Project homes would all seek to construct ADUs on their properties. The commenter's assertion that the Project would result in a four-fold increase of the proposed number of units or buildings is speculation and is not supported by substantial evidence.

Response AG 5-3

As discussed in Response AG 5-1, project alternatives should be designed to avoid or reduce project significant impacts and, as discussed in Sections 4.4, Biological Resources, and 4.10, Hydrology and Water Quality, of the DEIR, the Project would not have a significant impact associated with biological resources or hydrology and water quality. As described in Section 4.10, Hydrology and Water Quality, once constructed the Project would include 28 acres of publicly accessible open space and would plant over 1,820 new trees providing shade throughout the Project Site. In addition, the proposed Project would include on-site storm drain facilities that would consist of a combination of low flow water quality and peak flow conveyance systems. The low flow water quality systems would intercept the low flows and provide water quality treatment in order to meet the requirements of the LA County LID Ordinance. The peak flow conveyance systems would provide peak flow reduction via detention basin systems, in order to control flows to meet the capacity requirements of the existing LACFCD storm drain systems. The Project would include new filtration BMPs to the Project design and new landscaped areas throughout the Project site, all designed to meet a 25-year storm event. The intercepted storm flows would be treated onsite through applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) prior to being discharged into the storm drains and returned to the environment for groundwater recharge. Because the Project would not have a significant impact to hydrology and water quality or biological resources, the proposed alternative is not necessary to avoid or reduce project impacts and the range of alternatives studied in the DEIR is sufficient. Further, the Project site is not an "undeveloped land." The site was developed / constructed in 1961. The site was graded, filled, landscaped, and buildings were constructed. The site is a golf course, and it has been operated and maintained as such since 1961, recently ceasing operation in February 2024.

Response AG 5-4

See Response AG 5-3, above. The proposed storm drain system, which includes detention basin facilities, will attenuate potential flooding. As discussed in Section 4.10.5 of the DEIR, the Project's proposed storm drain and detention systems would reduce flows to the pre-project conditions before releasing flows to the Los Angeles County Flood Control District (LACFCD) existing storm drain facilities. The LACFCD storm drain facilities would continue to function as they do currently without adverse impact to the downstream storm drain reaches. As described in the DEIR, once constructed the Project would include 28 acres of publicly accessible open space and would plant approximately 1,820 new trees providing shade throughout the Project Site. This open space would not include any new nonpermeable surfaces allowing rain events to percolate into the ground. In addition, the proposed Project would include on-site storm drain facilities that would consist of a combination of low flow water quality and peak flow conveyance systems. The low flow water quality systems would intercept the low flows and provide water quality treatment in order to meet the requirements of the LA County LID Ordinance. The peak flow conveyance systems would provide peak flow reduction via detention systems, in order to control flows to meet the capacity requirements of the existing LACFCD storm drain systems.

The Project would include new filtration BMPs to the Project design and new landscaped areas throughout the Project site, all designed to meet a 25-year storm event. The intercepted storm flows would be treated onsite through applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) prior to being discharged into the storm drains and returned to the environment for groundwater recharge.

Response AG 5-5

See Responses AG 5-3 and AG 5-4, above. The commenter speculates that the County guidelines for sizing facilities for stormwater management are outdated without providing substantial evidence, and does not propose any alternative standard for evaluation. The proposed Project has been designed to comply with the conditions identified in the Low Impact Development plan prepared in compliance with the LARWQCB NPDES Municipal Separate Storm Sewer System (MS4) Permit for the Coastal Watersheds of Los Angeles County (Order No. R4-2012-0175 NPDES Permit No. CAS004001) and in accordance with the County of Los Angeles Department of Public Works Low Impact Development Standards Manual (Fuscoe 2023b). Compliance with applicable laws and regulations would ensure that construction of the Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.

Response AG 5-6

See Responses AG 5-3 to 5-5, above. The Project Site does include two blue-line drainages as depicted on the U.S. Geological Survey (USGS) topographic map dated 1964 and photo revised 1981. These drainages are constructed v-ditches which convey drainage from some of the adjacent residential tracts which run through portions of the golf course until the drainages enter into the storm drain system.

Response AG 5-7

See Response AG 5-3 to AG 5-5, above. Like the Project, any of the studied Project Alternatives, if approved and constructed, would be required to comply with the requirements to avoid potential surface flow hazards. As no significant impact regarding flooding was identified, alternatives are not required to avoid or substantially lessen such impacts, and CEQA does not require analysis of an alternative that would not avoid or substantially lessen the Project's significant impacts.

Response AG 5 -8

As discussed in Section 4.4 of the DEIR, impacts to biological resources are less than significant with mitigation. The Project would provide approximately 28 acres of open space that would remain as a vegetated surface to retain moisture and will increase the number of trees on the Project Site from 411 trees to 1,864 trees This is more than 4 times the number of existing trees. As discussed in Response AG 5-1 to 5-7, the proposed alternative would not avoid or reduce the Project's significant environmental impacts, the DEIR evaluates a reasonable range of alternatives, and no analysis of the proposed alternative is required.

Response AG 5-9

The commenter does not identify an unmitigated significant impact of the Project and does not provide evidence that the DEIR did not evaluate a reasonable range of alternatives. No further analysis is necessary. See Response AG 5-3 through AG 5-8.

Response AG 5 -10

The Project would provide approximately 28 acres of open space, approximately 37 percent of the site, that would remain as vegetated landscapes and will include a net gain in the number of trees on the Project Site from 411 trees to 1,864 trees. This will increase the number of trees by more than 4 times. Regarding stormwater retention, see Response AG 5-4 through AG 5-8 above.

Response AG 5 -11

Project Alternatives should be designed to reduce project significant impacts and, as discussed in Sections 4.7, Geology and Soils, and 4.10, Hydrology and Water Quality, the Project would not have a significant impact associated with geology and soils or hydrology and water quality. The proposed Project's storm drain system, which includes biofiltration and detention facilities, will aid in filtering water, slowing stormwater, reducing peak flows, and attenuating downstream flooding. 37 percent of the Project Site will remain in as open space with minimal alterations such as the planting of additional trees and incorporation of exercise stations, picnic tables and seating along the existing trails as shown in Figure 2-4 of the DEIR. The Project Site is not "undeveloped. The site was developed / constructed in 1961 as a commercial business. The site has not had native vegetation cover for decades, since the golf course was constructed in 1961 and prior to that time, the site was used as farmland or grazing pastures.

Response AG 5 -12

CEQA guideline Section 15125(a) provides that the baseline for analysis of environmental impacts is generally the conditions existing at the time of the issuance of the NOP, not some historical condition that the commenter believes might have existed in the distant past. At the time of the NOP, the Project Site was a man-made golf course. The existing golf course was developed in 1961. Development of the golf course included substantial changes to the previous condition of the site, including grading, import of fill soil to create the rolling golf course terrain, planting non-native landscaping and construction of buildings. Prior to the construction of the golf course in 1961, the site was historically used for agricultural uses. The commenter has provided no substantial evidence to support the use of a baseline other than the conditions existing at the time of the NOP. Moreover, the commenter is speculating on the vegetation and wildlife that occurred historically on the site.

The proposed Project is an infill development on an existing golf course that is not considered suitable habitat for protected wildlife species (see DEIR Section 4.4, Biological Resources). The commenter's assertions regarding the site's connection to the current SEA in Puente Hills is not supported by evidence. The Project Site does not contain SEA resources and does not connect or provide a corridor for wildlife to the Puente Hills SEA. The Site is surrounded by existing residential and commercial uses. No open space or wildlife corridor exists between the Project Site and the SEA. As the commenter acknowledges, given the golf course use for more than half a century, the Project Site does not currently provide suitable habitat.

Response AG 5 -13

The proposed alternative would not avoid or substantially lessen the Project's significant environmental impacts and no analysis is necessary. As discussed in DEIR section 4.15.5 (Impact PS-4) and Section 4.16, impacts to parks and recreational facilities is less than significant. The local need for parks has been assessed by the LA County Department of Parks and Recreation and it was determined that the park obligation for this Project will be met by the payment of in-lieu fees. Additionally, the Project will consist of 37 percent open space, including approximately 28 acres of publicly accessible open space with over 2 miles of recreational trails. Additionally, "quality of life" is not a CEQA consideration. The commenter does not provide evidence of any significant environmental impacts from the Project, or that the DEIR did not evaluate a reasonable range of alternatives.

Response AG 5 -14

The commenter does not identify an unmitigated significant impact of the Project, and the proposed alternative would not avoid or substantially lessen the Project's significant environmental impacts. The commenter does not provide evidence that the DEIR did not evaluate a reasonable range of alternatives. No further analysis is necessary. See Responses AG 5-11, and AG 5-12 above.

Response AG 5 -15

The commenter does not provide evidence of any significant environmental impact of the proposed Project or of the need for the recommended measures to reduce Project impacts. The

Project would include approximately 28 acres of publicly accessible open space and would plant approximately 1,820 new trees providing shade throughout the Project Site. This open space would not include any new nonpermeable surfaces allowing rain events to percolate into the ground. The proposed plant palette includes native trees and shrubs. The Project will remove approximately 65 acres of manicured turf that required large quantities of water and fertilizers to maintain the high-quality grass surface for golf and the required storage of large quantities of fertilizers and other potential hazardous material required to maintain a golf course. Further, prior to construction, the Project would implement Mitigation Measures BIO-1 and BIO-2 which would reduce potential significant impacts to less than significant for nesting birds.

Response AG 5 -16

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Tuesday, January 9, 2024 1:38 PM
To: Silva, Felicia@Wildlife <Felicia.Silva@Wildlife.ca.gov>
Subject: FW: Royal Vista Residential Project

Hello Ms. Silva,

I forgot to request posting of the letter to the State Clearinghouse by January 12th. I will not be able to forward comments to the applicant on that day, but want the consultant and applicant to be able to see the comments as they become available.

Thank you for your understanding,

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov AG 6-1

Our field offices are currently open to the public. Please visit planning.lacounty.gov for information about available services, public meeting schedules, and planning projects.

From: Silva, Felicia@Wildlife <Felicia.Silva@Wildlife.ca.gov>
Sent: Wednesday, January 10, 2024 1:57 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: RE: Royal Vista Residential Project

CAUTION: External Email. Proceed Responsibly.

Hello Ms. Pavlovic,

Thank you for letting me know. We have actually discussed the Project internally and have determined that written comments will not be necessary. We only have one main concern regarding the potential for bat species to be on site as there have been records of bat sightings in the area. Bats are considered non-game mammals and are afforded protection by state law from take and/or harassment, (Fish & G. Code, § 4150; Cal. Code of Regs, § 251.1). For potential bat species that may be on site, we recommend the following be incorporated into the DEIR:

1. Prior to construction activities, a qualified bat specialist shall conduct bat surveys within Project areas (plus a 100-foot buffer as access allows) in order to identify potential habitat that could provide daytime and/or nighttime roost sites, and any maternity roosts. Acoustic recognition technology shall be used to maximize detection of bat species and to minimize impacts to sensitive bat species. A discussion of survey results, including negative findings shall be included in the final EIR. The final EIR shall also discuss potentially significant effects of the Project on bats and include species specific mitigation measures to reduce impacts to below a level of significance (CEQA Guidelines, § 15125). Surveys, reporting, and preparation of robust mitigation measures by a qualified bat specialist shall be completed prior to any Project-related ground-disturbing activities or vegetation removal at or near locations of roosting habitat for bats.

2. If maternity roosts are found work shall be scheduled between October 1 and February 28, outside of the maternity roosting season when young bats are present but are yet ready to fly out of the roost (March 1 to September 30).

AG 6-1
Cont.

Let me know if you would like to discuss any of our recommendations or if you have questions.

Best

Felicia Silva | she/her
Environmental Scientist | California Department of Fish and Wildlife
South Coast | Region 5 | Habitat Conservation Planning Program
3030 Old Ranch Parkway, Suite 400 | Seal Beach, CA 90740
(562) 292-8105 | Felicia.Silva@wildlife.ca.gov

Response to Comment Letter AG 6

California Department of Fish and Wildlife

Response AG 6-1

CDFW reviewed the DEIR and provided a general comment to LA County Planning that addressed bats as a group, which includes the Pallid, Mastiff, and western yellow bats. CDFW recommends preconstruction bat surveys be incorporated into the Final EIR that would include impact analysis and mitigation measures.

As discussed in the GLA Supplemental Technical Memorandum re: Special Status Bats dated April 13, 2024 (Appendix O of this FEIR), the Project Site contains limited potential habitat for special status species bats including small sheds, a golf course maintenance building with a metal roof and no attic or crevices, and a few trees with cavities, all of which exhibit limited potential for roosting. While dead fronds of Mexican Fan Palm trees could provide potential habitat for some species, the palm trees on the Project site are regularly maintained to remove the dead fronds in order to limit the potential for fire and pest species such as Norwegian rats that are known to utilize palms. Thus, based on routine maintenance requirements and practices on the Project Site, no long-term habitat is maintained and therefore the existing palm trees are not considered suitable habitat.

Because there is a low or low to moderate potential for special status bat species to occur, and the majority of the habitat found on-site is not suitable to support these species, any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species.

Nevertheless, to ensure that individuals are not harmed, as recommended by CDFW, pre-construction bat surveys will be included in the Final EIR as Mitigation Measure BIO-3 (see Chapter 11 Correction, Clarifications and Additions). Mitigation Measure BIO-3, set forth below, provides for surveys to take place closer to the start of actual construction, rather than prior to completion of the Final EIR as suggested by CDFW. Implementing such surveys in proximity to the actual start of construction exhibits a much higher probability of capturing presence should special status species bats be present during construction. In addition, Mitigation Measure BIO-3 includes the mitigation to be implemented in the event the pre-construction surveys identify roosting bats on the Project Site. Mitigation Measure BIO 3 will ensure that individuals are not harmed and that any potential impacts to special-status bats would continue to be less-than-significant.

> **Mitigation Measure BIO-3:** Prior to site disturbance for Project construction, including removal of any vegetation, sheds and/or maintenance building that could be used by roosting bats, a qualified biologist shall conduct a pre-construction bat roost survey for roosting bats. The survey shall be conducted no more than 14 days prior to site disturbance and shall include daytime surveys to search for sign such as guano, visual "emergence" surveys at dusk, followed by night time surveys using acoustic recognition equipment specific for bat detection. The pre-construction bat roost survey shall consist of a minimum of two bat surveys (conducted consecutively or as determined by the

> qualified biologist). If roosting bats are detected onsite outside of the bat maternity season, the roost tree or building shall be removed in a manner to avoid and/or minimize injury to roosting bats. This may include using mechanical equipment to gently nudge the tree trunk multiple times or building as directed by the qualified biologist prior to removal or for palm trees and other tree species, to de-frond or de-branch the tree using a mechanical lift and gently lower the cut branches to the ground. Regardless of the method, the fallen tree and/or material shall be left undisturbed overnight until at least the next morning to give roosting bats time to exit before complete removal of the tree or structure. Similar and appropriate measures shall be implemented for building removal.
>
> If roosting bats are detected onsite during the maternity season (March 1 to September 30), the Project shall avoid the subject roost(s) and incorporate an avoidance buffer (as determined by a qualified biologist) until after the maternity season or until a qualified biologist determines no maternity roosting is occurring. Once the qualified biologist approves removal of the subject roost tree(s), or buildings, the same tree and building removal procedures as outlined above shall be implemented prior to tree or building removal.

The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

10.3 Organizations

The following comment letters were received from Organizations on the Royal Vista Residential Project DEIR. The comment letters are grouped together and are followed by all responses as indicated in Table 10-2. In addition, Appendix P includes GLA's technical memorandum that directly responds to Attachment C of the Channel Law Group, LLC, Comments from Biological Resource Consultant Scott Cashen, MS on the EIR.

TABLE 10-2
LIST OF DEIR COMMENT LETTERS: ORGANIZATIONS

Letter Code	Commenting Party	Response Page Number
ORG 1a	Royal Vista Open Space (RVOP)	Page 10-56
ORG 1b	South Coast Air Quality Management District submitted by RVOP	Page 10-69
ORG 2	Rowland Heights Community Coordinating Council	Page 10-73
ORG 3a	Pierce Law Firm submitted by RVOP	Page 10-81
ORG 3b	Pierce Law Firm email submitted by RVOP	Page 10-85
ORG 4	Pavone & Fonner, LLP submitted by RVOP	Page 10-202
ORG 5	Allen Matkins Leck Gamble Mallory & Natsis LLP, rep. Fairway Industrial Company, LLC	Page 10-207
ORG 6	Channel Law Group, LLP	Page 10-308
ORG 6 Attachment A	Additional Royal Vista Open Space Comment	Page 10-340
ORG 6 Attachment B	Letter from the County of Los Angeles Department of Public Works to Linscott Law and Greenspan Engineers	Page 10-351
ORG 6 Attachment C	Comments from Biological Resource Consultant Scott Cashen, MS on the EIR	Page 10-352

Royal Vista Open Space, Nonprofit
Rowland Heights, California
saveroyalvista@gmail.com
www.saveroyalvista.com

January 5, 2024

VIA EMAIL

Marie Pavlovic
Los Angeles County Department of Regional Planning
Subdivisions Section
320 West Temple Street
Los Angeles, CA 90012
mpavlovic@planning.lacounty.gov

ORG 1-1

RE: Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: No. PRJ2021-002011-(1)

Dear Marie Pavlovic,

In response to the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011, the following comments provide critical insights and considerations regarding the environmental consequences of the proposed project. These comments aim to contribute to the comprehensive evaluation and enhancement of the DEIR, addressing concerns related to various environmental aspects. By highlighting specific areas of impact and suggesting mitigation measures, these comments seek to promote a more thorough understanding of the project's effects on the surrounding environment and community.

MENTAL & PHYSICAL HEALTH CONSEQUENCES

ORG 1-2

DEIR - ES.3 Objectives - “Create a Healthy Community” (pg. 19-20)

It is crucial to highlight that various studies indicate that the depletion of sizable open spaces due to development have detrimental effects on both mental and physical health. In fact, the evidence proves that the development of open space is more detrimental than beneficial when aiming to create a genuinely healthy community.

1. **Mental Health Impact:** Robust research demonstrates that access to green and open spaces positively influences mental well-being. Urban environments with ample greenery such as Royal Vista, have been linked to reduced stress, anxiety, and depression. Horiuchi et al. proposed that visual stimuli such as green spaces, offers psychological advantages for human health when compared to the

absence of such exposure. This stimulation is linked to sensations of comfort, leading to reductions in blood pressure, heart rate, and psychological stress.[1]

Conversely, dense development that encroaches upon open spaces limits these mental health benefits. Gascon et al. stated that green spaces exert a protective influence on the mental health of adults, specifically in terms of mitigating depression and anxiety. This effect is thought to be partially mediated by air pollution and, to a lesser degree, noise exposure.[2]

2. **Physical Health Consequences:** The availability of open spaces encourages physical activity, contributing to a healthier lifestyle. Dense development, especially when it encroaches upon sizable open areas, restricts opportunities for outdoor exercise and recreation. This limitation can lead to a sedentary lifestyle and associated health issues.
3. **Quality of Life Considerations:** Studies consistently show that proximity to nature enhances overall quality of life. Depleting open spaces in favor of dense development may compromise residents' quality of life, as the loss of natural environments diminishes opportunities for relaxation and connection with the outdoors.
4. **Loss of Green Space:** The proposed development leads to the severe reduction and elimination of a significant green space. Access to nature is linked to improved mental well-being, reduced stress, and enhanced cognitive function. The absence of substantial open areas can negatively impact residents' mental health.
5. **Air and Noise Pollution:** Development creates increased air and noise pollution. Exposure to pollutants can have detrimental effects on respiratory health and overall well-being. Numerous studies have investigated the connection between green spaces and stress reduction and mental well-being among residents, highlighting that the presence of vegetation can diminish the adverse impact of noise.[3]

ORG 1-3

Evidence shows that the destruction of open space is more harmful than beneficial. Preserving this sizable area is critical for fostering both mental and physical well-being within the community.

The implications extend beyond the loss of 75 acres in this proposed development; the entire 156 acres are jeopardized, notably by the conceptual map of a different development. Sunjoint, another developer, sent conceptual plans for a minimum of 419 units near Lake Canyon Dr. to LACDRP, intensifying the threat to the entire area. The DEIR fails to take into account the full scale impact of what will occur if this portion is developed.

ORG 1-4

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[1] Horiuchi M., Endo J., Takayama N., Murase K., Nishiyama N., Saito H., Fujiwara A. Impact of Viewing vs. Not Viewing a Real Forest on Physiological and Psychological Responses in the Same Setting. *Int. J. Environ. Res. Public Health.* 2014;**11**:10883–10901.

[2] Gascon M., Sánchez-Benavides G., Dadvand P., Martínez D., Gramunt N., Gotsens X., Cirach M., Vert C., Molinuevo J.L., Crous-Bou M., et al. Long-term exposure to residential green and blue spaces and anxiety and depression in adults: A cross-sectional study. *Environ. Res.* 2018;**162**:231–239.

[3] Dzhambov A., Dimitrova D. Urban green spaces′ effectiveness as a psychological buffer for the negative health impact of noise pollution: A systematic review. *Noise Health.* 2014;**16**:157–165.

PROJECT & PROPOSED ALTERNATIVES

DEIR - ES.5.1 No Project Alternative (Alternative 1) (pg. 24)

"The 75.65-acre portion of the Royal Vista Golf Club…would cease golf operations and would become unused parcels for future redevelopment since the Project Applicant has no plans to continue golf operations on the Project Site."

ORG 1-5

Permitting unrestrained acquisition of private or public land for speculative development purposes, followed by approvals to deviate from its current zoning, stands to detrimentally impact the community across multiple dimensions.

1. **Community Disruption:** This speculative development disrupts the stability and character of the community. Abrupt changes in land use and zoning will undoubtedly result in significantly heightened traffic with a minimum of 2,000 more vehicles, disrupt neighborhood dynamics, and erode both the value and sense of community.
2. **Infrastructure Strain:** Sudden changes in land use will strain existing infrastructure. Roads, utilities, and public services may not be adequately equipped to handle the demands of a new development, leading to potentially severe or fatal issues for residents.

   Public services are already strained due to various factors, including population growth, increased demand, and budget constraints. Studies indicate that the population in urban areas has surged, leading to higher demand for services like healthcare, education, and public safety. Budget limitations have also impacted service quality, with reduced resources affecting infrastructure maintenance and social programs. Addressing the housing crisis solely by building more houses is not a comprehensive solution, as it overlooks the need for balanced urban planning, sustainable development, and considerations for infrastructure capacity and environmental impact. Simply increasing housing without addressing these broader factors first, can and will exacerbate existing strain on public services and fail to provide long-term solutions to community needs.

   ORG 1-6
3. **Community Engagement:** Speculative development sidelines the interests and preferences of the local community. Engaging residents in decisions about land use, especially when changing zones, ensures that developments align with the community's needs and desires.

ORG 1-7

Adhering to established zoning regulations and upholding prior zoning decisions that were made intentionally and with reason, allows for comprehensive planning, environmental consideration, and community input, fostering a more harmonious and prosperous community in the long run, as opposed to short-term financial gains that only benefit a select few parties. The financial benefits pale in comparison to the enduring harm and irreversible damage inflicted upon the land, environment, and community.

If the development is approved, Alternative 3 (a total of 97 residential units) is the most optimal "choice" among the presented options, with the exception of Alternative 1 or the utilization of Measure A funds to secure the land in perpetuity for public use. ORG 1-8

Varied and Sustainable Utilization of Open Spaces

Open spaces present diverse opportunities for community enhancement beyond traditional development. Areas for passive recreation, such as walking trails, picnic spots, and verdant expanses, offer residents environments for relaxation, exercise, and social engagement. Incorporating native plant landscapes advances biodiversity, bolstering local ecosystems and attracting native wildlife. These areas can function as educational centers, fostering environmental awareness through interpretive signage and community workshops. ORG 1-9

Furthermore, allocating open spaces for community gardens instills a sense of stewardship, promoting sustainable practices and providing locally grown produce.

By embracing alternative applications of open space, communities can nurture a healthier and more dynamic environment, fostering physical well-being, ecological robustness, and a collective sense of ownership among its members.

Green Space: Mitigating Past Developments

Pursuing the development of a green space that is already intentionally zoned and actively mitigating pollution and past developments, exposes a perplexing hypocrisy in the decision-making process. Green spaces have been proven to mitigate the urban heat island effect and thus improve air quality. [4]

If LA County persists in approving the development of lands that are currently offsetting adverse effects caused by humans, the resources reserved for future mitigation will be depleted, ultimately leaving insufficient capacity for environmental safeguards. These decisions carry consequences, and the apparent lack of awareness and an alarming absence of concern for our future on this planet, highlights a problematic trend in urban planning. ORG 1-10

CONSTRUCTION

DEIR - ES.6.2 Significant Irreversible Environmental Changes (pg. 28-29)

It states that the Project's irreversible alterations to the environment, including the consumption of non-renewable resources and changes to the land, would not be regarded as significant. This contradiction raises doubts about the consistency and transparency of the evaluation, as it minimizes and downplays the profound and lasting environmental consequences associated with both resource consumption and alterations to the land. ORG 1-11

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[4] Yin C., Yuan M., Lu Y., Huang Y., Liu Y. Effects of urban form on the urban heat island effect based on spatial regression model. *Sci. Total. Environ.* 2018;**634**:696–704.

> “These resources would include the following construction supplies: certain types of lumber and other forest products; aggregate materials used in concrete and asphalt such as sand, gravel and stone; metals such as steel, copper, and lead….”

The DEIR lacks clarity regarding the specific type(s) of lumber to be utilized, the origin of these materials, and whether they are responsibly sourced or not.

The statement that these are "non-renewable resources currently consumed within the County" doesn't justify their use without higher standards in construction practices, particularly given the available advancements and technology to adopt more sustainable alternatives.

Construction Equipment Emissions: The use of heavy machinery, such as excavators, bulldozers, and concrete mixers, contributes significantly to carbon emissions. The longer the equipment operates, the greater the emissions. The source of this energy (whether it's from fossil fuels or renewable sources) impacts the overall carbon footprint. ORG 1-12

Construction Noise & Sustainability: Noise pollution from construction activities impact the well-being of local residents and wildlife. It is imperative for this project to proactively address and significantly reduce its environmental impact by adopting sustainable practices, employing eco-friendly materials, and integrating energy-efficient technologies. Incorporation of these sustainable measures is paramount to not only enhance the project's overall environmental stewardship, but also to minimize and offset the negative impacts. Gas-powered construction equipment is louder than electric counterparts, leading to increased noise pollution in construction zones. Electric construction vehicles offer quieter operation, reducing disturbances to wildlife, residents and workers. ORG 1-13

Impact on Wildlife

Construction noise and disturbance has detrimental effects on wildlife, causing negative impacts on their behavior, health, and well-being. This is an issue, given the presence of endangered and threatened wildlife in the area, such as the California Gnatcatcher, which has been documented nearby by a biologist for the City of Diamond Bar for a trail widening project. Notably, the Gnatcatcher has also been observed in the backyards of local residents, emphasizing the need for careful consideration and mitigation measures to protect the habitat and well-being of these vulnerable species during construction activities. ORG 1-14

Some of the specific consequences include:

1. **Disruption of Communication:** Loud construction noise can interfere with the communication signals of wildlife species, affecting their ability to mate, establish territories, or warn of potential threats.
2. **Changes in Reproductive Behavior:** Construction disturbance may lead to alterations in reproductive behavior, such as nest abandonment or decreased reproductive success, as wildlife may feel stressed or threatened.
3. **Habitat Abandonment:** Persistent construction noise can lead to the abandonment of habitats by wildlife, particularly species sensitive to disturbances. This can result in the loss of critical feeding and breeding grounds.
4. **Stress and Increased Vulnerability:** Wildlife exposed to continuous construction noise experience chronic stress, leading to weakened immune systems and increased vulnerability to diseases. The stress response can also affect reproductive success and survival rates.
5. **Displacement:** Construction activities force wildlife to relocate to unfamiliar, dangerous, or less suitable habitats, increasing competition for resources and potentially leading to population decline.
6. **Altered Movement Patterns:** Wildlife may alter their normal movement patterns and migration routes to avoid construction disturbances, impacting their ability to access food, water, and suitable breeding sites.
7. **Impact on Nocturnal Species:** Nocturnal species observed in the area, such as a variety of bats and owls, can be particularly sensitive to construction noise, affecting their hunting and foraging behaviors during the night.
8. **Direct Physical Harm:** Construction activities pose direct physical threats to wildlife through habitat destruction, collisions with machinery, and exposure to hazardous materials.

Mitigating these impacts should involve establishing larger buffer zones, scheduling construction activities during less sensitive times, reducing the construction to 5 days a week, reducing construction hours from 9am-5pm, and employing higher sound barriers to minimize noise disturbance. Should the project advance, it is imperative to adopt sustainable construction practices that prioritize wildlife conservation.

Calculated CO2 From Haul Truck Emissions

The transportation of materials to and from the construction site, as well as the frequent deliveries, involves the use of trucks that emit carbon dioxide (CO2) and other pollutants.

ORG 1-15

The carbon dioxide emissions resulting from 11,427 haul trucks (at minimum) operating at an average distance of 20 miles each (10 miles one way to the Olinda Landfill stated as the repository) would approximate 335,120.91 kilograms of CO2.[5] This quantity is equivalent to the annual carbon dioxide absorption potential of approximately

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[5] Average values for calculation; 20 miles per delivery, 8.8 kg CO2 per gallon of diesel, and average 6 miles per gal. for large trucks

15,233 mature trees, at minimum. On average, a mature tree can absorb about 22 kg of CO2 per year. This comparison underscores the environmental impact and highlights the importance of implementing sustainable practices in transportation.

Proposed Green Solutions & Mitigations for Construction:

1. Electric Construction Vehicles:
    - Electric construction vehicles offer quieter operation, reducing disturbances to residents and workers.
    - Transitioning from gas-powered to electric construction vehicles significantly reduces emissions on construction sites.
    - Implementing hybrid or fully electric machinery minimizes the carbon footprint of construction activities.
    - Continuous advancements in electric vehicle technology, including faster charging times and improved battery efficiency, make electric construction vehicles more convenient and competitive with traditional gas-powered counterparts.
2. Sustainable Concrete Practices:
    - Using alternative materials such as recycled aggregate, fly ash, or slag in concrete mixtures reduces the environmental impact.
    - Adopting high-performance concrete mixes that require less cement can also contribute to sustainability.
3. Responsibly Sourced Wood:
    - Opting for certified sustainable wood from sources like the Forest Stewardship Council (FSC) ensures responsible and eco-friendly forestry practices.
    - Utilizing engineered wood products, which can use wood more efficiently, reducing overall demand.
4. Green Building Materials:
    - Incorporating recycled or reclaimed materials into construction projects minimizes the need for new resources.
    - Exploring innovative materials such as bamboo, recycled steel, or reclaimed wood for specific applications.
5. Efficient Deliveries and Logistics:
    - Implementing just-in-time delivery practices reduces the need for excessive stockpiling of materials, minimizing waste.
    - Utilizing electric or hybrid vehicles for material transportation reduces emissions associated with deliveries.
6. Modular Construction:
    - Embracing modular construction techniques minimizes on-site waste and construction time.
    - Prefabricated components can be produced with greater precision, reducing the need for on-site adjustments and material waste.
7. Energy-Efficient Equipment:

    - Employing energy-efficient construction equipment and machinery reduces overall energy consumption on construction sites.
    - Regular maintenance of equipment ensures optimal performance, reducing energy waste.
8. Water Recycling and Conservation:
    - Implementing water recycling systems on construction sites minimizes water consumption.
    - Utilizing low-flow fixtures and ensuring proper erosion control practices further promotes water conservation.
9. Green Roofing and Insulation:
    - Opting for green roofing solutions helps with natural insulation, reducing the need for energy-intensive heating or cooling.
    - Utilizing energy-efficient insulation materials contributes to the overall energy performance of buildings.
10. Renewable Energy Integration:
    - Incorporating on-site renewable energy sources, such as solar panels, offsets energy consumption during construction.
    - Using renewable energy to power construction sites reduces reliance on fossil fuels.

These solutions, when combined and tailored to specific construction projects, can contribute significantly to more sustainable and environmentally friendly construction practices.

WATER SCARCITY

DEIR - 4.19 Utilities and Service Systems (pg. 645-688)

While the Walnut Valley Water District (WVWD) has issued a will-serve letter, it's essential to note that this does not guarantee the assured capability to provide water to the current long time residents, the proposed project and potential subsequent projects on the remaining portions.

ORG 1-16

The Water Resources Control Board of the state has approved regulations allowing recycled wastewater from households to be converted into drinking water. California's updated guidelines empower local water agencies to opt for the treatment of wastewater from sources like toilets or showers and reintegrate it into the drinking water system.[6] Furthermore, uncertainties arise regarding the type and quality of water from WVWD that will potentially impact residents.

Utilizing recycled wastewater for drinking purposes will certainly face public resistance, as there is a prevalent aversion to consuming water derived from sewage, highlighting the challenge of overcoming the stigma associated with the notion of "pee pee water." Notably, concerns regarding the long-term effects of the processes and chemicals used in treating wastewater, especially considering their safety for

ORG 1-17

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[6] https://www.waterboards.ca.gov/water_issues/programs/recycled_water/

consumption. As of now, there is a lack of conclusive evidence proving the long term safety of such treatments for drinking water, raising valid concerns about impacts on the health and well-being of the community.

REQUEST FOR A COMPREHENSIVE LIFE CYCLE ASSESSMENT (LCA)

Undertaking a comprehensive Life Cycle Assessment (LCA) is indispensable, serving as an important tool to holistically evaluate and optimize the project's ecological footprint. This should include environmental impact categories such as global warming potential, acidification potential, eutrophication potential, and more.

ORG 1-18

Notably, the current DEIR is insufficient, turning a blind eye to the remaining acres at risk and failing to account for the genuine environmental impact. It focuses on a small snapshot rather than considering the entire picture.

CONCLUSION

In conclusion, it is imperative that the LA County Department of Regional Planning takes the concerns and issues raised by the community seriously and proactively addresses them. The environmental, social, and health impacts associated with the proposed project necessitate a thorough examination and implementation of measures to safeguard the well-being of residents and the ecosystem. By prioritizing transparency, community engagement, and adherence to environmental regulations, the county can demonstrate its commitment to responsible development.

It is crucial to foster an open dialogue with residents, consider expert opinions, and conduct comprehensive assessments to ensure that any approved project aligns with the long-term sustainability and resilience of the community. Only through a collaborative and diligent approach can the county effectively balance growth with the preservation of its valuable resources.

ORG 1-19

Sincerely,

Royal Vista Open Space

Royal Vista Open Space

Response to Comment Letter ORG 1a

Royal Vista Open Space, Nonprofit

Response ORG 1a -1

Comment noted. As demonstrated by the comments and responses below, the DEIR is comprehensive and has been completed in accordance with the County and CEQA Guidelines.

Response ORG 1a -2

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response ORG 1a -3

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response ORG 1a -4

See Response FORM 1-2, Response AG 5-8, Response FORM 22-2 and Response FORM 22-3. A description of the physical environmental conditions in the vicinity of the project, as they exist at the time the Notice of Preparation (NOP) is published, or if no NOP is published, at the time environmental analysis is commenced, from both a local and regional perspective is required to be provided in the EIR pursuant to CEQA Guidelines, Environmental Setting Section 15125(a). The NOP release date for the Royal Vista Residential Project was October 13, 2022, which established the relevant date for identification of cumulative projects. No general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the adjacent golf course properties (Sunjoint Property), nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. The commenter does not provide any evidence that a project on the Sunjoint Property was proposed, officially announced or otherwise identified prior to the release of the NOP for the Project.

Response ORG 1a-5

The commenter expresses views regarding the Project’s proposed zone change, but such views do not raise a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The proposed Project would require General Plan and Community Plan Amendments (Rowland Heights Community Plan): OS (Open Space) to Urban 2 ((U2); 3.3 to 6.0 dwelling units per acre) for portions of Planning Areas 1, 2 and 5; to Urban 3 ((U3); 6.1 to 12.0 dwelling units per acre) for portions of Planning Areas 1 and 5; and to Urban 4 ((U4); 12.1 to 22.0 dwelling units per acre) for a portion of Planning Area 3. In addition, Zone Change from A-1-1 and A-1-10,000 (Light Agricultural) to RPD-5000-6U and RPD-5000-12U (Residential Planned Development-5000 Square Feet Minimum Lot Area-6 Dwelling Units Per Acre and 12 Dwelling Units Per Acre, respectively) for the 62.25 acres of proposed single-family homes, duplexes, triplexes, with an affordable housing component and open space for Planning

Areas 1, 2, and 5 and to RPD-5000-17U (Residential Planned Development-5000 Square Feet Minimum Lot Area-17 Dwelling Units Per Acre) for the 6.0 acres of townhomes with an affordable housing component and open space for proposed Planning Area 3. See DEIR Chapter 2, Project Description,

The commenter also raises a general concern regarding traffic. Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, traffic impacts under CEQA are analyzed in terms of Vehicle Miles Traveled (VMT), and not in terms of automobile delay as described by Level of Service (LOS) or similar measures of vehicular capacity or traffic congestion.

As concluded in Section 4.17.5, Impact TR-2, of the DEIR the Project, the Project (Planning Areas 1, 2, 3 and 5) would generate VMT above the County's VMT thresholds. To lessen the impact, the Project would implement Mitigation Measure TR-1 and Mitigation Measure TR-2 to reduce the VMT impacts and trip generation of the Project by providing reimbursement subsidies for Metrolink and Foothill Transit Passes (Mitigation Measure TR-1) and by providing electric bicycles along with the purchase of each dwelling unit (Mitigation Measure TR-2). Implementation of Mitigation Measures TR-1 and TR-2 are expected to result in a quantifiable VMT reduction, but the Project's VMT would continue to exceed the County VMT threshold and Project level VMT impacts would be significant and unavoidable.

Transportation Impacts TR-1 (conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities), and Impact TR-3 (substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)) would be less than significant, and Impact TR-4 (emergency access) would be less than significant with implementation of Mitigation Measure TR-3 (Construction Staging and Traffic Management Plan). See DEIR Section 4.17.5. With respect to vehicle emissions, operational air quality emission impacts would be less than significant. See DEIR Section 4.3.5

Although changes in LOS or other measures of congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development projects under CEQA, a "non-CEQA" Operational Analysis was also conducted for the proposed Project in accordance with the Los Angeles County Public Works (LACPW) "Transportation Impact Analysis Guidelines" (TIA Guidelines). This analysis is provided beginning on page 64 of the Transportation Impact Analysis (TIA) which is included in Appendix M of the DEIR. The TIA Guidelines state: "Intersection level of service (LOS) and queuing methodologies from the latest edition of the Transportation Research Board Highway Capacity Manual (HCM) should be used to evaluate the operation of the project driveways and nearby intersections." As a result of the non-CEQA Operational Analysis, Project Design Features (PDF) T-3 through T-8 were identified and included as part of the Project. The PDF T-3 through T-8 improvements are described on pages 4.17-24 through 4.17-29 of the DEIR.

Response ORG 1a-6

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA. With respect to the general topics of infrastructure and population, the DEIR concluded less than significant impacts. See DEIR Section 4.14.5 for Population and Housing, 4.15.5 for Public Service, Section 4.17.52 for Transportation, and Section 4.19.5 for Utilities and Services for Project impact analyses and impact determinations.

Response ORG 1a-7

The commenter expresses a general view regarding the proposed zone change, but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

With respect to community engagement, the commenter has not identified any deficiencies in the public review process required by CEQA. However, for informational purposes, it should be noted that, with respect to the proposed entitlements, the County held a public meeting before the Regional Planning Commission and a public hearing before the Board of Supervisors to initiate the proposed General Plan Amendment. A public hearing will be held before the Regional Planning Commission and Board of Supervisors to consider the merits of the Project, including the suitability of the proposed General Plan Amendment, the zone change and other discretionary entitlements, and the Final EIR. In addition, the subdivider has conducted community outreach starting in 2021 and continuing through present day including but not limited to, holding and attending community and interest group meetings (virtual and in-person), specific group meetings, and operation of a public facing Project website. The subdivider attends the monthly Rowland Heights Community Coordinating Council (RHCCC) meetings to interact with the community and answer questions. Additional details regarding public outreach will be provided in the staff report and the subdivider's public outreach summary within the hearing package prepared for the Regional Planning Commission hearing.

Response ORG 1a-8

The comment expresses the commenter's preferences, but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record.

Response ORG 1a-9

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Although the commenter does not raise any CEQA issues, it is noted for informational purposes that historic and current access to the Project Site's private open space is limited to those who pay to play golf. The Proposed Project will reserve approximately 28 acres (37 percent) of its approximately 75 acres as publicly accessible landscaped open space including more than 2 miles of publicly accessible trails for walking, biking, picnic spots, relaxation, exercise, social engagement and passive recreation, as mentioned in the commenter's statement above, to encourage physical activity and contribute to a healthier lifestyle. Section 2.0, Project Description, discusses that the Project would plant California native plant species, including but not limited to oaks and sycamores throughout the Project Site.

Response ORG 1a-10

The commenter expresses views regarding the merits of the proposed zone change, but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

While the commenter does not raise a specific CEQA issue, it is noted that the Project Site's existing zoning of Light Agricultural is intended for the development of agricultural, recreational, residential uses, and other compatible uses. With respect to green spaces and heat islands generally mentioned by the commenter, the Project will increase the number of trees on the Project Site from 411 trees to 1,864 trees. This is more than 4 times the number of existing trees which will contribute toward mitigating any potential "heat island effect." According to the Environmental protection Agency (EPA), trees help cool the environment, making a simple and effective way to mitigate heat. It is also noted that the current use of the Project Site as a golf course causes its own impacts on the environment through daily general maintenance, mowing, fertilizing, pumping water, transporting goods to the golf course and golfers driving cars to the site.

Response ORG 1a-11

CEQA Guidelines Section 15126(c) requires that an EIR discuss irreversible environmental changes due to the proposed project. Irreversible environmental changes would occur as a result of Project implementation. However, the Project's continued use of non-renewable resources would be on a relatively small scale and consistent with regional and local growth forecasts in the area, as well as State and local goals for reductions in the consumption of such resources. The Project Site contains no energy resources that would be precluded from future use through Project implementation. The Project provides a diverse range of new housing while reducing reliance on non-renewable resources by eliminating natural gas usage, providing all-electric residences (see Section 4.8, Greenhouse Gas Emissions). Thus, the Project's irreversible changes to the environment related to the consumption of non-renewable resources would not be significant. Further, it would be speculative to assume the specific resource and/or the source of construction materials in the DEIR.

With respect to transparency and community engagement, this DEIR has been prepared to evaluate the potential direct and indirect physical impacts to the environment as a result of the Project. This DEIR has been prepared pursuant to the applicable provisions of the CEQA (California Public Resources Code Section 21000 et seq.), its implementing guidelines, known as the State CEQA Guidelines (California Code of Regulations, Title 14, Chapter 3, Sections 15000-15387), and the applicable rules and regulations of regional and local entities. The County of Los

Angeles (County) is the "public agency which has the principal responsibility for carrying out or approving the project" and is the "Lead Agency" for the Project and this DEIR pursuant to State CEQA Guidelines Section 15367. The County, as Lead Agency, has caused this FEIR to be prepared and will review and consider this FEIR prior to the ultimate decision to approve, disapprove, or modify the Project.

In accordance with State CEQA Guidelines Section 15121(a), the purpose of an EIR is to serve as an informational document that will generally inform public agency decision makers and the public of the significant environmental effects of a proposed project, and possible ways to minimize those significant effects.

An EIR is an informational document that is intended to inform regulatory agency decision makers and the public of the significant adverse environmental effects of a proposed project and any feasible mitigation measures that may substantially reduce or avoid the significant impacts. It also discusses alternatives to the project that could accomplish most of the primary objectives while substantially reducing or avoiding significant environmental impacts.

The purpose of an EIR is not to recommend approval or denial of a proposed project. Rather, an EIR is required to identify the significant adverse environmental effects of a proposed project to the physical environment, and to identify measures that avoid or mitigate those impacts to the extent feasible. When environmental impacts are identified as significant and unavoidable in the sense that no feasible mitigation measures or alternatives have been identified that would reduce the impact to a less than significant level, the County may still approve the project after adopting all feasible mitigation measures and alternatives if, through the adoption of a statement of overriding considerations, it finds that social, economic, legal, technological, or other benefits outweigh these impacts.

Response ORG 1a-12

The use of equipment necessary for construction of the Project was assumed and analyzed as part of the Project impacts to Air Quality and Greenhouse Gas Emissions. DEIR Section 4.3 Air Quality describes the analysis of Project construction emissions which were estimated using the most recent version of CalEEMod (version 2022.1) (http://www.caleemod.com/) which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies, land use planners, and environmental professionals to quantify potential criteria pollutant and greenhouse gas emissions from a variety of land use projects. CalEEMod was developed in collaboration with the air districts of California. Regional data (e.g., emission factors, trip lengths, meteorology, source inventory, etc.) have been provided by the various California air districts to account for local requirements and conditions. The model is considered to be an accurate and comprehensive tool for quantifying criteria pollutant and GHG emissions from construction and operations of various land use projects throughout California. The construction area is spread out over approximately 75 acres with open space buffers along multiple Project boundaries. Construction activities will move around the Project Site, and construction near any single receptor is expected to be of a much shorter duration than the Project's estimated 36-month construction schedule. Further, the CalEEMod emissions modeling is conservative and accounts for emissions associated with grading, over-excavation, and re-compaction. The analysis also assumes the simultaneous use of heavy-duty construction equipment that would generate maximum daily emissions on a given day during the various construction activities. The equipment mix is representative of the maximum equipment usage and maximum daily emissions potential on a given day during the various construction activities.

Response ORG 1a-13

Construction noise impacts were evaluated by determining the noise levels generated by the different types of on-site construction activity at the Project Site that could be operating simultaneously, calculating the construction-related noise levels at the six identified nearby sensitive receptor locations (R1 through R6, shown on DEIR Figure 4.13-2), and comparing these construction-related noise levels to existing ambient noise levels (i.e., noise levels without construction noise). The DEIR determined that construction noise would be significant and unavoidable with mitigation. DEIR Mitigation Measure NOI-1 includes a noise reduction performance standard but does not limit the methods by which the standard can be achieved. The standard can be achieved using solid walls, blankets, or other similar barriers methods that block noise transmission. Nonetheless, as explained in Section 4.11, Noise, of the DEIR, noise may not be feasibly reduced to below the threshold and thus, the environmental impacts related to the temporary or periodic increase in ambient noise levels during temporary construction of the proposed Project were determined to be significant and unavoidable after implementation of feasible mitigation measures.

Feasible mitigation measures are defined as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors” (Pub. Resources Code, § 21061.1, 14 Cal Code Regs., § 15364). Mitigation measures must, “identify the type(s) of potential action(s) that can feasibly achieve that performance standard and that will [be] considered, analyzed, and potentially incorporated in the mitigation measure” and be “roughly proportional” to the impacts of the project (Cal. Code Regs. tit. 14 § 15126.4). The DEIR identifies Mitigation Measure NOI-1 through NOI-4 which meet the criteria of feasible mitigation measures and lessen the impacts disclosed within the DEIR.

Noise barriers are effective in reducing noise when the barrier blocks the line-of-sight from the noise source to the receiver. Construction noise would affect off-site noise-sensitive receptors the greatest when construction occurs near the receptors towards the outer periphery of the Project Site. The noise levels in the DEIR were modeled assuming a number of construction equipment would be in use at the outer periphery of the Project Site. Noise levels would be lower when equipment would be in use within the interior of the Project Site due to distance attenuation. Noise levels would also be lower at noise-sensitive uses beyond the first row of homes or other buildings due to distance attenuation and due to the intervening buildings or structures partially or fully blocking the line-of-sight to the Project Site. DEIR Mitigation Measure NOI-1 requires a minimum height to block the direct line-of-sight. Since the maximum impacted noise-sensitive receptors are located adjacent to the Project Site, it is feasible to block the line-of-sight to those maximum impacted noise-sensitive receptors. Nonetheless, as explained in Section 4.11, Noise, of the DEIR, despite the use of noise barriers, noise may not be feasibly reduced to below the threshold and thus, the environmental impacts related to the temporary or periodic increase in ambient noise levels during temporary construction of the proposed Project were determined to be significant and unavoidable after implementation of feasible mitigation measures. See Response IND 24-15 in regards to electric construction equipment.

Response ORG 1a-14

DEIR Section 4.4, Biological Resources, discusses that the wildlife observed on the golf course and constructed irrigation ponds is typical of the suburban golf course landscaping. Bird species observed included Canada goose (Branta canadensis), mallard (Anas platyrhynchos), American kestrel (Falco sparverius), mourning dove (Zenaida macroura), black phoebe (Sayornis nigricans), western kingbird (Tyrannus verticalis), bushtit (Psaltriparus minimus), northern mockingbird (Mimus polyglottos), European starling (Sturnus vulgaris), great-tailed grackle (Quiscalus mexicanus), American goldfinch (Carduelis tristis), and house sparrow (Passer domesticus). Three mammal species were observed or detected by their sign, including California ground squirrel (Otospermophilus beecheyi), Botta's pocket gopher (Thomomys bottae), and coyote (Canis latrans).

DEIR Section 4.4, Biological Resources, Table 4.4-2, Special-Status Wildlife Species with Potential to Occur within the Project Site, lists the special-status wildlife species historically recorded from the Project region and assesses these special-status wildlife species' potential to occur on the Project Site. No threatened or endangered wildlife species are recorded from the Project Site.

Based on the GLA Supplemental Technical Memorandum re: Special Status Bats dated April 13, 2024 (Appendix O of this FEIR), the DEIR Section 4.4 and Table 4.4-2 have been updated as set forth in Chapter 11 Corrections, Clarifications, and Additions. The DEIR has been updated to change the potential for occurrence for the western mastiff bat from none to low, and to add discussion of four additional special status bat species, the Yuma myotis, western red bat, western yellow bat, and hoary bat and to identify their respective potential for occurrence on the Project Site. Of the non-listed special-status animals reported from the Project area with the potential to occur, nine California Species of Special Concern (SSC) have low potential to occur on the Project Site: coastal whiptail (Aspidoscelis tigris stejnegeri), San Diego coast horned lizard (Phrynosoma blainvillii), western pond turtle (Emys marmorata), burrowing owl (Athene cunicularia), pallid bat (Antrozous pallidus), western mastiff bat (Eumops perotis californicus), Yuma myotis (Myotis yumanensis), western red bat (Lasiurus blossevillii), and big free-tailed bat (Nyctinomops macrotis). Five California SSC have low to moderate potential to occur on the Project Site: southern California legless lizard (Anniella stebbinsi), northwestern San Diego pocket mouse (Chaetodipus fallax fallax), western yellow bat (Lasiurus xanthinus), hoary bat (Lasiurus cinereus), and San Diego desert woodrat (Neotoma lepida intermedia). There are no California Gnatcatchers on the Project Site. DEIR Table 4.4-2 on page 4.4-8 states that the site contains no suitable general or micro-habitat on-site for the California Gnatcatcher. The commenter does not provide any substantial evidence of any threatened or endangered wildlife species or habitat for such species on the Project Site.

Response ORG 1a-15

Section 4.3, Air Quality, of the DEIR concluded that the Project would result in a less than significant impact to air quality with the mitigation measures proposed. The Project will increase the number of trees on the Project site from 411 trees to approximately 1,864 trees. This is more than 4 times the number of existing trees which will contribute in annual carbon dioxide absorption. Further, the Project would be consistent with the requirements of the CALGreen Code and County Green Building Ordinance, which include building energy and water efficiency improvements such as low-E, dual pane windows block 95 percent of UV rays and Low-flow water fixtures and native landscaping (See PDFs AQ-1 and GHG 1 and 2). As shown in Table 4.8-7, the Project would meet the 2022 Building Energy Efficiency standards and CALGreen Code (Title 24, Parts 6 and 11). Consistency with the requirements of the CALGreen Code and County Green Building Ordinance address many of the same building energy and water efficiency improvements noted in the comment. Additionally, the proposed Project would not include any natural gas infrastructure and would use all-electric appliances (see PDF GHG-2).

The Project would also be consistent with the 2022 CALGreen Code and County Green Building Ordinance requirements aimed at reducing indoor and outdoor water consumption and increasing the use of gray and recycled water. Thus, the Project would be consistent with—and in some instances, exceed CALGreen Code and the County's Green Building Ordinance by forgoing the installation of natural gas infrastructure. Further, on-road haul trucks were appropriately analyzed for noise impacts as discussed on DEIR page 4.13-30 and shown in Table 4.13-15 on DEIR page 4.13-31. As discussed therein, impacts were determined to be less than significant. No additional mitigation measures are required and no changes to the environmental impact determinations in the DEIR are required.

Response ORG 1a-16

See Section 4.19 Utilities and Service Systems for a discussion on water supply. The Project will increase potable water demands; however, this increase fits within the anticipated increase in water demands as planned within WVWD's service area as described within the WVWD 2020 UWMP, which has planned for normal, dry and multiple dry years. Therefore, Section 4.19 Utilities and Service Systems of the DEIR concluded that there are adequate water supplies to support this Project in normal, dry and multiple dry year climate scenarios (Fuscoe 2023c).

The Royal Vista Residential Project has no known affiliation or relationship with any "potential subsequent projects on the remaining parcels" mentioned in the comment. Further, as set forth in Response FORM 1-2 and Response AG 5-8, no general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the adjacent golf course properties (Sunjoint Property), nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. The commenter does not provide any evidence that a project on the Sunjoint Property was proposed, officially announced or otherwise identified prior to the release of the NOP for the Project. As such, potential future development of the adjacent property is not properly considered a cumulative project. The WVWD Will-Serve letter was issued to provide domestic and reclaimed water to the proposed Royal Vista Residential Project with 360 dwelling units.

Response ORG 1a-17

The commenter expresses views regarding the use of recycled water, but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA. It is further noted that the Project does not propose the use of recycled wastewater for drinking water.

Response ORG 1a-18

Comment noted. The commenter suggests that the EIR should do a LCA which includes topics that are not relevant to the established CEQA issues and does not need to be addressed in the DEIR. In accordance with State CEQA Guidelines Section 15121(a), the purpose of a Draft EIR is to serve as an informational document that will generally inform public agency decision makers and the public of the significant environmental effects of a proposed project, and possible ways to minimize those significant effects. The Draft EIR evaluates impacts that could result from implementation of the Project as compared to the existing conditions including a comprehensive GHG emissions analysis and Cumulative Impact analyses. This DEIR is for the Royal Vista Residential Project, which is a proposed 360 dwelling unit development on approximately 75 acres with approximately 37 percent open space. To the extent the commenter's reference to "remaining acres at risk" is intended to refer to the adjacent golf course property, this property is not part of the Project Site, is not owned or controlled by the subdivider, and is not the subject of an approved or proposed development project. See Response FORM 1-2]. See DEIR Section 3.1.5 and Table 3-1 for discussion and listing of cumulative projects.

Response ORG 1a-19

The commenter makes concluding remarks, but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA. See Response ORG 1-11, regarding transparency and community engagement.

From: Royal Vista Open Space <saveroyalvista@gmail.com>
Sent: Thursday, January 4, 2024 1:18 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: DEIR Comment from SCAQMD Project No. PRJ2021-002011

ORG 1b-1

Dear Marie,

Please include the attached as part of public comments on the Draft EIR for the Royal Vista Residential Project.

--
Royal Vista Open Space
Nonprofit Organization
SaveRoyalVista.com
Facebook | Instagram

South Coast
Air Quality Management District
South Coast AQMD
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

December 12, 2022

SENT VIA E-MAIL:
mpavlovic@planning.lacounty.gov
Marie Pavlovic, Senior Planner
The County of Los Angeles
Planning Subdivisions Section
320 West Temple Street
Los Angeles, California 90012

Notice of Preparation of a Draft Environmental Impact Report for the Royal Vista Residential and Parks Project

South Coast Air Quality Management District (South Coast AQMD) staff appreciates the opportunity to comment on the above-mentioned document. Our comments are recommendations on the analysis of potential air quality impacts from the Proposed Project that should be included in the Draft Environmental Impact Report (EIR). Please send a copy of the Draft EIR upon its completion and public release directly to South Coast AQMD as copies of the Draft EIR submitted to the State Clearinghouse are not forwarded. **In addition, please send all appendices and technical documents related to the air quality, health risk, and greenhouse gas analyses and electronic versions of all emission calculation spreadsheets, and air quality modeling and health risk assessment input and output files (not PDF files). Any delays in providing all supporting documentation for our review will require additional review time beyond the end of the comment period.**

CEQA Air Quality Analysis

Staff recommends that the Lead Agency use South Coast AQMD's CEQA Air Quality Handbook and website[1] as guidance when preparing the air quality and greenhouse gas analyses. It is also recommended that the Lead Agency use the CalEEMod[2] land use emissions software, which can estimate pollutant emissions from typical land use development and is the only software model maintained by the California Air Pollution Control Officers Association.

ORG 1b-2

South Coast AQMD has developed both regional and localized significance thresholds. South Coast AQMD staff recommends that the Lead Agency quantify criteria pollutant emissions and compare the emissions to South Coast AQMD's CEQA regional pollutant emissions significance thresholds[3] and localized significance thresholds (LSTs)[4] to determine the Proposed Project's air quality impacts. The localized analysis can be conducted by either using the LST screening tables or performing dispersion modeling.

The Lead Agency should identify any potential adverse air quality impacts that could occur from all phases of the Proposed Project and all air pollutant sources related to the Proposed Project. Air quality impacts from both construction (including demolition, if any) and operations should be calculated. Construction-related air quality impacts typically include, but are not limited to, emissions from the use of

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[1] South Coast AQMD's CEQA Handbook and other resources for preparing air quality analyses can be found at: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook.

[2] CalEEMod is available free of charge at: www.caleemod.com.

[3] South Coast AQMD's CEQA regional pollutant emissions significance thresholds can be found at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf.

[4] South Coast AQMD's guidance for performing a localized air quality analysis can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/localized-significance-thresholds.

heavy-duty equipment from grading, earth-loading/unloading, paving, architectural coatings, off-road mobile sources (e.g., heavy-duty construction equipment) and on-road mobile sources (e.g., construction worker vehicle trips, material transport trips, and hauling trips). Operation-related air quality impacts may include, but are not limited to, emissions from stationary sources (e.g., boilers and air pollution control devices), area sources (e.g., solvents and coatings), and vehicular trips (e.g., on- and off-road tailpipe emissions and entrained dust). Air quality impacts from indirect sources, such as sources that generate or attract vehicular trips, should be included in the analysis. Furthermore, emissions from the overlapping construction and operational activities should be combined and compared to South Coast AQMD's regional air quality CEQA _**operational**_ thresholds to determine the level of significance.

If the Proposed Project generates diesel emissions from long-term construction or attracts diesel-fueled vehicular trips, especially heavy-duty diesel-fueled vehicles, it is recommended that the Lead Agency perform a mobile source health risk assessment[5].

Sensitive receptors are people that have an increased sensitivity to air pollution or environmental contaminants and include schools, daycare centers, nursing homes, elderly care facilities, hospitals, and residential dwelling units. The Proposed Project will include, among others, 360 residential units and is located in close proximity to State Route 60, and to facilitate the purpose of an EIR as an informational document, it is recommended that the Lead Agency perform a mobile source health risk assessment[5] to disclose the potential health risks[6].

ORG 1b-2 Cont.

In the event that implementation of the Proposed Project requires a permit from South Coast AQMD, South Coast AQMD should be identified as a Responsible Agency for the Proposed Project in the Draft EIR. The assumptions in the air quality analysis in the EIR will be the basis for evaluating the permit under CEQA and imposing permit conditions and limits. Questions on permits should be directed to South Coast AQMD's Engineering and Permitting staff at (909) 396-3385.

The California Air Resources Board's (CARB) *Air Quality and Land Use Handbook: A Community Health Perspective*[7] is a general reference guide for evaluating and reducing air pollution impacts associated with new projects that go through the land use decision-making process with additional guidance on strategies to reduce air pollution exposure near high-volume roadways available in CARB's technical advisory[8].

Mitigation Measures

In the event that the Proposed Project results in significant adverse air quality impacts, CEQA requires that all feasible mitigation measures that go beyond what is required by law be utilized to minimize these impacts. Any impacts resulting from mitigation measures must also be analyzed. Several resources to assist the Lead Agency with identifying potential mitigation measures for the Proposed Project include South Coast AQMD's CEQA Air Quality Handbook,[9] South Coast AQMD's Mitigation Monitoring and Reporting Plan for the 2022 Air Quality Management Plan,[10] and Southern California Association of

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[5] South Coast AQMD's guidance for performing a mobile source health risk assessment can be found at: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook/mobile-source-toxics-analysis.

[6] *Ibid.*

[7] CARB's *Air Quality and Land Use Handbook: A Community Health Perspective* can be found at: http://www.arb.ca.gov/ch/handbook.pdf.

[8] CARB's technical advisory can be found at: https://www.arb.ca.gov/ch/landuse.htm.

[9] https://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook

[10] South Coast AQMD's 2022 Air Quality Management Plan can be found at: http://www.aqmd.gov/home/air-quality/clean-air-plans/air-quality-mgt-plan (Chapter 4 - Control Strategy and Implementation).

Government's Mitigation Monitoring and Reporting Plan for the 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy.[11].

Mitigation measures for operational air quality impacts from other area sources that the Lead Agency should consider in the Draft EIR may include the following:

- Maximize use of solar energy by installing solar energy arrays.
- Use light colored paving and roofing materials.
- Utilize only Energy Star heating, cooling, and lighting devices, and appliances.
- Use of water-based or low VOC cleaning products that go beyond the requirements of South Coast AQMD Rule 1113.

Many strategies are available to reduce exposures, including, but are not limited to, building filtration systems with MERV 13 or better, or in some cases, MERV 15 or better is recommended; building design, orientation, location; vegetation barriers or landscaping screening, etc. Enhanced filtration units are capable of reducing exposures. However, enhanced filtration systems have limitations. For example, in a study that South Coast AQMD conducted to investigate filters[12], a cost burden is expected to be within the range of $120 to $240 per year to replace each filter panel. The initial start-up cost could substantially increase if an HVAC system needs to be installed and if standalone filter units are required. Installation costs may vary and include costs for conducting site assessments and obtaining permits and approvals before filters can be installed. Other costs may include filter life monitoring, annual maintenance, and training for conducting maintenance and reporting. In addition, because the filters would not have any effectiveness unless the HVAC system is running, there may be increased energy consumption that the Lead Agency should evaluate in the Draft EIR. It is typically assumed that the filters operate 100 percent of the time while residents are indoors, and the environmental analysis does not generally account for the times when the residents have their windows or doors open or are in common space areas of the project. These filters have no ability to filter out any toxic gases. Furthermore, when used filters are replaced, replacement has the potential to result in emissions from the transportation of used filters at disposal sites and generate solid waste that the Lead Agency should evaluate in the Draft EIR. Therefore, the presumed effectiveness and feasibility of any filtration units should be carefully evaluated in more detail prior to assuming that they will sufficiently alleviate exposures to diesel particulate matter emissions.

ORG 1b-2 Cont.

South Coast AQMD staff is available to work with the Lead Agency to ensure that air quality, greenhouse gas, and health risk impacts from the Proposed Project are accurately evaluated and mitigated where feasible. If you have any questions regarding this letter, please contact me at swang1@aqmd.gov.

Sincerely,

Sam Wang

Sam Wang
Program Supervisor, CEQA IGR
Planning, Rule Development & Implementation

SW
LAC221108-06
Control Number

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[11] Southern California Association of Governments' 2020-2045 RTP/SCS can be found at: https://www.connectsocal.org/Documents/PEIR/certified/Exhibit-A_ConnectSoCal_PEIR.pdf.

[12] This study evaluated filters rated MERV 13 or better. Accessed at: http://www.aqmd.gov/docs/default-source/ceqa/handbook/aqmdpilotstudyfinalreport.pdf. Also see 2012 Peer Review Journal article by South Coast AQMD: https://onlinelibrary.wiley.com/doi/10.1111/ina.12013.

Response to Comment Letter ORG 1b

South Coast Air Quality Management District

Response ORG 1b-1

This comment letter, dated December 12, 2022, was submitted in response to the Notice of Preparation (NOP) for the proposed Project, and is not a comment on the DEIR. However, this NOP comment letter was resubmitted during the DEIR public review period by Royal Vista Open Space Nonprofit Organization and therefore is included in the FEIR.

Response ORG 1b-2

The original comment letter received from South Coast AQMD was originally received on December 12, 2022 during the public circulation of the NOP. The comment letter includes recommendations from South Coast AQMD on the analysis of potential air quality impacts from the proposed Project that should be included in the DEIR. In response, the DEIR Section 4.3 Air Quality and Section 4.8 Greenhouse Gas Emissions were prepared in accordance with South Coast AQMD's recommendations. In addition, although the Notice of Availability of the DEIR was sent to South Coast AQMD for review, South Coast AQMD did not provide a comment letter on the DEIR. The DEIR circulated for a 67-day public review period, which exceeds the 45-day public review period required by the CEQA Guidelines.

ROWLAND HEIGHTS
COMMUNITY COORDINATING COUNCIL

"IMPROVING OUR COMMUNITY"

WWW.ROWLAND-HEIGHTS.ORG

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Wanda Ewing

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Ted Ebenkamp

January 1, 2024

Marie Pavlovic
Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012
MPavlovic@planning.lacounty.gov

Subject: Draft Environmental Impact Report for the Royal Vista Residential and Parks Project (Project No. PRJ2021-002011)

Dear Ms. Pavlovic:

The Rowland Heights Community Coordinating Council ("RHCCC") has reviewed the Draft Environmental Impact Report (DEIR) from the Los Angeles County Department of Regional Planning ("LACDRP") for the Royal Vista Residential and Parks Project ("Project"). RHCCC appreciates the opportunity to provide comments regarding aspects of the Project that will affect the Rowland Heights community.

RHCCC is an organization formed to serve as a liaison between the local community and various entities such as local government, businesses, schools, and nonprofit organizations. Its purposes include community representation of interests and concerns of the residents to Los Angeles County and other relevant governmental entities. It serves as a platform for community members to voice their opinions and address local issues. The council disseminates important information to the community and advocates for policies or changes that align with the interests and needs of the community in areas such as infrastructure, public safety, housing, economic development, and education.

After review of the DEIR, RHCCC would like to highlight certain issues the DEIR has not adequately addressed pertaining to environmental impacts of this Project.

ORG 2-1

1. Traffic

ORG 2-2

The DEIR lacks a comprehensive traffic analysis for the anticipated increase in vehicles along Colima Rd. between Desire Ave. and S. Larkvane Rd., an area already prone to persistent traffic congestion. The deterioration of traffic congestions and mitigations of such congestions have not been studied nor addressed. This area of traffic congestion is one of the greatest concerns for Rowland Heights residents.

ORG 2-3

In addition, there is no proposed installation of a traffic signal at the intersection of Walnut Leaf Drive and Colima Road. This omission raises concerns regarding the safety of residents executing left-hand turns from Walnut Leaf onto Colima. Considering the influx of additional vehicles stemming from the proposed development, the *Traffic Impact Assessment* report predicts a downgrade in the level of service from D to F at the Walnut Leaf and Colima Road intersection, and a decline from a level of service of C to F at the Tierra Luna and Colima intersection. These projected deteriorations in traffic service levels have not been addressed, nor have safety concerns been mitigated. These two issues have raised considerable doubts for the traffic study.

2. Reduced Lot Size

ORG 2-4

The reduced lot size certainly will have some unique challenges on the usability issues for single-family residential zone. The overall community's parking will likely be insufficient and inevitably overflow into the surrounding streets and/or the neighborhood.

Let's assume using a reduced lot width frontage of 40 feet, for example, the front of each lot will only have 20 feet for the guest/delivery truck parking which is barely sufficient for one passenger vehicle to park without intruding any driveway. LA County's residential parking standard requires that no blockage for each driveway, not even with the property owner's own vehicle, is allowed. This tight spacing of driveway will be further aggravated by the required fire hydrants which are generally spaced every 300 feet apart alternating locate on each side of a road.

Second, the driveway depth is potentially be reduced to making driveway parking impractical even for lot residents parking. Therefore, all vehicles such as street cleaning, mail trucks, and trash hauling trucks will all be negatively impacted.

Unlike a typical condominium complex, this proposed project does not show any extra visitors' parking in the preliminary site plan at all. In short, we strongly oppose to the minimum lot sizes of 5,000 sq. feet. It will irreversibly damage the current Rowland Heights community standards and our existing quality of living.

3. **Loss of Open Space**

The Project is located in the Unincorporated La Habra Heights - Rowland Heights study area established as part of the 2016 Parks Needs Assessment ("PNA"). The study area has approximately 1.2 acres of parkland per 1,000 residents, which is much lower than the countywide average of 3.3 acres of parkland per 1,000 residents. According to the *East San Gabriel Valley Area Plan* for Rowland Heights, thirty three percent (33%) of the community has a very high or high need of additional park space.

As part of the 2016 PNA, community members identified the need for a new community park at the Project site funded by Measure A. As of now, the County has yet to initiate the acquisition of parcels for the proposed new park. RHCCC demands a detailed report on the allocation and utilization of Measure A funds.

ORG 2-5

4. **Sunjoint Development**

The western portion of the golf course has been sold to Sunjoint. Sunjoint is proposing 420 homes directly adjacent to the Project. The DEIR failed to address the cumulative effect of the Sunjoint project regarding traffic congestion, water supplies, air quality and noise. Cumulative impacts refer to the effects of a project when combined with other reasonably foreseeable future projects. The purpose of studying cumulative effects under CEQA is to understand the combined potential adverse effects of multiple projects on the environment over time and implement mitigating measures to minimize negative environmental effects on the community.

ORG 2-6

We appreciate the opportunity to comment on the Project. RHCCC requests an opportunity to review and comment on any response that the LA County DRP has to our comments and to receive notification of any forthcoming hearing date(s) for the Project as well as any related adjacent residential developments.

Sincerely,

Cary Chen

Cary Chen
President, RHCCC

CC: Amy Bodek -LA County Planning Department
Cindy Chen - First District
Ryan Serrano - First District
Guadalupe Duran-Medina - First District
Waqas Rehman - First District

ORG 2-7

Response to Comment Letter ORG 2

Rowland Heights Community Coordinating Council

Response ORG 2-1

Comment noted. As demonstrated by the comments and responses below, the DEIR is comprehensive and has been completed in accordance with the County and CEQA Guidelines

Response ORG 2-2

Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, traffic impacts under CEQA are analyzed in terms of Vehicle Miles Traveled (VMT), and not in terms of automobile delay as described by Level of Service (LOS) or similar measures of vehicular capacity or traffic congestion. Section 4.17 of the DEIR therefore evaluates VMT in lieu of vehicular road capacity and congestion in order to determine the significance of transportation impacts. The specific thresholds of significance used to evaluate the potential transportation impacts of the Project are provided on page 4.17-13 of the DEIR. Mitigation Measures TR-1 and TR-2 are provided on page 4.17-20 related to the Project's significant VMT impact.

Although changes in LOS or other measures of congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development projects under CEQA, a "non-CEQA" Operational Analysis was also conducted for the proposed Project in accordance with the Los Angeles County Public Works (LACPW) "Transportation Impact Analysis Guidelines" (TIA Guidelines). This analysis is provided beginning on page 64 of the Transportation Impact Analysis (TIA) which is included in Appendix M of the DEIR. The TIA Guidelines state: "Intersection level of service (LOS) and queuing methodologies from the latest edition of the Transportation Research Board Highway Capacity Manual (HCM) should be used to evaluate the operation of the project driveways and nearby intersections." As a result of the non-CEQA Operational Analysis, Project Design Features (PDF) T-3 through T-8 were identified and included as part of the Project. The PDF T-3 through T-8 improvements are described on pages 4.17-24 through 4.17-29 of the DEIR.

Response ORG 2-3

The signal warrant analysis which was prepared for the intersection of Colima Road and Walnut Leaf Drive is described on page 4.17-24 of the DEIR, and on page 15 of the TIA provided in Appendix M of the DEIR. The four signal warrants evaluated for the Walnut Leaf Drive/Colima Road intersection included three warrants based on vehicular volumes and one warrant based on existing collision records. The warrant analysis determined that based on the strict application of the warrant criteria, the warrants were not met for this intersection.

Impact TR-3 provided on pages 4.17-23 of the DEIR concludes that the Project would not substantially increase hazards due to a geometric design feature. The commenter states there are "safety concerns" at two intersections but does not present any analysis or data to support the assertion. Further, the commenter does not state how the Project would degrade safety at these intersections.

Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. Accordingly, mitigation measures are not required to be identified in the DEIR related to potential changes in Level of Service due to Project-related traffic. See Response FORM 1-3.

Section 8.3.4 beginning on page 106 of the TIA provided in Appendix M of the DEIR, discusses that at two-way stop-controlled intersections such as the Project Driveway-Walnut Leave Drive/Colima Road intersection, the Level of Service (LOS) associated with the most constrained minor street approach is reported as the overall intersection LOS. The Walnut Leaf Drive approach is expected to operate at LOS F. The proposed project driveway is expected to operate at LOS C or better under all analysis conditions. Project Design Feature (PDF) T-6, which is described on page 4.17-27 of the DEIR, consists of restriping Walnut Leaf Drive in order to provide one southbound departure lane as well as one shared left-through lane and one right-turn lane on the northbound approach. The LOS at the subject intersection with implementation of PDF T-6 is presented in Table 8-2 on page 104 of the TIA. As shown in Table 8-2, the proposed restriping is expected to result in LOS D or better on the Walnut Leaf Drive approach. A conceptual plan of the proposed improvement is provided in Appendix Figure F-4 on page F-337 of the TIA.

The Tierra Luna-Project Driveway/Colima Road intersection was conservatively analyzed as a two-way stop-controlled intersection. PDF T-7 on page 4.17-28 of the DEIR describes the planned relocation of the existing signalized golf cart and pedestrian crossing to the Tierra Luna-Project Driveway/Colima Road intersection in order to provide traffic signal control at the intersection. The LOS at the subject intersection with implementation of PDF T-7 is presented in Table 8-2 on page 104 of the TIA. Table 8-2 shows the signalization of the Tierra Luna/Colima Road intersection is expected to result in LOS A at this location. It should be noted, the Project includes design improvements based on the non-CEQA transportation operational analysis, even though the TIA found no mitigations measures were necessary.

Response ORG 2-4

Under CEQA parking is not considered an environmental impact. Parking is considered a social impact and there is no evidence of a safety issue or any other CEQA issue regarding Project parking areas. As discussed in Section 4.11, Land Use and Planning, the proposed Project would comply with provisions of the County Zoning Ordinance (LACC Title 22), which implements the General Plan, inclusive of its Community Plans. LACC Section 22.18.060 requires automobile parking for a planned residential development in an amount adequate to prevent traffic congestion and excessive on-street parking; provided that in no event shall less than one covered parking space per dwelling unit be provided, or less than 50 percent of the required number of parking spaces for public assembly or recreational uses. The required covered parking for all units would be provided in the two-car garages. The townhomes in Planning Area 3 would also provide 63 guest parking spaces which is 47 more spaces than required by the LACC. Additionally, the private driveway and fire lane system within Planning Areas 1, 2, and 5 are designed to accommodate on-street parking.

Regarding reduced setbacks, the standard front yard depth of 20 feet is proposed for the single-family and duplex lots. The unit garage would be street facing; therefore, the driveway would be 20 feet in length. Reduced front yard depths are proposed for the triplex lots and the townhouse lot (Planning Area 3), at 10 and 12 feet deep, respectively. The triplexes and townhouses have interior facing garages, which means the garages would be accessed via an interior driveway. No parking would be allowed in the interior private driveways. Further LACC 22.18.010B.2 permits flexibility in establishing the Residential Planned Development Zone to promote residential amenities beyond those expected under conventional development, to achieve greater flexibility in design, to encourage well-planned neighborhoods through creative and imaginative planning, and to provide for appropriate use of land which is sufficiently unique in its physical characteristics or other circumstances to warrant special methods of development. The Project also includes inclusionary housing and is therefore entitled to an incentive and development standard modification under the Inclusionary Housing Ordinance (Chapter 22.122).

Response ORG 2-5

Section 4.16, Recreation, concluded that impacts to local and regional parks, and other recreational facilities would be less than significant and would not require mitigation. To satisfy the Project’s Quimby park obligation requirement, the subdivider will pay in-lieu fees in the amount of $986,332 which will be used by the Department of Parks and Recreation (DPR) to improve existing parks and/or develop additional parkland in the Rowland Heights area. Also, the Project includes approximately 28 acres of publicly accessible open space onsite which exceeds the 3.52-acre parkland dedication requirement indicated on DPR’s Park Obligation Report dated April 17, 2023, Park Obligation Report (see Appendix L of the DEIR) and ensures that the Project would meet the additional park and recreation needs created by the Project and expected population increase. The commenter’s request for a detailed report on the allocation and utilization of Measure A funds is not relevant to the CEQA analysis of the Project.

Response ORG 2-6

No general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the adjacent golf course properties (Sunjoint Property), nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. See Response FORM 1-2. The sale of the Sunjoint Property and the website posting by the community group Save Royal Vista Open Space (not the Sunjoint Property owner or developer) do not establish that a project on that site is “reasonably foreseeable.” CEQA Guidelines Section 15125(a) requires EIRs to contain a description of the physical environmental conditions in the vicinity of the project as they exist at the time the Notice of Preparation (NOP) for the Project is published, or if no NOP is published, at the time environmental analysis is commenced. The NOP release date for the Royal Vista Residential Project was October 13, 2022, which establishes the cut-off date for consideration of cumulative projects. The commenter does not provide any evidence that a project on the Sunjoint Property was proposed, officially announced or otherwise identified prior to the release of the NOP for the Project. See Response AG 5-8.

Response ORG 2-7

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

The RHCCC has been added to the Zoned District Courtesy List for the San Jose and Walnut Zoned Districts. Therefore, the RHCCC will receive notifications for the Project and all other discretionary projects within these Zoned Districts going forward.

Dear Marie,

Please include the attached letter from Bradley Pierce, Esq. as part of public comments on the Draft EIR for the Royal Vista Residential Project.

ORG 3a-1

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Royal Vista Open Space
Nonprofit Organization
SaveRoyalVista.com
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A PROFESSIONAL CORPORATION

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OUR FILE NO.
7696.001
SENDER'S EMAIL ADDRESS
BPierce@piercefirm.com

November 1, 2022

VIA EMAIL ONLY
Marie Pavlovic - mpavlovic@planning.lacounty.gov
LA County Planning
Subdivisions Section
320 West Temple Street
Los Angeles, CA 90012

Re: Project PRJ 2021-002011

ORG 3a-2

Dear Ms. Pavlovic:

This letter is for Los Angeles County Department of Regional Planning's consideration in connection with review of Project PRJ 2021-002011, the related requests for consideration by DRP[1] and the upcoming scoping meeting. Please make this correspondence part of the administrative record for the Project.

As you know, we represent Royal Vista Open Space "RVOS", a non-profit whose members include concerned citizens and property owners surrounding the Royal Vista Golf Course, including owners of benefitted parcels under the Declaration of Protective Restrictions (the "Restrictive Covenant") that burdens a number of the parcels (collectively the "servient tenements") that are the subject of the Project.

ORG 3a-3

There is no basis for DRP to proceed with the scoping meeting or other environmental review at this time. The Restrictive Covenant expressly prohibits the change in use of the servient tenements contemplated by the Project. In addition to the numerous adverse environmental impacts that cannot be mitigated, as discussed by the agencies and departments commenting on the proposed project, any environmental analysis, including the scoping meeting, is unrelated to the environmental conditions that may exist fifteen years in the future, if the conditions to termination of the Restrictive Covenant are ever met.

As DRP is aware, the Restrictive Covenant, dated December 16, 1961, recorded with the County Recorder December 29, 1961, limits the use of six of the large parcels

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[1] Royal Vista Residential and Parks Project, Project No. PRJ2021- 002011-(1) / Vesting Tentative Tract Map No. TR83534 (RPPL2021007149) / General Plan Amendment No. RPPL2021004860 / Zone Change No. RPPL2021007152 / Conditional Use Permit No. RPPL2021007151 / Housing Permit No. RPPL2021007161 / Environmental Assessment No. RPPL2021007150

that make up the Project, to golf course and country club uses. The language is unambiguous and provides:

> All property described herein shall be used only for the purpose of a golf and country club and its appurtenances, including golf tees, greens, fairways and rough, water storage and landscaping. (Art. II, ¶ 1.)

The changes in use proposed by the proponent of the Project violate this restriction. The Restrictive Covenant is not optional or a guideline, it is the obligation of the owner(s) of the servient tenements, that benefits the surrounding homeowners. It remains in full force and effect until January 31, 2036, and only terminates then if certain conditions are met, regardless of changes to the zoning or permitted land uses. Accordingly, the scoping meeting and the associated work and review by the responsible governmental departments and agencies are premature and a waste of resources.

The Restrictive Covenant provides for an initial term that ran through January 31, 2016, which automatically renewed at that time, for a period of 20 years. The Covenant provides:

> All of the conditions and restrictions set forth in this declaration shall run with the land and continue to be in full force and effect until January 31 2016, and shall, as then in force, be continued automatically and without further notice from that time for a period of twenty (20) years, and thereafter for a successive period of twenty (20) years, unless, within the six months prior to expiration of any period as set forth hereinabove, the then owners of the property covered in this declaration shall be able to show that the property is no longer suitable for use as a golf course. (Art. III.)

ORG 3a-3
Cont.

Accordingly, as of February 1, 2016, the Restrictive Covenant was renewed for an additional 20 years. It happened automatically at that time. No subsequent act of any party changes what occurred in the past.

While the proponent has argued that the six months language only qualifies the time frame for suitability, they are incorrect. In fact, we have requested that they provide legal authority or common-sense rationale for rewriting the language that required the then owners to provide proof that the property "**is** [not 'was'] **no longer suitable**" for use as a golf course six months **prior to expiration** of any period provided for in the declaration. They were unable to provide any legal authority or rationale.

The limited explanation provided to DRP that the document recorded five and a half years after the deadline, by the owner of a portion of the servient tenement and operator of the business, is somehow effective to wipe the Restrictive Covenant relied upon by hundreds of surrounding homeowners, is specious. If the proponent's rationale was correct, there would be no need to limit the time frame to six months before the natural expiration. It would simply read that after the initial term, once the property is no longer suitable, the restriction would terminate. The six-month provision is a notice provision, it does not qualify when the course becomes unsuitable.[2]

Before additional resources are wasted, DRP should require the proponent to demonstrate that it has obtained title to the rights described in the Restrictive Covenant. Until then, any environmental review is premature, including the scoping meeting. No one can predict the environment that will be in place in 2036 or 2056 when the Restrictive Covenant has run its course.

ORG 3a-3
Cont.

The proponent of the Project does not dispute that the Restrictive Covenant exists. They do not dispute that the restriction prevents the development they propose. Their only argument is that five and a half years after the Restrictive Covenant automatically renewed by its own terms, they wanted to change the use so they claim that five and a half years earlier the golf course was not profitable.

If you have any questions or need clarification concerning the enforceability of the Restrictive Covenant, please do not hesitate to contact me by phone or email at the contact information above.

Thank you,

ORG 3a-4

Bradley D. Pierce

BDP/dot

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[2] Additionally, the after-the-fact declaration does not address suitable of the property as a golf course, it simply claims that 5 ½ years earlier the way the course was managed, it was not profitable. Even if that statement is accurate, profitability is not synonymous with suitability.

Response to Comment Letter ORG 3a

Pierce Law Firm

Response ORG 3a-1

This comment letter, dated November 1, 2022, was submitted in response to the Notice of Preparation (NOP) for the proposed Project, and is not a comment on the DEIR. However, this NOP comment letter was resubmitted during the DEIR public review period by Royal Vista Open Space Nonprofit Organization and therefore is included in the FEIR.

Response ORG 3a-2

This comment letter, dated November 1, 2022, was submitted in response to the Notice of Preparation (NOP) for the proposed Project, and is not a comment on the DEIR. However, this NOP comment letter was resubmitted during the DEIR public review period by a resident and therefore is included in the FEIR.

The comment was submitted prior to release of the DEIR, and does not state a concern about the adequacy of the DEIR or otherwise provide a comment on the contents of the DEIR analysis.

Response ORG 3a-3

The commenter argues that the Project Site is subject to private restrictions, but does not state a specific concern about the adequacy of the DEIR or otherwise provide specific comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

It is further noted that the commenter's assertions reflect an apparent dispute between private parties that would be resolved by a court of law, not the County, as a determination of the legality of limitations in a private document is not within the purview or jurisdiction of the County. See LA County Planning's Department Statement, Board of Supervisors meeting: October 19, 2021.

Response ORG 3a-4

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Please also include this attached letter from Bradley Pierce, Esq.
Thank you

On Thu, Jan 4, 2024 at 2:20 PM Royal Vista Open Space <saveroyalvista@gmail.com> wrote:

> Dear Marie,
>
> Please include the attached letter from Bradley Pierce, Esq. as part of public comments on the Draft EIR for the Royal Vista Residential Project.
>
> --
> **Royal Vista Open Space**
> **Nonprofit Organization**
> SaveRoyalVista.com
> Facebook | Instagram

ORG 3b

Gmail

Royal Vista Golf Course

3 messages

Bradley D. Pierce <bpierce@piercefirm.com> Wed, Mar 30, 2022 at 10:14 AM
To: "PChou@planning.lacounty.gov" <PChou@planning.lacounty.gov>
Cc: "Linda S. Dahlke" <ldahlke@piercefirm.com>

We represent Royal Vista Open Space, the non profit consisting of members that own property benefitted by the restrictive covenant that limits the use of the golf course. As you know from interacting with some of our members, they oppose the project and believe that the proposed development would be in violation of the restrictive covenant and the County General Plan.

We have reached out to counsel for the project proponent (Plan Amendment No. 2021004860) and have explained that the after-the-fact document prepared 5 ½ years after the deadline is both insufficient to demonstrate that the property is "no longer suitable for use as a golf course" and not an accurate legal interpretation of the language in the covenant requiring the suitability determination to be six months prior to the expiration of the initial term.

Additionally, the claim in a preliminary title report that the covenant will be removed once golf course operations cease, is not accurate. Like the project proponent, we have not obtained a formal title insurance coverage opinion; however, our preliminary conversations with Chicago Title indicate that the interpretation proffered by the project proponent is not legally viable.

We understand that DRP does not involve itself in that legal issue and we will seek an injunction when the time is right; however, I did want to make it clear that the owners you have been working with are not just complaining NIMBYs, but they have a much better legal (and common sense) interpretation of the contract that is the restrictive covenant.

We have reached out to DRP and have asked to be placed on a mailing list or list of interested parties to be given notice of DRP proceedings involving the proposed plan amendment and the project. We were informed that there is no list of individuals or entities that are given notice of the proposed plan amendment or the proposed project. That does not sound accurate to me. I assume that stake holders and neighbors must be give notice and we would like to be added to that list (electronic notice is fine). Once the CEQA process starts, we will ask to be put on that list as well.

ORG
3b-1
Cont.

If you have any questions or comments, please do not hesitate to email or call. Thank you.

ORG
3b-2

Bradley D. Pierce, Esq.

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Response to Comment Letter ORG 3b

Pierce Law Firm-email

Response ORG 3b-1

This comment letter, dated November 1, 2022, was submitted in response to the Notice of Preparation (NOP) for the proposed Project, and is not a comment on the DEIR. However, this NOP comment letter was resubmitted during the DEIR public review period by Royal Vista Open Space Nonprofit Organization and therefore is included in the FEIR.

Response ORG 3b-2

The commenter argues that the Project Site is subject to private restrictions, but does not state a specific concern about the adequacy of the DEIR or otherwise provide specific comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

It is further noted that the commenter's assertions reflect an apparent dispute between private parties that would be resolved by a court of law, not the County, as a determination of the legality of limitations in a private document is not within the purview or jurisdiction of the County. See LA County Planning's Department Statement, Board of Supervisors meeting: October 19, 2021.

Response ORG 3b-3

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Dear Marie,

Please include the attached letter from Benjamin Pavone, Esq. as part of public comments on the Draft EIR for the Royal Vista Residential Project.

ORG 4-1

--

Royal Vista Open Space
Nonprofit Organization
SaveRoyalVista.com
Facebook | Instagram

OFFICES OF

PAVONE & FONNER, LLP

A LAW PARTNERSHIP

February 3, 2023

Ms. Marie Pavlovic
Los Angeles County Planning
Subdivision Section
320 West Temple Street
Los Angeles, CA 90012

Re: Proposed Royal Vista Housing Development
Concerns about Valley Fever

Dear Ms. Pavlovic,

ORG 4-2

My office represents Royal Vista Open Space ("RVOS"). RVOS is a non-profit corporation whose members include property owners surrounding the Royal Vista Golf Course and residents of Rowland Heights community at large.

It has come to our attention that the referenced housing project is in the process of obtaining approval to build 360 homes on the Royal Vista Golf Course. This project entails grading, excavation, and re-compaction of 3.6 million cubic yard of soil. As a result of this major movement of soil, members of RVOS are concerned about the possibility of contracting coccidioidomycosis, commonly known as valley fever.

Valley Fever is an expensive and incurable respiratory disease carried by a fungal organism that mostly lives in the soil in Arizona and California. It produces tiny spores that infect humans. About 40% contract the equivalent of the flu; but about 10% of those have complications for life. For them, the disease spreads beyond the lungs to other parts of the body; this is referred to as "disseminated" disease. For this subgroup, it can be debilitating, disfiguring, painful, bankrupting, and if it is not treated aggressively, may result in meningitis, and become fatal.[1]

---

[1] *See generally* Filip & Filip, Valley Fever Epidemic, Golden Phoenix Books (2008) [summarizing 268 published medical studies, professional journal articles, and other authoritative material concerning the disease].

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Visible lesions often spontaneously appear and give the presentation of a medieval disease. Blacks, Filipinos, pregnant women, and other immunocompromised individuals are at especially high risk of severe complications. Here is what it looks like to die from valley fever:

The State of California includes cocci spores among the prohibited agents of biological warfare within the Hertzberg-Alarcon California Prevention of Terrorism Act.[2] The Centers for Disease Control (CDC) requires scientists handling the spores to use protective protocols just one level below that required for handling the deadly hemorrhagic Ebola virus. A lawsuit involving contraction of cocci in 2016 resulted in a damage verdict of $12M on behalf of four highway workers in Kern County.[3] Cocci claims have been extensively litigated by my office against the California prison system.[4]

ORG
4-2
Cont.

In 2019, a case of Valley Fever surfaced during construction of another housing development near the current site. During that construction, hillsides were excavated, dust and other airborne particles circulated throughout the surrounding neighborhood. A female in her seventies found a mass in her lung and was diagnosed with Valley Fever. She is currently under the care of an infectious disease doctor and is taking antifungal medication for life. There are also concerns that dust from excavation can trigger asthma attacks and other respiratory diseases such as mucormycosis.

Currently there is no soil test to determine the existence of cocci spores. If the County approves the project, the protocol outlined in *Coccidioidomycosis (Valley Fever) Management*

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[2] Cal. Pen. Code, § 11419, subd. (b)(4).

[3] *See* Exhibit 1.

[4] *See Hines v. Youseff,* 914 F.3d 1218 (9th Cir.), *cert. denied sub nom. Smith v. Schwarzenegger,* 140 S. Ct. 159 (2019); *see* Exhibit 2.

Plan: Guidelines for Employers should be strictly adhered to in order to mitigate contraction risks.[5] An outreach plan also needs to be implemented to educate the Rowland Heights community about best practices to prevent a possible outbreak, by sending multi-lingual notices to surrounding residents and businesses. Notices and education material should be posted on all social media outlets.

ORG 4-2 Cont.

All involved parties have legal duties of care to prevent known infectious risks. Health officials must take all reasonable measures to avoid the spread of disease.[6] Other parties face tort liability for failure to take sufficient precautions. Suffice to say, if there is a cluster of outbreaks as a result of the proposed construction, there will almost certainly be a mass tort lawsuit.

Accordingly, we encourage all involved to take every conceivable precaution.

Sincerely,

Benjamin Pavone, Esq.
Attorney for Royal Vista Open Space

---

[5] *See* Exhibit 3.

[6] *In re Martin* (1948) 83 Cal.App.2d 164, 167, *citing* Health & Saf. Code, § 2554 [now § 120175]; Health & Saf. Code, § 120185.

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EXHIBIT 1

EXHIBIT 1

DAILY REPUBLIC
Solano County's News Source
FAIRFIELD-SUISUN CITY, CALIFORNIA

Solano jury hits Caltrans with $12M verdict in valley fever suit

By Jess Sullivan

FAIRFIELD — The deceptions and failures of employees of the state's department of transportation resulted in a Solano County jury slapping the agency Thursday with a nearly $12 million damage award.

The judgment against Caltrans was for four workers and the owner of a small construction company doing earth-movement and expanding a culvert in Kern County in 2008.

Siblings Elvie and Mark Hukill, residents of Solano County, along with Oscar Villasenor, Jose Hernandez and Glenn Bugler, sued Caltrans more than six years ago claiming Caltrans should have warned them about the risks of being exposed to valley fever from fungus that was known to be in the soil where the work was done.

The valley fever fungus is found in many areas of the San Joaquin Valley.

Jurors ruled Caltrans employees knew about the risks of valley fever, a debilitating, incurable disease, and that one Caltrans employee deliberately intended to deceive the five workers about the risks of valley fever.

During a civil jury trial spanning four months in the court of Judge Michael Mattice, jurors learned Caltrans employees knew the Kern County project was in an area posing the "highest risk" of developing valley fever and that the Caltrans employees had a map from the Kern County health department showing places where the fungus had been previously in the soil.

Jurors also learned Caltrans had warned its employees in 2007 about the risk of valley fever spores but that warning had never been shared with independent contractors and their employees.

Caltrans lawyers before the trial claimed none of its employees knew fungal spores were present at the construction site.

Two of the sickened construction company's employees are disabled and unable to work and two others who are not fully disabled require accommodations, according to Peter Alfert, lead attorney who handled the lawsuit against Caltrans.

Alfert said he hoped the $11.9 million damage award would prompt Caltrans to take steps to ensure no such actions occur in the future.

"There is no question that our clients will continue to suffer significant health issues in addition to the emotional and psychological damage that was done through the disregard for their well-being," said Alfert. "The jury reached the right conclusion and hopefully this award will help our clients establish some semblance of a new life and help pay for the health care costs they will continue to incur for the remainder of their lives."

Caltrans said in a statement Thursday that "Safety is the department's top priority."

"While we appreciate the time and effort of the jury in this lengthy trial, Caltrans is carefully evaluating all of its options for appeal," the statement read.

Reach Jess Sullivan at 427-6919 or jsullivan@dailyrepublic.net. Follow him on Twitter at www.twitter.com/jsullivandr. Ryan McCarthy contributed to this report.

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Tags: A1, Printed

22 Aug

Girls' Night Out Grows Up

Downtown Theatre, Fairfield 7:00 PM

Jess Sullivan has covered the criminal justice system in Solano County for several years. He also covers police, fire and general assignment. He was an embedded reporter in Iraq in 2003. Reach him at 425-4646, ext. 254, or jsullivan@dailyrepublic.net.

Story Archive

@jsullivandr on Twitter

EXHIBIT 2

EXHIBIT 2

18-1590

No. _____

In the
Supreme Court of the United States

COREY LAMAR SMITH, ET AL.,
Petitioners,

v.

ARNOLD SCHWARZENEGGER, ET AL.,
Respondents.

FILED
JUN 24 2019
OFFICE OF THE CLERK
SUPREME COURT, U.S.

On Petition for Writ of Certiorari to the United States Court of Appeals for the Ninth Circuit

PETITION FOR WRIT OF CERTIORARI

COREY LAMAR SMITH, ET AL.
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JUNE 24, 2019

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SUPREME COURT, U.S.

QUESTIONS PRESENTED

1. Did the Ninth Circuit misapply the clearly established test's generality principles by analyzing the issue so specifically as to create a logical absurdity relative to principles of *Helling v. McKinney*?

2. Did the Ninth Circuit err in applying qualified immunity by misunderstanding the applicable incident rate statistics, which drives the quantum of danger?

3. Can state officials be relieved of responsibility because the California *Plata* health care Receiver allegedly did not order them to take more robust precautions?

PARTIES TO THE PROCEEDING

PETITIONERS AND PLAINTIFFS-APPELLANTS BELOW

Petitioners are 50 current prisoners and 67 formerly-incarcerated private citizens who contracted valley fever while in California state custody, identified as follows:

Petitioners	
Abukar Abdulle	Asad Lewis
Richard Adams	Cleofas Lewis
Ruben Arechiga	George Lewis
David T. Atzet	Joe Lewis
Aubrey Derrico	Robert Maeshack
Garland Baker	Michael Manning
Fredrick Beagle	Daniel Masushige
Don Belardes	Ellis McCloud
Michael Blue	Jeffrey McDonald
Daniel Boland	James McGinley
Floyd Boyd	Charles McQuarn
Ray Bracamonte	Juan Mermejo
Gordon Bruce	Juan Meza
Richard Burke	Thomas Milford
Kevin Call	Dale Miller
Charles Carter	Herschel Mitchell
Pablo Castaneda	Grady Montgomery
Clifford Chaney	Michael Morrow
Otha Clark	Freddy Neal
Robert Conley	Raymond Newson
Kenneth Corley	Chek Ngoun
Roy Corning	Emmanuel Ocular
Walter Cornethan	Sim Peav

Petitioners

David Cox
Orlando Creswell
Danny Dallas
Joe DeJesus
Donald Dibble
Gerald Dickson
Joseph Duran
James Farr
Estate of Joseph Ferris
Alvin Scott Flowers
Steve G. Franklin
Aubrey Galloway
Christopher Garner
Candelario Garza
John Gholar
Robert Gonzalez
Vernon Grant
Robert Harris
Herman Haynes
Clifford Hayter
Sinohe Hercules
Bret Hill
Damor Hill
Ellis Hollis
Jeremy Hollis
Scott Imuta
Infinity (NLN)
Kenji Jackson
Danilo Jalotjot
George Johnson, III
Juan Penalva
Marvin Pierce
Robert Preston
Harvey Rayburn
Jorge A. Reyes
Paul Richardson
Ronald Ripoyla
Jay Roach
Rodney R. Roberts
David Robinson
Peter Romero
Lorenzo Sams
Johnny Sanchez
Tyrone Sanders
Albert Sherrod
Corey Lamar Smith
Kirk Smith
Ed Spence
Willie Steels
Tracy Stewart
Hector Talamantes
Maurice Thomas
Tyrone Thompson
Aaron Tillis
Estate of John Enos
Vance Utley
Patrick Wallace
Kenneth Washington
Byron West
Bertrum Westbrook

Petitioners	
Anthony Jones	Thomas Wiley
Edward Jones	Darren Williams
Lawrence Kerner	Wayne Woods
Milos Klvana	Donald Wright
Bruce Koklich	Gerald Young
Titi Lavea, Jr.	

RESPONDENTS AND DEFENDANTS-APPELLEES BELOW

Respondents are 14 state officials who were connected to the decision process in terms of declining to implement safety precautions to insulate prisoners or otherwise reduce the risk of contraction during the epidemic. They are:

- Arnold Schwarzenegger
  Former Governor of the State of California
- Jeffrey Beard
  Former Secretary of the California
  Department of Corrections and Rehabilitation
- Estate of Paul Brazelton
  Former Warden Pleasant Valley State Prison
- Matthew Cate
  Former Secretary of the California
  Department of Corrections and Rehabilitation
- James Hartley
  Former Warden of Avenal State Prison

- Susan L. Hubbard
  Former Director Division of
  CDCR Adult Operations
- Deborah Hysen
  Director CDCR Facilities
  Planning Construction & Management
- Felix Igbinosa M.D.
  Former Medical Director
  Pleasant Valley State Prison
- Scott Kernan
  Former Chief Deputy Secretary
  of Adult Institutions
- Chris Meyer
  Former CDCR Chief of Facilities Planning
  Construction & Management
- Tanya Rothchild
  Former Chief of the Classification Services Unit
- Teresa Schwartz
  Former Director Division of Adult Institutions
- Dwight Winslow M.D.
  Former CDCR Medical Director
- James A. Yates
  Former Warden of Pleasant Valley State Prison

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TABLE OF AUTHORITIES—Continued

TABLE OF AUTHORITIES—Continued

TABLE OF AUTHORITIES—Continued

PETITION FOR WRIT OF CERTIORARI

Petitioners respectfully request the Court to issue a writ of certiorari to review the judgment of the United States Court of Appeals for the Ninth Circuit.

OPINIONS BELOW

The opinion of the district court was published as *Smith, et al. v. Schwarzenegger, et al.*, 137 F.Supp. 3d 1233 (E.D.Cal.2015). (App.35a). The Ninth Circuit opinion was published as part of a larger consolidated VF appellate effort, denominated as *Hines, et al. v. Youseff, et al.*, 914 F.3d 1218 (9th Cir. 2019). (App.1a). The petition for rehearing was denied on March 26, 2019. (App.158a).

JURISDICTION

The judgment and opinion of the district court were entered on October 23, 2015. (App.35a). Petitioners appealed on October 25, 2015. The Ninth Circuit filed its opinion on February 1, 2019. (App.1a). Petitioners timely sought rehearing on February 13, 2019. The Ninth Circuit denied the petition on March 26, 2019. (App.158a). This petition is timely filed within 90 days, by June 24, 2019.

Federal court jurisdiction is premised on 42 U.S.C. § 1983, with federal appellate court jurisdiction founded on 28 U.S.C. § 1291. This Court's appellate jurisdiction is premised on 28 U.S.C. § 1254(1) and § 2101(c).

◆

INTRODUCTION

This petition is presented by 117 personal injury victims, consisting of 50 current and 67 former California state inmates subjected to a 10-year epidemic of the lung disease coccidioidomycosis, also known as "valley fever."

Most cases of valley fever do not result in serious health impacts, but for those it does seriously affect, it causes varying degrees of debilitation and occasionally results in death. It is usually treatable. However, in virtually all cases it requires a lifetime of medical management including side effects from the strong, anti-fungal medication.

From 2004-2014, thousands of inmates contracted the ailment due primarily to a series of irresponsible penological decisions by prison officials. They declined to implement recommended safety precautions within two facilities located inside the "hyperendemic" zone of the San Joaquin Valley of California. This failure cost taxpayers millions of needlessly-incurred medical care costs in a decade long display of professional irresponsibility, including violation of the Hippocratic oath, which prioritizes prevention of disease over treatment of it.

Other serious mistakes include a decision to build a state hospital next to one prison without adhering to standard construction practices for dust suppression.

This caused the infectious fungal spores residing in the ground to enter the air and then invade the lungs of the neighboring prisoners.

Additionally, the failure to take responsible measures within the prisons themselves via traditional clean-and-sanitary protocol allowed the spores to achieve maximum impact on the incarcerated population.

Two hundred seventy (270) plaintiffs banded together to press individual tort actions for wrongful contraction, beginning in 2013. They were dismissed at the 12(b)(6) pleading stage in 2015 based on the defense of qualified immunity, a decision that was upheld by the Ninth Circuit in 2019.

The Ninth Circuit's ruling is problematic for two major reasons: first, this Court's 1993 case of *Helling v. McKinney*, 509 U.S. 25, provided the prerequisite published notice to state officials to take safety precautions to prevent contraction of diseases and indeed to take reasonable measures to protect prisoners from all environmental conditions adverse to inmate health. It illustrated an example in that case by announcing protection for inmates from a new kind of danger, second-hand cigarette smoke.

The Ninth Circuit effectively negates *Helling* by applying unprecedented specificity to this Court's paradigm established in *Saucier v. Katz*. *Saucier* established the paradigm of generality to the clearly established test and the Ninth Circuit held that a prior case specific to valley fever was necessary to put officials on formal notice.

But *Helling* notified officials to protect inmates from all diseases. Coccidioidomycosis is a disease. Its laboratory safety protocols are one level below Ebola. To immunize officials until a case is published for each and every disease, including one specific to valley fever, results in a logical absurdity. It turns a simple directive from this Court for officials to protect inmates from danger (in this case, the well-established danger of diseases) to one that impossibly requires every individual disease to be recognized in published appellate litigation before this Court's directions apply. The Ninth Circuit's interpretation effectively negates *Helling*'s meaning and application.

Moreover, ten intervening years passed during the epidemic in which the Ninth Circuit five times declined to publish a valley fever case. The enforceability of the Eighth Amendment should not be held hostage to a court system that repeatedly declines to formally notify state officials to take safety seriously. This is another way the Ninth Circuit defeats the application of *Helling*. In this example, the California federal court system effectively extended official immunity until the epidemic was over, a 12-year window of formalized unaccountability for a series of ill-advised penological decisions, ones that merited more than passing scrutiny if *Helling* means anything.

The California federal court's publication decisions separately represent a negation of the notice concepts integral to the legitimate function of the qualified immunity doctrine, as established by this Court's *Saucier* decision and its progeny.

The second major error is that the panel argued that, in line with language originating in *Helling* (and seen again in cases like *Ashcroft*), society residing in the hyperendemic zone accepted a heightened risk of valley fever contraction in electing to live there; prisoners could expect no safer environment than the larger public.

Apart from the fact that Petitioners did not elect to live there, and the fact that they did not enjoy innate immunity as native residents often do, this comparison fails to acknowledge the statistical reality that the prisons were 10-50 times more dangerous; the rate of contraction was exponentially greater inside the prisons as compared to private citizens living in the nearby communities. The decision by the Ninth Circuit to foreclose relief on this factual equivalence rests on a well-documented and indisputable mathematical error.

A grant of certiorari of this case cannot be justified on the basis of an existing conflict between the appellate circuits. No other government agency has argued that the duty to protect prisoners from diseases is somehow unsettled after *Helling*. Nor has any court in Petitioners' research attempted to stake out the (controversial) view that each disease must be individually litigated before *Helling* applies. *See* Supreme Court Rule 10(c).

The Ninth Circuit opinion defies the language, meaning and spirit of *Helling*, in a triplicate exercise of assigning the *Saucier* generality level too specifically, obfuscating the disparate incidence numbers between the prisons and the surrounding area, and expanding the window of official immunity by withholding timely publication.

Understanding these sorts of complaints nevertheless constitute a less common reason for this Court to grant certiorari as compared to inter-circuit conflict, a perusal of the California federal court system's ever-changing arguments, internal contradictions, above violations, inconsistent intra-circuit opinions, and most noticeably, several 180-degree reversals of their own legal positions, amounts to an exceptionally troubled case history worthy of some form of correction.

The Ninth Circuit's historical application of the *Saucier* generality paradigm has typically resulted in some protection for civil rights claimants against qualified immunity. If anything, the California courts have sometimes applied the level of generality too broadly, and thus too liberally, according to this Court. *See, e.g, Escondido v. Emmons*, 586 U.S. ___, 139 S.Ct. 500 (2019).

This case stands in diametric contrast to that dynamic wherein here the *Saucier* test was applied so hyper-specifically, it deprives the plaintiffs of the benefit and supremacy of this Court's rulings and the consistency that the application of those rulings require.

Sadly, this case chronicles an indefensible transgression from the Ninth Circuit's ordinarily protective stance toward the health of human beings and respect for their civil rights.

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

U.S. Const., amend. VIII

> Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

42 U.S.C. § 1983

> Every person who, under color of any statute, ordinance, regulation, custom, or usage, of any State or Territory or the District of Columbia, subjects, or causes to be subjected, any citizen of the United States or other person within the jurisdiction thereof to the deprivation of any rights, privileges, or immunities secured by the Constitution and laws, shall be liable to the party injured in an action at law, suit in equity, or other proper proceeding for redress, except that in any action brought against a judicial officer for an act or omission taken in such officer's judicial capacity, injunctive relief shall not be granted unless a declaratory decree was violated or declaratory relief was unavailable. For the purposes of this section, any Act of Congress applicable exclusively to the District of Columbia shall be considered to be a statute of the District of Columbia.

STATEMENT OF THE CASE

From 2004-2014, prison officials observed dramatically increased rates of contraction of the disease valley fever, in prisons located in California's San Joaquin Valley. App.174a-189a. The most danger originated in two particular facilities, Pleasant Valley State Prison (PVSP) and Avenal State Prison (ASP). App.178a-186a. The disease begins as a fungus in the lungs, and left untreated, spreads to other parts of the body resulting in increasing degrees of debilitation, up to and including death. App.174a-178a, 206a-215a.

Inmates began filing *pro se* lawsuits as early as 2007. A systematic effort through counsel to assert Eighth Amendment claims based on the right to protection against cruel and unusual punishment was formalized in an initial filing in October, 2013. App.164a.

At the same time, in December 2013, a federal district judge in the Northern District, within a different lawsuit, the *Plata* action (relating more generally to reform of inmate medical care), ordered high-risk inmates (ones biologically at higher risk than most native citizens of the Central Valley) to be transferred out of Pleasant Valley and Avenal due to unacceptable danger from the risk of contraction of cocci. *See Plata v. Brown*, No. 3:01-cv-01351-TEH, Dkt. 2661 (N.D.Cal.2001).

Notably, the Northern District's legal argument sits in operative contradiction to the positions of the Eastern District Court and Ninth Circuit Court in this appeal, which materially deviate from each other in their legal reasoning, all of which conflict with a different Ninth Circuit case (*Edison*), despite all legal arguments being based on the same set of facts. Regardless, *Helling* should control all of these matters.

By December 2015, 270 plaintiffs distributed across 13 complaints asserted individual actions. The first 7 actions were consolidated into a single complaint in November 2014, representing 160 "*Smith*" plaintiffs. App.164a-166a.

The remaining 6 actions consisting of 110 plaintiffs were stayed pending the outcome of the appellate decision made in the consolidated action. This latter body of 110 plaintiffs ("*Alaniz*") intend to re-visit the Ninth Circuit's qualified immunity ruling now that the stay has been lifted, despite the doctrine of *stare decisis*. Of the 160 *Smith* plaintiffs directly governed by the Ninth Circuit ruling, there are 117 before this Court.

The state's qualified immunity challenge in this litigation was initially rejected by both the magistrate and district court in the Eastern District. App.157a, 129a. However, both judges later reversed their legal position after the number of *Smith* plaintiffs became apparent. App.71a, 125a.

These self-reversals by the Eastern District Court resulted in the trial-level dismissal of the case in October, 2015 and contribute to a larger body of contradictory jurisprudence by the California federal court system when it comes to the handling of valley fever claims. App.71a, 125a, 129a, 157a; *Edison v. Geo*, 822 F.3d 510, 522 (9th Cir. 2016); see fn. 2.

The *Smith* group appealed to the Ninth Circuit while the Alaniz group was stayed at the trial level. The Ninth Circuit ruled against the *Smith* plaintiffs in February, 2019, by holding that qualified immunity barred all claims. App.1a, 6a.

Its decision rests on three arguments: (i) that the level of generality for application of the *Saucier* clearly-established test is to require a prior published case specifically finding valley fever to be a potential Eighth Amendment violation; (ii) that the rates between the subject prisons and the local area were not materially different so as to make the risk of contraction unacceptable to Central Valley society; and (iii) state officials allegedly deferred to the alleged policies of the prison system's alleged true authority on the subject, the *Plata* Receiver. App.20a, 23a-24a.[1]

The *Smith* Plaintiffs petitioned for rehearing to an en banc panel of the Ninth Circuit in February, 2019, which was denied on March 22, 2019. App.158a-163a.

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[1] The *Jackson* plaintiffs also asserted certain racial discrimination claims. *See* App.27a. The *Smith* plaintiffs did not, in deciding to stand on the disparate danger in the prisons, as to all inmates. App.168a.

REASONS FOR GRANTING THE PETITION

The Court should grant this petition based on three legal arguments:

(1) the Ninth Circuit has periodically misapplied the clearly-established test's generality principles, usually in the manner of applying it too broadly, but in this case by applying it so narrowly as to effectively emasculate this Court's opinion in *Helling v. McKinney*, 501 U.S. 25 (1993) and *Helling*'s application of the Eighth Amendment's prohibition against cruel and unusual punishment.

Requiring a prior published case specifically addressed to valley fever violates the language and principles established in *Helling*, which 20 years earlier announced protection for inmates against environmental dangers including diseases–ergo, including coccidioidomycosis.

In addition, the Ninth Circuit's five-year declination to publish a valley fever case, and thus failure to put officials on formal notice to implement safety measures, results in an outcome that amounts to immunity for all mistakes and misconduct during the 10-year window of mass infection. This translates to zero accountability for a preventable epidemic. App. 178a-197a.

This is in spite of the fact that, during the epidemic, dozens of inmates died, countless others were maimed, thousands infected, and treatment-over-prevention resource misallocations (borne by taxpayers) exceeded an estimated $100 million. App.195a.

Nonetheless, the Ninth Circuit concluded that prison officials had no obligation by virtue of the qualified immunity doctrine to implement safety precautions or to compensate injured victims. App.6a.

The concept of the qualified immunity doctrine's clearly established test being applied in this fashion, to effectively require every disease, toxin, chemical and/or environmental danger to be uniquely recognized in appellate litigation before officials are required to take action is anathema to this Court's expectations under *Helling* with respect to the Eighth Amendment. It results in a blank check for prison officials to behave in a systematically irresponsible manner with regard to prisoner safety, from the period between their first detection of danger (here, in 2004) and formal appellate publication, which in this case did not occur until 12 years later in 2016. *Compare* App.178a-197a to *Edison v. Geo*, 822 F.3d 510 (9th Cir. 2016).

(2) The Ninth Circuit position is also premised on the factual assumption that the risk of contraction at the subject prisons was no different from the surrounding geographic area, in derogation of facts alleged in the operative complaint and undisputed statistical detail in the appellate record. App.203a-205a, 219a-221a, 226a-235a, 20a.

The panel's factual predicate is inaccurate. Data on appeal established without contradiction that the prisons, from 2004-2012, were 10-50 times more dangerous than the geographic valley area around them, and were 100-600 times more dangerous than the larger State of California. App.203a-205a, 219a-221a, 226a-235a.

The Ninth Circuit ruled under the premise that the rates between the prisons and the local area were effectively equivalent (both being treated as "heightened") and maintained this position even after its statistical misunderstanding was pointed out in plaintiffs' Petition for Rehearing. App.20a.

This misapplication marks the difference between a risk that society accepts, and a risk that is exponentially higher, and thus one society does not accept. *Scott v. Harris*, 550 U.S. 372, 379, fn. 6 (2007).

(3) The Court should also grant review because the Ninth Circuit's decision to effectively assign fault to the *Plata* Receiver is based on an under-developed record that does not support the sweeping conclusions and findings it made, nor does it represent a realistic assessment of who possessed the necessary information and controlled the levers of power to prevent the spread of the disease in real time. *See* App.23a-24a.

I. SINCE THIS COURT'S *HELLING* OPINION, THIS CASE STANDS ALONE AS REQUIRING THE EXACT DISEASE FROM A DANGEROUS ENVIRONMENTAL CONDITION TO FIRST BE LITIGATED TO A PUBLISHED APPELLATE OPINION BEFORE OFFICIAL RESPONSIBILITY FOR INMATE SAFETY IS OBLIGATORY.

When state officials hold a person in custody, the Constitution imposes a corresponding duty for them to take reasonable safety measures. *DeShaney v. Winnebago County*, 489 U.S. 189, 199-200 (1989); *Farmer v. Brennan*, 511 U.S. 825, 832 (1994); *Pearson v. Callahan*, 555 U.S. 223, 231 (2009).

As early as 1978, this Court first formally recognized prison officials' failure to prevent the spread of disease as a potential Eighth Amendment violation. *Hutto v. Finney*, 437 U.S. 678, 682, 685 (1978).

In 1993, in the more widely-recognized case of *Helling v. McKinney*, 509 U.S. 25 (1993), this Court generally announced that inmates should be protected from all dangers in their environment, in that case second-hand cigarette smoke from a prisoner's cellmate, by commenting that diseases and dirty water merit protection. *Id.*, 33-34.

As alleged by the operative complaint, beginning in 2004, state prison officials received a steady stream of warnings and alerts from their experts and from other authorities that epidemic-level numbers of inmates were contracting valley fever and some were dying. App.178a-197a. Various safety recommendations, principally exclusion but alternatively environmental suppression, were made and effectively ignored. App. 178a-197a.

Prison officials passed a policy in 2007 that excluded a select group of ultra-vulnerable inmates, such as those who had recently undergone heart surgery, while ignoring the safety needs of the vast majority of the population, including persons at well-known higher biological risk, per the applicable medical and scientific research. App.178a-197a.

Because of the extremely limited exclusion policy, thousands of inmates contracted valley fever, and over the next seven years through 2014, a large number suffered serious health consequences, including debilitation and death. App.178a-197a.

Inmates filed at least 36 *pro se* VF lawsuits from 2007-2014 in response.[2]

Of these, at least five were appealed to the Ninth Circuit: *Smith*, *Gray*, *Johnson*, *Ahlin* and *Gregge*, in 2010, 2012, 2013, and the latter two in 2014. In all five instances, the Ninth Circuit implicitly or explicitly recognized that contraction of valley fever at least potentially stated an Eighth Amendment violation. *Smith v. Schwarzenegger*, 393 Fed.Appx. 518 (9th Cir. 2010); *Gray v. Robinson*, 481 Fed.Appx. 380 (9th Cir. 2012); *Johnson v. Pleasant Valley*, 505 Fed.Appx. 631 (9th Cir. 2013); *Samuels v. Ahlin*, 584 Fed.Appx. 636 (9th Cir. 2014); *Gregge v. Cate*, 584 Fed.Appx. 421 (9th Cir. 2014).

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[2] *See, e.g.*, *Widby v. Lewis*, 2007 WL 528766 (E.D.Cal. 2007); *Thurston v. Schwarzenegger*, 2008 WL 2129767 (E.D.Cal. 2008); *Love v. Mekemson*, 2008 WL 942945 (E.D.Cal. 2008); *Hunter v Yates*, 2009 WL 233791 (E.D. 2009); *King v. Avenal*, 2009 WL 546212 (E.D.Cal. 2009); *Lancaster v. Aung*, 2012 WL 1355762 (E.D.Cal. 2009); *Cruz v. Schwarzenegger*, 2009 WL 256649 (E.D. Cal. 2009); *Williams v. Yates*, 2009 WL 3486674 (E.D.Cal. 2009); *Moreno v. Yates*, 2010 WL 1223131 (E.D.Cal. 2010); *Smith v. Schwarzenegger*, 393 Fed.Appx. 518 (9th Cir. 2010); *Gilbert v. Yates*, 2010 WL 5113116 (E.D.Cal. 2010); *Gregge v. Cate*, 584 Fed.Appx. 421, 2015 WL 2448679 (9th Cir. 2014); *Clark v. Igbinosa*, 2011 WL 1043868 (E.D.Cal. 2011); *Gray v. Robinson*, 481 Fed.Appx. 380, 2011 WL 489035 (9th Cir. 2011); *Stevens v. Yates*, 2012 WL 2520464 (E.D.Cal. 2012); *Smith v. Brown*, 2012 WL 1999858 (E.D.Cal. 2012); *Johnson v. Pleasant Valley*, 505 Fed.Appx. 631 (9th Cir. 2013); *Holley v. Scott*, 2013 WL 3992129 (E.D.Cal. 2012); *Samuels v. Ahlin*, 584 Fed.Appx. 636 (9th Cir. 2014); *Lua v. Smith*, 2014 WL 1308605 (E.D.Cal. 2014); *Brown v. Cate*, 2015 WL 6535469 (E.D.Cal. 2015); *Wilner v. Biter*, 2015 WL 1830770 (E.D.Cal. 2015), *Davis v. Kelso*, 2015 WL 7007982 (E.D.Cal. 2015).

Its rejection of this case contravenes in certain ways a body of its own unpublished prior jurisprudence, despite an operative complaint that was pled with scientific certainty and statistical detail. *Ibid*; *see, e.g.*, App.167a-198a.

The Ninth Circuit in each of the five instances above also declined to publish its decision thereby never placing prison authorities on formal notice to implement precautionary safety measures.

Before the mass tort actions represented by the *Smith* and *Alaniz* plaintiffs, valley fever litigation originated in a single case (*Panah v. United States*, No. 09-cv-6535 (C.D.Cal. 2009)), which the government settled, and which was then followed by a class action, *Jackson v. California*, filed in July 2013. *Jackson v. California*, No. 1:13-cv-01055 (E.D.CA 2013).

In *Jackson*, as relevant here, the magistrate judge originally dismissed the state's qualified immunity argument in observing, based on *Helling*, that "[t]he law was sufficiently clear prior to the claims raised here that if prison officials are aware that certain inmates are at a significantly higher risk of contracting a disease based upon identifiable criteria, it would be deliberate indifference to fail to take action to protect those inmates." App.155a.

The district judge adopted the magistrate's position on qualified immunity without comment, in his order adopting the *Jackson* magistrate's report and recommendations. App.129a.

In October, 2013, the *Smith* plaintiffs began filing cases. By October, 2015, this activity had resulted in 253 individual claims.

The state renewed its qualified immunity challenge to 160 of those claims, the *Smith* plaintiffs, arguing that they had no clearly established right to avoid the risk of contracting valley fever.

The magistrate documented the allegations of the operative complaint in relating the disease process by which cocci spores attack the body, the severity it poses to those who for whatever reason are immunologically vulnerable, and the extensive history of memos, warnings and alerts afforded to state officials prior to the onset of the full-scale epidemic. App.77a-87a.

However, this time the magistrate reversed his position. He acknowledged that he had previously viewed the issue as whether officials had an obligation to protect high risk inmates from diseases, which was exactly consistent with this Court's position as reflected by *Helling*. Now, with the reality of 253 additional pending claims, he redefined the issue as whether "housing inmates in prisons in areas endemic for valley fever, a naturally occurring soil-borne fungus which can lead to serious illness, would violate the Eighth Amendment." App.90a.

Using this more specific phraseology, the magistrate concluded that no prior published case had found valley fever to constitute a viable Eighth Amendment claim and *Helling* was therefore not applicable. App. 90a-105a.

The magistrate also found that "society accepts exposure to Valley Fever . . . [because] over a million people live in areas in which the cocci spores are endemic and are subjected to the risk of contracting [it]. Further, tens of thousands of individuals live in those areas which are considered to be hyperendemic." App.101a, 110a.

The problem with this observation is that the referenced population lives outside the prisons, where the risk of contraction is 10-50 times lower. App.219a-221a, 226a-235a. People who choose to be employed by the San Jose Valley prisons, like employees of a nuclear plant, do so for the financial benefits such occupation affords, including automatic (workers' compensation) benefits in the event of infirmity. Local employees are also far more likely to enjoy innate immunity.

Plaintiffs filed objections to challenge the magistrate's ruling. The district judge, who had also previously rejected the state's qualified immunity defense, went in a third direction. He argued that this Court's *Saucier* paradigm regarding generality did not matter at all, by curiously holding that "under any definition of the constitutional right at issue in this case . . . the substantial and unsettled case law concerning Valley Fever at the district court level establishes that Defendants are entitled to qualified immunity." App. 49a.

The district judge then surveyed the universe of differing outcomes and intellectual routes of the many district level cases (and several unpublished Ninth Circuit cases), to say that state officials could not have clearly understood what their obligations were given this body of muddled jurisprudence. App. 109a-121a.

By the end of the district court's extended intellectual journey, which was neither quick nor easy, it concluded, up front, that "[t]his is a case where the Court can 'rather quickly and easily decide that there was no violation of clearly established law.'" App.50a-68a.

The district court's analytical approach is inaccurate. Its position that the level of generality is irrelevant to an accurate conclusion contravenes the *Saucier* paradigm. *See Saucier v. Katz*, 533 U.S. 194, 201 (2001). If the level of generality is framed as a question of whether officials have been given published notice to protect inmates from diseases, *Helling* provided that notice in 1993. It would supersede any body of lower court jurisprudence. District level cases are only relevant in qualified immunity circles if no higher authority is available. *Wilson v. Layne*, 526 U.S. 603, 617 (1999).

Helling was at all times binding on US district courts. The lower courts nevertheless wiggled out of *Helling* by engaging the *Saucier* paradigm at such a hyper-specific level that enforcing compliance with *Helling* becomes a practical impossibility.

Moreover, the premise of reviewing district level *pro per*-pled cases for resulting jurisprudential consistency itself constituted a design flaw in the district court's analysis, in that such consistency can hardly be expected by judicial scrutiny of complaints prepared by persons with no legal training. *See* fn. 2.

Given these several perceived errors, Plaintiffs appealed. With a trial-level record of the lower courts engaging in self-reversals, counter-factual inaccuracies, and unorthodox applications of the established qualified immunity analysis, Plaintiffs detailed, and provided a bulk of statistical data to support, a precisely accurate analysis of the qualified immunity defense. *See* App.199a-205a, 220a-221a, 226a-235a.

Petitioners in particular proved on appeal that the magistrate's factual predicate was statistically inaccurate, in that the prisons were far more dangerous on an incident-rate basis than the surrounding hyper-endemic zone. App.220a-221a, 226a-235a. A motion for judicial notice on appeal was granted validating the authenticity of the statistical data Plaintiffs relied on. Their conclusions disproving the magistrate's claim were met with virtual acquiescence by all defendants.

However, the Ninth Circuit panel did not acknowledge or discuss this problem. Instead, it compiled other statistics to show that migration patterns in the Central Valley revealed that the population was increasing. App.25a-26a. This evidence was assembled to argue that society contemplating to move there accepts a risk of valley fever, in sort of the same way the magistrate reached the same conclusion by looking at the size of the existing Central Valley population. App.25a-26a, 101a-102a.

Nonetheless, these contentions did not change Plaintiffs' proof that, no matter how many people lived in, or moved to, the Central Valley, the incidence rate of valley fever in the prisons was dramatically–epidemically–higher. App.220a-221a, 226a-235a.

The Ninth Circuit also assumed (without discussion) that the applicable *Saucier* level of generality was to the specific disease, valley fever. App.193a. This is logically untenable for the reasons stated above: it creates a 'catalog' exception that swallows the protective rule announced by this Court in *Helling*. *See also Farmer v. Brennan*, 511 U.S. 825, 828 (1994); *Baze v. Rees*, 553 U.S. 35, 49-50 (2008); *Anderson v. Creighton*, 483 U.S. 635, 640 (1987); *Hope v. Pelzer*, 536 U.S. 730, 742 (2002).

No one would seriously contend that officials should be immunized from liability if notified as a traffic matter to avoid oncoming cars, on the flimsy response they were not specifically warned to avoid oncoming Toyotas.

No one could rationally maintain that case law directing officials to protect inmates from nuclear radiation results in immunity unless a case unique to Uranium 235 was previously litigated.

The entire idea of protecting inmates from environmental dangers, like diseases (which is what *Helling* instructs) until each uniquely-named disease (here, valley fever) is recognized by a published case is logically indefensible. It negates *Helling*. It converts what is already an increasingly controversial, and some now say unwarranted, doctrine of partial government immunity into total immunity. *See, e.g., Ziglar v. Abbasi*, 137 S.Ct. 1843, 1872 (2017) (Thomas, J., concurring); Baude, W., *Is Qualified Immunity Unlawful?*, 106 Calif. L. Rev. 45 (2018).

The application here effectively rewrites the Founding Fathers' carefully-crafted Bill of Rights to say that officials only violate the Constitution's Eighth Amendment cruel-and-unusual punishment clause when they have first been told by the federal courts that they violated it and then violate it a second time. Constitutional originalists might note that there is no mulligan clause within the text of the Eighth Amendment. *See Crawford-El v. Britton*, 523

U.S. 574, 611 (1998) (Scalia, J., Diss.); *Wyatt v. Cole*, 504 U.S. 158, 170 (1992) (Kennedy, J., Conc.)

Separate and apart from these problems is yet another problem: *Edison*. In 2016, while the *Smith* mass action, *Jackson* class action, and one individual action were pending on appeal (later published under the umbrella name of *Hines v. Youssef*, 914 F.3d 1218 (9th Cir. 2019)), the Ninth Circuit decided *Edison v. Geo*, 822 F.3d 510 (9th Cir. 2016), a valley fever case against Taft federal prison.

There, the panel was unambiguous. Ruling on another trial-level dismissal, the Ninth Circuit reversed by finding wrongful contraction of coccidioidomycosis to be worthy of compensation.

"In most individuals, cocci manifests primarily as a minor fever. In an unlucky few, however, the disease takes a different, more devastating course—it causes a number of painful conditions, and can be fatal . . . As prisoners, Plaintiffs were particularly vulnerable to infection: Even if Plaintiffs had been warned of the disease, they were unable to move to a different location, remodel their living quarters, or erect protective structures, such as covered walkways. Thus, by placing prisoners at Taft, the BOP directly increased Plaintiffs' risk of harm. Under California law, the United States had a duty to protect Plaintiffs from the risk of contracting cocci." *Edison v. Geo*, 822 F.3d 510, 513, 522 (9th Cir. 2016).

Due to the slightly different procedural context, the defense of qualified immunity was not raised or litigated. However, the tenor, tone and outcome of the two opinions is stark. For the same legal problem involving the same elevated danger (285x CA rate at

Taft versus 363x combined CA rate at PVSP/ASP), *Edison* held that VF is a problem the United States and private-provider Geo must answer for in damages, in validating all plaintiff arguments and claims.

In contrast, in the umbrella litigation of *Hines*, the Ninth Circuit brushed off plaintiffs' protestations of epidemic danger, immunized all prison officials, dismissed all plaintiff arguments and claims, and left the victims without a remedy.

Finally, on a related issue, the qualified immunity doctrine seems pointedly contorted in the context of a dynamic where as long as the judiciary never "tells" the executive to take precautions, as occurred here for 12 long years, government officials can act as if the Eighth Amendment does not apply to them. This is how the defendant officials behaved. Since they had no formal obligation during the 2004-2014 window of the epidemic, and despite lawsuits, warnings, expert reports, activist alerts, pointed recommendations, media attention and a general prison population clamoring to avoid the "death dust," they did almost nothing. *See* App.35a-60a.

Yet, this Court's decisions, as reflected most prominently by a straightforward opinion like *Helling*, apply to all government officials without the insertion of convoluted exceptions.

II. ANY RESPONSIBILITY THE RECEIVER MIGHT SHARE WITH DEFENDANTS DID NOT CREATE A DEFENSE FOR DEFENDANTS.

The panel opinion also discusses the federal Receiver's role in the epidemic and relies on his "orders" to prison officials. App.23a-24a. The Court cites little authority in making sweeping conclusions that prison officials respected or relied on these as orders during the window in question. App.23a-24a. The district court's ruling did not address or depend on the Receiver's position. App.71a. A total of two pages were addressed to the matter in the underlying briefs.

The Receiver never appeared, detailed or defended his decisions or defenses in a properly-worked up record, particularly as to whether that office had authority to issue the kind of safety precautions and inmate transportation directives the panel ascribes to it. Just as importantly, there is a question whether the Receiver had sufficient time to study the problem given the many other priorities his office faced in being charged with reforming the entire California prison medical system.

In particular, in the order of appointment, the Receiver "shall provide leadership and executive management of the California prison medical health care delivery system with the goals of restructuring day-to-day operations and developing, implementing, and validating a new, sustainable system that provides constitutionally adequate medical care to all class members as soon as practicable. To this end, the Receiver shall have the duty to control, oversee, supervise, and direct all administrative, personnel, financial, accounting, contractual, legal, and other operational functions of the medical delivery component of the CDCR." *Plata v. Brown*, Case No. 3:01-cv-01351, Dkt. 473 (N.D.Cal.2001) (underscore added).

In other words, the Receiver was tasked with creating a better system of medical treatment. It is a different and debatable question whether those powers extended to proactive prevention during the plaintiffs' contraction window, such as ordering specific facilities to implement environmental suppression, commanding wardens to transfer certain inmates to safer prisons, or compelling a certain cleanliness standard within the prisons.

On June 24, 2013, the Northern District implicitly found that the Receiver could direct inmates to be excluded, but Petitioners recall the exercise preceding it as a point of contention up to Judge Henderson's decision. *See Plata v. Brown*, No. 3:01-cv-01351-TEH, Dkt. 2661 (N.D.Cal.2001). Either way, the record is devoid of the kind of serious work-up necessary for the Ninth Circuit to adjudicate that matter in this case, much less pin full responsibility for a mismanaged facilities safety epidemic on a person assigned to reform the way the prison system's medical care is delivered.

Messrs. Kelso (and Sillen) were not parties to the instant appeal. Rather, the Receiver's office was named in some of the underlying actions but was dismissed without prejudice pursuant to private tolling agreements entered in lieu of litigating against them on the same track as the prison defendants. *See, e.g., Smith v. Schwarzenegger*, Case No. 1:14-cv-00060-LJO-SAB, Dkt. 133.

Mr. Kelso was one of the actors on the solution side of the problem. Prison officials were on the defiance side of the equation, in both *Plata* and *Hines*. Even if Mr. Kelso was not as initially proactive as Petitioners might have preferred, foisting full responsibility on him given his other priorities is like blaming the ER doctor for choosing which lives to save first, after a mass shooting. He may have possibly made some prioritization mistakes, but a modicum of perspective prohibits focus on him for the larger mess. It is unfair for the Ninth Circuit to have singled him out for criticism in a published opinion.

Given these limitations on proper record development of this complex issue, and given what was essentially a footnote issue in the underlying litigation here, awarding qualified immunity to defendants by suggesting that Receiver Kelso was both entirely empowered and entirely to blame for mismanaging the 10-year epidemic is legally and morally misplaced. App.23a-24a.

CONCLUSION

This case is defined by its absurdities.

During World War II, foreign prisoners of war succeeded in avoiding contraction of valley fever, by prevailing on American authorities to transfer them to safety. In contrast, the plaintiffs before the Court, being more vulnerable and with a greater amount of information transmitted to more scientifically-advanced decision makers 50 years later, are somehow without remedy despite being American citizens with a panoply of constitutional and legal rights.

One of the most significant mass torts in American penological history, involving hundreds of life-altering outcomes, has resulted in a lawsuit that cannot get past the pleading stage, in contrast to federal cases that have previously recognized a single day's sun exposure (*Hope v. Pelzer*, 536 U.S. 730 (2002)) and deprivation of toothpaste (*Board v. Farnam*, 394 F.3d 469 (7th Cir. 2005)) as civil rights violations.

The opinion under review is founded on a dogged refusal to acknowledge the statistical disparity between the exponentially-higher danger in the state prisons as compared to the surrounding geographical area. Meanwhile, the same court validated comparable danger from the same agent located in the same hyper-endemic area in a federal prison. Diseases do not discriminate between defendants convicted of state versus federal offenses. Nor should judicial logic.

The opinion being challenged applies a *Saucier* level of generality that is so hyper-specific as to render absurd the operation of the qualified immunity defense, and thus extinguishes this Court's holding in *Helling v. McKinney*, which otherwise has afforded prisoners a constitutionally-minimal level of protection for the last 25 years.

This hyper-specificity, requiring a published case unique to cocci before any responsibility by prison officials attaches, means that every germ, toxin, disease, chemical and other unique environmental danger must be individually, and thus impossibly, litigated to an appellate outcome, before officials bear any responsibility for prisoner safety.

The notion that prison officials can ignore numerous alarms, expert warnings and formal alerts, and take no action in the face of nearly 40 lawsuits because of a governmental appellate publication technicality, and for the courts to then validate such profound inaction on the same metric, undermines professional responsibility norms and standards.

Mitigation measures that worked well to minimize the spread of the disease in the 1940's were ignored at a current annual cost of less than $1M per prison. App.58a, 159a. Over the course of 10 years, the impact of the epidemic could have been avoided or greatly reduced for 1/5 of what was actually spent–estimated at over $100M in subsequent medical care expenses. App.41a-60a, 58a. If such wasteful exercises are not corrected, they will be repeated at additional taxpayer expense.

Most importantly, the Ninth Circuit did not apply the law as established by this Court in *Helling*. This Court should grant certiorari to correct the Ninth Circuit's rejection of its precedent.

Respectfully submitted,

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June 24, 2019

EXHIBIT 3

EXHIBIT 3

ACUTE COMMUNICABLE DISEASE CONTROL PROGRAM
and DEPARTMENT OF ENVIROMENTAL HEALTH

Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers

August 2019

COUNTY OF LOS ANGELES
Public Health

www.publichealth.lacounty.gov/acd/Diseases/Cocci.htm

Acute Communicable Disease Control
LA County Department of Public Health

Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers

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Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers

INTRODUCTION

The purpose of a Valley Fever Management Plan (VFMP) is to establish guidelines for educating and training personnel on the management of Valley Fever during construction in Los Angeles County (LAC). The VFMP outlines the health risks, symptoms, and causes of Valley Fever, and provides information on hazard reduction. (Hazard reduction plans include engineering controls, best work practices and administrative controls.) The VFMP provides steps that can be taken to help reduce risk of Valley Fever to workers and surrounding community.

Coccidioidomycosis (Cocci), or Valley Fever is an illness caused by a fungus. The fungus lives in the soil and dirt in some places in California and other areas in the Southern US, as well as Central and South America. It can get inside the lungs and cause an illness that might seem like the flu. Most people who get Valley Fever have mild symptoms and often get better on their own. More severe sickness is rare, but it can be serious and even deadly.

GENERAL INFORMATION AND GUIDELINES

Valley Fever exposure is highest during ground disturbing activities such as grading, trenching, and landscaping. Therefore, the following preventative measures should be implemented during construction and operations of projects to prevent exposure of construction personnel, operations and maintenance staff, and surrounding communities to Valley Fever. It is recommended that projects comply with the following:

1. The requirements of Antelope Valley Air Quality Management District (AVAQMD) Rule 403 and South Coast Air Quality Management District (SCAQMD) for Fugitive Dust provided in Appendix A.

2. Provide construction and operations personnel training to understand and manage the risks associated with Valley Fever. Training includes information on how to recognize symptoms of Valley Fever and ways to minimize exposure; proper cleaning procedures to minimize accidental exposure; and demonstrations on how to use personal protective equipment, such respiratory protection, skin and eye protection. Health Education materials can be found in Appendix B. Attendance rosters are included in Appendix C.

3. The General Contractor distributes the Valley Fever educational materials provided in Appendix B to construction and operations personnel and are posted next to the Cal OSHA poster. Community outreach is also recommended. (see Appendix D)

Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers

4. The General Contractor provides respirators to construction and operations personnel upon request during ground disturbing activities.

a. National Institute for Occupational Safety and Health (NIOSH)-approved half-face respirators equipped with minimum N-95 protection factor shall be available upon request for use during worker collocation with surface disturbance activities. Upon request, a worker shall be provided with a higher level of respiratory protection.

b. For employees who request respirators, the General Contractor shall ensure they are medically evaluated, fit-tested, and properly trained on the use of the respirators, and implement a full respiratory protection program in accordance with the applicable Cal/OSHA Respiratory Standard (8 CCR 5144).

5. Heavy equipment with factory enclosed cabs should be provided with HEPA rated air filtration and positive pressure air. The General Contractor utilizing applicable heavy equipment provides proof of worker training on proper use of applicable heavy equipment cabs. Provide communication methods, such as two-way radios, for use in enclosed cabs.

6. Provide separate, clean eating areas with hand-washing facilities, and a changing of clothing area. Separate bins with proper labels be provided for on-site disposables.

7. Install equipment inspection stations at each construction equipment access/egress point. Examine construction vehicles and equipment for excess soil material and clean, as necessary, before equipment is moved off-site.

8. Any employee experiencing symptoms of Valley Fever shall promptly reports to their supervisor and consult a medical professional as necessary. Maintain an accessible log of all employees reporting symptoms and disease of Valley Fever.

9. When possible, position workers upwind or crosswind when performing ground-disturbing activities.

10. Prohibit smoking at the project site in or outside of designated smoking areas. Designated smoking areas shall be equipped with handwashing facilities.

11. Maintain an Injury and Illness Prevention Program (IIPP) which should include a cold and heat illness prevention section. Make the IIPP available upon request.

Appendix A

Rule 403 & R403

(**Adopted**: 02/07/76; **Amended**: 11/06/92; **Amended**: 07/09/93;
Amended: 02/14/97: **Amended**: 04/20/10)

RULE 403
Fugitive Dust

(A) General

(1) Purpose

(a) The purpose of this rule is to reduce the amount of Particulate Matter entrained in the ambient air as a result of anthropogenic (man-made) Fugitive Dust sources by requiring actions to prevent, reduce or mitigate Fugitive Dust emissions.

(2) Applicability

(a) The provisions of this rule shall apply to any activity or man-made condition capable of generating Fugitive Dust.

(B) Definitions

(1) <u>"Active Operations"</u> – Any activity capable of generating Fugitive Dust, including, but not limited to, Earth-Moving Activities, Construction/Demolition Activities, or heavy- and light-duty vehicular movement.

(2) <u>"Agricultural Operation"</u> – The growing and harvesting of crops or the raising of fowl or animals for the primary purpose of making a profit, providing a livelihood, or conducting agricultural research or instruction by an educational institution. Agricultural Operations do not include activities involving the processing or distribution of crops or fowl.

(3) <u>"Air Pollution Control Officer (APCO)"</u> – The person appointed to the position of Air Pollution Control Officer pursuant to the provisions of Health and Safety Code §40750 and his or her designee.

(4) <u>"Anemometers"</u> – Devices used to measure wind speed and direction.

(5) <u>"Bulk Material"</u> – Sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic Particulate Matter.

(6) <u>"Chemical Stabilizers"</u> – Any non-toxic chemical Dust Suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the United States Environmental Protection Agency, or any applicable law, rule or regulation; and should meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic Chemical Stabilizer shall be of sufficient concentration and application frequency to maintain a Stabilized Surface.

(7) “Construction/Demolition Activities” – Any on-site mechanical activities preparatory to or related to the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities; grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(8) “Contractor” – Any person who has a contractual arrangement to conduct an active operation for another person.

(9) “Disturbed Surface Area” – A portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of Fugitive Dust. This definition excludes those areas which have:

(a) Been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(b) Been paved or otherwise covered by a permanent structure; or

(c) Sustained a vegetative ground cover over at least 70 percent of an area for a period of at least six months.

(10) “Dust Control Plan (DCP)” – A District-approved document that describes what measures will be taken at a location to comply with this rule, prepared in accordance with section (D).

(11) “Dust Suppressants” – Water, hygroscopic materials, or non-toxic Chemical Stabilizers used as a treatment material to reduce Fugitive Dust emissions.

(12) “Earth-Moving Activities” – The use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or Bulk Materials, adding to or removing from Open Storage Piles of Bulk Materials, landfill operations, weed abatement through disking, and soil mulching.

(13) “Fugitive Dust” – Any solid Particulate Matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of man.

(14) “High Wind Conditions” – Instantaneous wind speeds (gusts) which exceed 25 miles per hour.

(15) “Inactive Disturbed Surface Area” – Any Disturbed Surface Area upon which Active Operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(16) “Non-Routine” – Any non-periodic active operation which occurs no more than three times per year, lasts less than 30 cumulative days per year, and is scheduled less than 30 days in advance.

(17) "Open Storage Pile" – Any accumulation of Bulk Material with five percent or greater Silt content which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet. Silt content level is assumed to be five percent or greater unless a person can show, by sampling and analysis in accordance with ASTM Method C-136 or other equivalent method approved in writing by the APCO and the California Air Resources Board, that the Silt content is less than five percent. The results of ASTM Method C-136 or equivalent method are valid for 60 days from the date the sample was taken.

(18) "Particulate Matter" – Any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(19) "Paved Road" – An improved street, highway, alley, public way, or easement that is covered by typical roadway materials excluding access roadways that connect a facility with a public Paved Road and are not open to through traffic. Public Paved Roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private Paved Roads are any Paved Roads not defined as public.

(20) "PM_{10}" – Particulate Matter with an aerodynamic diameter smaller than or equal to ten microns as measured by the applicable state and federal reference test methods.

(21) "Property Line" – The boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the Property Line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(22) "Silt" – Any aggregate material with a particle size less than 74 micrometers in diameter which passes through a No. 200 sieve.

(23) "Simultaneous Sampling" – The operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(24) "Stabilized Surface" – Any previously Disturbed Surface Area or Open Storage Pile which, through the application of Dust Suppressants, shows visual or other evidence of surface crusting and is resistant to Wind-Driven Fugitive Dust and is demonstrated to be stabilized and where Visible Dust Emissions are limited to 20 percent opacity. Chemical treatment must be performed with a substance not disapproved for such use by the applicable Regional Water Quality Control Board.

(25) "Track-out" – Any Bulk Material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(26) "Unpaved Roads" – Any unsealed or earthen roads, equipment paths, or travel ways that are not covered by one of the following: concrete, asphaltic concrete, recycled asphalt, or asphalt.

(27) "United States Environmental Protection Agency (USEPA)" – Refers to the Administrator or the appropriate designee of the United States Environmental Protection Agency.

(28) "Visible Dust Emissions (VDE)" – Any dust emissions that are visible to an observer.

(29) "Wind-Driven Fugitive Dust" – Visible emissions from any Disturbed Surface Area which is generated by wind action alone.

(30) "Wind Gust" – The maximum instantaneous wind speed as measured by an Anemometer.

(C) Requirements

(1) A person shall not cause or allow the emissions of Fugitive Dust from:

(a) Any Active Operation, Open Storage Pile, or Disturbed Surface Area such that the presence of such dust remains visible in the atmosphere beyond the Property Line of the emission source; or

(b) Any applicable source such that the dust causes 20 percent opacity or greater during each observation and the total duration of such observations (not necessarily consecutive) is a cumulative three minutes or more in any one hour. Only opacity readings from a single source shall be included in the cumulative total used to determine compliance.

(2) A person shall not cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by Simultaneous Sampling, as the difference between upwind and downwind samples collected on high-volume Particulate Matter samplers or other USEPA-approved equivalent method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(a) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate USEPA-published documents for USEPA-approved equivalent method(s) for PM_{10}.

(b) Reasonably placed upwind and downwind of key activity areas and as close to the Property Line as feasible, such that other sources of Fugitive Dust between the sampler and the Property Line are minimized.

(3) Track-out Operations

(a) A person shall not allow Track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation.

Notwithstanding the preceding, all Track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(b) A person shall not conduct an Active Operation with a Disturbed Surface Area of five or more acres, or with a daily import or export of 100 cubic yards or more of Bulk Material without utilizing at least one of the measures listed in subparagraphs (C)(3)(b)(i) through (C)(3)(b)(v) at each vehicle egress from the site to a paved public road.

(i) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long;

(ii) Pave or apply chemical stabilization at sufficient concentration and frequency to maintain a Stabilized Surface starting from the point of intersection with the public paved surface, and extending at least 100 feet and at least 20 feet wide;

(iii) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and ten feet wide to remove Bulk Material from tires and vehicle undercarriages before vehicles exit the site;

(iv) Install and utilize a wheel washing system to remove Bulk Material from tires and vehicle undercarriages before vehicles exit the site; or

(v) Any other control measure approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(3)(b)(i) through (C)(3)(b)(iv).

(4) Earth-Moving Operations

(a) A person shall not conduct an Active Operation of Construction, excavation, extraction and other Earth-Moving Activities with a Disturbed Surface Area of five or more acres, or with a daily import or export of 100 cubic yards or more of Bulk Material without utilizing at least one of the measures listed for each of the operation stages specified in subparagraphs (C)(4)(a)(i) through (C)(4)(a)(iv).

(i) Pre-activity:

a. Pre-water site sufficient to limit VDE to 20 percent opacity; and
b. Phase work to reduce the amount of Disturbed Surface Area at any one time

(ii) During Active Operations:

  a. Apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
  b. Construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity. If utilizing wind barriers, control measure (a) above shall also be implemented; or
  c. Apply water or chemical/organic stabilizers/suppressants to unpaved haul/access roads and unpaved vehicle/equipment traffic areas sufficient to limit VDE to 20 percent opacity and meet the requirements of section (C)(9).

(iii) Temporary Stabilization During Periods of Inactivity:

  a. Restrict vehicular access to the area; and
  b. Apply water or chemical/organic stabilizers/suppressants, sufficient to limit VDE to 20 percent opacity, or to comply with the conditions of a Stabilized Surface. If an area having one-half acres or more of Disturbed Surface Area remains unused for seven or more days, the area must comply with the conditions for a Stabilized Surface area.

(iv) Any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(4)(a)(i) through(C)(4)(a)(iii).

(5) Demolition Operations

(a) A person shall implement the requirements of (C)(5)(a)(i) through (C)(5)(a)(v) when using wrecking balls or other wrecking equipment to raze or demolish buildings:

(i) Apply sufficient water to building exterior surfaces and razed building materials to limit VDE to 20 percent opacity throughout the duration of razing and demolition activities;
(ii) Apply sufficient Dust Suppressants to unpaved surface areas where materials from razing or demolition activities will fall, or where wrecking or hauling equipment will be operated, in order to limit VDE to 20 percent opacity;
(iii) Handling, storage, and transport of Bulk Materials on-site or off-site resulting from the demolition or razing of buildings shall comply with the requirements specified in section (C)(6);
(iv) Prevention and removal of carryout or Track-out on paved public access roads from demolition operations shall be performed in accordance with (C)(3); or
(v) Any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(5)(a)(i) through (C)(5)(a)(iv).

(6) Bulk Material Operations

(a) No person shall conduct an active operation of handling Bulk Material with a daily import or export of 100 cubic yards or more of Bulk Material without utilizing at least one of the measures listed for each of the operation stages specified in subparagraphs (C)(6)(a)(i) through (C)(6)(a)(vi):

(i) Handling of Bulk Materials:

a. When handling Bulk Materials, apply water or chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity; or
b. Construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity and with less than 50 percent porosity. If utilizing fences or wind barriers, control measure (C)(6)(a)(i)[a.] shall also be implemented.

(ii) Storage of Bulk Materials:

a. When storing Bulk Materials, comply with the conditions for a Stabilized Surface;
b. Cover Bulk Materials stored outdoors with tarps, plastic, or other suitable material and anchor in such a manner that prevents the cover from being removed by wind action;
c. Construct and maintain wind barriers sufficient to limit VDE to 20 percent opacity and with less than 50 percent porosity. If utilizing fences or wind barriers, apply water or chemical/organic stabilizers/suppressants to limit VDE to 20 percent opacity;
d. Utilize a three-sided structure with a height at least equal to the height of the storage pile and with less than 50 percent porosity; or
e. Installation of wind breaks of such design so as to reduce maximum Wind Gusts to less than 25 miles per hour in the area of the Bulk Material deposits.

(iii) On-site Transporting of Bulk Materials:

a. Limit vehicular speed while traveling on the work site sufficient to limit VDE to 20 percent opacity;
b. Load all haul trucks such that the freeboard is not less than six inches when material is transported across any paved public access road sufficient to limit VDE to 20 percent opacity;
c. Apply water to the top of the load sufficient to limit VDE to 20 percent opacity; or
d. Cover haul trucks with a tarp or other suitable cover.

(iv) Off-site Transporting of Bulk Materials:

a. Clean the interior of the cargo compartment or cover the cargo compartment before the empty truck leaves the site;
b. Prevent spillage or loss of Bulk Material from holes or other openings in the cargo compartment's floor, sides, and/or tailgate; and
c. Load all haul trucks such that the freeboard is not less than six inches when material is transported on any paved public access road, and apply water to the top of the load sufficient to limit VDE to 20 percent opacity; or cover haul trucks with a tarp or other suitable cover.

(v) Outdoor Transport of Bulk Materials With a Chute or Conveyor:

a. Fully enclose the chute or conveyor;
b. Operate water spray equipment that sufficiently wets materials to limit VDE to 20 percent opacity; or
c. Wash separated or screened materials to remove conveyed materials having an aerodynamic diameter of ten microns or less sufficient to limit VDE to 20 percent opacity.

(vi) Any other control measures approved by the APCO and USEPA as equivalent to the methods specified in subparagraphs (C)(6)(a)(i) through(C)(6)(a)(v).

(7) Disturbed Open Area of Three or More Acres

(a) An owner/operator of an open area with a Disturbed Surface of three or more acres that has remained undeveloped, unoccupied, unused, or vacant for more than seven days shall do at least one of the following:

(i) Apply and maintain water or Dust Suppressant(s) to all unvegetated areas sufficient to limit VDE to 20 percent opacity;
(ii) Establish vegetation on all previously disturbed areas sufficient to limit VDE to 20 percent opacity;
(iii) Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
(iv) Upon evidence of trespass, prevent unauthorized vehicle access by posting "No Trespassing" signs or installing physical barriers such as fences, gates, posts, and/or other appropriate barriers to effectively prevent access to the area; or
(v) Any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in subparagraphs (C)(7)(a)(i) through(C)(7)(a)(iv).

(8) Unpaved Roads at Industrial or Commercial Facilities

(a) An owner/operator of an Unpaved Road at an industrial or commercial facility shall limit VDE to 20 percent opacity from the Unpaved Road segment by application and/or maintenance of at least one of the following control measures, or shall implement an APCO approved Dust Control Plan:

(i) Apply and maintain water or Dust Suppressant(s) sufficient to limit VDE to 20 percent opacity;
(ii) Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
(iii) Restrict vehicle speed to 15 miles per hour; or
(iv) Any other method that effectively limits VDE to 20 percent opacity and results in a stabilized Unpaved Road surface.

(9) Unpaved Vehicle/Equipment Traffic Area

(a) An owner/operator of an unpaved vehicle/equipment traffic area shall limit VDE to 20 percent opacity from the unpaved vehicle/equipment traffic area by application and/or maintenance of at least one of the following control measures, or shall implement an APCO approved Dust Control Plan:

(i) Apply and maintain water or Dust Suppressant(s) sufficient to limit VDE to 20 percent opacity;
(ii) Pave, apply and maintain gravel, or apply and maintain chemical/organic stabilizers/suppressants sufficient to limit VDE to 20 percent opacity;
(iii) Restrict vehicle speed to 15 miles per hour;
(iv) An owner/operator shall restrict access and periodically stabilize a Disturbed Surface Area whenever a site becomes an Inactive Disturbed Surface Area to comply with the conditions for a Stabilized Surface; or
(v) Any other method that effectively limits VDE to 20 percent opacity and results in a Stabilized Surface.

(10) A person performing Earth-Moving Activities during High Wind Conditions shall:

(a) Cease all Active Operations; or

(b) Apply water to soil not more than 15 minutes prior to moving such soil to limit VDE to 20 percent opacity.

(11) The owner/operator of Disturbed Surface Areas during High Wind Conditions shall:

   (a) Apply water with a mixture of Chemical Stabilizer diluted to not less than 1/20 of the concentration required to maintain a Stabilized Surface for a period of six months only on the last day of Active Operations prior to a weekend, holiday, or any other period when Active Operations will not occur for not more than four consecutive days;

   (b) Apply Chemical Stabilizers prior to high wind event;

   (c) Apply water to all unstabilized Disturbed Areas three times per day. Watering frequency should be increased to a minimum of four times per day if there is any evidence of visible Wind-Driven Fugitive Dust;

   (d) Establish a vegetative ground cover within 30 days after Active Operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter;

   (e) Apply Chemical Stabilizers within seven working days of grading completion; or

   (f) Utilize any combination of control actions listed such that, in total, these actions apply to all Disturbed Surface Areas.

(12) Owners/operators of Unpaved Roads during high winds shall:

   (a) Apply Chemical Stabilizers prior to wind event;

   (b) Apply water once per hour during active operation; or

   (c) Stop all vehicular traffic.

(13) Owners/operators of Open Storage Piles during high winds shall:

   (a) Apply Chemical Stabilizers;

   (b) Apply water to at lest 70 percent of the surface area of all Open Storage Piles on a daily basis when there is evidence of Wind-Driven Fugitive Dust;

   (c) Install temporary coverings; or

   (d) Install a three sided enclosure which will extend, at a minimum, to the top of the pile.

(14) Owners/operators of all categories during high winds shall:

   (a) Use any other control measures approved by the APCO and the USEPA as equivalent to the methods specified in section (C).

(D) Dust Control Plan

(1) An owner/operator shall submit a Dust Control Plan (DCP) to the APCO prior to the start of any construction activity on any site that will include ten acres or more of Disturbed Surface Area for residential developments, or five acres or more of Disturbed Surface Area for non-residential development, or will include moving, depositing, or relocating more than 2,500 cubic yards per day of Bulk Materials on at least three days. Construction activities shall not commence until the APCO has approved or conditionally approved the DCP. An owner/operator shall provide written notification to the APCO within ten days prior to the commencement of Earth-Moving Activities via fax or mail. The requirement to submit a DCP shall apply to all such activities conducted for residential and non-residential (e.g., commercial, industrial, or institutional) purposes or conducted by any governmental entity.

(a) Install and maintain project signage with project contact prior to initiating any Earth-Moving Activities that;

(i) Identifies phone numbers for dust complaints; and
(ii) Meets minimum standards of Rule 403, Appendix “A”.

(b) An owner/operator may submit one DCP covering multiple projects at different sites where construction will commence within the next 12 months provided the DCP includes each project size, location, and types of activities to be performed. The DCP shall specify the expected start and completion date of each project.

(c) The DCP shall describe all Fugitive Dust control measures to be implemented before, during, and after any dust generating activity.

(d) A DCP shall contain all the information described in section (D)(1)(h)(i) through (D)(1)(h)(viii). The APCO shall approve, disapprove, or conditionally approve the DCP within ten days of DCP submittal. A DCP is deemed automatically approved if, after ten days following receipt by the District, the District does not provide any comments to the owner/operator regarding the DCP.

(e) An owner/operator shall submit a copy of a DCP approval letter to the building and safety authority prior to issuance of a grading permit.

(f) An owner/operator shall retain a copy of an approved DCP at the project site. The approved DCP shall remain valid until the termination of all dust generating activities. Failure to comply with the provisions of an approved DCP is deemed to be a violation of this rule. Regardless of whether an approved DCP is in place or not, or even when the owner/operator responsible for the DCP is complying with an approved DCP, the owner/operator is still subject to comply with all requirements of Rule 403 at all times.

(g) An owner/operator shall maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the APCO upon request.

(h) A DCP shall contain all of the following information:

  (i) Name(s), address(es), and phone number(s) of person(s) and owner(s)/operator(s) responsible for the preparation, submittal, and implementation of the DCP and responsible for the dust generating operation and the application of dust control measures.

  (ii) A plot plan which shows the type and location of each project.

  (iii) The total area of land surface to be disturbed, daily throughput volume of earthmoving in cubic yards, and total area in acres of the entire project site.

  (iv) The expected start and completion dates of dust generating and soil disturbance activities to be performed on the site.

  (v) The actual and potential sources of Fugitive Dust emissions on the site and the location of Bulk Material handling and storage areas, paved and Unpaved Roads; entrances and exits where carryout/Track-out may occur; and traffic areas.

  (vi) Dust Suppressants to be applied, including: product specifications; manufacturer's usage instructions (method, frequency, and intensity of application); type, number, and capacity of application equipment; and information on environmental impacts and approvals or certifications related to appropriate and safe use for ground application.

  (vii) Specific surface treatment(s) and/or control measures utilized to control material carryout, Track-out, and sedimentation where unpaved and/or access points join paved public access roads.

  (viii) Identify a dust control supervisor that:

    a. Is employed by or contracted with the property owner or developer;
    b. Is on the site or available on-site within 30 minutes during working hours;
    c. Has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with Rule requirements; and
    d. Has completed the AVAQMD Fugitive Dust Control Class and has been issued a valid Certification of Completion for the class.

(i) Notify the APCO in writing within 30 days after the site no longer qualifies as an active operation.

(j) Any approved DCP shall be valid for a period of one year from the date of approval or conditional approval of the DCP. DCPs must be resubmitted annually, at least 60 days prior to the expiration date, or the DCP shall become disapproved as of the expiration date. If all Fugitive Dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously approved DCP, the resubmittal may contain a simple statement of no-change. Otherwise, a resubmittal must contain all the items specified in subparagraphs (D)(1)(h).

(E) Compliance Schedule

All the newly amended provisions of this rule shall become effective upon adoption of this rule amendment.

(F) Exemptions

(1) The provisions of this rule shall not apply to:

(a) Agricultural Operations.

(b) Unpaved Roads not part of an industrial or commercial facility.

(c) Any Disturbed Surface Area less than one-half acre on property zoned for residential uses.

(d) Active Operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(e) Active Operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(f) Any Contractor subsequent to the time the contract ends, provided that such Contractor implemented the required control measures during the contractual period.

(g) Any grading Contractor, for a phase of Active Operations, subsequent to the contractual completion of that phase of Earth-Moving Activities, provided that the required control measures have been implemented during the entire phase of Earth-Moving Activities, through and including five days after the final grading inspection.

(h) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

  (i) Mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and
  (ii) Any disking or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in (F)(1)(h)(i). The provisions of this clause shall not exempt the owner of any property from stabilizing Disturbed Surface Areas which have been created as a result of the weed abatement actions.

(i) Blasting operations which have been permitted by the California Division of Industrial Safety.

(j) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the APCO must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.

(2) The provisions of paragraphs (C)(1) through (C)(14) shall not apply:

(a) When high winds exceed 25 miles per hour, provided that:

  (i) The required control measures for High Wind Conditions are implemented for each applicable Fugitive Dust source type, as specified in section (C)(10) through (C)(14);

  (ii) Maintain daily records to document the specific actions taken;

  (iii) Maintain such records for a period of not less than six months; and

  (iv) Make such records available to the APCO upon request.

(b) To Unpaved Roads, provided such roads:

  (i) Are used solely for the maintenance of wind-generating equipment; or
  (ii) Meet all of the following criteria:
    a. Are less than 50 feet in width at all points along the road;
    b. Are within 25 feet of the Property Line; and
    c. Have a traffic volume less than 20 vehicle-trips per day.

(c) To any Active Operation, Open Storage Pile, or Disturbed Surface Area for which necessary Fugitive Dust preventive or mitigative actions are in conflict with the federal Endangered Species Act.

(d) To Non-routine or emergency maintenance of flood control channels and water spreading basins.

(4) The provisions of section (C)(3) shall not apply to earth coverings of public Paved Roads where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles.

(5) The provisions of section (D) shall not apply to:

(a) Officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(G) Fees

(1) Any person subject to a Dust Control Plan submittal pursuant to section (D) shall be assessed applicable filing and evaluation fees pursuant to Rule 306.

(2) The submittal of an annual statement of no-change, pursuant to section (D)(1)(i), shall not be considered as an annual review, and therefore shall not be subject to annual review fees, pursuant to Rule 306.

(3) The owner/operator of any facility for which the APCO conducts upwind/downwind monitoring for PM_{10} pursuant to section (C)(2) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1.

[SIP: Submitted as amended mm/dd/yy on mm/dd/yy; Submitted as amended 2/14/97 on 8/1/97; Submitted as amended 7/9/93 on 7/13/94; Approved 9/8/78, 43 FR 40011, 40 CFR 52.220(c)(39)(iii)(C); Approved 6/14/78, 43 FR 25684, 40 CFR 52.220(c)(32)(iv)(A)]

Appendix "A"

CONSTRUCTION SITE SIGNAGE GUIDELINES
(Minimum Requirements)

The purpose of this signage is to allow the public to contact the responsible party if Visible Dust Emissions or Track-out of material is observed from a construction site.

Project size	≥ Ten Acres
Sign size	48" x 96"

Sign Template

Permit # (if applicable)	4"
Site Name	4"
Project Name / Tract # # # #	4"
IF YOU SEE DUST COMING FROM THIS PROJECT CALL	4"
Name, Phone Number(XXX) XXX-XXXX	6"
If you do not receive a response, Please call The Antelope Valley AQMD at 1-877-723-8070	3"

Notes:

Signage must be located within 50 feet of each project site entrance.

No more than four signs are required per site/facility.

One sign is sufficient for multiple site entrances located within 300 yards of each other.

Text height shall be at a minimum as shown on right side of sign template above.

Sign background must contrast with lettering, typically black text with white background.

Sign should be one inch AC laminated plywood board.

The lower edge of the sign board must be a minimum of six feet and a maximum of seven feet above grade.

The telephone number listed for the contact must be a local or a toll-free number and shall be accessible 24 hours per day.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT

RULE 403 -- FUGITIVE DUST

(Adopted: May 7, 1976)(Amended: November 6, 1992, July 9, 1993, February 14, 1997, December 11, 1998, April 2, 2004, June 3, 2005)

(a) Purpose

The purpose of this Rule is to reduce the amount of particulate matter entrained in the ambient air as a result of anthropogenic (man-made) fugitive dust sources by requiring actions to prevent, reduce or mitigate fugitive dust emissions.

(b) Applicability

The provisions of this Rule shall apply to any activity or man-made condition capable of generating fugitive dust.

(c) Definitions

(1) ACTIVE OPERATIONS means any source capable of generating fugitive dust, including, but not limited to, earth-moving activities, construction/demolition activities, disturbed surface area, or heavy- and light-duty vehicular movement.

(2) AGGREGATE-RELATED PLANTS are defined as facilities that produce and / or mix sand and gravel and crushed stone.

(3) AGRICULTURAL HANDBOOK means the region-specific guidance document that has been approved by the Governing Board or hereafter approved by the Executive Officer and the U.S. EPA. For the South Coast Air Basin, the Board-approved region-specific guidance document is the Rule 403 Agricultural Handbook dated December 1998. For the Coachella Valley, the Board-approved region-specific guidance document is the Rule 403 Coachella Valley Agricultural Handbook dated April 2, 2004.

(4) ANEMOMETERS are devices used to measure wind speed and direction in accordance with the performance standards, and maintenance and calibration criteria as contained in the most recent Rule 403 Implementation Handbook.

(5) BEST AVAILABLE CONTROL MEASURES means fugitive dust control actions that are set forth in Table 1 of this Rule.

(6) BULK MATERIAL is sand, gravel, soil, aggregate material less than two inches in length or diameter, and other organic or inorganic particulate matter.

(7) CEMENT MANUFACTURING FACILITY is any facility that has a cement kiln at the facility.

(8) CHEMICAL STABILIZERS are any non-toxic chemical dust suppressant which must not be used if prohibited for use by the Regional Water Quality Control Boards, the California Air Resources Board, the U.S. Environmental Protection Agency (U.S. EPA), or any applicable law, rule or regulation. The chemical stabilizers shall meet any specifications, criteria, or tests required by any federal, state, or local water agency. Unless otherwise indicated, the use of a non-toxic chemical stabilizer shall be of sufficient concentration and application frequency to maintain a stabilized surface.

(9) COMMERCIAL POULTRY RANCH means any building, structure, enclosure, or premises where more than 100 fowl are kept or maintained for the primary purpose of producing eggs or meat for sale or other distribution.

(10) CONFINED ANIMAL FACILITY means a source or group of sources of air pollution at an agricultural source for the raising of 3,360 or more fowl or 50 or more animals, including but not limited to, any structure, building, installation, farm, corral, coop, feed storage area, milking parlor, or system for the collection, storage, or distribution of solid and liquid manure; if domesticated animals, including horses, sheep, goats, swine, beef cattle, rabbits, chickens, turkeys, or ducks are corralled, penned, or otherwise caused to remain in restricted areas for commercial agricultural purposes and feeding is by means other than grazing.

(11) CONSTRUCTION/DEMOLITION ACTIVITIES means any on-site mechanical activities conducted in preparation of, or related to, the building, alteration, rehabilitation, demolition or improvement of property, including, but not limited to the following activities: grading, excavation, loading, crushing, cutting, planing, shaping or ground breaking.

(12) CONTRACTOR means any person who has a contractual arrangement to conduct an active operation for another person.

(13) DAIRY FARM is an operation on a property, or set of properties that are contiguous or separated only by a public right-of-way, that raises cows or

produces milk from cows for the purpose of making a profit or for a livelihood. Heifer and calf farms are dairy farms.

(14) DISTURBED SURFACE AREA means a portion of the earth's surface which has been physically moved, uncovered, destabilized, or otherwise modified from its undisturbed natural soil condition, thereby increasing the potential for emission of fugitive dust. This definition excludes those areas which have:

(A) been restored to a natural state, such that the vegetative ground cover and soil characteristics are similar to adjacent or nearby natural conditions;

(B) been paved or otherwise covered by a permanent structure; or

(C) sustained a vegetative ground cover of at least 70 percent of the native cover for a particular area for at least 30 days.

(15) DUST SUPPRESSANTS are water, hygroscopic materials, or non-toxic chemical stabilizers used as a treatment material to reduce fugitive dust emissions.

(16) EARTH-MOVING ACTIVITIES means the use of any equipment for any activity where soil is being moved or uncovered, and shall include, but not be limited to the following: grading, earth cutting and filling operations, loading or unloading of dirt or bulk materials, adding to or removing from open storage piles of bulk materials, landfill operations, weed abatement through disking, and soil mulching.

(17) DUST CONTROL SUPERVISOR means a person with the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule 403 requirements at an active operation.

(18) FUGITIVE DUST means any solid particulate matter that becomes airborne, other than that emitted from an exhaust stack, directly or indirectly as a result of the activities of any person.

(19) HIGH WIND CONDITIONS means that instantaneous wind speeds exceed 25 miles per hour.

(20) INACTIVE DISTURBED SURFACE AREA means any disturbed surface area upon which active operations have not occurred or are not expected to occur for a period of 20 consecutive days.

(21) LARGE OPERATIONS means any active operations on property which contains 50 or more acres of disturbed surface area; or any earth-moving operation with a daily earth-moving or throughput volume of 3,850 cubic

meters (5,000 cubic yards) or more three times during the most recent 365-day period.

(22) OPEN STORAGE PILE is any accumulation of bulk material, which is not fully enclosed, covered or chemically stabilized, and which attains a height of three feet or more and a total surface area of 150 or more square feet.

(23) PARTICULATE MATTER means any material, except uncombined water, which exists in a finely divided form as a liquid or solid at standard conditions.

(24) PAVED ROAD means a public or private improved street, highway, alley, public way, or easement that is covered by typical roadway materials, but excluding access roadways that connect a facility with a public paved roadway and are not open to through traffic. Public paved roads are those open to public access and that are owned by any federal, state, county, municipal or any other governmental or quasi-governmental agencies. Private paved roads are any paved roads not defined as public.

(25) PM_{10} means particulate matter with an aerodynamic diameter smaller than or equal to 10 microns as measured by the applicable State and Federal reference test methods.

(26) PROPERTY LINE means the boundaries of an area in which either a person causing the emission or a person allowing the emission has the legal use or possession of the property. Where such property is divided into one or more sub-tenancies, the property line(s) shall refer to the boundaries dividing the areas of all sub-tenancies.

(27) RULE 403 IMPLEMENTATION HANDBOOK means a guidance document that has been approved by the Governing Board on April 2, 2004 or hereafter approved by the Executive Officer and the U.S. EPA.

(28) SERVICE ROADS are paved or unpaved roads that are used by one or more public agencies for inspection or maintenance of infrastructure and which are not typically used for construction-related activity.

(29) SIMULTANEOUS SAMPLING means the operation of two PM_{10} samplers in such a manner that one sampler is started within five minutes of the other, and each sampler is operated for a consecutive period which must be not less than 290 minutes and not more than 310 minutes.

(30) SOUTH COAST AIR BASIN means the non-desert portions of Los Angeles, Riverside, and San Bernardino counties and all of Orange

County as defined in California Code of Regulations, Title 17, Section 60104. The area is bounded on the west by the Pacific Ocean, on the north and east by the San Gabriel, San Bernardino, and San Jacinto Mountains, and on the south by the San Diego county line.

(31) STABILIZED SURFACE means any previously disturbed surface area or open storage pile which, through the application of dust suppressants, shows visual or other evidence of surface crusting and is resistant to wind-driven fugitive dust and is demonstrated to be stabilized. Stabilization can be demonstrated by one or more of the applicable test methods contained in the Rule 403 Implementation Handbook.

(32) TRACK-OUT means any bulk material that adheres to and agglomerates on the exterior surface of motor vehicles, haul trucks, and equipment (including tires) that have been released onto a paved road and can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(33) TYPICAL ROADWAY MATERIALS means concrete, asphaltic concrete, recycled asphalt, asphalt, or any other material of equivalent performance as determined by the Executive Officer, and the U.S. EPA.

(34) UNPAVED ROADS means any unsealed or unpaved roads, equipment paths, or travel ways that are not covered by typical roadway materials. Public unpaved roads are any unpaved roadway owned by federal, state, county, municipal or other governmental or quasi-governmental agencies. Private unpaved roads are all other unpaved roadways not defined as public.

(35) VISIBLE ROADWAY DUST means any sand, soil, dirt, or other solid particulate matter which is visible upon paved road surfaces and which can be removed by a vacuum sweeper or a broom sweeper under normal operating conditions.

(36) WIND-DRIVEN FUGITIVE DUST means visible emissions from any disturbed surface area which is generated by wind action alone.

(37) WIND GUST is the maximum instantaneous wind speed as measured by an anemometer.

(d) Requirements

(1) No person shall cause or allow the emissions of fugitive dust from any active operation, open storage pile, or disturbed surface area such that:

(A) the dust remains visible in the atmosphere beyond the property line of the emission source; or

(B) the dust emission exceeds 20 percent opacity (as determined by the appropriate test method included in the Rule 403 Implementation Handbook), if the dust emission is the result of movement of a motorized vehicle.

(2) No person shall conduct active operations without utilizing the applicable best available control measures included in Table 1 of this Rule to minimize fugitive dust emissions from each fugitive dust source type within the active operation.

(3) No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined, by simultaneous sampling, as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other U.S. EPA-approved equivalent method for PM_{10} monitoring. If sampling is conducted, samplers shall be:

(A) Operated, maintained, and calibrated in accordance with 40 Code of Federal Regulations (CFR), Part 50, Appendix J, or appropriate U.S. EPA-published documents for U.S. EPA-approved equivalent method(s) for PM_{10}.

(B) Reasonably placed upwind and downwind of key activity areas and as close to the property line as feasible, such that other sources of fugitive dust between the sampler and the property line are minimized.

(4) No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation. Notwithstanding the preceding, all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.

(5) No person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without utilizing at least one of the measures listed in subparagraphs (d)(5)(A) through (d)(5)(E) at each vehicle egress from the site to a paved public road.

(A) Install a pad consisting of washed gravel (minimum-size: one inch) maintained in a clean condition to a depth of at least six inches and extending at least 30 feet wide and at least 50 feet long.

    - (B) Pave the surface extending at least 100 feet and at least 20 feet wide.
    - (C) Utilize a wheel shaker/wheel spreading device consisting of raised dividers (rails, pipe, or grates) at least 24 feet long and 10 feet wide to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
    - (D) Install and utilize a wheel washing system to remove bulk material from tires and vehicle undercarriages before vehicles exit the site.
    - (E) Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the actions specified in subparagraphs (d)(5)(A) through (d)(5)(D).
  - (6) Beginning January 1, 2006, any person who operates or authorizes the operation of a confined animal facility subject to this Rule shall implement the applicable conservation management practices specified in Table 4 of this Rule.

- (e) Additional Requirements for Large Operations
  - (1) Any person who conducts or authorizes the conducting of a large operation subject to this Rule shall implement the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards can not be met through use of Table 2 actions; and shall:
    - (A) submit a fully executed Large Operation Notification (Form 403 N) to the Executive Officer within 7 days of qualifying as a large operation;
    - (B) include, as part of the notification, the name(s), address(es), and phone number(s) of the person(s) responsible for the submittal, and a description of the operation(s), including a map depicting the location of the site;
    - (C) maintain daily records to document the specific dust control actions taken, maintain such records for a period of not less than three years; and make such records available to the Executive Officer upon request;

(D) install and maintain project signage with project contact signage that meets the minimum standards of the Rule 403 Implementation Handbook, prior to initiating any earthmoving activities;

(E) identify a dust control supervisor that:

(i) is employed by or contracted with the property owner or developer;

(ii) is on the site or available on-site within 30 minutes during working hours;

(iii) has the authority to expeditiously employ sufficient dust mitigation measures to ensure compliance with all Rule requirements;

(iv) has completed the AQMD Fugitive Dust Control Class and has been issued a valid Certificate of Completion for the class; and

(F) notify the Executive Officer in writing within 30 days after the site no longer qualifies as a large operation as defined by paragraph (c)(18).

(2) Any Large Operation Notification submitted to the Executive Officer or AQMD-approved dust control plan shall be valid for a period of one year from the date of written acceptance by the Executive Officer. Any Large Operation Notification accepted pursuant to paragraph (e)(1), excluding those submitted by aggregate-related plants and cement manufacturing facilities must be resubmitted annually by the person who conducts or authorizes the conducting of a large operation, at least 30 days prior to the expiration date, or the submittal shall no longer be valid as of the expiration date. If all fugitive dust sources and corresponding control measures or special circumstances remain identical to those identified in the previously accepted submittal or in an AQMD-approved dust control plan, the resubmittal may be a simple statement of no-change (Form 403NC).

(f) Compliance Schedule

The newly amended provisions of this Rule shall become effective upon adoption. Pursuant to subdivision (e), any existing site that qualifies as a large operation will have 60 days from the date of Rule adoption to comply with the notification and recordkeeping requirements for large operations. Any Large Operation

Notification or AQMD-approved dust control plan which has been accepted prior to the date of adoption of these amendments shall remain in effect and the Large Operation Notification or AQMD-approved dust control plan annual resubmittal date shall be one year from adoption of this Rule amendment.

(g) Exemptions

(1) The provisions of this Rule shall not apply to:

(A) Dairy farms.

(B) Confined animal facilities provided that the combined disturbed surface area within one continuous property line is one acre or less.

(C) Agricultural vegetative crop operations provided that the combined disturbed surface area within one continuous property line and not separated by a paved public road is 10 acres or less.

(D) Agricultural vegetative crop operations within the South Coast Air Basin, whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Agricultural Handbook;

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(E) Agricultural vegetative crop operations outside the South Coast Air Basin whose combined disturbed surface area includes more than 10 acres provided that the person responsible for such operations:

(i) voluntarily implements the conservation management practices contained in the Rule 403 Coachella Valley Agricultural Handbook; and

(ii) completes and maintains the self-monitoring form documenting sufficient conservation management practices, as described in the Rule 403 Coachella Valley Agricultural Handbook; and

(iii) makes the completed self-monitoring form available to the Executive Officer upon request.

(F) Active operations conducted during emergency life-threatening situations, or in conjunction with any officially declared disaster or state of emergency.

(G) Active operations conducted by essential service utilities to provide electricity, natural gas, telephone, water and sewer during periods of service outages and emergency disruptions.

(H) Any contractor subsequent to the time the contract ends, provided that such contractor implemented the required control measures during the contractual period.

(I) Any grading contractor, for a phase of active operations, subsequent to the contractual completion of that phase of earth-moving activities, provided that the required control measures have been implemented during the entire phase of earth-moving activities, through and including five days after the final grading inspection.

(J) Weed abatement operations ordered by a county agricultural commissioner or any state, county, or municipal fire department, provided that:

(i) mowing, cutting or other similar process is used which maintains weed stubble at least three inches above the soil; and

(ii) any discing or similar operation which cuts into and disturbs the soil, where watering is used prior to initiation of these activities, and a determination is made by the agency issuing the weed abatement order that, due to fire hazard conditions, rocks, or other physical obstructions, it is not practical to meet the conditions specified in clause (g)(1)(H)(i). The provisions this clause shall not exempt the owner of any property from stabilizing, in accordance with paragraph (d)(2), disturbed surface areas which have been created as a result of the weed abatement actions.

(K) sandblasting operations.

(2) The provisions of paragraphs (d)(1) and (d)(3) shall not apply:

(A) When wind gusts exceed 25 miles per hour, provided that:

    - (i) The required Table 3 contingency measures in this Rule are implemented for each applicable fugitive dust source type, and;
    - (ii) records are maintained in accordance with subparagraph (e)(1)(C).
  - (B) To unpaved roads, provided such roads:
    - (i) are used solely for the maintenance of wind-generating equipment; or
    - (ii) are unpaved public alleys as defined in Rule 1186; or
    - (iii) are service roads that meet all of the following criteria:
      - (a) are less than 50 feet in width at all points along the road;
      - (b) are within 25 feet of the property line; and
      - (c) have a traffic volume less than 20 vehicle-trips per day.
  - (C) To any active operation, open storage pile, or disturbed surface area for which necessary fugitive dust preventive or mitigative actions are in conflict with the federal Endangered Species Act, as determined in writing by the State or federal agency responsible for making such determinations.
- (3) The provisions of (d)(2) shall not apply to any aggregate-related plant or cement manufacturing facility that implements the applicable actions specified in Table 2 of this Rule at all times and shall implement the applicable actions specified in Table 3 of this Rule when the applicable performance standards of paragraphs (d)(1) and (d)(3) can not be met through use of Table 2 actions.
- (4) The provisions of paragraphs (d)(1), (d)(2), and (d)(3) shall not apply to:
  - (A) Blasting operations which have been permitted by the California Division of Industrial Safety; and
  - (B) Motion picture, television, and video production activities when dust emissions are required for visual effects. In order to obtain this exemption, the Executive Officer must receive notification in writing at least 72 hours in advance of any such activity and no nuisance results from such activity.
- (5) The provisions of paragraph (d)(3) shall not apply if the dust control actions, as specified in Table 2, are implemented on a routine basis for

each applicable fugitive dust source type. To qualify for this exemption, a person must maintain records in accordance with subparagraph (e)(1)(C).

(6) The provisions of paragraph (d)(4) shall not apply to earth coverings of public paved roadways where such coverings are approved by a local government agency for the protection of the roadway, and where such coverings are used as roadway crossings for haul vehicles provided that such roadway is closed to through traffic and visible roadway dust is removed within one day following the cessation of activities.

(7) The provisions of subdivision (e) shall not apply to:

(A) officially-designated public parks and recreational areas, including national parks, national monuments, national forests, state parks, state recreational areas, and county regional parks.

(B) any large operation which is required to submit a dust control plan to any city or county government which has adopted a District-approved dust control ordinance.

(C) any large operation subject to Rule 1158, which has an approved dust control plan pursuant to Rule 1158, provided that all sources of fugitive dust are included in the Rule 1158 plan.

(8) The provisions of subparagraph (e)(1)(A) through (e)(1)(C) shall not apply to any large operation with an AQMD-approved fugitive dust control plan provided that there is no change to the sources and controls as identified in the AQMD-approved fugitive dust control plan.

(h) Fees

Any person conducting active operations for which the Executive Officer conducts upwind/downwind monitoring for PM_{10} pursuant to paragraph (d)(3) shall be assessed applicable Ambient Air Analysis Fees pursuant to Rule 304.1. Applicable fees shall be waived for any facility which is exempted from paragraph (d)(3) or meets the requirements of paragraph (d)(3).

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	**Control Measure**	**Guidance**
Backfilling	01-1 Stabilize backfill material when not actively handling; and 01-2 Stabilize backfill material during handling; and 01-3 Stabilize soil at completion of activity.	✓ Mix backfill soil with water prior to moving ✓ Dedicate water truck or high capacity hose to backfilling equipment ✓ Empty loader bucket slowly so that no dust plumes are generated ✓ Minimize drop height from loader bucket
Clearing and grubbing	02-1 Maintain stability of soil through pre-watering of site prior to clearing and grubbing; and 02-2 Stabilize soil during clearing and grubbing activities; and 02-3 Stabilize soil immediately after clearing and grubbing activities.	✓ Maintain live perennial vegetation where possible ✓ Apply water in sufficient quantity to prevent generation of dust plumes
Clearing forms	03-1 Use water spray to clear forms; or 03-2 Use sweeping and water spray to clear forms; or 03-3 Use vacuum system to clear forms.	✓ Use of high pressure air to clear forms may cause exceedance of Rule requirements
Crushing	04-1 Stabilize surface soils prior to operation of support equipment; and 04-2 Stabilize material after crushing.	✓ Follow permit conditions for crushing equipment ✓ Pre-water material prior to loading into crusher ✓ Monitor crusher emissions opacity ✓ Apply water to crushed material to prevent dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	**Control Measure**	**Guidance**
Cut and fill	05-1 Pre-water soils prior to cut and fill activities; and 05-2 Stabilize soil during and after cut and fill activities.	✓ For large sites, pre-water with sprinklers or water trucks and allow time for penetration ✓ Use water trucks/pulls to water soils to depth of cut prior to subsequent cuts
Demolition – mechanical/manual	06-1 Stabilize wind erodible surfaces to reduce dust; and 06-2 Stabilize surface soil where support equipment and vehicles will operate; and 06-3 Stabilize loose soil and demolition debris; and 06-4 Comply with AQMD Rule 1403.	✓ Apply water in sufficient quantities to prevent the generation of visible dust plumes
Disturbed soil	07-1 Stabilize disturbed soil throughout the construction site; and 07-2 Stabilize disturbed soil between structures	✓ Limit vehicular traffic and disturbances on soils where possible ✓ If interior block walls are planned, install as early as possible ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes
Earth-moving activities	08-1 Pre-apply water to depth of proposed cuts; and 08-2 Re-apply water as necessary to maintain soils in a damp condition and to ensure that visible emissions do not exceed 100 feet in any direction; and 08-3 Stabilize soils once earth-moving activities are complete.	✓ Grade each project phase separately, timed to coincide with construction phase ✓ Upwind fencing can prevent material movement on site ✓ Apply water or a stabilizing agent in sufficient quantities to prevent the generation of visible dust plumes

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Importing/exporting of bulk materials	09-1 Stabilize material while loading to reduce fugitive dust emissions; and 09-2 Maintain at least six inches of freeboard on haul vehicles; and 09-3 Stabilize material while transporting to reduce fugitive dust emissions; and 09-4 Stabilize material while unloading to reduce fugitive dust emissions; and 09-5 Comply with Vehicle Code Section 23114.	✓ Use tarps or other suitable enclosures on haul trucks ✓ Check belly-dump truck seals regularly and remove any trapped rocks to prevent spillage ✓ Comply with track-out prevention/mitigation requirements ✓ Provide water while loading and unloading to reduce visible dust plumes
Landscaping	10-1 Stabilize soils, materials, slopes	✓ Apply water to materials to stabilize ✓ Maintain materials in a crusted condition ✓ Maintain effective cover over materials ✓ Stabilize sloping surfaces using soil binders until vegetation or ground cover can effectively stabilize the slopes ✓ Hydroseed prior to rain season
Road shoulder maintenance	11-1 Apply water to unpaved shoulders prior to clearing; and 11-2 Apply chemical dust suppressants and/or washed gravel to maintain a stabilized surface after completing road shoulder maintenance.	✓ Installation of curbing and/or paving of road shoulders can reduce recurring maintenance costs ✓ Use of chemical dust suppressants can inhibit vegetation growth and reduce future road shoulder maintenance costs

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	**Control Measure**	**Guidance**
Screening	12-1 Pre-water material prior to screening; and 12-2 Limit fugitive dust emissions to opacity and plume length standards; and 12-3 Stabilize material immediately after screening.	✓ Dedicate water truck or high capacity hose to screening operation ✓ Drop material through the screen slowly and minimize drop height ✓ Install wind barrier with a porosity of no more than 50% upwind of screen to the height of the drop point
Staging areas	13-1 Stabilize staging areas during use; and 13-2 Stabilize staging area soils at project completion.	✓ Limit size of staging area ✓ Limit vehicle speeds to 15 miles per hour ✓ Limit number and size of staging area entrances/exists
Stockpiles/ Bulk Material Handling	14-1 Stabilize stockpiled materials. 14-2 Stockpiles within 100 yards of off-site occupied buildings must not be greater than eight feet in height; or must have a road bladed to the top to allow water truck access or must have an operational water irrigation system that is capable of complete stockpile coverage.	✓ Add or remove material from the downwind portion of the storage pile ✓ Maintain storage piles to avoid steep sides or faces

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	Control Measure	Guidance
Traffic areas for construction activities	15-1 Stabilize all off-road traffic and parking areas; and 15-2 Stabilize all haul routes; and 15-3 Direct construction traffic over established haul routes.	✓ Apply gravel/paving to all haul routes as soon as possible to all future roadway areas ✓ Barriers can be used to ensure vehicles are only used on established parking areas/haul routes
Trenching	16-1 Stabilize surface soils where trencher or excavator and support equipment will operate; and 16-2 Stabilize soils at the completion of trenching activities.	✓ Pre-watering of soils prior to trenching is an effective preventive measure. For deep trenching activities, pre-trench to 18 inches soak soils via the pre-trench and resuming trenching ✓ Washing mud and soils from equipment at the conclusion of trenching activities can prevent crusting and drying of soil on equipment
Truck loading	17-1 Pre-water material prior to loading; and 17-2 Ensure that freeboard exceeds six inches (CVC 23114)	✓ Empty loader bucket such that no visible dust plumes are created ✓ Ensure that the loader bucket is close to the truck to minimize drop height while loading
Turf Overseeding	18-1 Apply sufficient water immediately prior to conducting turf vacuuming activities to meet opacity and plume length standards; and 18-2 Cover haul vehicles prior to exiting the site.	✓ Haul waste material immediately off-site

TABLE 1
BEST AVAILABLE CONTROL MEASURES
(Applicable to All Construction Activity Sources)

Source Category	**Control Measure**	**Guidance**
Unpaved roads/parking lots	19-1 Stabilize soils to meet the applicable performance standards; and 19-2 Limit vehicular travel to established unpaved roads (haul routes) and unpaved parking lots.	✓ Restricting vehicular access to established unpaved travel paths and parking lots can reduce stabilization requirements
Vacant land	20-1 In instances where vacant lots are 0.10 acre or larger and have a cumulative area of 500 square feet or more that are driven over and/or used by motor vehicles and/or off-road vehicles, prevent motor vehicle and/or off-road vehicle trespassing, parking and/or access by installing barriers, curbs, fences, gates, posts, signs, shrubs, trees or other effective control measures.	

Table 2
DUST CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		CONTROL ACTIONS
Earth-moving (except construction cutting and filling areas, and mining operations)	(1a)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations each subsequent four-hour period of active operations; OR
	(1a-1)	For any earth-moving which is more than 100 feet from all property lines, conduct watering as necessary to prevent visible dust emissions from exceeding 100 feet in length in any direction.
Earth-moving: Construction fill areas:	(1b)	Maintain soil moisture content at a minimum of 12 percent, as determined by ASTM method D-2216, or other equivalent method approved by the Executive Officer, the California Air Resources Board, and the U.S. EPA. For areas which have an optimum moisture content for compaction of less than 12 percent, as determined by ASTM Method 1557 or other equivalent method approved by the Executive Officer and the California Air Resources Board and the U.S. EPA, complete the compaction process as expeditiously as possible after achieving at least 70 percent of the optimum soil moisture content. Two soil moisture evaluations must be conducted during the first three hours of active operations during a calendar day, and two such evaluations during each subsequent four-hour period of active operations.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY		**CONTROL ACTIONS**
Earth-moving: Construction cut areas and mining operations:	(1c)	Conduct watering as necessary to prevent visible emissions from extending more than 100 feet beyond the active cut or mining area unless the area is inaccessible to watering vehicles due to slope conditions or other safety factors.
Disturbed surface areas (except completed grading areas)	(2a/b)	Apply dust suppression in sufficient quantity and frequency to maintain a stabilized surface. Any areas which cannot be stabilized, as evidenced by wind driven fugitive dust must have an application of water at least twice per day to at least 80 percent of the unstabilized area.
Disturbed surface areas: Completed grading areas	(2c) (2d)	Apply chemical stabilizers within five working days of grading completion; OR Take actions (3a) or (3c) specified for inactive disturbed surface areas.
Inactive disturbed surface areas	(3a) (3b) (3c) (3d)	Apply water to at least 80 percent of all inactive disturbed surface areas on a daily basis when there is evidence of wind driven fugitive dust, excluding any areas which are inaccessible to watering vehicles due to excessive slope or other safety conditions; OR Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR Establish a vegetative ground cover within 21 days after active operations have ceased. Ground cover must be of sufficient density to expose less than 30 percent of unstabilized ground within 90 days of planting, and at all times thereafter; OR Utilize any combination of control actions (3a), (3b), and (3c) such that, in total, these actions apply to all inactive disturbed surface areas.

Table 2 (Continued)

FUGITIVE DUST SOURCE CATEGORY		**CONTROL ACTIONS**
Unpaved Roads	(4a)	Water all roads used for any vehicular traffic at least once per every two hours of active operations [3 times per normal 8 hour work day]; OR
	(4b)	Water all roads used for any vehicular traffic once daily and restrict vehicle speeds to 15 miles per hour; OR
	(4c)	Apply a chemical stabilizer to all unpaved road surfaces in sufficient quantity and frequency to maintain a stabilized surface.
Open storage piles	(5a)	Apply chemical stabilizers; OR
	(5b)	Apply water to at least 80 percent of the surface area of all open storage piles on a daily basis when there is evidence of wind driven fugitive dust; OR
	(5c)	Install temporary coverings; OR
	(5d)	Install a three-sided enclosure with walls with no more than 50 percent porosity which extend, at a minimum, to the top of the pile. This option may only be used at aggregate-related plants or at cement manufacturing facilities.
All Categories	(6a)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 2 may be used.

TABLE 3
CONTINGENCY CONTROL MEASURES FOR LARGE OPERATIONS

FUGITIVE DUST SOURCE CATEGORY		CONTROL MEASURES
Earth-moving	(1A)	Cease all active operations; OR
	(2A)	Apply water to soil not more than 15 minutes prior to moving such soil.
Disturbed surface areas	(0B)	On the last day of active operations prior to a weekend, holiday, or any other period when active operations will not occur for not more than four consecutive days: apply water with a mixture of chemical stabilizer diluted to not less than 1/20 of the concentration required to maintain a stabilized surface for a period of six months; OR
	(1B)	Apply chemical stabilizers prior to wind event; OR
	(2B)	Apply water to all unstabilized disturbed areas 3 times per day. If there is any evidence of wind driven fugitive dust, watering frequency is increased to a minimum of four times per day; OR
	(3B)	Take the actions specified in Table 2, Item (3c); OR
	(4B)	Utilize any combination of control actions (1B), (2B), and (3B) such that, in total, these actions apply to all disturbed surface areas.
Unpaved roads	(1C)	Apply chemical stabilizers prior to wind event; OR
	(2C)	Apply water twice per hour during active operation; OR
	(3C)	Stop all vehicular traffic.
Open storage piles	(1D)	Apply water twice per hour; OR
	(2D)	Install temporary coverings.
Paved road track-out	(1E)	Cover all haul vehicles; OR
	(2E)	Comply with the vehicle freeboard requirements of Section 23114 of the California Vehicle Code for both public and private roads.
All Categories	(1F)	Any other control measures approved by the Executive Officer and the U.S. EPA as equivalent to the methods specified in Table 3 may be used.

Table 4
(Conservation Management Practices for Confined Animal Facilities)

SOURCE CATEGORY	CONSERVATION MANAGEMENT PRACTICES
Manure Handling **(Only applicable to Commercial Poultry Ranches)**	(1a) Cover manure prior to removing material off-site; AND (1b) Spread the manure before 11:00 AM and when wind conditions are less than 25 miles per hour; AND (1c) Utilize coning and drying manure management by removing manure at laying hen houses at least twice per year and maintain a base of no less than 6 inches of dry manure after clean out; or in lieu of complying with conservation management practice (1c), comply with conservation management practice (1d). (1d) Utilize frequent manure removal by removing the manure from laying hen houses at least every seven days and immediately thin bed dry the material.
Feedstock Handling	(2a) Utilize a sock or boot on the feed truck auger when filling feed storage bins.
Disturbed Surfaces	(3a) Maintain at least 70 percent vegetative cover on vacant portions of the facility; OR (3b) Utilize conservation tillage practices to manage the amount, orientation and distribution of crop and other plant residues on the soil surface year-round, while growing crops (if applicable) in narrow slots or tilled strips; OR (3c) Apply dust suppressants in sufficient concentrations and frequencies to maintain a stabilized surface.
Unpaved Roads	(4a) Restrict access to private unpaved roads either through signage or physical access restrictions and control vehicular speeds to no more than 15 miles per hour through worker notifications, signage, or any other necessary means; OR (4b) Cover frequently traveled unpaved roads with low silt content material (i.e., asphalt, concrete, recycled road base, or gravel to a minimum depth of four inches); OR (4c) Treat unpaved roads with water, mulch, chemical dust suppressants or other cover to maintain a stabilized surface.
Equipment Parking Areas	(5a) Apply dust suppressants in sufficient quantity and frequency to maintain a stabilized surface; OR (5b) Apply material with low silt content (i.e., asphalt, concrete, recycled road base, or gravel to a depth of four inches).

Appendix B

Attendance Roster

COUNTY OF LOS ANGELES
Public Health

Coccidioidomycosis (Valley Fever) Management Plan Guidelines for Employers

Attendance Roster of Employees

Date	Name	Title	Comments

Appendix C

Educational Brochures

Preventing Work-Related Coccidioidomycosis (Valley Fever)

Valley Fever is an illness that usually affects the lungs. It is caused by the fungus *Coccidioides immitis* that lives in soil in many parts of California. When soil containing the fungus is disturbed by digging, vehicles, or by the wind, the fungal spores get into the air. When people breathe the spores into their lungs, they may get Valley Fever.

Is Valley Fever a serious concern in California? YES!

Often people can be infected and not have any symptoms. In some cases, however, a serious illness can develop which can cause a previously healthy individual to miss work, have long-lasting and disabling health problems, or even result in death.

This fact sheet describes actions employers can take to prevent workers from getting Valley Fever and to respond appropriately if an employee does become ill.

➤ **In October 2007, a construction crew excavated a trench for a new water pipe. Within three weeks, 10 of 12 crew members developed coccidioidomycosis (Valley Fever), an illness with pneumonia and flu-like symptoms. Seven of the 10 had abnormal chest x-rays, four had rashes, and one had an infection that had spread beyond his lungs and affected his skin. Over the next few months, the 10 ill crew members missed at least 1660 hours of work and two workers were on disability for at least five months.**

FACT SHEET HESIS

HAZARD EVALUATION SYSTEM & INFORMATION SERVICE
California Department of Public Health, Occupational Health Branch
850 Marina Bay Parkway, Building P, 3rd Floor, Richmond, CA 94804
510-620-5757 • www.cdph.ca.gov/programs/ohb

JUNE 2013

California Department of Public Health • California Department of Industrial Relations

How do workers get Valley Fever?

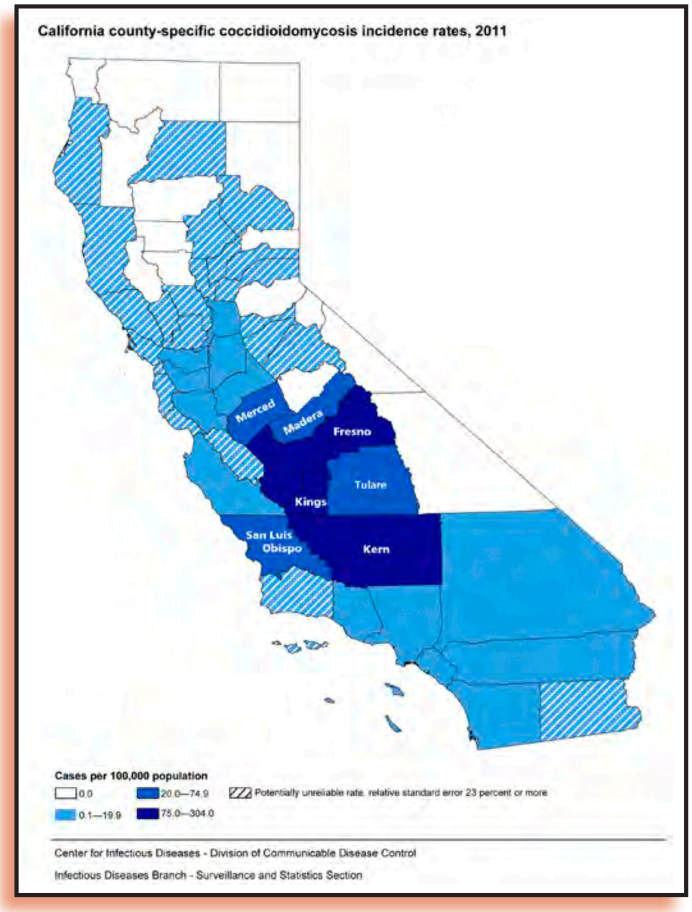
In California, Valley Fever is caused by the fungus *Coccidioides immitis* that lives in the top two to 12 inches of soil in many parts of the state. When soil containing this fungus is disturbed by activities such as digging, vehicles, or by the wind, the fungal spores get into the air. When people breathe the spores into their lungs, they may get Valley Fever. Fungal spores are small particles that can grow and reproduce in the body. The illness is not spread from one person to another.

How do employers know if the fungus is present in soil at their worksites?

The Valley Fever fungal spores are too small to be seen by the naked eye, and there is no reliable way to test the soil for spores before working in a particular place. Some California counties consistently have the Valley Fever fungus present in the soil. In these regions Valley Fever is considered endemic. Health departments track the number of cases of Valley Fever illness that occur. This information is used to map illness rates as seen on the figure above. Employers can contact their local health department for more information about the risk in their counties.

Where do people get Valley Fever?

Highly endemic counties, i.e., those with the highest rates of Valley Fever (more than 20 cases per 100,000 population per year), are Fresno, Kern, Kings, Madera, Merced, San Luis Obispo, and Tulare. Other counties or parts of counties also have the fungus present.



California county-specific coccidioidomycosis incidence rates, 2011

Who is at risk for Valley Fever?

Workers who disturb the soil by digging, operating earth-moving equipment, driving vehicles, or working in dusty, wind-blown areas are more likely to breathe in spores and become infected. Some occupations at higher risk for Valley Fever include:

- Construction workers, including road-building and excavation crews
- Archeologists
- Geologists
- Wildland firefighters
- Military personnel
- Workers in mining, quarrying, gas and oil extraction jobs
- Agricultural workers*

* Cultivated, irrigated soil may be less likely to contain the fungus compared to undisturbed soils.

Anyone, even healthy young people, can get Valley Fever. Once a person has had Valley Fever, their body may develop some immunity against future infections.

How does Valley Fever affect health?

- Experiments on laboratory animals indicate that a very small dose, 10 spores or fewer, may cause an infection.
- After breathing in the spores, the following can happen:
  - In about 60% of cases, symptoms are mild or not present.
  - In about 40% of cases, symptoms vary from moderate to severe. Usually symptoms are those of a flu-like illness that may last up to a month but goes away on its own. However, some people develop pneumonia (at times severe).
  - In a small proportion of cases (about 5%), disease spreads outside of the lungs causing very serious illness. Parts of the body that may be affected include the brain (meningitis), bones, joints, skin, or other organs. This is called ***disseminated Valley Fever*** (or disseminated coccidioidomycosis).
- People who are more likely to have severe or disseminated Valley Fever include those who have weakened immune systems, such as people who are HIV positive, have AIDS, cancer, or diabetes; who smoke; or who are pregnant. People of African and Filipino descent are much more likely to get disseminated disease; however, others can get disseminated disease, too.

Earth-moving equipment may stir up spores

What are signs or symptoms of Valley Fever?

When present, symptoms usually occur between seven to 21 days after breathing in spores, and can include:

- Cough
- Fever
- Chest pain
- Headache
- Muscle aches
- Rash on upper trunk or extremities
- Joint pain in the knees or ankles
- Fatigue.

Symptoms of Valley Fever can be mistaken for other diseases such as the flu (influenza) and TB (tuberculosis), so it is important for workers to obtain medical care for an accurate diagnosis and possible treatment.

Disseminated Valley Fever

Dissemination refers to spread of infection beyond the lungs to other parts of the body. With Valley Fever this usually occurs within the first six to 12 months after the initial illness.

Signs or symptoms of disseminated Valley Fever may vary but usually consist of some combination of the following:

- Fever
- Raised skin lesions with irregular surfaces
- Lymph node swelling, especially in the neck
- Pain and swelling in one or more joints
- Recurrent, persistent, new headaches (may be mild)
- Stiff neck.

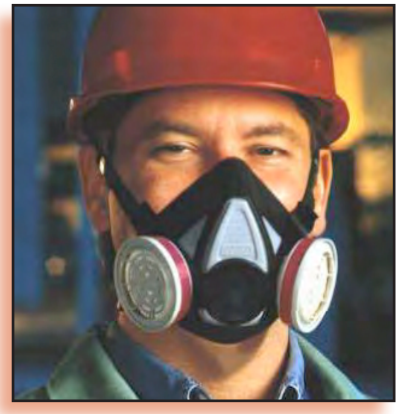
Preventing Valley Fever exposure

There is no vaccine to prevent Valley Fever. Employers can reduce worker exposure by incorporating the following elements into the company's Injury and Illness Prevention Program and project-specific health and safety plans:

1. Determine if the worksite is in an area where Valley Fever is endemic (consistently present). Check with your local health department to determine whether cases have been known to occur in the proximity of your work area. See the map on page 2 to determine whether your company will be working in an endemic county.
2. Train workers and supervisors on the location of Valley Fever endemic areas, how to recognize symptoms of illness (see page 3), and ways to minimize exposure. Encourage workers to report respiratory symptoms that last more than a week to a crew leader, foreman, or supervisor.
3. Limit workers' exposure to outdoor dust in disease-endemic areas. For example, suspend work during heavy wind or dust storms and minimize amount of soil disturbed.
4. When soil will be disturbed by heavy equipment or vehicles, wet the soil before disturbing it and continuously wet it while digging to keep dust levels down.
5. Heavy equipment, trucks, and other vehicles generate heavy dust. Provide vehicles with enclosed, air-conditioned cabs and make sure workers keep the windows closed. Heavy equipment cabs should be equipped with high efficiency particulate air (HEPA) filters. Two-way radios can be used for communication so that the windows can remain closed but allow communication with other workers.
6. Consult the local Air Pollution Control District regarding effective measures to control dust during construction. Measures may include seeding and using soil binders or paving and laying building pads as soon as possible after grading.
7. When digging a trench or fire line or performing other soil-disturbing tasks, position workers upwind when possible.
8. Place overnight camps, especially sleeping quarters and dining halls, away from sources of dust such as roadways.

PAPR with helmet (APF=1000)

Full-face respirator (APF=50)



Half-mask respirator (APF=10)

9. When exposure to dust is unavoidable, provide NIOSH-approved ***respiratory protection*** with particulate filters rated as N95, N99, N100, P100, or HEPA. Household materials such as washcloths, bandanas, and handkerchiefs do not protect workers from breathing in dust and spores.

   Respirators for employees must be used within a Cal/OSHA compliant respiratory protection program that covers all respirator wearers and includes medical clearance to wear a respirator, fit testing, training, and procedures for cleaning and maintaining respirators.

   Different classes of respirators provide different levels of protection according to their Assigned Protection Factor (APF) (see table below). Powered air-purifying respirators (PAPRs) have a battery-powered blower that pulls air in through filters to clean it before delivering it to the wearer's breathing zone. PAPRs will provide a high level of worker protection, with an APF of 25 or 1000 depending on the model. When PAPRs are not available, provide a well-fitted NIOSH-approved full-face or half-mask respirator with particulate filters.

   Fit-tested half-mask or filtering facepiece respirators are expected to reduce exposure by 90% (still allowing about 10% faceseal leakage), which can result in an unacceptable risk of infection when digging where Valley Fever spores are present.

The table below shows the relative effectiveness of various types of respirators for particles of dust and spores.

Respiratory Protection for Reducing Dust and Spore Exposure

	Respirator Type (worn with particulate filters)	**Assigned Protection Factor (APF)**	**Expected Reduction of Exposure to Dust and Spores (%)**
	No respirator	None	0
Increasing Protection ↓	Half-mask respirator (elastomeric or filtering facepiece)	10	90
	Powered air-purifying respirator with loose-fitting face covering	25	96
	Full-face respirator	50	98
	Some powered air-purifying respirators are designed to offer higher protection (check with manufacturer)	1000	99.9

Preventing transport of spores

- **Clean tools, equipment, and vehicles with water to remove soil before transporting offsite** so that any spores present won't be re-suspended in air and inhaled at a later time.
- **Provide workers with coveralls or disposable Tyvek™ daily.** At the end of the work day, require workers to remove their work clothes at the worksite.
- **Keep street clothes and work clothes separate by providing separate lockers or other storage areas.** If possible, store work boots at the worksite; otherwise, have workers use a boot wash before getting into their vehicles.
- **Encourage workers to shower and wash their hair at the workplace** (if at a fixed location) or as soon as they get home.

What should employers do if a worker reports Valley Fever symptoms?

- If the worker disturbed soil or otherwise did dusty work in an endemic area, **the employer should send the worker to their workers' compensation health care provider or occupational medicine clinic**. The employer should provide the health care provider with the details about the dust or soil exposure. The worker should give a copy of this fact sheet to the health care provider.
- When two or more workers report symptoms that suggest Valley Fever, workers should be sent to a single medical provider or occupational medicine clinic for coordinated medical care, if possible. This can facilitate better communication between the medical provider, public health agencies, and employer.
- **Travel through endemic areas has resulted in Valley Fever cases.** When a worker who has traveled through an endemic area reports a respiratory illness that lasts more than a week, the employer should send the worker to their workers' compensation health care provider or occupational medicine clinic.
- **Complete the "Employer's Report of Occupational Injury or Illness" (Form 5020) for each occupational Valley Fever illness** which results in "lost time" or medical treatment beyond first aid.
- **List cases on the Cal/OSHA Form 300,** "Log of Work-Related Injuries and Illnesses".
- **Report immediately any serious injury, illness or death occurring in a place of employment** or in connection with any employment to the local Cal/OSHA district office. A "serious injury or illness" is defined in 8 CCR 330(h) found at **www.dir.ca.gov/title8/330.html**.

What is the treatment for Valley Fever?

Although many people with Valley Fever do not require treatment, those with symptoms should seek medical attention. When Valley Fever is suspected, doctors can order specialized tests to confirm the diagnosis. If treatment is indicated, anti-fungal medications are available. Workers who develop severe or chronic infections may need to stay in the hospital.

It is especially important for people at risk for severe disease, such as people infected with HIV or those with weakened immune systems, to be diagnosed and receive treatment as quickly as possible. People with severe infections need to be treated because advanced Valley Fever can be fatal.

Summary of Controls to Minimize Workers’ Dust Exposure and Risk of Valley Fever in Endemic Areas

Type of Control	**Actions**
Engineering and Work Practice Controls ➤ *to control dust at the source or isolate worker from exposure.*	Minimize exposure to outdoor dust: • Suspend (stop) work in dust storms or high winds. • Minimize the amount of digging by hand. Instead, use heavy equipment with operator in an enclosed, air-conditioned, HEPA-filtered cab. Continuously wet the soil before and while digging or moving the earth. Landing zones for helicopters and areas where bulldozers, graders, or skid steers operate are examples where wetting the soil is necessary. When digging in soil is required, train workers to reduce the amount of dust inhaled by staying upwind when possible.
Administrative Controls ➤ *to increase hazard awareness and knowledge of safe work practices and select safer work practices.*	Train workers and supervisors on: • Distribution of endemic areas • Symptoms and signs, and need to report to supervisor to obtain medical evaluation • People at highest risk of serious disease • Effective controls, including proper use of equipment.
Personal Protective Equipment ➤ *to decrease quantity of fungal spores inhaled.*	Provide respirators when digging or working near earth-moving trucks or equipment: • Powered air-purifying respirator (PAPR) with high efficiency particulate air (HEPA) filter or • Full-face respirator with particulate filter or • Half-mask respirator with particulate filter and • Implement a comprehensive respirator program including medical clearance, training, fit testing, and procedures for cleaning and maintaining respirators. Provide coveralls to prevent street clothes from being contaminated with fungal spores and then taken home.
Clean up ➤ *to decrease quantity of fungal spores inhaled.*	Provide lockers and require change of clothing and shoes at worksite so workers don’t take dust and spores home. Wash equipment before moving offsite.
Medical care for disease recognition and prompt, appropriate treatment.	Contract with local medical clinics • Provide prompt evaluation and care • Make sure clinic has a protocol for evaluation, follow-up, and treatment of Valley Fever Make sure in-house physician is aware of work in Valley Fever endemic areas.

Valley Fever in the general population in California (*includes individuals exposed at work*):

- In 2011, 5123 people were diagnosed with new infections.
- The number of new Valley Fever cases reported in California increased dramatically in the past few years. In 2011, there were 20% more cases compared to 2010.
- Every year, about 1,430 people are hospitalized with Valley Fever.
- About 8% (8 out of 100) of people hospitalized with Valley Fever die due to the infection.

RESOURCES

FOR MORE INFORMATION

- **California Department of Public Health,** *"Coccidioidomycosis (Valley Fever) Fact Sheet"* **www.cdph.ca.gov/healthinfo/discond/pages/coccidioidomycosis.aspx** Available in English, Spanish, and Tagalog. Also see *Yearly Summary Report of Coccidioidomycosis in California.*
- **California Department of Public Health, Hazard Evaluation System and Information Service (HESIS).** HESIS answers questions about workplace hazards for California workers, employers, and health care professionals. Call **(510) 620-5817 or (866) 282-5516 (toll free in CA).** HESIS has many free publications available. To request publications, leave a message at **(510) 620-5717 or toll free (866) 627-1586**, or visit our website at **www.cdph.ca.gov/programs/ohb**
- **Centers for Disease Control and Prevention,** *"Coccidioidomycosis, Valley Fever"* **www.cdc.gov/fungal/coccidioidomycosis/.**
- **Centers for Disease Control and Prevention,** *"Increase in Reported Coccidioidomycosis-United States, 1998-2011,"* March 29, 2013 **http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6212a1.htm**
- **Injury and Illness Prevention Program.** This standard (California Code of Regulations (CCR) Title 8, Section 3203), requires employers to implement an injury and illness prevention program (IIPP). For links to publications on IIPPs, see **www.dir.ca.gov/title8/3203.html.**
- **Respiratory Protection.** This standard, CCR Title 8, Section 5144, requires employers to provide respirators when necessary to protect the health of employees. See **www.dir.ca.gov/title8/5144.html**.

To obtain a copy of this document in an alternate format, please contact: (510) 620-5757. (CA Relay Service: 800-735-2929 or 711). Please allow at least ten (10) working days to coordinate alternate format services.

Adapted from the California Department of Public Health

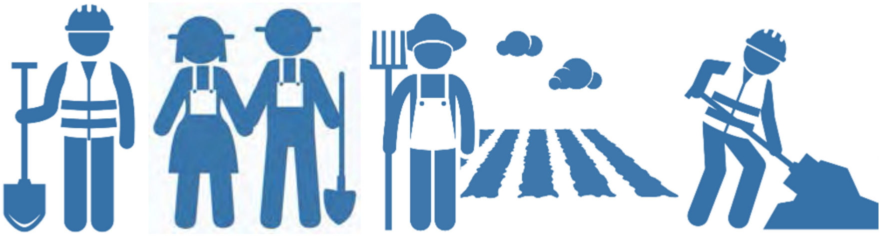
County of Los Angeles
Public Health

VALLEY FEVER (Coccidioidomycosis)

An infection caused by breathing in fungal spores in soil found in hot, dry places like the **Antelope Valley.**

PEOPLE AT MOST RISK

- Farmers
- Construction workers
- People who spend time outside in dirt or dusty areas



SIGNS & SYMPTOMS

- Cough
- Fever
- Feeling tired
- Rash
- Night sweats

You might be sick for a few weeks and miss work or school.

Do you have a cough and fever?

ASK YOUR DOCTOR ABOUT VALLEY FEVER.

Visit http://publichealth.lacounty.gov/acd/Diseases/Cocci.htm for more information.

Los Angeles County Department of Public Health
http://publichealth.lacounty.gov

COUNTY OF LOS ANGELES
Public Health

FIEBRE DEL VALLE (Coccidioidomycosis)

Una infección causada por la inhalación de esporas del hongo encontradas en el suelo en lugares calientes y secos como en Antelope Valley.

PERSONAS CON MAYOR RIESGO

- **Agricultores**
- **Trabajadores de construcción**
- **Personas que pasan mucho tiempo fuera en áreas de tierra o polvo**

SIGNOS Y SÍNTOMAS

- **Tos**
- **Fiebre**
- **Sensación de cansancio**
- **Salpullido**
- **Sudor por la noche**

Usted podría estar enfermo por unas semanas y faltar al trabajo o a la escuela.

¿Tiene tos y fiebre?

PREGÚNTELE A SU MÉDICO SOBRE LA FIEBRE DEL VALLE.

Visite http://publichealth.lacounty.gov/acd/Diseases/Cocci.htm para más información.

CDCP-ACDC-0079-02 (01/13/16)

Departamento de Salud Pública del Condado de Los Ángeles
http://publichealth.lacounty.gov

CONDADO DE LOS ANGELES
Salud Pública

Frequently Asked Questions (FAQ)

Valley Fever (Coccidioidomycosis)

1. What is Valley Fever?

Valley Fever is an illness caused by a fungus. The fungus lives in the soil and dirt in some places in California and other areas in the Southern US, as well as Central and South America. It can get inside the lungs and cause an illness that might seem like the flu. Most people who get Valley Fever have mild symptoms and often get better on their own. More severe sickness is rare, but it can be serious and even deadly.

2. How do people get Valley Fever?

People can get sick when they breathe in spores, a form of the Valley Fever fungus. Spores are too small to be seen. They can get into the air when anything disturbs the soil, such as farming, construction, and wind. Valley Fever cannot spread from person to person.

3. Where is Valley Fever found?

The fungus that causes Valley Fever is often found in the Antelope Valley, which includes cities like Palmdale and Lancaster. Around the state, the fungus has been found in Kern County and around Central California. Since this fungus may be in other areas, it's always important to take basic safety measures around soil and dirt when you work, play, or travel.

4. What are symptoms of Valley Fever?

About 3 out of every 5 people who come in contact with the Valley Fever fungus will not get sick. People who get sick can have symptoms that last a month or more. These include:

- Fever
- Tiredness
- Cough
- Chest pain
- Muscle or joint aches
- Headaches
- Weight loss
- Night sweats
- Rash

In more serious cases, Valley Fever can sometimes infect the brain, joints, bone, skin, or other organs. Most people who get Valley Fever fully recover and are usually protected from getting it again.

Key Points:

- Valley fever is caused by a fungus found in some soil and dirt. People get sick when they work or play in the dirt and breathe in the fungus (spores).
- Most illness from Valley Fever is mild and people get better on their own. Rarely, it can cause serious illness and death.
- The best way to lower your risk is to avoid breathing in dirt or dust in areas where Valley Fever is more common.

For more information:

Los Angeles County Department of Public Health
www.publichealth.lacounty.gov/acd/Diseases/Cocci.htm

California Department of Public Health
www.cdph.ca.gov/healthinfo/discond/Pages/Coccidioidomycosis.aspx

Centers for Disease Control and Prevention
http://www.cdc.gov/features/valleyfever/

CDCP-ACDC-0037-01 (8/3/15)

5. How is Valley Fever diagnosed and treated?

See your doctor if you think you might have Valley Fever. Since the symptoms are like other illnesses, your doctor may order tests, such as a blood test or chest x-ray, to find out if you have Valley Fever. People with mild symptoms usually get better on their own without treatment. Your doctor can tell you if you need antifungal treatment.

6. Who is most at risk to get Valley Fever?

Anyone can get this illness, even young and healthy people. People who live, work, or travel in areas where dirt and soil is sent into the air, like construction, farming, and military have higher risk. Some people are more likely to suffer from severe illness from Valley Fever. These include people who have a health condition that makes them unable to fight off disease or a genetic (born with) risk. Other people at high risk include:

- Infants younger than 1 year old
- Adults who are 60 years or older
- African Americans and Filipinos
- Pregnant women (especially in the later stages of pregnancy)
- People with diabetes
- People with conditions that weaken their immune system (such as cancer, HIV, chemotherapy, steroid treatment, or organ transplant)

7. How can I lower my risk of getting Valley Fever?

The best way to lower your risk is to avoid breathing in dirt or dust in areas where Valley Fever is more common. If you can't avoid it, make sure to wet- down dirt and soil before working or playing in it to help prevent "dust clouds" or soil being sent into the air.

During dust storms, or when it is windy and the air is dusty:

- Stay inside and keep windows and doors closed
- While driving, keep car windows shut. Use "recirculating" air conditioning if you have it
- If you must be outside during a dust storm, wear a special (N95) face mask to help avoid breathing in dust.

8. What is being done about Valley Fever in Los Angeles County?

The Los Angeles County Department of Public Health tracks the number of people who get Valley Fever and the places where people become ill. We also teach doctors, other health care providers, and the public about this illness. Many cities in Los Angeles County have laws that limit the amount of dust from construction activities.

Preguntas más frecuentes

Fiebre del Valle (Coccidioidomicosis)

1. ¿Qué es la Fiebre del Valle?

La Fiebre del Valle es una infección causada por el hongo llamado Coccidioides. Se sabe que el hongo vive en los suelos de California y del suroeste de los EE. UU. al igual que en zonas de México, América Central y América del Sur. El hongo también se encontró últimamente en la zona sur central de Washington. Puede entrar a los pulmones y causar una enfermedad que puede parecer como la gripe. La mayoría de las personas que contraen la Fiebre del Valle tienen síntomas leves y a menudo mejoran por sí solos. Enfermedad más severa es rara, pero puede ser grave y hasta mortal.

2. ¿Cómo contraen las personas la Fiebre del Valle?

Las personas pueden enfermarse de Fiebre del Valle al inhalar las esporas microscópicas del hongo que están en el aire en estas zonas. Las esporas son demasiado pequeñas para ser observadas a simple vista. Pueden entrar en el aire cuando algo perturba el suelo, como la agricultura, la construcción, y el viento. La Fiebre del Valle no se puede propagar de persona a persona.

3. ¿Dónde se encuentra la Fiebre del Valle?

El hongo que causa la Fiebre del Valle se encuentra a menudo en Antelope Valley, que incluye ciudades como Palmdale y Lancaster. En todo el estado, el hongo se ha encontrado en el Condado de Kern y alrededor del centro de California. Ya que este hongo puede estar en otras áreas, siempre es importante tomar medidas de seguridad alrededor de la tierra y suciedad al trabajar, jugar o viajar.

4. ¿Cuáles son los síntomas de Fiebre del Valle?

Alrededor de 3 de cada 5 personas que entran en contacto con el hongo de la Fiebre del Valle no se enferman. Las personas que se enferman pueden tener síntomas que duran un mes o más. Estos incluyen:

- Fiebre
- Cansancio
- Tos
- Dolor en el pecho
- Dolores musculares o en las articulaciones
- Dolores de cabeza
- Perdida de peso
- Sudores nocturnos
- Salpullido

En casos más graves, la Fiebre del Valle puede a veces infectar el cerebro, articulaciones, huesos, piel u otros órganos. La mayoría de las personas que contraen Fiebre del Valle se recuperan totalmente y son por lo general protegidas de contraer la Fiebre del Valle otra vez.

Puntos claves:

- La Fiebre del Valle es causada por un hongo que se encuentra en algunos suelos y tierra. Las personas se enferman cuando trabajan o juegan en la tierra e inhalan el hongo (esporas).
- La mayor parte de enfermedades causadas por la Fiebre del Valle son leve y las personas se mejoran por sí solos. En raras ocasiones, puede causar enfermedad grave y la muerte.
- La mejor manera de disminuir el riesgo es evitar la inhalación de tierra o polvo en áreas donde la Fiebre del Valle es más común.

Para más información:

Departamento de Salud Pública del Condado de Los Ángeles
www.publichealth.lacounty.gov/acd/Diseases/Cocci.htm

Departamento de Salud Pública de California
www.cdph.ca.gov/healthinfo/discond/Pages/Coccidioidomycosis.aspx

Centros para la el Control y la Prevención de Enfermedades
http://www.cdc.gov/features/valleyfever/

CDCP-ACDC-0037-02 (09/10/15)

5. ¿Cómo es diagnosticada y tratada la Fiebre del Valle?

Consulte a su médico si usted piensa que podría tener la Fiebre del Valle. Dado que los síntomas son como los de otras enfermedades, su médico puede ordenar exámenes, tales como un examen de sangre o radiografía del pecho, para averiguar si usted tiene Fiebre del Valle. Personas con síntomas leves generalmente mejoran por sí solos sin tratamiento. Su médico puede indicarle si usted necesita tratamiento antifúngico.

6. ¿Quién tiene mayor riesgo de contraer Fiebre del Valle?

Cualquier persona puede contraer esta enfermedad, incluso personas jóvenes y sanas. Personas que viven, trabajan o viajan a áreas donde la suciedad y la tierra son mezcladas con el aire, como la construcción, la agricultura, y militares tienen mayor riesgo. Algunas personas son más propensas a sufrir enfermedades graves causadas por la Fiebre del Valle. Entre estos se incluyen a las personas que tienen una condición de salud que les hace incapaces de luchar contra la enfermedad o un riesgo genético (con el cual se nace). Otras personas de alto riesgo incluyen:

- Niños menores de 1 año de edad
- Adultos mayores de 60 años
- Afro-Americanos y Filipinos
- Mujeres embarazadas (especialmente en las últimas etapas del embarazo)
- Personas con diabetes
- Personas con condiciones que debilitan su sistema inmunológico (como cáncer, VIH, quimioterapia, tratamientos con esteroides, o trasplante de órganos)

7. ¿Cómo puedo reducir mi riesgo de contraer la Fiebre del Valle?

La mejor manera de reducir el riesgo es evitar la inhalación de polvo o suciedad en las zonas donde la Fiebre del Valle es más común. Si no puede evitarlo, asegúrese de humedecer el polvo y la tierra antes de trabajar o jugar en ella para ayudar a prevenir "las nubes de polvo" o que el polvo se mezcle con el aire.

Durante tormentas de polvo o cuando hay mucho viento y el aire este polvoriento:

- Manténgase dentro de su hogar y mantenga las ventanas y puertas cerradas
- Mientras maneje, mantenga las ventanas de su auto cerradas. Use el aire acondicionado “circulante” si lo tiene
- Si debe estar afuera durante una tormenta de polvo, use una mascarilla (N95) especial para ayudar a evitar la inhalación de polvo.

8. ¿Qué acciones están siendo tomadas con respecto a la Fiebre del Valle en el Condado de Los Ángeles?

El Departamento de Salud Pública del Condado de Los Ángeles observa el número de personas que contraen la Fiebre del Valle y los lugares donde la gente enferma. También enseñamos a los médicos, otros proveedores de atención médica y al público sobre esta enfermedad. Muchas ciudades en el Condado de Los Angeles tienen leyes que limitan la cantidad de polvo generado por las actividades de construcción.

Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers

Appendix D

Checklist

COCCIDIOIDOMYCOSIS (VALLEY FEVER) MANAGEMENT PLAN FOR EMPLOYERS CHECK LIST

ACTION	PLAN ELEMENT	COMMENTS
☐ Completed	Provided supervisors with Valley Fever educational materials	
☐ Completed	Provided supervisors with attendance rosters	
☐ Completed	Provided Valley Fever health education materials to all persons entering job site	
☐ Completed	Are OSHA poster and valley fever awareness sheet posted	
☐ Completed	Is there an accessible copy of the Injury and Illness Prevention Program on site?	
☐ Completed	Were site assessment and job hazard analysis conducted?	
☐ Completed	Are there personnel training records available?	
☐ Completed	Is there a dust plan?	
☐ Completed	Is there a responsible person for monitoring and assessing fugitive dust and implementing the dust plan?	
☐ Completed	Are grading plans available?	
☐ Completed	List engineering controls and best management practices for dust control on unpaved roads and disturbed areas	
☐ Completed	Is the applicant aware of AQMD Rule 403?	
☐ Completed	Are Best Management Practices (BMPs) in place for the pre-construction and the construction phases of the project?	
☐ Completed	Valley Fever information posted at job site.	
	Name:	Title:

Response to Comment Letter ORG 4

Pavone & Fonner, LLP

Response ORG 4-1

This comment letter, dated November 1, 2022, was submitted in response to the Notice of Preparation (NOP) for the proposed Project, and is not a comment on the DEIR. However, this NOP comment letter was resubmitted during the DEIR public review period by Royal Vista Open Space Nonprofit Organization and therefore is included in the FEIR.

The comment was submitted prior to release of the DEIR, and does not state a concern about the adequacy of the DEIR or otherwise provide a comment on the contents of the DEIR analysis.

Response ORG 4-2

Valley Fever is an infective disease caused by the fungus Coccidioides immitis. Infection occurs via inhalation of Coccidioides immitis spores that have become airborne from the upturn of dry, dusty soil by wind, construction, farming, or other activities. Several factors indicate a project's potential to expose sensitive receptors to Valley Fever: disturbance of the topsoil of undeveloped land, dust storms, strong winds, earthquakes, archaeological digs, agricultural activities, and construction activities. Coccidioides immitis spores are often found in the soil around rodent burrows, native American ruins, and burial grounds. See DEIR Section 4.3, Air Quality.

Construction activities for the proposed Project would have the potential to expose persons to the spores that cause Valley Fever from fugitive dust generated during construction. In particular, construction activities that disturb topsoil, especially of undeveloped land, have the potential to cause Coccidioides immitis spores in soil to become airborne. Individuals who work outdoors and who are exposed to wind and dust are more likely to contract Valley Fever. However, implementation of Mitigation Measure AQ-2, set forth below, would reduce the risk of Valley Fever exposure. Specifically, the Project would follow the requirements and guidelines listed in the 2019 County of Los Angeles Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers, to help reduce the risk of Valley Fever to workers and the surrounding community. In addition, compliance with independently enforceable rules and other measures that reduce emissions of fugitive dust, such as SCAQMD fugitive dust control rules (e.g., Rule 403), would reduce the potential for Coccidioides immitis spores in soil to become airborne. Applicable California Division of Occupational Safety and Health (Cal/OSHA) requirements would provide additional protection of construction workers, as well as the nearby community. Such compliance would require the control and mitigation of all sources of construction-related fugitive dust, and thereby potential sources of airborne Coccidioides immitis spores, to at or below applicable regulatory limits for fugitive dust for on-site and off-site receptors. The DEIR concluded that compliance with regulatory requirements, together with Mitigation Measure AQ-2 which requires compliance with the 2019 County of Los Angeles Valley Fever Management Plan would reduce Valley Fever impacts for on-site workers, as well as the off-site neighboring communities to a less-than-significant level. See DEIR Section 4.3.

Allen Matkins

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Via Electronic Mail

December 15, 2023

Los Angeles County Dept. of Regional Planning
Attn: Marie Pavlovic
mpavlovic@planning.lacounty.gov
320 W. Temple St., Room #160
Los Angeles, CA 90012

Re: Stakeholder (Fairway Industrial Company, LLC; Shea Center Walnut, LLC) Public Comment re Draft Environmental Impact Report for Royal Vista Residential Project | Project No. PRJ2021-002011-(1) / Environmental Assessment No. RPPL2021007150, State Clearinghouse No. 2022100204

Dear Ms. Pavlovic:

This firm represents Fairway Industrial Company, LLC ("Fairway") with respect to the existing industrial park it owns and operates commonly known as Fairway Industrial Park located at 19844-19888 Quiroz Court ("Fairway Industrial Park") in the City of Walnut ("City"). The Fairway Industrial Park is in direct proximity to the proposed large-scale 306-home residential development ("Proposed Project") being considered under the above-referenced Los Angeles County ("County") case file. Fairway's affiliate, Shea Center Walnut, LLC ("Walnut"), owns another industrial property in the area near the Proposed Project located at 657-727 Brea Canyon Road in the City ("Shea Center Walnut"). On behalf of Fairway and Walnut, we respectfully submit the following comments to the Los Angeles County Department of Regional Planning ("Planning") in connection with the Draft Environmental Report ("DEIR") prepared for the Proposed Project.

In submitting this comment letter pertaining to the DEIR, Fairway and Walnut, while not fundamentally opposed to the Proposed Project, are concerned with and urge Planning to ensure that the Proposed Project takes into account nearby intensive industrial uses (including Fairway Industrial Park and Shea Center Walnut). The Proposed Project is in close proximity, less than 1,000 feet, from the existing Fairway Industrial Park and nearby a series of other similarly zoned and operated existing intensive industrial uses, including Shea Center Walnut.

ORG 5-1

The DEIR must contain a comprehensive land use and compatibility analysis for purposes of the California Environmental Quality Act ("CEQA") and incorporate sufficient design features and mitigation for the Proposed Project to ensure ongoing compatibility between the incoming residential density on a former golf course in relation to existing industrial uses. Based on our review, the DEIR and proposed design aspects of the Proposed Project relating to buffering appear to fall short in multiple areas.

ORG 5-2

Fairway Industrial Park consists of several buildings comprising an approximately 131,155 square foot industrial warehousing and industrial campus facility. Fairway Industrial Park has long served as an essential industrial hub, owing to its location abutting the 60 Freeway, a major transportation corridor in East Los Angeles County. It is in proximity to four major freeways—the 710, 605, 57, and 10—and has access to two freight lines, Union Pacific and Southern Pacific, as well as the Metropolitan Transit District passenger rail and more than 50 major trucking lines. Fairway Industrial Park is only one of several industrial uses that have clustered around this concentrated industrial hub located just across Fairway Drive and East Walnut Drive South from the Proposed Project. In the future, Fairway and Walnut may choose seek project modifications to intensify the uses on their sites or lease to tenants with higher intensity industrial uses compared to the present land uses.

ORG 5-3

Based on our review of the DEIR, we understand the Proposed Project would include a large-scale residential development, consisting of a total of 360 homes and a publicly accessible recreational area. In addition to the residential uses, the Proposed Project also proposes opening a large public trail making the current private golf course (formerly open to patrons only) accessible to the public. Given the proximity of Fairway Industrial Park and Shea Center Walnut to the Proposed Project, there are several key considerations that warrant further analysis in the DEIR.

As a general matter, there is inadequate consideration of industrial uses surrounding the Proposed Project to the northwest across Fairway Drive, across East Walnut Drive South and across the 60 Freeway. The DEIR contains a review of the Proposed Project's consistency with existing land use plans and policies but appears to overlook specific considerations necessary for harmonizing the Proposed Project with nearby industrial operations. The focus is primarily on compatibility with residential and recreational uses, potentially underestimating the impacts of neighboring industrial activities on the proposed residential development, and vice versa.

ORG 5-4

The DEIR's narrow scope on ensuring compatibility primarily with residential and commercial uses raises concerns about the lack of detailed consideration for nearby industrial operations. The DEIR should demonstrate that the proposed use will not have a detrimental effect on surrounding land uses and also consider whether the Proposed Project might cause existing environmental hazards to get worse. Yet, the analysis appears to center on residential and commercial compatibility, with no emphasis on industrial impacts. For example, the DEIR Land Use Compatibility section provides that "[t]he applicant must demonstrate that the requested use is appropriate for the location and will not have a detrimental effect on surrounding land uses." (DEIR, 4.11-26.) In this regard, the DEIR simply provides that "[s]ingle-family residential uses immediately surround the Project Site on all sides except the north, where commercial and hotel uses exist along East Walnut Drive South, and a portion of the west, where the Project Site is adjacent to portions of the existing golf course property that are not included as part of this Project." (DEIR, 4.11-26.) **Zero mention is made of industrial uses, including Fairway Industrial Park or Shea Center Walnut.**

ORG 5-5

Not only does this appear to be insufficient for purposes of a sufficient DEIR under CEQA, but also for Findings required for the necessary Residential Planned Development and a CUP pursuant to Los Angeles County Municipal Code Sections 22.18.060

ORG 5-6

and 22.158.050 which require a determination, among others, that the proposed development is compatible with surrounding uses.

There is further an insufficient analysis and proposed requirement for a buffering strategy for industrial properties in proximity to the Proposed Project. The DEIR mentions the creation of landscaped open space buffers, roadways, and internal streets, which are primarily designed to enhance the residential and commercial areas' compatibility. However, there is a notable absence of specific strategies or detailed plans for buffering between the residential development and the adjacent industrial zones. This omission suggests a lack of thorough planning for mitigating potential conflicts and impacts arising from longstanding existing industrial operations. As an example of buffering contemplating only residential and commercial uses: "Planning Areas 1 2 3 and 5 would be separated from most adjacent residential uses by landscaped open space buffers... Dedicated open space buffers trails and sidewalks would create an open feel on the Project Site and improve pedestrian and bicycle circulation between the Project Site and adjacent commercial uses." (DEIR, p. 4.11-26, emphasis added.) ORG 5-7

In the alternative development scenario (e.g., where a proposed industrial use would be situated in proximity to an existing residential neighborhood), the County would undoubtedly require a certain level of buffering between the project and the existing residential uses. The requirement for minimum buffers between industrial and residential and other sensitive uses is common in cities and counties throughout California and often is imposed through adopted Good Neighbor Policies and industrial sustainability standards. For example, the County's own Green Zones program requires a distance of at least 500 feet between industrial uses and sensitive receptors for properties located within the subject areas or else the industrial use—even if lawfully operating and pre-dating the residential use or other sensitive receptor—is required to obtain a new CUP or else cease operations within the designated sunset period of 3, 5 or 7 years. (LA County Code, Table 22.84.040-A.) ORG 5-8

This same rationale and buffering requirements should apply with equal force to new residential uses that seek to locate adjacent to existing industrial uses as the nature and scope of potential adverse impacts are the same whether the project at issue involves a proposed industrial or residential use. Proximity between the conflicting uses is the key. There is, accordingly, no logical or legal basis for requiring new industrial projects to maintain a certain buffer and distance from existing residential neighborhoods while allowing these same sensitive uses to be entitled and approved for sites located adjacent to longstanding and legacy industrial operations. Smart and sensible planning requires otherwise. ORG 5-9

In addition to further requirements for sufficient buffering in relation to the industrial cluster adjacent to the Proposed Project, we would also suggest the inclusion of specific requirements that would ensure the future compatibility and coexistence between the industrial and residential stakeholders. While there is no issue in our view of any inherent incompatibility between residential and industrial uses, including requirements such as a recorded notice in conveyance documents to the end users/purchasers of the proposed homes that would specifically notify them of the existing industrial uses nearby and potential hazards/cautions related thereto are helpful and utilized in other jurisdictions. ORG 5-10

In light of the foregoing, we respectfully encourage Planning and the Proposed Project applicant to provide a more thorough analysis of the compatibility and buffering strategies relative to the adjacent industrial uses, including Fairway Industrial Park and Shea Center Walnut. The current DEIR does not appear to fully capture the potential conflicts and impacts arising from the juxtaposition of residential and longstanding industrial land uses that operate nearby.

Please contact me if you have any questions or if you wish to discuss this matter in further detail.

Very truly yours,

Jon Shardlow

Jonathan E. Shardlow

cc: Fairway Industrial Company, LLC
Shea Center Walnut, LLC

ORG
5-11

Response to Comment Letter ORG 5

Allen Matkins Leck Gamble Mallory & Natsis LLP, rep. Fairway Industrial Company, LLP

Response ORG 5-1

Comment noted. As demonstrated by the comments and responses below, the DEIR is comprehensive and has been completed in accordance with the County and CEQA Guidelines. No new analysis or mitigation measures are required. In addition, the Project would include 360 units not 306 units as mentioned by the commenter.

Response ORG 5-2

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The commenter suggests the proposed design aspects of the Proposed Project relating to buffering appear to fall short in multiple areas but does not identify any specific deficiency or provide any examples. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response ORG 5-3

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The commenter describes the Fairway Industrial Park and its current operations and potential proposals for future expansion. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response ORG 5-4

CEQA generally does not require a lead agency to analyze the impact that existing environmental conditions might have on a project’s future users or residents, according to the California Supreme Court’s decision in California Building Industry Association v Bay Area Air Quality Management District (S213478, December 17, 2015). A lead agency must analyze how environmental conditions might adversely affect a project’s residents or users only where the project itself might worsen existing environmental hazards in a way that will adversely affect them. The DEIR analyzed the compatibility of the Project with the surrounding land uses and determined the impacts to be less than significant. As discussed in Section 4.11, Land Use and Planning, the proposed Project is consistent with both the General Plan and the Rowland Heights Community Plan, which is a component of the General Plan. The Project Site is located in an urbanized area and surrounded by similar residential uses on three sides. Additionally, the existing residential uses, south of East Walnut Drive, are located within 500 feet of the industrial land uses located on the north side of the same street. As a result, the Project would be a like development and would not be inconsistent with the surrounding land uses.

The DEIR discloses the surrounding land uses, including industrial uses. The Project Site is located within a highly developed and urbanized area (see Figure 2-3 of Chapter 2, Project Description, for primary surrounding uses). Single-family residential uses immediately surround the Project Site on all sides except the north. Commercial, industrial, and religious uses are located to the north, along East Walnut Drive South, including a hotel, warehouse / office space, self-storage facility, LA County Public Works yard, religious temple, and associated surface parking lot uses.

The Fairway Industrial Park is located directly across the street from Planning Areas 2 and 3, on the north side of East Walnut Drive. East Walnut Drive is a 40-foot-wide local street. The Project will dedicate 12 feet to widen the street and thereby increase East Walnut Drive to 52 feet, thereby increasing the distance between the land uses to the north to 52 feet along the frontage of Planning Areas 2 and 3. The Fairway Industrial Park is presently located adjacent to existing residential uses, both east and west of the Project. CEQA does not require the DEIR to speculate as to potential future industrial facilities in the area. The DEIR analyzed the compatibility of the Project with the surrounding land uses and determined the impacts to be less than significant. The commenter does not provide substantial evidence of any new or substantial more severe impacts not evaluated in the DEIR.

Response ORG 5-5

The DEIR discloses Light Industrial uses in the Project area. See Section 4.9, Hazards and Hazardous Materials and Section 4.11, Land Use Planning. For example, on page 4.9-5 the DEIR states, “The properties surrounding the Project Site are predominately residential to the northeast, east, south, and west, with golf course uses to the south, west, and southwest. There is commercial and industrial development to the north and further west of the Project Site.” See also DEIR page 4.11-29. No industrial uses are mentioned by name. The Project Site is not located in a County Green Zone District. Further, there is no County Green District in Rowland Heights. Residential uses are already located adjacent to the subject industrial area, along the north side of East Walnut Drive, between Fairway Drive and Moscada Avenue. Walnut Drive currently serves as a 40’ wide buffer, and will serve as a 52’ wide buffer with the Project. The industrial development is located in the City of Industry and not within a County Green Zone District. Green Zones Districts were established through adoption of the County’s Green Zone Program by the Board of Supervisors on June 14, 2022. The Green Zone Program Ordinance promotes environmental justice by establishing 11 Green Zone Districts in communities that are disproportionately affected by toxic pollutant and contaminants generated from various land uses over time and specifies additional permitting requirements and development standards for existing and new industrial and vehicle related uses. It also sets forth development standards for new sensitive uses such as residences and schools located adjacent to industrial uses and new recycling and solid waste uses. The Ordinance requires new sensitive uses, including residences, located adjacent to an existing industrial use, whether within or outside of a designated Green Zone, to comply with development standards. Development standards include landscaping, setbacks, solid walls, open space, air filtrations systems, double-glazed window, and imposes balcony limitations pursuant to Chapter 22.134 (Sensitive Uses Adjacent to Industrial, Recycling or Solid Waste, or Vehicle-Related Uses). Although the development application for this Project was deemed complete on December 7, 2021, prior to the effective date of the Green Zone Program Ordinance, the Project incorporates some of the development standards such as a solid wall in the front yard of PA-3, landscaping, air filtration and double-paned windows to minimize conflict. Further, the Shea Center Walnut Business Park is not located nearby. It is located nearly 2 miles from the Project Site and is on the opposite side of the 60 freeway.

Response ORG 5-6

See Response ORG 5-4 and Response ORG 5-5. To the extent the comment is addressed to the merits of the proposed discretionary entitlements and findings in support of a determination on those entitlements, as opposed to the content of the CEQA analysis and CEQA findings, such comments do not raise an issue under CEQA.

Response ORG 5-7

As discussed in response to ORG 5-4 and 5-5, the Project would widen East Walnut Drive South by 12 feet, resulting in a 52 foot local street separating the Project from the light industrial and other commercial uses on East Walnut Drive South. The Project would also be separated from uses to the northwest by the intersection of East Walnut Drive South and Fairway Drive.

Response ORG 5-8

As discussed in Chapter 5 Alternatives, Alternative 2 if chosen would be developed pursuant to the provisions of the County Zoning Ordinance (LACC Title 22), which implements the General Plan, inclusive of its Community Plans. The General Plan Land Use Element is supplemented by the Rowland Heights Community Plan, which is in turn implemented by the Rowland Heights CSD (codified as Chapter 22.332 of the LACC). Among other provisions, the County Zoning Ordinance defines the permitted land uses on a site, height restrictions, minimum lot size, maximum lot coverage, parking requirements and setbacks. Alternative 3 was not considered the environmentally superior alternative as shown in Table 5-3, Summary of Impacts of Alternatives Compared to the Proposed Program.

Further, there is no County Green District south of East Walnut Drive. Residential uses are already located adjacent to the subject industrial area, along the north side of East Walnut Drive, between Fairway Drive and Moscada Avenue. Walnut Drive currently serves as a 40’ wide buffer, and will serve as a 52’ wide buffer with the Project.

Response ORG 5-9

See Response ORG 5-7 and ORG 5-8, above. The DEIR evaluates the impacts of the Project and is not required to address potential impacts or requirements of speculative future projects on other properties.

Response ORG 5-10

See the response above regarding buffering. The DEIR analyzed the compatibility of the Project with the surrounding land uses and determined the impacts to be less than significant. The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response ORG 5-11

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

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ORG 6-1

January 5, 2024

VIA ELECTRONIC MAIL

Marie Pavlovic
LA County Planning
Subdivisions Section
320 W. Temple Street, Room #160
Los Angeles, CA 90012
mpavlovic@planning.lacounty.gov

RE: Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1); Vesting Tentative Tract Map No.: TR83534 (RPPL2021007149); General Plan Amendment No. RPPL2021004860; Zone Change No. RPPL2021007152; Conditional Use Permit No. RPPL2021007151; Housing Permit No. RPPL2021007161; Environmental Assessment No. RPPL2021007150; and, State Clearinghouse Number 2022100204

Dear Ms. Pavlovic:

This firm represents Royal Vista Open Space. As detailed in this comment letter, the Draft Environmental Impact Report ("DEIR") for the Royal Vista Residential Project ("Project" or "proposed Project")[1] is fatally flawed and must be revised and recirculated for additional public comment and review.

ORG 6-2

1.0 INTRODUCTION

Our clients have identified a number of issues and concerns with the DEIR, which are included in **Attachment A** to this comment letter. In addition to a response to the additional comments presented herein, we request a response to the comments included in **Attachment A** to this letter.

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[1] The DEIR is available at: https://ceqanet.opr.ca.gov/2022100204/2

Please keep this office on the list of interested persons to receive timely advance notice of all hearings, votes and determinations related to the Project, its EIR and requested entitlements. Pursuant to Public Resources Code Section 21167(f), please provide us with a copy of each and every Notice of Determination issued in connection with the Project.

We adopt and incorporate by reference all Project comments and objections raised by all others during the environmental review and land use entitlement processes for the Project. Pursuant to PRC Section 21167.6(e) and *Consolidated Irrig. Dist. v. Superior Court*, 205 Cal.App.4th 697 (2012), please include all of the hyperlinked references cited in each of the comment letters submitted during the administrative process in the administrative record. We submit reference documents cited in Attachment C by separate correspondence.

Process

- The County Planning Commission approved the initiation of the Amendment of the Rowland Heights Community Plan as requested by the Project applicant on July 28, 2021. The Commission's decision was appealed to the County Board of Supervisors on August 9, 2021. The Appeal was heard on October 19, 2021 and denied, thus allowing initiation of a Plan Amendment.[2] The County Board of Supervisors approved initiation of a Plan Amendment despite the fact that the Project applicant acknowledged that there "is a restrictive covenant on the subject property limiting use as golf course only until 2036."[3] The restrictive covenant thus does not expire for an additional 12 years.
- The Notice of Preparation was issued on October 7, 2022.
- The DEIR comment period was from October 30, 2023 to January 5, 2024.

The Proposed Project

As detailed in the Executive Summary of the Environmental Impact Report ("EIR") for the proposed Project, the Project applicant proposes to redevelop six irregularly shaped parcels (or "Planning Areas") totaling approximately 76-acres, which currently comprises a portion of the existing Royal Vista Golf Club.[4] Planning Areas 1,

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[2] https://file.lacounty.gov/SDSInter/bos/supdocs/162024.pdf

[3] Ibid. PDF page 6.

[4] For information the Royal Vista Golf Club see:
https://www.larv.com
https://www.larv.com/the-club/
https://www.larv.com/the-course/

2, 3 and 5 (68.24 acres) would be developed with residential uses while Planning Areas 4 and 6 would remain open space (7.4 acres). The Project would include a total of 360 residential units, consisting of 200 detached single-family homes, 88 attached residential units (58 duplex units, 30 triplex units) and 72 townhomes. All 72 townhomes and 10 triplex units would be set aside for sale to middle- and moderate-income households. The Project would also include approximately 28 acres of publicly accessible open space areas. Of the 360 units, 82 units (22.7 percent) would be set-aside for sale to middle- and moderate-income households, consistent with the County's 20 percent inclusionary housing ordinance. The Project would require the following entitlements, as detailed on DEIR page ES-7:

- General Plan and Community Plan Amendments (Rowland Heights Community Plan): OS (Open Space) to Urban 2 ((U2); 3.3 to 6.0 dwelling units per acre) for portions of Planning Areas 1, 2 and 5; to Urban 3 ((U3); 6.1 to 12.0 dwelling units per acre) for portions of Planning Areas 1 and 5; and to Urban 4 ((U4); 12.1 to 22.0 dwelling units per acre) for a portion of Planning Area 3 (see Figure 2-5, *Existing and Proposed Land Use*).

- Zone Change from A-1-1 and A-1-10,000 (Light Agricultural) to RPD-5000-6U and RPD- 5000-12U (Residential Planned Development-5000 Square Feet Minimum Lot Area-6 Dwelling Units Per Acre and 12 Dwelling Units Per Acre, respectively) for the 62.25 acres of proposed single-family homes, duplexes, triplexes, with an affordable housing component and open space for Planning Areas 1, 2, and 5 and to RPD-5000-17U (Residential Planned Development-5000 Square Feet Minimum Lot Area-17 Dwelling Units Per Acre) for the 6.0 acres of townhomes with an affordable housing component and open space for proposed Planning Area 3.

- Vesting Tentative Tract Map: Subdivision of six (6) existing parcels into 248 lots, consisting of 200 single family lots, 29 residential condominium lots with a total of 58 duplex units, 5 residential condominium lots with a total of 30 triplex units, 1 residential condominium lot with 72 attached townhomes, 13 open space lots to be privately owned and maintained by the HOA but accessible to the

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https://www.larv.com/rates/
https://www.larv.com/membership/

public, and a street frontage waiver for the private driveway and firelane system within PAs-1, 2, and 5.

- Conditional Use Permit (CUP): For grading in excess of 100,000 cubic yards, and a Residential Development Program, walls over 6-feet in height, buildings over 35-feet in height, setback reduction for townhomes (front) and triplex (front and rear) yards, and residential lot widths less than 50-feet.
- Housing Permit to reserve 22.7 percent (82 units) of subdivision units for sale to middle- and moderate-income households and to allow single-family lots smaller than 5,000 square feet and waive the parkway requirement along private driveways within Planning Areas 1, 2, 3, and 5. Single-family Lots #18, #47, and #155 are slightly less than 5,000 sf in size (net size) Lot #18 is undersized due to a side yard utility easement, Lot #47 is a corner lot with a curved front side yard on one side, and Lot #155 is undersized due to utility easement.

The Project involves a massive amount of earth movement. According to DEIR page ES-7: “Project grading plus over-excavation, re-compaction and export totals approximately 3,863,200 cubic yards.” This massive amount of earth movement calls into question the accuracy of the air quality analysis for the Project, and the conclusion that air quality impacts would be less than significant with mitigation. Defects in the air quality analysis also call into question the accuracy of the noise analysis for the Project. ORG 6-3

Impacts Identified in the DEIR

As noted in the NOC/NOA and the DEIR the proposed Project would result in significant and unavoidable environmental impacts to Greenhouse Gas Emissions, Noise, and Transportation. All other environmental factors, including Aesthetics, Agricultural and Forestry Resources, Air Quality, Biological Resources, Cultural Resources, Energy, Geology and Soils, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use and Planning, Mineral Resources, Population and Housing, Public Services, Recreation, Tribal Cultural Resources, Utilities and Service Systems, and Wildfire, were found in the DEIR to have less than significant Impacts or less than significant impacts with mitigation. As detailed in this comment letter, a number of these conclusions are inaccurate. ORG 6-4

Alternatives Analyzed in the DEIR

According to DEIR page ES10-11, the DEIR includes analysis of four alternatives: Alternative 1, the No Project Alternative; Alternative 2, the Mixed-Use ORG 6-5

Alternative consisting of 324 residential units, 36,000 square feet of commercial retail uses and open space with a trail system; Alternative 3, the Existing Zoning Alternative resulting in 97 residential units; and Alternative 4, a 322 Residential Units Alternative. The No Project Alternative and Alternative 3, the Existing Zoning Alternative were identified as Environmentally Superior Alternatives. However, DEIR has designed Alternative 3 so that it "would not include open space or a trail system to encourage outside recreation and would not distribute below-market units throughout the site." Additionally, Alternative 3 has been designed so that it "would provide . . . a narrower range of housing types, sizes and prices as compared to the Project because it would not include duplex or triplex housing options." Alternative 3 thus includes unnecessary design choices intended to provide a basis for rejecting the Environmentally Superior Alternative. Clearly Alternative 3 could be modified to address these concerns.

Criteria for Recirculation

As detailed in this comment letter, the DEIR is fatally flawed and must be corrected and recirculated. CEQA Guidelines Section 15088.5 specifies when recirculation of an EIR is required prior to certification. CEQA Guidelines Section 15088.5 states in part:[5]

> (a) A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under Section 15087 but before certification. As used in this section, the term "information" can include changes in the project or environmental setting as well as additional data or other information. New information added to an EIR is not "significant" unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. "Significant new information" requiring recirculation include, for example, a disclosure showing that:
>
> (1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.

ORG 6-6

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[5] CEQA Guidelines Section 15088.5(e) specifies: A decision not to recirculate an EIR must be supported by substantial evidence in the administrative record.

> (2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.
>
> (3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.
>
> (4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded. (Mountain Lion Coalition v. Fish and Game Com. (1989) 214 Cal.App.3d 1043)

2.0 INADEQUATE AND INACCURATE PROJECT DESCRIPTION – DEIR CHAPTER 2

The regional location map (Figure 2-1) needs to include the jurisdictional boundaries for the County and surrounding cities. A full set of Project plans, including grading, landscaping, utilities and service systems, drainage and geology needs to be provided in an Appendix to the DEIR. The DEIR also needs to include a full set of plans for the existing golf course and project parcels in an Appendix to the DEIR. This information is necessary for commenters to judge the accuracy and adequacy of the DEIR. ORG 6-7

Description of Project Grading

The DEIR, in the Executive Summary and Project Description as well as other locations, mischaracterizes the nature of Project grading for purposes of downplaying the amount of cut and fill activity, thus resulting in an inaccurate air quality and greenhouse gas analysis, as detailed later in this comment letter. According to DEIR page 2-10:

> Project grading will require approximately 387,100 cubic yards of cut and approximately 253,400 cubic yards of fill, with a net export of approximately 133,700 cubic yards for the Project Site. Over excavation and recompaction of up to 1,544,500 cubic yards each is anticipated. The maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during the construction of the golf course. During Project excavation the 1,544,500 cubic yards would be temporarily stockpiled on site and when the site is ready for re- compaction, the 1,544,500 cubic yards soil would be redistributed on site and

ORG 6-8

> compacted to create roadways and the residential lots (Project grading plus over-excavation, re-compaction and export totals approximately 3,863,200 cubic yards).

The concept of “over-excavation and re-compaction” is the DEIR’s fancy way of disguising the volume of Project cut and fill activity. As noted on page 16 of the Los Angeles County Public Works Grading Guidelines,[6] in Section J102.1 Definitions:

> **EXCAVATION.** The removal of earth material by artificial means, also referred to as a cut.
>
> **FILL.** Deposition of earth materials by artificial means.
>
> **GRADING.** An excavation or fill or combination thereof.

So, the DEIR’s Project Description, and any analysis based thereon, must be corrected to identify the total amount of cut and fill as follows and explain the 3,863,200 figure provided in the DEIR:

TABLE 1 **Project Grading And Earth Movement (Cubic Yards)**	
Soil to be cut, stockpiled on site and then placed and re-compacted on-site.	1,544,500
Cut = 387,100 + 1,544,500	1,931,600
Fill = 253,400 + 1,544,500	1,797,900
Export = (Cut-Fill)	133,700
Total Earth Movement (Cut + Fill)	3,729,500
Note: 3,729,500 cubic yards is the equivalent of 2,311.67 acre-feet of earth moved, without consideration of compaction equipment operations or distance traveled when stockpiling soil and using stockpiled soil. (An acre-foot is the amount needed to cover an acre one foot deep).	

Excavation of 1,931,600 cubic yards of earth is the equivalent of excavation of 1,197.27 acre-feet of soil.[7] Dividing the 1,197.27 by the 68.24 acres to be developed with housing, yields an average depth of excavation over the entire 68.24 acres of 17.54 feet. This should be described in the DEIR. The 1,544,500 cubic yards of soil to be stockpiled on site equals 957.34 acre-feet of soil. If this soil were stockpiled on a five-

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[6] The Grading Guidelines are available at: https://dpw.lacounty.gov/ldd/lddservices/docs/Grading_Guidelines.pdf

[7] 1 cubic yard = 0.000619836 acre-feet.

acre portion of the Project site, it would result in a column of soil 191.46 feet tall with a five-acre base.[8] Given the extensive amount of excavation, the Project Description needs to include a copy of the grading plan for the Project. Based on the following statement from page 1 of the April 18, 2023 Geotechnical Report contained in DEIR Appendix G, it appears that a grading plan has yet to be developed, and was therefore not available for review by drafters of the noise, hydrology and other technical sections of the DEIR:

> Based on our review of the most recent revised Conceptual Site Plan (FUSCOE, 2023), we understand that the plan has been revised to include a total of 360 residential units including 200 single family detached units, 58 duplex units, 30 triplex units, and 72 townhome units. Otherwise, the site plan is very similar to that previously reviewed as part of our site geotechnical evaluation (LGC Geotechnical, 2020 & 2021a). Therefore, the recommendations provided in our reports (LGC Geotechnical, 2020 & 2021a) remain valid and applicable.
>
> It should be noted that the recommendation provided in our previous reports (LGC Geotechnical, 2020 & 2021a) should be considered approximate and conceptual. **Once 40-scale grading plans have been prepared**, LGC Geotechnical should review and analyze the site development plans in the context of the site geologic conditions. **A comprehensive geotechnical report for the development of the site will be prepared at that time.**

In addition, DEIR page 4.7-5 states that **"**(f)ill materials at the Project Site vary from near surface to a maximum of approximately 25 feet of depth, except for one isolated area within Planning Area 5 that may be as deep as 30 feet. So, the representation in the Project Description that excavation will be to a maximum of 25 feet appears to be understated. This should be corrected.

ORG 6-9

Inadequate Information Regarding Project Construction Phasing and Timing

The Project Description in DEIR Section 2.5 – Construction fails to identify the length of each of the Project construction phases or to provide any detail regarding whether construction will be phased by parcel/Planning Area, or whether each phase will occur concurrently on all of the parcels. Given the massive quantity of on-site soil excavation and storage the Project Description needs to detail the phasing and timing of on-site construction, which areas will be developed in what order, and where and for how long soil will be stockpiled on the Project site. More detail is required in order for the public to assess the accuracy of the impact analysis.

ORG 6-10

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[8] 957.34 acre-feet/5 = a 191.46 foot tall column with a 5-acre base.

Failure to Describe the Location of Stockpiled Soil

It is important to understand the sheer volume of soil movement associated with project construction. One cubic yard is roughly the size of a washing machine. According to Los Angeles County Public Works, by way of comparison, the Rose Bowl in Pasadena would hold about 400,000 cubic yards.[9] It should be noted that "[a]t a modern capacity of 92,542, Rose Bowl Stadium is the 15th-largest stadium in the world, the 11th-largest stadium in the United States, and the 10th largest NCAA stadium."[10]

As shown in the following table, the Project involves removing and temporarily storing the equivalent of nearly four Rose Bowls worth of earth on site. In total, the Project will involve moving the equivalent of nearly nine and a half Rose Bowls worth of earth.

TABLE 2
PROJECT WILL RESULT IN A MASSIVE AMOUNT OF EARTH MOVEMENT

	Cubic Yards	# of Rose Bowls Worth
Rose Bowl holds:	400,000	100% or 1 Rose Bowl
Over-excavation, Temporarily Stored on Site, Then Re-compaction, and Re-distribution. (Soil to Be Stockpiled on Site).	1,544,500	386% or 3.86 Rose Bowls
Additional Cut	387,100	96.7% or 0.967 – i.e. nearly one Rose Bowl
Additional Fill	253,400	63.4% or 0.634 Rose Bowls
Net Export to Olinda Landfill	133,700	33.4% or 0.334 Rose Bowls
Total Earth Movement (see Table 1)	3,729,500	932.38% or 9.32 Rose Bowls
Per DEIR Project grading plus over-excavation, re-compaction and export totals approximately	3,863,200	965.8% or 9.66 Rose Bowls

Given the sheer volume of earth movement associated with the Project, the Project Description in the EIR needs to identify the locations where soil will be stockpiled, and the volume of soil to be stockpiled at each stockpile location, as well as the duration of the storage. The need to stockpile soil may also result in a

ORG 6-11

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[9] https://dpw.lacounty.gov/lacfcd/sediment/debrisbasins.aspx

[10] https://www.discoverlosangeles.com/visit/rose-bowl-stadium-the-story-of-an-la-icon

phasing of development on or across the Project parcels and the DEIR needs to describe the phasing of any such development. This information is important to analysis of the Project's air quality and noise impacts.

Stormwater System

ORG 6-12

DEIR page 2-14 states that the "Project would retain the existing stormwater management system within the Project Site, which serves the surrounding existing residential areas." The Project Description needs to provide more information regarding the existing stormwater management system and explain the elements to be retained, given the substantial amount of Project grading and landform modification and how continued operation of the system will be accomplished during the three-year period of project construction.

3.0 INADEQUATE ENVIRONMENTAL SETTING – CHAPTER 3

ORG 6-13

The Environmental Setting chapter fails to provide information which is necessary for reviewers to assess the accuracy of the impact analysis. Information should be provided on when operations of the Royal Vista Golf Club ceased and the golf course property was sold and the number separate owners. The DEIR must include evidence that the golf club/course was still in active operation as recently as October 7, 2022. The Environmental Setting needs to provide information on the ownership of the remaining golf course parcels as this information is important to an understanding of cumulative impacts. It also needs to indicate whether the Royal Vista Golf Club was a public or private club/course. DEIR page 4.1-1 indicates that the "156.4-acre Royal Vista Golf Club has a small maintenance building, clubhouse, banquet and special event facility, practice putting green, driving range, **and a public** 27-hole golf course layout that meanders between pockets of single-family residential development." The public nature of the golf course is important to an understanding of the impact of the Project on open space, parks, and recreational facility availability in the area.

The environmental setting chapter of the DEIR needs to provide more information and maps showing the location of existing Waters of the United States, as well as the existing topography, the existing utilities, and the stormwater system. In addition, Chapter 3 need to provide information regarding the Morning Sun Avenue landslide[11] in the Project vicinity and a map showing its location in relation to the Project. This is important to an understanding of the geological issues associated with the Project.

Cumulative Projects List

ORG 6-14

The cumulative projects list also needs to include the other projects that have been proposed for the remaining golf course properties and provide information on their

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[11] https://www.latimes.com/archives/la-xpm-1995-05-24-me-5405-story.html https://www.latimes.com/archives/la-xpm-1995-06-10-me-11579-story.html

ownership and status, as development of these parcels is reasonably foreseeable. The cumulative impact analysis for each issue area then needs to be redone and the DEIR recirculated for public review and comment, as cumulative impacts are thus underestimated in the DEIR.

Figure 1 shows a cumulative development on another portion of the golf course property which has been proposed in recent years, but which is not included on the cumulative project's list. In addition, the cumulative analysis must address what is reasonable and foreseeable for the remainder of the golf course property, since the proposed Project will render future use of the property for full golf purposes infeasible, and how the remainder of the golf course property is used going forward will impact nearby residents. For example, the City of Diamond Bar, in a comment letter on the Notice of Preparation ("NOP") contained in DEIR Appendix A, expressed concern regarding the potential for the Project to result in blight should the remainder of the golf course lands be unutilized for an indefinite period of time. This needs to be addressed as part of the cumulative impact analysis or as part of an analysis of the indirect impacts of the proposed Project.

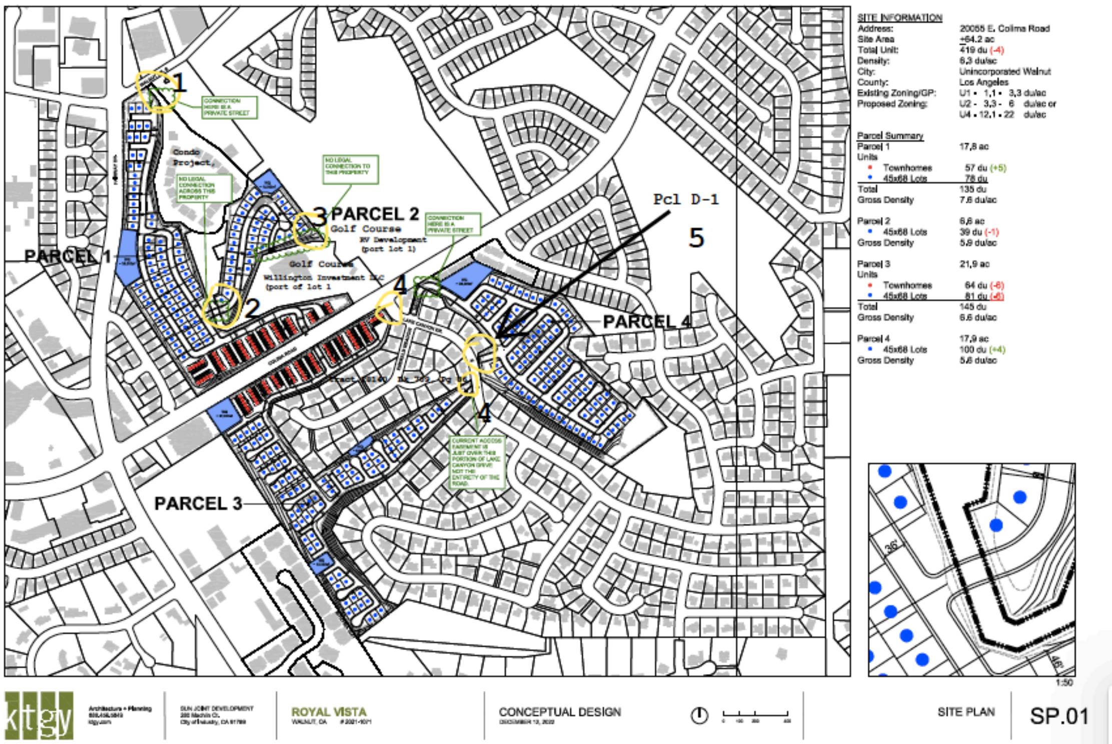

FIGURE 1 – Sunjoint Proposed 419 Unit Development on the Royal Vista Golf Club Property

Source: Emails from Bob Garrison, Director of Consulting Services, Murow Development Consultants, to David Esfandi, P.E., Los Angeles County Public Works, dated February 24, 2023 and March 10, 2023.

4.0 DEIR INAPPROPRIATELY CATEGORIZES SOME MITIGATION MEASURES AS PROJECT DESIGN FEATURES

In making important judgments regarding the Project's potential for impacts, the DEIR impermissibly relies on Project Design Features (PDFs) which are in fact mitigation measures designed to avoid or lessen Project impacts. PDFs include: PDF AES-1, PDF AQ-1, PDF GHG-1 and 2, PDF NOI-1, and PDF T-1 to 8. As noted in the discussion of PDFs on DEIR pages 2-18 to 2-22, the "Project Design Features would be implemented for the proposed Project and will help to reduce Project-related . . . impacts."

It is clear from the impact analysis in the DEIR, that some of the impact judgments in the EIR are after-implementation-of-the-PDFs judgements. For example:

- DEIR page 4.3-43 states the following regarding PDF AQ-1: "these measures have *been assumed in the impacts analysis."
- DEIR pages 4.3-48 to 4.3-49 and 4.17-18 to 4.17-19 discuss the mitigation value of PDF T-1 and T-2. As shown in **Attachment B**, a number of the transportation PDFs are mitigation measures required by the County. As noted on DEIR page 4.17-20, the VMT reductions from PDF T-1 "have been applied to the baseline forecast provided by the County's VMT Tool."
- DEIR page 4.8-34 indicates that PDF GHG-1 and 2 have been "assumed in the GHG impacts analysis, grouped by those that would directly result in quantifiable GHG emission reductions used in the CalEEMod run, and those that are non-quantifiable."
- Footnote 6 on DEIR page 4.17-25 indicates that the "analysis in this DEIR does not assume or rely upon PDF T-3 through PDF T-8 to reduce potential impacts, and if these PDFs were not to be constructed the analysis of Project impacts would not be affected." However, this is in conflict with the introduction to PDF T-1 to 8 on DEIR pages 2-19 to 2-22 which states that the: "following Project Design Features would be implemented for the Project and will help to reduce Project-related transportation related impacts." Only PDF T-3 is footnoted (footnote 4 DEIR page 2-21) in the Project Description as not assumed in the impact analysis. Furthermore, PDF T-3 to 8 compensate for Project-induced deficiencies in the operation of local roadways in the Project vicinity and thus serve as mitigation for Project-induced roadway safety hazards and impacts to emergency response.

ORG 6-15

While several of the PDF are standard regulatory measures, essential elements of the Project, or include components that are regulatory measures, a number of PDFs are clearly measures intended to mitigate, minimize or avoid impacts. The way the EIR has relied on PDFs which are mitigations in making impact judgements is contrary to the requirement that project impact significance determinations under CEQA be made without consideration of mitigation measures.

The EIR for the proposed project thus understates Project impacts, by improperly relying on PDFs which are in fact mitigation measures, as a basis for concluding that Project impacts are less than significant. In *Lotus vs. Department of Transportation* (2014) 223 Cal.App.4th 645 (Lotus), the court found that an EIR violated CEQA by incorporating proposed mitigation measures into the description of the project, and then basing its conclusion of less-than-significant impacts in part on those mitigation measures. This is exactly what has been done in the EIR for the proposed Project. The court found that this improperly compressed the analysis of impacts and mitigation measures into a single issue.

In *Lotus v. Dep't of Transp.* (2014) 223 Cal.App.4th 645 (Lotus), Caltrans was found to have certified an insufficient EIR based on its failure to properly evaluate the potential impacts of a highway project. The *Lotus* court found that Caltrans erred by:

> . . . incorporating the proposed mitigation measures into its description of the project and then concluding that any potential impacts from the project will be less than significant. As the trial court held, the "avoidance, minimization and/or mitigation measures," as they are characterized in the EIR, are not "part of the project." They are mitigation measures designed to reduce or eliminate the damage to the redwoods anticipated from disturbing the structural root zone of the trees by excavation and placement of impermeable materials over the root zones. By compressing the analysis of impacts and mitigation measures into a single issue, the EIR disregards the requirements of CEQA. (*Lotus v. Dep't of Transp.*, *supra*, 223 Cal.App.4th at pp. 655–656, emph. added.

The court ordered Caltrans' certification of the EIR be set aside, finding:

> [T]his shortcutting of CEQA requirements subverts the purposes of CEQA by omitting material necessary to informed decisionmaking and informed public participation. It precludes both identification of potential environmental consequences arising from the project and also thoughtful analysis of the sufficiency of measures to mitigate those consequences. The deficiency cannot be considered harmless. *Ibid*.
>
> (*Id*. at 658.)

Under CEQA, significance determinations must be made without consideration of avoidance, minimization, and/or mitigation measures. The EIR for the proposed Project has violated this precept and has thus understated and failed to identify impacts. The EIR is therefore fatally flawed. This must be corrected and the EIR recirculated pursuant to CEQA Guidelines Section 15088.5(a)(1), (2) and (4).

5.0 INACCURATE IMPACT ANALYSIS

Aesthetic Impacts

The aesthetic impact analysis needs to address not only the potential impacts of the completed Project, but also potential aesthetic impacts during Project construction and the storage of soil on site. DEIR page 4.1-18 notes the amount of grading and soil to be stored on-site, but the analysis fails to address the temporary aesthetic impacts associated with the soil storage or disclose the location of such storage and the length of such storage. Given the massive quantity of soil to be stockpiled, the DEIR must address whether the stockpiles will be visible from surrounding areas and identify any aesthetic impacts therefrom. ORG 6-16

The analysis states that the Project is consistent with the 2035 General Plan, but that is only true if the County approves a General Plan and Community Plan Amendment, Zone Change, Vesting Tentative Map Tract, and Conditional Use Permit ("CUP"). The analysis must address consistency in the absence of these potential discretionary approvals which are a form of mitigation, and should be treated as such. Land Use consistency impacts in the absence of these mitigation measures must be identified in the DEIR to facilitate the County's determination of whether these discretionary approvals are warranted. ORG 6-17

DEIR Table 4.1-1 needs to be amended to indicate that the Project is not consistent with the surrounding built environment. It includes increased density to address VMT impacts. In addition, the Project townhomes are not consistent with the height limitations in the area, as noted on DEIR page 4.1-39, necessitating a Conditional Use Permit ("CUP"). It is inappropriate for the table to only identify the ways the Project is consistent, and to fail to identify inconsistencies. It must therefore be corrected.

Project construction will occur over a three-year period. The analysis cannot dismiss construction lighting impacts as short-term and therefore not significant, but must address whether there are significant short-term impacts during construction. ORG 6-18

The Project includes roof-top solar. The analysis must address the question of whether roof-top solar facilities will be visible from adjacent uses and whether or not this will result in glare impacts to nearby uses, given topography at project completion.

The aesthetic impacts analysis fails to address key impact questions regarding stockpiled soil and roof-top solar and must therefore be augmented and recirculated for public review and comments.

Air Quality Impacts

The air quality analysis for the proposed Project needs to be completely redone and recirculated for public review and comment. The analysis fails to address all of the South Coast Air Quality Management District's ("SCAQMD") thresholds of significance. The analysis substantially underestimates Project construction emissions. The DEIR fails to contain a quantitative assessment of the Project's and cumulative potential air toxic contaminants. The analysis subtracts emissions estimated for "existing" golf course uses, from estimated Project emissions while providing no evidence that the golf course was in operation on October 7, 2022 and beyond.[12] In the absence of such a showing, it would be inappropriate to deduct golf course emissions from Project Emissions. In addition, the project site represents only about a third of the golf course site. It does not contain the parking lot, restaurant or pro shop. It only contains the maintenance building and 13 holes of the course's 27 holes and the driving range. It would be inappropriate to deduct all golf course-related emissions; only emissions being generated on the project site after October 6, 2022 can be properly deducted. This is also true for vehicle trips. ORG 6-19

The statement on DEIR page 4.3-37 to 38 that a maximum of 50 haul trucks during the grading and excavation phases represents a worst-case scenario and that on average there would be approximately 33 hauling trucks per day is not supported by substantial evidence. The proposed Project will result in 133,700 cubic yards of soil export. Assuming 10 cubic yards ("cy") per truck and 314 days of grading, (133,700/10)/314 days of grading = 42 truck loads per day for each of the 314 days of grading. Using the Project Applicant's figure of 13 cubic yards per haul truck yields the following calculation: (133,700/13)/314 days of grading = 33 truck loads per day for each of the 314 days of grading. However, according to DEIR Appendix M page 89, hauling of exported soil is only expected to occur for 262 of the 314 grading days. (133,700/10)/262 days of grading = 51 truck loads per day for each of the 262 days; (133,700/13)/262 days of grading = 40 truck loads per day for each of the 262 days. These are two-way trips. These numbers must be doubled to obtain total daily one-way haul trips. The DEIR contains many examples of statements designed to downplay project impacts. In addition, haul trucks will be operating continuously on the Project Site during grading to address the massive quantity of soil to be removed, stockpiled, and then redistributed and recompacted. The analysis in the DEIR thus significantly underestimates Project air quality impacts as discussed further below. ORG 6-20

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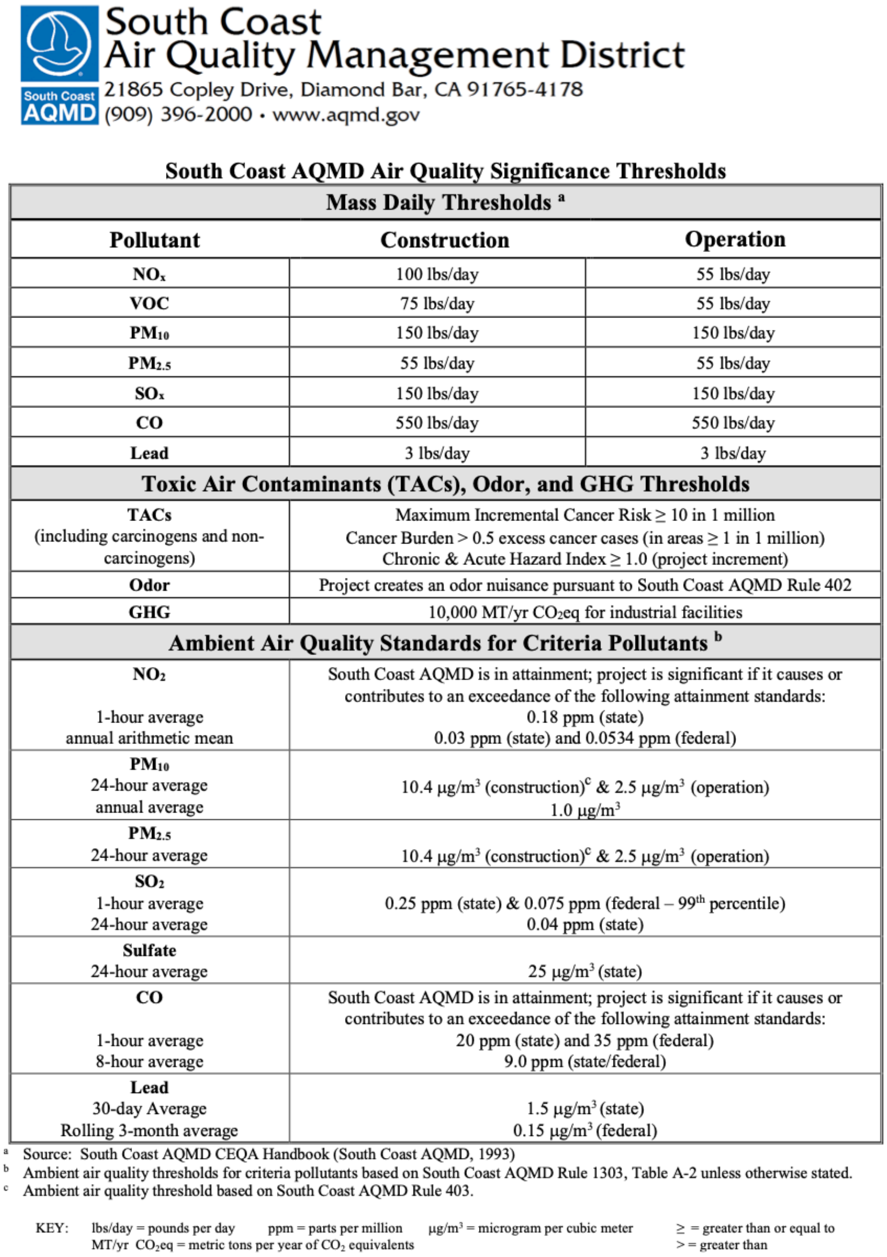
[12] See DEIR page 4.3-41. DEIR Appendix M, in Attachment H provides evidence of some operations at the golf course via SoCalGas bills dated August 5, 2021 and July 7, 2021 and Southern California Edison bills dated June 21, 2021 and May 18, 2021, but no evidence is provided that the golf course was operating in 2022.

Thresholds of Significance

The DEIR needs to address all of the SCAQMD's thresholds of significance[13] as shown on the following figure from the SCAQMD.

ORG 6-21



South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

South Coast AQMD Air Quality Significance Thresholds

Mass Daily Thresholds [a]

Pollutant	Construction	Operation
NO_x	100 lbs/day	55 lbs/day
VOC	75 lbs/day	55 lbs/day
PM_{10}	150 lbs/day	150 lbs/day
$PM_{2.5}$	55 lbs/day	55 lbs/day
SO_x	150 lbs/day	150 lbs/day
CO	550 lbs/day	550 lbs/day
Lead	3 lbs/day	3 lbs/day

Toxic Air Contaminants (TACs), Odor, and GHG Thresholds

TACs (including carcinogens and non-carcinogens)	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index ≥ 1.0 (project increment)
Odor	Project creates an odor nuisance pursuant to South Coast AQMD Rule 402
GHG	10,000 MT/yr CO_2eq for industrial facilities

Ambient Air Quality Standards for Criteria Pollutants [b]

NO_2 1-hour average annual arithmetic mean	South Coast AQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 0.18 ppm (state) 0.03 ppm (state) and 0.0534 ppm (federal)
PM_{10} 24-hour average annual average	10.4 μg/m^3 (construction)^c & 2.5 μg/m^3 (operation) 1.0 μg/m^3
$PM_{2.5}$ 24-hour average	10.4 μg/m^3 (construction)^c & 2.5 μg/m^3 (operation)
SO_2 1-hour average 24-hour average	0.25 ppm (state) & 0.075 ppm (federal – 99th percentile) 0.04 ppm (state)
Sulfate 24-hour average	25 μg/m^3 (state)
CO 1-hour average 8-hour average	South Coast AQMD is in attainment; project is significant if it causes or contributes to an exceedance of the following attainment standards: 20 ppm (state) and 35 ppm (federal) 9.0 ppm (state/federal)
Lead 30-day Average Rolling 3-month average	1.5 μg/m^3 (state) 0.15 μg/m^3 (federal)

[a] Source: South Coast AQMD CEQA Handbook (South Coast AQMD, 1993)
[b] Ambient air quality thresholds for criteria pollutants based on South Coast AQMD Rule 1303, Table A-2 unless otherwise stated.
[c] Ambient air quality threshold based on South Coast AQMD Rule 403.

KEY: lbs/day = pounds per day ppm = parts per million μg/m^3 = microgram per cubic meter ≥ = greater than or equal to
MT/yr CO_2eq = metric tons per year of CO_2 equivalents > = greater than

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[13] See: https://www.aqmd.gov/docs/default-source/ceqa/handbook/south-coast-aqmd-air-quality-significance-thresholds.pdf?sfvrsn=25

Construction Emissions

Given the magnitude of grading and excavation of the site, the air quality analysis in the DEIR fails the smell test. The values obtained for PM10 and PM2.5 alone (maximum of 21.7 and 8.6 respectively)[14] should have clued the person conducting the analysis into the fact that there was a problem with the way the model was being run and the input values used, just as someone using a calculator should be clued in to the fact that there has been an input or calculator error when obtaining a value of 21.7 or 8.6 when multiplying 2387 by 12642.

As noted on page 34 of the California Emissions Estimator Model ("CalEEMod") User's Guide,[15] in discussing the calculation of grading and soils movement:

> The Total Acres Graded field represents the cumulative distance traversed on the property by the grading equipment, assuming a blade width of 12 feet. To properly grade a piece of land, multiple passes with grading equipment may be required. So even though the lot size is a fixed number of acres, the Total Acres Graded could be an order of magnitude higher than the footprint of the lot and is calculated based on the equipment list (including number of equipment), the number of days need to complete the grading and/or site preparation phase, and the maximum number of acres a given piece of equipment can traverse in an 8-hour workday. For more information regarding how Dust from Material Movement is calculated, including grading rates, see Appendix A, Subchapter 4.3.

According to the air modeling output in DEIR Appendix B, the analysis assumed the equivalent of three passes over the site, as shown in the following screenshot of the user changes to default values:

ORG 6-22

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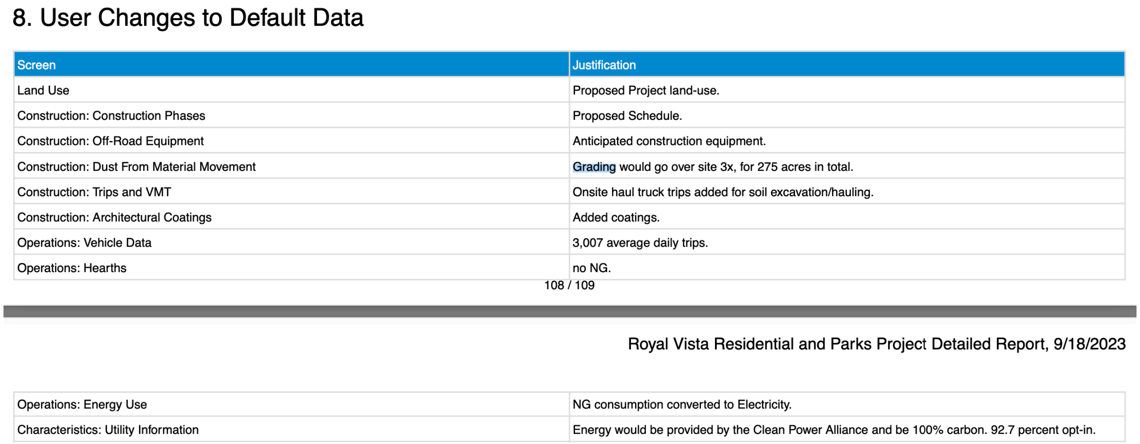
[14] See DEIR Table 4.3-8.

[15] Available at: http://www.aqmd.gov/caleemod/user's-guide http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01_user-39-s-guide2020-4-0.pdf?sfvrsn=6 http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/appendix-a2020-4-0.pdf?sfvrsn=6



8. User Changes to Default Data

Screen	Justification
Land Use	Proposed Project land-use.
Construction: Construction Phases	Proposed Schedule.
Construction: Off-Road Equipment	Anticipated construction equipment.
Construction: Dust From Material Movement	Grading would go over site 3x, for 275 acres in total.
Construction: Trips and VMT	Onsite haul truck trips added for soil excavation/hauling.
Construction: Architectural Coatings	Added coatings.
Operations: Vehicle Data	3,007 average daily trips.
Operations: Hearths	no NG.

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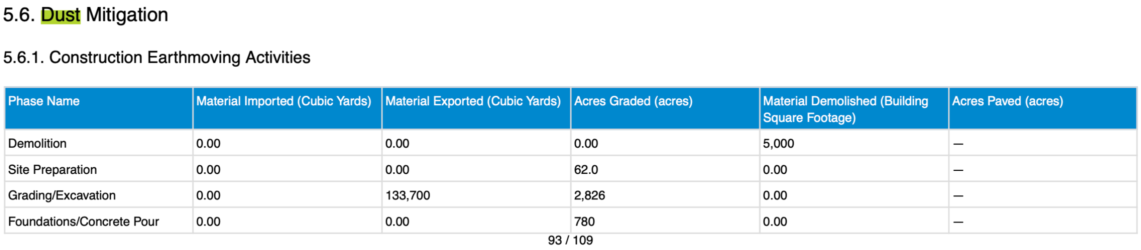
Royal Vista Residential and Parks Project Detailed Report, 9/18/2023

Operations: Energy Use	NG consumption converted to Electricity.
Characteristics: Utility Information	Energy would be provided by the Clean Power Alliance and be 100% carbon. 92.7 percent opt-in.

The assumption of three passes over the site is too low, given that almost the entire site will be excavated, the material will be stockpiled on site, and then redistributed and recompacted, and thus the number of passes of the site needed by earthmoving vehicles moving earth around on the site would be more than the equivalent of three passes of the site. PDF NOI-1 provides for 12 hours a day of construction, not the 8 hours assumed in the analysis. In addition, the equipment mix assumed in the analysis is understated.

The air quality analysis has failed to accurately account for the amount of earth that must be moved as part of "over excavation and recompaction" whereby 1,544,500 cubic yards would be excavated, then temporarily stockpiled on site and when the site is ready for re- compaction, the 1,544,500 cubic yards soil would be redistributed on site and compacted to create roadways and the residential lots, as well as the grading associated with the identified cut and fill. As noted in **Table 1** above, in terms of acre-feet, the 3,729,500 cubic yards of total earth movement is the equivalent of 2,311.67 acre-feet, just of earth moved, without consideration of recompaction equipment operations or distance traveled when stockpiling soil and then placing stockpiled soil in its intended location. Thus, the cumulative distance traversed on the property by the grading equipment should be several orders of magnitude higher than 2,312, particularly given the irregular nature of the Project Site, yet DEIR Appendix B shows the calculated area graded in acres as only 2,826 acres, as shown in the following screenshot from DEIR Appendix B.

ORG 6-23



5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	5,000	—
Site Preparation	0.00	0.00	62.0	0.00	—
Grading/Excavation	0.00	133,700	2,826	0.00	—
Foundations/Concrete Pour	0.00	0.00	780	0.00	—

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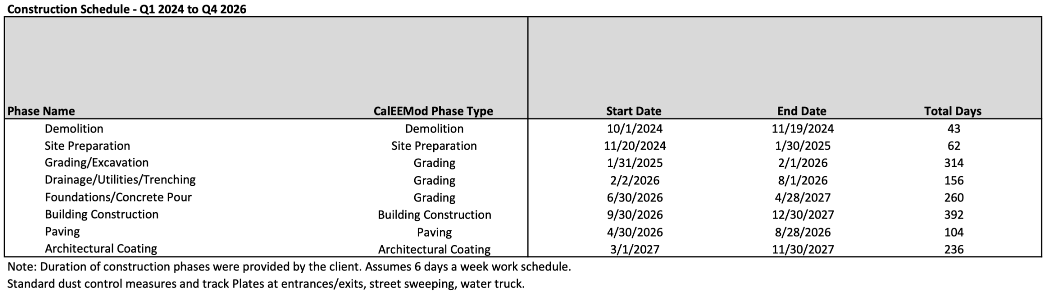
This is because the assumed days of grading activity, hours of grading activity and grading equipment mix clearly underestimate the time, and/or equipment, required for the sheer volume of earth movement required for the Project. The grading phasing length and equipment mix assumptions in the model are shown in the following screenshots from DEIR Appendix B.



Construction Schedule - Q1 2024 to Q4 2026

Phase Name	CalEEMod Phase Type	Start Date	End Date	Total Days
Demolition	Demolition	10/1/2024	11/19/2024	43
Site Preparation	Site Preparation	11/20/2024	1/30/2025	62
Grading/Excavation	Grading	1/31/2025	2/1/2026	314
Drainage/Utilities/Trenching	Grading	2/2/2026	8/1/2026	156
Foundations/Concrete Pour	Grading	6/30/2026	4/28/2027	260
Building Construction	Building Construction	9/30/2026	12/30/2027	392
Paving	Paving	4/30/2026	8/28/2026	104
Architectural Coating	Architectural Coating	3/1/2027	11/30/2027	236

Note: Duration of construction phases were provided by the client. Assumes 6 days a week work schedule.
Standard dust control measures and track Plates at entrances/exits, street sweeping, water truck.

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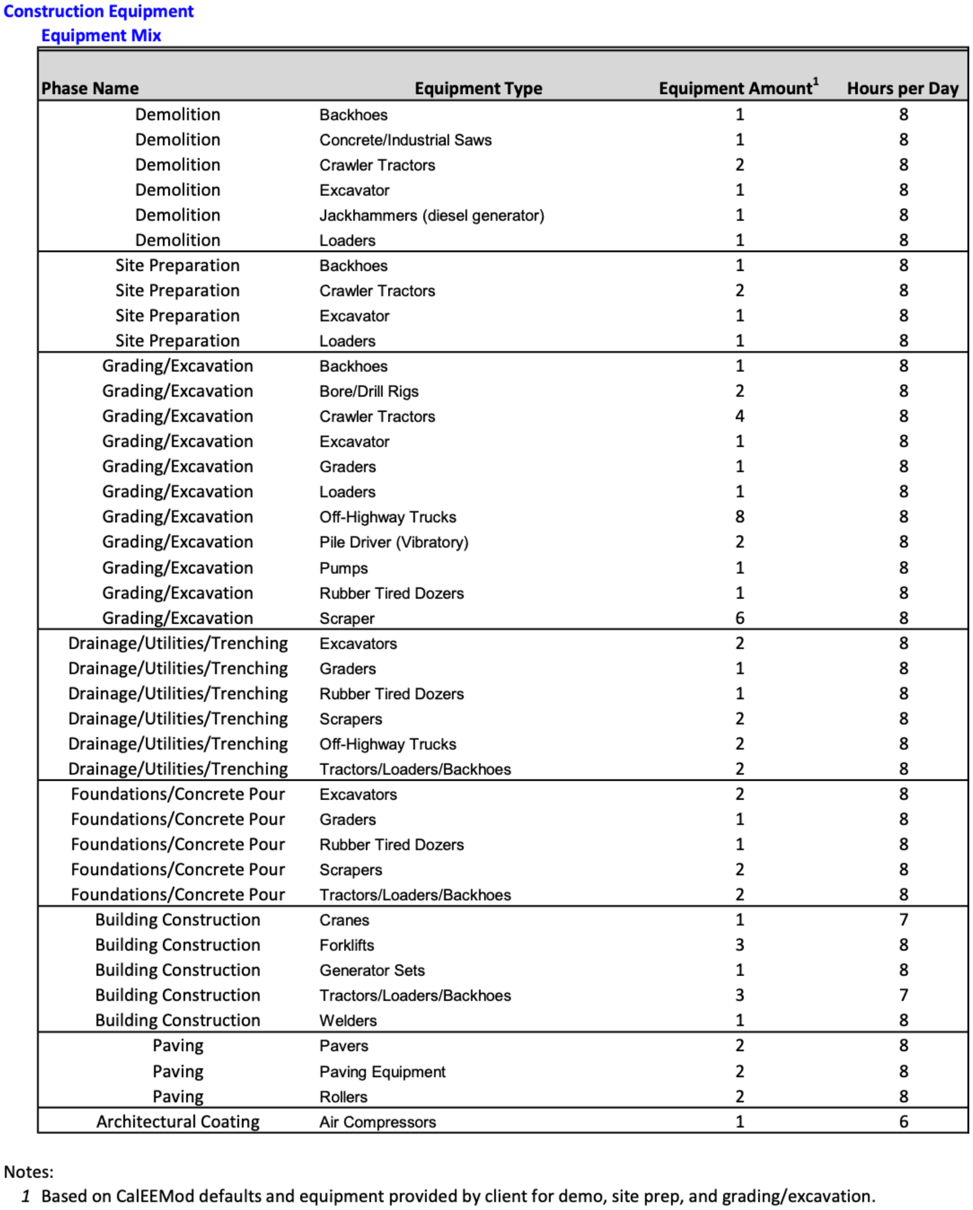

Construction Equipment

Equipment Mix

Phase Name	Equipment Type	Equipment Amount[1]	Hours per Day
Demolition	Backhoes	1	8
Demolition	Concrete/Industrial Saws	1	8
Demolition	Crawler Tractors	2	8
Demolition	Excavator	1	8
Demolition	Jackhammers (diesel generator)	1	8
Demolition	Loaders	1	8
Site Preparation	Backhoes	1	8
Site Preparation	Crawler Tractors	2	8
Site Preparation	Excavator	1	8
Site Preparation	Loaders	1	8
Grading/Excavation	Backhoes	1	8
Grading/Excavation	Bore/Drill Rigs	2	8
Grading/Excavation	Crawler Tractors	4	8
Grading/Excavation	Excavator	1	8
Grading/Excavation	Graders	1	8
Grading/Excavation	Loaders	1	8
Grading/Excavation	Off-Highway Trucks	8	8
Grading/Excavation	Pile Driver (Vibratory)	2	8
Grading/Excavation	Pumps	1	8
Grading/Excavation	Rubber Tired Dozers	1	8
Grading/Excavation	Scraper	6	8
Drainage/Utilities/Trenching	Excavators	2	8
Drainage/Utilities/Trenching	Graders	1	8
Drainage/Utilities/Trenching	Rubber Tired Dozers	1	8
Drainage/Utilities/Trenching	Scrapers	2	8
Drainage/Utilities/Trenching	Off-Highway Trucks	2	8
Drainage/Utilities/Trenching	Tractors/Loaders/Backhoes	2	8
Foundations/Concrete Pour	Excavators	2	8
Foundations/Concrete Pour	Graders	1	8
Foundations/Concrete Pour	Rubber Tired Dozers	1	8
Foundations/Concrete Pour	Scrapers	2	8
Foundations/Concrete Pour	Tractors/Loaders/Backhoes	2	8
Building Construction	Cranes	1	7
Building Construction	Forklifts	3	8
Building Construction	Generator Sets	1	8
Building Construction	Tractors/Loaders/Backhoes	3	7
Building Construction	Welders	1	8
Paving	Pavers	2	8
Paving	Paving Equipment	2	8
Paving	Rollers	2	8
Architectural Coating	Air Compressors	1	6

Notes:
1 Based on CalEEMod defaults and equipment provided by client for demo, site prep, and grading/excavation.

PDF NOI-1 allows for construction activities to occur between 7 a.m. and 7 p.m. Mondays through Saturdays, which is 12 hours per day, not 8. Simply increasing the hours of activity per day to 12 from 8 would result in a 50 percent increase in the model's calculated area graded, from 2,826 to 4,239. This adjustment needs to be made to the model inputs.

ORG 6-24

By way of illustration of the inaccuracy of the inputs to the air quality model, and the fact that correcting the user input to reflect a 12-hour construction day will not fully correct the errors in model inputs, the movement of 3,729,500 cubic yards of soil (cut + fill), represents the movement of 11,877 cubic yards per each of the 314 grading days in the schedule. The 11,877 cubic yards per day represents between 848 and 1,187 dump truck loads per day of soil moved per day.[16] Given that the equipment mix shows 8 off-highway trucks per day operating for 8 hours per day, that means that each of the trucks would have to handle between 13 and 18 loads per hour, or be able to be filled, travel to the unloading site, unload, and return to the loading area, all in 3.3 to 4.6 minutes, doing so continuously over the 8-hour day assumed in the model run. This is clearly infeasible. Even adjusting the hours per day from 8 to 12, yields an infeasible construction scenario, whereby each of the trucks would have to handle between 9 and 12 loads per hour. This means each truck would need to be filled, travel to the unloading site, unload, and return to the loading area, all in 5 to 7 minutes, and do so continuously over the 12-hour construction day for each of 314 grading days.

Clearly the inputs to the air quality model are inaccurate, resulting in an underestimate of air quality impacts and a likely failure to identify significant air quality impacts. The air quality model must be redone and the DEIR recirculated with accurate and credible modeling results.

As part of correcting the construction equipment mix and timing and acres of grading used in the air quality analysis, consideration should be given to information contained in the Geotechnical Report for the Project, such as the following information from page 6 of the July 26, 2021 report in DEIR Appendix 6 which will further increase the grading figures used in the analysis and thus likely emissions:

> During grading, the contractor should anticipate wet removals that may need to be removed by top-loading dump trucks with an excavator rather than with scrapers. The need to dry out and/or mix the wet material removed with drying materials prior to fill placement should also be anticipated. Stabilization of wet/saturated removal areas may be necessary for equipment access and prior to placement of compacted fill. Localized, temporary construction dewatering may also be necessary to accomplish remedial grading.

ORG 6-25

In addition, it should be noted that there are inconsistencies in the equipment mix by phase assumed between the air quality and noise analyses.[17] Once the equipment mix has been corrected to more accurately reflect the equipment required for Project construction, the noise analysis will also need to be rerun to account for the corrected equipment mix and phase timing.

ORG 6-26

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[16] A dump truck can usually carry about 10 to 14 cubic yards of dirt. See: https://www.lynchtruckcenter.com/manufacturer-information-how-much-can-a-dump-truck-carry.html#:~:text="Cubic%20yards"%20are%20also%20used,14%20cubic%20yards%20of%20dirt.

[17] See Table 8, DEIR Appendix K – Noise and Vibration Study

As part of revising and correcting the air quality analysis, the following additional mitigation measures must be required to ensure that Project emissions do not exceed projected levels.

> **New Mitigation Measures** – The construction equipment present on the Project site on any day shall be limited to a maximum of the equipment mix contained in the Air Quality Analysis for the Project.

ORG 6-27

Localized Pollutant Concentrations

The assessment of the Project's localized pollutant concentrations using the South Coast Air Quality District's ("SCAQMD") Localized Significance Threshold ("LST") Methodology is inappropriate, given that the Project is larger than five acres. The analysis should have been done using the AERMOD dispersion model.[18] As noted by the SCAQMD:[19]

> LSTs would **only apply to projects that** must undergo an environmental analysis pursuant to CEQA or the National Environmental Policy Act (NEPA) and **are five acres or less**. **It is recommended that proposed projects larger than five acres in area undergo air dispersion modeling to determine localized air quality.**

It should be noted that the appropriateness of the LST analysis is based on the size of a project site, not the number of acres disturbed per day, as assumed in the DEIR. As noted on DEIR page 4.3-35, the DEIR inappropriately justifies use of the LST methodology, stating:

> Although the proposed Project would disturb more than 5 acres per day, this disturbance would occur across the 75-acre site and would not be localized to a single area near sensitive receptors. Furthermore, as discussed above, a smaller LST acreage threshold would be conservative as the threshold values are lower. Thus, although the Project may disturb up to 9 acres per day, the Project's localized emissions are analyzed against the 5- acre LST thresholds.

ORG 6-28

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[18] The SCAQMDs Modeling Guidance for AEROMOD is available at: http://www.aqmd.gov/home/air-quality/meteorological-data/modeling-guidance

[19] http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/localized-significance-thresholds
See also: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2

This is completely contrary to the guidance provided by the SCAQMD. As noted by the SCAQMD, projects larger than five acres in areas should undergo air dispersion modeling to determine localized air quality.

Because analysis has used the wrong methodology and inappropriately applied a methodology intended for Projects that are less than five acres in size, the analysis of localized pollution concentrations and the conclusion of less than significant impacts is not supported by substantial evidence. Furthermore, given that the LST analysis is based on the inaccurate emissions estimates obtained from the CalEEMod model run, even if the LST methodology were the correct methodology, the results obtained would underestimate impacts to nearby sensitive receptors, including the adjacent residential neighborhoods. The analysis of localized pollutant concentrations resulting from the Project must be redone using the appropriate dispersion model, and the DEIR recirculated for public review and comment. Once this is done, given the massive quantity of grading associated with the proposed Project, localized pollutant concentrations, including PM10 and PM2.5 are likely to be significant.

Consistency With the Air Quality Plan

The proposed Project is not consistent with the growth projections used in the Air Quality Plan. Those growth projections do not fully account for recent State housing legislation which has essentially re-zoned all single family lots to multifamily lots throughout the State and the County, as well as other State legislation which allows for increased residential density. The Project requires a change in zoning from open space to allow for residential use at a much higher density than that allowed under the existing zoning, something not accounted for in the growth projections. Once the air quality model is corrected and rerun it is likely that construction emissions will exceed the SCAQMD thresholds of significance for at least PM10 and PM2.5. DEIR page 4.3-36 already indicates that "construction-related daily NOX emissions would exceed the SCAQMD regional significance thresholds for the grading/excavation phase in 2025. Therefore, with respect to regional emissions from unmitigated construction activities, NOX impacts would be significant. Mitigation measures would be required." (This needs to be reflected in DEIR Table ES-2). The proposed Project is therefore inconsistent with the Air Quality Plan. This would be a significant impact not acknowledged in the DEIR. The DEIR must therefore be corrected and recirculated for public review. ORG 6-29

Toxic Air Contaminants ("TAC")

The DEIR needs to include a quantitative analysis of the Project's toxic air contaminant emissions. The DEIR's statement on page 4.3-36, that "the Project would have limited sources of TAC associated with construction" is not supported by substantial evidence. Given that the Project will result in export of 133,700 cubic yards of soil, it will result in at least 80-100 one-way truck trips per day during grading to and from the Olinda Landfill site. The qualitative analysis in the DEIR which attempts to justify a ORG 6-30 finding of less than significant impacts is not supported by substantial evidence and is insufficient.

Valley Fever

ORG 6-31

As noted on DEIR page 4.3-53: "Construction activities for the proposed Project could result in the exposure of sensitive receptors to *Coccidioides immitis* growing in the soil and dirt of the Project Site." However, the DEIR concludes that Valley Fever impacts would be less than significant, stating that:

> The proposed Project would have the potential to expose persons to the spores that cause Valley Fever from fugitive dust generated during construction. The proposed Project would implement Mitigation Measure AQ-2 to reduce the risk of Valley Fever exposure. Specifically, the Project would follow the requirements and guidelines listed in the 2019 County of Los Angeles Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers, to help reduce the risk of Valley Fever to workers and the surrounding community.[131] In addition, compliance with independently enforceable rules and other measures that reduce emissions of fugitive dust, such as SCAQMD fugitive dust control rules (e.g., Rule 403), would reduce the potential for Coccidioides emits spores in soil to become airborne. Applicable California Division of Occupational Safety and Health (Cal/OSHA) requirements would provide additional protection of construction workers, as well as the nearby community. Such compliance would require the control and mitigation of all sources of construction-related fugitive dust, and thereby potential sources of airborne *Coccidioides immitis* spores, to at or below applicable regulatory limits for on-site and off-site receptors. These regulatory requirements, together with Mitigation Measure AQ-2, would reduce impacts to a less-than-significant level with mitigation.
>
> 131. County of Los Angeles, *Coccidioidomycois (Valley Fever) Management Plan: Guidelines for Employers*, August 2019, accessed March 2023, http://www.ph.lacounty.gov/acd/docs/valleyfeverplan2019.pdf.

However, the DEIR fails to list the applicable Cal/OSHA requirements, or to demonstrate that given the sheer volume of grading and soil movement that the cited measures are sufficient to protect adjacent neighborhoods from Valley Fever exposure, particularly given that a corrected air quality analysis and dispersion modeling is likely to show exposure of adjacent neighborhoods to increased PM10 and PM2.5 concentrations due to Project construction. The conclusion that Valley Fever impacts will be less than significant with mitigation is not supported by substantial evidence. The analysis must be redone to account for a corrected air quality and dispersion analysis and the DEIR recirculated for public review and comment.

While mitigation measures AQ-2 may address potential Valley Fever impacts to Project construction workers, it is not protective of nearby residents. As noted by the CDC, the "symptoms of Valley fever usually last for a few weeks to a few months." "However, some patients have symptoms that last longer than this, especially if the infection becomes severe." "Approximately 5 to 10% of people who get Valley fever will develop serious or long-term problems in their lungs." "In an even smaller percent of people (about 1%), the infection spreads from the lungs to other parts of the body, such as the central nervous system (brain and spinal cord), skin, or bones and joints."[20] Given the potential for local residents to be exposed to Valley Fever, we hereby request the following additional mitigation measure to provide compensation to any residents diagnosed with Valley Fever during Project construction:

> **New Mitigation** – Any resident living within five miles of the Project site that is diagnosed by a doctor with a documented case of Valley Fever between the start of Project construction (site preparation) and up to the issuance of the last Project occupancy permit, shall be eligible for a one-time payment equal to the area median household income[21] ($85,842) from the Project Applicant. This payment does not preclude the resident from seeking additional compensation should they suffer a long-term case of Valley Fever. The project sponsor shall post bond in the amount of $1,000,000 (one million dollars) to cover such potential costs prior to the issuance of the first grading or demolition permit for the Project. Any application for compensation shall be made to the Project Applicant and Planning Director. Notice providing information on how to file a claim shall be posted on the Project site and mailed to residents within 1,000 feet of the Project boundaries. In the event that payment is not received within 60 days of application and submittal of case documentation, the Director of Planning shall issue a stop work order for the Project.

ORG 6-32

Biological Resources

As detailed in the comment letter from biological resources consultant Scott Cashen, M.S., included as **Attachment C** to this letter, the impact conclusions in the DEIR are not supported by substantial evidence, the biological resource mitigation measures are inadequate to reduce identified significant impacts to levels considered less than significant, and the DEIR fails to identify a number of additional significant

ORG 6-33

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[20] https://www.cdc.gov/fungal/diseases/coccidioidomycosis/symptoms.html#:~:text=The%20symptoms%20of%20Valley%20fever,weeks%20to%20a%20few%20months.&text=However%2C%20some%20patients%20have%20symptoms,if%20the%20infection%20becomes%20severe.&text=Approximately%205%20to%2010%25%20of,term%20problems%20in%20their%20lungs

[21] https://www.california-demographics.com/rowland-heights-demographics#:~:text=Median%20Income,Heights%20families%20live%20in%20poverty.

biological resource impacts. The DEIR must therefore be corrected and recirculated for public review and comment. We hereby request full responses to the biological resource comment letter from Mr. Cashen included as **Attachment C**.[22]

Geotechnical

As noted on DEIR page 4.7-22:

> Mitigation Measure GEO-1 would require landslide removal within the property boundary of Planning Area 5, buttressing and shoring with tiebacks and shear pin to stabilize potential slope stability issues in the southeastern most portion of the site to enable suitable conditions for the proposed development of the site (LGC 2023c, 2023d). **The development of a final geotechnical engineering report after the approval of 40-scale grading plans** and the adherence to all recommendations in final geotechnical report. Additionally, Mitigation Measure GEO-1 includes the preliminary recommendations provided in the Geotechnical Reports, implementation of these required recommendations would ensure that all groundwater and soil removal activities would be conducted in accordance with all regulatory conditions, **would require additional subsurface evaluations in areas where seismic-induced landslides would occur, and would require that slopes on the Project Site would be thoroughly analyzed** and stabilized to ensure that development would not induce landslides. (Emphasis added).

Mitigation Measure GEO-1 thus relies on improperly deferred analysis in the assessment of potential impacts and the development of appropriate mitigation measures. Important information necessary to an understanding of Project impacts has yet to be developed, including 40-scale grading plans and necessary subsurface evaluations in areas where seismic-included landslides have or could occur. There is thus insufficient information on which to conclude that impacts would be less than significant. Furthermore, the lack of information regarding the specifics of landslide stabilization provides insufficient evidence to conclude that adjacent residences in the Project area would not be impacted in some way by Project construction. More information regarding this issue needs to be added to the DEIR and the EIR recirculated for public review and comment.

ORG 6-34

Hydrology and Water Quality

This section of the DEIR needs to include a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways,

ORG 6-35

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[22] We submit reference documents cited in **Attachment C** by separate correspondence.

stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project area, and the location and design of bioretention, rainfall storage and/or biofiltration facilities, and the proposed storm drain and detention facilities designed for each planning area to meet a 25-year storm event in order for commenters to be able to independently assess the potential for impacts. The DEIR alleges that the as yet undeveloped SWPPP for the Project would prevent construction site runoff from affecting off-site drainage patterns, but provides no evidence to support this.

The DEIR fails to address what happens to stormwaters currently channeled through facilities and swales on the Project site during construction. According to pages 19-20 of the March 2023 Hydrology Report in DEIR Appendix J:

- Lot 1 currently accepts flows from culverts PD 1266 and PD 2377 in Colima Road. These public drains currently discharge to Lot 1, and the flows are conveyed through the lot.
- Lot 3 currently accepts flows from PD 1440 in Tarta Court. The existing storm drain in Tarta Court also accepts flows from a small portion of Lot 1 drainage.
- Lot 5 currently accepts flows from three LACFCD storm drains, labeled Lines "A", "E", and "H" of PD 0812.

DEIR page 4.10-18 states that the "demolition and construction activities would be temporary in nature and the drainage patterns would be restored to capture all runoff onsite and convey any surface flows to the existing LACFCD storm drain systems." However, the DEIR fails to address the question of whether stormwater drainage in the area will be impacted during project construction.

Although the body of the DEIR provides pre- and post-construction drainage plans, it is difficult for the reader to match the two pre-figures (DEIR Figure 4.10-1) with the post-construction drainage plan (DEIR Figure 4.10-2) in order to determine if pre-construction drainage facilities serving the project site and the adjacent area will be impacted during construction. The DEIR needs to provide comparable Figures which do not require the reader to use photoshop and to rotate and splice figures in order to be able to understand pre-and post-construction drainage. **Figure 2** below, provides a spliced version of DEIR Figure 4.10-1 in the same orientation as DEIR Figure 4.10-2. **Figure 3** replicates DEIR Figure 4.10-2, and **Figure 4** provides an overlay of **Figure 2** on **Figure 3**. ORG 6-36

FIGURE 2 – Existing Drainage On The Project Site
Source: DEIR Figures 4.10-1

FIGURE 3 – Proposed Drainage On The Project Site
Source: DEIR Figures 4.10-2

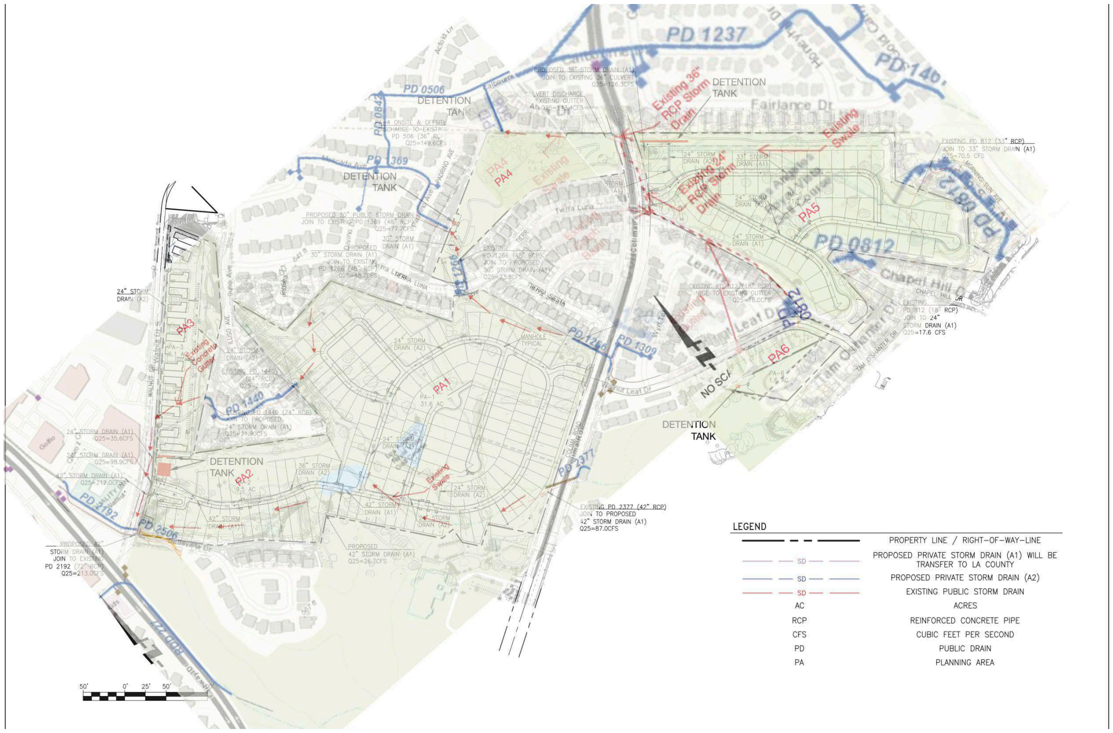

FIGURE 4 – Overlay Of Existing And Proposed Drainage On The Project Site
Source: DEIR Figures 4.10-1

Based on a comparison of these figures, it appears that although Project stormwater facilities have been designed to connect to existing stormwater facilities along the Project boundaries, that Project construction will significantly disrupt stormwater flows on the Project site during construction. For example, the existing swale in areas Planning Area ("PA") PA1 and PA2 will be removed along with the concrete gutter in area PA3, and the existing swale and 24-inch RCP storm drain in area PA5 may also be removed during construction grading. Additionally, facilities such as PD1440, PD1266 and PD2506 may also be impacted. Construction is anticipated to take three years. How will stormwater flows be handled during the near one-year grading period and the three-year construction period? The DEIR fails to provide information on what will happen to the existing stormwater management facilities on the Project site and how stormflows from the Project site and adjacent areas using on-site facilities or crossing the Project site will be handled during construction, no doubt because 40-scale grading plans were not available at the time that the DEIR's technical studies were prepared. In the absence of significant evidence to the contrary, the proposed Project will result in a significant impact to stormwater drainage in the area during construction. The DEIR must be corrected and recirculated to address this impact.

Land Use and Planning

ORG 6-37

Project applicant has acknowledged that there "is a restrictive covenant on the subject property limiting use as golf course until 2036." The restrictive covenant thus does not expire for an additional 12 years. The proposed Project would thus violate a restrictive covenant as detailed in a comment letter from the Pierce Law Firm, included in DEIR Appendix A.[23] This is a significant land use impact that cannot be cured through mitigation and must be identified in the DEIR as a significant unmitigated impact. The DEIR must then be recirculated for public review and comment.[24]

Noise and Vibration

ORG 6-38

According to the DEIR and the Noise and Vibration analysis contained in DEIR Appendix K, the proposed Project would result in the following significant noise impacts:

- Significant construction noise impacts at Sensitive Receptor sites R1, R2, R3, R4, R5 and R6. Even with mitigation, impacts to sensitive receptor locations R2 through R5 would remain significant.

- Noise levels from the crane used during traffic signal installation would result in noise levels exceeding the County's 75 dBA noise standard for mobile source construction equipment noise at single-family residences and impacts would be potentially significant before mitigation. Even with all feasible mitigation, traffic signal construction activity would result in increases of ambient noise levels greater than 10 dBA at sensitive receptor location R2, which is the closest sensitive receptor to the off-site construction work. As such, environmental impacts related to the temporary or periodic increase in ambient noise levels during installation of the traffic signal widening would be significant and unavoidable with mitigation.

The Noise and Vibration Analysis DEIR Appendix K, and summarized in the DEIR, needs to be redone based on accurate information regarding Project construction equipment. As detailed under Air Quality above, the equipment mix is inaccurate which results in an underestimate of construction noise impacts, particularly during grading operations.

ORG 6-39

In addition, the Noise Analysis was done without benefit of a grading plan or detailed information regarding the location of soil stockpiles during construction and the height and footprint of those stockpiles. Given the potential height of stockpiles, noise barriers may be ineffective during the construction phases. Construction noise impacts

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[23] See DEIR Appendix A, beginning on PDF page 88 and page 150.

[24] This issue was raised during the NOP process, which the DEIR acknowledges, but the DEIR fails to address the issue.

are therefore underestimated. The DEIR must address noise impacts during the grading phase resulting from the location and height of stockpiles.

The DEIR fails to accurately describe the magnitude of the Project's noise impacts. In addition, the DEIR fails to include all feasible mitigation measures, as required by CEQA, particularly when a Project results in unavoidable impacts, as this Project does.

ORG 6-40

Confusing and Inaccurate Thresholds of Significance Discussion

The DEIR appears to apply the noise standards from Chapter 12.08, Noise Control of the Los Angeles County Code (LACC) to Table 3 from the County's General Plan Noise Element. This is not what Chapter 12.08 says.[25] Part 4 – Specific Noise Restrictions, which govern construction noise includes the following provisions, which should be cited in the DEIR. Section 12.08.390 – Exterior noise standards – Citations for violations authorized , reads as follows:

> **Section 12.08.390 – Exterior noise standards – Citations for violations authorized**
>
> A. Unless otherwise herein provided, the following exterior noise levels shall apply to all receptor properties within a designated noise zone:

Noise Zone	Designated Noise Zone Land Use (Receptor property)	Time Interval	Exterior Noise Level (dB)
I	Noise-sensitive area	Anytime	45
II	Residential properties	10:00 pm to 7:00 am (nighttime)	45
		7:00 am to 10:00 pm (daytime)	50
III	Commercial properties	10:00 pm to 7:00 am (nighttime)	55

ORG 6-41

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[25] See: https://library.municode.com/ca/los_angeles_county/codes/code_of_ordinances/354460?nodeId=TIT12ENPR_CH12.08NOCO

Noise Zone	Designated Noise Zone Land Use (Receptor property)	Time Interval	Exterior Noise Level (dB)
		7:00 am to 10:00 pm (daytime)	60
IV	Industrial properties	Anytime	70

B. Unless otherwise herein provided, no person shall operate or cause to be operated, any source of sound at any location within the unincorporated county, or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, when measured on any other property either incorporated or unincorporated, to exceed any of the following exterior noise standards:

Standard No. 1 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 30 minutes in any hour. Standard No. 1 shall be the applicable noise level from subsection A of this section; or, if the ambient L50 exceeds the foregoing level, then the ambient L50 becomes the exterior noise level for Standard No. 1.

Standard No. 2 shall be the exterior noise level which may not be exceeded for a cumulative period of more than 15 minutes in any hour. Standard No. 2 shall be the applicable noise level from subsection A of this section plus 5dB; or, if the ambient L25 exceeds the foregoing level, then the ambient L25 becomes the exterior noise level for Standard No. 2.

Standard No. 3 shall be the exterior noise level which may not be exceeded for a cumulative period of more than five minutes in any hour. Standard No. 3 shall be the applicable noise level from subsection A of this section plus 20dB; or, if the ambient L8.3 exceeds the foregoing level, then the ambient L8.3 becomes exterior noise level for Standard No. 3.

Standard No. 4 shall be the exterior noise level which may not be exceeded for a cumulative period of more than one minute in any hour. Standard No. 4 shall be the applicable noise level from subsection A of this section plus 15dB; or, if the ambient L1.7

exceeds the foregoing level, then the ambient L1.7 becomes the exterior noise level for Standard No. 4.

Standard No. 5 shall be the exterior noise level which may not be exceeded for any period of time. Standard No. 5 shall be the applicable noise level from subsection A of this section plus 20dB; or, if the ambient L0 exceeds the foregoing level then the ambient L0 becomes the exterior noise level for Standard No. 5.

C. If the measurement location is on a boundary property between two different zones, the exterior noise level utilized in subsection B of this section to determine the exterior standard shall be the arithmetic mean of the exterior noise levels in subsection A of the subject zones. Except as provided for above in this subsection C, when an intruding noise source originates on an industrial property and is impacting another noise zone, the applicable exterior noise level as designated in subsection A shall be the daytime exterior noise level for the subject receptor property.

D. The ambient noise histogram shall be measured at the same location along the property line utilized in subsection B of this section, with the alleged intruding noise source inoperative. If for any reason the alleged intruding noise source cannot be turned off, the ambient noise histogram will be estimated by performing a measurement in the same general area of the alleged intruding noise source but at a sufficient distance such that the noise from the alleged intruding noise source is at least 10dB below the ambient noise histogram in order that only the actual ambient noise histogram be measured. If the difference between the ambient noise histogram and the alleged intruding noise source is 5 to 10dB, then the level of the ambient noise histogram itself can be reasonably determined by subtracting a one-decibel correction to account for the contribution of the alleged intruding noise source.

E. In the event the intrusive exceeds the exterior noise standards as set forth in subsections B and C of this section at a specific receptor property and the health officer has reason to believe that this violation at said specific receptor property was unanticipated and due to abnormal atmospheric conditions, the health officer shall issue an abatement notice in lieu of a citation. If the specific violation is abated, no citation shall be issued therefor. If, however, the specific violation is not abated, the health officer may issue a citation.

(Ord. 11778 § 2 (Art. 4 § 403), 1978: Ord. 11773 § 2 (Art. 4 § 403), 1978.)

Section 12.08.444 – Construction noise, reads as follows:

12.08.440 - Construction noise.

A. Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of 7:00 p.m. and 7:00 a.m., or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real-property line, except for emergency work of public service utilities or by variance issued by the health officer is prohibited.

B. Noise Restrictions at Affected Structures. The contractor shall conduct construction activities in such a manner that the maximum noise levels at the affected buildings will not exceed those listed in the following schedule:

1. At Residential Structures.

a. Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:

	Single-family Residential	Multi-family Residential	Semiresidential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	75dBA	80dBA	85dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	60dBA	64dBA	70dBA

b. Stationary Equipment. Maximum noise level for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment:

	Single-family Residential	Multi-family Residential	Semiresidential/ Commercial
Daily, except Sundays and legal holidays, 7:00 a.m. to 8:00 p.m.	60dBA	65dBA	70dBA
Daily, 8:00 p.m. to 7:00 a.m. and all day Sunday and legal holidays	50dBA	55dBA	60dBA

2. At Business Structures.

a. Mobile equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation of mobile equipment:

Daily, including Sunday and legal holidays, all hours: maximum of 85dBA.

C. All mobile or stationary internal-combustion-engine powered equipment or machinery shall be equipped with suitable exhaust and air-intake silencers in proper working order.

D. In case of a conflict between this chapter and any other ordinance regulating construction activities, provisions of any specific ordinance regulating construction activities shall control.

(Ord. 11778 § 2 (Art. 5 § 501(c)), 1978: Ord. 11778 § 2 (Art. 5 § 501(c)), 1978.)

Since Project construction does not fall into the category of “Mobile Equipment - nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment, Project construction should be subject to the thresholds for Stationary Equipment - for repetitively scheduled and relatively long-term operation (periods of 10 days or more) of stationary equipment, since Project construction equipment will be scheduled and will be operating for an extended period of time. This is supported by the Code's definition of a mobile source as opposed to a fixed source:

> **12.08.150 - Fixed noise source.**
> "Fixed noise source" means a stationary device which creates sounds while fixed or motionless, including but not limited to residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.
>
> **12.08.220 - Mobile noise source.**
> "Mobile noise source" means any noise source other than a fixed noise source.
>
> (Ord. 11778 § 2 (Art. 3 § 302(r)), 1978: Ord. 11773 § 2 (Art. 3 § 302(r)), 1978.)

The thresholds of significance should be amended accordingly so that a construction noise impact is defined as occurring when:

- On-site construction activity would result in 10 dBA or greater increase in ambient noise, which is perceived by the healthy human ear as a doubling of noise, consistent with the Federal Highway Administration (FHWA) Highway Construction Noise Handbook (FHWA, August 2006) definition of a substantial temporary increase in ambient noise levels due to on-site construction activity; or,

- When construction activity lasting 10 days or more in duration would result in construction-induced ambient noise levels of 60 dBA at single-family residences; or

- When temporary construction activity lasting less than 10 days would result in construction-induced ambient noise levels of 75 dBA at single-family residences.

- The impact thresholds must also address the thresholds articulated in Section 12.08.390 – Exterior noise standards – Citations for violations authorized which address the length of noise in excess of the standards

Based on these thresholds, noise impacts would be more significant than categorized in the DEIR and a greater number of residences would be impacted. The DEIR must be corrected and recirculated for public review and comment.

Inadequate Noise Measurement Locations (Off-Site Sensitive Receptors)

The DEIR fails to provide sufficient existing noise measurements and with-Project noise projections for areas containing sensitive uses. **Figure 5** shows the location of the noise measurements taken for the Noise Analysis contained in DEIR Appendix K and summarized in the DEIR (see the receptor sites "R" shown in yellow). These are also the location of the noise projections for on-site generated construction noise in the analysis. Additional locations where noise reading should have been taken are noted in red in **Figure 5**. These additional locations are required in order to get a full picture of the likely impact of Project construction on adjacent sensitive noise receptors.

ORG 6-42

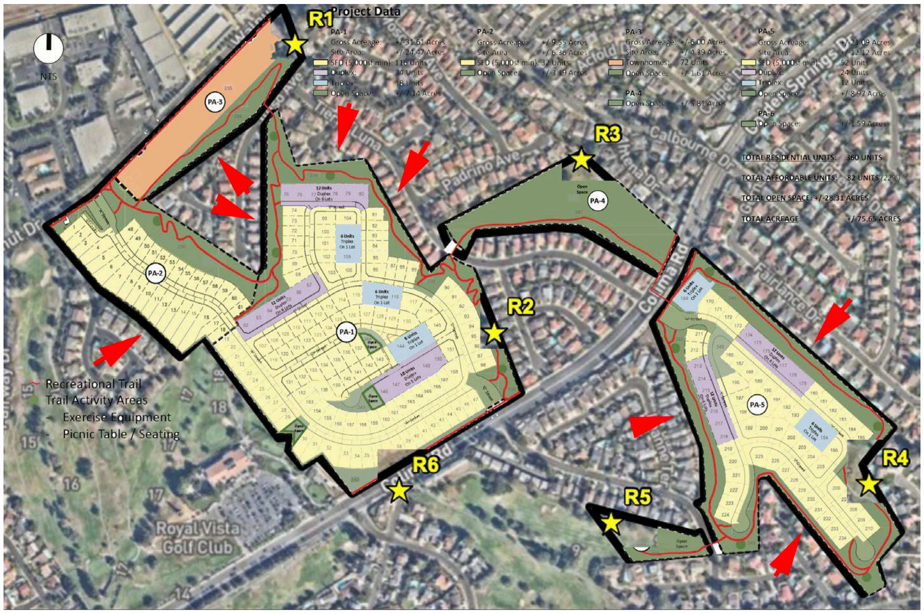

FIGURE 5 – Location of Noise Reading Taken For The Noise Analysis (yellow) and Locations Where Additional Noise Readings Should Have Been Taken (red)
Source: Figures 3 and 4 DEIR Appendix K

The location, date and timing of the noise readings has resulted in an underestimate of Project noise impacts. Noise readings were taken on Thursday morning, March 18, 2021 for 15 minutes per receptor, starting at 8:18 a.m. at R1 and ending at 10:31 a.m. at R6.[26] The Noise Analysis fails to provide justification for the choice of date, day or times. This information needs to be included in the DEIR. The noise readings were taken nearly a year-and-a-half prior to issuance of the NOP for the Project, and only three months after Los Angeles County lifted the Covid stay-at-home order on January 21, 2021.[27] The noise readings are therefore likely to understate existing noise

ORG 6-43

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[26] DEIR Appendix K, pdf pages 73-78.

[27] Http://publichealth.lacounty.gov/phcommon/public/media/mediapubhpdetail.cfm?prid=2931

conditions at the time of the NOP and must be redone. This is important because noise sources are additive on a logarithmic scale.

The DEIR needs to include a map showing the location of all noise-sensitive uses within a 500-foot radius of the Project boundary, with the 500-foot distance clearly delineated. This is important to an understanding of the number of sensitive receptors potentially impacted by Project noise.

ORG 6-44

Inadequate Analysis of Project Grading Impacts

As previously noted, a grading plan for the Project was not available at the time the Noise Analysis was conducted for the Project. However, given the information in the Geotechnical Reports for the Project, it is clear that significant over-excavation and re-compaction and replacement of soils in close proximity to existing residences will occur, as shown in **Figure 6**. The DEIR needs to include a more robust analysis of noise impacts during the grading phase of construction.

ORG 6-45

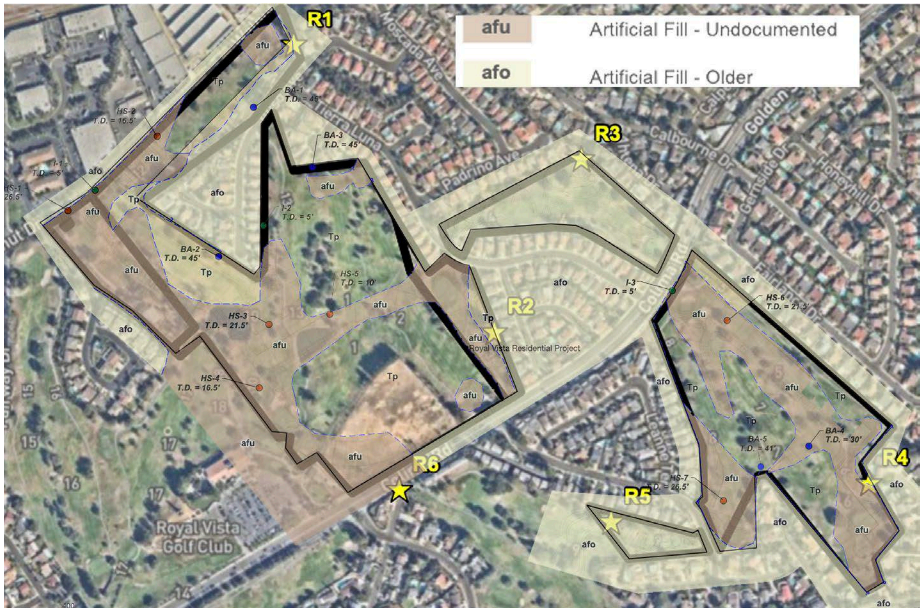

FIGURE 6 – Location of Existing On-Site Fill In Proximity to Existing Residences
Source: DEIR Figures 4.13-2 and 4.7-2

Inadequate Discussion of Health Impacts of Excessive Noise

Just as the California Supreme Court required for air emissions in *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, the DEIR must address the connection between Project noise emissions and likely health and human behavior impacts. According to the Noise Analysis (DEIR Appendix K, Table 9, and the matching Table 4.13-13 in the DEIR), unmitigated maximum overlapping noise levels at the six sensitive receptor

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locations in the study would range from 88.2 to 89.5 hourly Leq (dBA). The DEIR therefore needs to include a discussion of the potential impacts of different levels of noise on human behavior, activity and health and appropriate thresholds of significance. For example, according to the American Speech-Language-Hearing Association:[28]

> You can listen to sounds at 70 dBA or lower for as long as you want. Sounds at 85 dBA can lead to hearing loss if you listen to them for more than 8 hours at a time.
>
> Sounds over 85 dBA can damage your hearing faster. The safe listening time is cut in half for every 3-dB rise in noise levels over 85 dBA. For example, you can listen to sounds at 85 dBA for up to 8 hours. If the sound goes up to 88 dBA, it is safe to listen to those same sounds for 4 hours. And if the sound goes up to 91 dBA, your safe listening time is down to 2 hours.

Therefore, not only would construction noise levels exceed the thresholds of significance, as noted on page 26 of DEIR Appendix K, but unmitigated construction noise levels would exceed 85 dBA, the level at which hearing damage can occur, depending on the duration of daily noise and the duration of noise over the period of construction. Given that the dBA levels in DEIR Table 4.13-13 (Table 9 of Appendix K) are hourly Leq (dBA), they represent the average over a one-hour period, meaning that higher intermittent noise levels are likely during the one-hour period. Moreover, Project construction is scheduled to take place 12 hours per day, six days a week, for approximately three years. The DEIR needs to identify the potential for sensitive receptors adjacent to the Project site to experience hearing loss or noise-induced annoyance as a significant Project impact, mitigation measures need to be provided, and the DEIR needs to be recirculated for public review and comment.

Post-Mitigation Values In DEIR Table 4.12-14 (Appendix K Table 16) Overstate Mitigation Value and Understate Impacts

ORG 6-47

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[28] https://www.asha.org/public/hearing/noise-and-hearing-loss-prevention/#:~:text=You%20can%20listen%20to%20sounds,and%2075%20dBA%20for%20children.

See also: https://nepis.epa.gov/Exe/ZyNET.exe/2000L3LN.TXT?ZyActionD=ZyDocument&Client=EPA&Index=Prior+to+1976&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRestrict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5Czyfiles%5CIndex%20Data%5C70thru75%5CTxt%5C00000001%5C2000L3LN.txt&User=ANONYMOUS&Password=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&Display=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results%20page&MaximumPages=1&ZyEntry=1&SeekPage=x&ZyPURL#

The noise analysis indicates that mitigation will reduce noise levels by 15 dBA Leq. However, Mitigation NOI-1 only requires the specified temporary noise barriers to achieve a 12 dBA reduction in construction noise. The Table and DEIR must be corrected to only credit mitigation with a 12 dBA effect. It is inappropriate to add the mitigation values of MM NOI-1 and MM NOI-2 as there is no indication in the DEIR that the noise analysis did not include MM NOI-2 as an assumption. The assumption that NOI-2 will result in a 3dBA noise reduction is not supported by substantial evidence. It is standard practice to require that construction equipment meets manufacturer's standards. Requiring construction staging to be located at the greatest distance **feasible** from sensitive uses, provides no real protections, and placing stationary construction equipment so that noise is directed away from sensitive receptions will have a negligible effect on construction noise levels and may also not be feasible, since construction equipment typical does not emit a beam of noise that can be directed. The effectiveness of MM NOI-2 is therefore minimal.

Furthermore, it is unclear where the Estimated Construction Noise Levels in the Table are coming from, as they do not match the numbers in DEIR Table 4.13-13 (Appendix K Table 9). For example, without consideration of phase overlap DEIR Table 4.13-13 (Appendix K Table 9) provides the following values for the phase with the greatest noise level: R1=86 dBA; R2=86 dBA; R3=86 dBA; R4=86 dBA; R5=86 dBA; and R6=80 dBA. Estimated maximum overlapping noise levels are shown as: R1=89 dBA; R2=88.2 dBA; R3=89 dBA; R4=88.2 dBA; R5=89.5 dBA; and R6=82.9 dBA. DEIR 4.13-14 / Appendix K Table 16 must be corrected to reflect the following information in **Table 3** below, which shows that noise levels will increase by more than 10 dBA at all of the sensitive receptor locations, even with mitigation, and without accounting for combined ambient plus mitigated construction noise levels which should be corrected and added to the table:

TABLE 3
CONSTRUCTION NOISE LEVELS AT EXISTING OFF-SITE SENSITIVE RECEPTOR LOCATIONS

Off-Site Sensitive Land Use	Existing Ambient Noise Levels (dBA Leq)	Maximum Estimated Construction Noise Levels - Unmitigated /1/	Maximum Estimated Overlapping Construction Noise Levels - Unmitigated /1/	Mitigation	Maximum Estimated Construction Noise Levels - Mitigated	Increase Over Existing with Mitigation	Maximum Estimated Overlapping Construction Noise Levels - Mitigated	Increase Over Existing With Mitigation	Exceed Significance Threshold After Mitigation
R1	62.1	86	89	-12	74	11.9	77	14.9	Yes
R2	49.9	86	88.2	-12	74	24.1	76.2	26.3	Yes
R3	48	86	89	-12	74	26	77	29	Yes
R4	46.9	86	88.2	-12	74	27.1	76.2	29.3	Yes
R5	44.6	86	89.5	-12	74	29.4	77.5	32.9	Yes
R6	61.1	80	82.9	-12	68	6.9	70.9	9.8	Yes

It should be noted that each increase of 10 dBA represents a sound being perceived as twice as loud and each additional increase of 10 dBA similarly results in an

ORG 6-48

additional, further perceived doubling of noise. An increase of 20 dBA thus represents a perceived quadrupling of the noise level (2 x 2 = 4) and an increase of 30 dBA thus represents a perceived 8-fold increase in noise levels (2 x 2 x 2 = 8). Noise levels at R2-R5 with mitigation will thus be perceived as a 4-to-8-fold increase in ambient levels, even after mitigation. As shown in **Table 3**, after mitigation construction noise levels at sensitive receptor sites are thus greater than described in the DEIR. The DEIR must therefore be corrected and recirculated.

The DEIR needs to include a graphics showing the extent of the existing sensitive receptors which will be impacted by Project construction noise, with graphics to show: single-family residential areas where ambient levels will be above 60 dBA both pre- and post-mitigation for 10 or more days during construction; single-family residential areas where ambient levels will be above 75 dBA both pre- and post-mitigation for less than 10 days during construction; and, the areas where residences will experience a 10 dBA increase in ambient levels during construction both pre- and post-mitigation. The DEIR also needs to include a graphic showing the required locations for noise barriers specified by MM NOI-1 and MM NOI-3. ORG 6-49

Additional Mitigation To Address Significant Unavoidable Impacts

CEQA Guidelines § 15126.4 requires that an EIR "shall identify mitigation measures for each significant environmental effect identified in the EIR." CEQA Guidelines §15092(b) then specifies that an agency cannot approve a project unless it has adopted all feasible mitigation measures to eliminate or substantially lessen the significant environmental effects of a project before turning to overriding consideration for remaining impacts. The following additional mitigation measures must be included in the DEIR to address the significant unavoidable noise impacts of the Project:

> **New Mitigation**: An information sign shall be posted at the entrance to each construction site that identifies the permitted construction hours and provides a telephone number to call and receive information about the construction project or to report complaints regarding excessive noise levels. Any reasonable complaints shall be rectified within 24 hours of their receipt. ORG 6-50
>
> **New Mitigation**: Construction equipment or construction methods that generate peak noise levels which would exceed 75 dBA at the property line shall be prohibited.
>
> **New Mitigation**: If noise levels from construction activity are found to exceed 75 dBA at the property line of any adjacent property and construction equipment is left stationary and continuously operating for more than one construction day, a temporary noise barrier shall be erected between the noise source and receptor. Any noise barrier around stationary equipment shall be sufficiently high to block the direct path between all parts of the construction equipment and sensitive

receptors. All gaps between barrier panels and at the bottom of the barrier shall be sealed to avoid sound leaks.

New Mitigation: Noticing of the scheduling of various phases of construction shall be submitted to the adjacent owners and occupants within the noise impact area 90 days in advance of activities and will identify the dates of activity, the hours of activity, types of equipment to be used on each day and the associated noise and vibration levels anticipated. Lane closures on the adjacent streets shall be similarly noticed. Truck staging shall not occur on public property adjacent to or in the immediate vicinity of the Project site.

New Mitigation: Prior to the start of construction, noise monitors shall be installed in the projected noise impact area to monitor noise levels. A website shall be established to provide daily noise monitoring results and the web address provided to residents within the noise impact area. In the event that noise levels exceed 75dBA a sensitive receptor sites for more than 10 days cumulatively, construction shall be halted and the Project applicant shall be required to submit a noise mitigation plan to reduce levels to 60 dBA or less. If mitigation to levels below 60 dBA is not feasible, the Project applicant shall be required to pay affected residents in the amount of $235 per day (median income/365). In the event that noise levels equal or exceed 85dBA for more than 8 hours cumulatively, the Project applicant shall be required to pay affected residents in the amount of $470 per each 8 hours of cumulative noise in excess of 85 dBA Leq. This payment shall not limit the ability of affected residents to sue the Project applicant to obtain additional compensation for any documented hearing loss. The Project applicant shall be required to post bond or establish a trust fund in an amount deemed sufficient by the Planning Director to compensate residents, given anticipated noise days in excess of 60 and 75 dBA. A mechanism for timely paying residents for noise exceedances shall be established prior to issuance of any construction or grading permits for the Project, so that residents will receive payments within 30 days of noise exceedances. (This will enable them to make timely credit card payments should they choose to use the funds to stay at a hotel during noisy periods of construction.)

New Mitigation – Prior to issuance of any construction or grading permit for the Project, the Project applicant must offer to residents bordering the Project site located in areas that are projected to experience noise levels greater than 60 dBA for 10 or more days, or 75dBA for less than 10 days, due to Project construction, the option to have their homes retrofitted with dual pane window at the Project applicant's expense. Prior to issuance of any construction or grading permit, the Project applicant must demonstrate to the satisfaction of the Planning Director, that the Project applicant has: (1) mailed notice of the offer at least two times to all affected owners; (2) received written notice from each affected owner either accepting or rejecting the offer; and (3) completed all retrofit work to the satisfaction of the affected owners.

Vibration Threshold

In discussing the County's vibration limitations, the DEIR (Appendix K, page 45 states:

> ***County of Los Angeles***
>
> The County Noise Ordinance Section 12.08.350 provides a presumed perception threshold of 0.01 in/sec RMS; however, this applies to groundborne vibrations from long-term operational activities, such as surface traffic, and not to short-term activities such as construction. Therefore, the 0.01 in/sec RMS vibration criteria is used in connection with the Project's operation-related vibration impacts and does not apply to construction-related vibration impacts. The vibration level of 0.01 in/sec RMS is equivalent to 0.04 in/sec PPV.

However, the DEIR provides no evidence that the County's threshold only applies to long-term operational activities such as surface traffic and not to short-term activities such as construction. In fact, what the County's Noise Control Code says is:

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> **12.08.350 - Vibration.**
>
> "Vibration" means the minimum ground or structure-borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observations of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.
>
> (Ord. 11778 § 2 (Art. 3. § 302(ee)), 1978: Ord. 11773 § 2 (Art. 3 § 302(ee)), 1978.)

Part 4 of the Code – Specific Noise Restrictions, Section 12.08.560 – Vibration, states:

> **12.08.560 - Vibration.**
>
> Operating or permitting the operation of any device that creates vibration which is above the vibration perception threshold of any individual at or beyond the property boundary of the source if on private property, or at 150 feet (46 meters) from the source if on a public space or public right-of-way is prohibited. The perception threshold shall be a motion velocity of 0.01 in/sec over the range of 1 to 100 Hertz.

> (Ord. 11778 § 2 (Art. 5 § 501(d)), 1978: Ord. 11773 § 2 (Art. 5 § 501(d)), 1978.)

And, Part 5 – Exemptions, Section 23.08.570 D in part states:

> D. Exemptions from Exterior Noise Standards. The following activities are exclusively regulated by the prohibitions of Part 4 of this chapter:
>
> 1. Construction

The County's code is thus clear that Part 4, including Section 12.08.560 – Vibration, applies to construction. Nowhere in the Code does it say that this standard applies only to long-term operational activities such as surface traffic and not to short-term activities such as construction; rather the Code explicitly states that the standard applies to construction. The vibration analysis must be redone using the County's vibration annoyance standard for construction devices. Based on this standard and Appendix K Table 21 / DEIR Table 4.13-20 it appears that the operation of additional construction equipment, other than just pile drivers, will result in significant vibration annoyance impacts to nearby residences. These impacts must be identified in the DEIR. The DEIR must therefore be corrected and recirculated for public review and comment.

As with noise, the DEIR should include a graphic showing the area of vibration annoyance impact. The DEIR should also include the following mitigation measure:

> **New Mitigation**: Prior to the start of construction, vibration monitors shall be installed in the area of projected vibration annoyance impact to monitor vibration levels. A website shall be established to provide daily vibration monitoring results and the web address provided to residents within the vibration annoyance impact area. In the event that vibration levels exceed the vibration perception threshold of 0.01 in/sec over the range of 1 to 100 Hertz for more than eight hours cumulatively in any construction day, construction shall be halted and the Project applicant shall be required to submit a vibration mitigation plan detailing changes in construction methods to avoid vibration annoyance impacts. If mitigation is not feasible, the Project applicant shall be required to pay affected residents in the amount of $235 per day (median income/365) for any day in which the threshold is violated. This payment shall not limit the ability of affected residents to sue the Project applicant to obtain additional compensation for any documented impacts. The Project applicant shall be required to post bond or establish a trust fund in an amount deemed sufficient by the Planning Director to compensate residents, given anticipated vibration annoyance days and projected number of residences affected. A mechanism for timely paying residents for vibration annoyance threshold exceedances shall be established prior to issuance of

any construction or grading permits for the Project, so that residents will receive payments within 30 days of exceedances. (This will enable them to make timely credit card payments should they choose to use the funds to stay at a hotel during noisy periods of construction.)

6.0 INADEQUATE CUMULATIVE IMPACT ANALYSIS

ORG 6-52

As previously noted, the cumulative impact analysis does not address reasonably foreseeable development on the remainder of the golf course property. Cumulative impacts are therefore underestimated in the DEIR and the DEIR must therefore be redone and recirculated for public review and comment.

7.0 SIGNIFICANT IRREVERSIBLE CHANGE

ORG 6-53

As explained by CEQA Guidelines Section 15126.2(d), significant irreversible change can include projects that "generally commit future generations to similar uses.

> **15126.2 CONSIDERATION AND DISCUSSION OF SIGNIFICANT ENVIRONMENTAL IMPACTS.**
>
> (d) Significant Irreversible Environmental Changes Which Would be Caused by the Proposed Project Should it be Implemented. Uses of nonrenewable resources during the initial and continued phases of the project may be irreversible since a large commitment of such resources makes removal or nonuse thereafter unlikely. Primary impacts and, particularly, secondary impacts (such as highway improvement which provides access to a previously inaccessible area) generally commit future generations to similar uses. Also irreversible damage can result from environmental accidents associated with the project. Irretrievable commitments of resources should be evaluated to assure that such current consumption is justified. (See Public Resources Code section 21100.1 and Title 14, California Code of Regulations, section 15127 for limitations to applicability of this requirement.)

This section of the DEIR needs to be augmented to discuss the fact that the proposed Project will result in the loss of 68.42 acres of open space and the lost opportunity to acquire and preserve the area as parkland. As noted in the County's 2016 Los Angeles Countywide Comprehensive Park & Recreation Needs Assessment, Appendix A, Unincorporated La Habra Heights – Rowland Heights Study Area Profile,[29] the Rowland Heights area has only 1.2 park acres per 1,000 persons compared to the County average of 3.3 park acres per 1,000 persons. Only 27% of the area's population

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[29] Available at: https://lacountyparkneeds.org/wp-content/root/FinalReportAppendixA/StudyArea_092.pdf

live within ½ mile of a park, compared to the County average of 49%. The Needs Assessment for the area included an estimated budget of $23,516,649.00, exclusive of monies for deferred maintenance, for prioritized park projects including a new community park. The 2016 Parks Needs Assessment ("PNA") "directly informed the development of Measure A, a countywide funding measure that was approved by nearly 75% of voters in November 2016 and includes dedicated funding for Very High and High park need areas."[30] The DEIR needs to address how much of Measure A funds have been spent to-date in the Rowland Heights area, and the DEIR needs to identify the loss of open space as a Significant Irreversible Change of the Project.

Loss of open space is even more important as a Significant Irreversible Change of the Project given California's 30x30[31] efforts:

> In October 2020, Governor Newsom issued the Nature-Based Solutions Executive Order N-82- 20, advancing biodiversity conservation as an administration priority and elevating the role of nature in the fight against climate change. As part of this Executive Order, California committed to the goal of conserving 30% of our lands and coastal waters by 2030 (30x30) .[32]

The DEIR needs to address this Executive Order,[33] which was subsequently codified into law with the passage of SB337,[34] and identify the loss of open space as a Significant Irreversible Change of the Project. The DEIR then needs to be recirculated for public review.

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[30] https://worldurbanparks.org/blog/conservation-reimagined-los-angeles-countys-30x30-plan/#:~:text=Introduction,advance%20conservation%2C%20and%20protect%20biodiversity

[31] See: https://www.planetizen.com/news/2023/10/125888-new-law-makes-californias-30x30-goal-official#:~:text=Governor%20Newsom%20just%20signed%20SB,waters%20by%20the%20year%202030.&text=California%20Governor%20Gavin%20Newsom%20just,Senate%20Bill%20(SB)%20337.

[32] https://resources.ca.gov/-/media/CNRA-Website/Files/Initiatives/30-by-30/Final_Pathwaysto30x30_042022_508.pdf

[33] The Executive Order is available at: https://www.gov.ca.gov/wp-content/uploads/2020/10/10.07.2020-EO-N-82-20-.pdf

[34] See: https://sd37.senate.ca.gov/news/senator-dave-min-introduces-legislation-protect-californias-biodiversity-future-generations

SB337 is available at:
https://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=202320240SB337
https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=202320240SB337

8.0 ALTERNATIVES ANALYSIS

As previously noted, the DEIR has designed Alternative 3 so that it "would not include open space or a trail system to encourage outside recreation and would not distribute below-market units throughout the site." Additionally, Alternative 3 has been designed so that it "would provide . . . a narrower range of housing types, sizes and prices as compared to the Project because it would not include duplex or triplex housing options." Alternative 3 thus includes unnecessary design choices intended to provide a basis for rejecting the Environmentally Superior Alternative. Clearly Alternative 3 must be modified to address these concerns.

In addition, the DEIR should include a new Alternative, which is a variation on the No Project Alternative, whereby the site is preserved as open space and an application for Measure A funds for site acquisition submitted to the County.[35]

ORG 6-54

9.0 CONCLUSION

The DEIR for the Project significantly understates the nature and magnitude of Project impacts. As detailed in this comment letter, the EIR for the proposed Project contains significant defects. These must be corrected and the EIR recirculated pursuant to CEQA Guidelines Section 15088.5(a)(1), (2) (3) and (4). Moreover, the Project as proposed cannot be approved given that there is a feasible alternative, Alternative 3, which reduces impacts.

Sincerely,

Jamie T. Hall

ORG 6-55

Attachments:

A. Comments from Royal Vista Open Space on the DEIR
B. Letter From the County of Los Angeles Department of Public Works to Linscott Law and Greenspan Engineers dated September 28, 2023
C. Comments from Biological Resource Consultant Scott Cashen, MS on the DEIR

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[35] See: https://rposd.lacounty.gov/measure-a/#:~:text=Measure%20A%20funds%20are%20derived,specific%20funding%20program(s).
https://rposd.lacounty.gov/competitive-grant-programs/
https://file.lacounty.gov/SDSInter/dpr/1121372_MeasureA_Categories345.pdf

ATTACHMENT A

COMMENTS FROM ROYAL VISTA OPEN SPACE ON THE DEIR

Additional Royal Vista Open Space Comments

Below are concerns with the Royal Vista housing development and analysis in the DEIR that should be corrected in a revised and recirculated DEIR.

1. Aesthetics

1.1 All homes will have solar panels. How will the glare from solar panels be minimized to reduce reflection to current homes? Some of the existing homes are on higher elevation and might be in direct line of the glare/reflection.

ORG 6-56

1.2 Walking and biking paths are proposed around the perimeter of the project. The EIR does not address the type of lighting to be installed or the height of the light poles. We are concern with bright lights along walking paths projecting into neighboring private backyards. [A]

ORG 6-57

1.3 We are concerned with bright LED streetlights. A recent development in Upland installed LED lights that emit a brightness resembling daylight, causing confusion among the local bird population. The birds are mistakenly perceiving nighttime as daytime due to this intense illumination, which is disrupting their natural patterns.

ORG 6-58

[A] – The proposed parks renderings are inaccurate. A dog park and basketball/ pickleball courts were proposed. We objected to the dog park and active sport courts. The County has agreed to leave the two parks in its natural state with minimal development.

ORG 6-59

2. Air Quality

2.1 We are concern with catching Valley Fever. In 2019, a case of Valley Fever surfaced during construction of another housing development near the current proposed site. During construction, hillsides were excavated, dust and other airborne particles circulated throughout the surrounding neighborhood. Our neighbor across the street from us found a mass in her lung and was diagnosed with Valley Fever. She is currently under the care of an infectious disease doctor and is taking antifungal medication for life (see attached Valley Fever attorney letter). There are also concerns of dust from excavation that can trigger asthma attacks and other respiratory diseases such as mucormycosis.

2.2 Grading of 3.8 million cubic yards of excavation, recompacting and export of soil over one year period, assuming no delays, is excessive. How many Rose Bowl would that fill? As a result of this volume of grading among sensitive receptors, we are concern with 2.1 above.

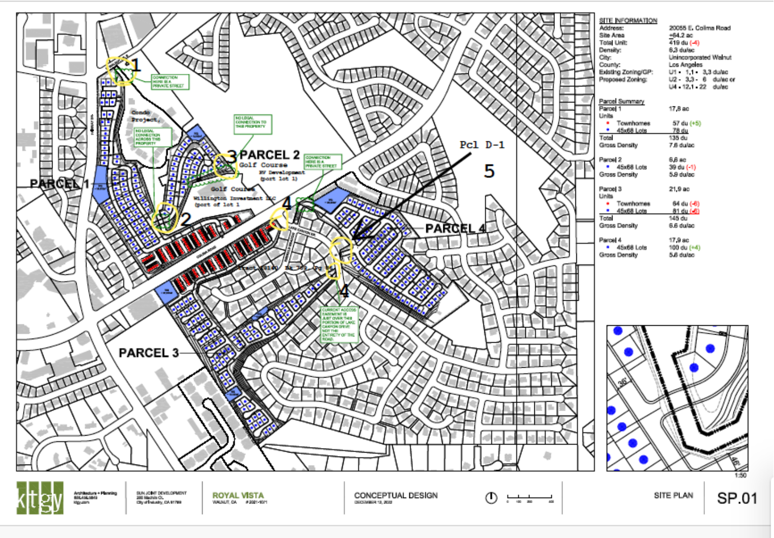
ORG 6-61

2.3 It is estimated it will take 10,277 haul trucks to grade the site at 40-50 trucks per day. The haul route is on a major and only thoroughfare, Colima Road. There is no mention of traffic control during construction on Colima Road. The other hauling

ORG 6-62

route is on East Walnut Dr. South which is a two lane road. During morning hours, congestion occurs in this area due to the influx of school traffic from nearby Ybarra Elementary School. Hauling route and traffic control during hauling need to be further addressed in the EIR.

2.4 Construction for four years is too long. This is assuming there are no delay in construction. With the Sunjoint development, we could be looking at eight years of construction with an estimated of 22,854 hauling trips on a major thoroughfare. This situation poses a significant challenge for the residents to manage or endure.



SITE INFORMATION
Address: 20055 E. Colima Road
Site Area: +64.2 ac
Total Unit: 419 du (-4)
Density: 6,3 du/ac
City: Unincorporated Walnut
County: Los Angeles
Existing Zoning/GP: U1 • 1,1 • 3,3 du/ac
Proposed Zoning: U2 - 3,3 - 6 du/ac or U4 • 12,1 • 22 du/ac

Parcel Summary
Parcel 1: 17,8 ac
Units
Townhomes: 57 du (+5)
45x68 Lots: 78 du
Total: 135 du
Gross Density: 7,6 du/ac

Parcel 2: 6,6 ac
45x68 Lots: 39 du (-1)
Gross Density: 5,9 du/ac

Parcel 3: 21,9 ac
Units
Townhomes: 64 du (-6)
45x68 Lots: 81 du (-6)
Total: 145 du
Gross Density: 6,6 du/ac

Parcel 4: 17,9 ac
45x68 Lots: 100 du (+4)
Gross Density: 5,6 du/ac

The other portion of the golf course has been sold as we recently discovered. The developer, Sunjoint, is proposing to build 420 homes.

ORG 6-63

2.5 The golf course is the last sizable open space located adjacent to City of Industry's Good Transit Corridor. It is 157 acres of carbon sink, absorbing carbon from the atmosphere, only a mile from the heavy carbon source of cars burning fossil fuels on the 57/60 Freeways.

ORG 6-64

2.6 South Coast Air Quality Management District (SCAQMD) scoping letter recommends a mobile source health risk assessment to disclose potential health risk. We are unsure if this mobile source health risk assessment was performed and presented in the EIR.

ORG 6-65

2.7 Is it possible for developer to set up a fund to provide financial support to upgrade windows and AC unit of surrounding homes? Homes in the area are over 45 years old and many have not upgraded to double pane windows or adequate AC system for proper ventilation. Post-pandemic, an increasing number of residents are working from home, necessitating prolonged stays at their residences. Given this context, expecting residents to refrain from opening windows poses an impractical and burdensome request.

ORG 6-66

3. Biological Resources

3.1 The Draft EIR fails to mention the presence of bats in the area, despite reports from residents regarding sightings and auditory evidence. Special status bat species observed in the Puente Hills Significant Ecological Area, which is 3.5 miles to the Royal Vista Golf Course, include the pallid bat, pocketed free-tailed bat, big free-tailed bat and the western mastiff bat (roosting sites include palm trees and buildings). ORG 6-67

3.2 The golf course is 1.2 miles from the Puente Hills Significant Ecological Area and is an important wildlife corridor. ORG 6-68

3.3 The general biological reconnaissance of 75 acres conducted by Placeworks on one day only, July 13, 2020, was in no way complete or thorough. We have photographic evidence of Cooper's Hawk adjacent to Royal Vista, as well as egrets and heron on the golf course. Placeworks also noted only 3 mammal species on Royal Vista, including the ground squirrel, pocket gopher and coyote, whereas there are a number more observed or photographed daily by residents such as the Cooper's Hawk. ORG 6-69

See Royal Vista Open Space website for animals observed on the golf course: https://saveroyalvista.com/wildlife-of-royal-vista/

3.4 The golf course is situated on top of the Puente Basin Aquifer. Seventy-six acres of rainwater permeate the ground, filtering down to the aquifer. It serves as a watershed to replenish the ground water. The EIR does not address the loss of the watershed to replenish loss of groundwater. ORG 6-70

After rain storm in January 2017

3.5 Several blueline streams and two ponds are identified within the confines of the golf course, with the ponds being fed from upstream drainages. The ponds were drained in October 2022. The delineation report states the two ponds have little water. We ORG 6-71 have picture as of last week with Pond #1retaining water. We often see ducks swimming in the pond.

4. **Geology and Soil**

4.1 Twenty one homes are in a landslide zone as a result of the Morning Sun landslide in May 1995. There were additional landslides after May 1995. Water was piped above ground on the streets for five years according to one resident. The theory was when Diamond Bar built South Point Middle School, excavation dirt was dump on the blue line streams. The water's inability to find an outlet led to the occurrence of the landslide. EIR does not address in detail how to mitigate the landslide zone once excavation commence.[1]

ORG 6-72

4.2 Ground water was found as shallow as 2.5 feet, mapped at East Walnut Dr. South and Bellavista. We are concern with this area's wet soil located in proximity to the two ponds. Water drains toward this area as this is the lowest point of the course.

ORG 6-73

5. **Hydrology and Water Quality**

5.1The other portion of the golf course has been sold to Sunjoint which plans to build an additional 420 homes. Walnut Valley Water District has issued a Will Serve Letter for the 360 homes. However, it did not take into consideration the Sunjoint project. In light of this recent development, Walnut Valley Water District should perform a water supply assessment study per SB 610 for any development over 500 units.

ORG 6-74

6. **Noise and Vibration**

6.1 Noise barrier of 10 feet temporary sound barrier does nothing to reduce the dba which is expected to exceed 85. This is an unacceptable threshold. The sound dampening is only effective in the line of sight. The sound barriers are ineffective for homes on higher elevation. 85 dba is much higher than the 60 dba per County code, chapter 12.08.440 for construction zone.[2] Sound absorbing material, such as blankets, should be used to mitigate the 85dba.

ORG 6-75

6.2 Vibration of 11,427 hauling trips on Colima Road was not addressed in the EIR. Residents have reported vibrations when trucks travel pass homes on Colima Road.

ORG 6-76

7. **Population and Housing**

7.1 These parcels are not part of the 2021-2029 Housing Element inventory to rezone in unincorporated areas to meet state housing mandates. Rowland Heights is already pulling its weight to meet the housing requirement with over fifty properties with

ORG 6-77

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[1] See *Los Angeles Times* article dated May 24, 1995 and June 10, 1995

[2] https://library.municode.com/ca/los_angeles_county/codes/code_of_ordinances?nodeId=TIT12ENPR_CH12.08NOCO_PT2DE_12.08.080COPR

potential to develop housing 2,228 units.[3] This project is not in the scope of the Housing Element and takes away open space in park poor area.

8. Recreation

8.1 *2022 Parks Needs Assessment Plus* includes the golf course as part of its inventory as a public recreational facility.[4] EIR does not address the loss of 42 net acres (75 acres - 35 proposed open space acres) that is being removed from the site inventory. 27% of the community lives within a half a mile of a park, that is far less than the county average of 49%. 33% of the community has a very high or high need of additional park space.[5] The removal of 42 acres of open space exacerbates the existing shortage of recreational areas within the community, resulting in a higher percentage of residents experiencing a significant need for additional park space categorized as very high or high need. ORG 6-78

8.2 The EIR does not address the safety of the proposed trails given homeless encampments and lack of any fencing between existing homes and the proposed project. ORG 6-79

8.3 Proposed paved trails do not allow water penetration into soil and majority of planned landscapes are not native to California. ORG 6-80

9. Transportation

9.1 The traffic study did not include the Sunjoint project as a potential cumulative project. This will increase vehicle counts significantly. ORG 6-81

9.2 The traffic report did not address Caltrans request (see Caltrans scoping letter) to include queueing analysis with actual signal timing at Brea Canyon Road/57 FWY, Pathfinder/57 FWY, Lemon Avenue/60 FWY and Fairway Drive/60 FWY. ORG 6-82

9.3 The traffic study performed in Nov. 2021 captured a lower traffic volume compared to 2023 as a considerable number of residents were still working remotely from home in 2021. An updated traffic study should be performed to include more current traffic data. ORG 6-83

9.4 A traffic light is not proposed at Walnut Leaf Drive and Colima Road. Navigating a left-hand turn from Walnut Leaf unto Colima is dangerous. With additional traffic from the proposed development, level of service is projected to downgrade from D to F per the Traffic Impact Assessment report, page 85. Level of service for Tierra Luna ORG 6-84

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[3] See Housing Element map at https://data.lacounty.gov/datasets/lacounty::los-angeles-county-housing-element-2021-2029-sites-inventory/explore?location=33.993792%2C-117.985910%2C11.00.

[4] Page A-278, https://lacountyparkneeds.org/wp-content/uploads/2023/03/AppA_RegionalProfiles_EastSanGabrielValley_Dec2022.pdf

[5] *East San Gabriel Valley Area Plan*, Rowland Heights, page 8-41, https://planning.lacounty.gov/wp-content/uploads/2023/06/ESGVAP_8-9_RH.pdf

and Colima is projected to downgrade from C to F. These downgrades need to be mitigated.

9.5 Colima and Fairway are collision concertation corridor.[6]

ORG 6-85

9.6 Queueing on west bound on ramp at Lemon Ave. and 60 FWY needs to be studied. There is no traffic signal as vehicles cross two lanes of southbound traffic.

ORG 6-86

Image: Vehicle attempting to make a left turn while oncoming traffic blocks the westbound 60 FWY entrance at Lemon Ave. When making a left turn, the vehicle must cross 2 lanes of southbound traffic, and visibility is almost completely obscured by vehicles turning left onto the eastbound 60 FWY entrance.

10. Additional Comments

10.1 The no project alternative analysis needs to discuss in detail regarding the feasibility of operating it as a golf course or the sale to another golf course operator.

ORG 6-87

10.2 EIR needs to address the possibility of using public funds to acquire the golf course for public open space. A recent EIR has been struck down because discussion of alternative did not analyze the possibility public funds might be used to acquire land for open space, *Save the Hill Group v. City of Livermore* (2022).[7] Measure A was passed in 2016 to provide funds to preserve and protect parks and open space. The County has since collected approximately over half a billion dollars. During a community listening session, residents expressed a desire for transforming the golf course into a public park. We seek an account of the allocation and utilization of Measure A funds, as no initiative was undertaken by the County to establish the proposed park. Furthermore, we seek a portion the Quimby Act funds be earmarked for acquiring the land.

ORG 6-88

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[6] *East San Gabriel Valley Area Plan*, Rowland Heights, page 8-43, https://planning.lacounty.gov/wp-content/uploads/2023/06/ESGVAP_8-9_RH.pdf

[7] https://www.californialandusedevelopmentlaw.com/2023/01/25/eir-invalidated-for-failure-to-analyze-potential-public-acquisition-of-residentially-zoned-land/

In 2021, 9.13 acres of the Diamond Bar Golf Course (county owned course) was sold to San Gabriel Valley Council of Governments and the Los Angeles County Metropolitan Transportation Authority for $28.3 millions for the 60/57 Fwy interchange improvement. The October 19, 2021 *Board of Supervisors Statement of Proceeding* states the compensation of $28.3 millions is sufficient for the County to acquire park land of comparable characteristics located in an area to serve generally the same persons as the original park land, plus the costs of developing the substitute park land, including acquiring substitute facilities of the same type and number, in compliance with Public Resources Code Section 5405.[8] The compensation should have been used to purchase the golf course. The Diamond Bar Golf Course was only 2.3 miles from Royal Vista. Instead, the $28.3 million was earmarked to build the Puente Hills Regional Park 15 miles from the Diamond Bar Golf Course.[9]

10.3 The Rowland Height Community General Plan states area designated as open space are intended to remain undeveloped for the life of the plan. This category is designed to protect natural landforms, riparian corridors and primary viewsheds.[10] ORG 6-89

10.4 Declaration of Protective Restrictions dated December 26, 1961 states certain parcels shall be used only for the purpose of a golf course until 2036. We acknowledge the course is on private land; however, the County should not act in a manner inconsistent with property rights of surrounding homeowners. ORG 6-90

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[8] October 19, 2021 *Board of Supervisors Statement of Proceedings* at https://file.lacounty.gov/SDSInter/bos/sop/1114704_101921.pdf#search=%222021-002011-(4)%22

[9] *Los Angeles Times* article at: https://www.latimes.com/california/story/2022-08-18/l-a-county-puente-hills-park-former-landfill-site

[10] *Rowland Heights Community General Plan* at: https://case.planning.lacounty.gov/assets/upl/data/pd_rowland-heights.pdf

ATTACHMENT B

LETTER FROM THE COUNTY OF LOS ANGELES DEPARTMENT OF PUBLIC WORKS TO LINSCOTT LAW AND GREENSPAN ENGINEERS DATED SEPTEMBER 28, 2023

COUNTY OF LOS ANGELES

DEPARTMENT OF PUBLIC WORKS

"To Enrich Lives Through Effective and Caring Service"

900 SOUTH FREMONT AVENUE
ALHAMBRA, CALIFORNIA 91803-1331
Telephone: (626) 458-5100
http://dpw.lacounty.gov

MARK PESTRELLA, Director

ADDRESS ALL CORRESPONDENCE TO:
P.O. BOX 1460
ALHAMBRA, CALIFORNIA 91802-1460

REPLY PLEASE
REFER TO FILE: T-4

September 28, 2023

David S. Shender, P.E.
Linscott Law and Greenspan Engineers
600 S. Lake Avenue Suite 500
Pasadena, CA 91106

Dear Mr. Shender:

ROYAL VISTA RESIDENTIAL AND PARKS PROJECT
TRACT MAP NO 83534
TRANSPORTATION IMPACT ANALYSIS (JULY 18, 2023)
UNINCORPORATED EAST LOS ANGELES

ORG 6-91

The subdivision Tract Map Number 83534 shall conform to the design standards and policies of Public Works, in particular, but not limited to the following items as described in the transportation impact analysis dated July 18, 2023 (Electronic Permitting and Inspections County of Los Angeles Case Number ESTU2021000278):

Vehicle Miles Traveled Reduction Measures

The project's Vehicles Miles Traveled (VMT) impact will not be fully mitigated and shall be described as significant and unavoidable impact. The subdivision shall implement the following items or equivalent to the satisfaction of Public Works:

1. Project's Proposed VMT Reduction Design Features
    a. 2021 California Air Pollution Control Officers Association (CAPCOA) T-1
        i. Increase Residential Density
            1. Project Design Feature Description
                a. Provide a residential density of 2.72 dwelling units per acre.
            2. Project Design Feature Requirement
                a. This is a project attribute.
                b. Any reduction in the proposed project's residential density would require the project to submit a revised traffic impact analysis for review and approval to the satisfaction of Public Works.

- b. 2021 CAPCOA T-32
  - i. Locate Project near Bike Path/Bike Lane
    - 1. Project Design Feature Description
      - a. Locate the project near existing or planned bicycle facilities on Fairway Drive and along Golden Springs Road.
    - 2. Project Design Feature Requirement
      - a. This is a project attribute.
      - b. No additional requirements.

2. Project's Proposed VMT Reduction Mitigation Measure
   - a. 2021 CAPCOA T-9
     - i. Implement Subsidized or Discounted Transit Program
       - 1. Project Mitigation Description
         - a. The project shall provide an annual transit reimbursement. Subsidies (Metrolink and Foothill Transit) paid by the project developer/homeowner's association (HOA) will not exceed $45,000.00 per year for 5-year period.
           - i. Metrolink Requirement
             - 1. The project developer/HOA is required to provide reimbursement subsidy of up to 50 percent of the cost of one Metrolink monthly pass per homeowner/residential dwelling unit for 5 years (the project developer shall administer and fund the reimbursement subsidy program for the first 3 years at which point the HOA shall take over administration and funding).
             - 2. The project will advertise the subsidy program to future residents at the time of purchase and once a year for the remaining years of subsidy program.
             - 3. The total yearly homeowner transit subsidy reimbursement cost for Metrolink passes shall not exceed $20,250.00 to the project developer/HOA.

- ii. Foothill Transit Requirement
    1. The project developer/HOA will fund a reimbursement subsidy of up to 50 percent of the cost of one Foothill Transit monthly bus pass per homeowner/residential dwelling unit for 5 years and fund the reimbursement subsidy program for the first three 3 years, at which point the HOA shall take over administration and funding.
    2. The project will advertise the subsidy program to future residents at the time of purchase and once a year for the remaining years of subsidy program.
    3. The total yearly homeowner transit subsidy reimbursement cost for Foothill Transit bus passes shall not exceed $24,750.00 to the project developer.

2. Project Mitigation Requirement
    - a. The project developer/HOA is required to establish and fund a Subsidized or Discounted Transit Program (Metrolink monthly pass and Foothill Transit monthly bus pass) as described above prior to Final Map Recordation.
    - b. Provide a copy of the final covenants, conditions, and restrictions which includes the above requirement to provide the above mitigation prior to Final Map Recordation.
3. Additional Monitoring
    - a. The project developer/HOA is required to provide a report to Los Angeles County 6 months prior to the end of the fifth year, detailing the use of the transit subsidy program to the satisfaction of Public Works.
    - b. The County will determine within 90 days if the use of the transit subsidy program should continue for an additional 5 years.

                c. In no event will the transit subsidy program last more than a total of 10 years.
    b. Electric Bicycles
        i. Provide Electric Bicycles to Residents
            1. Project Mitigation Description
                a. The project developer/HOA is required to provide at least one electric bicycle along with the purchase of each dwelling unit at the close of escrow.
            2. Project Mitigation Requirement
                a. The project developer/HOA is required to establish the Electric Bicycle Program and prior to Final Map Recordation.
                b. Provide a copy of the final covenants, conditions, and restrictions which includes the above requirement to provide the above mitigation prior to Final Map Recordation.

Operational Improvement Measures

The project has identified the following intersections have operational deficiencies. The subdivision will implement the following items or equivalent to the satisfaction of Public Works:

1. Project's Proposed Intersection Improvements
    a. East Walnut Drive South at Fairway Drive
        i. Project Intersection Improvement Description
            1. Extend the existing westbound right-turn lane striping to provide an additional 50 feet of storage place. The lane striping will terminate prior to the existing driveway along the north side of the roadway.
            2. The driveway will maintain full access.
            3. Remove/relocate/propose signing and striping and pavement markings associated with modification shown above.
        ii. Project Intersection Improvement Requirement
            1. The project is fully responsible for the construction of the improvement described above.
            2. Submit signing and striping plan for review and approval, and bonds for the improvement described above to the satisfaction of Public Works prior to final map recordation.

b. Brea Canyon Cut-off Road at Colima Road
    i. Project Intersection Improvement Description
        1. Modify and narrow the existing raised concrete median adjacent to the northbound left-turn lane to accommodate the extension of the left-turn lane by 60 feet. The raised median is not proposed to be extended further to the south to maintain full access to existing driveway on west side of roadway.
        2. Extend the existing northbound right-turn lane striping to provide an additional ten feet of storage place.
        3. Modify the existing raised concrete median adjacent to the eastbound left-turn lane to accommodate the extension of the left-turn lane by 60 feet.
        4. Modify the existing raised concrete median adjacent to the westbound left-turn lane to accommodate the extension of the left-turn lane by 105 feet.
        5. Remove/relocate/propose signing and striping and pavement markings and provide Loop Restoration plan, if necessary, associated with modifications shown above.
    ii. Project Intersection Improvement Requirement
        1. The project is fully responsible for the construction of the improvement described above.
        2. Submit traffic signal plan, signing and striping plan for review and approval, and bonds for the improvements described above to the satisfaction of Public Works prior to final map recordation.

c. Colima Road at Walnut Leaf Drive
    i. Project Intersection Improvement Description
        1. Restripe south approach to provide one southbound departure lane, one shared left-through lane, and one right-turn lane.
        2. Restripe to accommodate eastbound left turns into the project driveway, located at north approach by an exclusive left-turn lane.
        3. Remove/relocate/propose signing and striping and pavement markings associated with modifications shown above.
    ii. Project Intersection Improvement Requirement
        1. The project is fully responsible for the construction of the improvement described above.

        2. Submit signing and striping plan for review and approval, and bonds for the improvement described above to the satisfaction of Public Works prior to final map recordation.

d. Colima Road at Tierra Luna
    i. Project Intersection Improvement Description
        1. Remove existing signalized pedestrian and golf cart crossing located east of Tierra Luna on Colima Road.
        2. Install a new traffic signal at the intersection.
        3. Restripe to accommodate exclusive westbound left turns into the project driveway.
        4. Remove/relocate/propose signing associated with new Traffic Signal.
    ii. Project Intersection Improvement Requirements
        1. The project is fully responsible for the construction of the improvement described above.
        2. Submit for review and approval traffic signal plan and signing and striping plan and bond for the mitigations shown above to the satisfaction of Public Works prior to final map recordation.
e. Fairway Drive at State Route 60 Freeway
    i. Project Intersection Improvement Description
        1. Convert existing exclusive northbound right turn lane at Eastbound On-Ramps to a shared through/right turn lane.
        2. Restripe existing exclusive northbound left turn lane at the Westbound On-Ramps to accommodate vehicle queues.
        3. Remove/relocate/propose signing and striping and pavement markings, associated with the modifications shown above.
    ii. Project Intersection Improvement Requirements
        1. The project will require approval from Caltrans prior to implementing this improvement. If Caltrans does not concur with this improvement, then this improvement will not be required.
        2. The project is fully responsible for the construction of the improvement described above.
        3. Submit for review and approval traffic signal plan and signing and striping plan and bond for the mitigations shown above to the satisfaction of Public Works prior to final map recordation.
f. Lemon Avenue at Golden Springs Drive

i. Project Intersection Improvement Description
    1. Modify traffic signal to provide a westbound right overlap phase.

ii. Project Intersection Improvement Requirements
    1. The project will require approval from City of Diamond Bar prior to implementing this improvement. If the City does not concur with this improvement, then this improvement will not be required.
    2. The project is fully responsible for the construction of the improvement described above.
    3. Submit approved traffic signal plan and signing and striping plan and bond for the mitigations shown above to the satisfaction of Public Works prior to final map recordation.

Other Jurisdictions Referrals

The project applicant is recommended to consult with the City of Diamond Bar, City of Industry, and California Department of Transportation regarding any potential transportation impacts within their jurisdictions.

If you have any questions, please contact Kent Tsujii, Traffic Safety and Mobility Division, at (626) 300-4776 or ktsujii@dpw.lacounty.gov.

Very truly yours,

MARK PESTRELLA
Director of Public Works

AMIR IBRAHIM, P.E., L.S.
Principal Engineer
Traffic Safety and Mobility Division

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cc: Land Development (Lasso, Suarez)

ATTACHMENT C

COMMENTS FROM BIOLOGICAL RESOURCE CONSULTANT SCOTT CASHEN, MS ON THE DEIR

ORG 6-92

* Reference documents cited in Attachment C have been submitted by separate correspondence.

Scott Cashen, M.S.—Independent Biological Resources Consultant

January 4, 2024

Mr. Jamie T. Hall
Channel Law Group, LLP
8383 Wilshire Blvd., Suite 750
Beverly Hills, CA 90211

Subject: Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project

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Dear Mr. Hall:

This letter contains my comments on the Draft Environmental Impact Report ("DEIR") prepared by the County of Los Angeles ("County") for the Royal Vista Residential Project ("Project"). The Project Applicant, RV DEV LLC ("Applicant"), proposes a project that would redevelop six parcels of the existing Royal Vista Golf Course into four residential planning areas, comprised of 360 dwelling units, and two recreational/open space planning areas, containing a trails and park system.

ORG 6-92
Cont.

I am an environmental biologist with 30 years of professional experience in wildlife biology and natural resources management. I have served as a biological resources expert for over 200 projects in California. My experience and scope of work in this regard has included assisting various clients with evaluations of biological resource issues; preparation and peer review of environmental compliance documents prepared pursuant to the California Environmental Quality Act ("CEQA") and the National Environmental Policy Act ("NEPA"); and preparation of written comments that address deficiencies with CEQA and NEPA documents. My work has included written and oral testimony for the California Energy Commission, California Public Utilities Commission, and Federal courts. My educational background includes a B.S. in Resource Management from the University of California at Berkeley, and a M.S. in Wildlife and Fisheries Science from the Pennsylvania State University. A copy of my curriculum vitae is attached hereto.

The comments herein are based on my review of the environmental documents prepared for the Project, a review of scientific literature pertaining to biological resources known to occur in the Project area, consultations with other biological resource experts, and the knowledge and experience I have acquired during my 30-year career in the field of natural resources management.

ENVIRONMENTAL SETTING

A detailed description of the environmental setting is critical to an EIR's ability to accurately analyze a project's environmental impacts, and subsequently, for the EIR to incorporate effective mitigation that will reduce the project's potentially significant impacts to less-than-significant levels. ORG 6-92 Cont.

Field efforts to establish the Project's biological resources setting were limited to a Jurisdictional Delineation, a "brief site visit" to search for regulated trees, and a single reconnaissance survey of unspecified duration "to assess potential biological resource constraints."[1] Contrary to California Department of Fish and Wildlife ("CDFW") guidance, focused surveys to document baseline conditions with respect to plants and animals were not conducted.[2] ORG 6-93

Although the Applicant's consultant, Placeworks, determined nine special-status animal species have at least some potential to occur at the Project site, and although no surveys were conducted, the DEIR speculates that eight of these species either are absent, or would only be present in "limited amounts." This speculation serves as the sole basis for the DEIR's additional speculation that impacts to these eight species "would be expected to be less than significant," and therefore mitigation is not warranted.[3] The determination by a Lead Agency on whether a project may have a significant effect on the environment calls for careful judgment, based to the extent possible, on scientific and factual data (State CEQA Guidelines § 15064(b)(1)). Two layers of speculation does not constitute scientific and factual data. ORG 6-94

Trees

The DEIR states: "[b]ased on a desktop review of aerial photographs and brief site visit conducted by ESA biologist Daryl Koutnik on January 11, 2021, there are approximately 410 landscape trees within the Project footprint, 102 of which are Mexican fan palms."[4] The DEIR provides no additional information on these trees, such as: (a) the species composition and relative abundance;[5] (b) the diameter, height, and structure of the trees; and (c) the habitat elements provided by the trees (e.g., cavities, loose bark, broken top, fruits, nuts, among other habitat elements).[6] These deficiencies preclude proper understanding of the environmental setting, the Project site's value to wildlife, and its potential to support special-status species associated with trees. ORG 6-95

Wildlife

The DEIR fails to accurately describe the Project's environmental setting with respect to wildlife. Efforts to document wildlife at the Project site were limited to a reconnaissance survey, ORG 6-96

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[1] DEIR, p. 4.4-21.

[2] DEIR, Appendix A, CDFW NOP comment letter, pp. 6 and 7.

[3] DEIR, p. 4.4-23.

[4] DEIR, p. 4.4-21.

[5] DEIR, Appendix C (Bio Assessment) lists some, but not all, of the tree species at the Project site.

[6] *See* California Department of Fish and Wildlife. 2023. CWHR Habitat Element Checklist. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=65856&inline>.

of unspecified duration, by Placeworks biologist Phil Brylski on July 13, 2020.[7] The purpose of this survey was "to assess potential biological resource constraints within the Project Site"[8]—*not to inventory the plant and animal species at the site*. Indeed, a mere 15 wildlife species (12 birds and 3 mammals) were detected during the survey.[9] No efforts were made to identify reptiles and amphibians at the site, birds that use the site for nesting or stopover habitat during migration, or nocturnal wildlife (e.g., bats). In addition, there were no efforts to determine presence of special-status species that could occur at the Project site. These deficiencies preclude understanding of the Project's impacts on biological resources.

The DEIR uses four categories to categorize the potential for various special-status species to occur at the Project site: Present, Moderate Potential, Low Potential, and None/Not Observed.[10] The DEIR defines the "Present" category as: "[s]pecies is known to occur within the Project Site, based on recent (within 20 years) CNDDB or other records, and there is suitable habitat present within the Project Site, or the species was observed within the Project Site during field surveys." The CNDDB [California Natural Diversity Database] is a positive detection database. Records in the database exist only where a given species was detected and subsequently reported to the CNDDB. Thus, absence of CNDDB records does not mean that special-status species are absent from the Project site, only that no data has been entered into the CNDDB inventory, possibly because the site has never been surveyed for special-status species. Protocol-level or other comprehensive field surveys during the appropriate season(s), at the appropriate time of day, and that employ species-specific survey techniques are generally required to generate a determination on presence or absence of special-status species. These surveys were not conducted for the Project, thus eliminating the potential for any of the species contemplated in the DEIR to be classified as "Present." ORG 6-97

The DEIR did not include a "High Potential" category. Consequently, the next highest category (below "Present") is "Moderate Potential," followed by "Low Potential." Based on the July 13, 2020, reconnaissance survey, Placeworks determined that three California Species of Special Concern have "low to moderate potential" to occur on the Project Site.[11] This is deceptive and confusing because the DEIR's classification scheme does not include a "low to moderate" category. According to the DEIR, species with "Moderate Potential" have a moderate to high probability of occurring at the Project site, while species with "Low Potential" have a low probability of occurring.[12] Therefore, it appears that the probability of occurrence of species with a "low to moderate potential" is somewhere between low probability *and high probability*. ORG 6-98

In addition to the three species with "low to moderate potential" to occur on the Project Site, Placeworks determined that five California Species of Special Concern have "low potential" to occur on the Project Site, and that the Cooper's hawk, a CDFW Watch List species, has a high potential to forage on the Project site and a moderate potential to nest at the site. No or minimal efforts were made to determine whether any of these nine special-status species actually occur at ORG 6-99

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[7] DEIR, p. 4.4-21.
[8] DEIR, p. 4.4-21.
[9] DEIR, p. 4.4-2.
[10] DEIR, p. 4.4-5.
[11] DEIR, p. 4.4-6.
[12] DEIR, p. 4.4-5.

the Project site. For example, although Placeworks determined that two special-status bats have the potential to occur at the site, no bat surveys (e.g., using bat detectors or other techniques appropriate for bat detection) were conducted at the Project site.

ORG 6-100

The DEIR states: "[n]o special-status wildlife species are expected to occur within the Project Site, including those with low or moderate potential to occur, with the exception of Cooper's hawk."[13] This statement is inconsistent with the DEIR's categorization of species with "moderate potential" or "low potential" to occur at the Project site. The DEIR provides the following definition of "Moderate Potential" species:

> "Species is known to occur in the vicinity of the Project Site (based on recent [within 20 years] CNDDB or other records or based on professional expertise specific to the project area or species), and **there is suitable habitat within the Project Site that makes the probability of the species occurring there moderate to high**. Alternatively, there is suitable habitat within the Project Site and within the known range of the species."[14]

Thus, the DEIR's determination that "moderate potential" species are not expected to occur at the Project site contradicts the DEIR's statement that "moderate potential" species have a moderate to high probability of occurring at the Project site.

ORG 6-101

The DEIR provides the following definition of "Low Potential" species:

> "Species is known to occur in the vicinity of the Project Site (within the area comprised by the surrounding United States Geological Survey [USGS] quadrangles); however, there is only poor quality or marginal habitat within the Project Site and the probability of the species occurring is low."

ORG 6-102

The DEIR assumes that the probability of a species' presence is correlated with habitat quality and that presence of poor quality or "marginal" habitat at the Project site makes it unlikely that the species occurs at the site. However, this assumption may not be valid for various reasons. For example, dominant individuals may prevent subdominant individuals from entering the high-quality habitat, forcing the subdominant individuals to use poor quality habitat. Although the animals in the poor-quality habitat may have low survivorship and reproductive output, their density may actually be greater than the animals in the high-quality habitat because there is no social interaction factor to prevent high densities (in contrast to high-quality habitats where dominant animals exclude subordinate animals to maintain a low population density).[15] Alternatively, animals may be forced to occupy poor quality or "marginal" habitats when higher quality habitats are unavailable. This circumstance occurs at the Project site, which is surrounded by residential development and commercial uses.[16] Consequently, special-status species may occupy habitat (albeit poor quality) at the Project site because there is no high-quality habitat in the surrounding areas for those species to occupy.

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[13] DEIR, p. 4.4-6.

[14] DEIR, p. 4.4-5 [emphasis added].

[15] Van Horne B. 1983. Density as a misleading indicator of habitat quality. The Journal of Wildlife Management 47(4):893-901.

[16] DEIR, p. 4.4-1.

Furthermore, "low potential" is not equivalent to "no potential" or "absent." As stated in the DEIR, a determination of absence can only be made if there is no suitable habitat for the species, or if the species was surveyed for during the appropriate season with unequivocal negative results for species occurrence.[17] Therefore, speculation by Placeworks that "no special-status wildlife species [except the Cooper's hawk] are expected to occur within the Project Site" is not evidence that the Project would have less-than-significant impacts on those species, and consequently, that no mitigation is warranted. ORG 6-103

The DEIR Mischaracterizes the Potential for the Pallid Bat and Western Mastiff Bat

Pallid Bat

The DEIR states that the pallid bat occurs in a variety of habitats, and that it roosts in rock crevices, old buildings, bridges, caves, mines, and tree cavities.[18] The DEIR then states, without justification, that there is "low potential for [pallid bat] roosting on-site."[19] The Project site contains an old maintenance building.[20] The Project site also contains old sheds and several trees with cavities (Figures 1-3). These features were not disclosed in the DEIR's description of the Project's environmental setting. Pallid bats were detected in the eastern Puente Hills during surveys in 2004.[21] Therefore, based on the DEIR's classification scheme,[22] the pallid bat has moderate potential to occur at the Project site. ORG 6-104

Western Mastiff Bat

The DEIR states there is no potential for the western mastiff bat to occur at the Project site because "[t]here is no suitable general or micro-habitat for roosting on-site."[23] The DEIR is incorrect. Western mastiff bat roosts have been detected in buildings[24] and a palm tree.[25] As a result, the buildings and palm trees at the Project site provide potential roost sites for the western mastiff bat. ORG 6-105

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[17] DEIR, p. 4.4-5.

[18] DEIR, Table 4.4-2.

[19] DEIR, Table 4.4-2.

[20] DEIR, Appendix C (Bio Assessment), p. 2 and Photo 9.

[21] Remington S. 2006. Bat Surveys of the Puente Hills. Final Report prepared for the Puente Hills Landfill Native Habitat Preservation Authority. Available at: <https://habitatauthority.org/newsite/wp-content/uploads/2012/04/BatReport.pdf>.

[22] DEIR, p. 4.4-5.

[23] DEIR, Table 4.4-2.

[24] Bolster BC (editor). 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report submitted to California Department of Fish and Game Wildlife Management Division, Nongame Bird and Mammal Conservation Program for Contract No. FG3146WM. Available at: <https://wildlife.ca.gov/Conservation/SSC/Mammals>.

[25] Remington S. 2011. Bat Surveys of the Proposed Whittier Matrix Oil Project, Whittier, California. Final Report prepared for the Puente Hills Habitat Preservation Authority.

The DEIR Omits Consideration of Several Special-Status Bats that Could Occur at the Project Site

The DEIR's analysis of special-status bats is limited to four bat species included in the 1998 Draft Update of *Terrestrial Mammal Species of Special Concern in California*.[26] Inexplicably, the DEIR omits consideration of other special-status bats[27] that occur in the Project region. These include the western yellow bat, western red bat, hoary bat, and Yuma myotis.[28,29] The western yellow bat, western red bat, and hoary bat are tree-roosting species.[30] The Yuma myotis roosts in a variety of locations, including bridges, buildings, cliff crevices, caves, mines, and trees.[31] The Project site contains trees and building that provide potential roosting sites for these bat species. ORG 6-106

Western Yellow Bat

The western yellow bat is a foliage-roosting species that has been detected near the Project site.[32] This species occurs in the southern portions of California, where it appears to roost exclusively in the skirts of palm trees, often near open water or wetlands.[33] The Project site contains 102 Mexican fan palms[34] located near open water (i.e., the irrigation ponds). Many of these palms have large skirts that provide the preferred roosting habitat for western yellow bats (Figures 4 and 5). As a result, there is at least a moderate potential for western yellow bats to occur at the Project site. ORG 6-107

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[26] The 1998 Draft Update was never finalized by the contracted writers and did not receive peer review. *See* <https://wildlife.ca.gov/Conservation/SSC/Mammals>.

[27] All bats on the CNDDB *Special Animals List* are considered special-status because they are listed under the state or federal Endangered Species Act, are listed as a Species of Special Concern, or are taxa that meet the criteria for listing as described in the California Environmental Quality Act Guidelines (Section 15380). *See* California Natural Diversity Database (CNDDB). May 4, 2022. Review Process for Creating the Special Animals List. California Department of Fish and Wildlife. Sacramento, CA. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=201936&inline>.

[28] Based on a query of the CNDDB for USGS 7.5'quadrangles of Yorba Linda, Baldwin Park and San Dimas. *See also* Remington S. 2011. Bat Surveys of the Proposed Whittier Matrix Oil Project, Whittier, California. Final Report prepared for the Puente Hills Habitat Preservation Authority.

[29] California Natural Diversity Database. 2023 Oct. Special Animals List. California Department of Fish and Wildlife. Sacramento, CA. Available at: <https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals>.

[30] Western Bat Working Group. 2017. Species Matrix. Available at: <https://wbwg.org/matrices/species-matrix/>.

[31] Western Bat Working Group. 2017. Species account for Yuma myotis. Available at: <https://wbwg.org/western-bat-species/>.

[32] California Natural Diversity Database. 2023. RareFind 5 [Internet]. California Department of Fish and Wildlife [Dec 1, 2023]. *See also* Remington S. 2011. Bat Surveys of the Proposed Whittier Matrix Oil Project, Whittier, California. Final Report prepared for the Puente Hills Habitat Preservation Authority.

[33] Pierson ED, Rainey WE. 1998. Western yellow bat, *Lasiurus xanthinus*. In: Bolster BC, ed. Terrestrial Mammal Species of Special Concern in California. pp. 50 and 51. *See also* Marty J, Unnasch R. 2015. Western Yellow Bat (*Lasiurus xanthinus*) (WYBA) Basic Conceptual Ecological Model for the Lower Colorado River. Submitted to the Bureau of Reclamation, Boulder City, Nevada, by Sound Science, LLC, Boise, Idaho.

[34] DEIR, p. 4.4-21.

The DEIR Fails to Establish the Environmental Setting with Respect to Bats

Bats have been seen at the Project site (Attachment 1). However, the Applicant made no efforts to determine: (a) the particular bat species that occur at the Project site; (b) the importance of the Project site as habitat for bats; (c) the presence, abundance, and distribution of bat roosts at the Project site; and (d) whether the Project site contains nursery sites for bats. The DEIR's failure to establish the environmental setting with respect to bats precludes the public from understanding the severity of the Project's impacts on bat populations, and it precludes the County from making an accurate determination on the significance of the Project's environmental impacts. To properly disclose, analyze, and mitigate the Project's impacts on bats, the County must conduct surveys to document the environmental setting with respect to bats, and the subsequent survey data must be released to the public in a recirculated DEIR. ORG 6-108

Golf Courses Provide Important Habitat for Bats

The DEIR assumes the Project site has a low potential to contain special-status bats, that any bat populations at the site "would be in limited amounts," and that any potential impacts associated with the Project "would be expected to be less than significant to regional populations of these species."[35] The basis for these assumptions is that the Project site provides only poor-quality habitat for bats. To the contrary, golf courses provide local landscape features that may provide relatively high-quality habitat for bats. The greater shape complexity of golf courses at the site scale provides increased edge habitat that bats are known to favor for movement and foraging activity, and the characteristic design of golf courses is commensurate with prime foraging habitat.[36] Water features at golf courses provide bats with drinking water and a source of insect prey.[37] These water features may be extremely valuable to bats in hot arid urban landscapes where water is a limiting factor for bats.[38] In addition, golf courses contain large open patches of grass, which is a preferred foraging habitat type for several of California's special-status bat species (e.g., western yellow bat, hoary bat, pallid bat).[39] Grass and other vegetation at golf courses stays greener for longer periods of time (due to irrigation). This likely increases concentrations of prey that are available for longer periods of time, providing reliable foraging habitat for bats.[40] ORG 6-109

Several studies have found high bat species richness and activity at golf courses.[41] The results of these studies reveal that golf courses are hotspots for bat species richness, and that they serve as important habitat refuges for special-status bats. Golf courses in urban landscapes support

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[35] DEIR, p. 4.4-23.

[36] Bazelman TC. 2016. Effects of urbanization on bat habitat use in the Phoenix metropolitan region, Arizona, USA: a multi-scale landscape analysis. Arizona State University.

[37] Wallrichs MA. 2019. Bat Activity on Golf Courses in Delaware. Delaware State University.

[38] Bazelman TC. 2016. Effects of urbanization on bat habitat use in the Phoenix metropolitan region, Arizona, USA: a multi-scale landscape analysis. Arizona State University.

[39] Wallrichs MA. 2019. Bat Activity on Golf Courses in Delaware. Delaware State University. *See also* Western Bat Working Group. 2017. Western Bat Species [web page]. Available at: <https://wbwg.org/western-bat-species/>.

[40] Bazelman TC. 2016. Effects of urbanization on bat habitat use in the Phoenix metropolitan region, Arizona, USA: a multi-scale landscape analysis. Arizona State University.

[41] *Ibid. See also* Drake E, Vonhof M, Maslo B. 2023. Bat use of golf courses depends on surrounding landscape context. Urban Ecosystems 26:1469–1482. *See also* Wallrichs MA. 2019. Bat Activity on Golf Courses in Delaware. Delaware State University.

biodiversity and are especially important to bats.[42] For example, Drake et al. (2023) found that for most species, bat activity was greater on golf courses when the surrounding landscape contained fewer open spaces and more developed land.[43] The led to the conclusion that golf courses may play an important role in wildlife conservation in human-altered landscapes.[44]

Crotch Bumble Bee

ORG 6-110

The DEIR states that the Crotch bumble bee, a candidate for listing under the California Endangered Species Act ("CESA"), occurs on *Eriogonum* and other [unspecified] host plants in the project region.[45] The DEIR then states that there is no potential for the Crotch bumble bee at the Project site because "[t]here is no suitable general or micro-habitat on-site."[46] The DEIR's determination is not supported by evidence. Contrary to what is suggested in the DEIR, the Crotch bumble bee is not confined to sites containing *Eriogonum.* Crotch bumble bees are generalist foragers and have been reported visiting a wide variety of flowering plants.[47]

The CDFW has developed guidelines for evaluating a project's potential for causing impacts to CESA-protected bumble bees.[48] The guidelines entail three steps. The first step involves evaluating historical and current occurrence data to determine whether one of the candidate species is likely to occur within or near a given project area. There are numerous occurrence records of the Crotch bumble bee in the vicinity of the Project site.[49] These include several recent "research grade"[50] records in the iNaturalist database.[51]

The second step in evaluating a project's potential for causing impacts to CESA-protected bumble bees is a habitat assessment. According to the CDFW guidelines:

> "A habitat assessment evaluating the likelihood of bumble bees occurring within and adjacent to the project area should occur and results should be submitted to CDFW prior to initiation of ground disturbing project activities. The assessment

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[42] *Ibid. See also* Burgin S, Wotherspoon D. 2009. The potential for golf courses to support restoration of biodiversity for BioBanking offsets. Urban Ecosystems 12:145-55. *See also* Colding J, Folke C. 2009. The role of golf courses in biodiversity conservation and ecosystem management. Ecosystems 12:191-206. *See also* Nooten SS, Schultheiss P, Wright J, Macdonald C, Singh BK, Cook JM, Power SA. 2018. What shapes plant and animal diversity on urban golf courses? Urban Ecosystems 21:565-576.

[43] Drake E, Vonhof M, Maslo B. 2023. Bat use of golf courses depends on surrounding landscape context. Urban Ecosystems 26:1469–1482.

[44] *Ibid.*

[45] DEIR, Table 4.4-2.

[46] *Ibid.*

[47] California Department of Fish and Wildlife. 2019 Apr 4. Evaluation of the Petition from the Xerces Society, Defenders of Wildlife, and the Center for Food Safety to List Four Species of Bumble Bees as Endangered Under the California Endangered Species Act. Report to the Fish and Game Commission.

[48] California Department of Fish and Wildlife. 2023 Jun 6. Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213150&inline>.

[49] California Natural Diversity Database. 2023. RareFind 5 [Internet]. California Department of Fish and Wildlife [Dec 1, 2023]. *See also* Bumble Bee Watch [database]. Available at: <https://www.bumblebeewatch.org/>. *See also* iNaturalist [database]. Available at: <https://www.inaturalist.org>.

[50] "Research Grade" observations have media, location, a date, and a community consensus on a precise identification (usually at species-level).

[51] *See* <https://www.inaturalist.org/>. (Accessed Dec 31, 2023).

> should include historical and current species occurrences as well as proximity to the last known sighting. The habitat assessment should include data from site visits to observe and document potential habitat including potential foraging, nesting, and/or overwintering resources. The habitat assessment should quantify which plant species are in bloom and what their percent cover is. General plant diversity should also be assessed and documented. The foraging resources should be quantified across multiple site visits, corresponding with the Colony Active Season (see Table 1) of the candidate species in the region where the project is located. Foraging resources recorded should not be limited to the preferred plant species known to be favored by a given candidate species but should include all flowering plants including non-natives and invasives. Nesting resources quantified can include bare ground, rodent burrows, and other potential nesting sites that may support bumble bee colonies. Leaf litter and woody forest edge that could provide overwintering habitat should also be described."[52]

The DEIR provides no information on the floral resources, nesting resources, or potential overwintering habitat for Crotch bumble bees at the Project site. However, according to a homeowner adjacent to the Project site, the Project site and nearby properties contain abundant floral resources during the Colony Active Season (April through August for Crotch bumble bee) and bumble bees have been observed on native plants at 20467 Tam O'Shanter Drive in Walnut (which borders the Project site).[53] In addition, presence of burrowing mammals (California ground squirrel and Botta's pocket gopher) at the Project site indicates the site contains potential nesting resources for the Crotch bumble bee,[54] and a photograph in the Project's Bio Assessment suggests the Project site provides potential overwintering habitat for the Crotch bumble bee.[55]

ORG 6-111

The third step is on-site surveys, which provide the most valuable information for determining potential impacts of a project on bumble bees. According to CDFW, the survey efforts should include multiple on-site surveys, should be developed to detect foraging bumble bees and potential nesting sites, and should be conducted during the Colony Active Period.[56] The Applicant made no effort to survey bumble bees at the Project site.

Collectively, these deficiencies in the DEIR's assessment of the Crotch bumble bee preclude the County from making the determination that the Project has no potential to cause significant impacts on the Crotch bumble bee.

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[52] California Department of Fish and Wildlife. 2023 Jun 6. Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213150&inline>.

[53] Email communication with Wanda Ewing on Dec 31, 2023.

[54] DEIR, p. 4.4-2.

[55] DEIR, Appendix C, Photo 8.

[56] California Department of Fish and Wildlife. 2023 Jun 6. Survey Considerations for California Endangered Species Act (CESA) Candidate Bumble Bee Species. Available at: <https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=213150&inline>.

PROJECT IMPACTS

Special-Status Bats

ORG 6-112

The DEIR states that Project construction activities could impact the eight California Species of Special Concern that have the potential to occur at the site.[57] The DEIR then provides the following analysis of impacts to special-status bats:

> "The existing landscape trees and maintenance structure on the Project Site provide low potential for suitable habitat that would support special-status bat species. The maintenance structure is currently in use and the maintained landscape trees do not constitute a woodland setting, which combined result in a low potential for special-status bat species to occur. In addition, the biological reconnaissance survey did not observe bat species. However, because there is a low or low to moderate potential for these species to occur, and the majority of the habitat found on-site is not suitable to support these species, any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species. Therefore, no mitigation is warranted."[58]

The DEIR's analysis is inconsistent with scientific information pertaining to special-status bats. First, the DEIR's statement that "[t]he existing landscape trees and maintenance structure on the Project Site provide low potential for suitable habitat that would support special-status bat species" is inconsistent with scientific information. As discussed previously, the western yellow bat appears to roost exclusively in the skirts of palm trees. Most of the 102 Mexican fan palms at the Project site have large skirts, which provide excellent roosting habitat for the western yellow bat and potentially other bat species. The assertion that the palms and other trees at the Project site do not constitute a woodland setting *does not* mean that those trees have low potential for special-status bats. For many bat species, the primary factor in habitat selection is the presence of roost sites that contain specific thermal and physical properties—not the presence of a woodland setting (or other land cover type).[59] This is reflected in the DEIR, which acknowledges the pallid bat and western mastiff bat occur in a "variety of habitats."[60] As discussed above, research has shown that golf courses in urban settings may function as important habitat refugia for bats, including special-status species.

Second, the fact that the maintenance structure is currently in use does not preclude occupation by bats. There are numerous records of special-status bat roosts (e.g., pallid bat, western mastiff bat, Yuma myotis) in structures occupied by humans.[61]

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[57] DEIR, p. 4.4-23.

[58] *Ibid.*

[59] Bolster BC (editor). 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report submitted to California Department of Fish and Game Wildlife Management Division, Nongame Bird and Mammal Conservation Program for Contract No. FG3146WM. Available at: <https://wildlife.ca.gov/Conservation/SSC/Mammals>.

[60] DEIR, Table 4.4-2.

[61] California Natural Diversity Database. 2023. RareFind 5 [Internet]. California Department of Fish and Wildlife [Dec 1, 2023].

Third, some bat species can be detected at dusk. However, other species (e.g., western mastiff bat, western red bat, hoary bat, among others) do not emerge from roosts until it is dark and thus require special survey techniques (e.g., acoustic monitoring, mist netting, night vision goggles) to facilitate detection. In addition, most bat roosts are well concealed in areas that are not easily detected through visual inspection surveys.[62] Therefore, the fact that bats were not observed during the reconnaissance survey, which apparently was limited to daylight hours, is not evidence that bats do not occur at the site. To the contrary, local residents have confirmed that bats occur at the Project site (Attachment 1).

Finally, the DEIR's statement that "any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species" is speculative because no efforts were made to document the size and composition of bat populations at the site. The availability of suitable roost sites is the limiting factor for most bat populations.[63] Most California bat species, including some of the species that may occur at the Project site, form nursery colonies in the summer.[64] These maternity roosts can contain hundreds of individuals.[65] Thus, the loss of even a single roost site can have relatively severe implications on the overall population. Furthermore, the CEQA significance threshold adopted in the DEIR is whether the Project would have a "substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species…"[66] Most of the bat species that have the potential to occur at the Project site have a State Rank of S3.[67] This means they are "[a]t moderate risk of extirpation in the state due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors."[68] Bat populations are susceptible to numerous threats, including habitat loss, wind turbine strikes, pesticides, and white-nose syndrome (among other threats).[69] Due to their low fecundity (most bat species produce only one young per year),[70] many bat populations cannot withstand any additional losses.[71] Therefore, any impacts to special-status bats at the Project site are potentially

ORG 6-113

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[62] Western Bat Working Group. 2017. Survey Matrix [online]. Available at: <https://wbwg.org/matrices/survey-matrix/>.

[63] Western Bat Working Group. 2005 (Update). Species Accounts. Available at: <http://wbwg.org/western-bat-species/>.

[64] *Ibid.*

[65] *Ibid. See also* California Department of Fish and Wildlife. 2023. California's Wildlife [online]. Available at: <https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range>.

[66] DEIR, p. 4.4-19.

[67] California Natural Diversity Database. 2023 Oct. Special Animals List. California Department of Fish and Wildlife. Sacramento, CA. Available at: <https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals>.

[68] *Ibid.*

[69] Bolster BC (editor). 1998. Terrestrial Mammal Species of Special Concern in California. Draft Final Report submitted to California Department of Fish and Game Wildlife Management Division, Nongame Bird and Mammal Conservation Program for Contract No. FG3146WM. Available at: <https://wildlife.ca.gov/Conservation/SSC/Mammals>. *See also* Frick WF, Baerwald EF, Pollock JF, Barclay RMR, Szymanski JA, Weller TJ, Russell AL, Loeb SC, Medellin RA, and McGuire LP. 2017. Fatalities at wind turbines may threaten population viability of a migratory bat. Biological Conservation 209:172-177.

[70] Western Bat Working Group. 2017. About Bats [web page]. Available at: <https://wbwg.org/about-bats/>.

[71] *For example, see* Frick WF, Baerwald EF, Pollock JF, Barclay RMR, Szymanski JA, Weller TJ, Russell AL, Loeb SC, Medellin RA, and McGuire LP. 2017. Fatalities at wind turbines may threaten population viability of a migratory bat. Biological Conservation 209:172-177.

significant, and because the DEIR does not incorporate mitigation, those impacts remain unmitigated.

Other Special-Status Species

The DEIR determined: "[c]onstruction could impact the eight California Species of Special Concern with low or low to moderate potential to occur: (Southern California legless lizard, coastal whiptail, San Diego coast horned lizard, burrowing owl, pallid bat, big free-tailed bat, northwestern San Diego pocket mouse, and San Diego desert woodrat) if these species occur on-site."[72] The DEIR does not incorporate mitigation for this impact. Instead, the DEIR speculates that: "any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species."[73] This expectation does not address the CEQA significance thresholds adopted by the DEIR and it conflicts with CDFW's statement that (any) impacts to a California Species of Special are a significant direct and cumulative adverse effect unless appropriate avoidance and/or mitigation measures are implemented.[74]

ORG 6-114

The DEIR's speculation that there would be an unquantified "limited amount" of special-status species at the Project site is not supported by survey data or other scientific evidence. Perhaps more importantly, the DEIR fails to justify its determination that any "small" populations of special-status species at the Project site are unimportant to the conservation of those species, and therefore, elimination of those populations would not be significant.

Small, relatively isolated populations, such as those that may occur at the Project site, have conservation value because they have the potential to: (a) harbor unique genetic traits, which are important to biodiversity and the species' ability to adapt to climate change; (b) promote population persistence by providing individuals capable of recolonizing other habitat areas following local extinctions; and (c) help maintain the overall geographic range of the species. For these reasons, Project impacts to special-status species populations of any size would be potentially significant.

Jurisdictional Features

The DEIR states the following regarding impacts to riparian habitat and Sensitive Natural Communities: "[a]s set forth in the Jurisdictional Delineation, the proposed Project would impact various golf course drainage features including concrete V-ditches, earthen drainage ditches, and the mostly unvegetated golf course irrigation ponds."[75] This statement is incorrect: the Jurisdictional Delineation does not discuss or quantify the Project's impacts on riparian habitat, Sensitive Natural Communities, wetlands, or other jurisdictional features. The DEIR does not resolve this issue because it only identifies the total amount of each resource (e.g., waters of the U.S.) that *could* be impacted by the Project. The DEIR's failure to quantify permanent and temporary impacts to jurisdictional features has implications on the value of Mitigation Measure

ORG 6-115

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[72] DEIR, p. 4.4-23.

[73] *Ibid.*

[74] DEIR, Appendix A, NOP comment letter from CDFW, p. 6.

[75] DEIR, p. 4.4-24.

BIO-2, which requires the Applicant to mitigate the Project's temporary impacts by restoring the impact area to pre-project conditions. As stated in the Jurisdictional Delineation, drainage features at the Project site convey surface flow with the potential to support beneficial uses.[76] The ability of the drainages to support beneficial uses is eliminated if the Project eliminates connectivity with downstream waters. Therefore, restoring segments of the drainages that have been temporarily impacted by the Project would not mitigate the Project's impacts if the Project's permanent impacts eliminate connectivity to downstream waters. In other words, restoring an isolated stream fragment surrounded by Project development does not effectively mitigate the Project's impacts to downstream waters. The DEIR's failure to: (a) quantify the Project's permanent and temporary impacts to jurisdictional features, and (b) identify the spatial relationship of those impacts, precludes the public's ability to evaluate the efficacy of the DEIR's proposed mitigation in reducing the impacts to less-than-significant levels.

Nursery Sites

The DEIR's analysis of Project impacts to native wildlife nursery sites is limited to birds; there is no analysis of potentially significant impacts to nursery sites of other wildlife taxa. Because the Project site functions as an "island" of habitat surrounded by residential and industrial development, it likely serves as a nursery site for many of the mammal species that are known to occur at the site (e.g., bats, racoons, coyotes, California ground squirrels, Botta's pocket gophers, among others). ORG 6-116

Birds

The DEIR acknowledges that the existing landscape trees and structures on the Project Site provide suitable nesting habitat for avian species, that areas containing active bird nests are considered a wildlife nursery site, and that construction of the Project would remove those nursery sites.[77] The DEIR then concludes that implementation of Mitigation Measure BIO-1 (requiring buffers around bird nests during the nesting season) would reduce impacts to active bird nests to less than significant. A fundamental flaw with this reasoning is that although Mitigation Measure BIO-1 may reduce impacts to nesting birds during a particular reproductive cycle, it does nothing to mitigate the permanent loss of the nursery (nest) sites and the associated loss of productivity (population recruitment) from those nursery sites. As a result, Project impacts to wildlife nursery sites are not mitigated and remain potentially significant. ORG 6-117

Young (1948) calculated a density of 32.8 nests per acre at an urban park in Madison, Wisconsin.[78] The two main plant communities at the park were mowed lawn of blue grass (*Poa* spp.) covering approximately 40% of the total area, and numerous plantings of closely spaced arbor vitae (*Thuja occidentalis*), covering approximately 26% of the total area. These plantings were arranged in irregular patterns, making for extensive environmental edges with the grass area. Thus, the Project site and the park in Young's study have similar habitat characteristics. Assuming Young's study site provides a relatively accurate estimate of nest density at the Project site, development at the Project would permanently eliminate 1,563 to 2,481 nest sites (Project ORG 6-118

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[76] DEIR, Appendix D, p. 15.
[77] DEIR, pp. 4.4-26 and -27.
[78] Young H. 1948. A comparative study of nesting birds in a five-acre park. The Wilson Bulletin 61:36-47.

Alternative 4 and Project Alternative 3, respectively)[79] and the associated capacity of those nest sites to maintain bird populations.

The DEIR states the following regarding impacts to birds during operation of the Project:

> "Regular tree and landscape maintenance is expected to occur during the operation of the new residential development. As part of the operational practices, tree and landscape maintenance should be conducted from September 2 to January 31 to avoid conflicts with nesting birds protected under the MBTA and California Fish and Game Code which may occur onsite. These typical maintenance activities would result in less than significant impacts. Operational impacts would be less than significant."[80]

ORG 6-119

The provision for tree and landscape maintenance activities to occur only between September 2 and January 31 is not incorporated as an enforceable mitigation measure. As a result, impacts to nesting birds during the operations phase of the Project remain potentially significant.

Cumulative Impacts

The DEIR provides the following analysis of the Project's contribution to cumulative impacts:

> "The twelve cumulative projects listed in Table 3-1, Cumulative Projects, are almost entirely located within urban settings where there would be no change to biological resources. The proposed Project does not contain sensitive biological resources, aside from the regulated jurisdictional features described above, but it does have the potential to support nesting by birds protected by State and federal regulation. Impacts to nesting birds for the proposed Project and the cumulative projects would be below the level of significance with the incorporation of the stated mitigation measure and compliance with regulations protecting nesting birds. Thus, impacts to biological resources would not be cumulatively significant. Further, given the developed nature of the Project Site and limited potential impacts of the proposed Project, implementation of the Project would not have a cumulatively considerable contribution to cumulative effects on biological resources. Therefore, cumulative impacts to biological resources as a result of implementation of the proposed Project would not be expected to be significant."[81]

ORG 6-120

The assertion that the Project site does not contain sensitive biological resources, aside from the regulated jurisdictional features, is not supported by evidence. Indeed, the DEIR states that there is at least some potential for nine different special-status animals to occur at the site, none of which were subject to surveys sufficient to infer their absence.

The statement that the Project would not have a cumulatively considerable contribution to cumulative effects on biological resources is based on the false premise that the Project site is

ORG 6-121

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[79] Based on development area of each Project alternative, DEIR, pp. ES-8 and -9.

[80] DEIR, p. 4.4-27.

[81] DEIR, p. 4.4-29.

developed. Aside from the maintenance building, sheds, and paved golf cart paths, the Project site *is not* "developed," but rather, consists of turf grass, non-native grasslands, two ponds, several drainage features, and ornamental vegetation.[82] The presence of native wildlife at the site demonstrates that these habitats function as surrogates for native habitat types, and they may provide relatively high-quality habitat for special-status bat species.

ORG 6-122

The DEIR's analysis of cumulative impacts to nesting birds is fundamentally flawed because it only considers direct impacts to bird nests, not the long-term impact habitat loss has on bird populations. In the 48-year period between 1970 and 2018, there was a net loss of nearly 3 billion birds across the U.S. and Canada, or 29% of 1970 abundance.[83] Common birds—the species that many people see every day—have suffered the greatest losses, but there have been devastating losses among birds in every biome.[84] The Project site provides breeding habitat for birds (Figure 6). The Project would eliminate that breeding habitat, thereby further reducing the reproductive capacity of the various bird species that use the Project site for reproduction. Therefore, if the 12 cumulative projects considered in the DEIR are almost entirely located within urban settings "where there would be no change to biological resources" (presumably because biological resource values have already been eliminated), it is illogical for the DEIR to conclude that the Project—which would cause significant changes to avian breeding habitat—would have no contribution to a cumulative impact.

ORG 6-123

MITIGATION

Mitigation Measure BIO-1 (Nesting Birds)

Mitigation Measure BIO-1 states:

> "If Project-related construction and tree maintenance activities cannot occur outside of the general avian breeding season, a pre-activity nesting bird survey shall be conducted prior to the onset of the aforementioned activities, within a maximum of 7 days prior to commencement. The survey shall be conducted by a qualified biologist."[85]

Most bird species construct well-concealed or camouflaged nests, and as a result, finding bird nests generally requires extensive efforts that include observations of bird behaviors (e.g., territorial defense behavior, food deliveries) that are only evident during certain periods of the nesting cycle.[86] In addition, the success of any nest-searching method depends on the surveyor's knowledge of where birds nest, how nesting birds behave, and the best time of day to search for

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[82] DEIR, Appendix C, p. 2.

[83] Rosenberg KV, Dokter AM, Blancher PJ, Sauer JR, Smith AC, Smith PA, Stanton JC, Panjabi A, Helft L, Parr M, Marra PP. 2019. Decline of the North American avifauna. Science. 366(6461):120-4.

[84] *Ibid.*

[85] DEIR, p. 4.4-23.

[86] DeSante DF, Geupel GR. 1987. Landbird productivity in central coastal California: the relationship to annual rainfall and a reproductive failure in 1986. Condor. 89:636-653. *See also* Martin TE, Geupel GR. 1993. Nest-Monitoring Plots: Methods for Locating Nests and Monitoring Success. J. Field Ornithol. 64(4):507-519. *See also* Rodewald AD. 2004. Nest-Searching Cues and Studies of Nest-Site Selection and Nesting Success. J. Field Ornithol. 75(1):31-39.

nests.[87] Attaining this knowledge requires training and experience.[88] Because Mitigation Measure BIO-1 fails to establish standards (minimum qualifications) for the "qualified biologist" that would conduct the nesting bird surveys, it does not ensure that person would have the qualifications needed to successfully locate all nests prior to an activity that could result in take of nesting birds.

Mitigation Measure BIO-1 further states: "[a]ny excessive noise or lighting that could potentially impact the nest shall be directed away from the nest to the greatest extent feasible."[89] Thus, if it is not feasible for the construction contractors to alter the construction schedule or activities, nests would be exposed to noise and lighting, and impacts to nesting birds would remain potentially significant. Based my experience conducting biological monitoring at construction sites, it is almost certain that construction activities will not be modified to accommodate nesting birds if feasibility is determined by the construction contractors. As a result, unless Mitigation Measure BIO-1 is modified to give the Project biologist the authority to limit construction activities in the vicinity of bird nests, impacts to nesting birds would remain potentially significant.

ORG 6-124

Mitigation Measure BIO-2 (Jurisdictional Features)

Mitigation Measure BIO-2 states the following:

> "On- and/or off-site restoration and/or enhancement of USACE/RWQCB jurisdictional "waters of the U.S."/"waters of the State" and wetlands at a ratio no less than 1:1 for permanent impacts, and for temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate). Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank)."[90]

ORG 6-125

Mitigation Measure BIO-2 proposes the same mitigation for impacts to CDFW jurisdictional streambed and associated riparian habitat.

Mitigation Measure BIO-2 suffers several deficiencies. First, the DEIR fails to demonstrate that on-site restoration or enhancement of jurisdictional waters and riparian habitat is a feasible strategy for mitigating the Project's impacts given the proposed development plan and alternatives. Similarly, even if on-site mitigation is feasible, the DEIR fails to provide evidence that on-site mitigation would have any ecological value given the surrounding development.

Second, Mitigation Measure BIO-2 fails to identify how many credits would be purchased at the off-site mitigation bank and which variable(s) would be replaced at a 1:1 ratio. At the Soquel Canyon Mitigation Bank, one ephemeral stream credit is used to preserve, restore, and/or

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[87] Winter M, Hawks SA, Shaffer JA, Johnson DH. 2003. Guidelines for Finding Nests of Passerine Birds in Tallgrass Prairie. The Prairie Naturalist 35(3):197-211.

[88] *Ibid. See also* Martin TE, Geupel GR. 1993. Nest-Monitoring Plots: Methods for Locating Nests and Monitoring Success. J. Field Ornithol. 64(4):507-519.

[89] DEIR, p. 4.4-24.

[90] DEIR, p. 4.4-25.

enhance 0.01 acres of stream, 0.17 acres of riparian buffer, and 0.82 acres of upland buffer.[91] Therefore, if the 1:1 ratio is based solely on permanent impacts to the Project's jurisdictional waters and wetlands, the Project would result in a substantial net loss of aquatic resources. For example, if the Applicant is allowed to purchase 0.36 credits at the Soquel Canyon Mitigation Bank to mitigate impacts to 0.36 acres of jurisdictional waters at the Project site, a mere 0.0036 acres of ephemeral stream would be preserved, restored, and/or enhanced at the Soquel Canyon Mitigation Bank. This would not achieve the state and federal "no net loss" standard and thus the Project's impacts to jurisdictional waters would remain significant.

Third, Mitigation Measure BIO-2 allows the Applicant to enhance jurisdictional waters as mitigation. Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource functions(s), but may also lead to a decline in other aquatic resource function(s). By definition, enhancement as a form of mitigation results in net loss of aquatic resource area, and thus, requires a mitigation ratio greater than 1:1 to mitigate a project's impacts to less-than-significant levels.[92]

This concludes my comments on the DEIR.

Sincerely,

Scott Cashen, M.S.
Senior Biologist

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[91] *See* <https://ribits.ops.usace.army.mil/ords/f?p=107:10:::::P10_BANK_ID:2852>.

[92] California Water Boards. 2019 Apr 2. State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State pp. Staff Report Including the Substitute Environmental Documentation. pp. 24 and 87.

Figure 1. Old sheds in Project Planning Area 2.

Figure 2. Tree with cavity in Project Planning Area 5.

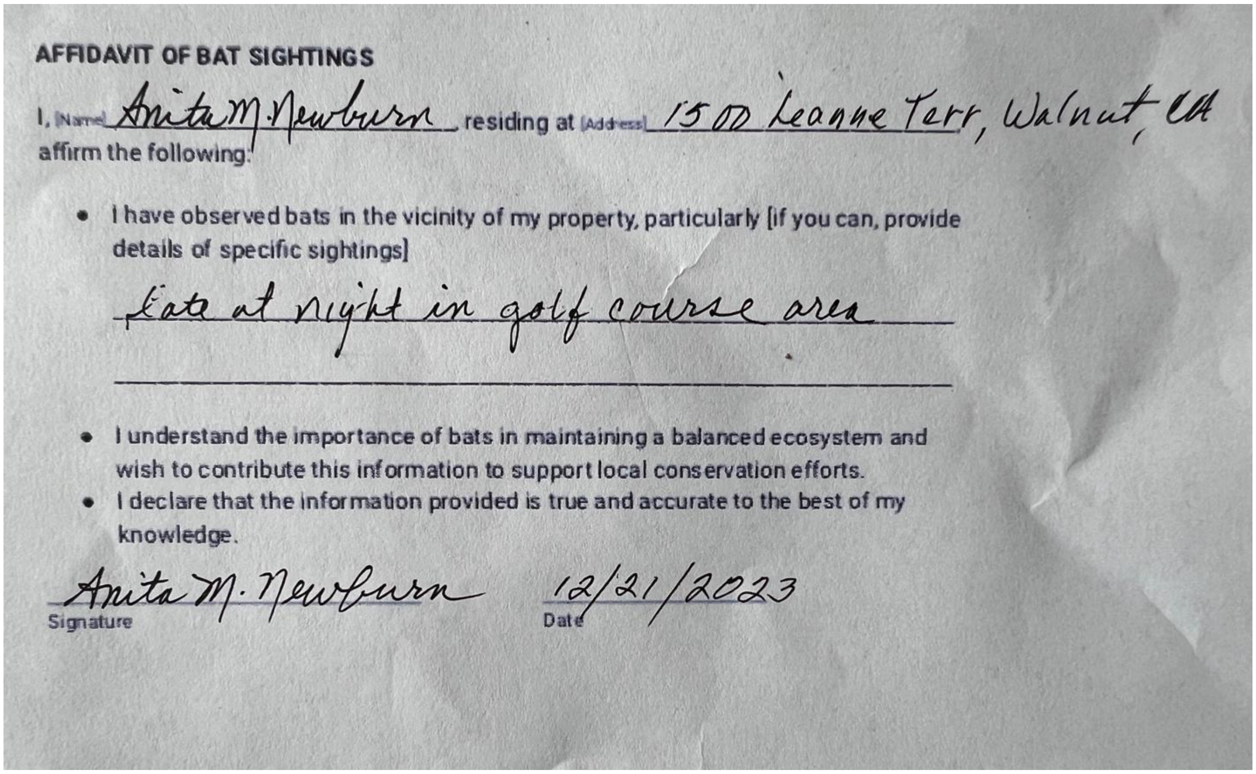
Figure 3. Tree with cavity in Project Planning Area 2.

Figure 4. Mexican fan palms in Project Planning Area 5. The skirts on these palms provide potential roost sites for special-status bats.

Figure 5. Mexican fan palms in Project Planning Area 4. The skirts on these palms provide potential roost sites for special-status bats.

Figure 6. Juvenile black-crowned night heron (red circle) in pond at the Project site.

Attachment 1: Bat Sighting Affidavits.



AFFIDAVIT OF BAT SIGHTINGS

I, [Name] Anita M. Newburn residing at [Address] 1500 Leanne Terr, Walnut, CA affirm the following:

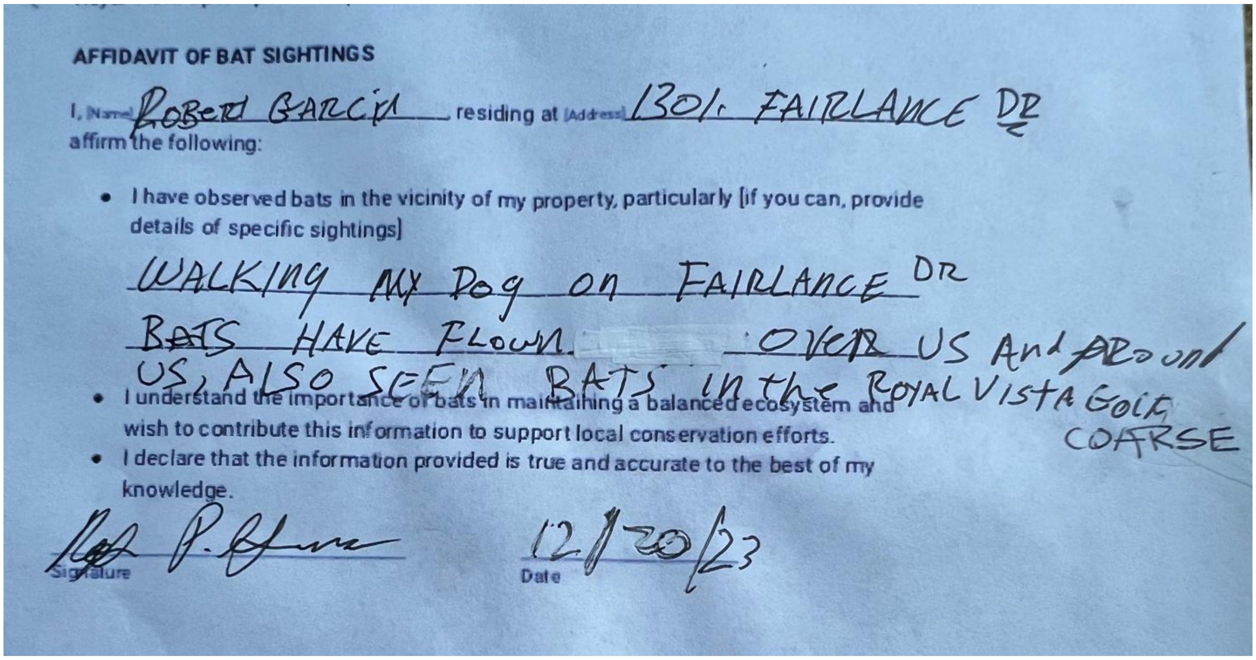
- I have observed bats in the vicinity of my property, particularly [if you can, provide details of specific sightings]

  Bats at night in golf course area

- I understand the importance of bats in maintaining a balanced ecosystem and wish to contribute this information to support local conservation efforts.
- I declare that the information provided is true and accurate to the best of my knowledge.

Anita M. Newburn
Signature

12/21/2023
Date



AFFIDAVIT OF BAT SIGHTINGS

I, [Name] ROBERT GARCIA residing at [Address] 1301. FAIRLANCE DR affirm the following:

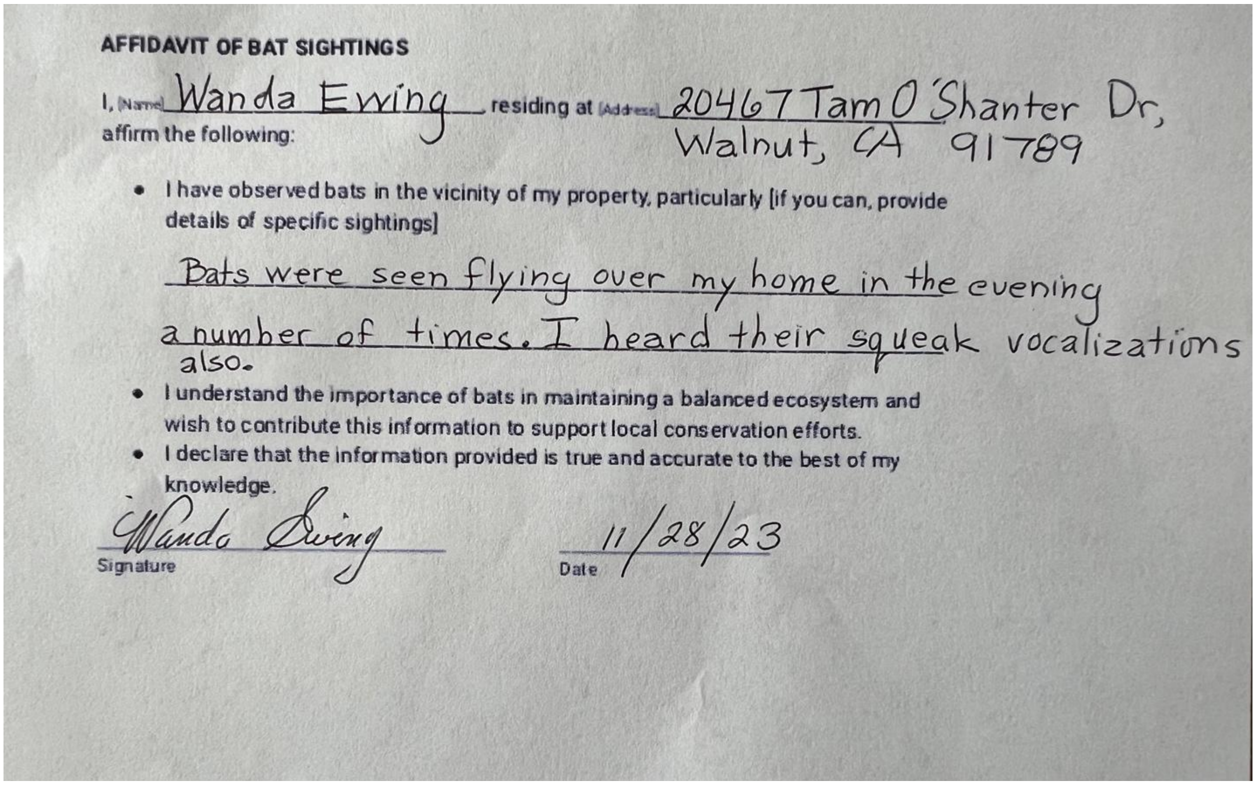
- I have observed bats in the vicinity of my property, particularly [if you can, provide details of specific sightings]

  WALKING MY DOG ON FAIRLANCE DR
  BATS HAVE FLOWN OVER US AND AROUND US, ALSO SEEN BATS IN THE ROYAL VISTA GOLF COURSE

- I understand the importance of bats in maintaining a balanced ecosystem and wish to contribute this information to support local conservation efforts.
- I declare that the information provided is true and accurate to the best of my knowledge.

Signature

12/20/23
Date



AFFIDAVIT OF BAT SIGHTINGS

I, [Name] Wanda Ewing, residing at [Address] 20467 Tam O'Shanter Dr, Walnut, CA 91789 affirm the following:

- I have observed bats in the vicinity of my property, particularly [if you can, provide details of specific sightings]

  Bats were seen flying over my home in the evening a number of times. I heard their squeak vocalizations also.

- I understand the importance of bats in maintaining a balanced ecosystem and wish to contribute this information to support local conservation efforts.
- I declare that the information provided is true and accurate to the best of my knowledge.

Wanda Ewing
Signature

11/28/23
Date

Scott Cashen, M.S.
Senior Wildlife Biologist

Scott Cashen has 28 years of professional experience in natural resources management. During that time he has worked as a field biologist, forester, environmental consultant, and instructor of Wildlife Management. Mr. Cashen focuses on CEQA/NEPA compliance issues, endangered species, scientific field studies, and other topics that require a high level of scientific expertise.

Mr. Cashen has knowledge and experience with numerous taxa, ecoregions, biological resource issues, and environmental regulations. As a biological resources expert, Mr. Cashen is knowledgeable of the various agency-promulgated guidelines for field surveys, impact assessments, and mitigation. Mr. Cashen has led field investigations on several special-status species, including ones focusing on the yellow-legged frog, red-legged frog, desert tortoise, steelhead, burrowing owl, California spotted owl, northern goshawk, willow flycatcher, Peninsular bighorn sheep, red panda, and various forest carnivores.

Mr. Cashen is a recognized expert on the environmental impacts of renewable energy development. He has been involved in the environmental review process of over 100 solar, wind, biomass, and geothermal energy projects. Mr. Cashen's role in this capacity has encompassed all stages of the environmental review process, from initial document review through litigation support. Mr. Cashen provided expert witness testimony on several of the Department of the Interior's "fast-tracked" renewable energy projects. His testimony on those projects helped lead agencies develop project alternatives and mitigation measures to reduce environmental impacts associated with the projects.

Mr. Cashen was a member of the independent scientific review panel for the Quincy Library Group project, the largest community forestry project in the United States. As a member of the panel, Mr. Cashen was responsible for advising the U.S. Forest Service on its scientific monitoring program, and for preparing a final report to Congress describing the effectiveness of the Herger-Feinstein Forest Recovery Act of 1998.

AREAS OF EXPERTISE

- CEQA, NEPA, and Endangered Species Act compliance issues
- Comprehensive biological resource assessments
- Endangered species management
- Renewable energy development
- Scientific field studies, grant writing and technical editing

EDUCATION

M.S. Wildlife and Fisheries Science - The Pennsylvania State University (1998)
Thesis: *Avian Use of Restored Wetlands in Pennsylvania*
B.S. Resource Management - The University of California, Berkeley (1992)

PROFESSIONAL EXPERIENCE

Litigation Support / Expert Witness

Mr. Cashen has served as a biological resources expert for over 125 projects subject to environmental review under the California Environmental Quality Act (CEQA) and/or the National Environmental Policy Act (NEPA). As a biological resources expert, Mr. Cashen reviews CEQA/NEPA documents and provides his clients with an assessment of biological resource issues. He then submits formal comments on the scientific and legal adequacy of the project's environmental documents (e.g., Environmental Impact Report). If needed, Mr. Cashen conducts field studies to generate evidence for legal testimony, or he can obtain supplemental testimony from his deep network of species-specific experts. Mr. Cashen has provided written and oral testimony to the California Energy Commission, California Public Utilities Commission, and U.S. district courts. His clients have included law firms, non-profit organizations, and citizen groups.

REPRESENTATIVE EXPERIENCE

Solar Energy
- Abengoa Mojave Solar Project
- Avenal Energy Power Plant
- Beacon Solar Energy Project
- Blythe Solar Power Project
- Calico Solar Project
- California Flats Solar Project
- Calipatria Solar Farm II
- Carrizo Energy Solar Farm
- Catalina Renewable Energy
- Fink Road Solar Farm
- Genesis Solar Energy Project
- Heber Solar Energy Facility
- Imperial Valley Solar Project
- Ivanpah Solar Electric Generating
- Maricopa Sun Solar Complex
- McCoy Solar Project
- Mt. Signal and Calexico Solar
- Panoche Valley Solar
- San Joaquin Solar I & II
- San Luis Solar Project
- Stateline Solar Project
- Solar Gen II Projects
- SR Solis Oro Loma
- Vestal Solar Facilities
- Victorville 2 Power Project
- Willow Springs Solar

Geothermal Energy
- Casa Diablo IV Geothermal
- East Brawley Geothermal
- Mammoth Pacific 1 Replacement
- Orni 21 Geothermal Project
- Western GeoPower Plant

Wind Energy
- Catalina Renewable Energy
- Ocotillo Wind Energy Project
- SD County Wind Energy
- Searchlight Wind Project
- Shu'luuk Wind Project
- Tres Vaqueros Repowering Project
- Tule Wind Project
- Vasco Winds Relicensing Project

Biomass Facilities
- CA Ethanol Project
- Colusa Biomass Project
- Tracy Green Energy Project

Other Development Projects
- Cal-Am Desalination Project
- Carnegie SVRA Expansion Project
- Lakeview Substation Project
- Monterey Bay Shores Ecoresort
- Phillips 66 Rail Spur
- Valero Benecia Crude By Rail
- World Logistics Center

Project Management

Mr. Cashen has managed several large-scale wildlife, forestry, and natural resource management projects. Many of the projects have required hiring and training field crews, coordinating with other professionals, and communicating with project stakeholders. Mr. Cashen's experience in study design, data collection, and scientific writing make him an effective project manager, and his background in several different natural resource disciplines enable him to address the many facets of contemporary land management in a cost-effective manner.

REPRESENTATIVE EXPERIENCE

Wildlife Studies

- Peninsular Bighorn Sheep Resource Use and Behavior Study: (*CA State Parks*)
- "KV" Spotted Owl and Northern Goshawk Inventory: (*USFS, Plumas NF*)
- Amphibian Inventory Project: (*USFS, Plumas NF*)
- San Mateo Creek Steelhead Restoration Project: (*Trout Unlimited and CA Coastal Conservancy, Orange County*)
- Delta Meadows State Park Special-Status Species Inventory: (*CA State Parks, Locke*)

Natural Resources Management

- Mather Lake Resource Management Study and Plan – (*Sacramento County*)
- Placer County Vernal Pool Study – (*Placer County*)
- Weidemann Ranch Mitigation Project – (*Toll Brothers, Inc., San Ramon*)
- Ion Communities Biological Resource Assessments – (*Ion Communities, Riverside and San Bernardino Counties*)
- Del Rio Hills Biological Resource Assessment – (*The Wyro Company, Rio Vista*)

Forestry

- Forest Health Improvement Projects – (*CalFire, SD and Riverside Counties*)
- San Diego Bark Beetle Tree Removal Project – (*SDG&E, San Diego Co.*)
- San Diego Bark Beetle Tree Removal Project – (*San Diego County/NRCS*)
- Hillslope Monitoring Project – (*CalFire, throughout California*)

Biological Resources

Mr. Cashen has a diverse background with biological resources. He has conducted comprehensive biological resource assessments, habitat evaluations, species inventories, and scientific peer review. Mr. Cashen has led investigations on several special-status species, including ones focusing on the foothill yellow-legged frog, mountain yellow-legged frog, desert tortoise, steelhead, burrowing owl, California spotted owl, northern goshawk, willow flycatcher, Peninsular bighorn sheep, red panda, and forest carnivores.

REPRESENTATIVE EXPERIENCE

Biological Assessments/Biological Evaluations ("BA/BE")

- Aquatic Species BA/BE – Reliable Power Project (*SFPUC*)
- Terrestrial Species BA/BE – Reliable Power Project (*SFPUC*)
- Management Indicator Species Report – Reliable Power Project (*SFPUC*)
- Migratory Bird Report – Reliable Power Project (*SFPUC*)
- Terrestrial and Aquatic Species BA – Lower Cherry Aqueduct (*SFPUC*)
- Terrestrial and Aquatic Species BE – Lower Cherry Aqueduct (*SFPUC*)
- Terrestrial and Aquatic Species BA/BE – Public Lands Lease Application (*Society for the Conservation of Bighorn Sheep*)
- Terrestrial and Aquatic Species BA/BE – Simon Newman Ranch (*The Nature Conservancy*)
- Draft EIR (Vegetation and Special-Status Plants) - Wildland Fire Resiliency Program (*Midpeninsula Regional Open Space District*)

Avian

- Study design and Lead Investigator - Delta Meadows State Park Special-Status Species Inventory *(CA State Parks: Locke)*
- Study design and lead bird surveyor - Placer County Vernal Pool Study *(Placer County: throughout Placer County)*
- Surveyor - Willow flycatcher habitat mapping *(USFS: Plumas NF)*
- Surveyor - Tolay Creek, Cullinan Ranch, and Guadacanal Village restoration projects *(Ducks Unlimited/USGS: San Pablo Bay)*
- Study design and Lead Investigator - Bird use of restored wetlands research *(Pennsylvania Game Commission: throughout Pennsylvania)*
- Study design and surveyor - Baseline inventory of bird species at a 400-acre site in Napa County *(HCV Associates: Napa)*
- Surveyor - Baseline inventory of bird abundance following diesel spill *(LFR Levine-Fricke: Suisun Bay)*

- Study design and lead bird surveyor - Green Valley Creek Riparian Restoration Site *(City of Fairfield: Fairfield, CA)*
- Surveyor - Burrowing owl relocation and monitoring *(US Navy: Dixon, CA)*
- Surveyor - Pre-construction burrowing owl surveys *(various clients: Livermore, San Ramon, Rio Vista, Napa, Victorville, Imperial County, San Diego County)*
- Surveyor - Backcountry bird inventory *(National Park Service: Eagle, Alaska)*
- Lead surveyor - Tidal salt marsh bird surveys (*Point Reyes Bird Observatory: throughout Bay Area*)
- Surveyor – Pre-construction surveys for nesting birds (*various clients and locations)*

Amphibian

- Crew Leader - Red-legged frog, foothill yellow-legged frog, and mountain yellow-legged frog surveys *(USFS: Plumas NF)*
- Surveyor - Foothill yellow-legged frog surveys *(PG&E: North Fork Feather River)*
- Surveyor - Mountain yellow-legged frog surveys *(El Dorado Irrigation District: Desolation Wilderness)*
- Crew Leader - Bullfrog eradication *(Trout Unlimited: Cleveland NF)*

Fish and Aquatic Resources

- Surveyor - Hardhead minnow and other fish surveys *(USFS: Plumas NF)*
- Surveyor - Weber Creek aquatic habitat mapping (*El Dorado Irrigation District: Placerville, CA*)
- Surveyor - Green Valley Creek aquatic habitat mapping *(City of Fairfield: Fairfield, CA)*
- GPS Specialist - Salmonid spawning habitat mapping *(CDFG: Sacramento River)*
- Surveyor - Fish composition and abundance study (*PG&E: Upper North Fork Feather River and Lake Almanor*)
- Crew Leader - Surveys of steelhead abundance and habitat use *(CA Coastal Conservancy: Gualala River estuary)*
- Crew Leader - Exotic species identification and eradication *(Trout Unlimited: Cleveland NF)*

Mammals

- Principal Investigator – Peninsular bighorn sheep resource use and behavior study (*California State Parks: Freeman Properties*)

- Scientific Advisor –Study on red panda occupancy and abundance in eastern Nepal *(The Red Panda Network: CA and Nepal)*
- Surveyor - Forest carnivore surveys *(University of CA: Tahoe NF)*
- Surveyor - Relocation and monitoring of salt marsh harvest mice and other small mammals *(US Navy: Skagg's Island, CA)*
- Surveyor – Surveys for Monterey dusky-footed woodrat. Relocation of woodrat houses (*Touré Associates: Prunedale*)

Natural Resource Investigations / Multiple Species Studies

- Scientific Review Team Member – Member of the scientific review team assessing the effectiveness of the US Forest Service's implementation of the Herger-Feinstein Quincy Library Group Act.
- Lead Consultant - Baseline biological resource assessments and habitat mapping for CDF management units *(CDF: San Diego, San Bernardino, and Riverside Counties)*
- Biological Resources Expert – Peer review of CEQA/NEPA documents (*various law firms, non-profit organizations, and citizen groups)*
- Lead Consultant - Pre- and post-harvest biological resource assessments of tree removal sites *(SDG&E: San Diego County)*
- Crew Leader - T&E species habitat evaluations for Biological Assessment in support of a steelhead restoration plan *(Trout Unlimited: Cleveland NF)*
- Lead Investigator - Resource Management Study and Plan for Mather Lake Regional Park *(County of Sacramento: Sacramento, CA)*
- Lead Investigator - Biological Resources Assessment for 1,070-acre Alfaro Ranch property *(Yuba County, CA)*
- Lead Investigator - Wildlife Strike Hazard Management Plan *(HCV Associates: Napa)*
- Lead Investigator - Del Rio Hills Biological Resource Assessment *(The Wyro Company: Rio Vista, CA)*
- Lead Investigator – Ion Communities project sites (*Ion Communities: Riverside and San Bernardino Counties*)
- Surveyor – Tahoe Pilot Project: Validation of California's Wildlife Habitat Relationships (CWHR) Model *(University of California: Tahoe NF)*

Forestry

Mr. Cashen has five years of experience working as a consulting forester on projects throughout California. Mr. Cashen has consulted with landowners and timber operators on forest management practices; and he has worked on a variety of forestry tasks including selective tree marking, forest inventory, harvest layout, erosion control, and supervision of logging operations. Mr. Cashen's experience with many different natural resources enable him to provide a holistic approach to forest management, rather than just management of timber resources.

REPRESENTATIVE EXPERIENCE

- Lead Consultant - CalFire fuels treatment projects *(SD and Riverside Counties)*
- Lead Consultant and supervisor of harvest activities – San Diego Gas and Electric Bark Beetle Tree Removal Project *(San Diego)*
- Crew Leader - Hillslope Monitoring Program *(CalFire: throughout California)*
- Consulting Forester – Forest inventories and timber harvest projects *(various clients throughout California)*

Grant Writing and Technical Editing

Mr. Cashen has prepared and submitted over 50 proposals and grant applications. Many of the projects listed herein were acquired through proposals he wrote. Mr. Cashen's clients and colleagues have recognized his strong scientific writing skills and ability to generate technically superior proposal packages. Consequently, he routinely prepares funding applications and conducts technical editing for various clients.

PERMITS

U.S. Fish and Wildlife Service Section 10(a)(1)(A) Recovery Permit for the Peninsular bighorn sheep

PROFESSIONAL ORGANIZATIONS / ASSOCIATIONS

The Wildlife Society

Cal Alumni Foresters

Mt. Diablo Audubon Society

OTHER AFFILIATIONS

Scientific Advisor and Grant Writer – *The Red Panda Network*

Scientific Advisor – *Mt. Diablo Audubon Society*

Grant Writer – *American Conservation Experience*

TEACHING EXPERIENCE

Instructor: Wildlife Management - The Pennsylvania State University, 1998

Teaching Assistant: Ornithology - The Pennsylvania State University, 1996-1997

PUBLICATIONS

Gutiérrez RJ, AS Cheng, DR Becker, S Cashen, et al. 2015. Legislated collaboration in a conservation conflict: a case study of the Quincy Library group in California, USA. Chapter 19 *in*: Redpath SR, et al. (eds). Conflicts in Conservation: Navigating Towards Solutions. Cambridge Univ. Press, Cambridge, UK.

Cheng AS, RJ Gutiérrez RJ, S Cashen, et al. 2016. Is There a Place for Legislating Place-Based Collaborative Forestry Proposals?: Examining the Herger-Feinstein Quincy Library Group Forest Recovery Act Pilot Project. Journal of Forestry.

Response to Comment Letter ORG 6

Channel Law Group, LLP

Response ORG 6-1

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Response ORG 6-2

This introductory comment is noted for the record and will be forwarded to the decision-makers for their review and consideration. Specific comments regarding the DEIR are provided and responded to below.

Response ORG 6-3

Commenter raises general concerns regarding the accuracy of the air quality analysis and the significance determination, yet does not identify any specific issue and provides no substantial evidence of a significant impact, only speculation. Speculation is not substantial evidence under CEQA. (CEQA Guidelines section 15145.) As set forth in DEIR section 4.3, Air Quality, and DEIR Appendix B, Air Quality and Greenhouse Gas, the air quality analysis took into account the amount of grading in determining that construction air quality impacts would be less than significant with implementation of mitigation measures AQ-1 and AQ-2.

Response ORG 6-4

The commenter makes a general assertion regarding the conclusions of the DEIR, but does not identify any specific issue or provide substantial evidence of a significant impact. Specific comments regarding the DEIR are provided and responded to below.

Response ORG 6-5

Alternative 3 would develop the entire site (all Planning Areas 1-6) with a total of 97 residential units, consisting of 71 single family residential units and 26 townhomes, consistent with existing zoning, with all 26 townhome units reserved for middle and moderate income households. Planning Areas 2 and 3 are zoned A-1-10,000 and would include 16 single-family lots in Planning Area 2 and 4 single-family lots and 26 townhomes on Planning Area 3. Planning Areas 1, 4, 5 and 6 are zoned A-1-1 and would include 51 single-family lots. Alternative 3 would not require a Zone Change from the current A-1-1 and A-1-10,000 (Light Agricultural) to RPD-5000 (Residential Planned Development) for the proposed single-family homes or for the affordable housing component (townhomes). Under the Alternative, impacts would be to aesthetics, air quality, cultural resources, energy, GHG, hazards and hazardous materials, hydrology and water quality, land use, noise, public services, recreation, transportation, and utilities impacts would occur compared to the Project. This Alternative would reduce the significant and unavoidable VMT impact. However, this Alternative would not reduce the significant and unavoidable impacts for GHG or construction noise. Overall, this Alternative would result in reduced environmental impacts compared to the proposed Project. However, this Alternative would not meet all of the Project Objectives since the Alternative would not include open space or a trail system to encourage outside recreation or provide affordable housing evenly distributed throughout the site plan. The proposed affordable housing would be entirely located in Planning Area 3. As a result, Alternative 3 Existing Zoning Alternative is a reasonable and feasible alternative to the Project. Commenter suggests that Alternative 3 could be modified, but there is no requirement to do so. (Assn. of Irritated Residents v. County of Madera (2003) 107 Cal.App.4th 1383, 1396 [“that additional studies might be helpful does not mean that they are required”].)

As discussed in Section 5.0 Alternatives, CEQA does not prescribe fixed rules governing the type of alternatives to a project that should be analyzed in an EIR; the nature of alternatives varies depending on the context of the project being analyzed and left to the discretion of the lead agency to formulate a reasonable range of alternatives to be considered. As expressed by the California Supreme Court: “CEQA establishes no categorical legal imperative as to the scope of alternatives to be analyzed in an EIR. Each case must be evaluated on its facts, which in turn must be reviewed in light of the statutory purpose.” (Citizens of Goleta Valley v. Board of Supervisors (1990) 52 Cal.3d 553, 564).

Section 15126.6(a) of the CEQA Guidelines provides that:

> [a]n EIR shall describe a range of reasonable alternatives to the project, or to the location of the project, which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives. An EIR need not consider every conceivable alternative to a project. Rather it must consider a reasonable range of potentially feasible alternatives that will foster informed decision making and public participation. An EIR is not required to consider alternatives which are infeasible. The lead agency is responsible for selecting a range of project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. There is no ironclad rule governing the nature or scope of the alternatives to be discussed other than the rule of reason.

Under these principles, an EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and “to foster meaningful public participation and informed decision making” (CEQA Guidelines Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or substantially reduce them; alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of the project objectives (CEQA Guidelines Section 15126.6[b]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project. Rather, the discussion of alternatives must include sufficient information about each alternative to allow “meaningful evaluation, analysis, and comparison with the proposed project” (State CEQA Guidelines Section 15126.6[d]).

The range of alternatives required in an EIR is therefore governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice (State CEQA Guidelines Section 15126.6 [f]). An EIR need not consider every conceivable alternative to a project. Alternatives may be eliminated from detailed consideration in the EIR if they fail to meet most of the basic project objectives, are not feasible, or do not avoid or substantially lessen any significant environmental effects (State CEQA Guidelines Section 15126.6[c]). Moreover, under CEQA, a lead agency may structure its alternatives analysis around a reasonable definition of a fundamental underlying purpose, and need not study alternatives that cannot achieve that basic goal (In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings [2008] 43 Cal.4th 1143, 1165).

CEQA also requires that alternatives evaluated in an EIR be potentially feasible. Feasible is defined in CEQA as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (PRC Section 21061.1). The CEQA Guidelines elaborate that factors that may be taken into account when addressing the feasibility of alternatives include site suitability, economic viability, availability of infrastructure, other plans or regulatory limitations, and jurisdictional boundaries and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (State CEQA Guidelines Section 15126.6[f]). Finally, alternatives should also avoid or substantially lessen one or more significant environmental impact that would occur under the proposed project.

In addition to the requirements described above, CEQA requires evaluation of the "No Project Alternative," which analyzes the environmental effects that would occur if the Project were not to proceed (State CEQA Guidelines Section 15126.6[e]). The purpose of describing and analyzing the No Alternative is to compare the impacts of approving the proposed Project with the impacts of not approving the proposed Project. An EIR is also required to identify the environmentally superior alternative. "If the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives" (State CEQA Guidelines Section 15126.6[e]).

Response ORG 6-6

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response ORG 6-7

Figure 2-1 shows the vicinity of the Project in relation to the surrounding cities. Further, Section 3.0 Environmental Setting, describes in detail the Project site, the local setting and the surrounding regional setting. Further, CEQA Guidelines section 15124 states a project description "should not supply extensive detail beyond that needed for evaluation and review of the environmental impact." The commenter asserts that additional materials are necessary but does not identify any specific CEQA issues to which they are relevant or explain how they are necessary to "judge the accuracy and adequacy of the DEIR." The Project Description is adequate under CEQA Guidelines section 15124. The project description is not required to include plans. Project plans will need to be finalized and approved prior to the issuance of the grading permit.

While the additional materials identified in the comment are not necessary to evaluate CEQA impacts, the Project Vesting Tentative Tract Map (VTTM) includes preliminary grading plans, landscape plans, utility plans, drainage and geology, and these are available for public review on the County's website.

Response ORG 6-8

The commenter's presentation of the Project grading quantities is misleading and inaccurate. The commenter's quotes from the DEIR are accurate, however the presentation of Table 1 is not accurate. The DEIR presentation of "over-excavation and re-compaction" is accurate as to the type of grading activities that are anticipated. The DEIR grading and excavation quantities are from the geotechnical engineer's calculations based on the site conditions and County design requirements. While the commenter asserts that additional detail is required in the Project Description, it fails to identify any such requirement. CEQA Guidelines section 15124 states the project description "should not supply extensive detail beyond that needed for evaluation and review of the environmental impact". That standard is met by the DEIR Project Description. The calculations performed to come up with the grading and excavation quantities would be considered "extensive details" in a project description under CEQA Guidelines section 15124. The detailed calculations prepared by the geotechnical engineer, LGC Geotechnical, for the grading and excavation can be found in Appendix G.

Response ORG 6-9

The Project Description includes a general description of the geologic condition of the site and relies on the technical sections to include more details (e.g., Section 4.7, Geology and Soils). The Project Description provides that "The maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during construction of the golf course." (DEIR page 2-10.) As discussed in Section 4.7, Geology and Soils, the Project discloses in several places, including page 4.7-5, that the estimated maximum depths of removals would be up to approximately 25 feet below existing grades in the low-lying areas, with one isolated area within Planning Area 5 that may be as deep as 30 feet. The Project Description's more general excavation description is not inconsistent with the more detailed description in DEIR Section 4.7. However, the Project Description, page 2-10, will be clarified to include the following text (<u>underline</u>):

The maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during construction of the golf course, <u>except for one isolated area within Planning Area 5 that may be as deep as 30 feet.</u>

Response ORG 6-10

The Project Description describes the construction window as 3 years. CEQA Guidelines section 15124 states a Project Description "should not supply extensive detail beyond that needed for evaluation and review of the environmental impact". The Project Description is not required to include construction specifics. All of the necessary details for impact analyses relating to construction phasing and timing are provided in the respective DEIR sections and/or technical reports, e.g., DEIR Section 4.3 Air Quality, DEIR Section 4.6, Energy, DEIR Section 4.8 Greenhouse Gas Emissions, etc. The commenter does not identify a specific CEQA issue for which additional information is necessary.

Response ORG 6-11

During construction, soil will be moved throughout the Project site. The stockpiling of soil will be mobile and temporary, moving as needed to accommodate the grading plan. The on-site movement of soil from one location to another is the concept behind the action of grading a site. The volume of soil the commenter is referring to is the total Project volume of soil and total volume includes temporary stockpiling volume being counted twice, consistent with County requirements. During Project excavation, the cut (387,100 cubic yards) and over-excavation (1,544,400 cubic yards) volume would be temporarily stockpiled on site and when the site is ready for re-compaction, the same quantity (1,931,500 cubic yards) of soil would be redistributed on site and compacted to create roadways and the residential lots (Project grading plus over-excavation, re-compaction and export totals approximately 3,863,200 cubic yards). It should be noted that the total stockpiled volume would be less due to immediate reuse, shrinkage, and export (133,700 cubic yards). At no one time could it be feasible that the entire Project site volume of soil would be stockpiled in one on-site location. The air quality and noise analyses appropriately took into account the grading of the Project site, at the qualities calculated. Commenter has provided no evidence that the air quality and noise analyses contain errors or identified any additional information needed to understand or evaluate the DEIR analyses.

Response ORG 6-12

The Project Description includes a general description of the stormwater system of the Project site and relies on the technical sections to include more details. See Section 4.10.5, Hydrology and Water Quality. CEQA Guidelines section 15124 states the project description “should not supply extensive detail beyond that needed for evaluation and review of the environmental impact”. The Project Description is adequate under CEQA Guidelines section 15124 and the additional details regarding the existing drainage system and proposed stormwater management system are appropriately provided in Section 4.10, Hydrology and Water Quality, as well as in DEIR Appendix J, Hydrology Report and LID Report. The Preliminary Hydrology Report presents concept-level hydrologic and hydraulics analyses of the 25-year storm event for the existing and proposed conditions of the Project Site. The analyses facilitate the design of drainage and detention systems that will provide adequate conveyance and stormwater control without adversely impacting the proposed development, surrounding areas, neighboring properties, and/or existing storm drain facilities.

Response ORG 6-13

The Royal Vista Golf Club was in operation as of the date of the release of the NOP (October 13, 2022) and remained in operation, with hours generally from 6 a.m. to 8 p.m. Monday through Sunday, until it ceased operation at the end of February 2024. The Royal Vista Golf Club is a privately owned golf course which is open to public play. There is no common ownership or control of the Project Site and the adjacent golf course property. However, the details of the ownership of the adjacent property are not relevant to CEQA issues and do not need to be addressed in the DEIR.

The purpose of the Environmental Setting section is to describe the physical environmental conditions of the site and the surrounding areas (CEQA Guidelines section 15125). The specific map showing Waters of the United States and topography of the site, utilities and stormwater system can be found in the appropriated environmental sections and appendices of the DEIR. See Section 3.7, Geology and Soils, for the description and disclosure of the landslide in Planning Area 5. See Figure 4.7-1, Landslide Location for the specific landslide location. The DEIR Environmental Setting section is adequate under CEQA Guidelines section 15125 and the details demanded are appropriately provided in other sections of the DEIR.

Response ORG 6-14

See Response FORM 1-2 and Response IND-22-3. CEQA Guidelines Section 15125(a) requires EIRs to contain a description of the physical environmental conditions in the vicinity of the Project, as they exist at the time the Notice of Preparation (NOP) is published, or if no NOP is published, at the time environmental analysis is commenced, from both a local and regional perspective. The NOP release date for the Royal Vista Residential Project was October 13, 2022, which establishes the relevant date for identification of cumulative projects. No general plan amendment, zone change, subdivision or other discretionary development application was filed with LA County Planning for a project on the adjacent property as of the date of release of either the NOP or the DEIR, or as of the date of the preparation of this response. CEQA does not require the analysis of speculative impacts. (CEQA Guidelines section 15145.)

Response ORG 6-15

Project Design Features (PDFs) are specific design and/or operational characteristics proposed by the subdivider that are incorporated into the Project as project features. Because PDFs are incorporated and conditioned into the Project, they do not constitute mitigation measures as they are project features that are proposed as part of the proposed project, not in response to environmental impact determinations. To the extent a PDF was considered in the impact analysis (which is appropriate as PDFs are part of the project), the DEIR fully disclosed how that PDF was taken into account. For example, with respect to the aesthetic impact analysis, PDF AES-1 provides certain requirements for lighting. Lighting improves safety but also needs to be shielded to prevent unnecessary light spillage and glare at surrounding sensitive receptors. As a result, the implementation of PDF AES-1 would reduce the potential for light or glare, which would adversely affect day or nighttime views in the area (DEIR, page 4.1-41). As such, there is no Lotus violation. The Lotus case mentioned in the comment involved the adoption of mitigation absent analysis demonstrating a significant impact requiring mitigation. The DEIR provides transparent analysis on when a PDF is being incorporated into the analysis versus the requirement of implementing a mitigation measure to reduce a significant impact.

With respect to PDF AQ-1, each of the 10 features of the air quality PDF are subdivider proposed project features designed to achieve Project energy and emission saving features. There is no associated determination of a significant impact regarding the listed features that would require mitigation. Commenter has not identified any missing analysis or significant impact determination requiring mitigation. As is evident from the descriptions below, none of the features are mitigation:

- The 360 dwelling units will be wired for solar roof panels which can save energy by producing solar electricity and offer credit for excess solar electricity produced.
- Each garage will be wired for EV car charging.
- Radiant barrier roof sheathing to improve cooling energy efficiency.
- Low-E, dual pane windows block 95 percent of UV rays will reduce window heat gain by 64 percent compared to ordinary glass.
- Improved insulation techniques will help to minimize gaps and higher thermal properties (R-value) add to energy efficiency.
- Designed and properly sealed duct system will improve comfort and efficiency.
- Programmable thermostats will be included to regulate home temperatures year-round.
- High efficiency ENERGY STAR® rated water heater, refrigerator, and dishwashers will help save money by using less power.
- All lighting on the Project Site would be light-emitting diode (LED).
- The Project would include open space buffers adjacent to most existing adjacent residential land uses, within which public trails will be included to facilitate pedestrian and bicycle circulation within the Project Site.

With respect to PDF T-1 (Increase Residential Density) and T-2 (Locate Project near Bike Path/Bike Lane), these PDFs are from the California Air Pollution Control Officers Association's (CAPCOA) Handbook for Analyzing Greenhouse Gas Emissions Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity (2021 Handbook) as PDFs. Incorporation of recommended project design features are not mitigation measures, rather they are design features that are proposed as part of the Project and would be further documented as conditions of any Project approval. Commenter has not identified any missing analysis or significant impact determination requiring mitigation. Attachment B describes the conditions that the subdivision Tract Map Number 83534 will be required to conform to the design standards and policies of Public Works. Thes design standards that have been incorporated into the Project as PDFs and does not require that these design standards are mitigation measures.

With respect to PDF GHG-1 and GHG-2, each PDF contains subdivider proposed project features designed to achieve Project energy and emission savings. There is no associated determination of a significant impact regarding the listed features that would require mitigation. Commenter has not identified any missing analysis or significant impact determination requiring mitigation. As is evident from the descriptions below, none of the features are mitigation:

Non-quantifiable GHG Reduction Measures (PDF GHG-1):

- The 360 dwelling units will be wired for solar roof panels which can save energy by producing solar electricity and offer credit for excess solar electricity produced.

- Each garage will be wired for EV car charging.
- Radiant barrier roof sheathing to improve cooling energy efficiency.
- Low-E, dual pane windows block 95 percent of UV rays.
- Improved insulation techniques to help to minimize gaps and higher thermal properties (R-value) add to energy efficiency.
- Designed and properly sealed duct system to improve comfort and efficiency.
- Programmable thermostats will be included to regulate home temperatures year-round.
- Open space buffers adjacent to most existing adjacent residential land uses that include public trails to facilitate pedestrian and bicycle circulation within the Project Site as depicted on the approved Vesting Tentative Tract Map.
- To incorporate teleworking, each residential unit would be sized to accommodate home offices and be equipped with new and efficient internet and phone cable systems. (2021 GHG Handbook Measure Transportation T-4).

Quantifiable GHG Reduction Measures (PDF GHG-2):

- Each unit shall be equipped with high efficiency ENERGY STAR® rated water heater, refrigerator, and dishwashers. (2021 CAPCOA GHG Handbook Measure Energy E-2).
- All lighting on the Project Site would be light-emitting diode (LED). (2021 CAPCOA GHG Handbook Measure Energy E-2).
- The proposed Project would not include any natural gas infrastructure. (2021 CAPCOA GHG Handbook Measure Energy E-15).
- Electricity would be provided by the Clean Power Alliance and would be 100 percent renewable, unless the resident(s) opt-out. (2021 CAPCOA GHG Handbook Measure Energy E-11).
- Low-flow water fixtures and native landscaping. (2021 CAPCOA GHG Handbook Measure Water W-5).

With respect to Footnote 6, on DEIR page 4.17-25, this is an accurate statement. Level of Service (LOS) is no longer the allowed traffic impact analysis; vehicle miles travelled (VMT) is the required traffic impact analysis. PDFs T-3 through T-8 are design features that improve LOS and circulation; they are not features that will reduce VMT and as such they would not reduce VMT impacts. As such, these PDFs are not VMT mitigation measures. That said, as stated in the Project Description, overall these PDFs will help reduce “Project transportation-related impacts” by providing additional queuing capacity at the surrounding intersections thus improving off-site street circulation and intersection delay.

With respect to the enforceability of PDFs, PDFs, like Mitigation Measures, are included in the Project’s Mitigation Monitoring Program (see Mitigation Monitoring Program, of this Final EIR). As such, as with Mitigation Measures, Project Design Features are fully enforceable. In addition, separate from the CEQA requirement of enforceability of a Mitigation Monitoring Program, the County’s standard project conditions include the enforcement of the entirety of the Mitigation Monitoring Program.

The DEIR's impact analyses utilizing PDFs, as appropriate, fully complied with requirements of CEQA.

Response ORG 6-16

As discussed in Response ORG 6-11 above, during construction, soil will be moved throughout the Project site. The stockpiling of soil will be mobile and temporary moving as needed to accommodate the grading plan. The movement of soil from one on-site location to another is the concept behind the action of grading a site. DEIR Section 4.1 Aesthetics, Impact AES-1 and AES-3 each addressed the potential aesthetic impacts from Project construction (which includes grading) and determined that impacts would be less than significant and no impact, since construction/grading is temporary and would not result in any long term visual impacts and as discussed in Section 4.1 Aesthetics, there are no existing scenic vistas or other significant visual resources visible within the Project Site or in the surrounding area.

Response ORG 6-17

DEIR Table 4.1-1 analyzes the Project's consistency with applicable aesthetic policies of the County General Plan. As discussed in Table 4.1-1, the design and scale of the Project is compatible with the built environment of the surrounding area. Single family residential lots are in keeping with the lot sizes of existing single-family lots in the Project vicinity. The townhome, duplexes and triplexes design are similar to other multi-family uses in the area and are sited to minimize the appearance of scale.

Architectural amenities associated within the Project include both single-family residences, duplexes, triplexes, and townhomes, with similar, yet varying dimensions and styles. All proposed housing types will be in compliance with applicable design policies of the County's zoning code, including building facades that face the street and would consist of materials or designs distinguishable from the rest of the façade, such as offset planes and other architectural accents. The building facades would consist of materials and designs that are neutral and non-reflective, such as stucco, wood, and concrete. Through design and variety of materials, building height variations, and landscaping, development within the Project Site would be consistent with single-family residences in the vicinity. Development of the proposed residences and open space is being planned to be consistent with development standards set forth in the LACC, Rowland Heights Community Plan, and the Rowland Heights CSD, including permitted lot coverage, front and side yard building setbacks, and landscaping requirements.

DEIR Table 4.11-2 and Table 4.11-3 analyze the Project's consistency with applicable guiding principles and policies of the County General Plan and Table 4.11-4 analyzes the Project's consistency with applicable policies of the Rowland Heights Community Plan.

The Project is an urban infill development that repurposes a portion of a privately owned golf course facility with housing units. The Project Site is surrounded by similarly scaled single-family residential development and is located in proximity to shopping centers, and multiple regional and local bus lines and the I-60. As an infill project, the Project would not develop in areas with established habitat. The Project would convert a portion of an existing golf course to a residential development with approximately 28 acres of open space which would buffer new residential land uses from most existing adjacent residential land uses, within which public-use trails, over two miles in length, will be included to facilitate pedestrian and bicycle circulation / connections between the Project's residential components, and the adjacent existing residential neighborhood.

The proposed Project consists of a planned residential development with a mix of housing types and sizes that accommodate different income levels and building types. The Project would require General Plan and Community Plan Amendments (Rowland Heights Community Plan): OS (Open Space) to Urban 2 ((U2); 3.3 to 6.0 dwelling units per acre) for portions of Planning Areas 1, 2 and 5; to Urban 3 ((U3); 6.1 to 12.0 dwelling units per acre) for portions of Planning Areas 1 and 5; and to Urban 4 ((U4); 12.1 to 22.0 dwelling units per acre) for a portion of Planning Area 3. The fact that the Project requires discretionary entitlements does not mean the Project is inconsistent with the applicable policies, as the entitlements need to be consistent with polices to allow for the revisions to the underlying zoning. Amendments to the General Plan and Community Plan are not mitigation measures. Moreover, discretionary actions by the County are not considered mitigation measures under CEQA. Without the approval of the General Plan and Community Plan Amendment, Zone Change, Vesting Tentative Map Tract, and Conditional Use Permit, the Project would not be implemented.

Response ORG 6-18

As discussed in Section 4.1 Aesthetics, the Project is not anticipated to require nighttime construction lighting other than for security reasons. If nighttime construction lighting is required, it would be temporary. As discussed in DEIR Section 4.1, existing residential lighting as well as street lighting currently introduce relatively high levels of ambient light in the Project vicinity, any artificial light associated with temporary construction activities would not significantly impact existing residential uses in a manner that would adversely affect nighttime views.

Solar panels are designed to capture light, not reflect it. A solar panel is comprised of numerous solar cells. A solar cell differs from a typical reflective surface in that it has a microscopically irregular surface designed to trap the rays of sunlight for the purposes of energy production. The intent of solar technology is to increase efficiency by absorbing as much light as possible, minimizing reflection and glare. Solar glass sheets (the glass layer that covers the solar panels) are typically tempered and/or textured glass that is treated with an anti-reflective or diffusion coating that further diffuses the intensity of glare produced. Modern solar panels reflect as little as two percent of incoming sunlight, which is approximately the same as water and less than soil or even wood shingles.[2]Further, the proposed Project would not use highly reflective materials for roofing or exterior siding as required by LACC Section 22.140.580 (d) of the County Code. The proposed residential homes and townhomes would use neutral tones, and non-reflective materials, such as wood, stucco and concrete.

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[2] National Renewable Energy Laboratory, Research and Analysis Demonstrate the Lack of Impacts of Glare from Photovoltaic Modules, July 31, 2018.

As a result, the DEIR adequately addresses the concern of construction grading, lighting and glare. See Response ORG 6-16 regarding stockpiling. As a result, the DEIR does not need to be recirculated.

Response ORG 6-19

As discussed in Section 4.3, Air Quality, the SCAQMD thresholds of significance are identified and discussed in Section 4.3.3, Thresholds of Significance. The Mass Daily Thresholds for Criteria Pollutants for construction and operation are addressed on page 4.3-35 of the DEIR. As presented, in Table 4.3-1, on page 4.3-12 of the DEIR, the County is under partial attainment for lead due to localized emissions from two lead-acid battery recycling facilities in the City of Vernon and City of Industry. The Project is a portion of an existing golf course, in the unincorporated community of Rowland Heights, and not an industrial land use. As a result, it does not warrant the need to evaluate the SCAQMD threshold for lead. Toxic air contaminant (TAC) thresholds are discussed on page 4.3-36 of the DEIR. Additionally, the Ambient Air Quality Standards for Criteria Pollutants thresholds outlined in the table are the Localized Significance Thresholds located on page 4.3-36 of the DEIR. The odors threshold is discussed on page 4.3-29 of the DEIR. The GHG threshold is discussed in Section 4.8, Greenhouse Gas Emissions. Thus, the analysis addresses all of the SCAQMD Air Quality Significance Thresholds and therefore, does not substantially underestimate Project construction or operation emissions.

The air quality cumulative analysis is addressed in Section 4.3.7, Cumulative Impacts. As discussed on page 4.3-36 of the DEIR, because the Project would have limited sources of TACs associated with construction and would not have any stationary sources during operations, a qualitative assessment was used to determine whether the Project would result in a significant impact by exceeding the above-referenced standard. A qualitative assessment is consistent with the CARB Handbook.[3] If the qualitative analysis does not rule out significant impacts from a new source, or modification of an existing TAC emissions source, a more detailed analysis is conducted, including quantifying emissions. As discussed below, the DEIR provides substantial evidence that the Project would have limited sources of TACs associated with construction that would generate short-term emissions that would be dispersed over a large area and not concentrated near any one specific receptor and would not have any stationary sources during operations. Therefore, a quantitative assessment is not required consistent with SCAQMD guidance.

As discussed in Section 4.3, Air Quality, construction activities would occur on the Project site over approximately 36 months. For potential health risks, the construction duration would be significantly lower than the 70-year residential exposure period associated with cancer health risks. Sensitive receptors (i.e., residential receptors) may be exposed to diesel particulate matter (DPM), which the State of California has identified as a TAC, from the exhaust from construction equipment and diesel-fueled motor vehicles.

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[3] CARB, 2005. Air Quality and Land Use Handbook, a Community Health Perspective, April. https://www.aqmd.gov/docs/default-source/ceqa/handbook/california-air-resources-board-air-quality-and-land-use-handbook-a-community-health-perspective.pdf

The construction area is spread out over approximately 75 acres with open space buffers along multiple Project boundaries. Construction activities will move around the Project site, and construction near any single sensitive receptor is expected to be at a much shorter duration than the estimated 36-month construction schedule. DPM has no acute exposure factors (i.e., no short-term effects). Therefore, the SCAQMD Handbook does not recommend an analysis of TACs from short-term construction activities, which result in a limited duration of exposure. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. Specifically, "Individual Cancer Risk" is the likelihood that a person continuously exposed to concentrations of TACs over a 70-year lifetime will contract cancer based on the use of standard risk assessment methodology. Health risk impacts would not be anticipated due to the short-term and temporary construction duration (36 out of 840 months of a 70-year lifetime), the buffers to nearby sensitive receptors, the movement of construction activities around the Project site and short time frame near any single receptor, and the correspondingly small emissions relative to the SCAQMD thresholds. Furthermore, the Project would incorporate Mitigation Measure AQ-1 (see page 4.3-45 of the DEIR), which requires the use of Tier 4 Final off-road diesel construction equipment for any equipment greater than 50 horsepower. The use of Tier 4 Final off-road diesel construction equipment reduces DPM emissions by at least 84.4 percent compared to the default CalEEMod fleet mix, which includes Tier 0 to Tier 3 equipment that produce larger amounts of DPM emissions. Furthermore, construction contractors would be required to comply with regulations that limit diesel emissions, such as the CARB Air Toxics Control Measure that limits diesel vehicle idling to no more than five minutes at a location (Section 2485 in Title 13 of the California Code of Regulations [CCR]), the Truck and Bus regulation that reduces NO_X, PM_{10}, and $PM_{2.5}$ emissions from existing diesel vehicles operating in California (13 CCR, Section 2025) and the In-Use Off-Road Diesel Fueled Fleets regulation that reduces emissions by the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission controlled models (13 CCR, Section 2449). No residual emissions and corresponding individual cancer risk are anticipated after construction. Therefore, because construction is short-term and temporary (36 out of 840 months of a 70-year lifetime), health risks associated with DPM emissions during construction would be less than significant. In addition, as discussed above, the Project would not result in a localized significant impact.

During long-term operations, TACs could be emitted as part of periodic maintenance operations, routine cleaning, periodic painting, etc., and from periodic visits from delivery trucks and service vehicles. However, these events would be occasional and result in minimal emissions exposure to off-site sensitive receptors. As the Project consists of residential and open space land uses, the Project would not include sources of substantial TAC emissions identified by the SCAQMD or CARB siting recommendations.[4][5]

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[4] SCAQMD, 2005. Guidance Document for Addressing Air Quality Issues in General Plans and Local Planning, May 6. https://www.aqmd.gov/docs/default-source/planning/air-quality-guidance/complete-guidance-document.pdf?sfvrsn=4

[5] CARB, 2005. Air Quality and Land Use Handbook, a Community Health Perspective, April. https://www.aqmd.gov/docs/default-source/ceqa/handbook/california-air-resources-board-air-quality-and-land-use-handbook-a-community-health-perspective.pdf

As discussed on pages 4.3-52 through 4.3-53 of the DEIR, the Project does not pose a potential DPM risk during construction or operation and impacts would be less than significant. Since TACs impacts are less than significant, they would not contribute to a cumulative TAC risk. Therefore, the DEIR does not fail to assess the Project's and cumulative potential TAC emissions and a quantitative analysis is not required consistent with SCAQMD guidance.

As discussed on page 4.3-14 of the DEIR, the existing Project site generates minimal man-made emissions. Emission sources include traffic from visitors and employees traveling to and from the golf course and driving range. The Project's net new emissions were calculated by subtracting out existing operational emissions from mobile trips to and from the Project site. As shown in Table 4.3-3, page 4.3-17 of the DEIR, area and energy emissions are less than 1 Pounds Per Day (PPD) and mobile source emissions range from less than 1 PPD for SO_2 to 20 PPD for CO. As shown in the Traffic Impact Assessment (Appendix M Traffic Study), the existing Project site is currently occupied by portions of the Royal Vista Golf Course which comprise 13 golf course holes and the driving range, and which was in full operation as of the release of the NOP and the DEIR, and which operated until the golf course closure in February, 2024[6]. The golf course holes and driving range on the Project Site will be removed in order to accommodate development of the proposed residential Project. Trip generation forecasts were prepared for the existing Royal Vista Golf Course components which are planned for demolition using trip generation average rates for Land Use 430: Golf Course and Land Use 432: Golf Driving Range. The existing uses on the Project Site generate approximately 764 trips per day, while the Project buildout would generate 3,007 trips per day. In total, the Project would generate 2,243 net trips per day. Operational air quality impacts are assessed based on the incremental increase in emissions compared to baseline conditions. Therefore, it is appropriate to deduct existing emissions only from the Project site from Project emissions to get net Project emissions since the portion of the Royal Vista Golf Course on the Project Site was in full operation as of the release of the NOP**.** All golf course existing emissions were not used calculate net Project emissions; just those emissions from the Project site portion of the golf course.

Response ORG 6-20

As discussed on page 89 of Appendix M, Traffic Impact Assessment, of the DEIR, the construction vehicles that are planned to be utilized for import and export activities would have a capacity of 13 cubic yards per truck. During the Grading/Excavation phase (which is expected to occur over 262 work days), a total of 10,277 haul trucks will be required (i.e., 133,600 CY material export/13 CY trucks = 10,277 truckloads of material export). Therefore, on average a total of 40 haul trucks are expected to travel to the Project site and from the Project site on a daily basis (i.e., 10,277 truckloads/262 days = 40 truckloads/day) generating 40 inbound and 40 outbound trips per day. During the most intensive ("worst-case") material hauling activities, a maximum of up to 50 truckloads may access the site per day. The maximum of up to 50 truckloads per day corresponds to approximately six (6) truckloads per hour, assuming that hauling overlaps with the AM peak hour but concludes by 3:30 PM (i.e., prior to the PM peak hour) after an 8-hour workday (i.e., approximately six in bound and six outbound trips per hour).

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[6] https://www.koreadailyus.com/royal-vista-favored-golf-course-among-korean-golfers-in-socal-closes-on-feb-29/, accessed 5/1/2024

This equates to approximately 15 inbound and 15 outbound passenger car equivalent (PCE) vehicle trips, or a total of 30 PCE-adjusted vehicle trips during the AM peak hour (i.e., when accounting for a passenger car equivalency factor [PCE] of 2.5 for each 13 cubic yard capacity haul truck). As shown in the discussion above, the inbound and outbound truck trips were accounted for in the Project analysis. Therefore, the assumptions used in the analysis do not need to be doubled as the commenter suggests and the DEIR does not significantly underestimate Project air quality impacts. The commenter is applying their own construction assumptions (such as the use of 10 CY trucks) which are not supported by substantial evidence; the subdivider confirmed the use of 13 CY trucks, which is the assumption that the analysis included in the analytics. Therefore, the calculations provided by the commenter are not relevant to this Project and do not constitute evidence of a potential significant impact; no further analysis is needed.

Response ORG 6-21

The DEIR addresses all of the SCAQMD's thresholds of significance, as applicable. The mass daily thresholds are evaluated in the DEIR's analysis of regional emissions. TACs and the ambient air quality standards are addressed in the DEIR's analysis of localized emissions and potential impacts to sensitive receptors. Odors are addressed in the DEIR's evaluation of the potential to generate odors affecting a substantial number of people. GHG emissions are addressed in Section 4.7 of the DEIR. The commenter does not identify any missing analyses with respect to the SCAQMD's thresholds of significance.

The commenter suggests an error in the result of the air quality analysis without providing substantial evidence, or even identifying a specific issue, basing the comment entirely on the "smell test" which is not an applicable or reasoned threshold for analyzing CEQA impacts The modeled values for construction PM10 and PM 2.5 are correct and the comment does not provide any evidence to the contrary.

Response ORG 6-22

The Project would not require grading of all Project area surfaces every day during the grading phase as would be assumed using CalEEMod defaults. The Project would excavate soil, redistribute soil on site and compact portions of the site on any given day to create roadways and residential lots. During excavation activities, it would be an inaccurate overestimation to assume the excavation areas would be repeatedly graded every day as the CalEEMod defaults would assume. Consistent with the CalEEMod User's Guide, Project-specific inputs were used based on the Project's construction activity information. Therefore, the construction analysis in the DEIR represents a reasonable Project-specific analysis and the changes to the CalEEMod default area to be graded values were justified and reasonable. Royal Vista Open Space counsel is not an air quality expert. Their lay opinions, along with counsel's air quality calculations were not provided by an expert. Counsel testimony is not substantial evidence. (Pala Band of Mission Indians v. County of San Diego (1998) 68 Cal.App.4th 556, 580 [attorney testimony not substantial evidence].) Therefore, the calculations provided by the commenter are not relevant to this Project and do not require further discussion. Further, the commenter is confusing the period within which construction activities can take place with the actual amount of daily construction hours as provided by the subdivider. PDF NOI-1 provides a construction window of 12 hours, which is based on the allowable construction hours provided in the Los Angeles County Municipal Code for noise; it does not specify the number of hours that Project construction activities will occur. Actual Project construction activities and equipment usage will occur over 8 hours corresponding to a workday as confirmed by the subdivider and as correctly evaluated in the air quality model. The air quality model does not need to be redone and the DEIR does not need to be recirculated.

Response ORG 6-23

See Response ORG 6-22. The Project would not require grading of all Project area surfaces every day during the grading phases as would be assumed using CalEEMod defaults. The Project would excavate soil, redistribute soil on site and compact portions of the site on any given day to create roadways and residential lots. During excavation activities, it would be an inaccurate overestimation to assume the excavation areas would be repeatedly graded every day as the CalEEMod defaults would assume. Consistent with the CalEEMod User's Guide, Project-specific inputs were used based on the Project's construction activity information. Therefore, the construction analysis in the DEIR represents a reasonable Project-specific analysis and the changes to the CalEEMod default area to be graded values were justified and reasonable. Furthermore, the commenter compares dissimilar units of measurement in an attempt to claim that the area graded value in CalEEMod is not correct. The commenter refers to "acre-feet," which is a unit of volume and not a unit of area. A unit of volume cannot be meaningfully compared to a unit of area. An appropriate conversion would be to convert the unit of volume (e.g., 3,729,500 cubic yards of earth movement or 2,312 acre-feet) to a unit of area by dividing by the vertical depth of earth excavation. According to Chapter 2, Project Description, of the DEIR, the maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during the construction of the golf course (with one noted isolated exception at 30-feet). Applying a depth equal to half the maximum depth (i.e., 12.5 feet) results in a unit of area value of approximately 185 acres. The CalEEMod value for area graded in acres of 2,826 acres is substantially more than the 185-acre value (more than 15 times the 185-acre value), which indicates that the CalEEMod emissions modeling is adequately conservative to account for emissions associated with grading, over-excavation, and re-compaction. The analysis also conservatively assumes the simultaneous use of heavy-duty construction equipment that would generate maximum daily emissions on a given day during the various construction activities. The equipment mix is representative of the maximum equipment usage and maximum daily emissions potential on a given day during the various construction activities. Thus, the commenter's assertions are not supported by substantial evidence and are incorrect. Royal Vista Open Space counsel is not an air quality expert. Their lay opinions, along with counsel's air quality calculations were not provided by an expert. Counsel testimony is not substantial evidence (Pala Band of Mission Indians v. County of San Diego (1998) 68 Cal.App.4th 556, 580 [attorney testimony not substantial evidence].) Therefore, the calculations provided by the commenter are not relevant to this Project and are dismissed from further discussion. The air quality impact analysis is correct and the DEIR does not need to be recirculated.

Response ORG 6-24

See Response ORG 6-22 and Response ORG 6-23. As discussed therein, the CalEEMod value for area graded in acres of 2,826 acres is adequately conservative to account for emissions associated with grading, over-excavation, and re-compaction. The commenter's calculation of off-road truck hauling is also incorrect because it assumes all excavated soil must be loaded into off-road haul trucks. This is not the case as soil will be moved to stockpile areas by backhoes, tractors, graders, loaders, dozers, and scrapers in addition to the off-road trucks. Thus, the commenter's calculations are inaccurate and incorrect and do not reflect the Project. Moreover, the commenter is confusing the period that construction activities can take place with the actual Project construction hours. PDF NOI-1 provides a construction window of 12 hours, which is based on the allowable construction hours provided in the Los Angeles County Municipal Code for noise; it does not specify the number of hours that Project construction activities will occur. Actual Project construction activities and equipment usage will occur over 8 hours corresponding to a workday as correctly evaluated in the air quality model. The air quality and noise models do not need to be redone and the DEIR does not need to be recirculated.

Response ORG 6-25

The Project construction assumptions were provided by the subdivider, including the grading assumptions and equipment list, as CalEEMod guidance expressly provides for adjustments to defaults based on Project specifics. This was appropriately done here and the commenter's comment to the contrary is incorrect; no correction to the construction mix back to defaults is appropriate. As provided in DEIR Appendix B, the Project construction assumptions include a variety of earth moving equipment including backhoes, tractors, graders, loaders, dozers, and scrapers in addition to the off-road trucks. Based on information provided on page 6 of the July 26, 2021, geotechnical report in DEIR Appendix G, the Project construction fleet in the air quality analysis includes excavators which are recommended to remove wet material. Therefore, the removal of wet material with excavators does not further increase the grading figures used in the analysis as excavators were already accounted for in the analysis.

Response ORG 6-26

The DEIR contains a minor discrepancy between the construction fleet in Section 4.3, Air Quality, and Section 4.13, Noise, with respect to the number of dump trucks in the construction phases for Grading/Excavation and Drainage/Utilities/Trenching. In the Noise analysis, Table 4.13-12, page 4.13-26 of the DEIR, assumes 4 dump trucks under the heading Grading/Excavation and 0 dump trucks under the heading Drainage/Utilities/Trenching, while the air quality analysis assumes 8 dump trucks and 2 dump trucks, respectively. The commenter is correct and the noise analysis should have included 4 additional dump trucks under Grading/Excavation and 2 dump trucks under the heading Drainage/Utilities/Trenching. The underestimation in the noise analysis for the additional 6 dump trucks over the duration of the construction is minimal and would only account for a minimal non-perceptible increase of less than 1 dBA, which is an inaudible change in ambient environmental noise to the human ear. A doubling of sound energy is required to generate an increase of 3 dBA. The addition of 4 additional dump trucks during Grading/Excavation and 2 dump trucks during Drainage/Utilities/Trenching increases the total number of individual pieces of construction equipment modeled from 32 pieces of equipment to 38 pieces of equipment. The additional 6 dump trucks would account for an increase of less than 1 dBA, which is an inaudible change in ambient environmental noise to the human ear. This increase in noise is small because the decibel scale is logarithmic, and adding a relatively small number of equipment to the already large number of equipment modeled for these construction phases does not substantially change the decibel value. This small increase thus does not warrant rerunning the models. Further, the conclusion in the noise section is significant and unavoidable for construction and the minor adjustment noted above would not alter this conclusion let alone result in a substantial increase in the significant and unavoidable determination. Therefore, the addition of 6 trucks would not substantially increase the noise impacts or change the impact conclusion in the noise section. The Project would still implement Mitigation Measures NOI-1 through NOI-4 and PDF NOI-1 but as demonstrated in Table 4.13-14, impacts would remain significant and unavoidable. Therefore, the noise analysis does not need to be rerun to account for the additional 6 dump trucks since the impact conclusion of significant and unavoidable would not change and the increased noise (1 dBA) is very minimal and does not substantially increase the severity of the impact and the significance determinations in the DEIR would remain the same. Thus, recirculation is not required.

Response ORG 6-27

As discussed in DEIR Section 4.3, Air Quality, the implementation of the Project, including PDF AQ-1, would result in a less than significant impact associated with air quality, with the implementation of the Mitigation Measure AQ-1. As discussed above, none of the commenter's air quality comments identify any additional or more severe impacts and the commenter does not provide substantial evidence that the Project would create a significant impact that requires mitigation other than what is already included in Mitigation Measure AQ-1. No additional mitigation measures are warranted or required.

Response ORG 6-28

As stated on page 3-1 of the Final Localized Significance Threshold Methodology[7], if the calculated emissions for the proposed construction or operational activities are below the LST emission levels found on the LST lookup tables, then the proposed construction or operation activity is not significant. Although the Project would disturb up to nine acres per day, as discussed on page 4.3-36 of the DEIR, Project emissions would occur throughout the site and would not be localized in one area near sensitive receptors. Additionally, the emissions from construction equipment used for nine acres was compared to the emissions threshold for the smaller five acres with sensitive receptors located within 25 meters of the Project site as outlined in the LST methodology. Localized emission thresholds generally increase with larger disturbed areas because larger areas can generate a greater number of emissions before exceeding the concentration-based thresholds due to a greater degree pollutant dispersion. This results in a more conservative analysis as the Project's localized emissions for a 9-acre area are analyzed against the 5-acre LST threshold, which results in a lower significance threshold for a smaller site. As shown on Table 4.3-11, page 4.3-51 of the DEIR, the Project's maximum daily emissions were significantly below the SCAQMD LST thresholds and as such impacts would be less than significant. Additionally, the Final LST Methodology also states that, proposed projects whose

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[7] SCAQMD, 2003, revised 2008. Final Localized Significance Threshold Methodology. https://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf

calculated emission budgets for the proposed construction or operational activities are above the LST emission levels found in the LST lookup tables should not assume that the project would necessarily generate adverse impacts. Detailed emission calculations and/or air dispersion modeling may demonstrate that pollutant concentrations are below localized significant levels. Thus, even if a project's emissions are above the LST screening thresholds, dispersion modeling could show that actual emissions are below LST thresholds. As discussed, the LST methodology used to analyze Project impacts was appropriate and consistent with the SCAQMD guidance, and provided for a more conservative analysis than more generalized air dispersion modeling. The conclusion of less than significant impacts is supported by substantial evidence. Additionally, as discussed above in Response ORG 6-20 through ORG 6-26, the air quality analysis is based on accurate emissions estimates obtained from the CalEEMod model analytic runs using Project specific information. Air quality impacts to nearby sensitive receptors are not underestimated. Therefore, the LST analysis does not need to be redone using dispersion modeling and the DEIR does not need to be recirculated.

Response ORG 6-29

As stated on DEIR page 4.3-37, as part of its air quality planning, the Southern California Association of Governments (SCAG) has prepared the Regional Comprehensive Plan and Guide and the 2020–2045 RTP/SCS which provide the basis for the land use and transportation components of the AQMP and are used in the preparation of the air quality forecasts and the consistency analysis included in the AQMP.[8] Projects that are considered consistent with the AQMP would not interfere with attainment because this growth is included in the projections used in the formulation of the AQMP. The Project's estimated increase in population would represent approximately 0.10 percent of the growth in population projected for unincorporated Los Angeles County in the 2020–2044 RTP/SCS, between 2016 and 2045. The Project would, therefore, also fall within the growth projections as contained in the 2020–2045 RTP/SCS, and ultimately the growth projections in the 2022 AQMP. There is no evidence that State housing legislation or individual zoning changes will result in an exceedance of the growth projections. State housing legislation and individual zoning changes do not result in the development of housing units. It is inappropriate under CEQA to evaluate hypothetical and speculative future development as a result of State housing legislation and individual zoning changes.

As discussed under Impact AIR-1, page 4.3-44 of the DEIR, Project construction, with implementation of Mitigation Measures AQ-1, which requires the use of USEPA Tier 4 Final construction equipment for all construction equipment greater than 50 hp, would not conflict with or obstruct implementation of the AQMP and impacts would be less than significant. Furthermore, as shown in Table ES-2 of the DEIR, Impact AIR-1 has Mitigation Measure AQ-1 listed. The NO_X impact was potentially significant prior to implementation of Mitigation Measure AQ-1 and with implementation of Mitigation Measure AQ-1 the NOx impact became less than significant as it was under the SCAQMD thresholds. As discussed above in Response ORG 6-20 through ORG 6-27, the air quality analysis is based on accurate emissions estimates obtained from the CalEEMod model runs and air quality impacts to nearby sensitive receptors are not underestimated. Additionally, the commenter is applying their own assumptions regarding

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[8] SCAG, *2016–2040 RTP/SCS*, April 2016.

reversion to CalEEMod defaults and its own baseless assumptions which are not appropriate and are not supported by substantial evidence and are incorrect in any event; CalEEMod guidance expressly allows for modification of default values based on project specific data what was supplied here. Royal Vista Open Space counsel is not an air quality expert. Their lay opinions, along with counsel's air quality calculations were not provided by an expert. Counsel testimony is not substantial evidence. (Pala Band of Mission Indians v. County of San Diego (1998) 68 Cal.App.4th 556, 580 [attorney testimony not substantial evidence].) The Project is not inconsistent with the AQMP as the potentially significant NO_X impact was acknowledged in the DEIR under Impact AIR-2 and was rendered less than significant with implementation of Mitigation Measure AIR-1. Thus, the DEIR is not required to be recirculated.

Response ORG 6-30

See Response ORG 6-19**.** Because the Project would have limited sources of TACs associated with construction and would not have any stationary sources during operations, a qualitative assessment was used to determine whether the Project would result in a significant impact by exceeding the above-referenced standard. A qualitative assessment is consistent with the CARB Handbook.[9] and as discussed on pages 4.3-52 through 4.3-53 of the DEIR, the Project does not pose a potential DPM risk and impacts would be less than significant. Project construction trucks traveling along roadways would not result in concentrated emissions near any one specific receptor location because it would pass by a receptor location for a brief instant in time. Thus, as stated in Response ORG 6-19, construction equipment that would generate short-term emissions would be dispersed over a large area and not concentrated near any one specific receptor given mobility of the equipment, especially haul trucks. No residual emissions and corresponding individual cancer risk are anticipated after construction. Therefore, because there is such a short-term exposure period (36 out of 840 months of a 70-year lifetime) and dispersion of pollutants over a large area, health risks associated with DPM emissions during construction would be less than significant. The qualitative analysis in the DEIR is supported by substantial evidence and is sufficient.

Response ORG 6-31

The County of Los Angeles Coccidioidomycois (Valley Fever) Management Plan: Guidelines for Employers[10] includes the provisions that are in Cal/OSHA[11], such as providing education and training regarding Valley Fever, providing PPE, adopting site plans to reduce exposure if in an endemic area which would minimize soil disturbance (using techniques outlined in SCAQMD Rules 403), providing heavy equipment with factory enclosed cabs and HEPA rated air filtration and positive pressure air, providing clean areas, cleaning equipment as necessary before leaving the site, position workers upwind or crosswind, if possible, when performing ground disturbing

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[9] CARB, 2005. Air Quality and Land Use Handbook, a Community Health Perspective, April. https://www.aqmd.gov/docs/default-source/ceqa/handbook/california-air-resources-board-air-quality-and-land-use-handbook-a-community-health-perspective.pdf

[10] County of Los Angeles, 2019. Coccidioidomycois (Valley Fever) Management Plan: Guidelines for Employers, August. http://www.ph.lacounty.gov/acd/docs/valleyfeverplan2019.pdf

[11] California Department of Industrial Relations, 2022. Protection from Valley Fever, April. https://www.dir.ca.gov/dosh/valley-fever-home.html

activities, and maintain an injury illness prevention plan. Thus, adhering to requirements of the County of Los Angeles Coccidioidomycois (Valley Fever) Management Plan: Guidelines for Employers is protective of employees and sensitive receptors in the area as it provides control of fugitive dust emissions and limits the potential for Valley Fever exposure. Regarding the commenters assumptions that the air quality analysis is incorrect, as set forth in Response ORG 6-19 through Response ORG 6-29, the air quality emissions impact analysis and modeling was appropriately conducted and there is no basis rerun the model or analysis. Therefore, the less than significant Valley Fever impact analysis is supported by substantial evidence and the DEIR does not need to be recirculated.

Response ORG 6-32

See Response ORG 6-30, above, for the discussion of why compliance with Mitigation Measure AQ-2 would provide control of fugitive dust emissions and limit the potential for exposure to Valley Fever. As noted on DEIR page 4.3-53, Mitigation Measure AQ-2 along with implementation of applicable California Division of Occupational Safety and Health (Cal/OSHA) and SCAQMD Rule 403 regulatory requirements would provide protection of construction workers, as well as the nearby community. As discussed in DEIR Section 4.3, Air Quality, implementation of the Project would result in a less than significant impact associated with Valley Fever, with the implementation of Mitigation Measure AQ-2. The commenter does not provide substantial evidence that the Project would create a significant impact that requires mitigation other than what is already included in Mitigation Measure AQ-2. Therefore, no additional mitigation measures are warranted or required.

Response ORG 6-33

See Responses ORG 6-92 through ORG 6-125 and the GLA Response to Cashen (FEIR Appendix P) which, addresses all of the comments included in Exhibit C to Comment ORG 6. As set forth therein, none of the comments from Cashen in Exhibit C to Comment ORG 6 undermine the analyses and impact determinations of the DEIR. The DEIR has been clarified and amplified as discussed in Responses ORG 6-92 through ORG 6-125, and in Chapter 11, Corrections, Clarifications and Additions of the FEIR. These clarifications do not require recirculation of the DEIR.

Response ORG 6-34

The analysis and recommended mitigation in the DEIR is based on the Geotechnical Feasibility Study and the three addendums to the study (see Appendix G of the DEIR), which have been approved by the Los Angeles County Public Works Geotechnical and Material Engineering Division (GMED), following substantive review and revision. The analysis in the Geotechnical Feasibility Study is sufficient for purposes of evaluating CEQA impacts in advance of the preparation of the Final Geotechnical Report and 40-scale grading plans that will be developed if the project is approved, prior to issuance of grading permits. GMED concurred with the analysis and Mitigation Measure GEO-1, which requires a Final Geotechnical Report once the 40-scale grading plans have been developed. Mitigation Measure GEO-1 is an appropriate mitigation measure providing the necessary performance criteria. A Final Geotechnical Report is not required at this time. Recirculation of the DEIR is not required.

Response ORG 6-35

The information the commenter is requesting to be included in the DEIR are elements that are developed as part of the Storm Water Pollution Prevention Plan (SWPPP), which relies on the final grading plan. Dischargers whose project disturbs one or more acres of soil or where projects disturb less than one acre but are part of a larger common plan of development that in total disturbs one of more acres, are required to obtain coverage under the NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit; Order 2022-0057-DWQ, NPDES No. CAS000002). Construction activities subject to this permit include clearing, grading, grubbing, and other disturbances to the ground such as excavation and stockpiling, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of a facility. The Construction General Permit requires the development and implementation of a SWPPP that includes specific Best Management Practices (BMPs) designed to prevent sediment and pollutants from contacting stormwater from moving off-site into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Once a SWPPP is prepared the Regional Water Quality Control Board must approve the document and proposed BMPs prior to construction.

The demolition and construction activities would be temporary in nature and the drainage patterns would be restored to capture all runoff onsite and convey any surface flows to the existing LACFCD storm drain systems. During construction, the previously described SWPPP required by the General Construction Permit would prevent construction site runoff from affecting off-site drainage patterns through the use of BMPs and erosion control measures to be used during construction to prevent erosion and off-site siltation. Compliance with the NPDES Municipal Permits and its MS4 BMP requirements and LID practices, along with County code requirements, would reduce the amount of pollutants in stormwater runoff through the use of BMPs such as managing surface water runoff, on-site infiltration, and connecting to the existing LACFCD stormwater drainage system.

Adherence to the regulatory requirements and regulatory plans would decrease the potential for drainage pattern alteration, polluted runoff, and decrease erosion and sedimentation effects during construction. There are no nearby streams or rivers within the immediate vicinity that would be affected by construction of the proposed Project. The Project's required compliance with the NPDES Municipal Permits and its local MS4 permit development standards, LID practices, and all applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) pertaining to water quality standards would ensure that drainage patterns, erosion or siltation, stormwater drainage systems, or polluted runoff would not be significantly impacted. Regulatory compliance, including the implementation of a SWPPP, is acceptable impact analysis. (Tracy First v. City of Tracy (2009) 177 Cal.App.4th 912, 934 [agency can rely on compliance with generally applicable regulations to conclude that a project will not have significant effects]; Leonoff v. Monterey County Bd. of Supervisors (1990) 222 Cal. App. 3d 1337 [county may rely on the fact that a project will comply with environmental laws in concluding that there will be no significant impacts from a leaking tank].)

Response ORG 6-36

The commenter erroneously assumes that the pre-construction existing conditions (operating golf course) and post construction (residential development) drainage patterns would be the same. Figure 4.10-1 of the DEIR identifies the drainage patterns of the existing Project site and location of existing storm drains. It is worth mentioning that Figure 4.10-1 above in the comment letter has been modified from the original Figure within the DEIR which is not an accurate representation of the DEIR figure. As mentioned above, the Project would require a SWPPP during construction which would retain all run-off during construction on-site. Once the Project site is graded and the residential pads are created, the site drainage would be completely different than pre-construction conditions. Nevertheless, the Project would be designed to use detention basins and the stormwater system would reconnect to the existing LACFCD storm drain system. The post-construction conditions are identified on Figure 4.10-2. Regarding how storm flows would be handled during construction see Response ORG 6-34, above.

As a result, the DEIR adequately addresses the concern of construction grading and stormwater flows during construction and during post construction and therefore does not need to be recirculated. Commenter failed to provide any evidence, substantial or otherwise, of potential significant impacts.

Response ORG 6-37

See Response ORG 3a-3.

Response ORG 6-38

The DEIR contains a minor discrepancy between the construction fleet in Section 4.3, Air Quality, and Section 4.13, Noise, with respect to the number of trucks in the construction phases for Grading/Excavation and Drainage/Utilities/Trenching. In the Noise analysis, Table 4.13-12, page 4.13-26 of the DEIR, assumes 4 dump trucks under the heading Grading/Excavation and 0 dump trucks under the heading Drainage/Utilities/Trenching, while the air quality analysis assumes 8 dump trucks and 2 dump trucks, respectively. The commenter is correct and the noise analysis should have included 4 additional dump trucks under Grading/Excavation and 2 dump trucks under the heading Drainage/Utilities/Trenching. The underestimation in the noise analysis for the additional 6 dump trucks during the Grading/Excavation and Drainage/Utilities/Trenching phases combined is minimal and would account for an increase of less than 1 dBA, which an inaudible change in ambient environmental noise to the human ear. A doubling of sound energy is required to generate an increase of 3 dBA. The addition of 4 additional dump trucks during Grading/Excavation and 2 dump trucks during Drainage/Utilities/Trenching increases the total number of individual pieces of construction equipment modeled from 32 pieces of equipment to 38 pieces of equipment for these two phases combined. If there was overlapping of the two phases the increase of 4 dump trucks in the grading phase and 2 dump trucks in the trenching phase would result in a minimal increase. The additional 6 dump trucks would account for an increase of less than 1 dBA, which is an inaudible change in ambient environmental noise to the human ear. This increase in the number of pieces of construction equipment in both the Grading/Excavation and Drainage/Utilities/Trenching phases is small and the corresponding increase in temporary construction noise is small because the decibel scale is logarithmic and adding a relatively small number of equipment to the already large number of equipment modeled for these construction phases does not substantially change the decibel value. This small increase thus does not warrant rerunning the models. Further, the conclusion in the noise section is significant and unavoidable for construction. Therefore, the addition of 6 trucks would not substantially increase the noise impacts or change the impact conclusion in the noise section. The Project would still implement Mitigation Measures NOI-1 through NOI-4 and PDF NOI-1 but as demonstrated in Table 4.13-14, impacts would remain significant and unavoidable. No changes to Mitigation Measures NOI-1 through NOI-4 and PDF NOI-1 are required as the change here is to the number of already considered dump trucks, not a new unconsidered piece of construction equipment. Additionally, since dump trucks were previously analyzed, and the only change is in the number of dump trucks during the Grading/Excavation and Drainage/Utilities/Trenching phases, the selected sensitive receptors remain adequate for the construction noise analysis. Therefore, the noise analysis does not need to be rerun to account for the additional 6 dump trucks since the impact conclusion of significant and unavoidable would not change and the increased noise (less than 1 dBA) is very minimal and does not substantially increase the severity of the impact, does not change the sensitive receptors that would be impacted, and the significance determinations in the DEIR would remain the same. Thus, recirculation is not required.

Response ORG 6-39

The Project construction assumptions, including the grading assumptions and equipment list, were provided by the subdivider based on anticipated Project construction. The commenter is applying their own construction assumptions that the construction noise analysis failed to account for the location and height of stockpiles and fails to cite any substantial evidence in support. Soil stockpiles alone are not a noise-generating activity, and the height of a stockpile is irrelevant to the noise analysis. Noise levels are generated by individual pieces of construction equipment, specifically from the equipment’s engines. The equipment’s engine is typically located at the base of the equipment, and soil would not be stockpiled at a height that would be difficult to access by construction equipment located on the ground. Further, construction equipment would not operate on top of stockpiles as it would disturb the stockpiles and pose a safety risk to the equipment and workers. Thus, noise levels would not be impacted by the height of a stockpile since the height of the engine location would not change. Construction equipment noise, including from graders, was properly accounted for in the noise model. Additionally, stockpiling of soil would not be located at the site perimeter as the subdivider has confirmed that there is a buffer between the fence line/noise barrier and grading activities, in particular stockpiling. Therefore, temporary construction noise barriers would block the direct line-of-sight between onsite active construction area and sensitive receptors.

Response ORG 6-40

Feasible mitigation measures are defined as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors” (Pub. Resources Code, § 21061.1, 14 Cal Code Regs., § 15364). Mitigation measures must, “identify the type(s) of potential action(s) that can feasibly achieve that performance standard and that will [be] considered, analyzed, and potentially incorporated in the mitigation measure” and be “roughly proportional” to the impacts of the project (Cal. Code Regs. tit. 14 § 15126.4). The DEIR identifies MM NOI-1 through MM NOI-4 which meet the criteria of feasible mitigation measures and lessen the impacts disclosed within the DEIR. See Response 6-47, below, for a detailed discussion of mitigation measures and their feasibility. Commenter has proposed no additional mitigation measures nor provided any evidence that additional mitigation would be feasible.

Response ORG 6-41

The commenter claims that the noise analysis interprets and applies LACC Section 12.08 incorrectly to construction noise levels and impacts. However, LACC Section 12.08.390 does not apply to construction noise analysis. Section 12.08.390 sets forth exterior noise levels standards for operational uses. The LACC establishes specific construction noise standards as evidenced under Chapter 12 Part 4, Specific Noise Restrictions. Chapter 12 Part 4 includes LACC Section 12.08.440 which applies to construction noise. The commenter even concedes that Chapter 12 Part 4 “govern[s] construction noise”. Therefore Section 12.08.390 is not and should not be applied to construction noise analysis.

The commenter also claims that Section 12.08.440 is incorrectly applied to construction noise because the analysis uses the mobile equipment threshold of 75 dBA Leq at single-family residences and mobile homes, 80 dBA Leq at multi-family residences, or 85 dBA Leq at semi-residential/ commercial land uses. As stated in Section 12.08.150, a fixed noise source “means a stationary device which creates sounds while fixed or motionless, including but not limited to residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.” Off-road construction equipment does not fit the definition of a fixed or motionless device. On any given day, off-road construction equipment would be circulating around the Project construction site and would not be fixed to any particular location. Furthermore, Section 12.08.220 defines a mobile noise source as “any noise source other than a fixed noise source”. Therefore, by definition provided under LACC Section 12.08.220, off-road construction equipment is considered a mobile noise source and noise thresholds were correctly applied. Furthermore, the commenter misinterprets Section 12.08.440(B)(1)(a) as only applying to short-term operation of less than 10 days. That section provides “Mobile Equipment. Maximum noise levels for nonscheduled, intermittent, short-term operation (less than 10 days) of mobile equipment:” Thus, the section provides 3 separate categories of mobile equipment that the Maximum Noise Level table applies to: (1) nonscheduled, (2) intermittent, and (3) short-term operation (less than 10-days). Here, the Project’s construction noise fits category 2 – intermittent. The noise analysis and DEIR used the correct significant thresholds. As such, commenter’s noise assertions using the incorrect significant threshold are wrong. Further, Royal Vista Open Space counsel is not a noise expert. Their lay opinions, along with counsel’s noise calculations were not provided by an expert. Counsel testimony is not substantial evidence (Pala Band of Mission Indians v. County of San Diego (1998) 68 Cal.App.4th 556, 580 [attorney testimony not substantial evidence].) The noise model does not need to be redone and the DEIR does not need to be recirculated.

Response ORG 6-42

Commenter questions the adequacy of the ambient noise level measurements, whether they represent the ambient noise level for the area, and the dates and duration of the measurements. The predominant existing noise source surrounding the Project site is traffic noise from major roadways, such as State Route 60 and Colima Road. Secondary noise sources include local roadway traffic, landscaping equipment, and other typical urban noise from residences. Other noise sources include general residential and commercial-related activities associated with trash collection activities, loading and unloading activities, and surface parking lots.

The ambient noise measurement locations analyzed in the DEIR were selected because they are representative of the noise environment of the existing off-site noise-sensitive receptors. As previously mentioned, the predominant existing noise source surrounding the Project Site is traffic noise. All ambient noise measurement locations near the Project Site were placed along the nearby streets and the nearby noise-sensitive receptors; therefore, these locations were representative of the ambient noise levels surrounding the Project site. Thus, the locations and time period for the ambient noise level measurements comply with the LACC specifications as outlined in LACC Section 12.08.420 and provide adequate and representative ambient noise data measured in the Project area. Further, the suggested noise measurement locations represent similar land uses and similar interior neighborhood locations to those already identified for receptors R1 through R6 and the ambient noise levels would be similar to those disclosed in the DEIR. The commenter provides no evidence that the additional locations requested are materially different from the locations analyzed, or that analysis of additional locations would identify materially different ambient noise levels.

Response ORG 6-43

As noted on pages 4.13-9 to 4.13-10 of the DEIR, noise measurements were conducted for 15-minute increments at each of the noise measurement locations using a Type 1 Sound Level Meter with a microphone placed at a height of five feet above the local grade. This is consistent with LACC Section 12.08.420 which outlines the measurement methods. As the commenter mentioned, noise measurements were taken after the County had already lifted COVID stay-at-home orders in an effort to capture a representative ambient noise level. The combined noise level from multiple noise sources (e.g., combined traffic on roadways) is additive on a logarithmic scale such that a doubling of traffic volumes on a roadway results in an approximately 3 dBA increase in noise and a halving of traffic volumes on a roadway results in an approximately 3 dBA reduction in noise. Thus, even if traffic patterns had not been restored to pre-pandemic levels three months after stay-at-home orders were lifted, such conditions would result in a more conservative analysis as the noise measurements would reflect lower ambient noise levels, which would establish lower noise thresholds. Therefore, the analysis provided in the DEIR is, if anything, more conservative and discloses all potential impacts.

Response ORG 6-44

Please refer to pages 4.13-8 to 4.13-10 for a detailed discussion of ambient noise levels and receptors. All sensitive receptors nearest the Project site are clearly identified on DEIR Figure 4.13-2 and the DEIR states that "all other receptors at greater distances than those identified above would experience lower noise levels.” Therefore, the greatest impacts to the closest sensitive receptors are disclosed (refer to Table 4.13-11).

Response ORG 6-45

Construction noise from grading operations was properly evaluated by models based on the grading assumptions and associated equipment as provided by the subdivider based on preliminary grading plans; a final grading plan would provide no additional information nor would it alter the assumptions or equipment mix and thus was not required in order to analyze grading noise impacts. As discussed in Response ORG 6-26, the equipment mix for the Grading/Excavation and Drainage/Utilities/Trenching phases of construction included a minor correction to include an additional four (4) dump trucks during Grading/Excavation phase and two (2) dump trucks during Drainage/Utilities/Trenching phase which increases the total number of individual pieces of construction equipment modeled from 32 pieces of earth moving equipment to 38 pieces of earth moving equipment in total for these two phases combined. If there was overlapping of the two phases the increase of 4 dump trucks in the grading phase and 2 dump trucks in the trenching phase would result in a minimal increase. The additional 6 dump trucks would account for an increase of less than 1 dBA, which is an inaudible change in ambient environmental noise to the human ear. The Site Preparation phase of construction includes five (5) pieces of equipment. The 43 pieces of earth moving equipment for these three construction phases adequately analyses the noise impacts including for over-excavation and re-compaction and replacement of soils. Furthermore, as explained on page 4.13-22 of the DEIR, the construction noise analysis applies several layers of conservatism to ensure that the noise analysis is robust and accounts for maximum impacts, including simultaneous operation of equipment in construction areas nearest each sensitive receptor. Thus, a final grading plan is not required to thoroughly and accurately analyze construction noise impacts.

The commenter provides no substantial evidence of additional noise impacts, just speculation. (CEQA Guidelines section 15145 (CEQA does not require analysis of speculative impacts).) Royal Vista Open Space counsel is not a noise expert. Their lay opinions, along with counsel’s noise calculations were not provided by an expert. Counsel testimony is not substantial evidence. (Pala Band of Mission Indians v. County of San Diego (1998) 68 Cal.App.4th 556, 580 [attorney testimony not substantial evidence].) The DEIR construction noise analysis is complete and thorough. Recirculation is not required.

Response ORG 6-46

Commenter presents the DEIR modelled unmitigated construction noise levels and erroneously argues that the health impacts from the unmitigated levels need to be analyzed and discussed. However, it is not appropriate to look at the unmitigated levels, which are not likely to occur. As set forth in Section 4.13.6 of the DEIR, construction at the six sensitive receptors, with implementation of mitigation measures, results in noise levels between 67.9 dBA and 74.5 dBA as shown in DEIR Table 4.13-14 and are below the 85 dBA level pointed to by the commenter that can lead to hearing loss. As discussed in Response ORG 6-25, the equipment mix for the Grading/Excavation and Drainage/Utilities/Trenching phases of construction included a minor correction to include an additional four (4) dump trucks during Grading/Excavation and two (2) dump trucks during Drainage/Utilities/Trenching increases the total number of individual pieces of construction equipment modeled from 32 pieces of earth moving equipment to 38 pieces of earth moving equipment for these two phases combined. The additional 6 dump trucks would account for an increase of less than 1 dBA, which is an inaudible change in ambient environmental noise to the human ear. A doubling of sound energy is required to generate an increase of 3 dBA. This increase in noise is small because the decibel scale is logarithmic and adding a relatively small number of pieces of equipment to the already large number of equipment modeled for these construction phases does not substantially change the decibel value. The Project would implement Mitigation Measures NOI-1 through NOI-4 and PDF NOI-1. The noise impact conclusion of significant and unavoidable would not change and the increased noise (less than 1 dBA) is very minimal and does not substantially increase the severity of the impact, does not change the sensitive receptors that would be impacted, and would not exceed the 85 dBA level at noise-sensitive receptors. Moreover, the DEIR at pages 4.13-3 through 4.13-5 adequately discloses the health effects from noise exposure.

The Occupational Safety and Health Administration require hearing conservation plans when noise levels continuously exceed 85 dBA over an 8-hour period. With implementation of mitigation measures NOI-1 through NOI-3, as shown in Table 4.13-14 of the DEIR, with inclusion of the less than 1 dBA correction discussed above, noise levels would not exceed 85 dBA over an 8-hour period at any sensitive receptors. Consequently, the significant and unavoidable noise impact is not generated by virtue of noise levels that would be considered harmful but, rather, as a result of the magnitude of the increase over existing ambient noise levels without construction at certain receptor locations. Therefore, Project construction noise would not result in adverse health effects related to pain, the onset of hearing loss or other significant health effects. The commenter provides no substantial evidence to the contrary.

Additionally, the County of Los Angeles, as the lead agency, determines the methodology which includes the use of an hourly Leq noise metric. The Leq noise metric is described on page 4.13-3 of the DEIR and states that it is the equivalent sound level over a specified period of time. Although there could be occasional instantaneous spikes in noise levels from construction equipment, the average sound level within an hour is the method by which the County evaluates noise impacts. The County's threshold is supported by substantial evidence in that the average sound level represents community noise exposure as equipment operates over time during a workday and at varying locations on a project site. The commenter provides no substantial evidence that occasional instantaneous spikes in noise levels would be an appropriate threshold for a significant impact. Royal Vista Open Space counsel is not a noise expert. Their lay opinions were not provided by an expert. Counsel testimony is not substantial evidence. (Pala Band of Mission Indians v. County of San Diego (1998) 68 Cal.App.4th 556, 580 [attorney testimony not substantial evidence].)

Finally, as discussed above, the commenter is incorrect in assuming project construction will take place 12-hours a day. While there is a 12-hour window in which construction activities are allowed to take place during the daytime, the Project construction equipment would be used for 8-hours only during the 12-hour allowed period. The 12-hour window from LACC Section 12.08.440 does not characterize the construction workday.

Response ORG 6-47

Construction noise levels are correctly disclosed in Table 4.13-13 and Table 4.13-14. Table 4.13-14 includes a 15 dBA reduction accounting for a 12 dBA from noise barriers under MM NOI-1 and a 3 dBA reduction from equipment mufflers as clearly stated under MM NOI-2. According to FHWA, use of adequate mufflers systems can achieve reductions in noise levels of up to 10 dBA[12], however a 3 dBA reduction was taken for the Project to represent a conservative analysis. Therefore, the reduction from mufflers is supported by substantial evidence and the commenter's recalculation eliminating the 3 dBA reduction is incorrect.

Construction noise levels presented in Table 4.13-13 and Table 4.13-14 are accurate and use the appropriate estimated construction noise compared to the existing ambient noise as well as the appropriate reductions. The commenter is correct and Table 16 found on page 39 of the Noise and Vibration Impact Study (DEIR Appendix K) is not consistent with Tables 4.13-13 or Table 4.13-14 as it presents the highest non-overlap values per sensitive receptor instead of the highest overlap values. Table 16 has been updated to reflect the highest overlap values consistent with the values set forth in Table 9 on pages 27 and 28 of the Noise and Vibration Impact Study (DEIR Appendix K) and identified in Table 4.13-13 and Table 4.13-14 (see Chapter 11, Corrections, Clarifications, and Additions). The impacts identified in the DEIR are correct because the impact conclusions in the DEIR were based on the data in Table 4.13-13 and Table 4.13-14 as well as the Table 9 of the Noise and Vibration Impact Study (DEIR Appendix K) and no additional changes are required.

Response ORG 6-48

As noted in Response ORG 6-45, above, Table 4.13-13 and Table 4.13-14 accurately represent analyzed construction noise levels and no updates are needed nor required. Table 4.13-14 discloses the Project's construction noise level increase over existing ambient noise levels with the implementation of MM NOI-1 and NOI-2. Comments related to the logarithmic nature of noise are duly noted.

Response ORG 6-49

The DEIR adequately describes the extent of noise impacts to noise-sensitive receptors as well as the conditions upon which noise barriers specified by MM NOI-1 and MM NOI-3 shall be provided (refer to pages 4.13-8, 4.13-9, 4.13-29, and 4.13-38 of the DEIR). Figure 4.13-2 on page 4.13-9 shows the ambient noise measurement locations and Section 4.13.2, Existing Conditions, on page 4.13-8 discloses noise sensitive receptor locations. Further, page 4.13-38 describes the conditions and/or locations of noise barriers required under MM NOI-1 and MM NOI-3. No further analysis is required.

Response ORG 6-50

Feasible mitigation measures are defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social,

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[12] FHWA, *Special Report – Measurement, Prediction, and Mitigation*, Chapter 4 Mitigation, https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm. Accessed July 16, 2021.

and technological factors" (Pub. Resources Code, § 21061.1, 14 Cal Code Regs., § 15364). Mitigation measures must, "identify the type(s) of potential action(s) that can feasibly achieve that performance standard and that will [be] considered, analyzed, and potentially incorporated in the mitigation measure" and be "roughly proportional" to the impacts of the project (Cal. Code Regs. tit. 14 § 15126.4). With these considerations in mind, the commenter's proposed mitigation measures would be infeasible or are otherwise already required or substantially included in the DEIR for the following reasons. In addition, the commenter provides no substantial evidence in support of its proposed measures that demonstrated the proposed measures are in fact feasible or not already required in the proposed noise mitigation measures.

New Mitigation: An information sign shall be posted at the entrance to each construction site that identifies the permitted construction hours and provides a telephone number to call and receive information about the construction project or to report complaints regarding excessive noise levels. Any reasonable complaints shall be rectified within 24 hours of their receipt.

This mitigation measure is substantially included in Mitigation Measure TR-3 and the commenter does not identify any additional mitigation not included in Mitigation Measure TR-3 that would tie back to any noise reduction performance standard or lessen the impact. Therefore, no additional measure is required.

New Mitigation: Construction equipment or construction methods that generate peak noise levels which would exceed 75 dBA at the property line shall be prohibited.

This mitigation measure is infeasible from a technological standpoint as, due to the nature of construction, equipment generating noise levels at or above 75 dBA would be required, and this equipment is disclosed within Table 4.13-12 of the DEIR. Further MM NOI-2 is implemented to ensure that staging areas and stationary equipment are located at the greatest distance feasible from sensitive receptors and that emitted noise is directed away from sensitive receptors whenever feasible.

New Mitigation: If noise levels from construction activity are found to exceed 75 dBA at the property line of any adjacent property and construction equipment is left stationary and continuously operating for more than one construction day, a temporary noise barrier shall be erected between the noise source and receptor. Any noise barrier around stationary equipment shall be sufficiently high to block the direct path between all parts of the construction equipment and sensitive receptors. All gaps between barrier panels and at the bottom of the barrier shall be sealed to avoid sound leaks.

The suggested measure is partially redundant since MM NOI-1 and MM NOI-3 identify both construction noise barriers and mobile noise barriers, which would lessen impacts on surrounding sensitive receptors. The suggested measure is partially infeasible since access gates to the Project site must be allowed for personnel and equipment into the Project site.

which may result in small gaps along gate hinges and temporary gaps when gates are opened for access. Thus, the feasible portions of this suggested mitigation measure are already included in the DEIR and the infeasible portions cannot be implemented.

New Mitigation: Noticing of the scheduling of various phases of construction shall be submitted to the adjacent owners and occupants within the noise impact area 90 days in advance of activities and will identify the dates of activity, the hours of activity, types of equipment to be used on each day and the associated noise and vibration levels anticipated. Lane closures on the adjacent streets shall be similarly noticed. Truck staging shall not occur on public property adjacent to or in the immediate vicinity of the Project site.

This measure is substantially included in Mitigation Measure TR-3. No additional measure is required.

New Mitigation: Prior to the start of construction, noise monitors shall be installed in the projected noise impact area to monitor noise levels. A website shall be established to provide daily noise monitoring results and the web address provided to residents within the noise impact area. In the event that noise levels exceed 75dBA a sensitive receptor sites for more than 10 days cumulatively, construction shall be halted and the Project applicant shall be required to submit a noise mitigation plan to reduce levels to 60 dBA or less. If mitigation to levels below 60 dBA is not feasible, the Project applicant shall be required to pay affected residents in the amount of $235 per day (median income/365). In the event that noise levels equal or exceed 85dBA for more than 8 hours cumulatively, the Project applicant shall be required to pay affected residents in the amount of $470 per each 8 hours of cumulative noise in excess of 85 dBA Leq. This payment shall not limit the ability of affected residents to sue the Project applicant to obtain additional compensation for any documented hearing loss. The Project applicant shall be required to post bond or establish a trust fund in an amount deemed sufficient by the Planning Director to compensate residents, given anticipated noise days in excess of 60 and 75 dBA. A mechanism for timely paying residents for noise exceedances shall be established prior to issuance of any construction or grading permits for the Project, so that residents will receive payments within 30 days of noise exceedances. (This will enable them to make timely credit card payments should they choose to use the funds to stay at a hotel during noisy periods of construction.)

This mitigation measure does not tie back to any noise reduction performance standard, nor is there any evidence that it would lessen the impact of the significant and unavoidable construction impacts.

New Mitigation – Prior to issuance of any construction or grading permit for the Project, the Project applicant must offer to residents bordering the Project site located in areas that are projected to experience noise levels greater than 60 dBA for 10 or more days, or 75dBA for less than 10 days, due to Project construction, the option to have their homes retrofitted with dual pane window at the Project applicant's expense. Prior to issuance of any construction or grading permit, the Project applicant must demonstrate to the satisfaction of the Planning Director, that the Project applicant has: (1) mailed notice of the offer at least two times to all affected owners; (2) received written notice from each affected owner either accepting or rejecting the offer; and (3) completed all retrofit work to the satisfaction of the affected owners.

This mitigation measure does not tie back to any noise reduction performance standard, nor is there any evidence it would lessen the impact of the significant and unavoidable construction impacts. Moreover, the measure applies criteria that are inconsistent with the County's noise significance thresholds, as discussed in Response ORG 6-40. Furthermore, it would be economically infeasible for the subdivider to fund the installation of dual-pane windows to residents bordering the Project site for temporary noise impacts.

Response ORG 6-51

The commenter asserts that Section 12.08.350 of the LACC should be applied to construction vibration impacts and that the DEIR vibration analysis failed to use the County standard. This threshold is inappropriate to use for human annoyance impacts which are related to construction equipment's impact on nearby structures and not to human perception. Section 12.08.350 states that the 0.01 inches/second (in/sec) threshold applies to vibration that causes a "normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observations of moving objects".

The County's threshold of 0.01 in/sec is the root mean square (RMS) value characterizing human response to vibration. The RMS is the average of the squared amplitude of the signal. Vibration, as it relates to CEQA impacts, is typically expressed in peak particle velocity (PPV). PPV is defined as the maximum instantaneous peak of the vibration signal.[13] The County's threshold of 0.01 in/sec RMS is equivalent to 0.04 in/sec PPV, which is the threshold applied to human annoyance from vibration impacts in the DEIR (see pages 4.13-40 to 4.13-41). The DEIR vibration analysis used the correct human annoyance threshold; the only difference is the expression of the unit of measurement. Human annoyance impacts would exceed both the 0.01 in/sec RMS and 0.04 in/sec PPV threshold regardless of whether or not the units are expressed as an RMS or PPV value, and therefore, the impacts disclosed in the DEIR would not change and the DEIR adequately discloses the impacts relative to the threshold expressed in equivalent units of inches per second PPV. The DEIR provides MM NOI-4, which limits pile driving and vibratory roller activities within 75 feet of residential buildings adjacent to the Project site. With MM NOI-4 implemented, impacts would be less than significant and no further mitigation is required. The commenter does not provide substantial evidence that the Project would create a significant impact that requires mitigation other than what is already included in MM NOI-4. Commenter's proposed mitigation is not necessary or required.

Response ORG 6-52

As set forth in Response ORG 6-14 the cumulative projects cut off was October 13, 2022, the date of the NOP. See Responses FORM 1-2 and IND 22-3. No reasonably foreseeable project existed regarding the remainder of the golf course property at that time. As a result, the DEIR adequately addresses cumulative projects and potential impacts and therefore does not need to be recirculated.

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[13] FTA, Transit Noise and Vibration Impact Assessment. https://planning.lacity.gov/eir/8150Sunset/References/4.G.%20Noise/N.05_%20FTA%20Noise%20and%20Vibration%20Impact%20Assessment%20Chapter%207_1995.pdf

Response ORG 6-53

The local need for parks has been assessed by the LA County Department of Parks and Recreation and it was determined that the park obligation for this Project will be met by the payment of in-lieu fees. Further, the Project will include 37 percent open space, including 28 acres of publicly accessible open space with over 2 miles of recreational trails. Further, this bill refers to natural land. The golf course is considered developed land.

Response ORG 6-54

As set forth in Response ORG 6-5 the DEIR contains a reasonable range of alternatives in compliance with CEQA Guidelines section 15126.6.

The Project analyzed a range of feasible alternatives and does not need to include an additional alternative of preserving the site as open space. Further, an open space alternative would be considered but rejected based on the fact that the alternative would not meet any of the Project Objectives.

Response ORG 6-55

This comment, which concludes the letter, is noted for the record and will be forwarded to the decision-makers for their review and consideration. As demonstrated by the comments and responses above, the DEIR is comprehensive and has been completed in accordance with the County and CEQA Guidelines. No new analysis or mitigation measures are required.

With respect to Alternative 3, see response ORG 6-5, and 6-53, above. As a result, the DEIR discloses and adequately addresses the potential impacts associated with proposed Project and therefore does not need to be recirculated.

Response to Comment Letter ORG 6 Attachment A

Additional Royal Vista Open Space Comment

Response ORG 6-56

As set forth in Response ORG 6-18, solar panels are designed to capture light, not reflect it. A solar panel is comprised of numerous solar cells. A solar cell differs from a typical reflective surface in that it has a microscopically irregular surface designed to trap the rays of sunlight for the purposes of energy production. The intent of solar technology is to increase efficiency by absorbing as much light as possible, minimizing reflection and glare. Solar glass sheets (the glass layer that covers the solar panels) are typically tempered glass that is treated with an anti-reflective or diffusion coating that further diffuses the intensity of glare produced. Further, the proposed Project would not use highly reflective materials for roofing or exterior siding as required by LACC Section 22.140.580 (d) of the County Code. FORM 1-6 which addresses all comments within Comment ORG 6-55.

Response ORG 6-57

As discussed in EIR Section 4.1, Aesthetics, Existing sources of light at the Project Site include streetlights, light structures in surface parking areas, security lighting on buildings, and additional security lighting in various areas of the Project Site. In addition, the Royal Vista Golf Course driving range has lighting and is open until 10:30 p.m. every day. Light sources nearest to surrounding properties are building lighting and street lighting along East Walnut Drive South and Colima Road. The occupancy of the residences on the Project Site would result in new sources of light and glare primarily from interior and exterior lights on/in the new residences, and street and ambient lighting along the new streets. These varied sources of lighting would be similar to the existing lighting from the surrounding residents. The Project would illuminate areas that have not had nighttime lighting in the past and could contribute to an overall increase in the area’s ambient lighting. With the incorporation of the trail system, the Project would consolidate light sources toward the west and southeast portions of the Project Site adjacent to areas that currently have similar amounts of lighting from existing streetlights and residential lighting from the existing residential development to the northwest, east and south. In addition, the Project includes a Project Design Feature to ensure that lighting is shielded and does not spill off of the property into surrounding areas. See Response FORM 1-7 which addresses all comments within Comment ORG 6-56.

Response ORG 6-58

As set forth in Response ORG 6-56, the Project is a residential development that would include similar lighting as the existing residential development to the northwest, east and south. All lighting would be shielded to promote dark skies and would not impact bird populations. See also FORM 1-8 which addresses all comments within Comment ORG 6-57.

Response ORG 6-59

As set forth in Response FORM 1-9, the Project no longer proposes public parks but does include publicly accessible open space in Planning Areas 4 and 6. The Project’s design change in removing the proposed public parks was a result of existing neighborhood concerns and direction from the LA County Department of Parks and Recreation. The Project still includes an open space trail system that meanders throughout the proposed residential development. It is currently proposed that these areas, totaling over 7 acres, will remain in their current improved/developed state with the exception of planting additional trees.

Response ORG 6-60

See Response IND 17-4 which addresses Comment ORG 6-60.

Response ORG 6-61

See Response IND 17-5 which addresses Comment ORG 6-61.

Response ORG 6-62

As set forth in Response FORM 2-7, Mitigation Measure TR-3, presented on page 4.17-30 of the DEIR, requires the proposed Project to implement a Construction Staging and Traffic Management Plan (CSTMP). As stated in the DEIR, the CSTMP includes a requirement, among other things, to:

- "limit any potential roadway lane closure/s to off-peak travel periods, to the extent feasible;"
- "provide traffic control for any potential roadway lane closure, detour, or disruption to traffic circulation;"
- "schedule delivery of construction materials and hauling/transport of oversize loads to nonpeak travel periods, to the extent possible;"

The CSTMP ensures that temporary construction activities would be appropriately coordinated so as not to result in conflicts with existing traffic.

Response ORG 6-63

See Response IND 17-7 which addresses Comment ORG 6-63.

Response ORG 6-64

As set forth in Response IND 17-8, there is no data provided to support the commenter's claim that Royal Vista Golf Club is a "carbon sink". The golf course generates carbon emissions daily from various sources such as general maintenance, mowing, fertilizing, pumping water, transporting goods to the golf course and golfers driving cars to the site. According to the EPA, trees do absorb carbon. The Project will include a net gain in the number of trees on the Project site from 411 trees to 1,8643 trees. More than 4 times the number of existing trees which will contribute to absorbing carbon. Please see Section 4.3 Air Quality for additional Environmental Impact Analysis regarding Air Quality. All Air Quality impacts are less than significant after mitigation.

Response ORG 6-65

See Response IND 17-9.

Response ORG 6-66

This commenter does not raise issues with the DEIR impact analyses. As Hazard and Air Quality impacts are considered less than significant after mitigation (see DEIR Sections 4.3 (Air Quality) and 4.9 (Hazards and Hazardous Materials), no additional mitigation measures are warranted or required. See Response IND 17-10.

Response ORG 6-67

See Response FORM 3-6. The DEIR has also been clarified to provide that construction could impact a total of 14 California Species of Special Concern (rather than nine California Species of Special Concern) with low or low to moderate potential to occur: Southern California legless lizard, western pond turtle, coastal whiptail, San Diego coast horned lizard, burrowing owl, pallid bat, big free-tailed bat, western mastiff bat, Yuma myotis, western red bat, western yellow bat, hoary bat, northwestern San Diego pocket mouse, and San Diego desert woodrat) if these species occur on-site.

The existing landscape trees and maintenance structure on the Project Site provide low potential for suitable habitat that would support special-status bat species. The palms on the Project site are regularly maintained such that the dead fronds are regularly removed and there are few fan palms with extensive frond skirts, precluding the establishment of suitable habitat in the palm trees for the bat species. Further, existing structures consist of small sheds and a golf course maintenance building with a metal roof and no attic or crevices, which provide at most limited potential for roosting, and the maintained landscape trees do not constitute a woodland setting, which combined result in a low potential for special-status bat species to occur. In addition, the biological reconnaissance survey did not observe bat species. Because there is a low or low to moderate potential for these species to occur, and the majority of the habitat found on-site is not suitable to support these species, any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be less than significant to regional populations of these species. See GLA Supplemental Technical Memorandum re: Special Status Bats (FEIR Appendix O) for additional detailed responses regarding bats.

In addition, while impacts to special status bats are less than significant, the DEIR has been revised to include Mitigation Measure BIO-3 that would ensure that individuals are not harmed and that any potential impacts associated with roosting bats would remain less-than-significant. See Response AG 6-1 and Response ORG 6-104.

Response ORG 6-68

As set forth in Response FORM 1-4, the proposed Project is an infill development on an existing golf course. The golf course is not considered suitable habitat for protected wildlife species (see EIR Section 4.4, Biological Resources and GLA Response to Cashen (FEIR Appendix P). Further, the Project site does not connect or provide a corridor for wildlife to the Puente Hills SEA. The Site is surrounded by existing residential and commercial uses. No open space or wildlife corridor exists between the Project site and the SEA.

Response ORG 6-69

As set forth in Response FORM 3-7 and as discussed in DEIR Section 4.4, Biological Resources, wildlife observed on the golf course and constructed irrigation ponds is typical of the suburban golf course landscaping. Bird species observed included Canada goose (Branta canadensis), mallard (Anas platyrhynchos), American kestrel (Falco sparverius), mourning dove (Zenaida macroura), black phoebe (Sayornis nigricans), western kingbird (Tyrannus verticalis), bushtit (Psaltriparus minimus), northern mockingbird (Mimus polyglottos), European starling (Sturnus vulgaris), great-tailed grackle (Quiscalus mexicanus), American goldfinch (Carduelis tristis), and house sparrow (Passer domesticus). Three mammal species were observed or detected by their sign, including California ground squirrel (Otospermophilus beecheyi), Botta's pocket gopher (Thomomys bottae), and coyote (Canis latrans).

As shown in Section 4.4, Biological Resources, Table 4.4-2, Special-Status Wildlife Species with Potential to Occur within the Project Site, lists the special-status wildlife species historically recorded from the Project region and assesses these special-status wildlife species' potential to occur on the Project Site. No threatened or endangered wildlife species are recorded from the Project Site.

Of the non-listed special-status animals reported from the Project area with the potential to occur, nine California Species of Special Concern (SSC) have low potential to occur on the Project Site: coastal whiptail (Aspidoscelis tigris stejnegeri), San Diego coast horned lizard (Phrynosoma blainvillii), western pond turtle (Emys marmorata), burrowing owl (Athene cunicularia), pallid bat (Antrozous pallidus), western mastiff bat (Eumops perotis californicus), Yuma myotis (Myotis yumanensis), western red bat (Lasiurus blossevillii), and big free-tailed bat (Nyctinomops macrotis). Five California SSC have low to moderate potential to occur on the Project Site: southern California legless lizard (Anniella stebbinsi), northwestern San Diego pocket mouse (Chaetodipus fallax fallax), western yellow bat (Lasiurus xanthinus), hoary bat (Lasiurus cinereus) and San Diego desert woodrat (Neotoma lepida intermedia). In addition, Cooper's hawk (Accipiter cooperi), a CDFW Special Animal Watch List species, has a high potential to forage on the Project Site and a moderate potential to nest. No special-status wildlife species are expected to occur within the Project Site, including those with low or moderate potential to occur, with the exception of Cooper's hawk which has a moderate potential to nest on-site, but a high potential for this species to forage on-site. Cooper's hawk (nesting) is a CDFW Watch list species (CDFW 2021c). This species was not observed on the Project Site during the site visits. Nevertheless, construction could impact Cooper's hawk if it were nesting on-site. Since this species is protected under the Migratory Bird Treaty Act (MBTA), impact to a Cooper's hawk nest would be potentially significant. As a result, the DEIR requires Mitigation Measure BIO-1 (which has been revised in this FEIR (See Chapter 11, Corrections, Clarifications and Additions) to reduce impacts to Cooper's hawk and nesting birds to less than significant by avoiding breeding bird nests. There is a high potential for Cooper's hawk to forage on the Project Site, portions of which would be unavailable to the species during and after construction. The Cooper's hawk is highly adapted to the urban environment and regularly nests in urban areas including landscape trees in residential areas. The loss of foraging habitat would not be significant as Cooper's hawks forage in a variety of land cover types including residential neighborhoods. Further, Planning Areas 4 and 6 would remain as open space, including during construction, and would provide foraging habitat for Cooper's hawk. There are also off-site parks and open space areas such as the Larkstone Park and surrounding areas in the City of Diamond Bar that would continue to provide foraging habitat for this species, and the species is known to forage within residential communities, as well. Impacts to Cooper's hawk foraging habitat would be less than significant because other foraging habitats are available.

For additional discussion on species observed on the Project Site refer to Section 4.4 Biological Resources of the DEIR.

Response ORG 6-70

As set forth in Response FORM 1-5, the existing Site (75 acres of the existing golf course) uses approximately 198-acre feet annually or 176,340 gallons per day, of water from the San Gabriel Valley Groundwater Basin / Puente Subbasin (Aquifer) in order to irrigate this portion of the existing golf course. Once constructed, the Project site would no longer pump groundwater to irrigate the golf course, as the Project's water would be supplied by the Walnut Valley Water District eliminating the need for extraction of groundwater from the Puente Subbasin. See EIR Section 4.10, Hydrology and Water Quality for additional details on the hydrologic conditions at the Project site. Additionally, As stated in Appendix J of the DEIR "Hydrology Report", the Project site is not a candidate for infiltration, meaning that rainwater does not "permeate the ground, filtering down to the aquifer". The report states in Section 2.4 "Soil Conditions & Infiltration Characteristics" that "Infiltration is not feasible for the site due to… the existing conditions of artificial fill and bedrock and the presence of perched groundwater throughout the site". Therefore, there will be no "loss of watershed to replenish loss of groundwater" as stated above by the commenter.

Response ORG 6-71

As set forth in Response FORM 3-8, the Project site does not include any blue-line streams; however, the site does include two blue-line drainages as depicted on the U.S. Geological Survey (USGS) topographic map dated 1964 and photo revised 1981). These drainages are constructed v-ditches which convey drainage from the adjacent residential tracts which run through portions of the golf course until the drainages enter into the storm drain system. The golf course does include two man-made lined water features which are golf course irrigation ponds. These ponds are fed from groundwater being pumped into them from the San Gabriel Valley Groundwater Basin, in addition to golf course irrigation runoff and other drainages. Refer to DEIR Appendix D – Jurisdictional Delineation Report, Section III.A.3 and III.A.4Geology and Soil.

Response ORG 6-72

As set forth in Response FORM 4-6 and as discussed in EIR Section 4.7, Geology and Soils, portions of the Project site are located within areas that are potentially susceptible to seismic-related landslides. As shown in the EIR Figure 4.7-1, Landslide Location, there is an ancient/historic landslide located on the southeast portion of Planning Area 5. Slope stability issues and potential ground settlement may occur in the landslide area without mitigation. As a result, the EIR requires implementing Mitigation Measure GEO-1 which would require landslide removal within the property boundary of Planning Area 5, buttressing and shoring with tiebacks and shear pin to stabilize potential slope stability issues in the southeastern most portion of the site to enable suitable conditions for the proposed development of the site (LGC 2023c, 2023d). GMED concurred with the analysis and Mitigation Measure GEO-1, which requires a Final Geotechnical Report once the 40-scale grading plans have been developed. The development of a final geotechnical engineering report after the approval of 40-scale grading plans and the adherence to all recommendations in the final geotechnical report was determined to resolve the issue with the potential landslide.

Response ORG 6-73

As set forth in Response IND 17-17, the Project's required compliance with the NPDES Municipal Permits and its local MS4 permit development standards, LID practices, and all applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) pertaining to water quality standards would ensure that drainage patterns, erosion or siltation, stormwater drainage systems, or polluted runoff would not be significantly impacted.

Response ORG 6-74

As set forth in Response FORM 1-10, the Royal Vista Residential Project has no affiliation or relationship with the neighboring property (Sunjoint). No application to develop this property has been submitted to the County. The proposed Project has just 360 residential units. A Water Supply Assessment (WSA) is required for residential developments of 500 or more units. There is no basis in the law to combine projects to reach the threshold requiring a WSA.

Response ORG 6-75

As set forth in Response IND 17-19, the commenter is applying their own noise attenuation assumptions which are not supported by substantial evidence. Feasible mitigation measures are defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (Pub. Resources Code, § 21061.1, 14 Cal Code Regs., § 15364). Mitigation measures must, "identify the type(s) of potential action(s) that can feasibly achieve that performance standard and that will [be] considered, analyzed, and potentially incorporated in the mitigation measure" and be "roughly proportional" to the impacts of the project (Cal. Code Regs. tit. 14 § 15126.4). The DEIR identifies Mitigation Measure NOI-1 through Mitigation Measure NOI-4 which meet the criteria of feasible mitigation measures and lessen the impacts disclosed within the DEIR.

Nevertheless, noise barriers are effective in reducing noise when the barrier blocks the line-of-sight from the noise source to the receiver. Construction noise would affect off-site noise-sensitive receptors the greatest when construction occurs near the receptors towards the outer periphery of the Project site. The noise levels in the DEIR were modeled assuming a number of construction equipment would be in use at the outer periphery of the Project site. Noise levels would be lower when equipment would be in use within the interior of the Project site due to distance attenuation. Noise levels would also be lower at noise-sensitive uses beyond the first row of homes or other buildings due to distance attenuation and due to the intervening buildings or structures partially or fully blocking the line-of-sight to the Project site. DEIR Mitigation Measure NOI-1 requires a minimum height to block the direct line-of-sight. Since the maximum impacted noise-sensitive receptors are located adjacent to the Project site, it is feasible to block the line-of-sight to those maximum impacted noise-sensitive receptors. DEIR Mitigation Measure NOI-1 includes a noise reduction performance standard but does not limit the methods by which the standard can be achieved. The standard can be achieved using solid walls, blankets, or other similar barriers methods that block noise transmission. Nonetheless, as explained in Section 4.11, Noise, of the DEIR, noise may not be feasibly reduced to below the threshold and thus, the environmental impacts related to the temporary or periodic increase in ambient noise levels during temporary construction of the proposed Project were determined to be significant and unavoidable after implementation of feasible mitigation measures.

Response ORG 6-76

As set forth in Response IND 17-20, according to Federal Transit Administration (FTA), groundborne vibration from trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road. Thus, it is not expected that groundborne vibration from trucks would not exceed 0.04 inch/second PPV (equivalent to 80 VdB) for annoyance of occupants in residential buildings. Such vibration levels may be slightly perceptible; however, based on FTA data, it is not expected that groundborne vibration from trucks would exceed thresholds for distinctly or strongly perceptible. On-road haul trucks were appropriately analyzed for noise impacts as discussed on DEIR page 4.13-30 and shown in Table 4.13-15 on DEIR page 4.13-31. As discussed therein, impacts were determined to be less than significant. No additional mitigation measures are required and no changes to the environmental impact determinations in the DEIR are required.

Response ORG 6-77

As set forth in Response IND 17-21, the commenter does not raise CEQA issues, is noted for the record, and will be forwarded to the decision-makers for their review and consideration. According to the East San Gabriel Valley Area Plan EIR (see Table 4.12-5 on page 4.12-12), Rowland Heights “Additional Unit Capacity” is 966 units, not 2,228 units. The Project would redevelop takes away an approximately 75-acre commercial business on private property with no publicly accessible open space, except for the paying golf customer, and replaces it with a 360-unit residential planned development that includes approximately- 28 acres of publicly accessible open space and with more than a 2- mile s of recreational trail system, both open to the public for everyone’s use.

Response ORG 6-78

As set forth in Response IND 17-22, this comment does not raise CEQA issues, is noted for the record, and will be forwarded to the decision-makers for their review and consideration. Pursuant to the County parkland dedication requirements, the Project would require four acres of parkland for every 1,000 people using the recommendations mentioned in the Rowland Heights Community Plan (County of Los Angeles 1981). Pursuant to County Code Section 21.28.140, a percent of private recreation facilities can be counted towards the required amount of park acreage. The Project will provide approximately 28 acres of open space, which is larger than the 5.04 acres that would be required for dedication using the four acres per thousand people standard of the community plan and the General Plan or the 3.52 acres calculated in the County Parks’

April 17, 2023, Park Obligation Report (see Appendix L of the DEIR). In addition, at the request of the Department of Parks and Recreation, the subdivider will pay the in-lieu fees of $986,332, calculated in the Park Obligation Report (Appendix L), to satisfy the Project's Quimby park obligation requirements. As such, the Project meets all parkland requirements. The request for a detailed report on the allocation and utilization of Measure A funds will be passed on to County decision-makers, but is not an appropriate demand regarding the Project.

Response ORG 6-79

As set forth in Response IND 17-23, safety is addressed in DEIR Section 4.15 Public Services. LA County Sheriff's Department has reviewed the proposed Project Tentative Tract Map and the Notice of Preparation for this DEIR and made safety recommendations including the incorporation of Crime Prevention Thru Environmental Design (CPTED) features, which have been incorporated within the DEIR. The CPTED reduces opportunities for criminal activities by employing physical design features that discourage anti-social behavior, while encouraging legitimate use of the Site. Existing walls and fences between the existing homes and the proposed Project are located on the private property of the adjacent homeowners and are owned and maintained by the homeowners. It is important to also note that the golf course was constructed (early 1960's) prior to the construction of the adjacent homes (mid 1960's and mostly 1970's).

Response ORG 6-80

As set forth in Response IND 17-24, this comment does not raise specific CEQA issues, is noted for the record, and will be forwarded to the decision-makers for their review and consideration. The existing site includes paved golf course cart paths which will be used as the trail system. The Project will provide approximately 28 acres of permeable open space that is not paved. The proposed landscape plant palette includes California native plant species.

Response ORG 6-81

As set forth in Response IND 17-25, the Royal Vista Residential Project has no affiliation with the neighboring property (Sunjoint) mentioned above. Appropriate cumulative projects were analyzed as part of the DEIR. See DEIR Section 3.1.5 Potential Cumulative Projects. According to the LA County Department of Regional Planning no application to develop the neighboring property mentioned above has been received. There is no basis to perform a new traffic study to include a speculative project. CEQA does not require analysis of speculative impacts. (CEQA Guidelines section 15145.)

Response ORG 6-82

As set forth in Response IND 17-26, a supplemental analysis was prepared in January 2023 in response to the request for queuing analyses at additional off-ramp locations along the SR-60 and SR-57 Freeways included in Caltrans' letter dated November 21, 2022. The supplemental analysis, "Royal Vista Residential and Parks Project – Supplemental Caltrans Off-Ramp Analysis," prepared by Linscott, Law, and Greenspan, Engineers on January 31, 2023, was inadvertently omitted from the DEIR, however it is provided in FEIR Appendix R and has been incorporated into Chapter 11 Corrections, Clarifications, and Additions. As a result of the supplemental analysis, no safety impacts resulting from off-ramp queuing were identified. Since no new safety impacts are anticipated to occur on the State Highway System due to the addition of project-generated traffic, no mitigation measures are required or proposed.

Response ORG 6-83

As set forth in Response IND 17-27, the traffic data collected in late 2021 was approved by Los Angeles County Public Works for use in the traffic study through approval of the "Royal Vista Residential and Parkis Project – Transportation Impact Analysis Scope of Work" which is provided in Appendix A to the Transportation Impact Analysis (TIA) provided in Appendix M of the DEIR. As stated in the approved scoping document (refer to page A-121 of the TIA), at the time the counts were collected, local public schools (e.g., Rowland Heights Unified School District) were in regular, in-person session, and prior social distancing requirements and capacity limitations issued by Los Angeles County Department of Public Health in response to the COVID-19 pandemic had been lifted. See also Response ORG 6-81.

Response ORG 6-84

As set forth in Response IND 17-28, pursuant to Public Resources Code Section 21099 (b)(2) and certification of CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. Section 4.17 of the DEIR therefore appropriately evaluates Vehicle Miles Traveled (VMT) in lieu of vehicular capacity and congestion in order to determine the significance of transportation impacts. The specific thresholds of significance used to evaluate the potential transportation impacts of the Project are provided on page 4.17-13 of the DEIR.

The signal warrant analysis which was prepared for the intersection of Colima Road and Walnut Leaf Drive is described on page 4.17-24 of the DEIR, and on page 15 of the TIA provided in Appendix M of the DEIR. The four signal warrants evaluated for the Walnut Leaf Drive/Colima Road intersection included three warrants based on vehicular volumes and one warrant based on existing collision records. The warrant analysis determined that based on the strict application of the warrant criteria, the warrants were not met for this intersection.

As stated in Section 8.3.4 beginning on page 106 of the TIA provided in Appendix M of the DEIR, at two-way stop-controlled intersections such as the Project Driveway-Walnut Leaf Drive/Colima Road intersection, the Level of Service (LOS) associated with the most constrained minor street approach is reported as the overall intersection LOS. The Walnut Leaf Drive approach is expected to operate at LOS F. The proposed Project driveway is expected to operate at LOS C or better under all analysis conditions. Project Design Feature (PDF) T-6, which is described on page 4.17-27 of the DEIR, consists of restriping Walnut Leaf Drive in order to provide one southbound departure lane as well as one shared left-through lane and one right-turn lane on the northbound approach. The LOS at the subject intersection with implementation of PDF T-6 is presented in Table 8-2 on page 104 of the TIA. As shown in Table 8-2, the proposed restriping is expected to result in LOS D or better on the Walnut Leaf Drive approach. A conceptual plan of the proposed improvement is provided in Appendix Figure F-4 on page F-337 of the TIA.

The Tierra Luna-Project Driveway/Colima Road intersection was conservatively analyzed as a two-way stop-controlled intersection. PDF T-7 on page 4.17-28 of the DEIR describes the planned relocation of the existing signalized golf cart and pedestrian crossing to the Tierra Luna-Project Driveway/Colima Road intersection in order to provide traffic signal control at the intersection. The LOS at the subject intersection with implementation of PDF T-7 is presented in Table 8-2 on page 104 of the TIA. As shown in Table 8-2, signalization of the Tierra Luna/Colima Road intersection is expected to result in LOS A at this location. The Los Angeles County Public Works reviewed and approved the TIA dated July 18, 2023 prepared by Linscott Law & Greenspan (see Appendix M of the DEIR) which included both CEQA and non-CEQA traffic analyses.

Response ORG 6-85

As set forth in Response IND 17-30, Impact TR-3 provided on pages 4.17-23 of the DEIR concludes that the Project would not substantially increase hazards due to a geometric design feature. The commenter states that Colima Road and Fairway Drive are “collision corridors” but does not provide any analysis or data to support this assertion. Further, the commenter does not state how the Project would degrade safety on these roadways. Nevertheless, per the East San Gabriel Valley Area Plan, Rowland Heights, page 8-43, collision concentration corridors are located along Colima Road, at the intersections of Nogales Street and Fairway Drive, and along Batson Avenue. The intersection of Fullerton and Colima Roads has also been voiced as a collision area of concern. Additionally, speeding, road racing, and “donuts” on Pathfinder Road and other major arterials have been observed, causing added safety concerns. As documented in the East San Gabriel Valley Area Plan, this is the existing condition and the Project is not exacerbating this condition; rather through design features PDF T-3 through PDF T-7, the Project is improving circulation conditions in the vicinity of the Project Site. The comment is noted for the record and will be forwarded to the decision-makers for their review and consideration.

Response ORG 6-86

As set forth in Response IND 17-31, the assumed assignment of Project-related trips in the TIA provided in Appendix M of the DEIR during the weekday AM and PM peak hours are presented in Figures 2-4 through 2-7. No Project-related trips are assumed to utilize the SR-60 Freeway westbound on-ramp at Lemon Avenue, which would require vehicles leaving the Project area to travel approximately 0.5-miles eastbound along Colima Rd-Golden Springs Drive prior to accessing the SR-60 Freeway westbound on-ramps. Instead, the TIA reasonably assumed that vehicles would utilize the SR-60 Freeway westbound on-ramps at Fairway Drive, which is located immediately west of the Project site. As shown in Figures 2-4, 2-5, and 2-7, 10 percent of vehicles related to Planning Areas 1, 2 and 5 which are destined to and from the east are assumed to travel along Lemon Avenue in order to access Valley Boulevard.

Response ORG 6-87

See Response IND 17-32 and Response ORG 6-5, above.

Response ORG 6-88

As set forth in Response IND 17-33, the County's use of Measure A funds is not related to the Proposed Project or this EIR. Members of the public have made previous requests that the County acquire the Project site as open space. The County has not expressed any interest in acquiring the Project site. The potential use of public funds to acquire the Project site (which is not open space in its existing condition) does not raise CEQA issues. Furthermore, Save the Hill Group v. City of Livermore (2022) has no bearing on the Project. There, the land to be developed was connected to pristine natural habitat and the City has earmarked public funds for the acquisition of that land such that it was inappropriate for the EIR to not address the reasonably feasible possibility of the site being purchased with public funds. Here, the Project site is a developed golf course, not connected to any natural open space habitat or wildlife corridors and the use of public funds to acquire the site as open spaces is not reasonably foreseeable and the County has not expressed any interest in purchasing the site.

Response ORG 6-89

As set forth in Response IND 17-34, the Rowland Heights Community General Plan includes two classifications for Open Space "in order to ensure that development proceeds in an orderly fashion and to encourage production of resources, two classes of Open Space are shown---open space and transitional open space". The "Open Space" class refers to protecting natural landforms, riparian corridors and primary viewsheds. These areas, included in a "Resource Inventory", of approximately 4,500 acres of undeveloped, undisturbed hillsides including the Powder Canyon and Tonner Canyon Significant Ecological Areas (SEA) and the Brea-Olinda oil field area. These are the areas which are "intended to remain undeveloped for the life of the plan". The Project site is not a part of this open space classification. The private golf facility is considered an outdoor recreational and falls within the category of Open Space for outdoor recreation and not Open Space for the preservation of natural resources or Open Space for the management production of resources such as minerals, vegetation and wildlife.

Response ORG 6-90

See Response IND 17-35.

Response to Comment Letter ORG 6 Attachment B

Letter from the County of Los Angeles Department of Public Works to Linscott Law and Greenspan Engineers

Response ORG 6-91

See Response ORG 6-15. Attachment B is a letter from the County of Los Angeles Department of Public Works to Linscott Law and Greenspan Engineers Dated September 28, 2023

Response to Comment Letter ORG 6 Attachment C

Comments from Biological Resource Consultant Scott Cashen, MS on the EIR

Response ORG 6-92

The following responses to Comments ORG 6-92 through ORG 6-125 have been prepared by Glenn Lukos Associates (GLA) in response to the comments provided in Attachment C of Comment ORG 6. These responses have been prepared by an expert in the field of biological resources, Tony Bomkamp of GLA, and contain additional expert analysis. These responses are also provided in Appendix P to this FEIR.

Reference documents cited in Attachment C can be found in Appendix Q of this FEIR. The Placeworks Technical Memorandum provides an accurate and adequate description of the environmental setting for the Royal Vista Residential Project (Project), including each of the five vegetation alliances or land cover types with descriptions (i.e., Ornamental, Constructed Ponds, Disturbed, Non-native grassland and Ruderal Habitats, and Developed Areas). Page 3 of the Technical Memorandum is a site aerial photograph showing that the environmental setting consists of an area that is fully developed with residential and commercial land uses and no contiguous open space with large blocks of native communities or even smaller areas of native habitat.

As described in the Technical Memorandum, the Project site covers approximately 75 acres of golf course that is surrounded almost entirely by dense residential development and a limited area of adjacent golf course land use. The 75-acre golf course area contains no native habitat, which GLA confirmed during site visits. Further, in reviewing the Technical Memorandum and other information discussed above, GLA noted that approximately 95.6-percent of the adjacent land uses consist of single-family residences or major roadways such as Colima Drive. Only 4.4-percent of the adjacent land use is golf course which has no contiguous open space or native habitat. To reiterate, GLA confirmed that there is no natural open space or other areas that support native habitat adjacent to the 75-acre Project area. As discussed below in various responses, the fact that the 75-acre area of golf course contains no areas of native habitat, is an important factor relative to Cashen's comments. As depicted on the site aerial photograph on page 3 of the Technical Memorandum, and confirmed by GLA, the Project site supports a low density of trees, including about 410 trees of which 102 are Mexican fan palms. This results in a density of 5.5 trees/acre. Off-site but adjacent to the Project site are five native coast live oaks, none of which would be impacted by the Project (including the required five-foot protection zone), as reported in the Arborist Report appended to the Technical Memorandum.[14] The remaining trees on the site consist of ornamental trees including weeping willow (Salix babylonica), palm trees (Washingtonia spp), sycamore (Platanus racemosa) (which in this case is functioning as an ornamental tree, although native), various pine tree species (Pinus spp.), several eucalyptus species (Eucalyptus globulus, E. camaldulensis, E. sp.), and Araucaria (Araucaria sp.). As will be discussed throughout the responses below, Cashen fails to consider the total absence of any native habitat within or in proximity to the Project site. This severely limits the potential for

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[14] LSA. May 31, 2023. Memorandum: Royal Vista Residential Project Arborist Tree Report, pp.8.

special-status plants or animals, and to the extent that certain special-status species could occur, the conservation value of the golf course for special-status species is very low to non-existent due to the absence of native habitat. Additionally, the site and surrounding areas were subject to agricultural use prior to the development of the golf course, as depicted on Exhibit 7A of the GLA Jurisdictional Delineation Report, (Appendix D to the DEIR) which is a 1953 aerial photograph that shows portions of the site and adjacent areas under cultivation, while other areas appear to have been cleared and support no native vegetation. Thus, there is no suitable habitat for special-status species.

Response ORG 6-93

The field efforts to assess the potential for special-status biological resources as reflected in the Technical Memorandum are commensurate with the conditions at the Project site described above. In addition to the site visit by Placeworks in support of the Technical Memorandum, GLA conducted four site visits as set forth in the Jurisdictional Delineation Report [15]that confirmed the lack of native habitat as follows: ”On March 1 and April 21, 2021, November 3, 2022, and January 25, 2023 regulatory specialists (all of which are biologists) of GLA examined the Project site …” Given the complete lack of native habitat within the 75-acre site and complete lack of native habitat adjacent to the 75-acre Project site, combined with the extensive areas of surrounding dense urban development, the information in the Technical Memorandum provides for an accurate description of the Project site and fully addresses the potential for special-status plants and, together with the clarifications and amplification in the GLA Supplemental Technical Memorandum (see Appendix O and P of the FEIR), fully addresses the potential for special-status animal species. CDFW guidance does not require focused surveys when baseline site conditions are completely devoid of native habitat. The Technical Memorandum is accurate which, as noted, was also confirmed by GLA during the jurisdictional delineation visits which allowed review of the entire 75-acre area over the period between March of 2021 and January 2023. While impacts are less than significant, in response to CDFW’s comment on the DEIR, Mitigation Measure BIO-3 will be added to provide for pre-construction surveys for special-status bats on the Project site, and corresponding measures, as needed, to avoid harm to individuals, in order to further ensure that impacts to special status bats remain less than significant. See also Responses ORG 6-104 through ORG 6-109 below.

Response ORG 6-94

The Technical Memorandum identifies three animal species with “Low to Moderate” (L-M) Potential and six with “Low Potential” (L) to occur including Southern California legless lizard (Anniella stebbinsi) (L-M), Coastal western whiptail (Aspidoscelis tigris stejnegeri) (L), San Diego coast horned lizard Phrynosoma coronatum blainvillei) (L), Southwestern pond turtle (Actinemys marmorata) (L), Burrowing owl (Athene cunicularia) (L), Pallid bat (Antrozous pallidus) (L), Big free-tail bat (Nyctinomops macrotis) (L), Northwestern San Diego pocket mouse (Chaetodipus fallax) (L-M), and San Diego desert woodrat (Neotoma bryanti intermedia) (L-M). Two of these nine species are bat species.

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[15] Glenn Lukos Associates. March 13, 2023. Jurisdictional Delineation of Golf Course Drainage and Water Storage Features at Royal Vista Golf Course Located in Rowland Heights, Los Angeles County, California.

During the jurisdictional delineation, GLA Senior Biologist and Technical Director Tony Bomkamp conducted site surveys to review all areas for potential jurisdictional drainages or other aquatic resources, which allowed for assessment of the entire 75-acre site. This included surveys of the golf course ponds. Based on my onsite observations, it is my opinion that the determination that there is "Low Potential" for the Coastal western whiptail, San Diego coast horned lizard, Southwestern pond turtle, and burrowing owl is accurate and is likely an overstatement regarding the potential for these species to occur. Similarly, the "Low to Moderate Potential" for Southern California legless lizard, San Diego pocket mouse, and San Diego desert woodrat is also conservative and likely overstated and is best designated as "Low Potential." The potential for occurrence of special-status bats is addressed in more detail under Response ORG 6-104 through ORG 6-109, below.

Before addressing each of the seven non-bat species below in more detail (the two bat species are addressed in Response ORG 6-104 through ORG 6-109), the concept of "occurrence" requires additional discussion. This also needs to be considered in the context of the CEQA Appendix G, Guidelines, Biological Resources, impact category (a) which considers whether a project would: "Have <u>a substantial adverse effect</u>, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.' [Emphasis Added]. As demonstrated below, Low to Moderate potential would not result in a "substantial adverse effect."

In this context, occurrence has a range of meanings that would include brief one-time visits, which would be typical of avifauna, foraging by bats which roost elsewhere, and residence by less mobile species such as reptiles or small mammals. As discussed below, likelihood of occurrence is informed by first, the agricultural land uses well before development began as reflected in the 1953 aerial photograph (Exhibit 7A of the Jurisdictional Delineation Report), followed by the decade-long presence of surrounding development which would prevent reptiles and small mammals from reaching the 75-acre site due to the isolation noted above; i.e., no contiguous open space or native habitat. For avian species such as burrowing owl, a migrating owl could reach the site and remain for hours or a few days during migration; however, this would be extremely rare (if it were ever to occur) and would not mean that the 75-acre area of turf, ornamental trees, and development is in fact "suitable habitat." For the reptiles and small mammals, in the very unlikely scenario where any have persisted since the golf course was developed in 1961, such individuals would be completely isolated from regional populations and do not contribute to the gene pool or overall vigor of the regional populations and are functionally extinct. These considerations are important in various discussions below. It is important to note that both Placeworks and GLA are highly familiar with the species addressed below. GLA has experience in conducting habitat assessments for each of the following species and has conducted focused surveys for all but the Northwestern San Diego pocket mouse.

Southern California legless lizard is typically associated with dune habitats or other sandy areas with moist areas below the surface as well as oak woodlands with accumulated leaf litter that provides cover and moisture. Suitable substrate must allow for burrowing as the legless lizard spends much of its time below the ground surface. Thus, the golf course turf and adjacent areas of “rough” which in some areas consist of non-native grassland do not exhibit suitable conditions for the legless lizard. If legless lizards were present on the site prior to agricultural uses followed by construction, suitable habitat was destroyed during grading to the extent any persisted following agricultural uses. In the unlikely event that any legless lizards survived agricultural and/or grading and installation of the turf and ornamental trees, ongoing maintenance including herbicide and pesticides use that is typical in golf course maintenance would have further degraded the habitat through killing of potential prey and direct poisoning. Given these factors, the determination by the Technical Memorandum that the potential for occurrence is Low to Medium is a conservative estimate of potential for the 75-acre site. This species has very low mobility and there is no potential for this species to reach the site given the dense surrounding development. Thus, this species could only be present if it was a resident at the time of construction of the golf course and it was able to persist within the 75 acres for the past 60-plus years which does not contain dune habitats or other sandy areas with moist areas below the surface as well as oak woodlands with accumulated leaf litter that provides cover and moisture. Therefore, the finding of DEIR that there is no potential for significant impacts to this species is correct.

Coastal western whiptail habitat is noted in Table 2 of the Technical Memorandum as follows: “occurs in coastal sage scrub, chaparral, and wash habitats”. The site contains no coastal sage scrub, chaparral, or wash habitats (implicit in the description or wash habitats would be “sandy washes with gravel and cobble” which do not occur on the site). Rather the drainage features on the Project site consist of concrete V-ditches, drainage ditches that consist of turf underlain by Urban land-Sorrento-Arbolado complex, 2 to 9 percent slopes, which is described in the Jurisdictional Delineation Report as:

The Sorrento series consists of very deep, well drained soils that formed in alluvium mostly from sedimentary rocks. Sorrento soils are on alluvial fans and stabilized floodplains and have slopes of 0 to 15 percent. The Arbolado series is classified as fine, spolic, smectitic, thermic Entic Haploxerolls that consist of very deep, well drained soils that formed in human-transported materials (HTM) that originate from alluvium derived from sedimentary sources. Arbolado soils are in high density urban residential and recreational areas. Vegetation is mostly non-native and ornamental in urban areas and annual grasses and forbs in natural areas.

These modified soils do not include “wash” habitat and do not include areas suitable for the coastal western whiptail. This species has low mobility and there is no potential for this species to reach the site given the dense surrounding development. Thus, this species could only present if it was a resident at the time of construction of the golf course in 1961 and it was able to persist within the 75 acres for the past 60-plus years that included agricultural uses, which do not contain coastal sage scrub, chaparral, or wash habitat. Therefore, the finding of the DEIR that there is no potential for significant impacts to this species is correct.

San Diego coast horned lizard habitat is described in the Technical Memorandum as follows: “Occurs in variety of habitats including coastal sage, grassland, chaparral, oak woodland, and riparian woodland with loose sandy soils and abundant native ants or other insects.” The 75-acre site contains none of the referenced native habitats and lacks areas with loose sandy soil with abundant native ants and other insects. The primary diet for the San Diego coast horned lizard consists of mainly ants, especially harvester ants, but can also consume other small invertebrates such as spiders, beetles, termites, flies, bees, and grasshoppers.[16] Areas such as urban golf courses do not typically contain the native harvester ants due to the presence of non-native Argentine ants which thrive in irrigated areas such as golf courses and the edge of residential areas. Combined with the use of herbicides and pesticides, prey species for this species would be very limited on the site. Combined with the lack of sandy soils, the potential for this species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species in correct.

Southwestern pond turtle habitat was described in the Technical Memorandum as "Slow-water aquatic habitats with available basking sites (e.g., submerged logs, open mud banks). The 75-acre Project site includes two golf course irrigation ponds designated in the Jurisdictional Delineation Report as Golf Course Irrigation Pond 1 and Golf Course Irrigation Pond 2. It is important to note that the Golf Course Ponds were created for the golf course and there were no water features that would support pond turtles during the agricultural period as reflected in the 1953 aerial photograph, Exhibit 7A of the Jurisdictional Delineation Report. Specific to current conditions, Golf Course Irrigation Pond 1 exhibits a wooden revetment around the entire perimeter preventing access by pond turtles. During numerous visits as part of the jurisdictional delineation and for preparation of an Approved Jurisdictional Determination by GLA biologists, as noted above, pond turtles were not detected in either feature. During the course of the delineation visits the ponds were drained for maintenance and visits during the draining of the ponds, no pond turtles were detected. Given these factors including the lack of detection during numerous site visits, the potential for this species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species is correct.

Burrowing owl habitat is described in the Technical Memorandum as "Open grassland, fallow fields, sparsely vegetated desert scrub, and edges of disturbed lands, where soil is friable for nesting burrows." A number of factors must be considered regarding suitability of habitat for the burrowing owl. While the Project site exhibits suitable topography (i.e., mostly flat land) for burrowing owl, other factors indicate that the 75-acre site does not have potential for supporting this species. First, both breeding and wintering burrowing owls have been largely (completely) extirpated from the coastal areas of Los Angeles County, which includes the project site[17] and any occurrence of a burrowing would be a highly rare brief stopover during migration. Second, burrowing owls avoid areas with trees that provide perches for raptors which prey on burrowing owl, further limiting site use. Finally, the high level of activity that is associated with golf courses would limit any potential for burrowing owl. Given these factors the potential for this species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species is correct.

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[16] https://www.nps.gov/samo/learn/nature/hornedlizard.htm#:~:text=The%20Coast%20Horned%20Lizard%20has%20a%20distinctive%20flat%20body.&text=Adult%20lizards%20eat%20mainly%20ants,flies%2C%20bees%2C%20and%20grasshoppers.

[17] In the context of the project site, "coastal southern California" includes the greater Los Angeles "Basin" from the immediate coast to the transverse and peninsular mountain ranges.

Northwestern San Diego pocket mouse habitat is described in the Technical Memorandum as: "Occurs mainly in sage scrub, chaparral, and grassland habitats". The Technical Memorandum also noted: "Low to moderate potential for occurrence in non-native grassland hillsides that border the golf course". As noted, the site contains no coastal sage scrub or chaparral habitats and areas of non-native grassland are limited to isolated strips and patches between the golf course fairways and adjacent roads and residential areas resulting in only a handful of acres of potentially suitable habitat. As for the reptiles discussed above, this species has low mobility and could not access the site from other suitable areas in the region. The only potential for this species to occur would be for individuals that survived construction and have been able to persist in the small habitat patches on the edges of golf course, which has low potential. Given these factors the potential for this species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species is correct.

San Diego desert woodrat habitat is described in the Technical Memorandum as follows: Occurs in scrub and desert habitats, usually in association with rock outcroppings, boulders, cacti, or areas of dense undergrowth." The Technical Memorandum also noted: "Low to moderate potential for occurrence in non-native grassland hillsides that border the golf course." As noted, the 75-acre site contains no scrub and no outcroppings, boulders, cacti, or areas of dense undergrowth. As noted for the pocket mouse in the paragraph above, areas of non-native grassland are limited to isolated strips and patches between the golf course fairways and adjacent roads and residential areas resulting in only a handful of acres of potentially suitable habitat. Of particular note is the absence of rock outcroppings, boulders, cacti, or areas of dense undergrowth within the small strips and patches of non-native grassland. Given these factors, the determination of low to moderate is conservative and is better described as low. As discussed for the reptiles and small mammals there is no potential for significant impacts to this species.

Response ORG 6-95

In addressing Comment ORG 6-95 it is necessary to consider two factors: 1) the site context set forth in the Response ORG 6-92 which shows that the Project site is within a dense urban environment, with a history of agriculture, with no native habitat and 2) the special-status species which have at most low to moderate potential to occur on the site. Specifically, whether the ornamental trees on the site have any potential for support of the nine special-status species discussed in the Technical Memorandum that have low to moderate or low potential. In evaluating the trees, it is necessary to separate the palms from the non-palms as the palms could provide potential habitat for certain of the special-status bats if they were not regularly maintained and trimmed (as discussed below associated with the Response ORG 6-104 through ORG 6-109). None of the seven non-bat special-status species addressed in Response ORG 6-94 above would utilize the non-palm tree habitat or the palms as none of the ornamental trees including the palms are suitable habitat for the referenced species. Thus, evaluating "(a) the species composition and relative abundance; (b) the diameter, height, and structure of the trees; and (c) the habitat elements provided by the trees (e.g., cavities, loose bark, broken top, fruits, nuts, among other habitat elements)" would not affect the determination that the site does not provide suitable habitat for the seven non-bat species addressed in Response ORG 6-94. Thus, there are no deficiencies as asserted by Cashen and there is nothing in the comment that would change the finding of no significant impact for the above-referenced species.

Response ORG 6-96

As discussed in Response ORG 6-92 through Response ORG 6-95, above, the Project site contains no native habitat and is fully surrounded by dense urban and commercial development as confirmed during the site visit by Placeworks biologist Phil Brylski on July 13, 2020, and as reflected in the Technical Memorandum. This was further confirmed by site visits by GLA Senior Biologist on March 1 and April 21, 2021 and GLA Biologist Velvet Park in the subsequent site visits. Conducting an inventory of special-status species on the site was not necessary, due to the lack of suitable native habitat as discussed in Response to ORG 6-94. Specifically, detailed biological inventories are only possible when sensitive resources are confirmed to have potential for occurrence based on the presence of suitable native habitat, which in the context of other factors noted above, such as history of agriculture followed by intense urban development including and surrounding the site, does not exist on the Project site. In the absence of such native habitat and associated suitable conditions, including site history detailed inventories are not needed or required.

Response ORG 6-97

Again, the commenter fails to acknowledge the actual conditions, including prior agricultural uses, on the site which consist entirely of golf course uses wherein the 75-acre site contains no native habitat and thus lacks potential for special-status species, except potentially for special-status bats as discussed below under Response ORG 6-104 through ORG 6-109. Regarding use of the CNDDB as a screening tool, which is a surrogate for direct observations, it is important to note that the DEIR included two criteria to be considered in combination. First, is CNDDB occurrences (or other records) in the last 20 years (again, in the absence of observation) in conjunction with the presence of the second criterion which is the presence of suitable habitat. Given the lack of native vegetation and associated lack of suitable habitat for the seven non-bat species discussed in Response ORG 6-94, the determination in the Technical Memorandum that the site contains no suitable habitat supports the conclusion that the Project would not have significant impacts on any of the seven special-status species addressed in Response ORG 6-94. In other words, a nearby occurrence in the CNDDB during the last 20 years would not result in a finding that one of the seven non-bat species would be subject to impacts because the Project Site exhibits a complete lack of native or otherwise suitable habitat and thus the second criterion is not met.

Response ORG 6-98

The DEIR description of the categories of potential to occur has been clarified in the FEIR. As used by biologists evaluating potential of a species to occur, “low potential,” “moderate potential” and “high potential,” are three separate and distinct categories of potential to occur. The category “moderate potential” does not include “high potential” and a species with a “low to moderate” potential to occur would not have a “high” potential to occur. The DEIR has been clarified in Chapter 11, Correction, Clarifications and Additions to reflect this, by adding the “high potential” category as a separate category.

The clarified categories are those that were used in GLA’s Supplemental Technical Memorandum, and reflect the standard understanding of the categories used by biologists when evaluating the potential of a species to occur. Thus, the clarification to the DEIR is consistent with the analysis of the Placeworks Technical Memorandum as well as the GLA Supplemental Technical Memorandum. As discussed in both technical memoranda, due to the lack of suitable habitat, there are no species that would be considered to have high potential, or moderate to high potential, with the sole exception of Cooper's Hawk, which has a high potential to forage on the Project Site. The clarification of these categories in the DEIR is consistent with the analysis, and does not affect the conclusions in the DEIR.

Response ORG 6-99

As set forth in Response ORG 6-94, there is no potential for significant impacts to the seven non-bat species determined to have either low to moderate or low potential to occur due the various factors described above. See Responses ORG-104 through ORG 6-109 regarding special status bats. Further, the potential for Cooper's hawk to forage on the site is high as noted in the Technical Memorandum and there is also moderate potential for nesting on the site; as such there is no need to conduct actual surveys of occurrences given this assumption. The Cooper's hawk is highly adapted to the urban environment and regularly nests in urban areas including landscape trees in residential areas. The loss of foraging habitat would not be significant as Cooper's hawks forage in a variety of land cover types including residential neighborhoods. The potential impacts to nesting Cooper's hawks would be addressed through Mitigation Measure BIO-1 (as revised per discussion in Response ORG 6-123, below) to protect nesting birds through removal of trees outside the avian breeding season and/or performance of surveys for active nests during the breeding season to avoid potential impact. Thus, impacts to Cooper's hawk would be less than significant.

Response ORG 6-100

See Response ORG 6-94, Response ORG 6-97, Response ORG 6-98 and Response ORG 6-99.

Response ORG 6-101

See Response ORG 6-94, ORG 6-97, and ORG 6-98.

Response ORG 6-102

The commenter confuses poor or marginal habitat with the complete absence of suitable habitat for non-bat species on the Project Site, as discussed in Response ORG 6-94. The comment is also highly "theoretical," does not provide any evidence and includes assumptions that are not valid for the 75-acre Project site. It is also important to note the definition of "occurrence" as discussed in Response ORG 6-94 because an occurrence does not necessarily equate to the presence of suitable habitat. This also needs to be considered in the context of the CEQA Appendix G, Guidelines, paragraph (a) which considers whether a project would: "Have <u>a substantial adverse effect</u>, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.' [Emphasis Added]. A potential effect on such a rare occurrence of any of the seven non-bat special-status or special-status bats addressed in the Supplemental Technical Memorandum would not result in a "substantial adverse effect". For example, a migrating burrowing owl could reach the site and stay on the site for a short period (e.g., hours or a few days) and then depart due to the absence of suitable habitat or because conditions (lots of golfers and high activity) create unsuitable conditions. Thus, it would be accurate to say that the site has low potential for an "occurrence" however, this would not equate to presence of suitable habitat. For the seven non-bat species addressed in Response ORG 6-94, the theoretical conditions described by Cashen do not apply due to the complete lack of suitable habitat. See Responses ORG 6-104 to ORGH 6-109 regarding special status bat species.

Response ORG 6-103

The Technical Memorandum is not speculative in its findings because there is no suitable habitat for the seven listed non-bat species addressed in Response ORG 6-94 such that no potential significant impacts would occur to these seven non-bat species. Cashen presents no evidence of suitable habitat. See Responses ORG 6-104 through ORG 6-109 regarding special status bats.

Response ORG 6-104

As noted, in Responses ORG 6-105, 106, and 107, the Project site contains limited habitat for the pallid bat including small sheds, a golf course maintenance building with a metal roof and no attic or crevices, and a few trees with cavities that exhibit at most, limited potential for roosting pallid bat individuals. Impacts to the limited habitat would not result in a substantial effect on the species in accordance with Appendix G, Paragraph (a) and would not result in a significant impact on pallid bat within the region.

In addition, as recommended by CDFW in Comment AG-6-1, pre-construction bat surveys will be included in the Final EIR as Mitigation Measure BIO-3 (see Chapter 11 Correction, Clarifications and Additions). Mitigation Measure BIO-3, set forth below, provides for surveys to take place closer to the start of actual construction, rather than prior to completion of the Final EIR as suggested by CDFW. Implementing such surveys in proximity to the actual start of construction exhibits a much higher probability of capturing presence should the pallid bat be present during construction. In addition, Mitigation Measure BIO-3 includes the mitigation to be implemented in the event the pre-construction surveys identify roosting bats on the Project Site. Mitigation Measure 3 will ensure that individuals are not harmed and that any potential impacts to special-status bats including the pallid bat would continue to be less-than-significant.

MITIGATION MEASURE BIO-3: Prior to site disturbance for Project construction, including removal of any vegetation, sheds and/or maintenance building that could be used by roosting bats, a qualified biologist shall conduct a pre-construction bat roost survey for roosting bats. The survey shall be conducted no more than 14 days prior to site disturbance and shall include daytime surveys to search for sign such as guano, visual "emergence" surveys at dusk, followed by night time surveys using acoustic recognition equipment specific for bat detection. The pre-construction bat roost survey shall consist of a minimum of two bat surveys (conducted consecutively or as determined by the qualified biologist). If roosting bats are detected onsite outside of the bat maternity season, the roost tree or building shall be removed in a manner to avoid and/or minimize injury to roosting bats. This may include using mechanical equipment to gently nudge the tree trunk multiple times or building as directed by the qualified biologist prior to removal or for palm trees and other tree species, to de-frond or de-branch the tree using a mechanical lift and gently lower the cut branches to the ground. Regardless of the method, the fallen tree and/or material shall be left undisturbed overnight until at least the next morning to give roosting bats time to exit before complete removal of the tree or structure. Similar and appropriate measures shall be implemented for building removal.

If roosting bats are detected onsite during the maternity season (March 1 to September 30), the Project shall avoid the subject roost(s) and incorporate an avoidance buffer (as determined by a qualified biologist) until after the maternity season or until a qualified biologist determines no maternity roosting is occurring. Once the qualified biologist approves removal of the subject roost tree(s), or buildings, the same tree and building removal procedures as outlined above shall be implemented prior to tree or building removal.

Response ORG 6-105

It is important to note that use of palm trees on the site by Pallid or Mastiff bats (or any other bat species) would be associated only with dead fronds (to the extent they remain) that form large skirts in the absence of maintenance. Typical maintenance of palm trees includes the removal of the dead fronds in order to limit the potential for fire and pest species such as Norwegian rats that are known to utilize palms. A desktop review of the palms on the Project site (based on Google Earth aerial from February 2024) show that nearly all the palms are regularly maintained such that the dead fronds are regularly removed and there are few to none fan palms with extensive frond skirts. The regular maintenance substantially limits the development of potential roost sites, precluding suitable habitat. In other words, regular maintenance of palms substantially limits or fully eliminates potential habitat. Thus, based on the routine maintenance requirements and practices at the Project Site, no long-term habitat is maintained and therefore the existing palm trees are not considered suitable bat habitat. See GLA Supplemental Technical Memorandum, Appendix O to the FEIR.

In addition, see Mitigation Measure BIO- 3 in Response ORG 6-104. Although impacts to special status bat species are less than significant, Mitigation Measure BIO-3 would ensure that individuals are not harmed and that that any potential impacts remain less-than-significant.

Response ORG 6-106

Western yellow bat is addressed below in Response ORG 6-107. Western red bats are solitary animals that prefer riparian habitats that include walnuts, oaks, willows, sycamores, and ash trees where they roost exclusively in the foliage. The Project site contains no riparian habitat and, as noted in the LSA, 2023 Royal Vista Residential Project Arborist Tree Report. May 31, 2023 (Tree Survey), contains only five oaks off-site, all of which are avoided by the Project. Given the lack of riparian habitat, there is low potential for this species to occur on the Project site. Given the low potential for occurrence and avoidance of non-riparian oaks there is no potential for the Project to have significant impacts on the western red bat.

The hoary bat is a solitary animal that roosts in in foliage of trees in dense forests, along the edges of forest openings and can be found in urban areas such as parks and street trees. The Project site does not contain a dense forest and based on the limited trees, exhibits low to moderate potential for the hoary bat; however, given the solitary nature of the species, numbers would be low and there is no potential for the Project to have significant impacts on the hoary bat.

The Yuma myotis can be found in the hundreds or thousands roosting in caves, attics, buildings, mines, underneath bridges, and other similar structures. As noted for the pallid bat, there is very limited potential habitat in the forms of existing structures and low potential for occurrence. Because of the limited amount of habitat in the form of structures, any potential impacts would be limited and not significant. See GLA Supplemental Technical Memorandum, Appendix O to the FEIR.

In addition, while impacts are less than significant, the DEIR has been revised to include Mitigation Measure BIO-3 that would ensure that individuals are not harmed and that any potential impacts associated with roosting bats, including the western mastiff bat, pallid bat, western red bat, or Yuma myotis on the Project site, would remain less-than-significant. See Response ORG 6-104 and Response ORG 6-105, above.

Response ORG 6-107

GLA concurs that there is moderate potential for western yellow bat to occur on the site due to the presence of over 100 Mexican fan palms. However, as discussed in Response ORG 6-105 and the GLA Supplemental Technical Memorandum (Appendix O to the FEIR), the palms on the Project site are regularly maintained such that the dead fronds are regularly removed and there are few fan palms with extensive frond skirts, precluding the establishment of suitable habitat in the palm trees for the western yellow bat or any other bat species, and thus impacts would be less than significant. In addition, implementation of Mitigation Measure BIO-3 as set forth above in Response ORG 6-104 will ensure that should any western yellow bats occur they would not be harmed and impacts would remain less than significant.

Response ORG 6-108

Attachment 1 includes three “Affidavits of Bat Sightings” one 20467 Tam O’ Shanter Drive which references bat sighting over the subject residence but not over the golf course. One reference bats sighting on Fairlance Drive and “in the golf course” with no additional details. The third, from 1500 Leanne Terr, “late at night in golf course area”.[18] No additional information is provided. While foraging by bats would be expected over the golf course and adjacent residential areas, the affidavits provide no evidence of special-status bats. As discussed in the GLA Supplemental Technical Memorandum (Appendix O to the FEIR) GLA has conducted focused bat surveys of one nearby golf course in 2018 and found no special-status bats. Specifically, GLA conducted focused surveys at the Westridge Golf Course in La Habra which is approximately 7.75 miles to the southwest of the Project Site. See GLA Supplemental Technical Memorandum.

Response ORG 6-109

Most of the bat studies referenced by Cashen are from other regions of the U.S. specifically Arizona and Delaware as well as a study from Sydney, Australia and do not directly inform the

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[18] Cashen, Scott, Appendix 1 of Attachment C to Channel Law Group Comment Letter. January 5, 2024.

presence of bats on the Project site. The study from Whittier does have proximity to the site; however, that study was conducted in a large area of regional open space, which the Project site is not and thus also does not directly inform the presence of bats on the Project Site. As noted in Response ORG 6-108, GLA has conducted focused bat surveys of one nearby golf course in 2018 and found no special-status bats. In addition, pre-construction surveys will be conducted in accordance with Mitigation Measure BIO-3, as discussed in Response ORG 6-104.

Response ORG 6-110

As stated in the DEIR, there is a complete absence of suitable habitat for the Crotch bumblebee. The discussion in the DEIR is not limited to the absence of Eriogonum spp. (buckwheat), but notes that other suitable habitat is not present on the Project Site. In addition, as noted during the jurisdictional delineation, GLA Senior Biologist and Technical Director Tony Bomkamp conducted site surveys to review all areas for potential jurisdictional drainages or other aquatic resources, which allowed for assessment of the entire 75-acre site. Based on this assessment, GLA verified that there is no native habitat on the site including floral resources typically used by the Crotch bumblebee including not just Eriogonum mentioned above but Salvia (sage species), Phacelia spp. and other native floral resources. The CDFW guidelines referenced in the comment are not applicable where, as here, there is a complete absence of suitable habitat. Note also that CDFW has reviewed the DEIR and did not note crotch bumblebee as a concern.

Response ORG 6-111

As noted in Response ORG 6-110, the site was confirmed to have no floral resources for Crotch bumblebee such as Salvia (sage) Phacelia spp., and Eriogonum (buckwheat). The DEIR's conclusion that there is no potential for this species due to absence of suitable habitat is correct, and CDFW survey guidelines do not apply. See Response ORG 6-110. In addition, as noted above, CDFW has reviewed the DEIR and did not identify crotch bumblebee as a concern.

Response ORG 6-112

As discussed in Responses ORG 6-104 through ORG 6-109, the DEIR's findings that there is generally low potential for special-status bats is accurate. Regarding the western yellow bat, Response ORG 6-107 notes that there is moderate potential for western yellow bat to occur on the site due to the presence of over 100 Mexican fan palms.

However, as noted in Response ORG 6-105 and the GLA Supplemental Technical Memorandum, a desktop review of the palms on the site (based on Google Earth aerial from February 2024) show that nearly all the palms are regularly maintained such that the dead fronds are regularly removed and there are few to none fan palms with extensive frond skirts. The regular maintenance substantially limits the development of potential roost sites, precluding suitable habitat. In other words, regular maintenance of palms substantially limits or fully eliminates potential habitat. Thus, based on routine maintenance requirements and practices on the Project site, no long-term habitat is maintained and therefore the existing palm trees are not considered suitable bat habitat. See GLA Supplemental Technical Memorandum, Appendix O to the FEIR. Cashen is not correct that the western yellow bat "appears to roost exclusively in the skirts of palm trees" as according to Bat Conservation International suitable habitat is described as "trees such as *Populus Fremontii*, *Platanus Wrightii*, and *Quercus Arizonica"*.[19] None of the listed tree species are palm trees such as the Mexican palm tree. These bats preferentially roost in trees, including the dead fronds of fan palms in the southern United States; sometimes they roost in hackberry, sycamore, cottonwood, giant dagger yucca, vines, or other sites.[20] While it is possible that the existing structures and any dead fronds of the Mexican fan palms could be used by western mastiff bat, pallid bat and Yuma myotis (buildings only for this species), these very limited features are not sufficient to provide suitable habitat, and the study, at nearby Westridge Golf Course further confirms that any potential impacts would be less than significant. In addition, Mitigation Measure BIO-3 would further ensure that individuals would not be harmed and that impacts to all bat species would continue to be less than significant. Regarding daytime versus nighttime surveys, as noted, implementation of Mitigation Measure BIO-3 would include use of acoustic survey equipment (as GLA used at Westridge Golf Course in 2018) to capture species that emerge after dark.

Response ORG 6-113

Regarding colony size, three of the bat species noted, western red bat, western yellow bat, and pallid bat, are solitary and do not roost in large colonies. The colonial roosting bats, such as the Yuma myotis, have very limited potential habitat such as structures, which are very limited on the Project Site, and there would be no potential for significant impacts. Implementation of Mitigation Measure BIO-3 would ensure that individuals are not harmed and that any potential impacts remain less-than-significant. See Response ORG 6-104 through ORG 6-109 and Response ORG 6-112.

Response ORG 6-114

As demonstrated in Response ORG 6-94, there is no potential for significant impacts to the seven non-bat species addressed in that response. As such, no mitigation is necessary to reduce impacts to less-than-significant. Response ORG 6-94 also demonstrates that for the reptiles and non-bat small mammals that were determined to have moderate or low potential, any such remnant populations that survived previous agriculture uses and subsequent construction are completely isolated and have no ability to contribute to regional populations and as such, the determination that in the unlikely event a remnant population of one of these species persists, any impact to such would not be significant.

Specially, CEQA states as a goal:

> "Prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities..."
>
> In accordance with Appendix G (Environmental Checklist Form) to the State CEQA

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[19] https://www.batcon.org/bat/lasiurus-xanthinus/

[20] https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.103577/Lasiurus_xanthinus

Guidelines, the Project would have a significant biota impact if it would:

(a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?

For the non-bat species, such species would not be able to recolonize other sites due to very low mobility combined with complete isolation. Should any of the seven non-bat species persist, the populations would not be sustainable due to small size and isolation, and the population would not contribute to regional fitness or self-perpetuating levels as already noted. Thus, any potential impacts would not contribute to substantial adverse impacts. As to bats, See Responses ORG 6-104 through ORG 6-109 and the GLA Supplemental Technical Memorandum. Implementation of Mitigation Measure BIO-3 would ensure that individual bats are not harmed and that any potential impacts would remain less-than-significant.

Response ORG 6-115

Contrary to Cashen's assertion, the Project would not impact riparian habitat or sensitive natural communities. The Project would impact 0.04 acre of artificial wetland dominated by non-native species. The remaining jurisdictional features consist of concrete golf course V- Ditches and earthen golf course drainage ditches none of which support riparian or other native habitat. As such, beneficial uses as described in the Los Angeles Regional Board's Basin Plan are very limited. All the features exhibit limited flow due to their small cross sections and all drain into the regional storm drain system and do not support areas of downstream habitat except where the water is discharged to downstream resources after significant mixing with other water sources and would not contribute to beneficial use. As such, there is no evidence of downstream impacts.

Response ORG 6-116

The fact that the 75-acre site is an island fully surrounded by dense urban development that contains no native habitat of any sort and is limited to turf, and approximately 5.5 ornamental trees/acres eliminates the site as nursery site defined as: "Nursery sites are locations where fish and wildlife **concentrate for hatching and/or raising young**, such as nesting rookeries for birds, spawning areas for native fish, fawning areas for deer, monarch overwintering sites, and maternal roosts for bats."[21] For the special status bats addressed in Response ORG 6-104 through ORG 6-109 and ORG 6-112, there is no evidence of communal maternal roosting on the Project site as three of the bat species are solitary and do not form a "concentrated roost." For the other bat species, the presence of small buildings such as the sheds and the maintenance building (which has a metal roof and no attic or crevices) do not constitute areas that would meet the definition of a nursery where species concentrate for breeding. It is also important to note that of the example given, racoons, coyotes, California ground squirrels, Botta's pocket gophers are common and widespread and have no special status and none of these breed communally such that it would constitute a "wildlife nursery".

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[21] https://docs.vcrma.org/images/pdf/planning/plans/VCGPU-EIR_4.04_Bio_Resources_.pdf

Response ORG 6-117

Occasional or isolated avian nesting does not constitute nursery sites per se, based on the appropriate definition of a nursery site as set forth in Response ORG 6-116, above. Moreover, single nest sites do not by definition constitute nursery sites. Nursery sites would be concentrated heronries or other egret, cormorant rookeries, which are not present on the Project Site. The Project's removal of ornamental trees would not result in impacts to avian rookeries or other nursery sites as these trees do not constitute a nursery site. See also Response ORG 6-116, above.

Response ORG 6-118

The commenter does not provide substantial evidence to support its assumption that the Madison Wisconsin "urban park" is sufficiently similar to the Project Site to serve as a proxy for estimating nest density on the Project Site. To the contrary, as noted in Response ORG 6-95, the entire 75-acre site contains approximately 410 trees of which 102 are Mexican fan palms which are subject to regular maintenance. Based on desktop visual estimates on aerial photographs, including a recent Google Earth aerial review dated February 2024), the 75-acre area exhibits between five and ten percent cover by trees such that the potential for nesting birds is substantially lower than the example from Madison Wisconsin in 1948. It is also important to note that arbor vitae (Thuja occidentalis) noted at the Madison site, exhibits highly dense foliage such that it would be capable of support many more nests than the vegetation on the 75-acre area of golf course with between five and ten-percent cover. Moreover, arbor vitae does not occur on the Project Site. Importantly, as demonstrated in Response ORG 6-94, there is no suitable habitat for special-status avifauna (i.e., birds). In addition, BIO-1 (revised as set forth in Response ORG 6-123, below) ensures that no nesting birds would be impacted during removal or trees or other potential nesting site, eliminating impacts. Therefore, impacts to common avifauna would not be considered significant.

Response ORG 6-119

As stated above, any maintenance would avoid the avian nesting season pursuant to Mitigation Measure BIO-1, as revised as described in Response ORG 6-123, below, to the extent feasible or other measures would be employed to protect nesting activity such that there would be no significant impacts associated with routine maintenance.

Response ORG 6-120

As noted in Response ORG 6-94, the statement that the Project would not have significant impacts on the seven non-bat special-status species addressed in the response is accurate. Thus, the statement that the Project would not have cumulatively significant impacts on biological resources is correct. Similarly, impacts to special status bats would be less than significant as discussed in the GLA Supplemental Technical Memorandum and Responses ORG 6-104 through ORG 6-109, and Mitigation Measure BIO-3 would ensure that individuals are not harmed and any potential impacts would remain less than significant; thus, cumulative impacts on special-status bats would also be less than significant.

Response ORG 6-121

Contrary to the statement by Cashen, the 75-acre Project site was subject to agricultural uses and later developed with a golf course through grading which changed the topography, character of the soils and removal of any remaining native habitat, with conversion to turf with about five to ten percent covered by ornamental trees which do not provide habitat for the seven non-bat special status species addressed in Response ORG 6-94. For bats, Response ORG 6-104 through 109 and ORG 6-112 demonstrate that the Project site does not contain suitable habitat for special status bat species and impacts are less than significant, and, in addition, implementation of Mitigation Measure BIO-3 would ensure that individuals are not harmed and that any potential impacts would remain less than significant; thus, cumulative impacts on special-status bats would be less than significant.

Response ORG 6-122

In accordance with the CEQA Appendix G Guidelines, impacts, either direct, indirect, or cumulative to common wildlife, including avifauna are not considered significant. As set forth in Response to ORG 6-94 and other responses, the Project would not have an adverse impact on special-status avifauna, either directly or indirectly or cumulatively or a long-term impact to habitat loss as the developed golf course does not contain habitat for the seven non-bat species. As to special status bats, as discussed in the GLA Supplemental Memorandum and Responses ORG 6-104 through ORG 6-109, the Project Site does not contain suitable habitat and impacts are less than significant. Thus, the Project would not result in significant impacts to special-status bats or common avifauna including cumulative impacts.

Response ORG 6-123

To further define the requirements for nesting surveys, the following measures currently incorporated as part of the Streambed Alteration Agreement application for the Project will be included in Mitigation Measure BIO-1, which will be modified to provide as set forth below to ensure consistency of implementation of the surveys:

> **Mitigation Measure BIO-1:** Designated Biologist. Prior to initiating ground- or vegetation-disturbing activities, subdivider shall submit to CDFW for review and approval a list of biological monitors (Designated Biologist) that will be involved with the Project. The list shall include their names, qualifications, experience, and contact information. Designated Biologists shall: a) be knowledgeable and experienced in the biology and natural history of local plant and wildlife resources; b) be able to identify resources that are or have the potential to be present at the Project area; c) have previous biological monitoring experience on construction Projects; d) for any required nesting bird surveys, the biologist must have at least three (3) years of field experience conducting general and protocol-level surveys related to finding nests and monitoring them for a specific purpose of determining breeding status, egg incubation, chick maturity, and estimating fledge date; e) have the necessary experience and/or certifications for conducting protocol and focused surveys for species that may be present in the Project area; f) when needed, have obtained the proper documentation in regards to Scientific Collecting Permits (SCP) or Memorandum of Understanding (MOU).

> Nesting and/or Breeding Bird Avoidance. Subdivider shall not conduct vegetation alteration or removal from February 1 to September 15 (January 1 to June 30 if raptors are present) to avoid impacts to breeding/nesting birds and other special status and common species. For all other activities if the nesting season cannot be avoided, a Designated Biologist shall complete surveys to identify active nests which may be impacted directly or indirectly by Project activities. If the survey identifies an active nest, a buffer shall be established between the construction activities and the active nest so that nesting activities are not interrupted. The buffer shall be delineated by temporary fencing if site conditions allow and does not create additional disturbance, and shall be in effect throughout construction or until the nest is no longer active. If the survey identifies and active nest, Permittee shall implement one of the following to avoid and minimize impacts to nesting bird species:
>
> a) Implement default 300-foot minimum avoidance buffers for all non-special status passerine birds and 500-foot minimum avoidance buffer for all special status passerine and raptor species. The breeding habitat/nest site shall be fenced and/or flagged in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the Project.
>
> b) Subdivider may propose an alternative plan for avoidance of nesting birds for CDFW concurrence.
>
> c) Should at any time during monitoring, the Designated Biologist determine that an active nest is potentially subject to adverse impacts from construction in any way, the Designated Biologist will be empowered to suspend work to ensure protection of the nest and will monitor the nest site until the nestlings have fledged and are no longer dependent on the nest.

Response ORG 6-124

See Subparagraph (c) of Mitigation Measure BIO-1, as revised in Response ORG 6-123, above, which addresses the responsibilities and powers of the Designated Biologist. It is important to note that the commenter is not accurate. For example, GLA conducts numerous nesting bird surveys in support of construction activities and, based on site specific conditions based on the Project biologist’s discretion, is often required to suspend grading or other construction activities to ensure nest protection during the avian breeding season.

Response ORG 6-125

In addressing mitigation for the jurisdictional features, all of which consist of artificial golf course drainage ditches including a substantial component of concrete V-ditches, it is important to consider the aquatic function of the features. None of the features support riparian habitat and only a single feature contains wetlands totaling 0.04 acre which is dominated by non-native vegetation. The concrete ditches do not contribute to such hydrologic functions such as groundwater recharge and biogeochemical functions such as reduction of sediment transport are negligible. Mitigation Measure BIO-2 includes programmatic mitigation that allows for a variety of mitigation options based on specific performance criteria provides for the replacement of functions by opting for the best alternative whether onsite or offsite at a mitigation bank. The final determination for the mitigation will be determined in consultation with ACOE, CDFW and the Regional Board during the permitting process implementing the mitigation measure performance criteria, as permitted under CEQA. It is recommended that Mitigation Measure BIO-2 be revised as set forth below to clarify that CDFW is the agency with jurisdiction and that the maximum amount of impact serves as the basis for the mitigation program:

"On- and/or off-site restoration and/or enhancement of USACE/RWQCB/CDFW jurisdictional "waters of the U.S."/"waters of the State" and wetlands at a ratio no less than 1:1 for permanent impacts. The mitigation program would be developed in consultation with the regulatory agencies and would be based on the maximum amount of impact which is expected to be CDFW jurisdiction. ~~and f~~For temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate) or through off-site restoration or enhancement. Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank)."

10.4 Form Letters

The following comment letters were received from individuals that submitted one of four versions of a form letter on the Royal Vista Residential Project DEIR. The comment letters are grouped together and are followed by all responses as indicated in Table 10-3.

TABLE 10-3
LIST OF DEIR FORM LETTERS: INDIVIDUALS

Letter Code	Commenting Party	Response Page Number
FORM Letter 1 Responses	**General Public Comment Letter 1**	**Page 10-374**
	Redacted Name	
	Todd Hsu	
	Quinnie Wong, Alice Da Luz, Alan Lee	
	Charlene Hobbs	
	Bruce Thompson	
	Hannah C Charng	
	James Osowski	
	Daniel Bodine	
	Lisa Marie	
	Jennifer Chen	
	Nancy Fox	
	Rick Wong	
	Amy Huang	
	Eileen Lu	
	Lissett Mondragon	
	Armando Carrillo	
	Lana Tran	
	Fabian Cheng	
	1945 Radclay Dr.	
	Winnie Lee	
FORM Letter 2 Responses	**General Public Comment Letter 2**	**Page 10-381**
	Justine Bell	
	LadyAnn Sabalburo	
	Martha Alcala	
	Tess Charng	
	Michael Caliendo	
	Jim Galvey	
	Mingjue Shi	
	Peter K Lee	
	Linda White	
	Peter Tran	

Letter Code	Commenting Party	Response Page Number
	1951 Radclay Dr.	
	Patricia C.	
	Adele Prince	
	Karen Allison	
FORM Letter 3 Responses	**General Public Comment Letter 3**	**Page 10-388**
	Bonnie Duenas	
	Greg Chiang	
	William Edwards	
	Asif Siddiqi	
	Jerry Hsieh	
	Makenzie King	
	Liuyu Xin	
	Barry Gould	
	Sarah Wang	
	Wei-Chun Wu	
	Jim Lin	
	Tim Chan	
	Chris Chen	
	Karen Gerloff	
	1645 Chapel Hill	
	1945 Radclay Dr.	
	1951 Radclay Dr.	
	Irene Tores Garcia	
	Gilbert Garcia	
FORM Letter 4 Responses	**General Public Comment Letter 4**	**Page 10-393**
	Anh Thu Nguyen	
	Julian and Zulai Sanchez	
	Michelle Coppel	
	Katie Tucker	
	Caroline Lam	
	Craig Johnson	
	Johnny Charng	
	Gisela Connelly	
	Machelle Hernandez	
	Mary Baker	
	James Chu	
	Jack Qi	
	Jing Yang	
	Jack Yao	

Letter Code	Commenting Party	Response Page Number
	Yusef D.	
	Vincent Ferrara	
	Rochelle Kellur	

Dear LA County Department of Regional Planning,

I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts. FORM 1-1

The proposed dense development comprising nearly 400 units (upwards of 800 units including the Sunjoint proposed development on Lake Canyon) poses a significant threat to our community's quality of life. This threat manifests in heightened crime rates within our city, FORM 1-2
an influx of at least 2000 additional vehicles clogging our roads and emitting pollutants, FORM 1-3

and the irrevocable destruction of the wildlife habitat, including the vital corridor to the Puente Hills SEA conservation area located just 1.2 miles away. FORM 1-4
In addition, the current permeable ground filters pollutants, replenishes the Puente Basin Aquifer, and mitigates the urban heat island effect as it cools the surrounding area. FORM 1-5

Solar Panel Glare: It is crucial to address potential impacts on residents due to direct glare or reflection. How will the glare from solar panels be minimized to reduce reflection on current homes, especially those situated on higher elevations? FORM 1-6

Lighting on Walking and Biking Paths: The DEIR lacks information on the type and height of lighting along proposed walking and biking paths. We are particularly concerned about bright lights projecting into neighboring private backyards. It is essential to address potential impacts on residents' privacy and well-being. FORM 1-7

Bright LED Streetlights: Considering the adverse effects observed in a recent Upland development with LED lights too bright at night, we request careful consideration of the choice of LED streetlights. It is vital to avoid disrupting the natural patterns of local bird populations due to intense illumination resembling daytime during nighttime hours. FORM 1-8

The Value of Open Space: Open space holds significant importance for our community. It provides essential recreational opportunities, greenery, and tranquility, contributing to residents' well-being and quality of life. Open spaces play a crucial role in rainwater collection, mitigating flooding, and replenishing groundwater. They contribute to climate change mitigation by reducing urban heat islands and providing shade. Trees in open spaces absorb carbon dioxide, aiding in carbon sequestration. FORM 1-9

Water: Another section of the golf course is sold to Sunjoint for 420 homes, and Walnut Valley Water District has issued a Will Serve Letter for 360 homes, not considering the Sunjoint project. Given this, a water supply assessment study per SB 610 should be conducted by Walnut Valley Water District for developments exceeding 500 units.The large number of units in the project will accelerate the mandated reduction of water usage up to 50% over the next 10 years, as well as raising our water rates. FORM 1-10

Thank you for your attention to these concerns and your commitment to ensuring that the Royal Vista Residential Project aligns with the values and needs of our community. FORM 1-11

Sincerely,

Master Response to Comment Letter FORM 1

Response FORM 1-1

Comment noted.

Response FORM 1-2

The Royal Vista Residential Project (Project) proposes to redevelop an approximately 76-acre site (Project Site), which currently comprises a portion of the existing Royal Vista Golf Club golf course, with residential and open space uses. The Project would develop a total of 360 residential units, consisting of 200 detached single-family homes, 88 attached residential condominium units (58 duplex units, 30 triplex units) and 72 townhomes. All 72 townhomes and ten triplex units would be set aside for sale to middle- and moderate-income households. The Project would also set aside approximately 28 acres of open space areas. See DEIR Chapter 2.0, Project Description. In addition, the Project proposes infill residential development that is compatible in density, design and scale with surrounding housing. See DEIR Chapter 4.1 (Aesthetics) and Chapter 4.11 (Land Use).

The commenter's reference to a "Sunjoint proposed development on Lake Canyon" appears to refer to adjacent portions of the Royal Vista Golf Club golf course which the commenter identifies as owned by Sunjoint (the "Sunjoint Property"). The Project does not include any portion of the Sunjoint Property, but is limited to the approximately 76 acres of the golf course that comprise the Project Site. In addition, no general plan amendment, zone change, subdivision or other discretionary development application has been filed with the LA County Planning for a project on the Sunjoint Property, nor has the LA County Planning received a request for environmental review of any development on the Sunjoint Property. Following the close of the public review period for the DEIR, LA County Planning received a request for preliminary consultation regarding potential development on the Sunjoint Property. This request for preliminary consultation seeks an informational review and does not seek approval of any project or development. It is unknown whether any discretionary entitlement application or request for environmental review regarding development of the Sunjoint Property will be submitted.

The commenter expresses a general concern that residential development would result in heightened crime rates, but does not provide any evidence that crime rates will increase as a result of developing the Project or identify any deficiency in the environmental analysis in the DEIR. The Los Angeles County Sheriff's Department (LASD) has indicated that any increase in service calls as a result of the population increase associated with the Project would be within LASD's goal of response times, and the LASD states that it has no plans for expansion or construction of any new facilities. See DEIR Section 4.15, Public Services, Impact PS-2. In addition, the Project proposes to include general principles of Crime Prevention Thru Environmental Design (CPTED) as recommended by the Walnut-Diamond Bar Sheriff Station, such as lighting and landscaping. The CPTED reduces opportunities for criminal activities by employing physical design features that discourage anti-social behavior, while encouraging legitimate use of the Project Site. The incorporation of CPTED design principles is an element of the Project Description, but would also be secured through Project conditions of approval. Thus, as concluded in the DEIR, Section 4-15.5, impacts on sheriff protection services during operation would be less than significant.

Response FORM 1-3

This commenter expresses a general concern about traffic and vehicle emissions. See also Response to Comment FORM 1-2, which addresses the first portion of this sentence.

The thresholds of significance used to evaluate the potential transportation impacts of the Project are provided on page 4.17-13 of the DEIR. The Project includes 360 dwelling units and will not create an “influx of at least 2,000 additional vehicles.” Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, traffic impacts under CEQA are analyzed in terms of Vehicle Miles Traveled (VMT), and not in terms of automobile delay as described by Level of Service (LOS) or similar measures of vehicular capacity or traffic congestion. As concluded in Section 4.17.5, Impact TR-2, of the DEIR, the Project (Planning Areas 1, 2, 3 and 5) would generate VMT above the County’s VMT thresholds. To lessen the impact, the Project would implement Mitigation Measures TR-1 and Mitigation Measure TR-2 to reduce the VMT impacts and trip generation of the Project by providing reimbursement subsidies for Metrolink and Foothill Transit Passes (Mitigation Measure TR-1) and by providing electric bicycles along with the purchase of each dwelling unit (Mitigation Measure TR-2). Implementation of Mitigation Measures TR-1 and TR-2 are expected to result in a quantifiable VMT reduction, but the Project’s VMT would continue to exceed the County VMT threshold and Project level VMT impacts would be significant and unavoidable.

Transportation Impacts TR-1 (conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities), and Impact TR-3 (substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)) would be less than significant, and Impact TR-4 (emergency access) would be less than significant with implementation of mitigation measure TR-3 (Construction Staging and Traffic Management Plan). See DEIR Section 4.17.5.

Although changes in LOS or other measures of congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development projects under CEQA, a “non-CEQA” Operational Analysis was also conducted for the proposed Project in accordance with the Los Angeles County Public Works (LACPW) “Transportation Impact Analysis Guidelines” (TIA Guidelines). This analysis is provided beginning on page 64 of the Transportation Impact Analysis (TIA) which is included in Appendix M of the DEIR. The TIA Guidelines state: “Intersection level of service (LOS) and queuing methodologies from the latest edition of the Transportation Research Board Highway Capacity Manual (HCM) should be used to evaluate the operation of the project driveways and nearby intersections.” As a result of the non-CEQA Operational Analysis, Project Design Features (PDF) T-3 through T-8 were identified and included as part of the Project. The PDF T-3 through T-8 improvements are described on pages 4.17-24 through 4.17-29 of the DEIR.

With respect to vehicle emissions, operational air quality emission impacts would be less than significant. See DEIR Section 4.3.5.

Response FORM 1-4

This commenter makes general assertions regarding impacts to wildlife habitat but does not provide any evidence in support of such an assertion. See also Response to Comment FORM 1-2 and Response to Comment FORM 1-3, which addresses the first portion of this sentence.

The proposed Project is an infill development on an existing (and recently closed) golf course. The Project Site is not considered suitable habitat for protected wildlife species. See DEIR Section 4.4, Biological Resources). Further, the Project Site does not connect or provide a corridor for wildlife to the Puente Hills Significant Ecological Area (SEA). Due to the development surrounding the Project Site, which does not provide habitat or has low habitat value to most wildlife, there are no wildlife corridors or habitat connectivity between the Project Site and any natural areas in the region that might support the movement of native wildlife. See DEIR Section 4.4, pages 4.4-15 and 4.4-26.

Response FORM 1-5

Once constructed, the proposed Project would result in an increase in impervious surface since it would redevelop a portion of an existing, mostly pervious, golf course. However, rainwater runoff would be captured in the proposed storm drain and detention facilities designed to meet a 25-year storm event. See DEIR Section 4.10, Hydrology and Water Quality. Compliance with applicable laws and regulations such as the NPDES Municipal Permits and its local MS4 permit development standards, LID practices, and all applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) pertaining to water quality standards and waste discharge requirements would ensure that operation of the Project would not violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality. See DEIR Section 4.10, Impact HYDRO-1.

The Project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that it may impede sustainable management of the basin. As stated in Appendix J of the DEIR "Low Impact Development Plan," the Project Site is not a candidate for infiltration, meaning that rainwater does not "permeate the ground, filtering down to the aquifer." The report states in Section 2.4, "Soil Conditions & Infiltration Characteristics," that "[i]nfiltration is not feasible for the site due to… the existing conditions of artificial fill and bedrock and the presence of perched groundwater throughout the site." Therefore, under current site condition no groundwater recharge is occurring.

Further, the proposed Project would include on-site storm drain facilities that would consist of a combination of low-flow water quality and peak-flow conveyance systems. The low-flow water quality systems would intercept the low flows and provide water quality treatment in order to meet the requirements of the LA County LID Ordinance. The peak flow conveyance systems would provide peak flow reduction via detention systems, in order to control flows to meet the capacity requirements of the existing LACFCD storm drain systems. The Project would include new filtration BMPs to the Project design and new landscaped areas throughout the Project Site, all designed to meet a 25-year storm event. The intercepted storm flows would be treated onsite through applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) prior to being discharged into the storm drains. Several of the existing off-site storm drains are earthen bottom and would allow for stormwater recharge into the groundwater system. See DEIR Section 4.10, Impact HYDRO-2.

The Project Site, which consists of approximately 76 acres of the existing golf course, used up to approximately 198-acre feet annually or 176,340 gallons per day, of water from the San Gabriel Valley Groundwater Basin / Puente Subbasin in order to irrigate this portion of the existing golf course. Once the Project is constructed, the Project Site would no longer pump groundwater to irrigate the golf course, as the Project's water would be supplied by the Walnut Valley Water District, eliminating the need for extraction of groundwater from the Puente Subbasin. See DEIR Section 4.10, Hydrology and Water Quality for additional details on the hydrologic conditions at the Project Site.

The Project would retain approximately 28 acres of open space, comprising approximately 37 percent of the Project Site, and would include a substantial net gain in the number of trees. The Project would result in the net increase of approximately 1,453 trees on the Project Site, increasing the existing 411 trees to approximately 1,864 trees, with a portion planted along paved sidewalks and the trail system. This is more than 4 times the number of existing trees. According to the Environmental Protection Agency (EPA), trees help cool the environment, making a simple and effective way to mitigate heat.[22]. These Project features would contribute to the reduction of the potential "heat island effect" mentioned by the commenter.

Response FORM 1-6

Solar panels installed as part of the Project are not expected to create direct glare or reflection on existing residences. Modern solar panels reflect as little as two percent of incoming sunlight, which is approximately the same as water and less than soil or even wood shingles.[23] Solar panels are designed to capture light, not reflect it. A solar panel is comprised of numerous solar cells. A solar cell differs from a typical reflective surface in that it has a microscopically irregular surface designed to trap the rays of sunlight for the purposes of energy production. The intent of solar technology is to increase efficiency by absorbing as much light as possible, minimizing reflection and glare. Solar glass sheets (the glass layer that covers the solar panels) are typically tempered glass that is treated with an anti-reflective or diffusion coating that further diffuses the intensity of glare produced. Further, the proposed Project would not use highly reflective materials for roofing or exterior siding as required by LACC Section 22.140.580 (d) of the County Code. The proposed residential homes and townhomes would use neutral tones, and non-reflective materials, such as wood, stucco and concrete.

Response FORM 1-7

Operation of the Project is not expected to create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. The occupancy of the residences on the Project Site would result in new sources of light primarily from interior and exterior lights on/in the new residences, and street and ambient lighting along the new streets. These varied

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[22] https://www.epa.gov/heatislands/heat-island-cooling-strategies; accessed 3/30/24.

[23] National Renewable Energy Laboratory, Research and Analysis Demonstrate the Lack of Impacts of Glare from Photovoltaic Modules, July 31, 2018.

sources of lighting would be similar to the existing lighting from the surrounding residences. The Project would illuminate areas that have not had nighttime lighting in the past and could contribute to an overall increase in the area's ambient lighting. However, the Project would eliminate the Royal Vista Golf Course driving range lighting, which remains illuminated until 10:30 p.m. daily. In addition, the Project includes a Project Design Feature to ensure that Project lighting is shielded and does not spill off of the Project Site into surrounding areas. See DEIR Section 4.1, Aesthetics.

> **PDF AES-1: Project Lighting**
>
> All light sources associated with the Project would be shielded and/or aimed so that no illumination would spill outside of the Project Site boundary. Lighting would be designed to improve safety and to add visual interest to the Project Site, including accentuating key landscape and architectural features. Additionally, street lighting would be shielded to illuminate the streets, promote dark skies, and inhibit any unnecessary nighttime lighting or glare.

This Project Design Feature would apply to all lighting on the Project Site, including the low bollard lighting fixtures along the trail system or other walking or biking paths. In addition, the Project would consolidate light sources toward the north, west and southeast portions of the Project Site adjacent to areas that currently have similar amounts of lighting from existing streetlights and residential lighting from the existing residential development to the northwest, east and south.

Response FORM 1-8

See Response FORM 1-7, above. The Project is a residential development that would include lighting similar to that of the existing residential development to the northwest, east and south. Project street lighting on private streets would be conditioned to require compliance with public street lighting standards, and submission of a street lighting plan for review and approval by the Department of Public Works. In addition, PDF-AES-1 provides that street lighting would be shielded to illuminate the streets, promote dark skies, and inhibit any unnecessary nighttime lighting or glare. Thus, lighting would not create illumination resembling daytime.

Response FORM 1-9

The commenter makes general statements regarding open space, but does not raise a specific comment regarding the Project or the DEIR's evaluation of environmental issues. See Response FORM 1-5.

Response FORM 1-10

State law requires a Water Supply Assessment (WSA) for projects that propose over 500 residential dwelling units, 500,000 square feet of commercial floor space, or employ over 1,000 individuals or the equivalent water usage. See DEIR, Section 4.19, Utilities and Service Systems. The proposed Project consists of a total of 360 residential units, and approximately 28 acres of open space areas. See DEIR Chapter 2.0, Project Description. The Project is proposed for the approximately 76-acre Project Site and does not include any portion of the adjacent Sunjoint

Property. Because the Project proposes 360 dwelling units, a WSA is not required. See DEIR, page 4.19-5. See also Response AG 2-1 from the Walnut Valley Water District. In addition, no general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the Sunjoint Property, nor has the LA County Planning received a request for environmental review of any development on the Sunjoint Property. See Response FORM 1-2.

Response FORM 1-11

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Dear LA County Department of Regional Planning,

I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts. FORM 2-1

The proposed dense development, which could reach up to 800 units when considering the Sunjoint development on Lake Canyon, poses a significant risk to our community's well-being. This risk is evident in the anticipated surge in crime rates, FORM 2-2

the addition of at least 2,000 vehicles causing congestion and emitting pollutants, and the irreversible damage to our wildlife habitat. FORM 2-3

This habitat, including a crucial corridor to the Puente Hills SEA conservation area just 1.2 miles away, is at stake. FORM 2-4

In addition, the existing permeable ground plays a vital role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. FORM 2-5

Air Quality:
Concerns arise over Valley Fever risk due to excavation during construction near the proposed site. A previous case during a similar development led to a resident's diagnosis and ongoing treatment. Excavation dust is also linked to respiratory issues like asthma and mucormycosis. FORM 2-6

The extensive 3.8 million cubic yards of grading, equivalent to 10,277 haul trucks on major roads, raises worries about traffic control on Colima Road and East Walnut Dr. South, especially during school hours. FORM 2-7

A four-year construction period may extend to eight with the Sunjoint development, impacting residents significantly. FORM 2-8

Royal Vista Golf Course, a vital carbon sink, borders the City of Industry's Good Transit Corridor, absorbing carbon near the 57/60 Freeways. The SCAQMD recommends a health risk assessment for mobile sources, and uncertainty surrounds its inclusion in the EIR. FORM 2-9

Residents propose a fund by the developer to upgrade windows and AC units for homes lacking proper ventilation, given the aging infrastructure and increased home-stay due to remote work post-pandemic. FORM 2-10

Particulate Matter Exposure:
Freeways emit significant PM2.5 and PM10, causing respiratory and cardiovascular problems. Prolonged exposure raises health concerns as these fine particles can penetrate deep into the lungs and enter the bloodstream, posing health risks such as respiratory issues, aggravated asthma, bronchitis, and heightened cardiovascular disease risk. FORM 2-11

Thank you for your attention to these concerns and your commitment to ensuring that the Royal Vista Residential Project aligns with the values and needs of our community. FORM 2-12

Sincerely,

Master Response to Comment Letter FORM 2

Response FORM 2-1

Comment noted.

Response FORM 2-2

See Response FORM 1-2.

Response FORM 2-3

See Response FORM 1-3. In addition, see Response FORM 1-4 regarding wildlife habitat.

Response FORM 2-4

See Response FORM 1-4.

Response FORM 2-5

See Response FORM 1-5.

Response FORM 2-6

The commenter raises a concern regarding Valley Fever, but does not provide a specific comment regarding the DEIR's evaluation of environmental issues. Valley Fever is an infective disease caused by the fungus Coccidioides immitis. Infection occurs via inhalation of Coccidioides immitis spores that have become airborne from the upturn of dry, dusty soil by wind, construction, farming, or other activities. Several factors indicate a project's potential to expose sensitive receptors to Valley Fever: disturbance of the topsoil of undeveloped land, dust storms, strong winds, earthquakes, archaeological digs, agricultural activities, and construction activities. Coccidioides immitis spores are often found in the soil around rodent burrows, native American ruins, and burial grounds. See DEIR Section 4.3, Air Quality.

Construction activities for the proposed Project would have the potential to expose persons to the spores that cause Valley Fever from fugitive dust generated during construction. In particular, construction activities that disturb topsoil, especially of undeveloped land, have the potential to cause Coccidioides immitis spores in soil to become airborne. Individuals who work outdoors and who are exposed to wind and dust are more likely to contract Valley Fever. However, implementation of Mitigation Measure AQ-2, set forth below, would reduce the risk of Valley Fever exposure. Specifically, the Project would follow the requirements and guidelines listed in the 2019 County of Los Angeles Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers, to help reduce the risk of Valley Fever to workers and the surrounding community. In addition, compliance with independently enforceable rules and other measures that reduce emissions of fugitive dust, such as SCAQMD fugitive dust control rules (e.g., Rule 403), would reduce the potential for Coccidioides immitis spores in soil to become airborne. Applicable California Division of Occupational Safety and Health (Cal/OSHA) requirements would provide additional protection of construction workers, as well as the nearby community. Such compliance would require the control and mitigation of all sources of construction-related fugitive dust, and thereby potential sources of airborne Coccidioides immitis spores, to at or below applicable regulatory limits for on-site and off-site receptors. The DEIR concluded that compliance with regulatory requirements, together with Mitigation Measure AQ-2, would reduce impacts to a less-than-significant level. See DEIR Section 4.3.

> **Mitigation Measure AQ-2:** During the construction phases with any soil disturbance, the construction contractor(s) shall comply with the 2019 County of Los Angeles Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers, as well as the following measures, as feasible, to reduce potential Valley Fever impacts. Compliance with the 2019 County of Los Angeles Valley Fever Management Plan would reduce Valley Fever impacts for on-site workers, as well as the off-site neighboring communities.
>
> - Equipment, vehicles, and other items shall be thoroughly cleaned of dust before they are moved off-site to other work locations.
> - Wherever possible, grading and trenching work shall be phased so that earth-moving equipment is working well ahead or downwind of workers on the ground and nearby sensitive uses.
> - The area immediately behind grading or trenching equipment shall be sprayed with water before ground workers move into the area to limit dust from blowing off-site.
> - To the greatest extent feasible, heavy-duty earth-moving vehicles shall be closed-cab and equipped with a high-efficiency particulate (HEP)-filtered air system.
> - Workers shall receive training in procedures to minimize activities that may result in the release of airborne Coccidioides immitis spores on-site and off-site, to recognize the symptoms of Valley Fever, and shall be instructed to promptly report suspected symptoms of work-related Valley Fever to a supervisor. Evidence of training shall be provided to the LA County Planning within 5 days of the training session.
> - A Valley Fever informational handout shall be provided to all onsite construction personnel, as well as neighboring off-site sensitive uses within 100 feet of the Project Site. The handout shall, at a minimum, provide information regarding the symptoms, health effects, preventative measures, and treatment.
> - On-site personnel shall be trained on the proper use of personal protective equipment, including respiratory equipment. National Institute for Occupational Safety and Health–approved respirators shall be provided to on-site personnel, upon request. When exposure to dust is unavoidable, provide appropriate National Institute for Occupational Safety and Health-approved respiratory protection to affected workers and off-site receptors. If respiratory protection is deemed necessary, employers must develop and implement a respiratory protection program in accordance with Cal/OSHA's Respiratory Protection standard (8 CCR 5144).

Response FORM 2-7

Mitigation Measure TR-3, presented on page 4.17-30 of the DEIR, requires the proposed Project to implement a Construction Staging and Traffic Management Plan (CSTMP). As stated in the DEIR, the CSTMP includes requirements, among other things, to:

- “Limit any potential roadway lane closure/s to off-peak travel periods, to the extent feasible;”

- "provide traffic control for any potential roadway lane closure, detour, or disruption to traffic circulation;"
- "schedule delivery of construction materials and hauling/transport of oversize loads to nonpeak travel periods, to the extent possible;"

The CSTMP ensures that temporary construction activities would be appropriately coordinated so as not to result in conflicts with existing traffic.

Response FORM 2-8

The estimated start of construction for the Project is the Fourth Quarter of 2024 with the estimated completion in the Fourth Quarter of 2027, thus it is expected that the Project would have a three-year construction period, not four years as the commenter suggests. See As DEIR Chapter 2.0, Project Description.

The Project does not include any development on the Sunjoint Property, and no discretionary entitlement application has been filed with the LA County Planning for a project on the Sunjoint Property. See Response FORM 1-2.

Response FORM 2-9

The commenter does not provide data or other evidence to support the commenter's claim that the Royal Vista Golf Club is a "vital carbon sink," and does not provide any evidence to support any assertions regarding the extent of the Project Site's carbon absorption or release in its existing condition. Nor does the commenter provide any evidence regarding the effect of the Project on carbon sequestration of the Project Site. The golf course generates carbon emissions daily from various sources such as general maintenance, mowing, fertilizing, pumping water, transporting goods to the golf course and golfers driving cars to the site. Although the Project would result in the redevelopment of approximately 47 acres of the existing golf course, the proposed Project will plant approximately 1,820 trees on the Project Site and will provide approximately 1,453 more trees than currently exist on the Project Site. Street trees will be planted along Colima Road, East Walnut Drive South and within all of the new internal streets. The addition of the 1,450 trees would help increase onsite carbon sequestration. In one year, a mature live tree can absorb more than 48 pounds of carbon dioxide, which is permanently stored in its fibers until the tree or wood experiences a physical event that releases it into the atmosphere, like fire or decomposition (USDA 2021). Although the Project would substantially increase the number of trees on the Project Site, and will retain approximately 28 acres of open space on the Project Site, the DEIR acknowledges that the Project would convert portions of an existing golf course to residential uses, and conservatively concludes that the Project is inconsistent with the VMT Reduction priority area in the 2022 Scoping Plan regarding the conversion of natural and working lands. Because the Project is consistent with many, but not all, of the key project attributes under the VMT Reduction priority area, the DEIR conservatively concludes that the Project is inconsistent with the CARB 2022 Scoping Plan. See DEIR Section 4.8.

SCAQMD recommends that operational health risk assessments be conducted for substantial sources of operational diesel particulate matter (DPM) (e.g., truck stops and warehouse distribution facilities that generate more than 100 trucks per day or more than 40 trucks with operating transport refrigeration units) and has provided guidance for analyzing mobile source diesel emissions. However, the Project would not include any truck stop or warehouse distribution or similar uses, and, as such, operations would generate only minor amounts of diesel emissions from mobile sources, such as delivery trucks and trash trucks. Furthermore, Project trucks would be required to comply with the applicable provisions of 13 CCR, Section 2025 (Truck and Bus regulation) to minimize and reduce PM10, PM2.5, and NO_X emissions from existing diesel trucks. Therefore, Project operation would not be considered a substantial source of DPM. See DEIR Section 4.3, Air Quality, page 4.3-53.

During long-term Project operations, TACs could be emitted as part of periodic maintenance operations, routine cleaning, periodic painting, etc., and from periodic visits from delivery trucks and service vehicles. However, these events would be occasional and result in minimal emissions exposure to off-site sensitive receptors. As the Project consists of residential and open space land uses, the Project would not include sources of substantial TAC emissions identified by the SCAQMD or CARB siting recommendations. Based on the uses expected on the Project Site, operation of the Project would not expose sensitive receptors to substantial toxic air contaminant (TAC) concentrations, and operational impacts would be less than significant.

With respect to the use of consumer products and architectural coatings, the residential and open space uses associated with the Project would be expected to generate minimal emissions from these sources. The Project's land uses would not include installation of industrial-sized paint booths or require extensive use of commercial or household cleaning products. Furthermore, as shown in Table 4.3-10 on page 4.3-49 of the DEIR, the Project's operational VOC emissions would be below the adopted SCAQMD threshold. As a result, toxic or carcinogenic air pollutants are not expected to occur in any substantial amounts in conjunction with operation of the proposed land uses within the Project Site.

Further, Los Angeles County Department of Public Health reviewed and Project and determined that a health risk assessment was not warranted for the Project. Thus, additional operational health risk assessment was not warranted.

The DEIR also discusses potential health risks associated with Project construction activities. Construction activities would occur on the Project Site over approximately 36 months. For potential health risks, the construction duration would be significantly lower than the 30-year residential exposure period associated with cancer health risks. Sensitive receptors (i.e., residential receptors) may be exposed to diesel particulate matter (DPM), which the State of California has identified as a toxic air contaminant (TAC), from the exhaust from construction equipment and diesel-fueled motor vehicles. The construction area is spread out over approximately 75 acres with open space buffers along multiple Project boundaries. Planning Areas 4 and 6 would include open space and, because these areas will not be further developed, would buffer sensitive receptors from construction. Further, construction activities will move around the Project Site, and construction near any single receptor is expected to be of a much shorter duration than the estimated 36-month construction schedule. Furthermore, the Project's construction is required to comply with stringent emissions control requirements for fugitive dust pursuant to South Coast Air Quality Management District (SCAQMD) Rule 403. See DEIR Section 4.3, Air Quality, page 4.3-52.

Rule 403 requires projects to prevent and reduce fugitive dust emissions from a site utilizing best available control measures identified in the tables within the rule, which include adding freeboard to haul vehicles, covering loose material on haul vehicles, watering, using soil stabilizers and/or ceasing all activities, as required. See DEIR pages 4.3-29-30. Regional and localized fugitive dust emissions, known as respirable particulate matter (PM10) and fine particulate matter (PM2.5) emissions, would be below the regional and localized significance threshold. Fugitive dust impacts would be less than significant with implementation of regulatory compliance and mitigation measures. See Table 4.3-8 and Table 4.3-12 of the DEIR. In addition, as discussed in Response FORM 2-6, the Project would implement Mitigation Measure AQ-2, which includes additional fugitive dust control requirements.

Health risk impacts would not be anticipated due to the short-term and temporary construction duration, the buffers to sensitive receptors, the movement of construction activities around the Project Site and short time frame near any single receptor, and the correspondingly small emissions relative to the SCAQMD thresholds. See DEIR Section 4.3, Air Quality, page 4.3-52. Furthermore, the proposed Project would incorporate Mitigation Measure AQ-1 (see below), which requires the use of Tier 4 Final off-road diesel construction equipment for any equipment greater than 50 horsepower. The use of Tier 4 Final off-road diesel construction equipment reduces DPM emissions by at least 84.4 percent compared to the default CalEEMod fleet mix, which includes Tier 0 to Tier 2 equipment that produce larger amounts of DPM emissions. Furthermore, construction contractors would be required to comply with regulations that limit diesel emissions, such as the CARB Air Toxics Control Measure that limits diesel vehicle idling to no more than five minutes at a location (Section 2485 in Title 13 of the California Code of Regulations [CCR]), the Truck and Bus regulation that reduces NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 CCR, Section 2025) and the In-Use Off-Road Diesel Fueled Fleets regulation that reduces emissions by the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission controlled models (13 CCR, Section 2449).

> **Mitigation Measure AQ-1:** The construction contractor shall require that all off-road diesel equipment greater than 50 horsepower (hp) used during construction of the Project shall be registered with CARB and meet CARB Tier 4 final off-road emission standards. Such equipment shall be outfitted with Best Available Control Technology (BACT) devices including a California Air Resources Board-certified Level 3 Diesel Particulate Filter. In order to ensure compliance with this measure, all contractors that utilize off-road diesel equipment that is greater than 50 horsepower shall participate in CARB's DOORS which is the State's online tool for Off-Road Diesel Reporting and shall submit a copy of the report to LA County Planning prior to issuance of a grading permit. Documentation of equipment emissions standards or Tier 4 certification shall also be kept onsite at all times during construction activities.

Response FORM 2-10

Comment noted. Section 4.3, Air Quality, of the DEIR concluded that the Project would result in a less than significant impact to air quality with the mitigation measures proposed. No additional mitigation measures are necessary or required.

Response FORM 2-11

The freeway proximity is an existing condition and the CEQA analysis considers the Project's potential impact on the environment, not the impact of the environment (such as an existing freeway) on the Project. To the extent the commenter is suggesting that the Project would exacerbate an existing condition (such as impacts of the existing freeway), the commenter has provided no evidence to support such an assertion. See Response Form 2-9, above, regarding the DEIR's analysis of health risk from Project construction and operation. The SCAQMD recommends that operational health risk assessments be conducted for substantial sources of operational DPM (e.g., truck stops and warehouse distribution facilities that generate more than 100 trucks per day or more than 40 trucks with operating transport refrigeration units) and has provided guidance for analyzing mobile source diesel emissions. However, the Project would not include any truck stop or warehouse distribution or similar uses, and, as such, operations would generate only minor amounts of diesel emissions from mobile sources, such as delivery trucks and trash trucks. Furthermore, Project trucks would be required to comply with the applicable provisions of 13 CCR, Section 2025 (Truck and Bus regulation) to minimize and reduce PM10, PM2.5, and NO_X emissions from existing diesel trucks. Therefore, Project operation would not be considered a substantial source of DPM.

Response FORM 2-12

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Dear LA County Department of Regional Planning,

I am writing to share feedback on the Draft Environmental Impact Report (DEIR) concerning the proposed Royal Vista Residential Project No. PRJ2021-002011. As an engaged community member, I value the chance to convey our perspectives on the project and its potential consequences. FORM 3-1

The proposed high-density development, (reaching 800 units with the inclusion of the Sunjoint development on Lake Canyon), poses a considerable threat to our community's welfare. This threat is evident in the expected increase in crime rates, FORM 3-2

the introduction of at least 2,000 vehicles causing traffic congestion and emitting pollutants, and the irreversible harm to our wildlife habitat. FORM 3-3

This habitat, a critical corridor to the Puente Hills SEA conservation area just 1.2 miles away, is in jeopardy. FORM 3-4

Additionally, the current permeable ground serves a crucial role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. FORM 3-5

The Draft EIR overlooks the presence of bats in the area, despite reports and evidence from residents, including special status bat species observed in the Puente Hills Significant Ecological Area. This area, crucial for wildlife, is 3.5 miles from the Royal Vista Golf Course, serving as an important wildlife corridor. FORM 3-6

The biological reconnaissance conducted by Placeworks on July 13, 2020, for 75 acres was incomplete, missing key species such as Cooper’s Hawks, egrets, and herons observed by residents daily. Placeworks documented only three mammal species on Royal Vista, neglecting several others, including skunks, raccoons, possums, rabbits, and more. FORM 3-7

Within the golf course, there are multiple blueline streams and two ponds, which are fed from upstream drainages. Despite the delineation report claiming low water levels and the draining of the ponds in October 2022, we have photographic evidence that contradicts this, showing Pond #1 retaining water and frequented by ducks, Canada geese, and other water birds. FORM 3-8

The DEIR fails to address the loss of this watershed and its impact on groundwater replenishment. FORM 3-9

Thank you for addressing these concerns and your dedication to ensuring the Royal Vista Residential Project aligns with our community's values and needs. FORM 3-10

Sincerely,

Master Response to Comment Letter FORM 3

Response FORM 3-1

Comment noted.

Response FORM 3-2

See Response FORM 1-2.

Response FORM 3-3

See Response FORM 1-3 and Response FORM 1-4.

Response FORM 3-4

See Response FORM 1-4.

Response FORM 3-5

See Response FORM 1-5.

Response FORM 3-6

Based on the GLA Supplemental Technical Memorandum re: Special Status Bats dated April 13, 2024 (Appendix O of this FEIR), the DEIR has been updated as set forth in Chapter 11 Corrections, Clarifications, and Additions to change the potential for occurrence for the western mastiff bat from none to low, and to add discussion of four additional special status bat species, the Yuma myotis, western red bat, western yellow bat, and hoary bat, and to identify their respective potential for occurrence on the Project Site. The DEIR has also been clarified to provide that construction could impact a total of 14 California Species of Special Concern (rather than nine California Species of Special Concern) with low or low to moderate potential to occur: Southern California legless lizard, western pond turtle, coastal whiptail, San Diego coast horned lizard, burrowing owl, pallid bat, big free-tailed bat, western mastiff bat, Yuma myotis, western red bat, western yellow bat, hoary bat, northwestern San Diego pocket mouse, and San Diego desert woodrat) if these species occur on-site.

The existing landscape trees and maintenance structure on the Project Site provide low potential for suitable habitat that would support special-status bat species. The palms on the Project site are regularly maintained such that the dead fronds are regularly removed and there are few fan palms with extensive frond skirts, precluding the establishment of suitable habitat in the palm trees for the bat species. Further, existing structures consist of small sheds and a golf course maintenance building with a metal roof and no attic or crevices, which provide at most limited potential for roosting, and the maintained landscape trees do not constitute a woodland setting, which combined result in a low potential for special-status bat species to occur. In addition, the biological reconnaissance survey did not observe bat species. Because there is a low or low to moderate potential for these species to occur, and the majority of the habitat found on-site is not suitable to support these species, any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be less than significant to regional populations of these species. See GLA Supplemental Technical

Memorandum re: Special Status Bats (FEIR Appendix O) for additional detailed responses regarding bats.

In addition, while impacts to special status bats are less than significant, the DEIR has been revised to include Mitigation Measure BIO-3 that would ensure that individuals are not harmed and that any potential impacts associated with roosting bats would remain less-than-significant. See Response AG 6-1 and Response ORG 6-104.

Response FORM 3-7

Wildlife observed on the Project Site, which consists of an existing golf course and constructed irrigation ponds, is typical of the suburban golf course landscaping. Bird species observed included Canada goose (Branta canadensis), mallard (Anas platyrhynchos), American kestrel (Falco sparverius), mourning dove (Zenaida macroura), black phoebe (Sayornis nigricans), western kingbird (Tyrannus verticalis), bushtit (Psaltriparus minimus), northern mockingbird (Mimus polyglottos), European starling (Sturnus vulgaris), great-tailed grackle (Quiscalus mexicanus), American goldfinch (Carduelis tristis), and house sparrow (Passer domesticus). Three mammal species were observed or detected by their sign, including California ground squirrel (Otospermophilus beecheyi), Botta's pocket gopher (Thomomys bottae), and coyote (Canis latrans). See DEIR 4.4, Biological Resources.

Table 4.4-2, Special-Status Wildlife Species with Potential to Occur within the Project Site, in DEIR Section 4.4, Biological Resources, lists the special-status wildlife species historically recorded from the Project region and the table assesses these special-status wildlife species' potential to occur on the Project Site. No threatened or endangered wildlife species are recorded from the Project Site.

Based on the GLA Supplemental Memorandum re: Special Status Bats dated April 2024 (Appendix O of this FEIR), Section 4.4, Biological Resources, of the DEIR has been updated to include discussion of four additional bat species including the Yuma myotis, western red bat, western yellow bat, and hoary bat, and to change the potential to occur for the western mastiff bat from none to low, as provided in Chapter 11 Corrections, Clarifications, and Additions.

Of the non-listed special-status animals reported from the Project area with the potential to occur, nine California Species of Special Concern (SSC) have low potential to occur on the Project Site: coastal whiptail (Aspidoscelis tigris stejnegeri), San Diego coast horned lizard (Phrynosoma blainvillii), western pond turtle (Emys marmorata), burrowing owl (Athene cunicularia), pallid bat (Antrozous pallidus), western mastiff bat (Eumops perotis californicus), Yuma myotis (Myotis yumanensis), western red bat (Lasiurus blossevillii), and big free-tailed bat (Nyctinomops macrotis). Five California SSC have low to moderate potential to occur on the Project Site: southern California legless lizard (Anniella stebbinsi), northwestern San Diego pocket mouse (Chaetodipus fallax fallax), western yellow bat (Lasiurus xanthinus), hoary bat (Lasiurus cinereus), and San Diego desert woodrat (Neotoma lepida intermedia). In addition, Cooper's hawk (Accipiter cooperi), a CDFW Special Animal Watch List species, has a high potential to forage on the Project Site and a moderate potential to nest. No special-status wildlife species are expected to occur within the Project Site, including those with low or moderate potential to occur, with the exception of Cooper’s hawk which has a moderate potential to nest on-site, but a high potential for this species to forage on-site. Cooper’s hawk (nesting) is a CDFW Watch list species (CDFW 2021c). This species was not observed on the Project Site during the site visits. Nevertheless, construction could impact Cooper’s hawk if it were nesting on-site. Since this species is protected under the Migratory Bird Treaty Act (MBTA), impact to a Cooper’s hawk nest would be potentially significant. As a result, the DEIR requires Mitigation Measure BIO-1 (which has been revised in this FEIR (See Chapter 11, Corrections, Clarifications and Additions) to reduce impacts to Cooper’s hawk and nesting birds to less than significant by avoiding breeding bird nests. There is a high potential for Cooper’s hawk to forage on the Project Site, portions of which would be unavailable to the species during and after construction. The Cooper’s hawk is highly adapted to the urban environment and regularly nests in urban areas including landscape trees in residential areas. The loss of foraging habitat would not be significant as Cooper’s hawks forage in a variety of land cover types including residential neighborhoods. Further, Planning Areas 4 and 6 would remain as open space, including during construction, and would provide foraging habitat for Cooper’s hawk. There are also off-site parks and open space areas such as the Larkstone Park and surrounding areas in the City of Diamond Bar that would continue to provide foraging habitat for this species, and the species is known to forage within residential communities, as well. Impacts to Cooper’s hawk foraging habitat would be less than significant because other foraging habitats are available.

For additional discussion on species observed on the Project Site refer to Section 4.4 Biological Resources of the DEIR.

Response FORM 3-8

The Project Site includes two blue-line drainages as depicted on the U.S. Geological Survey (USGS) topographic map dated 1964 and photo revised 1981. These drainages are constructed v-ditches which convey drainage from the adjacent residential tracts which run through portions of the golf course until the drainages enter into the storm drain system. The golf course includes two man-made lined water features which are golf course irrigation ponds. These ponds are fed from groundwater being pumped into them from the San Gabriel Valley Groundwater Basin, in addition to golf course irrigation runoff and other drainages. Refer to DEIR Appendix D – Jurisdictional Delineation Report, Section III.A.3 and III.A.4.

Further, as stated in Appendix J of the DEIR “Low Impact Development Plan”, the Project Site is not a candidate for infiltration, meaning that rainwater does not “permeate the ground, filtering down to the aquifer.” The report states in Section 2.4 “Soil Conditions & Infiltration Characteristics” that “Infiltration is not feasible for the site due to… the existing conditions of artificial fill and bedrock and the presence of perched groundwater throughout the site”. Therefore, under current site conditions, no groundwater recharge is occurring, and stormwater is being captured in the ponds rather than percolating into the ground. See Response FORM 3-7 regarding species observed during the field reconnaissance. No threatened or endangered wildlife species are recorded from the Project Site.

Response FORM 3-9

The proposed Project Site is not a watershed but rather a man-made golf course. DEIR Section 4.10, Hydrology and Water Quality, concluded that the Project would have a less than significant impact associated with groundwater replenishment. Once constructed the proposed Project would include on-site storm drain facilities that would consist of a combination of low-flow water quality and peak-flow conveyance systems. The low-flow water quality systems would intercept the low flows and provide water quality treatment in order to meet the requirements of the LA County LID Ordinance. The peak flow conveyance systems would provide peak flow reduction via detention basin systems, in order to control flows to meet the capacity requirements of the existing LACFCD storm drain systems. The Project would include new filtration BMPs to the Project design and new landscaped areas throughout the Project Site, all designed to meet a 25-year storm event. The intercepted storm flows would be treated onsite through applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) prior to being discharged into the storm drains and returned to the environment for groundwater recharge.

The Project Site (75 acres of the existing golf course) used up to approximately 198-acre feet annually or 176,340 gallons per day, of water from the San Gabriel Valley Groundwater Basin / Puente Subbasin in order to irrigate this portion of the existing golf course. Once the Project is constructed, the Project Site would no longer pump groundwater to irrigate the golf course uses on the Project Site, as the Project's water would be supplied by the Walnut Valley Water District eliminating the need for extraction of groundwater from the Puente Subbasin. See DEIR Section 4.10, Hydrology and Water Quality for additional details on the hydrologic conditions at the Project Site. See also Response FORM 1-5.

Response FORM 3-10

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Dear LA County Department of Regional Planning,

I am writing to provide input on the Draft Environmental Impact Report (DEIR) concerning the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned community member, I value the chance to convey our perspectives on the project and its potential consequences. FORM 4-1

The proposed high-density development, (reaching 800 units with the inclusion of the Sunjoint development on Lake Canyon), poses a considerable threat to our community's welfare. This threat is evident in the expected increase in crime rates, FORM 4-2

the introduction of at least 2,000 vehicles causing traffic congestion and emitting pollutants, and the irreversible harm to our wildlife habitat. FORM 4-3

This habitat, a critical corridor to the Puente Hills SEA conservation area just 1.2 miles away, is in jeopardy. FORM 4-4

Additionally, the current permeable ground serves a crucial role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. FORM 4-5

Several homes, totaling twenty-one, are situated in a landslide zone resulting from the Morning Sun landslide in May 1995, with subsequent incidents. One resident notes above-ground water piping on streets for five years. The theory suggests that the construction of South Point Middle School led to landslides due to dumped excavation dirt obstructing blue line streams. The EIR lacks detailed mitigation plans for the landslide zone during excavation. FORM 4-6

Concerns arise from groundwater found as shallow as 2.5 feet near East Walnut Dr. South and Bellavista, especially given its proximity to two ponds. This area's wet soil poses risks as water drains towards it due to its low elevation. FORM 4-7

In terms of Population and Housing, the mentioned parcels are not part of the 2021-2029 Housing Element inventory for rezoning in unincorporated areas to meet state housing mandates. Rowland Heights is already contributing to housing requirements with over fifty properties potentially developing 2,228 units. This project falls outside the scope of the Housing Element, impacting park-poor areas by reducing open space. FORM 4-8

Thank you for your attention to these concerns and your commitment to ensuring that the proposed Royal Vista Residential Project aligns with the values and needs of our community. FORM 4-9

Sincerely,

Master Response to Comment Letter FORM 4

Response FORM 4-1

Comment noted.

Response FORM 4-2

See Response FORM 1-2.

Response FORM 4-3

See Response FORM 1-3 and Response FORM 1-4.

Response FORM 4-4

See Response FORM 1-4.

Response FORM 4-5

See Response FORM 1-5.

Response FORM 4-6

Portions of the Project Site are located within areas that are potentially susceptible to seismic-related landslides. See DEIR Section 4.7, Geology and Soils. DEIR Figure 4.7-1, *Landslide Location*, shows an ancient/historic landslide located on the southeast portion of Planning Area 5. Slope stability issues and potential ground settlement may occur in the landslide area without mitigation. See DEIR Section 4.7.5. Appendix G to the DEIR contains the Project Geotechnical Report, which consists of four reports prepared by LGC Geotechnical Inc. (LGC), including detailed responses to comments from Los Angeles County Department of Public Works (LACDPW). See DEIR page 4.7-1 and Appendix G. The Geotechnical Report includes detailed analysis and recommendations for addressing landslide mitigation including provisions to address potential impacts to offsite properties. The recommended mitigation in the Geotechnical Report includes, among other things, partial landslide removal within Planning Area 5, buttressing and shoring with tiebacks and shear pins to stabilize potential slope stability issues (for both temporary and permanent conditions) in the southeastern most portion of the Project Site to enable suitable conditions for development of the Project while maintaining the stability of offsite properties, and other detailed recommendations, including those in the July 7, 2023 and September 12, 2023 LGC reports contained in Appendix G (LGC 2023c, 2023d). The Geotechnical Report in DEIR Appendix G provides sufficient detail for purposes of CEQA evaluation, and as required by Los Angeles County Building Code Section 111 and Mitigation Measure GEO-1, a final geotechnical report, based on final Project design and final grading plans, must be prepared and reviewed by the County prior to issuance of grading permits. See DEIR page 4.7-18. Mitigation Measure GEO-1 would require that the final geotechnical report comply with the recommendations contained in the Geotechnical Report in DEIR Appendix G, as well as any additional requirements of LACDPW following review of the final geotechnical report.

See Mitigation Measure GEO-1 below:

> **Mitigation Measure GEO-1:** Final Geotechnical Engineering Investigation. Prior to the issuance of a grading permit, the subdivider shall prepare and obtain approval from the Los Angeles County Department of Public Works (LACDPW) of a Final Geotechnical Engineering Investigation Report based on the final Project design and 40-scale grading plans to address the Project's specific foundation design. Specific field work, additional and/or modified geotechnical recommendations, and laboratory testing may be required in connection with the preparation of the Final Geotechnical Engineering Investigation Report, in order to comply with the recommendations contained within the Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (July 26, 2021), Geotechnical Addendum Report and Response to Geotechnical Review Comments Regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, Los Angeles County, California (May 1, 2023), and Response to Geotechnical Review Comments dated May 31, 2023 and July 7, 2023 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (September 27, 2023). The subdivider shall comply with the conditions contained within the LACDPW Geology and Soils Report Approval Letter for the Project, and as it may be subsequently amended or modified by LACDPW. Furthermore, the Project's final grading, drainage, and erosion control plans must be reviewed and approved by LACDPW before the issuance of a grading permit.

Response FORM 4-7

Perched groundwater was encountered at depths as shallow as 2.5 feet below existing grade and could be potentially uncovered in other low-lying areas of the Project Site within the older artificial fill above the underlying bedrock. See DEIR Section 4.7, Geology and Soils. Some of the native materials below the fill are anticipated to be wet/saturated due to golf course irrigation, leakage from the existing ponds, and precipitation/stormwater. Further, a relatively small portion of the Project Site, adjacent to East Walnut Drive and Bellavista Drive is located in a zone identified as being potentially susceptible to seismically-induced liquefaction.

The Project Geotechnical Report states that the potential for liquefaction is present within a small portion of Project Site, and that liquefaction-induced ground surface settling could occur if site soils were to liquefy. See DEIR Appendix G (LGC 2021, 2023a, 2023b, 2023c, 2023d). Implementation of the recommendations identified in the Project's Geotechnical Evaluation Study would reduce the potential for liquefaction by excavation and re-compaction of potentially liquefiable soils. See DEIR Section 4.7, Geology and Soils. Implementation of the County Building Code requirements and the appropriate geotechnical recommendations during design and construction would be ensured through implementation of the recommendations in the Geotechnical Report and the required final geotechnical report as required by Mitigation Measure GEO-1 and final grading, drainage, and erosion control plans. Additional detailed geotechnical information can be found in Appendix G of the DEIR.

Response FORM 4-8

The Southern California Association of Governments (SCAG) specifies the number of housing units each local jurisdiction must plan for in the eight-year Housing Element cycle. The assigned number of units is called the Regional Housing Needs Allocation (RHNA). A jurisdiction must then show that there are enough sites within the jurisdiction to build the assigned number of housing units by compiling a list of sites called the Adequate Sites Inventory (ASI). In order to be included in the ASI, sites must meet several criteria, including but not limited to residential zoning and corresponding general plan land use designation of a certain density, and a minimum lot size. Additionally, the site must be either vacant or underutilized. Underutilized means that the property is not built to its maximum capacity, so it has potential for construction of additional units. If a jurisdiction cannot show that there are enough adequate sites to address the housing need, the jurisdiction is required to develop a rezoning program. The rezoning ensures that there are enough sites with sufficient densities, to address the housing need identified by SCAG. Neither the ASI nor the rezoning program requires or guarantees that all owners of the identified sites will develop their private property at all, or to the maximum allowable density, or otherwise ensure that the County will reach its target RHNA number through development on the identified properties alone. The ASI itself does not serve to limit the sites where housing may be constructed, or the jurisdiction's ability to rezone additional sites to accommodate housing.

The proposed Project would support the goals, objectives and policies in the General Plan's Land Use Element and Housing Element by converting a portion of a golf course facility to housing. The underutilized land would accommodate a total of 360 residential units that include a mix of for-sale dwelling types (single-family and multi-family units) of varying types and sizes, both market rate and affordable. These Project characteristics support Land Use and Housing objectives and policies for enhancing communities, encouraging a mix of residential densities, providing resources for recreational open spaces trails and bikeways, and increasing the housing supply. The Project will assist the County in addressing the current State Housing Crisis and help meet Los Angeles County's RHNA of +/- 90,000 units including +/- 14,100 moderate units and +/- 36,500 above moderate / market rate units.

Response FORM 4-9

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

10.5 Individual Letters

The following comment letters were received from individuals on the Royal Vista Residential Project DEIR. The comment letters are grouped together and are followed by all responses as indicated in Table 10-4.

TABLE 10-4
LIST OF DEIR: INDIVIDUALS

Letter Code	Commenting Party	Response Page Number
IND 1	Monica Marcelo	Page 10-400
IND 2	Vincent Ferrara	Page 10-404
IND 3	Earlene Smith	Page 10-408
IND 4	George Funk	Page 10-411
IND 5	Coleen Garcia	Page 10-416
IND 6	CL	Page 10-418
IND 7	Mannjye Wu	Page 10-420
IND 8	Monique Marcelo	Page 10-423
IND 9	Henry Shih	Page 10-427
IND 10	Woolley Family	Page 10-430
IND 11	Chin-Chien W. Kuo	Page 10-433
IND 12	Teresa Liu	Page 10-436
IND 13	Victor Chen	Page 10-440
IND 14	Frances Wright	Page 10-445
IND 15	Abez	Page 10-448
IND 16	Beverly Pekar	Page 10-452
IND 17	Linda Kuo	Page 10-461
IND 18	Fina Segura	Page 10-472
IND 19	Charles Li	Page 10-475
IND 20	M. Breton	Page 10-478
IND 21	Naveen Reddy	Page 10-481
IND 22	Shelley Gentry	Page 10-502
IND 23	Wanda Ewing	Page 10-513
IND 24	Linda Himes	Page 10-518
IND 25	Edward O. Ewing	Page 10-522
IND 26a	Karen Gerloff	Page 10-526
IND 26b	Karen Gerloff	Page 10-529
IND 27	Thomas Prince	Page 10-531
IND 28	1435 Fairlance Dr.	Page 10-533
IND 29	Derrick and Susan Trautz	Page 10-539
IND 30	Edmundo Asuncion	Page 10-543
IND 31	Lisa Valladares	Page 10-546

Letter Code	Commenting Party	Response Page Number
IND 32	Luis Avalos	Page 10-549
IND 33	Mary Price	Page 10-552
IND 34	Teri Malkin	Page 10-554
IND 35	Karen Gerloff	Page 10-556
IND 36	Jo Ann Cromer	Page 10-558
IND 37	Jo Ann Cromer	Page 10-560

From: Monique Marcelo <moniquemar14@yahoo.com>
Sent: Friday, December 1, 2023 1:13 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: bodek@planning.lacounty.gov; firstdistrict@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

CAUTION: External Email. Proceed Responsibly.

Dear LA County Department of Regional Planning,

I have reviewed the Draft Environmental Impact Report (DEIR) pertaining to Project No. PRJ2021-002011 (Royal Vista Residential Project). I am a resident in the area of this proposed development, and I have several concerns about this project. The proposed housing development will result in a very high-density area and would directly have adverse effects on the residents and the community in general. IND 1-1

Most concerning to me is there are several homes that are situated in a landslide zone resulting from the Morning Sun landslide in May 1995, with subsequent incidents. This is close to the construction area of the proposed development. It was reported that there is above-ground water piping on streets for several years. The theory suggests that the construction of South Point Middle School led to landslides due to dumped excavation dirt obstructing blue line streams. The EIR lacks detailed mitigation plans for the landslide zone during excavation. We wouldn't want to be in constant worry of another landslide. IND 1-2

The other that is equally concerning to me is the traffic congestion and high pollutants that will be brought about by additional residents, which would result in approximately 2,000 vehicles or more, considering that there is also another proposed development on Lake Canyon by Sunjoint. With or without that other proposed development, this particular project of nearly 400 units will already clog our roads and emit pollutants. IND 1-3

This will significantly impact our community's quality of life, and this will lead to heightened crime rates as well as harm to our wildlife habitat. This habitat, a critical corridor to the Puente Hills SEA conservation area will be impacted. IND 1-4

Additionally, the current permeable ground serves a crucial role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the heat by cooling the surrounding area. IND 1-5

It is important to mention that the mentioned parcels are not part of the 2021-2029 Housing Element inventory for rezoning in unincorporated areas to meet state housing mandates. Rowland Heights is already contributing to housing requirements with over fifty properties potentially developing 2,228 units. This project falls outside the scope of the Housing Element, impacting park-poor areas by reducing open space. IND 1-6

The air quality will also worsen considerably for years during construction, and there is a potential for Valley Fever risk due to excavation. IND 1-7

Excavation dust will cause severe respiratory issues. The extensive grading will impact traffic control on Colima Road and the cross-streets, especially during school or rush hours. IND 1-8

A four-year construction period may extend to eight with the Sunjoint development, impacting residents significantly. IND 1-9

Royal Vista Golf Course, a vital carbon sink, borders the City of Industry's Good Transit Corridor, absorbing carbon near the 57/60 Freeways. IND 1-10

Overall, open space is valuable and important for our community. It contributes to residents' well-being and quality of life. Open spaces play a crucial role in rainwater collection, mitigating flooding, and replenishing groundwater. They contribute to climate change mitigation by reducing urban heat islands and providing shade. Trees in open spaces absorb carbon dioxide, aiding in carbon sequestration. IND 1-11

I am hopeful that you are taking all our concerns in consideration. IND 1-12

Sincerely,

Monica Marcelo

Response to Comment Letter IND 1

Monica Marcelo

Response IND 1-1

Comment noted.

Response IND 1-2

See Response FORM 4-6.

Response IND 1-3

See Response Form 1-2 and Response Form 1-3.

Response IND 1-4

See Response Form 1-2 and Response Form 1-4.

Response IND 1-5

See Response FORM 1-5.

Response IND 1-6

See Response FORM 4-8.

Response IND 1-7

See Response FORM 2-6 and Response FORM 2-9.

Response IND 1-8

The DEIR analyzed construction air quality impacts in Section 4.3 Air Quality, and concluded that impacts are less than significant with mitigation. DEIR Section 4.3, discusses Project construction activities which would occur on the Project Site over approximately 36 months. For potential health risks, the construction duration would be significantly lower than the 30-year residential exposure period associated with cancer health risks. Sensitive receptors (i.e., residential receptors) may be exposed to diesel particulate matter (DPM), which the State of California has identified as a toxic air contaminant (TAC), from the exhaust from construction equipment and diesel-fueled motor vehicles. The construction area is spread out over approximately 75 acres with open space buffers along multiple Project boundaries. Construction activities will move around the Project Site, and construction near any single receptor is expected to be of a much shorter duration than the estimated 36-month construction schedule. Furthermore, the Project's construction is required to comply with stringent emissions control requirements for fugitive dust pursuant to South Coast Air Quality Management District (SCAQMD) Rule 403. Rule 403 requires projects to prevent and reduce fugitive dust emissions from a site utilizing best available control measures identified in the tables within the rule, which include adding freeboard to haul vehicles, covering loose material on haul vehicles, watering, using soil stabilizers and/or ceasing all activities, as required. See DEIR page 4.2-32. As shown in Table 4.2-6 and Table 4.2-7 of the DEIR, regional and localized fugitive dust emissions, which are included in the tables as respirable particulate matter (PM10) and fine particulate matter (PM2.5) emissions, would be below the regional and localized significance threshold. See DEIR pages 4.2-38 through 4.2-57. Fugitive dust impacts would be less than significant with implementation of regulatory compliance and mitigation measures, as discussed therein. In addition, in Response FORM 2-6, the Project would implement Mitigation Measure AQ-2, which includes additional fugitive dust control requirements. See Response FORM 2-6.

Health risk impacts would not be anticipated due to the short-term and temporary construction duration, the buffers to sensitive receptors, the movement of construction activities around the Project Site and short time frame near any single receptor, and the correspondingly small emissions relative to the SCAQMD thresholds. Furthermore, the proposed Project would incorporate Mitigation Measure AQ-1 (see below), which requires the use of Tier 4 Final off-road diesel construction equipment for any equipment greater than 50 horsepower. The use of Tier 4 Final off-road diesel construction equipment reduces DPM emissions by at least 84.4 percent compared to the default CalEEMod fleet mix, which includes Tier 0 to Tier 2 equipment that produce larger amounts of DPM emissions.[24] Furthermore, construction contractors would be required to comply with regulations that limit diesel emissions, such as the CARB Air Toxics Control Measure that limits diesel vehicle idling to no more than five minutes at a location (Section 2485 in Title 13 of the California Code of Regulations [CCR]), the Truck and Bus regulation that reduces NO_X, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 CCR, Section 2025) and the In-Use Off-Road Diesel Fueled Fleets regulation that reduces emissions by the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission controlled models (13 CCR, Section 2449).

> **Mitigation Measure AQ-1:** The construction contractor shall require that all off-road diesel equipment greater than 50 horsepower (hp) used during construction of the Project shall be registered with CARB and meet CARB Tier 4 final off-road emission standards. Such equipment shall be outfitted with Best Available Control Technology (BACT) devices including a California Air Resources Board-certified Level 3 Diesel Particulate Filter. In order to ensure compliance with this measure, all contractors that utilize off-road diesel equipment that is greater than 50 horsepower shall participate in CARB's DOORS which is the State's online tool for Off-Road Diesel Reporting and shall submit a copy of the report to LA County Planning prior to issuance of a grading permit. Documentation of equipment emissions standards or Tier 4 certification shall also be kept onsite at all times during construction activities.

Regarding traffic control, see Response FORM 2-7.

Response IND 1-9

See Response FORM 2-8.

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[24] As shown in the CalEEMod results in Appendix B of the Draft EIR.

Response IND 1-10

See Response FORM 2-9.

Response IND 1-11

See Response FORM 1-9

Response IND 1-12

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: vincent ferrara <4speedss@gmail.com>
Sent: Monday, December 4, 2023 8:10 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; firstdistrict@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; achou@diamondbarca.gov; rlow@diamondbarca.gov; cteng@diamondbarca.gov; saveroyalvista <saveroyalvista@gmail.com>
Subject: DEIR Comments on Royal Vista Project no. PRJ2021-002011

CAUTION: External Email. Proceed Responsibly.

IND 2-1

Dear Neighbors and fellow Californians,

I'm writing in response to the proposed development of the Royal Vista Golf Course. This area is currently zoned as open space. It is imperative that it remain so. The Royal Vista open space is the most important asset our community has. The towering mature trees, rolling emerald green hills, and extensive wild life greatly enhance the community. The environmental impact would come at an extensive cost to the people and animals that reside in and near the open space. This area was zoned open space for a reason, so the ever growing concrete expansion would be broken up by a small amount of nature. Once this area is gone, we will never be able to get it back. I believe you all have a duty to protect the residents and wildlife who depend on the Royal Vista open space. Our community has been caring stewards to this environment since the early 1970's. We have voiced our concerns and fought the development for well over 5 years. We need your help. Is your duty to the people in our community, or a small group of developers? Million dollar homes do nothing to help the housing problems our state currently face. The years of construction, increased traffic, ground water disruption, additional strain on community services and impact on the wildlife is unacceptable. With the approval of additional dwelling units appearing in backyards in LA county, all communities will eventually suffer. Green open spaces are more important now more than ever. Please help us do what is rite for our community, planet and wildlife. Do not re zone this land. The deadline to do so has already passed. We should not have to fight for the written law to be upheld, yet we are forced to. Please help keep our community the amazing place it is. Nature is not for sale to the highest bidder. We have an extensive amount of full time and seasonal wildlife in our neighborhood. They depend on the community to protect them and we depend on you to protect us. Please understand what is at stake here.

Thank you for your help and support.
Vincent Ferrara

Response to Comment Letter IND 2

Vincent Ferrara

Response IND 2-1

The commenter expresses general concerns regarding the Project but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. See Response Form 1-5 regarding groundwater, open space and trees, Response FORM 1-2 regarding public services and Response FORM 1-4 regarding wildlife. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

20162 Padrino Avenue
Walnut, CA 91789

December 7, 2023

Los Angeles County Dept of Regional Planning
320 W. Temple Street
Floor 13
Los Angeles, CA 90012

Re: Draft Environmental Impact Report for proposed Royal Vista Residential Project No PRJ2021-002011

To Whom It May Concern:

I am writing to provide comments on the above **DEIR**. As a concerned member of the community, I appreciate the opportunity to express our views on the project and it potential impacts.

IND 3-1

The proposed dense development comprising nearly 400 units (upwards of 800 units including the Sunjoint proposed development on Lake Canyon) poses a significant threat to our community's quality of life. This threat manifests in heightened crime rates with our city,

IND 3-2

an influx of at least 2000 additional vehicles clogging our roads and emitting pollutants,

IND 3-3

and the irrevocable destruction of the wildlife habitat, including the vital corridor to the Puente Hills SEA conservation area located 1.2 miles away

IND 3-4

in addition, the current permeable ground filters pollutants, replenishes the Puente Basin Aquifer, and mitigates the urban island effect as it cools the surrounding area.

IND 3-5

Wildlife: The DEIR stated that the developers would mitigate the disruption to the wildlife community. What does this mean? The Canadian Geese use this space to rest on their migrations north and south where will they go? We allow our precious water to run out to the sea to protect the little minnow fish, but the wildlife here has no standing.

IND 3-6

Solar Panel Glare: It is crucial to address potential impacts on residents due to direct glare or refection. How will the glare from solar panels be minimized to reduce reflection on current homes, especially those situated on higher elevations?

IND 3-7

Lighting on Walking and Biling Paths: The Deir lacks information on the type and height of lighting along proposed walking and biking paths. We are particularly concerned about bright lights projecting into neighboring private backyards. It is essential to address potential impacts on residents' privacy and well-being.

IND 3-8

Bright LED Streetlights: Considering the adverse effects observed in a recent Upland development with LED lights too bright at night, we request careful consideration of the choice of LED streetlights. It is vital to avoid disrupting the natural patterns of local bird populations due to intense illumination resembling daytime during nighttime hours.

IND 3-9

Inaccurate Park Renderings: The proposed park renderings, specifically the dog park and active sport courts, do not align with community preferences. We would appreciate the County's decision to maintain the two parks in their natural state with minimal development. It would seem that parks including dog parks are extremely important to California as California provided $21.86 million to different areas of Los Angeles County for parks and dog parks.

IND 3-10

The Value of Open Space: Open space holds significant importance for our community. It provides essential recreational opportunities, greenery, and tranquility, contributing to residents' well-being and quality of life. Open spaces play a crucial role in rainwater collection, mitigating flooding and replenishing groundwater. They contribute to climate change mitigation by reducing urban heat islands and providing shade. Trees in open spaces absorb carbon dioxide aiding in carbon sequestration.

Trees are obviously extremely important to reducing green house gases because AB 2251 requires the Department of Forestry and Fire Protection to complete a strategic plan to achieve a 10% increase in tree canopy coverage in urban areas by 2035. It makes no sense that this project would destroy many mature trees that take CO2 out of the atmosphere and provide oxygen for us to breathe; it really seems counter-productive.

IND 3-11

Water: Another section of the golf course is sold to Sunjoint for 420 homes, and Walnut Valley Water District has issued a Will Service Letter for 360 homes, not considering the Sunjoint project. Given this, a water supply assessment study per SB 610 should be conducted by Walnut Valley Water District for developments exceeding 500 units. The large number of units in the project will accelerate the mandated reduction of water usage up to 50% over the next 10 years, as well as raising water rates.

Water seems to be of real concern to California representatives; they have, as mentioned before, provided millions of dollars to cities and counties to increase our water supply. AB 1845 Allows the Southern California Metropolitan Water District to expedite their drought mitigation projects for the region. Why would all these houses be allowed to be built when there is not enough water for the existing houses?

IND
3-12

It seems that if the Royal Vista Residential Project is allowed to proceed, it will only aggravate the existing problems our local community has with water drought and greenhouse gases and put a further burden on all its citizens.

Thank you for your attention to these concerns and your commitment to ensuring the Royal Vista Residential Project aligns with the values of our community.

Sincerely,

Earlene Smith

IND
3-13

Response to Comment Letter IND 3

Earlene Smith

Response IND 3-1

Comment noted.

Response IND 3-2

See Response FORM 1-2.

Response IND 3-3

See Response FORM 1-2.

Response IND 3-4

See Response FORM 1-3.

Response IND 3-5

See Response FORM 1-4.

Response IND 3-6

Section 4.4, Biological Resources, discusses that the Project would include Mitigation Measure BIO-1 to protect nesting birds and to restrict activities that may result in birds abandoning their nest, and reduce impacts to Cooper's hawk and nesting birds to less than significant by avoiding breeding bird nests. Mitigation Measure BIO-1 has been revised in the FEIR to include additional qualifications and requirements for the biologist conducting the preconstruction monitoring (See Chapter 11, Corrections and Additions). The Project Site is a developed private golf course and not undeveloped public open space. Nearby parks and open space areas, such as the opens space and parks throughout the cities of Diamond Bar to the east and Walnut to the north, would provide locations for migrating birds to rest and feed on the grass. See DEIR Figure 4.16-2, Other Parks within 5 Miles of the Project Site. In addition, the Project will include approximately 28 acres of open space, comprising approximately 37 percent of the Project Site. The Proposed Project will plant approximately 1,820 new trees, increasing the number of trees by 4 times. The number of trees will increase from 411 to approximately 1,864 trees.

See Response FORM 1-5. The Project would include storm drain facilities that would route rainwater to bio-filtration and detention systems for treatment prior to being discharged into the existing storm drains and returned to the environment for groundwater recharge. The Project would include on-site storm drain facilities that would consist of a combination of low flow water quality and peak flow conveyance systems. The low flow water quality systems would intercept the low flows and provide water quality treatment in order to meet the requirements of the LA County LID Ordinance. The peak flow conveyance systems would provide peak flow reduction via detention systems, in order to control flows to meet the capacity requirements of the existing LACFCD storm drain systems.

Response IND 3-7

See Response FORM 1-5.

Response IND 3-8

See Response FORM 1-6.

Response IND 3-9

See Response FORM 1-7.

Response IND 3-10

See Response FORM 1-9.

Response IND 3-11

See Response FORM 1-9.

Response IND 3-12

See Response FORM 1-10.

Response IND 3-13

See Section 4.19 Utilities and Service Systems for a discussion on water supply. The Project will increase potable water demands; however, this increase fits within the anticipated increase in water demands as planned within WVWD's service area as described within the WVWD 2020 UWMP, which has planned for normal, dry and multiple dry years. Therefore, the DEIR Section 4.19.5 Utilities and Service Systems concluded that there are adequate water supplies to support this Project in normal, dry and multiple dry year climate scenarios (Fuscoe 2023c).

Although the Project would generate greenhouse gas emissions, the Project would be consistent with the County's Sustainability Plan (OurCounty Plan), see DEIR Section 4.8.5. The Project would comply with CALGreen and Title 24 requirements, would locate housing near public transit and promote alternative modes of transportation, and include publicly accessible open space. The Project is also consistent with the specific goals of Strategy 3A of the OurCounty Plan. The Project is an infill project that would promote increased density and would not contribute to urban sprawl or promote development on the periphery of the built environment and the natural environment. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: George Funk <georgefunk74@gmail.com>
Sent: Thursday, December 14, 2023 5:41 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; firstdistrict@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; achou@diamondbarca.gov; rlow@diamondbarca.gov; saveroyalvista <saveroyalvista@gmail.com>; cteng@diamondbarca.gov
Subject: DEIR Public Comment - PRJ2021-002011

Dear Ms. Pavlovic:

DECEMBER 14, 2023

RE: ROYAL VISTA GOLF COURSE DEVELOPMENT PLAN – Project: PRJ2021-002011

To Whomever This Concerns,

My name is George Funk, living at 20421 Tam Oshanter Drive, Walnut, California, 91789, which is located in the Rowland Heights part of L.A. County and backing onto the said golf course.

I was born and raised in the San Gabriel Valley, over 79 years ago. Over these years I have watched developers destroy all of the orange groves to fill with houses, malls, gas stations and cities. Very little left for nature and her animals to use.

Now these greedy people seek to fill every space not filled with houses and hurt the lives of us who have enjoyed these open spaces for decades.

L.A. County has many open spaces to use, without using this last sizable open space for miles around. IND 4-1

This does not cover all of the other concerns about thousands of cars and thousands of people using the already overflowing roads and freeways.

It is my hope and prayer that this letter reaches people who care more for our future and the future of the natural world than for the pocket books of developers who will not be around in the years ahead.

Sincerely Yours
George Funk

Response to Comment Letter IND 4

George Funk

Response IND 4-1

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Coleen Garcia <cmeski3@yahoo.com>
Sent: Monday, December 25, 2023 7:11 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; firstdistrict@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; AChou@DiamondBarCA.gov; RLow@DiamondBarCA.gov; cteng@diamondbarca.gov; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

CAUTION: External Email. Proceed Responsibly.

December 25, 2023

Dear LA County Department of Regional Planning,

We hope this letter finds you well. We are writing to provide input on the Draft Environmental Impact Report (DEIR) concerning the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned community member, I value the chance to convey our perspectives on the project and its potential consequences. IND 5-1

The proposed high-density development, (reaching 800 units with the inclusion of the Sunjoint development on Lake Canyon), poses a considerable threat to our community's welfare. This threat is evident in the expected increase in crime rates, IND 5-2

the introduction of at least 2,000 vehicles causing traffic congestion and emitting pollutants, and the irreversible harm to our wildlife habitat. IND 5-3

This habitat, a critical corridor to the Puente Hills SEA conservation area just 1.2 miles away, is in jeopardy. IND 5-4

Additionally, the current permeable ground serves a crucial role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. IND 5-5

Several homes, totaling twenty-one, are situated in a landslide zone resulting from the Morning Sun landslide in May 1995, with subsequent incidents. We moved into our home on Morning Sun Ave in 2000. **We had above-ground water piping on streets for five years.** The theory suggests that the construction of South Point Middle School led to landslides due to dumped excavation dirt obstructing blue line streams. IND 5-6

The EIR lacks detailed mitigation plans for the landslide zone during excavation. After the big landslide in 1995 there were 2 other landslides after that. We are including *2 attachments with pictures* of one big landslide that destroyed the street right in front of 1635 Morning Sun Ave. This occurred after the county "fixed" the street. All of this has ruined our foundation and home. Then Lennar came in around 2016 and caused more damage to our property as well as surrounding properties. The daily grading felt like mini earthquakes for months. IND 5-7

The homes across the street have glares from the windows daily that hit our homes. We don't need more coming from the back of our homes. IND 5-8

Concerns arise from groundwater found as shallow as 2.5 feet near East Walnut Dr. South and Bellavista, especially given its proximity to two ponds. This area's wet soil poses risks as water drains towards it due to its low elevation. IND 5-9

In terms of Population and Housing, the mentioned parcels are not part of the 2021-2029 Housing Element inventory for rezoning in unincorporated areas to meet state housing mandates. Rowland Heights is already contributing to housing requirements with over fifty properties potentially developing 2,228 units. This project falls outside the scope of the Housing Element, impacting park-poor areas by reducing open space. IND 5-10

Thank you for your attention to these concerns and your commitment to ensuring that the proposed Royal Vista Residential Project aligns with the values and needs of our community. IND 5-11

Sincerely,
Coleen M. Garcia and Family (Chris, Andrea, & Ryan)
1635 Morning Sun Ave
Walnut, CA 91789

Response to Comment Letter IND 5

Coleen Garcia

Response IND 5-1

Comment noted.

Response IND 5-2

See Response FORM 1-2.

Response IND 5-3

See Response FORM 2-3.

Response IND 5-4

See Response FORM 2-4.

Response IND 5-5

See Response FORM 2-5.

Response IND 5-6

See Response FORM 4-6.

Response IND 5-7

See Response FORM 4-6.

Response IND 5-8

Section 4.1 Aesthetics, discusses that windows on the proposed residences and buildings, and associated cars, have the potential to create new sources of glare. However, these uses and glare sources would be consistent with the surrounding land uses, as the Project Site is entirely surrounded by existing residential development, except to the north (that includes commercial and retail development). Also, the proposed Project would not use highly reflective materials for roofing or exterior siding as required by LACC Section 22.140.580 (d) of the County Code. The proposed residential homes and townhomes would use neutral tones, and non-reflective materials, such as wood, stucco and concrete.

Response IND 5-9

See Response FORM 4-7.

Response IND 5-10

See Response FORM 4-8.

Response IND 5-11

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: ccc <tiger911411@gmail.com>
Sent: Tuesday, December 26, 2023 3:24 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: Comments for the DEIR

IND 6-1

敬啓者

我是Royal vista 高尔夫球场内的居民。

我们懇请不要破坏我们寧静生活。不能蓋房子，戈这裡已经太7
CL

Translation to English:

To whom It May Concern

I am a resident of Royal Vista Golf Course.

We kindly ask not to disrupt our quiet life. Can't build a house, it's already too big.

CL

Response to Comment Letter IND 6

CL

Response IND 6-1

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR

From: irene wu <irenewucpa@yahoo.com>
Sent: Wednesday, December 27, 2023 1:05 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: PRJ2021-002011 Draft Environmental Impact Report (DEIR)

IND 7-1

I want to address my concern regarding the project above. The above project will cause a lot of issues in this neighborhood, Such as but not limited to the followings:

Dense population, More traffic, more pollution, more crimes, less green, less recreation opportunity etc.

Please stop this project or invite the neighborhood for a public votes. As a resident we should have the right to vote on this public issue. Thank you for your consideration.

Mannjye Wu

Sent from Yahoo Mail on Android

Response to Comment Letter IND 7

Mannjye Wu

Response IND 7-1

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record. In addition, with respect to density and crime. See Response FORM 1-2 and DEIR Section 4.11, Land Use, and Section 4.14, Population and Housing. See also Response FORM 1-3 and DEIR Section 4.17 regarding traffic. The Project operational air quality emission impacts would be less than significant, see DEIR Section 4.3.5. The Project would provide approximately 28 acres of open space that would remain as a vegetated surface to retain moisture and will include a net gain in the number of trees on the Project Site from 411 trees to 1,864 trees. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 7:36 AM
To: Kevin Smith
Subject: FW: Project PRJ2021-002011 DEIR Comments

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov

From: Monique Marcelo <moniqueponco@yahoo.com>
Sent: Friday, December 29, 2023 12:40 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>; firstdistrict@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; bodek@planning.lacounty.gov
Subject: Project PRJ2021-002011 DEIR Comments

To LA County Regional Planning Dept,

In regard to the DEIR for Project No. PRJ2021-002011 / Royal Vista Residential Project, I would like to respectfully voice out my concerns regarding this development project. I am a resident in this area that will be greatly affected by the negative environmental impact of this development. The proposed housing development of over 360+ homes will result in a very high-density area and would directly have adverse effects on the residents and the community in general. IND 8-1

1. Noise and Pollution - The construction is expected to last about 4 years, and construction is to start from 7am to 7pm Monday to Saturday. How can we live comfortably and safely in our own homes when we have to endure this 6 days a week, 12 hours a day, for this many years? This residents in this IND 8-2

neighborhood are mostly elderly, as well as professionals who work from home..... could you imagine how devastating and inconvenient this is going to be for many years? This violates our right to quiet enjoyment of our homes, and we are going to be subjected to extreme level of construction noise, very poor air quality, traffic, dirt and pollution, among others.

More importantly, we are very concerned about the negative health effects, like Valley Fever and other respiratory illnesses due to the excavation that we will endure for many years. IND 8-3

2. Transportation - My family will be directly impacted by PDF T-6 as my only exit from my home is through Walnut Leaf Drive wherein the developer is proposing to have an opening/new road directly across this road crossing Colima. Just the way it is right now, it is already very difficult to turn left on Colima Road because of the many cars that pass by. Adding over 360+ homes to this very congested area will cause us to have a lot of traffic just to get out of our neighborhood to the main road. Take note that we have a multi-family 3 story complex on this corner of Colima and Walnut Leaf Drive already, plus the many single family homes from this area that use this only exit. If they add that road/opening for their new residents directly across ours to come out to Colima, it will be a very dangerous and congested intersection. We will have a lot of traffic just to get out of our own street. IND 8-4

This project of 360+ homes will clog our roads and emit much more pollutants. We are already very very close to the 60 and 57 Freeways which is the busiest freeway interchange, and adding this many residents directly by this freeway interchange will be a traffic nightmare.

We would like to believe that our lives and health also matter to our officials. I understand the reasons for adding more homes to our county, but PLEASE consider our concerns as this will affect both our physical and mental health. Our current open space is valuable and important for our community as it contributes to residents' well-being and quality of life. Open spaces play a crucial role in so many ways, some of which are, mitigating flooding and climate change which is also a very important issue right now that needs to be considered. Trees in open spaces absorb carbon dioxide, aiding in carbon sequestration. IND 8-5

We are hoping you would take all this into consideration.

Respectfully,

Monique M.

Response to Comment Letter IND 8

Monique Marcelo

Response IND 8-1

The Project proposes 360 homes on approximately 75 acres with 37 percent open space. The requested densities of U2 (3.3 to 6 dwelling units per acre), U3 (6.1 to 12 dwelling units per acre), and U4 (12.1 to 22 dwelling units per acre) are consistent with the surrounding densities U1 (1.1 to 3.2 dwelling units per acre), U2, U4, and U5 (22.1 to 35 dwelling units per acre), The Project proposes infill residential development that is compatible in density, design and scale with surrounding housing. See DEIR Chapter 4.1 (Aesthetics) and Chapter 4.11 (Land Use). Also, see Response FORM 1-2 and Response Form 1-3.

Response IND 8-2

The Project construction is estimated to last approximately 3 years. Construction days/hours will be consistent with County ordinances which currently allows construction to occur during daytime hours between 7:00 a.m. and 8:00 p.m. daily (except Sundays and holidays). Project construction would result in noise levels exceeding the County's 75 dBA (see Table 4.13-9) noise standard for mobile source construction equipment noise at single-family residences. Mitigation Measure NOI- and NOI-2 would be implemented and would reduce impacts, however, noise impacts would remain significant and unavoidable after implementation of all mitigation measures. Please refer to DEIR Section 4.13 for information regarding Noise and mitigation measures proposed; DEIR Section 4.17 for information regarding Transportation and mitigation measures proposed; and DEIR Section 4.1 for information regarding Air Quality and mitigation measures proposed. See Response IND 1-8.

Response IND 8-3

See Response FORM 2-6.

Response IND 8-4

Impact TR-3 provided on pages 4.17-23 of the DEIR concludes that the Project would not substantially increase hazards due to a geometric design feature. The commenter states there are "safety concerns" at Colima Road and Walnut Leaf Drive intersection but does not present any analysis or data to support the assertion. Further, the commenter does not state how the Project would degrade safety at these intersections.

The signal warrant analysis which was prepared for the intersection of Colima Road and Walnut Leaf Drive is described on page 4.17-24 of the DEIR, and on page 15 of the TIA provided in Appendix M of the DEIR. The four signal warrants evaluated for the Walnut Leaf Drive/Colima Road intersection included three warrants based on vehicular volumes and one warrant based on existing collision records. The warrant analysis determined that based on the strict application of the warrant criteria, the warrants were not met for this intersection.

Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service (LOS), or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. Although changes in LOS or other measures of congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development projects under CEQA, a “non-CEQA” Operational Analysis was also conducted for the proposed Project in accordance with the Los Angeles County Public Works (LACPW) “Transportation Impact Analysis Guidelines” (TIA Guidelines) to assess site access and circulation constraints at intersections within the vicinity of the Project. This analysis is provided beginning on page 64 of the Transportation Impact Analysis (TIA) which is included in Appendix M of the DEIR.

Section 8.3.4, beginning on page 106 of the TIA, discusses that at two-way stop-controlled intersections such as the Project Driveway-Walnut Leave Drive/Colima Road intersection, the LOS associated with the most constrained minor street approach is reported as the overall intersection LOS. The Walnut Leaf Drive approach is expected to operate at LOS F. The proposed project driveway is expected to operate at LOS C or better under all analysis conditions. Project Design Feature (PDF) T-6, which is described on page 4.17-27 of the DEIR, consists of restriping Walnut Leaf Drive in order to provide one southbound departure lane as well as one shared left-through lane and one right-turn lane on the northbound approach. The LOS at the subject intersection with implementation of PDF T-6 is presented in Table 8-2 on page 104 of the TIA. As shown in Table 8-2, the proposed restriping is expected to result in LOS D or better on the Walnut Leaf Drive approach. A conceptual plan of the proposed improvement is provided in Appendix Figure F-4 on page F-337 of the TIA.

The Tierra Luna-Project Driveway/Colima Road intersection was conservatively analyzed as a two-way stop-controlled intersection. PDF T-7 on page 4.17-28 of the DEIR describes the planned relocation of the existing signalized golf cart and pedestrian crossing to the Tierra Luna-Project Driveway/Colima Road intersection in order to provide traffic signal control at the intersection. The LOS at the subject intersection with implementation of PDF T-7 is presented in Table 8-2 on page 104 of the TIA. Table 8-2 shows the signalization of the Tierra Luna/Colima Road intersection is expected to result in LOS A at this location.

Response IND 8-5

Chapter 2.0, Project Description, discusses that the existing site is currently developed with a privately owned golf course and this open space is not accessible to the public, with the exception of those paying to play golf. Once constructed the Project would include 28 acres of publicly accessible open space and would plant approximately 1,820 new trees providing shade throughout the Project Site which will absorb carbon. In addition, the proposed Project would include on-site storm drain facilities that would consist of a combination of low flow water quality and peak flow conveyance systems designed to capture on-site storm flows preventing flooding hazards. The low flow water quality systems would intercept the low flows and provide water quality treatment in order to meet the requirements of the LA County LID Ordinance. The peak flow conveyance systems would provide peak flow reduction via detention systems, in order to control flows to meet the capacity requirements of the existing LACFCD storm drain systems reducing flood risks.

Quality of life is not an environmental topic addressed under CEQA. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: henry shih <shihhung78@hotmail.com>
Sent: Saturday, December 30, 2023 7:29 PM
To: saveroyalvista <saveroyalvista@gmail.com>; contactsaverv@gmail.com; Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: Re: Reminder: DEIR Comments Due January 5 - Happy Holidays!

CAUTION: External Email. Proceed Responsibly.

Hi DEIR members,

Every summer times, its hot and unpleasant feeling everywhere. But when we passed by Royal Vista golf course, we felt much cooler and open feeling because of the green lots gave us. It is so wonderful and unique from other cities nearby. We do not want it will be replaced with heated concrete structures and busy traffic.

Please help to save our last Greens and Open area of Rowland Heights, golf course is very special and unique symbol of city.

Thank you,

Starshine rd residences

IND 9-1

Get Outlook for iOS

From: Royal Vista Open Space <saveroyalvista@gmail.com>
Sent: Monday, December 25, 2023 9:05:34 PM
To: contactsaverv@gmail.com <contactsaverv@gmail.com>
Subject: Reminder: DEIR Comments Due January 5 - Happy Holidays!

Dear Save Royal Vista Community,

Wishing you joy this holiday season!

As we approach the year-end, a quick **reminder to submit your DEIR comments by January 5.** *Visit the* ***Draft EIR page*** *of our website for email contacts & 4 sample templates you can copy & paste or use as reference. Comments will be accepted in all languages.*

Please urge your friends, family & neighbors to submit comments.
Your valuable input makes a difference!

Happy Holidays and a wonderful New Year!

--
Royal Vista Open Space
Nonprofit Organization
SaveRoyalVista.com
Facebook | Instagram

Response to Comment Letter IND 9

Henry Shih

Response IND 9-1

The commenter raises general concerns regarding open space and traffic, but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis.

See Response FORM 1-5 for heat island and Response FORM 1-3 for traffic. The Project would retain approximately 28 acres of open space, comprising approximately 37 percent of the Project Site, and would include a substantial net gain in the number of trees. The Project would result in the net increase of approximately 1,453 trees on the Project Site, increasing the existing 411 trees to 1,864 trees, with a portion planted along paved sidewalks and the trail system. This is more than 4 times the number of existing trees. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 7:38 AM
To: Kevin Smith
Subject: FW: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov

From: swtcecile@aol.com <swtcecile@aol.com>
Sent: Saturday, December 30, 2023 11:17 AM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

Dear LA County Department of Regional Planning,
I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts. IND 10-1

The proposed dense development comprising nearly 400 units (upwards of 800 units including the Sunjoint proposed development on Lake Canyon) poses a significant threat to our community's quality of life. IND 10-2

This threat manifests in heightened crime rates within our city, an influx of at least 2000 additional vehicles clogging our roads and emitting pollutants, and the irrevocable destruction of the IND 10-3 wildlife habitat, including the vital corridor to the Puente Hills SEA conservation area located just 1.2 miles away.

In addition, the current permeable ground filters pollutants, replenishes the Puente Basin Aquifer, and mitigates the urban heat island effect as it cools the surrounding area. IND 10-4

Solar Panel Glare: It is crucial to address potential impacts on residents due to direct glare or reflection. How will the glare from solar panels be minimized to reduce reflection on current homes, especially those situated on higher elevations? IND 10-5

Lighting on Walking and Biking Paths: The DEIR lacks information on the type and height of lighting along proposed walking and biking paths. We are particularly concerned about bright lights projecting into neighboring private backyards. It is essential to address potential impacts on residents' privacy and well-being. IND 10-6

Bright LED Streetlights: Considering the adverse effects observed in a recent Upland development with LED lights too bright at night, we request careful consideration of the choice of LED streetlights. It is vital to avoid disrupting the natural patterns of local bird populations due to intense illumination resembling daytime during nighttime hours. IND 10-7

The Value of Open Space: Open space holds significant importance for our community. It provides essential recreational opportunities, greenery, and tranquility, contributing to residents' well-being and quality of life. Open spaces play a crucial role in rainwater collection, mitigating flooding, and replenishing groundwater. They contribute to climate change mitigation by reducing urban heat islands and providing shade. Trees in open spaces absorb carbon dioxide, aiding in carbon sequestration. IND 10-8

Water: Another section of the golf course is sold to Sunjoint for 420 homes, and Walnut Valley Water District has issued a Will Serve Letter for 360 homes, not considering the Sunjoint project. Given this, a water supply assessment study per SB 610 should be conducted by Walnut Valley Water District for developments exceeding 500 units.The large number of units in the project will accelerate the mandated reduction of water usage up to 50% over the next 10 years, as well as raising our water rates. IND 10-9

We moved to this community over 45 years ago from our hometown of Whittier. What attracted us to this area was the beautiful open space and the quiet. In that time the hills have been built upon, Rowland High put in a stadium and you can hear cars racing on Pathfinder from inside our house. The quiet is mostly gone. We do not need more traffic and less open space.

Thank you for your attention to these concerns and your commitment to ensuring that the Royal Vista Residential Project aligns with the values and needs of our community. IND 10-10

Sincerely,
Woolley Family
Curtis,.Candice, Christopher and Corey
19150 La Guardia St.
Rowland Heights, Ca 91748

Response to Comment Letter IND 10

Woolley Family

Response IND 10-1

Comment noted.

Response IND 10-2

See Response FORM 1-2.

Response IND 10-3

See Response FORM 1-4.

Response IND 10-4

See Response FORM 1-5.

Response IND 10-5

See Response FORM 1-6.

Response IND 10-6

See Response FORM 1-7.

Response IND 10-7

See Response FORM 1-8.

Response IND 10-8

See Response FORM 1-9.

Response IND 10-9

See Response FORM 1-10.

Response IND 10-10

This comment, which concludes the letter, is noted for the record and will be included in the Project record. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Translation of Handwritten Letter *(Original letter is below)*

Royal Vista Golf Course Sizable Open Space in Rowland Heights, California

Will result in California's highest density, most unlivable residential community. The *Royal Vista Golf Course* is like New York's Central Park to us community residents. We have beautiful scenery and fresh air, but the developer decided to develop this golf course into 419 residential *town houses* on the 64 *acre* property, 360 residential *triplexes and duplexes* on 86 *acres* on the main golf course. Total Including parking with 830 units. IND 11-1

Developer must cut down 700 trees and remove 150 *acres* of landscaping. IND 11-2

During construction: [This period] taking up to 4 years to complete, will disturb the neighbors because construction trucks will come and go, causing traffic chaos, generating noise, dust, and air pollution, preventing residents from opening their windows, putting stress on their quality of life. IND 11-3

Early phase after the construction: Because 700 trees will be cut down and 150 *acres* of landscaping removed, this will negatively affect the *biosphere* and *atmosphere*. Trees and grass are *breather* because photosynthesis produces oxygen and uses carbon dioxide. If oxygen is reduced, *carbon dioxide increases which affects the carbon dioxide and oxygen continually cycle through the biosphere and atmosphere* which affects the body's health negatively. IND 11-4

After the development has been constructed and later on: There will be 800 families moving in, which is about 3,000 people, cars increasing 1,600%. Community density will definitely increase. California has a lot of vacant land elsewhere, is there a reason to put a lot of people on such a golf course? IND 11-5

Chin-Chien W Kuo

20433 Tam O'Shanter Dr.

Walnut, CA 91789 Dec 20/2023

Royal Vista golf course Sizable open space.

in Rowland Hights California!

造成在加州"人口密度最高.最不適合居住的社區.

Royal Vista golf course 對我們社區居民等於紐約市的中央公園.我們有優美的景色、新鮮的空氣.建商卻計劃在這球場興建住房.

419 單位的 town house 在 64 acres 的土地上.

360 house triplexes and duplexes 在 86 acres 的主要球場上.

總計連停車位置共有 830 的建物.

建商必須砍掉 700 棵樹及鏟除 150 acres 的草皮.

興建期間：長達四年之久.各方面的困擾居民.如.工作車的進出.交通的混亂.噪音.灰塵.空氣污染.不能開窗户.生活受到沉重的壓力.

興建完工初期：

由於砍掉700棵樹.鏟除150 Acres 草皮.嚴重影響生態環境(Biosphere)及氣層(Atmosphere)樹和草都是 Breather.由於光合作用會釋放氧氣吸收二氧化碳.由於氧氣的減少,二氧化碳增多.

Response to Comment Letter IND 11

Chin-Chien W. Kuo

Translation of Handwritten Letter

Response IND 11-1

The Proposed Project consists of a total of 360 homes on approximately 75 acres. Approximately 28 acres of the 75 acres will be open space equaling approximately 37 percent of the Project Site. The 360 homes will include 200 single family detached homes, 58 duplexes, 30 triplexes and 72 townhomes. Please see Chapter 2, Project Description, of the DEIR for additional information.

Response IND 11-2

The Proposed Project will remove approximately 367 existing trees and approximately 68 acres of existing landscaping which is primarily golf course grass. The Proposed Project will plant approximately 1,820 new trees, increasing the number of trees by 4 times. The number of trees will increase from 411 to approximately 1,864 trees.

Response IND 11-3

The proposed construction schedule is 3 years. See DEIR Chapter 2, Project Description. The commenter raises general concerns but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Please refer to the following Section of the EIR for detailed environmental analysis regarding the topics generally mentioned in the comment: Section 4.3, Air Quality, Section 4.9, Hazards and Hazardous Materials, Section 4.13, Noise, and Section 4.17, Transportation.

Response IND 11-4

See Response IND 11-2, above regarding the removal of trees and landscaping and FORM 2-9.

Response IND 11-5

See Response IND 11-1 above regarding the Project's proposed number of homes (360). The Project's 360 residential units would generate an estimated residential population of 1,260 people (360 units x 3.5 individuals per unit). The commenter's statements regarding the number of people and cars are not accurate and appear to be based on the commenter's erroneous statement that the Project would include 800 homes. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 8:21 AM
To: Kevin Smith
Subject: FW: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov

Our field offices are currently open to the public. Please visit planning.lacounty.gov for information about available services, public meeting schedules, and planning projects.

From: Teresa Liu <teresa.hy.liu@gmail.com>
Sent: Tuesday, January 2, 2024 1:09 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

Dear LA County Department of Regional Planning,

I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts. IND 12-1

The proposed dense development comprising nearly 400 units (upwards of 800 units including the Sunjoint proposed development on Lake Canyon) poses a significant threat to our community's quality of life and safety. IND 12-2

This development will cause an influx of potentially 2000+ new vehicles to the neighborhood and ***I do not believe that the proposed solutions will be enough to mitigate this massive traffic issue.***

IND 12-3

If this project is really approved, my deepest worry is "How much extra burden it will generate to our current infrastructure? And how will this affect our evacuating effectiveness when a natural disaster happens?" This is a very mature and well-developed community, our current infrastructure has already undergone increasing pressure.

IND 12-4

Below are my feedbacks of the Traffic /Safety Impact of the EIR.

PDF T-3: Fairway Drive/SR-60 Freeway Ramps

The restriction of a shared right turn lane does not sufficiently mitigate the issue of large amounts of traffic within the neighborhood. Morning traffic is worst on the 60 Freeway, primarily going west, not east. The addition of a shared turn right turn lane will not help to mitigate morning traffic if the majority of the traffic is not going eastbound. Without widening the road it will only cause the main road to shrink which will actually adversely impact traffic. In addition to all of this Caltrans has not even completely approved the proposed solution yet so it is entirely possible this will be an issue that remains completely unaddressed.

IND 12-5

PDF T-4: Fairway Drive/East Walnut Drive South

The westbound approach along East Walnut Drive South is currently a one-lane street. Adding in a right turn lane at the end will only help to mitigate the issue of exiting the street itself. The influx of new vehicles will cause more traffic within the street itself, not the exit. In addition to this the street is also the site of numerous buildings that already have a significant impact on traffic. The Sri Guru Singh Gurdwara is a regular gathering site for the local Sikh community and the parking that is taken up along the side of the East Walnut Drive is already quite significant. Sureline Express Inc. has a warehouse at the area as well where large Semi trucks towing trailers loaded with shipping containers need to regularly enter and exit. More units and vehicles will massively impact the traffic just with these two buildings on East Walnut Drive and there are still other facilities there not mentioned. The addition of a slight extension of a right turn lane will not help to mitigate the core of the issue. The problem is with the street, not the exit.

IND 12-6

These are but two of the proposed solutions and they are completely insufficient to mitigate the potential issues that the new influx of traffic may cause. There is also an issue that remains completely unaddressed which is the large influx of traffic to South Pointe Middle School located within the neighborhood. **Majority of the Morning traffic came from Colima Road/Golden Spring.** The road leading up to South Pointe is completely local and the traffic there is already very bad. As a resident who has lived there for over 25 years we've seen the lines of cars go well into the neighborhood every single morning. **With new units coming in the roads will be completely unusable and stuck every single morning. Adding more traffic to this will also not help our community safety due to a rise in local crime. How can the police come to help us if the roads are completely clogged? The DEIR fails to address this significant issue and the other issues that it does attempt to address are done so with inadequate solutions**.

IND 12-7

Thank you for taking the time to address these concerns. We appreciate your commitment to ensuring that the Royal Vista Residential Project aligns with the values and needs of our community.

Teresa Liu

1411 Fairlance Drive

Walnut, CA 91789

Response to Comment Letter IND 12

Teresa Liu

Response IND 12-1

Comment noted.

Response IND 12-2

See Response FORM 1-2.

Response IND 12-3

See Response FORM 1-3.

Response IND 12-4

Section 4.19 Utilities and Service Systems, discusses that the service providers (e.g., Walnut Valley Water District, Los Angeles County Sanitation District) concluded that there is capacity to serve the Project.

In regard to evacuation, the Safety Element of the Los Angeles County General Plan 2035 identifies possible evacuation routes throughout unincorporated Los Angeles County that may be used for evacuation during emergencies. See Section 4.9, Hazards and Hazardous Materials, and Section 4.20, Wildfire. The nearest designated evacuation route to the Project Site is Fairview Drive/Brea Canyon Cutoff Road, which travels in a north/south direction along the western boundary of the Royal Vista Golf Club and connects to Colima Road, which provides primary access to the Project Site (Los Angeles County 2015). During construction of the Project, closure of a portion of a travel lane on East Walnut Drive South, Colima Road, and along the Project's frontage lane, together could impact the movement of emergency vehicles, although Project construction would not cut off access to or through any streets. Project construction would not include lane closures on any designated evacuation routes. The Project Site is located in an established urban area well served by the surrounding roadway network and multiple routes exist in the area for emergency vehicles and evacuation. Depending on the emergency situation, a given emergency or evacuation route may not necessarily be the road that would be used during an evacuation. Circumstances during an emergency may dictate use of other more viable alternate routes in the area. Nonetheless, to mitigate the construction impact Mitigation Measure TR-3 requires a Construction Staging and Traffic Management Plan to be reviewed and approved by the County, with detailed provisions, including identification of emergency and evacuation routes, to further ensure that temporary construction activities would be appropriately planned and coordinated so as not to result in conflicts with existing adopted emergency response plan or emergency evacuation plan. See DEIR Section 4.9, Hazards and Hazardous Materials, Section 4.20, Wildfire and Mitigation Measure TR-3.

Operation of the Project would not require any lane restrictions or closures and traffic into and out of the facilities would not exceed the carrying capacity of the local streets, as discussed in Section 4.17 Transportation of this Draft EIR. Therefore, the impact relative to impairing or interfering with an adopted emergency response plan or emergency evacuation plan would be less than significant.

Response IND 12-5

See Response FORM 1-3. Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, traffic impacts under CEQA are analyzed in terms of Vehicle Miles Traveled (VMT), and not in terms of automobile delay as described by Level of Service (LOS) or similar measures of vehicular capacity or traffic congestion. PDF T-3 is a voluntary component of the Project intended to facilitate traffic flow, but is not necessary to mitigate an impact under CEQA.

Response IND 12-6

The commenter expresses concerns regarding traffic capacity and congestion. Section 4.17 of the DEIR evaluates Vehicle Miles Traveled (VMT), and not vehicular capacity and congestion, in order to determine the significance of transportation impacts pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. The specific thresholds of significance used to evaluate the potential transportation impacts of the Project are provided on page 4.17-13 of the DEIR. See Response FORM 1-3.

Response IND 12-7

See Response IND 12-6 and Response IND 12-4, above regarding traffic, Response IND 17-29 below for discussion on traffic along Colima Road/Golden Spring and FORM 1-2 and DEIR Section 4.15.5 regarding public safety. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 8:24 AM
To: Kevin Smith
Subject: FW: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

-----Original Message-----
From: Victor Chen <vchen0@gmail.com>
Sent: Tuesday, January 2, 2024 6:43 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

CAUTION: External Email. Proceed Responsibly.

Hi Marie,

1. The alternatives are not applicable and should be redone. This area was never zoned for commercial. It also needs an alternative in which this land is sold to another golf course operator as I'm aware the current land owners are no longer interested. The response as to why another area was not selected is basically because this infill takes the lowest potential cost to development. But given that land is now a scarce commodity, this is not the approach that we should take. We need to think long term in how we want our community to look to appeal to new homeowners. IND 13-1

2. Noise being substantial after mitigating is a large issue. This area has a higher elderly population who are mostly at home. A large percent of the workforce is also now fully or partially work from home. The noise at a minimum must be brought down to insignificant after mitigation. It is unfair to have the residents carry this burden for 3+ years. Machines should be newer than 2022 with noise mufflers that reduce sound by at least 15lb. A noise barrier must also be erected so that the height blocks line of sight. I want to note that homes sit 10-15ft above the land in question, so the barrier must be at least 20+ feet to block line of sight when I am in my backyard. I would also like to make my area a sensitive receptor. I have elderly and newborn in my household who is sensitive to noise. My home is on Leanne terrace, which does not have a sensitive receptor pin. IND 13-2

3. Pollution and dust being significant after mitigation is also not acceptable. The homes are mostly older, without new building codes. My bathroom windows must be open for ventilation purposes as there is no bathroom vent. I cannot have dust coming through my windows and settling in the room, which will cause asthma for my newborn child. There must be constant monitoring and watering of the soil to prevent dust during excavation. Also construction should be stopped on wind is greater than 10 mph. IND 13-3

4. Construction workers should not be parking in my residential neighborhood. They should have their own created dedicated area. IND 13-4

5. A schedule of all construction work with day and time needs to be posted so that the community is aware of what is expected to happen. If construction does not align with the schedule. Construction must be stopped and timeline must be reposted and re-aligned. The community needs at least 48 hour notice of any changes. IND 13-5

6. The street lights must be covered and focused alway from the residential homes. They should not be greater than 2000k in color. IND 13-6

7. Left turn from walnut leaf drive and Colima needs a traffic light. There is significant traffic during rush hour which takes more than 5 mins to make a left turn. Also left turning lane on Colima to brea canyon road needs to be lengthened to account for more cars turning left. This will cause significant traffic to those cars going straight if they lane backs up. IND 13-7

8. Our community is currently park short. We require more park space allotted to make up for the lost if the current open space. This space should be spread out instead of being concentrated is certain areas. IND 13-8

9. More New trees needs to be planted. The current new trees planned are the minimum needed for all the trees they are removing. Triple the amount of trees planned. This is more useful to offset the current co2 that this project will create. LA metro is already doing this and we should follow suit. IND 13-9

10. No grading with machinery can be done within 75 feet from current residents boundaries. IND 13-10

11. Any foundation shift is the liability of the developer. And claims to repair will be covered in full to restore to original by the developer. IND 13-11

Response to Comment Letter IND 13

Victor Chen

Response IND 13-1

Comment noted. The Project does not propose to rezone the land to commercial. Further, continued operation of a golf course would not meet any of the Project objectives.

Response IND 13-2

DEIR Section 4.11, Noise, discusses the Project's impacts related to the temporary or periodic increase in ambient noise levels during temporary construction of the proposed Project and were determined to be significant and unavoidable after implementation of feasible mitigation measures. Feasible mitigation measures are defined as "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors" (Pub. Resources Code, § 21061.1, 14 Cal Code Regs., § 15364). Mitigation measures must, "identify the type(s) of potential action(s) that can feasibly achieve that performance standard and that will [be] considered, analyzed, and potentially incorporated in the mitigation measure" and be "roughly proportional" to the impacts of the Project (Cal. Code Regs. tit. 14 § 15126.4). The DEIR identifies MM NOI-1 through MM NOI-4 which meet the criteria of feasible mitigation measures and lessen the impacts identified in the DEIR. Further, per MM NOI-3, noise barriers will be installed along the Project boundaries to achieve a noise reduction of 12 dBA. The height of the barrier will be unique to the topography and sensitive receptor being shielded by the construction noise.

Response IND 13-3

The DEIR, Section 4.3, Air Quality, concluded that all Air Quality impacts are less than significant after mitigation. DEIR Section 4.3 discussed that the Project would be required to comply with SCAQMD Rule 403 Fugitive Dust. This rule requires projects to prevent, reduce or mitigate fugitive dust emissions from a site. Rule 403 restricts visible fugitive dust to the project property line, restricts the net PM10 emissions to less than 50 micrograms per cubic meter ($\mu g/m^3$) and restricts the tracking out of bulk materials onto public roads. Additionally, projects must utilize one or more of the best available control measures (identified in the tables within the rule). Complying with requirements of SCAQMD Rule 403 such as adding freeboard to haul vehicles, covering loose material on haul vehicles, watering, using chemical stabilizers and/or ceasing all activities if winds exceed 25 mph, would reduce dust impacts to the surrounding areas. See Section 4.3 Air Quality for the detailed discussion of impacts regarding Air Quality. As shown in Table 4.3-10 and Table 4.3-12 of the DEIR, regional and localized fugitive dust emissions, which are included in the tables as respirable particulate matter (PM10) and fine particulate matter (PM2.5) emissions, would be below the regional and localized significance threshold.

Response IND 13-4

Construction personnel would park their vehicles within the Project Site and would not use the public streets for parking.

Response IND 13-5

Comment noted. The Project includes Mitigation Measure TR-3 which includes the notification of upcoming construction activities. Mitigation Measure TR-3 requires, among other things: "Provide advanced notification to adjacent property owners and occupants, as well as nearby schools, of upcoming construction activities, including durations and daily hours of construction. Provide a posted sign on the Project Site with hotline information for adjacent property owners to call and address specific issues or activities that may potentially cause problems at on-and-off-site locations."

Response IND 13-6

See Section 4.1 Aesthetics of the DEIR. The Project would include PDF AES-1 which would require all light sources associated with the Project to be shielded and/or aimed so that no illumination would spill outside of the Project Site boundary. Lighting would be designed to improve safety and to add visual interest to the Project Site, including accentuating key landscape and architectural features. Additionally, street lighting would be shielded to illuminate the streets, promote dark skies, and inhibit any unnecessary nighttime lighting or glare. See Response FORM 1-8.

Response IND 13-7

The Project's Transportation Impact Analysis (TIA) Section 5.0, Operational Analysis (included as Appendix M to the DEIR) evaluated the transportation network and site access and concluded that no improvements are warranted at the suggested locations. In addition, see Response FORM 1-3. See Section 8.3 of the TIA for a discussion regarding the non-CEQA review of local residential intersections contained in Appendix M of the DEIR.

Response IND 13-8

See Response AG 5-13.

Response IND 13-9

The Project would provide approximately 28 acres of open space that would remain as a vegetated surface to retain moisture and will include a net gain in the number of trees on the Project Site from 411 trees to 1,864 trees. This will increase the number of trees by more than 4 times.

Response IND 13-10

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response IND 13-11

See Response FORM 1-10. The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Frances Wright <fadwjw1@aol.com>
Sent: Wednesday, January 3, 2024 10:02 AM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: Fwd: Royal Vista Residential Project Zoo. PRJ2021-002011

Begin forwarded message:

From: Frances Wright <fadwjw1@aol.com>
Subject: Royal Vista Residential Project Zoo. PRJ2021-002011
Date: January 3, 2024 at 9:58:58 AM PST
To: Linda Kuo <mynameiskuo@gmail.com>
Cc: gduran-medina@bos.lacounty.gov, wrehman@bos.lacounty.gov, cchen@bos.lacounty.gov, amoreno@bos.lacounty.gov, RSerrano@bos.lacounty.gov, saveroyalvista@gmail.com

Dear LA County Department of Regional Planning,

I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. *PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts.*

The proposed dense development comprising nearly 400 units (upwards of 800 units including the Sunjoint proposed development on Lake Canyon) poses a significant threat to our community's safeness and quality of life. This threat manifests in heightened crime rates within our city,

IND 14-1

an influx of at least 2000 additional vehicles clogging our roads and emitting pollutants,

IND 14-2

and the irrevocable destruction of the wildlife habitat, including the vital corridor to the Puente Hills SEA conservation area located just 1.2 miles away.

IND 14-3

In addition, the current permeable ground filters pollutants, replenishes the Puente Basin Aquifer, and mitigates the urban heat island effect as it cools the surrounding area.

IND 14-4

Solar Panel Glare: *It is crucial to address potential impacts on residents due to direct glare or reflection. How will the glare from solar panels be minimized to reduce reflection on current homes, especially those situated on higher elevations?* IND 14-5

Lighting on Walking and Biking Paths: *The DEIR lacks information on the type and height of lighting along proposed walking and biking paths. We are particularly concerned about bright lights projecting into neighboring private backyards. It is essential to address potential impacts on residents' privacy and well-being.* IND 14-6

The Value of Open Space: *Open space holds significant importance for our community. It provides essential recreational opportunities, greenery, and tranquility, contributing to residents' well-being and quality of life. Open spaces play a crucial role in rainwater collection, mitigating flooding, and replenishing groundwater. They contribute to climate change mitigation by reducing urban heat islands and providing shade. Trees in open spaces absorb carbon dioxide, aiding in carbon sequestration.* IND 14-7

Water: a water supply assessment study per SB 610 should be conducted by Walnut Valley Water District for developments exceeding 500 units.The large number of units in the project will accelerate the mandated reduction of water usage up to 50% over the next 10 years, as well as raising our water rates. IND 14-8

Air Quality:

Concerns arise over Valley Fever risk due to excavation during construction near the proposed site. A previous case during a similar development led to a resident's diagnosis and ongoing treatment. Excavation dust is also linked to respiratory issues like asthma and mucormycosis. The extensive 3.8 million cubic yards of grading, equivalent to 10,277 haul trucks on major roads, raises worries about traffic control on Colima Road and East Walnut Dr. South, especially during school hours. A four-year construction period may extend to eight with the Sunjoint development, impacting residents significantly. IND 14-9

Particulate Matter Exposure:

Freeways emit significant PM2.5 and PM10, causing respiratory and cardiovascular problems. Prolonged exposure raises health concerns as these fine particles can penetrate deep into the lungs and enter the bloodstream, posing health risks such as respiratory issues, aggravated asthma, bronchitis, and heightened cardiovascular disease risk. IND 14-10

The DEIR fails to address the loss of this watershed and its impact on groundwater replenishment. IND 14-11

The proposed high-density development, (reaching 800 units with the inclusion of the Sunjoint development on Lake Canyon), poses a considerable threat to our community's welfare. This threat is evident in the expected increase in crime rates, IND 14-12 *the introduction of at least 2,000 vehicles causing traffic congestion and emitting pollutants, and the irreversible harm to our wildlife habitat.* IND 14-13

This habitat, a critical corridor to the Puente Hills SEA conservation area just 1.2 miles away, is in jeopardy. IND 14-14

Additionally, the current permeable ground serves a crucial role infiltering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. IND 14-15

Several homes, totaling twenty-one, are situated in a landslide zone resulting from the Morning Sun landslide in May 1995, with subsequent incidents. One resident notes above-ground water piping on streets for five years. The theory suggests that the construction of South Point Middle School led to landslides due to dumped excavation dirt obstructing blue line streams. The EIR lacks detailed mitigation plans for the landslide zone during excavation. IND 14-16

Concerns arise from groundwater found as shallow as 2.5 feet near East Walnut Dr. South and Bellavista, especially given its proximity to two ponds. This area's wet soil poses risks as water drains towards it due to its low elevation. IND 14-17

In terms of Population and Housing, the mentioned parcels are not part of the 2021-2029 Housing Element inventory for rezoning in unincorporated areas to meet state housing mandates. Rowland Heights is already contributing to housing requirements with over fifty properties potentially developing 2,228 units. This project falls outside the scope of the Housing Element, impacting park-poor areas by reducing open space. IND 14-18

Of great concern is there are already traffic problems both on surface streets and freeways without adding more vehicles. Both the 60 and 57 Fwys which are a are of very close proximity to the LARV golf course are impacted at various times of the days. The traffic during these time is completely stop. In addition, There have been articles in the past about the 60 near Grand being the #1 traffic accident location for trucks. IND 14-19

Another important concern is there is not a medical hospital close or nearby to accommodate a most needed quick respond to a medical emergency especially during traffic times which is undoubtedly most important. This situation will only compound and make matters worse. IND 14-20

Thank You and Respectfully,

Frances Wright

Response to Comment Letter IND 14

Francis Wright

Response IND 14-1

See Response FORM 1-2.

Response IND 14-2

See Response FORM 4-3.

Response IND 14-3

See Response FORM 4-4.

Response IND 14-4

See Response FORM 1-5.

Response IND 14-5

See Response FORM 1-6.

Response IND 14-6

See Response FORM 1-7.

Response IND 14-7

See Response FORM 1-9.

Response IND 14-8

See Response FORM 1-10.

Response IND 14-9

See Response FORM 2-6 regarding Valley Fever and Response FORM 2-7 regarding grading. See Response FORM 1-2 regarding the Sunjoint Property.

Response IND 14-10

See Response FORM 2-11.

Response IND 14-11

See Response FORM 3-9.

Response IND 14-12

See Response FORM 1-2.

Response IND 14-13

See Response FORM 4-3.

Response IND 14-14

See Response FORM 4-4.

Response IND 14-15

See Response FORM 4-5.

Response IND 14-16

See Response FORM 4-6.

Response IND 14-17

See Response FORM 4-7.

Response IND 14-18

See Response FORM 4-8.

Response IND 14-19

The Project's Transportation Impact Analysis (TIA) Section 5.0 Operational Analysis included as Appendix M to the DEIR evaluated the transportation network and site access and concluded that no improvements are warranted at the suggested locations. In addition, see Response FORM 1-3.

Response IND 14-20

Please refer to DEIR Section 4.15.5 Public Services regarding emergency medical services. Impacts are less than significant. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: abez@roadrunner.com <abez@roadrunner.com>
Sent: Wednesday, January 3, 2024 10:22 AM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: DEIR Comment on royal vista project No. PRJ2021-002011

Hello,
Please save last sizable open space in Rowland Heights.
Please Do not build 360+ units, it damages environment, cause traffic, effect our houses value, and we lose beauty of golf courses green view.
Please do not do it.
Thanks

IND 15-1

Sent from Mail for Windows

Response Comment Letter IND 15

Abez

Response IND 15-1

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

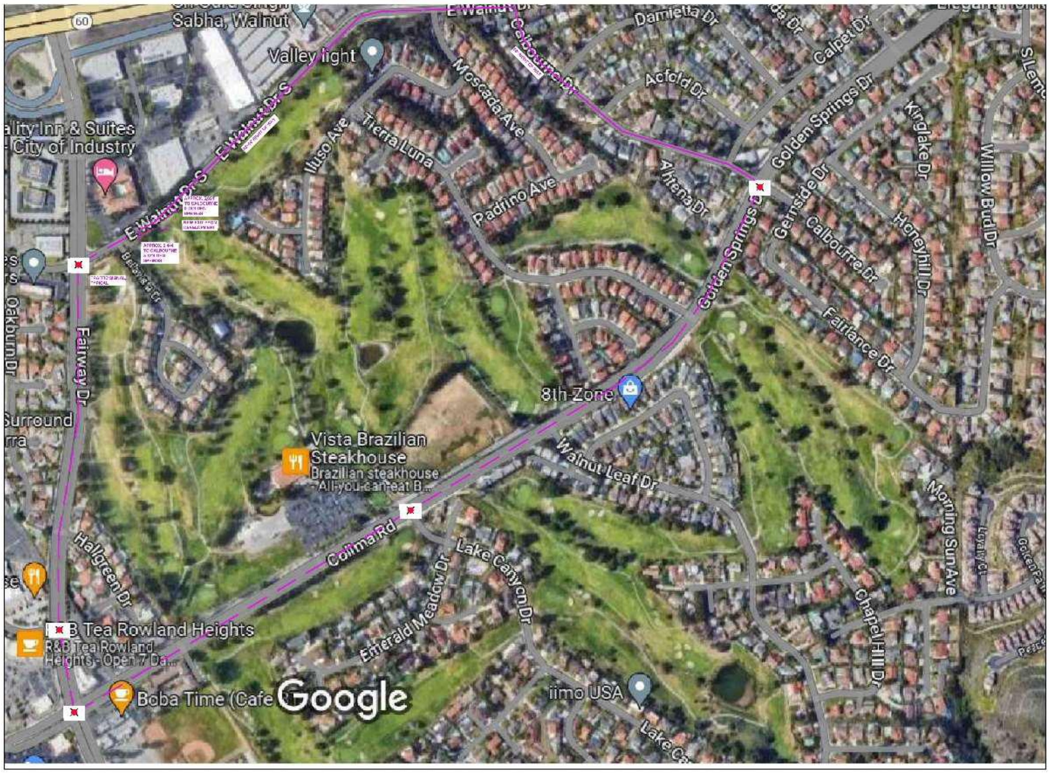
January 3, 2024

Marie Pavlovic

RE: DEIR for Royal Vista Residential & Parks Project PRJ2021-001011

Traffic and the pollution it produces are one of the major objections I have. Not everyone can afford an electric car. Entering and exiting the proposed development safely has not been addressed. With the possibility of adding 720+ cars, how will everyone be able to evacuate in case of an emergency, such as a fire? Will we end up like the poor souls in Lahaina, being cremated in our cars? Traffic is one thing, it is everywhere, but this could involve our lives. It seems that it is expected that many people will be using public transportation, or bicycles. I would not feel safe on a bus and I am too old to ride a bicycle. Will people be riding bikes to work or grocery shopping in the rain? They also assume that many people will be working from home but that is not always possible. This was not addressed in the DEIR.

Those cars exiting the development from Walnut St will most likely turn east on Walnut and south on Calbourne to get to the traffic signal at Golden Springs heading east. See map. Calbourne is a quiet 60' right of way that would be turned into a traffic mess. It is almost twice as far to go to Fairway, then Colima to get to the intersection of Calbourne & Golden Springs with 4 traffic signals.



EXITING FROM WALNUT DR TO GOLDEN SPRINGS & CALBOURNE

IND 16-1

Parking in the proposed development could be an issue. The larger houses will have 5-6 bedrooms with a 2-car garage. There is the possibility of 5 to 6 cars at each house, since many adult children still live with their parents. Where are they going to park? This was not addressed in the DEIR.

IND 16-2

The DEIR states that excess soil will be transported to the Brea Olinda landfill via SR60E to SR57S to Lambert. The city of Brea does not allow heavy trucks on Lambert. They would have to exit at Imperial Hwy eastbound to Valencia northbound. At every signal on Imperial Hwy there are depressions in the pavement where all the heavy trucks wait at the traffic signals. More damage will be done to the street. The left hand turn lane onto Valencia gets backed up and takes a few signals to get through, since the regular trash trucks are using the same route. IND 16-3

The DEIR does not include any future use of the rest of the golf course. The remainder was sold to Sunjoint which proposes an additional 419 houses. There would be a tremendous environmental impact if this project gets approved. This would be a disaster! IND 16-4

The DEIR says there is little or no impact on wildlife.
I see an abundance of birds every day. I have watched young hawks learning to fly and hunt. I have seen mockingbirds chase the hawks away from their nests. There have been bunnies and coyotes in my yard. There have been geese in the middle of Colima. The Canadian geese use the lakes as a resting place on their migration route and are here for several months. Where will they go when the lakes are removed? IND 16-5

Also the fire department uses the lakes to get water to fight wild fires. IND 16-6

I am concerned about the water availability for the project. We are supposed to conserve water, yet 360 residences are proposed. Even with water saving fixtures, the demand will still be high. The DEIR does not address this. IND 16-7

In summary, the proposed project will affect many aspects of our lives that the DEIR did not address or deemed to be insignificant. Maybe it is insignificant to them, but not to the surrounding neighborhoods. It is not just the Rowland Heights area, but also Diamond Bar, Walnut and Hacienda Heights that will suffer.
Beverly Pekar, a 40-year resident IND 16-8

Response to Comment Letter IND 16

Beverly Pekar

Response IND 16-1

See Response AG 3-5. Further, DEIR Section 4.17, Transportation, discuss that teleworking in the SCAG region is expected to remain higher than pre-pandemic levels in coming years; however, any prediction of the future levels of telecommuting would be speculative in nature. An adjustment to the baseline VMT forecast to reflect the documented share of telework prior to the pandemic would therefore be speculative and is not considered mitigation, and the baseline VMT forecast has not been adjusted to reflect telework. As a result, the Project did not account for any reductions in VMT based on telework.

Impact TR-3 provided on pages 4.17-23 of the DEIR concludes that the Project would not substantially increase hazards due to a geometric design feature. See Response IND 12-4 regarding emergency and evacuation routes.

Response IND 16-2

DEIR Section 4.11, Land Use and Planning, discusses the proposed Project would be developed pursuant to the Development Standards and Regulations for Zone RPD (22.18.060), or as modified, which requires automobile parking in an amount adequate to prevent traffic congestion and excessive on-street parking; provided that in no event shall less than one covered parking space per dwelling unit be provided, or less than 50 percent of the required number of parking spaces for public assembly or recreational uses. The required covered parking for all units would be provided in the garages. All units will have attached two-car garages. The townhomes in Planning Area 3 would have the living area stacked above the unit's 2-car garage on the ground floor and will also provide 63 uncovered guest parking spaces on-site, more than the required 18 guest spaces. Additionally, the 36-foot-wide private driveway and fire lane system in Planning Areas 1, 2, and 5 have sufficient width to provide street parking on both sides of the drives. Note that the adequacy of a project's parking supply is not a CEQA issue.

Response IND 16-3

Comment noted. Executive Summary, and Chapter 2, Project Description, text has been revised to modify the exported soil haul route as follows:

Pages: Executive Summary Page ES 8 and Project Description Page 2-10

…Export materials will be hauled to the closest landfill, which is expected to be the Olinda Landfill in the City of Brea. The haul route is expected to be the SR-60 Freeway East from the Project Site using Colima Road and Fairway Avenue, to the SR-57 Freeway South, and then exiting at ~~Lambert Road~~ Imperial Highway (approximately 12~~0~~ miles away). The final haul route will be reviewed by County DPW, Fire, and Sheriff prior to grading.

Response IND 16-4

See Response FORM 1-2. The golf course was in operation at the time of the public release of both the NOP and the DEIR, and closed in February 2024. The DEIR explains that in the absence of a specific proposal and application for the future use of the remaining portions of the golf course at the time of the release of the NOP, it would be speculative to attempt to predict future uses. See DEIR Section 2.1.2.

Response IND 16-5

Only sensitive regulated biological resources are evaluated for potential significance under CEQA. DEIR Section 4.4, Biological Resources, discusses that a biological resources reconnaissance survey of the Project Site was conducted by Placeworks to assess potential biological resource constraints within the Project Site. This included special-status species, such as plant and animal species either listed as threatened or endangered by state and/or federal wildlife agencies or not listed but potentially regulated, and sensitive and/or regulated habitats, such as wetlands, waterways, and associated habitats potentially subject to USACE, RWQCB, and/or CDFW jurisdiction. Plant species observed were listed by vegetation community. Wildlife species were identified during the field reconnaissance by sight or call, or other evidence of presence such as tracks, nests, scat, or remains, and with use of taxonomic keys where appropriate. This assessment was further confirmed and supplemented with respect to special status species bats by Glenn Lukos Associates. See Responses ORG 6-92 to ORG 6-125 and GLA Supplemental Memorandum dated April 2024 (Appendix O of this FEIR).

Response IND 16-6

Royal Vista Golf Course ponds may have been used previously in fighting fires events, however, the 3 golf course ponds are not a part of the LA County Fire Department official resources used in fighting fires. The Fire Department is aware that the ponds will be removed as part of the Project. Further, the DEIR comment letter dated 12/14/2023 from the County of Los Angeles Fire Department had no comments on the Project.

Response IND 16-7

The DEIR addresses the issues mentioned above related to water demand and availability. Please refer to DEIR Section 4.19 Utilities and Service Systems. Additionally, the Walnut Valley Water District has submitted a will serve letter for both domestic and reclaimed water service for the proposed Project.

Response IND 16-8

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

January 3, 2024

Marie Pavlovic
Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012
MPavlovic@planning.lacounty.gov

Subject: Draft Environmental Impact Report for the Royal Vista Residential and Parks Project (Project No. PRJ2021-002011)

Dear Ms. Pavlovic:

Below are my comments to the draft EIR for the Royal Vista housing development.

1. **Aesthetics**

1.1 All homes will have solar panels. How will the glare from solar panels be minimized to reduce reflection to current homes? Some of the existing homes are on higher elevation and might be in direct line of the glare/reflection.

IND 17-1

1.2 Walking and biking paths are proposed around the perimeter of the project. The EIR does not address the type of lighting to be installed or the height of the light poles. I'm concern with bright lights along walking paths projecting into neighboring private backyards.

IND 17-2

1.3 I'm concerned with bright LED streetlights. A recent development in Upland installed LED lights that emit a brightness resembling daylight, causing confusion among the local bird population. The birds are mistakenly perceiving nighttime as daytime due to this intense illumination, which is disrupting their natural patterns.

IND 17-3

2. **Air Quality**

2.1 I'm concerned with catching Valley Fever. In 2019, a case of Valley Fever surfaced during construction of another housing development near the current proposed site. During construction, hillsides were excavated, dust and other airborne particles circulated throughout the surrounding neighborhood. My neighbor across the street found a mass in her lung and was diagnosed with Valley Fever. She is currently under the care of an infectious disease doctor and is taking antifungal medication for life. There are also concerns of dust from excavation that can trigger asthma attacks and other respiratory diseases such as mucormycosis.

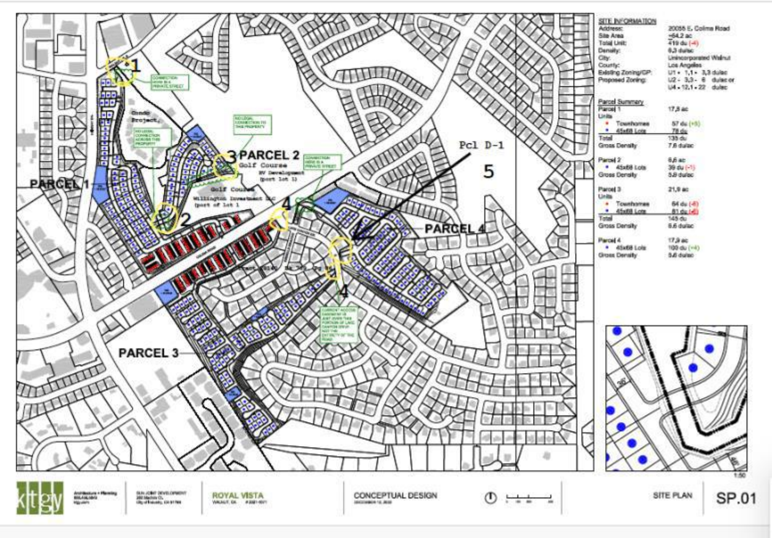
IND 17-4

2.2 Grading of 3.8 million cubic yards of excavation, recompacting and export of soil over one year period, assuming no delays, is excessive. As a result of this volume of grading among sensitive receptors, we are concern with 2.1 above.

IND 17-5

2.3 It is estimated it will take 10,277 haul trucks to grade the site at 40-50 trucks per day. The haul route is on a major and only thoroughfare, Colima Road. There is no mention of traffic control during construction on Colima Road. The other hauling route is on East Walnut Dr. South which is a two lane road. During morning hours, congestion occurs in this area due to the influx of school traffic from nearby Ybarra Elementary School. Hauling route and traffic control during hauling need to be further addressed in the EIR. IND 17-6

2.4 Construction for four years is too long. This is assuming there are no delay in construction. With the Sunjoint development, we could be looking at eight years of construction with an estimated of 22,854 hauling trips on a major thoroughfare. This situation poses a significant challenge for the residents to manage and endure. IND 17-7



The other portion of the golf course has been sold as we recently discovered.
The developer, Sunjoint, is proposing to build 420 homes.

2.5 The golf course is the last sizable open space located adjacent to City of Industry's Good Transit Corridor. It is 157 acres of carbon sink, absorbing carbon from the atmosphere, only a mile from the heavy carbon source of cars burning fossil fuels on the 57/60 Freeways. What is the mitigation for losing acres of carbon sink? IND 17-8

2.6 South Coast Air Quality Management District (SCAQMD) scoping letter recommends a mobile source health risk assessment to disclose potential health risk. Please perform a mobile source health risk assessment as we anticipate numerous construction vehicles grading 3.62 million cubic yards of soil over a one year period. IND 17-9

2.7 Is it possible for developer to set up a fund to provide financial support to upgrade windows and AC unit of surrounding homes? Homes in the area are over 45 years old and many have not upgraded to double pane windows or adequate AC system for proper ventilation. The homes also do not have bathroom ventilation and fans installed, thus relying on open windows for ventilation. Post-pandemic, an increasing IND 17-10 number of residents are working from home, necessitating prolonged stays at their residences. Given this context, expecting residents to refrain from opening windows poses an impractical and burdensome request.

3. Biological Resources

3.1 The Draft EIR fails to mention the presence of bats in the area, despite reports from residents regarding sightings and auditory evidence. Special status bat species observed in the Puente Hills Significant Ecological Area, which is 3.5 miles to the Royal Vista Golf Course, include the pallid bat, pocketed free-tailed bat, big free-tailed bat and the western mastiff bat (roosting sites include palm trees and buildings). IND 17-11

3.2 The golf course is 1.2 miles from the Puente Hills Significant Ecological Area and is an important wildlife corridor. IND 17-12

3.3 The general biological reconnaissance of 75 acres conducted by Placeworks on one day only, July 13, 2020, was in no way complete or thorough. We have photographic evidence of Cooper's Hawk adjacent to Royal Vista, as well as egrets and heron on the golf course. Placeworks also noted only 3 mammal species on Royal Vista, including the ground squirrel, pocket gopher and coyote, whereas there are a number more observed or photographed daily by residents such as the Cooper's Hawk. IND 17-13

3.4 The golf course is situated on top of the Puente Basin Aquifer. Seventy-six acres of rainwater permeate the ground, filtering down to the aquifer. It serves as a watershed to replenish the ground water. The EIR does not address the loss of the watershed to replenish loss of groundwater. IND 17-14

After rain storm in January 2017

3.5 Several blueline streams and two ponds are identified within the confines of the golf course, with the ponds being fed from upstream drainages. The ponds were drained IND 17-15 in October 2022. The delineation report states the two ponds have little water. I have picture, taken after October 2022, with Pond #1retaining water. We often see ducks swimming in the pond.

4. **Geology and Soil**

IND 17-16

4.1 Twenty one homes are in a landslide zone as a result of the Morning Sun landslide in May 1995. There were additional landslides after May 1995. Water was piped above ground on the streets for five years according to one resident. The theory was when Diamond Bar built South Point Middle School, excavation dirt was dump on the blue line streams. The water's inability to find an outlet led to the occurrence of the landslide. EIR does not address in detail how to mitigate the landslide zone once excavation commence.

IND 17-17

4.2 Ground water was found as shallow as 2.5 feet, mapped at East Walnut Dr. South and Bellavista. I'm concern with this area's wet soil located in proximity to the two ponds. Water drains toward this area as this is the lowest point of the course.

5. **Hydrology and Water Quality**

IND 17-18

5.1The other portion of the golf course has been sold to Sunjoint which plans to build an additional 420 homes. Walnut Valley Water District has issued a Will Serve Letter for the 360 homes. However, it did not take into consideration the Sunjoint project as a potential cumulative project. In light of this recent development and as part of the cumulative effect study, Walnut Valley Water District needs to perform a water supply assessment study as mandated by SB 610 for any development over 500 units.

6. **Noise and Vibration**

IND 17-19

6.1 Noise barrier of 10 feet temporary sound barrier does nothing to reduce the dba which is expected to exceed 85. This is an unacceptable threshold. The sound dampening is only effective in the line of sight. The sound barriers are ineffective for homes on higher elevation. 85 dba is much higher than the 60 dba per County code, chapter 12.08.440 for construction zone.[1] Sound absorbing material, such as blankets, should be used to mitigate the 85dba.

IND 17-20

6.2 Vibration of 11,427 hauling trips on Colima Road was not addressed in the EIR. Residents have reported vibrations when trucks travel pass homes on Colima Road.

7. **Population and Housing**

IND 17-21

7.1 These parcels are not part of the 2021-2029 Housing Element inventory to rezone in unincorporated areas to meet state housing mandates. Rowland Heights is already

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[1] https://library.municode.com/ca/los_angeles_county/codes/code_of_ordinances?nodeId=TIT12ENPR_CH12.08NOCO_PT2DE_12.08.080COPR

pulling its weight to meet the housing requirement with over fifty properties with potential to develop housing 2,228 units. This project is not in the scope of the Housing Element and takes away open space in park poor area.

8. Recreation

8.1 *2022 Parks Needs Assessment Plus* includes the golf course as part of its inventory as a public recreational facility. EIR does not address the loss of 42 net acres (75 acres - 35 proposed open space acres) that is being removed from the site inventory. 27% of the community lives within a half a mile of a park, that is far less than the county average of 49%. 33% of the community has a very high or high need of additional park space. The removal of 42 acres of open space exacerbates the existing shortage of recreational areas within the community, resulting in a higher percentage of residents experiencing a significant need for additional park space categorized as very high or high need. IND 17-22

8.2 The EIR does not address the safety of the proposed trails given homeless encampments and lack of any fencing between existing homes and the proposed project. IND 17-23

8.3 Proposed paved trails do not allow water penetration into soil and majority of planned landscapes are not native to California. IND 17-24

9. Transportation

9.1 The traffic study did not include the Sunjoint project as a potential cumulative project. This will increase vehicle counts significantly. Please perform a traffic study to include Sunjoint as a potential cumulative project. IND 17-25

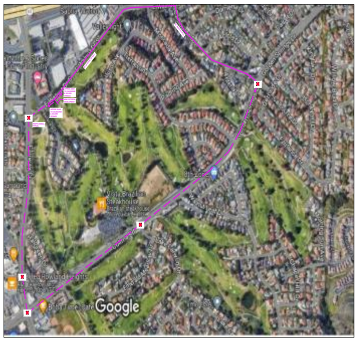
9.2 The traffic report did not address Caltrans request (see Caltrans scoping letter) to include queueing analysis with actual signal timing at Brea Canyon Road/57 FWY, Pathfinder/57 FWY, Lemon Avenue/60 FWY and Fairway Drive/60 FWY. IND 17-26

9.3 The traffic study performed in Nov. 2021 captured a lower traffic volume compared to 2023 as a considerable number of residents were still working remotely from home in 2021. An updated traffic study should be performed to include more current traffic data. IND 17-27

9.4 A traffic light is not proposed at Walnut Leaf Drive and Colima Road. Navigating a left-hand turn from Walnut Leaf unto Colima is dangerous. With additional traffic from the proposed development, level of service is projected to downgrade from D to F per the Traffic Impact Assessment report, page 85. Level of service for Tierra Luna and Colima is projected to downgrade from C to F. These downgrades need to be mitigated. IND 17-28

9.5 Traffic study should be performed from East Walnut Dr. South to Calbourne Dr. and from Calbourne Dr. to Golden Spring Dr. in the City of Diamond Bar. This is an exit route to the City of Diamond Bar and to 60 FWY East bound. The draft EIR has not addressed the additional vehicles on Calbourne Dr., which is a quiet residential street, as a result of this project.

IND 17-29



9.6 Colima and Fairway are collision concertation corridor.[2]

IND 17-30

9.7 Queueing on west bound on ramp at Lemon Ave. and 60 FWY needs to be studied. There is no traffic signal as vehicles cross two lanes of southbound traffic.

IND 17-31

Image: Vehicle attempting to make a left turn while oncoming traffic blocks the westbound 60 FWY entrance at Lemon Ave. When making a left turn, the vehicle must cross 2 lanes of southbound traffic, and visibility is almost completely obscured by vehicles turning left onto the eastbound 60 FWY entrance.

10. <u>Additional Comments</u>

10.1 The no project alternative analysis needs to discuss in detail regarding the feasibility of operating it as a golf course or the sale to another golf course operator.

IND 17-32

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[2] *East San Gabriel Valley Area Plan*, Rowland Heights, page 8-43, https://planning.lacounty.gov/wp-content/uploads/2023/06/ESGVAP_8-9_RH.pdf

10.2 Draft EIR needs to address the possibility of using public funds to acquire the golf course for public open space. Measure A was passed in 2016 to provide funds to preserve and protect parks and open space. The County has since collected approximately over half a billion dollars. During a community listening session, residents expressed a desire for transforming the golf course into a public park. We seek an account of the allocation and utilization of Measure A funds, as no initiative was undertaken by the County to establish the proposed park. Furthermore, we seek a portion the Quimby Act funds be earmarked for acquiring the land.

In 2021, 9.13 acres of the Diamond Bar Golf Course (county owned course) was sold to San Gabriel Valley Council of Governments and the Los Angeles County Metropolitan Transportation Authority for $28.3 millions for the 60/57 Fwy interchange improvement. The October 19, 2021 *Board of Supervisors Statement of Proceeding* states the compensation of $28.3 millions is sufficient for the County to acquire park land of comparable characteristics located in an area to serve generally the same persons as the original park land, plus the costs of developing the substitute park land, including acquiring substitute facilities of the same type and number, in compliance with Public Resources Code Section 5405. The compensation should have been used to purchase the Royal Vista Golf Course. The Diamond Bar Golf Course was only 2.3 miles from Royal Vista. Instead, the $28.3 million was earmarked to build the Puente Hills Regional Park 15 miles from the Diamond Bar Golf Course.

IND 17-33

10.3 The Rowland Height Community General Plan states area designated as open space are intended to remain undeveloped for the life of the plan. This category is designed to protect natural landforms, riparian corridors and primary viewsheds.[3]

IND 17-34

10.4 Declaration of Protective Restrictions dated December 26, 1961 states certain parcels shall be used only for the purpose of a golf course until 2036. We acknowledge the course is on private land; however, the County should not act in a manner inconsistent with property rights of surrounding homeowners.

IND 17-35

This concludes my comments to the DEIR.

Sincerely,

Linda Kuo

Linda Kuo
Rowland Heights Resident

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[3] *Rowland Heights Community General Plan* at: https://case.planning.lacounty.gov/assets/upl/data/pd_rowland-heights.pdf

Response to Comment Letter IND 17

Linda Kuo

Response IND 17-1

See Response FORM 1-6.

Response IND 17-2

See Response FORM 1-7.

Response IND 17-3

See Response FORM 1-8.

Response IND 17-4

See Response FORM 2-6

Response IND 17-5

See Response IND 17-4 and Response FORM 2-7.

Response IND 17-6

See Response FORM 2-7.

Response IND 17-7

See Response FORM 2-8.

Response IND 17-8

See Response FORM 2-9.

Response IND 17-9

See Response FORM 2-9.

Response IND 17-10

This commenter does not raise issues with the DEIR impact analyses. As Hazard and Air Quality impacts are considered less than significant after mitigation (see DEIR Sections 4.3 (Air Quality) and 4.9 (Hazards and Hazardous Materials), no additional mitigation measures are warranted or required.

Response IND 17-11

See Response FORM 3-6.

Response IND 17-12

See Response FORM 1-4.

Response IND 17-13

See Response FORM 3-7.

Response IND 17-14

See Response FORM 1-5.

Response IND 17-15

See Response FORM 3-8.

Response IND 17-16

See Response FORM 4-6.

Response IND 17-17

See Response FORM 3-8 and Response FORM 4-7.

The demolition and construction activities would be temporary in nature and the drainage patterns would be restored to capture all runoff onsite and convey any surface flows to the existing LACFCD storm drain systems. During construction, the previously described SWPPP required by the General Construction Permit would prevent construction site runoff from affecting off-site drainage patterns through the use of BMPs and erosion control measures to be used during construction to prevent erosion and off-site siltation. Compliance with the NPDES Municipal Permits and its MS4 BMP requirements and LID practices, along with County code requirements, would reduce the amount of pollutants in stormwater runoff through the use of BMPs such as managing surface water runoff, on-site infiltration, and connecting to the existing LACFCD stormwater drainage system.

Adherence to the regulatory requirements and regulatory plans would decrease the potential for drainage pattern alteration, polluted runoff, and decrease erosion and sedimentation effects during construction. There are no nearby streams or rivers within the immediate vicinity that would be affected by construction of the proposed Project. The Project's required compliance with the NPDES Municipal Permits and its local MS4 permit development standards, LID practices, and all applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) pertaining to water quality standards would ensure that drainage patterns, erosion or siltation, stormwater drainage systems, or polluted runoff would not be significantly impacted.

Response IND 17-18

See Response FORM 1-10.

Response IND 17-19

DEIR Mitigation Measure NOI-1 includes a noise reduction performance standard but does not limit the methods by which the standard can be achieved. The standard can be achieved using solid walls, blankets, or other similar barriers methods that block noise transmission. Nonetheless, as explained in Section 4.11, Noise, of the DEIR, noise may not be feasibly reduced to below the threshold and thus, the environmental impacts related to the temporary or periodic increase in ambient noise levels during temporary construction of the proposed Project were determined to be significant and unavoidable after implementation of feasible mitigation measures.

Feasible mitigation measures are defined as “capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors” (Pub. Resources Code, § 21061.1, 14 Cal Code Regs., § 15364). Mitigation measures must, “identify the type(s) of potential action(s) that can feasibly achieve that performance standard and that will [be] considered, analyzed, and potentially incorporated in the mitigation measure” and be “roughly proportional” to the impacts of the project (Cal. Code Regs. tit. 14 § 15126.4). The DEIR identifies Mitigation Measure NOI-1 through NOI-4 which meets the criteria of feasible mitigation measures and lessen the impacts disclosed within the DEIR.

Nevertheless, noise barriers are effective in reducing noise when the barrier blocks the line-of-sight from the noise source to the receiver. Construction noise would affect off-site noise-sensitive receptors the greatest when construction occurs near the receptors towards the outer periphery of the Project Site. The noise levels in the DEIR were modeled assuming a number of construction equipment would be in use at the outer periphery of the Project Site. Noise levels would be lower when equipment would be in use within the interior of the Project Site due to distance attenuation. Noise levels would also be lower at noise-sensitive uses beyond the first row of homes or other buildings due to distance attenuation and due to the intervening buildings or structures partially or fully blocking the line-of-sight to the Project Site. DEIR Mitigation Measure NOI-1 requires a minimum height to block the direct line-of-sight. Since the maximum impacted noise-sensitive receptors are located adjacent to the Project Site, it is feasible to block the line-of-sight to those maximum impacted noise-sensitive receptors. Nonetheless, as explained in Section 4.11, Noise, of the DEIR, noise may not be feasibly reduced to below the threshold and thus, the environmental impacts related to the temporary or periodic increase in ambient noise levels during temporary construction of the proposed Project were determined to be significant and unavoidable after implementation of feasible mitigation measures. The commenter does not provide any evidence of feasible mitigation not already incorporated in the DEIR.

Response IND 17-20

According to Federal Transit Administration (FTA), groundborne vibration from trucks rarely create vibration that exceeds 70 VdB unless there are bumps due to frequent potholes in the road. Thus, it is not expected that groundborne vibration from trucks would exceed 0.04 inch/second PPV (equivalent to 80 VdB) for annoyance of occupants in residential buildings. Such vibration levels may be slightly perceptible; however, based on FTA data, it is not expected that groundborne vibration from trucks would exceed thresholds for distinctly or strongly perceptible (0.04 inch/second PPV). On-road haul trucks were appropriately analyzed for noise impacts as discussed in the DEIR on page 4.13-30 and shown in Table 4.13-15 on page 4.13-31. Construction crew commutes and the transport of construction equipment and materials to the site for the proposed Project would incrementally increase noise levels on roads leading to the site. Although there would be a relatively high single-event noise-exposure potential causing intermittent noise nuisance (passing trucks at 50 feet would generate up to a maximum of 87 dBA Lmax), the effect on longer-term (hourly or daily) ambient noise levels would be small. As shown in Table 4.13-15, Off-Site Construction Traffic Noise Impacts – Existing Plus Project Construction, shows when construction traffic is added to the existing traffic volumes on street segments in the Project vicinity, no traffic noise level increases would exceed the 3 dBA threshold considered to be significant. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the Project Site would be less than significant. As discussed therein, impacts were determined to be less than significant. No additional mitigation measures are required and no changes to the environmental impact determinations in the DEIR are required.

Response IND 17-21

See Response FORM 4-8. This commenter does not raise CEQA issues, is noted for the record.

Response IND 17-22

The Department of Parks and Recreation (DPR) Park Obligation Report dated April 17, 2023 (see Appendix L of the DEIR) identified the Project's Quimby park obligation requirement as a 3.52-acre parkland dedication requirement. At the request of DPW, the Project's Quimby requirement will be satisfied by payment of in-lieu fees in the amount of $986,332 which will be used by the DPR to improve existing parks and/or develop additional parkland in the Rowland Heights area. In addition, the Project provides approximately 28 acres of publicly accessible open space onsite that includes a nearly two-mile trail, which exceeds the 3.52-acre parkland dedication requirement indicated in DPR's Park Obligation Report. Payment of the in-lieu fee and provision of the publicly accessible open space on the Project Site will ensure that the Project would meet the additional park and recreation needs created by the Project and expected population increase.

Response IND 17-23

See AG 3-2.

Response IND 17-24

The proposed trails will use existing paved golf course cart paths and will not create any new paved areas. The proposed landscape plant palette includes California native plant species, including but not limited to California Sycamores, Sweet Acacias, California Fescues and Toyon.

Response IND 17-25

The commenter's reference to a "Sunjoint project" appears to refer to adjacent portions of the Royal Vista Golf Club golf course (the "Sunjoint Property"). No general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the Sunjoint Property, nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. See Response FORM 1-2.

For purposes of cumulative analysis, CEQA Guidelines Section 15125(a) requires EIRs to contain a description of the physical environmental conditions in the vicinity of the project as they exist at the time the NOP is published, or if no NOP is published, at the time environmental analysis is commenced. The NOP release date for the Royal Vista Residential Project was

October 13, 2022, which establishes the cut-off date for consideration of cumulative projects. The commenter does not provide any evidence that a project on the Sunjoint Property was proposed, officially announced or otherwise identified prior to the release of the NOP for the Project.

There is no basis for a new traffic study to analyze a speculative project. CEQA does not require analysis of speculative impacts. (CEQA Guidelines section 15145.).

Response IND 17-26

A supplemental analysis was prepared in January 2023 in response to the request for queuing analyses at additional off-ramp locations along the SR-60 and SR-57 Freeways included in Caltrans' letter dated November 21, 2022. The supplemental analysis, "Royal Vista Residential and Parks Project – Supplemental Caltrans Off-Ramp Analysis," prepared by Linscott, Law, and Greenspan, Engineers on January 31, 2023, was inadvertently omitted from the DEIR, however it is provided in FEIR Appendix R. As a result of the supplemental analysis, no safety impacts resulting from off-ramp queuing were identified. Since no new safety impacts are anticipated to occur on the State Highway System due to the addition of project-generated traffic, no mitigation measures are required or proposed.

Response IND 17-27

The traffic data collected in late 2021 was approved by Los Angeles County Public Works for use in the traffic study through approval of the "Royal Vista Residential and Parkis Project – Transportation Impact Analysis Scope of Work" which is provided in Appendix A to the Transportation Impact Analysis (TIA) provided in Appendix M of the DEIR. As stated in the approved scoping document (refer to page A-121 of the TIA), at the time the counts were collected, local public schools (e.g., Rowland Heights Unified School District) were in regular, in-person session, and prior social distancing requirements and capacity limitations issued by Los Angeles County Department of Public Health in response to the COVID-19 pandemic had been lifted.

Response IND 17-28

Geometric design features or incompatible use hazards for vehicle, bicycle and pedestrian safety impacts, a review was conducted for all new driveways or vehicle access points, internal circulation, and parking access from an operational and safety perspective (e.g., turning radii, driveway queuing, line-of-sight for turns into and out of project driveway[s]). Where Project driveways would cross pedestrian facilities or bicycle facilities (bike lanes or bike paths), the analysis considers operational and safety issues related to the potential for vehicle/pedestrian and vehicle/bicycle conflicts and the severity of consequences that could result. As a result, a signal warrant analysis which was prepared for the intersection of Colima Road and Walnut Leaf Drive is described on page 4.17-24 of the DEIR, and on page 15 of the TIA provided in Appendix M of the DEIR. The four signal warrants evaluated for the Walnut Leaf Drive/Colima Road intersection included three warrants based on vehicular volumes and one warrant based on existing collision records. The warrant analysis determined that based on the strict application of the warrant criteria, the warrants were not met for this intersection.

Automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3. See also Response FORM 1-3. Section 4.17 of the DEIR therefore appropriately evaluates Vehicle Miles Traveled (VMT) in lieu of vehicular capacity and congestion in order to determine the significance of transportation impacts. The specific thresholds of significance used to evaluate the potential transportation impacts of the Project are provided on page 4.17-13 of the DEIR.

A "non-CEQA" Operational Analysis was conducted for the proposed Project, beginning on page 64 of the Transportation Impact Analysis (TIA), included in Appendix M of the DEIR, to assess as required by the Los Angeles County Public Works "Transportation Impact Analysis Guidelines" ("Guidelines"). TIA Section 8.3.4 beginning on page 106 of the TIA, discusses that at two-way stop-controlled intersections such as the Project Driveway-Walnut Leave Drive/Colima Road intersection, the LOS associated with the most constrained minor street approach is reported as the overall intersection LOS. The Walnut Leaf Drive approach is expected to operate at LOS F. The proposed project driveway is expected to operate at LOS C or better under all analysis conditions. Project Design Feature (PDF) T-6, which is described on page 4.17-27 of the DEIR, consists of restriping Walnut Leaf Drive in order to provide one southbound departure lane as well as one shared left-through lane and one right-turn lane on the northbound approach. The LOS at the subject intersection with implementation of PDF T-6 is presented in Table 8-2 on page 104 of the TIA. As shown in Table 8-2, the proposed restriping is expected to result in LOS D or better on the Walnut Leaf Drive approach. A conceptual plan of the proposed improvement is provided in Appendix Figure F-4 on page F-337 of the TIA.

The Tierra Luna-Project Driveway/Colima Road intersection was conservatively analyzed as a two-way stop-controlled intersection. PDF T-7 on page 4.17-28 of the DEIR describes the planned relocation of the existing signalized golf cart and pedestrian crossing to the Tierra Luna-Project Driveway/Colima Road intersection in order to provide traffic signal control at the intersection. The LOS at the subject intersection with implementation of PDF T-7 is presented in Table 8-2 on page 104 of the TIA. As shown in Table 8-2, signalization of the Tierra Luna/Colima Road intersection is expected to result in LOS A at this location.

Response IND 17-29

See Response IND-17-28 and Response FORM 1-3 regarding the use of VMT as the metric for determining significant transportation impacts under CEQA. Evaluation of traffic volumes on a subject roadway, including volumes considered "cut-through" traffic, is an evaluation of vehicular capacity, which by statute cannot be considered an environmental impact under CEQA.

Although changes in traffic volume or congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development Projects under CEQA, pursuant to the Los Angeles County Public Works "Transportation Impact Analysis Guidelines" ("TIA Guidelines"), a "non-CEQA" Local Residential Street Cut-Through Analysis was conducted for the proposed project, beginning on page 96 of the "Transportation Impact Analysis" (TIA) included in Appendix M of the DEIR. The TIA's non-CEQA analysis considered traffic on

Calbourne Drive and concluded that no improvements or changes were required based on the "non-CEQA" TIA Guidelines.

The TIA Guidelines state: "The objective of this analysis is to determine potential increases in average daily traffic (ADT) volumes on designated Local Streets near a project that can be classified as cut-through trips generated by the project, and that can adversely affect the character and function of those streets." In the transportation engineering profession, cut-through trips refer to trips which travel along a local residential street and which do not have an origin or destination in the neighborhood in which the local street is located. The Guidelines indicate that cut-through trips may result from development projects that add vehicle trips to congested arterial streets segments, which then results in trip diversion from the arterial roadway to a parallel and reasonably adjacent route utilizing local streets.

The assumed assignment of Project-related trips in the TIA for Planning Areas 1, 2 and 3 are shown on Figures 2-4, 2-5, and 2-6, respectively. As shown in Figures 2-4 and 2-5, Project related trips destined to and from the east via Colima Road/Golden Springs Drive are reasonably assumed to access Colima Road via the Project's on-site roadway network opposite Walnut Leaf Drive, and not utilize Calbourne Drive for travel. It is noted in Figures 2-4 and 2-5 that only 15% of vehicles related to the Planning Areas 1 are forecast to travel to the east via Golden Springs Road. Figure 2-6 shows no forecast Project-related trips traveling to and from the east via Colima Road/Golden Springs Drive because this portion of the Project Site does not have direct access to Colima Road as is the case with Planning Areas 1 and 2. Instead, Figure 2-6 reasonably assumes that vehicles destined to and from the east would utilize SR-60 and Fairway Drive north of SR-60 to reach these destinations. Table 2-2 in the TIA contained in Appendix M of the DEIR provides the vehicular trip generation forecast for the Project. Table 2-2 shows, for example, that Planning Area 3 is forecast to generate 22 outbound vehicle trips in the weekday morning (AM) peak hour and 23 inbound vehicle trips in the weekday afternoon (PM) peak hour. Assuming the commenter is correct and all forecast vehicle trips destined to and from the east (15%) generated by Planning Area 3 were to utilize Calbourne Drive for travel instead of SR-60 and Fairview Drive, it would result in approximately 3 additional outbound trips in the AM peak hour and 3 additional trips during the PM peak hour, or approximately one additional vehicle on Calbourne Drive every 20 minutes during the highest hours of travel during the day (23 vehicle trips x .15=3 trips per hour or 3 trips every 20 minutes). This nominal increase in vehicle traffic would not warrant any changes to the Project or to Calbourne Drive based on the Los Angeles County Public Works Guidelines.

Response IND 17-30

The East San Gabriel Valley Area Plan (ESGVAP) is a proposed local plan, and an extension of the General Plan, and when adopted would supersede the 1981 Rowland Heights Community Plan. The ESGVAP relies on collision concentration corridors information from the County's 2019 Vision Zero Action Plan (Vision Zero). Vision Zero lists collision concentration corridors as located along Colima Road, at the intersections of Nogales Street and Fairway Drive (300 feet east of Nausika Ave to 500 feet east of Brea Canyon Cutoff/ Fairway Dr), Desire Avenue/Greencastle to Otterbein Avenue, and along Batson Avenue (Companario Drive to

Vidora Drive). From 2013-2017, there were five reported fatal and severe injury collisions along Colima Fairway (Brea Canyon Cutoff).

Colima Road provides an approximately 84-foot roadway width and is signed for a 45 mile per hour speed limit in the vicinity of the subject intersection. Both factors require an extensive gap (up to 24 seconds, assuming a pedestrian travel speed of 3.5 feet per second) in traffic along Colima Road in order to accommodate safe pedestrian crossings. Identification of such extensive gaps is hindered by curves in the alignment of Colima Road to the east and west of the subject intersection. In addition, the proposed Project would construct the south leg of the intersection, increasing potential conflicts between pedestrians/bicyclists crossing Colima Road and vehicles turning to and from the minor streets.

While traffic signal warrants were not met at the subject intersection based on strict application of the warrant criteria, it was noted that a fatal collision, involving a motorist and golf cart driver, occurred in 2017 at the existing signalized crossing while the crossing was in use. In recognition of the increase invulnerable roadway users expected at the intersection as a result of the Project and the prior fatality at the existing signalized crossing, the Project includes PDF-7, which relocates the pedestrian signal to the future driveway at the intersection of Tierra Luna/Colima Road. Impact TR-3 provided on pages 4.17-23 of the DEIR concludes that the Project would not substantially increase hazards due to a geometric design feature.

Response IND 17-31

The DEIR reviewed project trip distribution and determined that the Project would not impact SR-60 Freeway westbound on-ramp at Lemon Avenue. The assumed assignment of Project-related trips in the TIA provided in Appendix M of the DEIR during the weekday AM and PM peak hours are presented in TIA Figures 2-4 through 2-7. No Project-related trips are assumed to utilize the SR-60 Freeway westbound on-ramp at Lemon Avenue, which would require vehicles leaving the Project area to travel approximately 0.5-miles eastbound along Colima Rd-Golden Springs Drive prior to accessing the SR-60 Freeway westbound on-ramps. Instead, the TIA reasonably assumed that vehicles would utilize the SR-60 Freeway westbound on-ramps at Fairway Drive, which is located immediately west of the Project Site. As shown in Figures 2-4, 2-5, and 2-7, 10% of vehicles related to Planning Areas 1, 2 and 5 which are destined to and from the east are assumed to travel along Lemon Avenue in order to access Valley Boulevard.

Response IND 17-32

CEQA requires evaluation of the “No Project Alternative,” which analyzes the environmental effects that would occur if the project were not to proceed (State CEQA Guidelines Section 15126.6[e]). The purpose of describing and analyzing the No Project Alternative is to compare the impacts of approving the proposed project with the impacts of not approving the proposed project. An EIR is also required to identify the environmentally superior alternative. “If the environmentally superior alternative is the No Project Alternative, the EIR shall also identify an environmentally superior alternative among the other alternatives” (State CEQA Guidelines Section 15126.6[e]). An EIR needs to describe and evaluate only those alternatives necessary to permit a reasonable choice and “to foster meaningful public participation and informed decision making" (CEQA Guidelines Section 15126.6[f]). Consideration of alternatives focuses on those that can either eliminate significant adverse environmental impacts or substantially reduce them; alternatives considered in this context may include those that are more costly and those that could impede to some degree the attainment of the project objectives (State CEQA Guidelines Section 15126.6[b]). CEQA does not require the alternatives to be evaluated at the same level of detail as the proposed project. Rather, the discussion of alternatives must include sufficient information about each alternative to allow "meaningful evaluation, analysis, and comparison with the proposed project" (State CEQA Guidelines Section 15126.6[d]). The No Project Alternative would not meet any of the Project objectives.

Response IND 17-33

The County's use of Measure A and/or Quimby Act funds is not related to the Proposed Project or this EIR. The commenter's proposal to consider potential use of public funds to acquire the Project Site does not raise CEQA issues. The public park use of the site does not need to be studied as an alternative as it would not meet the Project objectives.

Response IND 17-34

The language referenced in the comment is not applicable to the Project Site. The Rowland Heights Community General Plan includes two different classifications of Open Space for the purpose of undeveloped land and or mineral conservation. It provides that "in order to ensure that development proceeds in an orderly fashion and to encourage production of resources, two classes of Open Space are shown---open space and transitional open space." The "Open Space" class refers to protecting natural landforms, riparian corridors and primary viewsheds. These areas are included in a "Resource Inventory", of approximately 4,500 acres of undeveloped, undisturbed hillsides including the Powder Canyon and Tonner Canyon Significant Ecological Areas (SEA) and the Brea-Olinda oil field area. These are the areas which are "intended to remain undeveloped for the life of the plan". The transitional Open Space class pertains to "the managed production of resources" and only applies to two specific areas in Rowland Heights (an oil field in the southwest portion of the community and a plateau at a major ridgeline in the vicinity of Skyline Drive). The Project Site is not a part of this open space classification. The Project Site is a type of open space characterized by recreational uses, not by natural resources.

Response IND 17-35

See Response ORG 3a-2. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR

From: fina segura <fcsi94@yahoo.com>
Sent: Thursday, January 4, 2024 1:36 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: Royal Vista DEIR

Dear LA County Department of Regional Planning, I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts. IND 18-1

The proposed dense development comprising nearly 400 units (upwards of 800 units including the Sunjoint proposed development on Lake Canyon) poses a significant threat to our community's quality of life. This threat manifests in heightened crime rates within our city, IND 18-2

an influx of at least 2000 additional vehicles clogging our roads and emitting pollutants, IND 18-3

and the irrevocable destruction of the wildlife habitat, including the vital corridor to the Puente Hills SEA conservation area located just 1.2 miles away. IND 18-4

In addition, the current permeable ground filters pollutants, replenishes the Puente Basin Aquifer, and mitigates the urban heat island effect as it cools the surrounding area. IND 18-5

Solar Panel Glare: It is crucial to address potential impacts on residents due to direct glare or reflection. How will the glare from solar panels be minimized to reduce reflection on current homes, especially those situated on higher elevations? IND 18-6

Lighting on Walking and Biking Paths: The DEIR lacks information on the type and height of lighting along proposed walking and biking paths. We are particularly concerned about bright lights projecting into neighboring private backyards. It is essential to address potential impacts on residents' privacy and well-being. IND 18-7

Bright LED Streetlights: Considering the adverse effects observed in a recent Upland development with LED lights too bright at night, we request careful consideration of the choice of LED streetlights. It is vital to avoid disrupting the natural patterns of local bird populations due to intense illumination resembling daytime during nighttime hours. IND 18-8

The Value of Open Space: Open space holds significant importance for our community. It provides essential recreational opportunities, greenery, and tranquility, contributing to residents' well-being and quality of life. Open spaces play a crucial role in rainwater collection, mitigating flooding, and replenishing groundwater. They contribute to climate change mitigation by reducing urban heat islands and providing shade. Trees in open spaces absorb carbon dioxide, aiding in carbon sequestration. IND 18-9

Water: Another section of the golf course is sold to Sunjoint for 420 homes, and Walnut Valley Water District has issued a Will Serve Letter for 360 homes, not considering the Sunjoint project. Given this, a water supply assessment study per SB 610 should be conducted by Walnut Valley Water District for developments exceeding 500 units.The large number of units in the project will accelerate the mandated reduction of water usage up to 50% over the next 10 years, as well as raising our water rates. IND 18-10

Thank you for your attention to these concerns and your commitment to ensuring that the Royal Vista Residential Project aligns with the values and needs of our community. My backyard is the Golf course & this would be DETREMENTAL to my Health as I use my yard daily! I don't want people coming into my private space nor want the Troubles or Health Issue that come with Illegal act! I've seen BATS, COYOTES, OWLS, GHEESE, ETC, MOTHER NATURE & this will Kill off GODS Creation! My Family are the original First owners of this house & in THE DEED is what was agreed to when the house was bought! Politicians being Paid off is Illegal & not what any of us signed up for. This has already affected my health as well as others in this Community with the stress of this all. Please do what is right & LEGAL! IND 18-11

Sincerely,
Fina Segura

Response to Comment Letter IND 18

Fina Segura

Response IND 18-1

Comment noted.

Response IND 18-2

See Response FORM 1-2.

Response IND 18-3

See Response FORM 1-3.

Response IND 18-4

See Response FORM 1-4.

Response IND 18-5

See Response FORM 1-5.

Response IND 18-6

See Response FORM 1-6.

Response IND 18-7

See Response FORM 1-7.

Response IND 18-8

See Response FORM 1-8.

Response IND 18-9

See Response FORM 1-19.

Response IND 18-10

See Response FORM 1-10.

Response IND 18-11

This comment, which concludes the letter, will be available to the decision-makers for their review and consideration as part of the Final EIR

From: chli2006@gmail.com <chli2006@gmail.com>
Sent: Thursday, January 4, 2024 11:05 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

Dear LA County Department of Regional Planning:

IND 19-1

I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts.

IND 19-2

I want to draw your attention to the flawed analyses and conclusions, particularly to the section "Significance Determination after Mitigation" of the impacts in the DEIR.

Flaw # 1: Impact AES-1

How can 360 new residential units sitting on an originally open green spaces dotted with native trees and bushes, with wild lives such as owls, coyotes, skunks, and racoons living there, have not significantly altered the aesthetic aspects of the neighborhood? I looked through the pages to find the rationale and evidence for the determination that the impact will be "less than significant". However, I wasn't able to find any.

Flaw # 2: Impact AIR-1

IND 19-3

How can at least 360*2=720 more vehicles of the new residents, assuming two vehicles per unit, puffing out polluting particles and gases as well as carbon dioxide every day, not counting any other air polluting activities, in an originally empty space have "No impact" or "less than significant" impacts on air quality? What is the quantitative measurement in making such conclusions?

IND 19-4

The following screen shot is an illustration to show how conclusions have been made without sound evidence or rationale. I would like to ask DEIR be thoroughly reviewed for the validity for its conclusions that lack elaboration and / or quantitative analyses. In my opinion, there are a large number of such unsubstantiated conclusions in the DEIR.

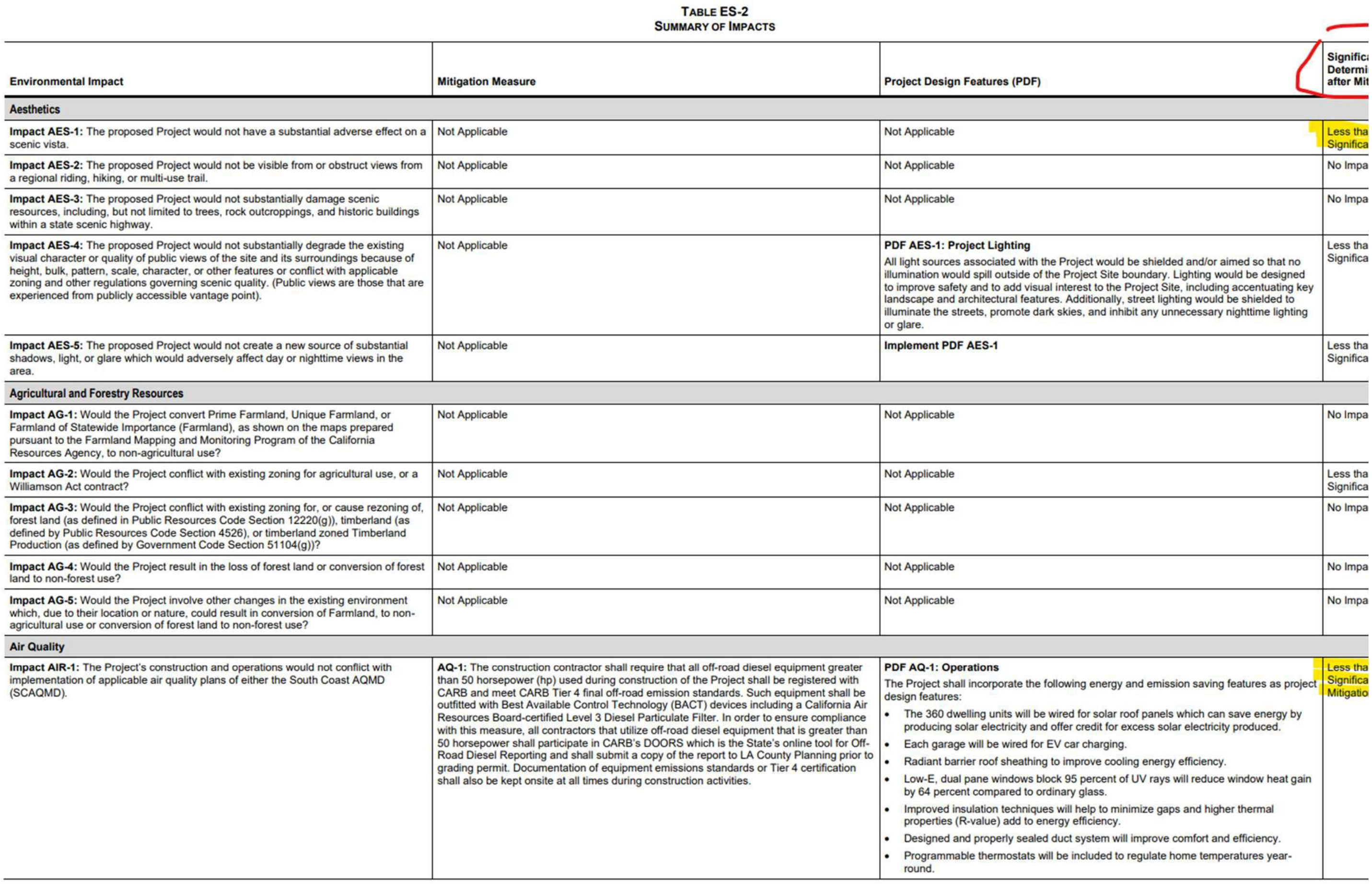


TABLE ES-2
SUMMARY OF IMPACTS

Environmental Impact	Mitigation Measure	Project Design Features (PDF)	Significa Determi after Mit
Aesthetics			
Impact AES-1: The proposed Project would not have a substantial adverse effect on a scenic vista.	Not Applicable	Not Applicable	Less tha Significa
Impact AES-2: The proposed Project would not be visible from or obstruct views from a regional riding, hiking, or multi-use trail.	Not Applicable	Not Applicable	No Impa
Impact AES-3: The proposed Project would not substantially damage scenic resources, including, but not limited to trees, rock outcroppings, and historic buildings within a state scenic highway.	Not Applicable	Not Applicable	No Impa
Impact AES-4: The proposed Project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings because of height, bulk, pattern, scale, character, or other features or conflict with applicable zoning and other regulations governing scenic quality. (Public views are those that are experienced from publicly accessible vantage point).	Not Applicable	**PDF AES-1: Project Lighting** All light sources associated with the Project would be shielded and/or aimed so that no illumination would spill outside of the Project Site boundary. Lighting would be designed to improve safety and to add visual interest to the Project Site, including accentuating key landscape and architectural features. Additionally, street lighting would be shielded to illuminate the streets, promote dark skies, and inhibit any unnecessary nighttime lighting or glare.	Less tha Significa
Impact AES-5: The proposed Project would not create a new source of substantial shadows, light, or glare which would adversely affect day or nighttime views in the area.	Not Applicable	**Implement PDF AES-1**	Less tha Significa
Agricultural and Forestry Resources			
Impact AG-1: Would the Project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	Not Applicable	Not Applicable	No Impa
Impact AG-2: Would the Project conflict with existing zoning for agricultural use, or a Williamson Act contract?	Not Applicable	Not Applicable	Less tha Significa
Impact AG-3: Would the Project conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code Section 12220(g)), timberland (as defined by Public Resources Code Section 4526), or timberland zoned Timberland Production (as defined by Government Code Section 51104(g))?	Not Applicable	Not Applicable	No Impa
Impact AG-4: Would the Project result in the loss of forest land or conversion of forest land to non-forest use?	Not Applicable	Not Applicable	No Impa
Impact AG-5: Would the Project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	Not Applicable	Not Applicable	No Impa
Air Quality			
Impact AIR-1: The Project's construction and operations would not conflict with implementation of applicable air quality plans of either the South Coast AQMD (SCAQMD).	**AQ-1:** The construction contractor shall require that all off-road diesel equipment greater than 50 horsepower (hp) used during construction of the Project shall be registered with CARB and meet CARB Tier 4 final off-road emission standards. Such equipment shall be outfitted with Best Available Control Technology (BACT) devices including a California Air Resources Board-certified Level 3 Diesel Particulate Filter. In order to ensure compliance with this measure, all contractors that utilize off-road diesel equipment that is greater than 50 horsepower shall participate in CARB's DOORS which is the State's online tool for Off-Road Diesel Reporting and shall submit a copy of the report to LA County Planning prior to grading permit. Documentation of equipment emissions standards or Tier 4 certification shall also be kept onsite at all times during construction activities.	**PDF AQ-1: Operations** The Project shall incorporate the following energy and emission saving features as project design features: • The 360 dwelling units will be wired for solar roof panels which can save energy by producing solar electricity and offer credit for excess solar electricity produced. • Each garage will be wired for EV car charging. • Radiant barrier roof sheathing to improve cooling energy efficiency. • Low-E, dual pane windows block 95 percent of UV rays will reduce window heat gain by 64 percent compared to ordinary glass. • Improved insulation techniques will help to minimize gaps and higher thermal properties (R-value) add to energy efficiency. • Designed and properly sealed duct system will improve comfort and efficiency. • Programmable thermostats will be included to regulate home temperatures year-round.	Less tha Significa Mitigatio

IND
19-4
Cont.

Best,
Charles Li
20527 Lake Canyon Drive
Walnut, CA 91789

Response to Comment Letter IND 19

Charles Li

Response IND 19-1

Comment noted.

Response IND 19-2

Section 4.1 Aesthetics subsection 4.1.4 Methodology on page 4.1-17, explains the methodology used to determine the potential aesthetic impacts associated with the Project. The Project would result in a change in the existing visual environment because it would redevelop an existing (and recently closed) golf course with residential and open space uses. However, because the Project site is surrounded by development, most of which is residential, the Project would not substantially change the existing developed character of the area and would be similar to the surrounding existing aesthetic conditions. The DEIR determined that there are no significant impacts associated with Aesthetics.

Response IND 19-3

Section 4.3 Air Quality subsection 4.3.4 Methodology on page 4.3-40, explains the methodology used to determine the potential air quality impacts associated with operational emission, including vehicle trips, with the Project. The Project's operational emission impacts were calculated by subtracting the existing emissions of the current uses. The maximum daily emissions from operation of the Project are compared to the SCAQMD daily regional numeric indicators shown in Table 4.3-6. Detailed assumptions used in this analysis are included with the CalEEMod printout sheets in Appendix B of this Draft EIR. The DEIR determined that there are no significant impacts associated with operational impacts of the Project.

Response IND 19-4

The commenter highlighted the column in Table ES-2 of the DEIR Executive Summary which states the impact conclusion after mitigation for each impact category studied. Each environmental topic in the EIR was evaluated in accordance with CEQA guidelines Sections 15120 through 15132. The commenter does not identify a specific issue regarding the DEIR's analysis or conclusions.

The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 8:50 AM
To: Kevin Smith
Subject: FW: DEIR comment on Royal Vista #PRJ2021-002011

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov

Our field offices are currently open to the public. Please visit planning.lacounty.gov for information about available services, public meeting schedules, and planning projects.

From: marianna breton <marianna2pep@yahoo.com>
Sent: Thursday, January 4, 2024 7:02 PM
To: Serrano, Ryan <RSerrano@bos.lacounty.gov>; Amy Bodek <ABodek@planning.lacounty.gov>; wrehman@bos.lacounty.gov; Moreno, Andrea <amoreno@bos.lacounty.gov>; Chen, Cindy <cchen@bos.lacounty.gov>; Marie Pavlovic <mpavlovic@planning.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: DEIR comment on Royal Vista #PRJ2021-002011

CAUTION: External Email. Proceed Responsibly.

I am a resident of East San Gabriel Valley for over 30 years and have commented on this project last year which is slated to encompass the current Royal Vista Golf Course which was owned by L.A. County for years.
The housing project proposed will add over 800 dwelling units to the parcel when the Lake Canyon Sunjoint Development is included in the count. I vehemently object to a developer destroying the last open space area that we have here in the Walnut/Rowland Hts/ Diamond Bar area outside of municipal parks many required of developers when they developed the area in the building boom of the late 80's early 90's. IND 20-1

The Royal Vista Golf Course is a vast, green expanse of rolling lawns and open space, long enjoyed by residents who golf and those who do not. I would frequent the club house restaurant there on weekend mornings with my Father when he was still alive. After eating we would sit on a concrete bench and enjoy the beauty of the facility, relishing the sunshine, the birds and the green expanse. We would talk and enjoy the morning. IND 20-2

The proposed development will bring more disruption to our region as an enormous transportation corridor at Grand Crossing is currently being enlarged at the corner of Grand Ave and Golden Springs Rd, less than 2 miles from Royal Vista. Many many old growth trees have been uprooted and bulldozed in order to widen the highway to accommodate the tractor trailer rigs that will enter and exit the 60 freeway taking inventory to the distribution warehouses lining Grand Ave, Valley Blvd and Industry Way. This project at Grand Crossing has been going on for 2-3 years now, during the pandemic and has snarled our streets with road closures, K rails, heavy earth moving equipment and it continues to this day as the widening of the freeway onramps/offramps and sidewalk modification is not finished.

The particulate matter, noise, traffic, travel delays, environmental destruction with the loss of so many trees, it has all been devastating for us residents residing in the Colima/60 corridor. One can view the devastation by just driving east on the 60 freeway and looking south as you approach and then pass the Grand Ave offramp. You will see the violated land, the uprooted trees and shrubs and the exposed soil and you will gasp. The thick canopy of old growth trees are gone, removed recently in 2022-2023. These trees created a sound barrier that buffered the roar of the 60 freeway. The sound barrier is gone leaving only a deafening roar of fast moving vehicles. The current project will plant seedling, little trees that will mature once I am no longer alive, decades from now.

IND 20-3

The wildlife corridor at Puente Hills SEA is only 1.2 miles from the proposed development at Royal Vista Golf Course and will be negatively impacted by such an expansive project that will bring a number of vehicles and people that our ecosystem cannot handle. There are 2 ponds at Royal Vista being fed by underground streams that provide respite for native fowl and wildlife. The Draft EIR overlooks this fact. We were ordered to save water in 2022 due to severe drought and destructive fires yet how can water conservation mandates be achieved with the planned addition of 800 residences? This enormous, destructive project does not belong here.

Thank you for the opportunity to express my concerns.
Sincerely,

M. Breton
P.O. Box 5619
Diamond Bar, Ca 91765

IND 20-4

Response to Comment Letter IND 20

M. Breton

Response IND 20-1

The Royal Vista Golf Club has always been under private ownership and was never owned by Los Angeles County as stated by the commenter. The Project proposes a total of 360 residential units. The Project does not propose 800 dwelling units and does not include development on any portion of the adjacent portions of the Royal Vista Golf Course referred to as the "Lake Canyon Sunjoint Development" (Sunjoint Property). In addition, no general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the Sunjoint Property, nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. See Response FORM 1-2. According to the Rowland Heights Community General Plan (RHCGP) (page 15), "There are approximately 4,500 acres of undeveloped land in Rowland Heights." The Project Site, which was developed in 1961, is not a part of the 4,500 acres mentioned in the RHCGP document.

Response IND 20-2

Comment noted. The clubhouse restaurant mentioned is not located on the Project Site and is not a part of the proposed Project.

Response IND 20-3

The Project is not associated with the "Grand Crossing" project mentioned above. The proposed Project will remove 367 of the existing 411 trees and will plant 1,820 new trees with the total number of trees being 1,864. This is 4 times the number of existing trees.

Response IND 20-4

The proposed Project is an infill development on a portion of an existing golf course and consists of a total of 360 residences, not 800 residences. See Response FORM 1-2. The Project Site is not considered suitable habitat for protected wildlife species (see DEIR Section 4.4, Biological Resources). Further, the Project Site does not connect or provide a corridor for wildlife to the Puente Hills SEA. The Site is surrounded by existing residential and commercial uses. No open space or wildlife corridor exists between the Project Site and the SEA. The 2 ponds mentioned above are not fed by underground streams. The ponds are filled with groundwater pumped from the Puente Subbasin. A water will serve letter has been provided by the Walnut Valley Water District which has the capacity to provide domestic and reclaimed water to the proposed Project.

The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 8:50 AM
To: Kevin Smith
Subject: FW: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov

From: Naveen Reddy <ndreddy2@gmail.com>
Sent: Thursday, January 4, 2024 5:42 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

Good evening Marie Pavlovic
I am writing to provide input on the Draft Environmental Impact Report (DEIR) concerning the proposed Royal Vista Residential Project No. PRJ2021-002011. I am a concerned resident and I oppose the development of this new choosing project on Royal Vista Golf Course. And want to keep our opens spaces for the following reasons:
Development will increase **traffic, noise, crime, pollution** (greenhouse gasses) and overuse area resources including water. IND 21-1

- According to the LA County Fire Department, communities need open spaces to serve as a fire break, and evacuation point. The lakes on Royal Vista are used as a source of water for air tankers to fight our **increasingly frequent fires due to drought**. IND 21-2

- **3+ years of construction noise and moving 1,000 olympic swimming pools of earth is significant, causing fugitive dust, increasing airborne fungal spores which can cause valley fever & harm the health of the community**, especially individuals with an impaired immune system, and respiratory or heart conditions. IND 21-3

- **Royal Vista is the last sizable green-space in the community**, and development will destroy the wildlife habitat and corridor to the **Puente Hills Significant Ecological Area** (SEA) IND 21-4

Development will contribute to the climate crisis, with multi-level dense housing and road paving, which will **limit ground permeability for rain water**, and further **deplete the water table**
As a concerned community member, I value the chance to convey our perspectives on the project and its potential consequences. The proposed high-density development, (reaching 800 units with the inclusion of the Sunjoint development on Lake Canyon), poses a considerable threat to our community's welfare. IND 21-5

This threat is evident in the expected increase in crime rates, the introduction of at least 2,000 vehicles causing traffic congestion and emitting pollutants, and the irreversible harm to our wildlife habitat. This habitat, a critical corridor to the Puente Hills SEA conservation area just 1.2 miles away, is in jeopardy. IND 21-6

Additionally, the current permeable ground serves a crucial role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. IND 21-7

Several homes, totaling twenty-one, are situated in a landslide zone resulting from the Morning Sun landslide in May 1995, with subsequent incidents. One resident notes above-ground water piping on streets for five years. The theory suggests that the construction of South Point Middle School led to landslides due to dumped excavation dirt obstructing blue line streams. The EIR lacks detailed mitigation plans for the landslide zone during excavation. IND 21-8

Concerns arise from groundwater found as shallow as 2.5 feet near East Walnut Dr. South and Bellavista, especially given its proximity to two ponds. This area's wet soil poses risks as water drains towards it due to its low elevation. IND 21-9

In terms of Population and Housing, the mentioned parcels are not part of the 2021-2029 Housing Element inventory for rezoning in unincorporated areas to meet state housing mandates. Rowland Heights is already contributing to housing requirements with over fifty properties potentially developing 2,228 units. This project falls outside the scope of the Housing Element, impacting park-poor areas by reducing open space. Thank you for your attention to these concerns and your commitment to ensuring that the proposed Royal Vista Residential Project aligns with the values and needs of our IND 21-10

Sincerely
Concerned resident on Starshine Rd, Walnut.

Response to Comment Letter IND 21

Naveen Reddy

Response IND 21-1

Please refer to DEIR Section 4.13 for information regarding Noise and mitigation measures proposed; DEIR Section 4.17 for information regarding Transportation and mitigation measures proposed; and DEIR Section 4.8 for information regarding Greenhouse Gas Emissions and mitigation measures proposed. Further, the Project would be required to comply with The CALGreen Code which has been updated in 2022 to include new mandatory measures for residential and nonresidential uses including energy efficiency, water conservation, material conservation, planning and design, and overall environmental quality.

Response IND 21-2

The Project is an infill development that proposes construction of a new internal private driveway system. These private drives and fire lanes would be required to be constructed in accordance with LA County DPW's Private Drives and Traffic Calming Manual. The Project also includes curbs and gutters, sidewalks, fire hydrants, streetlights, landscaping, irrigation and landscaping and open space buffers. The ponds on the golf course are not used as a planned source of water for firefighting by air.

Response IND 21-3

Section 4.13, Noise, discusses that the noise impacts were evaluated by determining the noise levels generated by the different types of on-site construction activity at the Project Site that could be operating simultaneously, calculating the construction-related noise levels at the six identified nearby sensitive receptor locations (R1 through R6, shown on DEIR Figure 4.13-2), and comparing these construction-related noise levels to existing ambient noise levels (i.e., noise levels without construction noise). Mitigation Measures have also been incorporated into the Project to reduce temporary construction noise impact; however, construction noise impacts remain significant and unavoidable. See Response FORM 2-6 regarding impacts associated with grading and Valley Fever.

Response IND 21-4

The Project Site is not greenfield (natural open space or undeveloped) and is not regarded as the last sizable green space in the community. According to the Rowland Heights Community General Plan (RHCGP) (page 15), "There are approximately 4,500 acres of undeveloped land in Rowland Heights". The Project Site, which was developed in 1961, is not a part of the 4,500 acres mentioned in the RHCGP document. See Response IND 17-34. Regarding the statement regarding wildlife corridor, see Response FORM 2-4.

Response IND 21-5

The proposed Project proposes 360 units on 75.65 acres, with an overall density of 4.75 units per acre, including 37 percent (28 acres) open space. The density of 4.75 is very close to the density of the surrounding neighborhoods of 4.64 units per acre.

The Project proposes a total of 360 residential units. The Project does not propose 800 dwelling units and does not include development on any portion of the adjacent portions of the Royal Vista Golf Course referred to as the “Sunjoint development on Lake Canyon” (Sunjoint Property). In addition, no general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the Sunjoint Property, nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. See Response FORM 1-2.

The existing Project Site actually depletes water from the San Gabriel Valley Groundwater Basin in order to irrigate the existing golf course. Once the Project is developed, groundwater from the basin will no longer be used to irrigate this portion of the golf course. Per the DEIR Appendix J - Hydrology Report, the Project Site is not a candidate for infiltration or permeation of rainwater.

Response IND 21-6

See Response FORM 2-2 with respect to the comment regarding crime rates, Response FORM 2-3 with respect to the comment regarding vehicle congestion, Response FORM 1-3 with respect to the comment regarding emitting pollutants and Response FORM 2-4 with respect to the comment regarding the Puente Hills SEA.

Response IND 21-7

See Response FORM 1-5.

Response IND 21-8

See Response FORM 4-6.

Response IND 21-9

See Response FORM 4-7.

Response IND 21-10

See Response FORM 4-8. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Shelley Gentry
1223 Calbourne Drive, Walnut CA 91789
Email: ShelleyG5@msn.com

January 4, 2023

Ms. Marie Pavlovic
Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

MPavlovic@planning.lacounty.gov

RE: Draft Environmental Impact Report ("DEIR"), Royal Vista Residential and Parks Project ("RVRPP")
Project No. PRJ2021-0020211

Dear Ms. Pavlovic,

As a resident of the city of Diamond Bar for the past 23 years whose property shares a property line with the Royal Vista Golf Course, I am writing to you to address concerns over the RVRPP DEIR issued in late October 2023. IND 22-1

First, I would like to point out that the County of Los Angeles elected officials have done a woeful job of representing the interests of the people who put them in office. The DEIR was issued in the middle of the year-end holiday season when many of the area residents are either out of town, the country, or otherwise occupied with holiday commitments. The DEIR is more than 1,000 pages long if you include the various appendices and giving such a short time to respond to the volume of material disenfranchises many by not allowing adequate time to read, review and respond.

There are many inaccuracies, assumptions and downright untrue statements contained in the DEIR that I would like to respond to, but given the time constraints, I will cover just what I see as the most egregious items, but this should not be misconstrued to mean I have no further disagreement or comments with the DEIR, as it is a poorly written and wholly inadequate document on many fronts.

1. **Growth Inducement Potential:**

On page 6-4 of the DEIR, the last paragraph, read as follows:

> *"The remaining properties of the Royal Vista Golf Club are not part of the Project and are **expected to retain the existing 14 holes and the clubhouse on 8 separate parcels**, both north and south of Colima Road, and comprising about 80 acres. Like the proposed Project, these properties are designated as Open Space for land use and zoned A-1-1, and A-1-10,000, with the clubhouse property zoned as C-R-DP, Commercial Recreation, Planned Development. The C-R zoning limits the permitted uses primarily to amusement parks, campgrounds, tennis courts, and golf courses. Golf course uses could continue operation with the 14 holes, or this property could be redesigned as an executive 9-hole golf course. These properties are not owned or controlled by the Project Applicant, and it would be speculative to attempt to predict the future use of these properties beyond their current use. There is no current application pending before the County for any change of use on the Royal Vista Golf Club properties not included in the proposed Project."*

IND 22-2

Here we find the first of several "Liar, Liar, Pants of Fire" moments. RVRPP is well aware that in March 2023, 4 of the remaining 8 golf course parcels were sold to Sunjoint, LLC ("Sunjoint"), a development company specializing in residential development. Sunjoint has had contact with several county agencies, posted proposed plans to develop 419 homes on said recently purchased parcels, and uses the exact same architecture and planning company, KTGY. Sunjoint's various current project renderings are identical to the Royal Vista Project renderings.

Supporting documentation is attached hereto as Exhibit A and incorporated herewith. IND 22-3

During the December 13 community meeting, Jon Conk admitted he was "aware" of the proposed project, but assured the community members that since Sunjoint has not submitted an official application to Los Angeles County, they were not obligated to include that in the cumulative effect analysis. However, not filing an official application at this time is not a requirement for inclusion in said analysis. The criteria for inclusion in the analysis is that the project be reasonably foreseeable, criteria which the Sunjoint project certainly meets.

IND 22-4

The DEIR tries to substantiate its reasoning for not including Sunjoint can be found in the first paragraph of page 6-5:

" Development of these properties would require a General Plan amendment or a zone change, or both, depending on the proposed use. Such application would require a legislative decision by the Board of Supervisors, providing the County with discretion for any land use change to residential or commercial uses. Any change of use of the C-R-DP zoned clubhouse property would also need a discretionary conditional use permit approval. Consequently, there is no known growth inducing action for the remaining golf course parcels that would result from the approval of the proposed Project, as such determination would be speculative, and development of the Project would not materially increase the likelihood or capacity of potential redevelopment of the remainder of the Royal Vista Golf Club."

This statement is utterly hypocritical when you consider that RVRPP itself has not yet been granted a "General Plan amendment or a zone change..." nor has there been "a legislative decision by the Board of Supervisors, providing the County with discretion for any land use change to residential or commercial uses..." for RVRPP.

In fact, it's quite possible that RVRPP is even in a more perilous predicament than Sunjoint, as the RVRPP project is proposing to build on parcels of land that are deed restricted and are to remain a golf course until 2036. Should Los Angeles County approve RVRPP's proposal, landowners that abut to the deed restricted parcels are ready to file a lawsuit to protect their rights.

IND 22-5

It's obvious that RVRPP is attempting to circumvent the system by deceptively excluding what it already knows regarding Sunjoint. Is RVRPP afraid that when including Sunjoint in the cumulative effect analysis it will have a negative impact on their proposal or may require additional mitigation they would rather avoid?

The cumulative effect analysis should be added and newly updated in the Final Environmental Impact Report.

2. <u>**Cut Through Traffic on Calbourne Drive**</u>: Raised in earlier NOP correspondence, the DEIR has failed to analyze the impact of cut through traffic from East Walnut Drive coming up and down Calbourne Drive to access Golden Springs Dr. (which is known as Colima Rd. in Rowland Heights). While not directly addressed in the DEIR, the following information was buried in Appendix M – 7.0 LOCAL RESIDENTIAL STREET CUT-THROUGH ANALYSIS, last paragraph on page 96, and continuing on the following page:

IND 22-6

"Local residential streets are located north of Colima Road and east of the project site. This existing residential neighborhood is generally bounded by the SR-60 Freeway corridor to the north, Colima. Road to the south, and the existing Royal Vista Golf Course to the west (refer to Figure 2-2). No new project-generated trips are anticipated to travel through the residential neighborhood to the east of the project site (e.g., no project trips are assumed to travel on Calbourne Drive), as the project will have direct access to and from Colima Road. The limited crossing opportunities across the SR-60 Freeway corridor, as well as the neighborhood's limited connectivity to the surrounding roadway network, do not provide an attractive viable alternative route for motorists traveling in either the east-west or north-south directions. Additionally, local residential streets are also located south of Colima Road south of the project site. The limited connectivity of the existing neighborhood to the south does not provide an attractive viable alternative route for motorists traveling along Brea Canyon Cutoff Road or Colima Road."

So, it appears that, without evidence or a of study of any kind, the authors of the DEIR determined that someone exiting the proposed condo complex driveways on East Walnut Dr., who want to travel east onto Colima/Golden Springs Road, will:

opt to turn left, going west in the opposite direction, then turn left onto "Street A" and traverse the new build neighborhood (having to possibly stop at several stop signs), exit the complex at the traffic light of Street A and Colima Rd, travel east on the very busy and crowded Colima Road, possibly have to stop at the proposed stop sign located at Tierra Luna and Colima, and then proceed to the next light located at Golden Springs Rd and Calbourne Drive;

Rather than taking the much shorter and direct path by:

Turn right (east) on East Walnut Drive, turn right onto to Calboune Drive and drive up the street to the traffic light at Calbourne Drive and Golden Springs.

Please see the attached map, incorporated herewith as Exhibit B. IND 22-7

The "analysis" set forth in Appendix M is absurd. No one with any common sense is going to take a path that takes you in the wrong direction, is almost twice as far and will take double the time instead of taking the shorter, less traveled, and more direct route to arrive at the same point, which will obviously cause cut-through traffic on Calbourne Drive.

After reading the Appendix, I made an effort to speak to my neighbors who have homes located at Harvard Estates (Bellavista Dr.) which is located off of East Walnut Drive and east of the proposed driveways for the condo complex. Havard Estates is just feet away from Fairway Drive, which is farther west of Calbourne Drive than the proposed condo complex driveways. Out of the approximately 22 homes located there, I was able to make contact with 12 homeowners. Each homeowner I spoke to confirmed that, when wanting to travel east onto Colima/Golden Springs Dr. they turn right (east) down East Walnut Drive and right again to go turn up Calbourne and out to Golden Springs. One travels it every workday up and back upon returning home, while others use it when going into Walnut or Diamond Bar for shopping, two to three times a week. In particular going to Target at Golden Springs Rd. and Grand Ave., as well as shopping trips/restaurant and fast-food purchases from the shopping center located at Valley and Grand were repeatedly mentioned. After conversations with the Harvard Estates neighbors, it appears these trips are not just relegated to rush hour traffic, but are an ongoing and continuing occurrence, including weekends.

If every condo has 2 cars (72 x 2) and each car traveled through Calbourne between 2 to 3 times a week (which is a modest estimate), that makes for 288 to 432 trips of cut through traffic, one way. That figure does not include a return trip. Aside from the 72 condos, when looking at the map, I believe it's possible some of the houses (34 of them), in the section IND 22-8 closest to East Walnut Drive and located on Street A, are also candidates for using Calbourne to cut through traffic.

I'd also like to point out that Jon Conk, who has the responsibility of presenting the project to the community, was asked at a December 13th meeting that was recorded and held at the golf course club house, how it was determined that the project would not generate a single trip of cut through traffic on Calbourne Drive. Mr. Conk responded that that was **NOT** the determination and that he's exited the golf course property numerous times himself that way and that there "are various exits when headed east on East Walnut Drive". While he is wrong about "various exits", which was also pointed out in the meeting, not only does this statement conflict with the DEIR, I find it ironic that he, himself has cut through Calbourne Drive to get to Golden Springs Drive. IND 22-9

Appendix M also included this information:

Appendix M – 2.4.1 Vehicular Site Access – 3rd paragraph, page 13

"• East Walnut Drive South Driveways (Planning Area 3)
Two (2) driveways along East Walnut Drive South will provide access to Planning Area 3.
The driveways will be constructed at the easterly and westerly ends of the parcel, and each are expected to accommodate full access (i.e., left- and right-turning inbound and outbound movements)."

If it is true that this project will create no cut through traffic on Calbourne Drive, why do they anticipate the need for right turns when exiting the driveways or left turns when turning into the driveway? Once you turn right from the proposed driveways to exit, you're going to have to cut through Calbourne Drive to exit the track. If you are traveling West on East Walnut Drive and looking to enter the condo complex driveways, the odds are you got on East Walnut Drive by coming down Calbourne Drive. IND 22-10

As a side note, it is important to note that the City of Industry owns a strip of land between the end of Calbourne Drive and the 60 freeway, which they have also expressed interest in developing. If they decide to do so, this will also put even more strain on Calbourne Drive. IND 22-11

Calbourne Drive was not designed, nor is it capable of handling this kind of traffic. This is a narrow residential street and not a busy thoroughfare, which is what is being contemplated here. Houses built on busy streets suffer from the following disadvantages: IND 22-12

(a) It creates noise. We are already very close to the 60 freeway, which is quite noisy, residents do not need any more noise on their street.
(b) Cars zipping up and down the street all day and night will create a lack of privacy.
(c) There is more dust and pollution, and with Calbourne Drive adjacent to and within several yards of the notoriously overcrowded 60 freeway, the addition of more traffic will create an even more unhealthy environment than already exists.
(d) It hurts resale value. No one wants to live on a busy street, and it is the single most common reason for homeowners needing to discount their selling price.

If this project aspect is approved, who is going to compensate homeowners for the above-mentioned disadvantages that are sure to result? No homeowner on Calbourne Drive should suffer with more noise, lack of privacy, more pollution and loss of home resell value IND 22-13 so the developer can make a buck on the cheap. If this issue is approved without resolution in a manner that protects and preserves the health of the residents and value of homes on Calbourne Drive, let no one be surprised when homeowners band together and proceed with litigation against all parties involved with such an approval.

Lastly, and most importantly, Calbourne Drive is a street located in the city of Daimond Bar and is not part of the Los Angeles County unincorporated area commonly known as Rowland Heights. Do the Los Angeles County Planning Commission/County Supervisors have the authority to unilaterally approve this aspect of the project without the consent of the City of Diamond Bar, who will ultimately have to deal with the cut through traffic and problems it will cause? Why should Diamond Bar residents shoulder the wear and tear expenses this project will bring to the city's roadway? There are other alternatives that can be taken, inside Rowland Heights, which could help avoid cut-through traffic into Diamond Bar's residential street. The developer needs to find better exit and entrance strategy solutions, such as removing at least one of the condo complex driveways on East Walnut Drive and extending Tierra Luna to connect with the condo complex so it can be used as a more direct exit to Colima.

IND 22-14

I look forward to seeing this issue finally addressed, as it should have been in the DEIR in the Final Environmental Impact Report, rather than being ignored by way of inaccurate assumptions that are buried within the pages of an appendix.

IND 22-15

3. **Area 4, Open Space:**

Overall safety and security for the homes that back to the Royal Vista golf course, along with the lack of protective fencing for homes surrounding the proposed open space has been brought to the attention of both RVRPP and the County of Los Angeles Board of Supervisors ad nauseum during the NOP comment period by numerous people, yet was left totally unaddressed in the DEIR.

As pointed out numerous times, houses in the city of Diamond Bar that share a property line with the Royal Vista golf course were built in the early 60's and 70's and designed in a way to enhance the view of the property's backyard and golf course view. Fences are built with non-obstructive chain link or other materials. The homes have large windows and sliding doors that also face the backyard and feature the golf course view. This description fits my own home, and most of my neighbors' homes.

See the attached Exhibit C for a picture of my current backyard fencing.

To date, living behind the golf course has not been a safety issue for me, as the golf course is private property and people who choose to golf at Royal Vista are often required to provide identification, such as a driver's license to make reservations and/or rent golf carts. The golf course is also monitored by "golf referees", and golfers are subjected to observation while on the course, and the course is completely closed and secured at dusk every night.

The proposed "Open Space" in area 4 represents a completely different scenario. Leaving my backyard in full view of the general public is not only a violation of my privacy, but also a threat to my property and personal safety.

IND 22-16

In the last few years this proposal has been working its way through the system, I have asked how RVRPP plans to address this issue, and each time Jon Conk has responded in a flippant manner, stating, "You already have a fence."

This is not an acceptable response. What Park does not provide protective fencing between it and homeowners that back up to the park? Please let me know the name of a single park in Rowland Heights or Diamond Bar area that does this?

On page 185 of the DEIR, the Los Angeles Sheriff Department reinforces my concerns by stating the following:

"The Station is currently understaffed. However, assigning additional personnel to the Station to meet an acceptable service ratio will exacerbate the current shortage of space and supporting equipment…" and further stated "No expansion or new facilities are proposed at this time."

IND 22-17

The Sheriff also stated the following:

"The proposed Project will increase employees and daytime population of the Station's service area, which will generate an increased demand for law enforcement services. The Station expects the EIR to quantify the population increases, describe potential impacts to our resources and operations, and identify measures that will mitigate these impacts to a level of insignificance…"

The DEIR fails to provide the Sheriff Department with any information regarding concerns from homeowners that will impact law enforcement services due to homes now having their backyards exposed to an increased volume of people using the open space and trails. RVRPP also failed to articulate anything specific they will be doing to mitigate the increased danger the trails and open space will bring to exposed homeowners. The only "safety measure" they did list can be found in section 2.4.3, first paragraph of page 2-13.) which was really a slightly edited cut and paste from the sheriff's department's comments found on page 186 (see below):

IND 22-18

~~The Department recommends~~ Product design will include the All lighting on the Project Site would be light-emitting diode (LED). In addition the general principles of Crime Prevention Through Environmental Design (CPTED) as recommended by the Walnut-Diamond Bar Sheriff Station, where applicable ~~be implemented during the Project design phase~~. The goal of CPTED is to reduce opportunities for criminal activities by employing physical design features that discourage anti-social behavior, while encouraging the legitimate use of the site. The overall tenets of CPTED include defensible space, territoriality, surveillance, lighting, landscaping, and physical security. ~~With advanced notice, Station personnel can be available to discuss CPTED with the Project developer.~~ The Project HOA will maintain the open space areas, landscaping and lighting throughout the Project Site to minimize overgrown vegetation and prevent dark hiding places, void of light.

Aside from the fencing issue, there are many other concerns about open space and trail operations. While the parks will be owned and operated by the HOA, the proposal has the park completely open to the general public. There has been no information regarding the park hours, or the CCR's that will control what activities can or cannot be done in the parks, and most importantly, how can the HOA enforce any kind of rules over park usage when people using the park are not members of the HOA?

IND 22-19

4. Open Space off of Colima between Calbourne Dr and Tierra Luna:

Regarding the following statement in the DEIR:

Appendix M – last paragraph on page 22 and continued on page 23:

IND 22-20

"Colima Road provides an approximately 84-foot roadway width and is signed for a 45 mile per hour speed limit in the vicinity of the subject intersection. Both factors require an extensive gap (up to 24 seconds, assuming a pedestrian travel speed of 3.5 feet per second) in traffic along Colima Road in -22- LINSCOTT,

LAW & GREENSPAN, engineers LLG Ref. 1-20-4388-2 Royal Vista Residential and Parks Project O:\JOB_FILE\4388-2\Report\4388-Rpt3.doc order to accommodate safe pedestrian crossings. Identification of such extensive gaps is hindered by curves in the alignment of Colima Road to the east and west of the subject intersection. In addition, the proposed project would construct the south leg of the intersection, increasing potential conflicts between pedestrians/bicyclists crossing Colima Road and vehicles turning to and from the minor streets. In recognition of the increase in vulnerable roadway users expected at the intersection due to the proposed development and the prior fatality at the existing signalized crossing, it is recommended the Tierra Luna-Project Driveway/Colima Road intersection be signalized. Without the additional degree of protection provided by a signalized crossing, crossing Colima Road would be hazardous to pedestrians, bicyclists, and other users."

After reading the DEIR, I was unable to determine if the current opening (chain-link fencing) on the north side of Colima, between Tierra Luna and Calbourne Drive, where the current golf cart crossing currently exists, will be permanently closed off with adequate fencing. Currently, this opening is opened at approximately 8am and then locked and secured every night at dusk by golf course employees once no golfers remain on the course.

According to Jon Conk, this fence will be left "as is", which is a sliding chain link, but was unable to provide an answer as to who would be opening the gate in the morning and closing the gate every night at dusk. With walking trails on both sides of Colima at that point, leaving this as an opening of any kind will only entice people to cut across Colima to get to the open space area on the north side rather than walking the additional ½ block to the light at Tierra Luna and cross there. As noted in the DEIR, this is a highly dangerous proposition. It will not be "if" someone crosses there will they be hit by a car, it will really be a matter of when this happens, will that person survive.

Since parking lots will not be provided at this open space, if left open, it is a possibility car will also stop to drop off and pick up people at this spot, even though they should not be stopping on Colima Rd. Again, this is an accident waiting to happen, as the speed limit is 45 mph, and the street is curved. By the time someone is able to see a stopped car it is likely too late to stop.

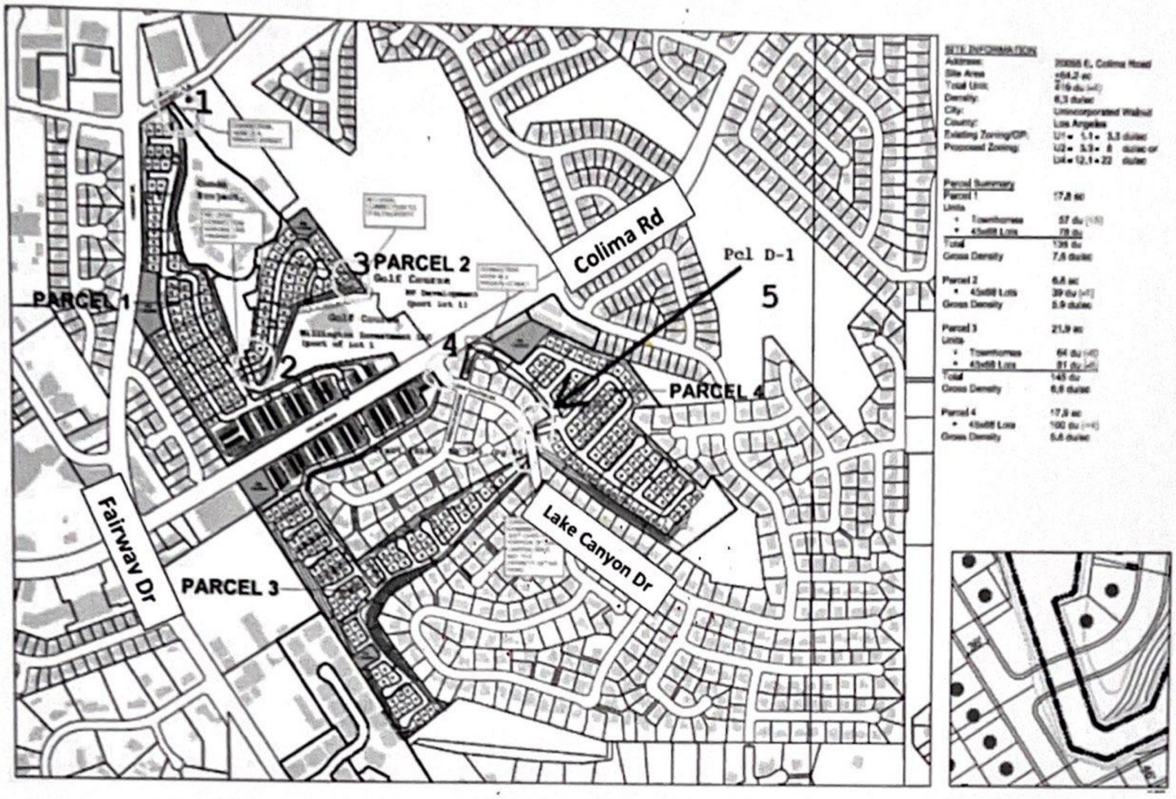
The safest alternative is to simply fence off this entrance permanently. Please provide a detailed written answer to exactly what the plan for this area in the final EIR.

Regards,

Shelley Gentry

Exhibit A

419 UNITS – NEW Conceptual Map – Developer: Sunjoint



From: Manouchehr (David) Esfandi
To: Bob Garrison
Cc: James Nelson; Dugan Garrison; Robert Wishner; Jose Suarez; Joseph Nguyen; Joshua Huntington; Diego Rivera
Subject: FW: Easement Question
Date: Monday, March 13, 2023 10:40:12 AM
Attachments: Royal Vista Golf Course - Private Roads - Per Title Feb 2023.pdf
TR 52492 FM.pdf
TR 28140 FM.pdf
TR 9494 FM.pdf
Colima and Fairway Drive.pdf

Good Day Mr. Garrison,
I reviewed the attached site plan and comments from your Title Company regarding Access.
Please note that the access to the subdivisions are reviewed by the Los Angeles County Department of Regional Planning (DRP).
Please contact Mr. Joshua Huntington (copied in this email) at jhuntington@planning.lacounty.gov or 213-893- 7001 for questions regarding access.
Please note that access from condominium projects are typically via Private Driveway and Firelanes. These access road are typically maintained by the Home Owners Association (HOA).
Please let me know, if you have any questions.
Thank you

M. David Esfandi, P.E.
Civil Engineer
Los Angeles County Public Works
(626) 458-7130

Public Works reopened its offices to the public. ***Our HQ office hours are Monday through Thursday, 7 a.m. – 5 p.m.*** ***Masks and distancing will be required*** *of all visitors and staff. You can avoid waiting in line by scheduling a virtual appointment now. Click* ***here*** *to schedule yours!*

From: Bob Garrison <bgarrison@murowdc.com>
Sent: Friday, March 10, 2023 5:02 PM
To: Manouchehr (David) Esfandi <MEsfandi@dpw.lacounty.gov>
Cc: James Nelson <jnelson@murowdc.com>; Dugan Garrison <dgarrison@murowdc.com>; Robert Wishner <robert.wishner@sunjointdv.com>
Subject: Re: Easement Question

CAUTION: **External Email. Proceed Responsibly.**

David - I am bringing this project back to your attention, will you please let me know your availability for a quick Zoom call next week regarding my previous email of 2/24 (see email and attachment below).

I did call you and left a message on your office line on 2/24, and I understand that you are busy with numerous requests. I believe we can knock this issue out very quickly if we could jump on a Zoom next week.

Thank you for your help!

Bob

Bob Garrison
Director of Consulting Services

16800 Aston Suite 200, Irvine, CA 92606
Direct: (949)398-8349 | Cell: (949)648-1525
www.murowdc.com | bgarrison@murowdc.com

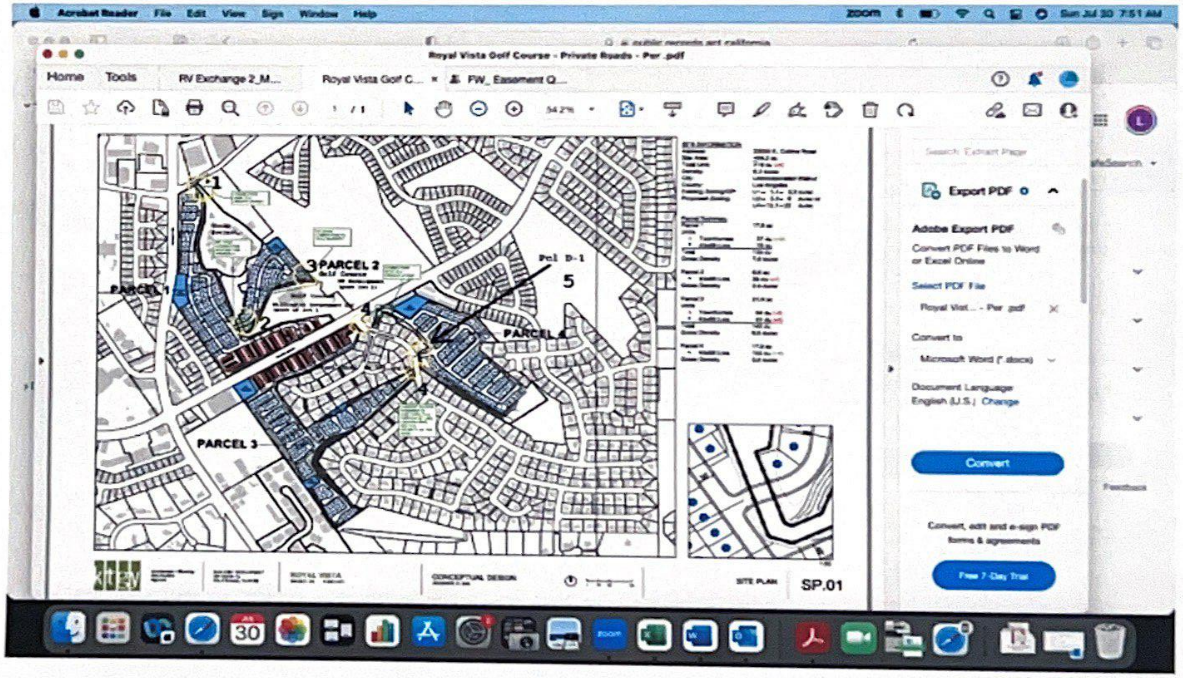
On Fri, Feb 24, 2023 at 2:34 PM Bob Garrison <bgarrison@murowdc.com> wrote:

> David - Nice to meet you over email and as noted by James I am working on a project for a client wherein there is a question whether the project can be built as envisioned due to the possibility that some of the internal streets may be private. I have asked our Title Co to review the streets and Title cannot find that the streets were ever dedicated to the County. Please see attached site plan and please note the yellow and green bubbles that the Title Co marked on the site plan. Basically Title is stating that they cannot find records that the following roads are public: 1.) Lake Canyon Dr.; 2.) Emerald Meadow Dr; 3.) Or the street that enters into the "Condo Project" off of Walnut Dr.
>
> Members of our Client met with the following individuals at LA County Regional Planning: Marie Pavlovic, Senior Planner, Subdivisions; Josh Huntington, Section Head. Our Client stated that
> Josh was extremely confident that Lake Canyon Dr. and Emerald Meadow Dr. are both public streets with full public access. Josh's presumption is based on the County's GIS database.
> This is the link to the database they used: https://rpgis.isd.lacounty.gov/Html5Viewer/index.html?viewer=GISNET_Public.GIS-NET_Public
>
> Our Client asked for assurance that Lake Canyon and Emerald Meadow are public, and Josh directed them to confirm this with the Public Works Dept, and that is why I am requesting your guidance. Please let me know if you have any availability next week for a quick Teams or Zoom meeting for you and I to review together, or if you find that both Lake Canyon Dr. and Emerald Meadow Dr. are both public streets with full public access. I would appreciate it if you could email that confirmation.
>
> Thank you and I appreciate your help!
>
> Bob
>
> **Bob Garrison**
>
> Director of Consulting Services

16800 Aston Suite 200. Irvine. CA 92606
Direct: (949)398-8349 | Cell: (949)648-1525
www.murowdc.com | bgarrison@murowdc.com

On Thu, Feb 16, 2023 at 4:21 PM James Nelson <jnelson@murowdc.com> wrote:

> Hi David,
>
> I hope you have been well since we spoke last and that you are having a great year so far. My team will likely be reaching out to you in the near future on bond exoneration items on some of the communities we are working on within LA County, but this is related to a separate subject. I'm looping in my colleague, Bob Garrison, who is assisting one of our clients with a project in Rowland Heights. Bob - please expand on this at your convenience.
>
> Take care until we talk next and as always I appreciate your assistance.
>
> Thank you.
>
> --
>
> **James Nelson**
> Director of Development Services
>
> 16800 Aston St. Suite 200. Irvine. CA. 92606
> Direct: (949)398-6733 | Cell: (509)679-8337
> www.murowdc.com | jnelson@murowdc.com
>
>


Acrobat Reader File Edit View Sign Window Help
zoom Sun Jul 30 7:51 AM
public records act california
Royal Vista Golf Course - Private Roads - Per .pdf
Home
Tools
RV Exchange 2_M...
Royal Vista Golf C...
FW_ Easement Q...
1 / 1
54.2%
1
3 PARCEL 2
PARCEL 1
Pcl D-1
5
4
PARCEL 4
PARCEL 3
4
ROYAL VISTA
CONCEPTUAL DESIGN
SITE PLAN
SP.01
Search 'Extract Page'
Export PDF
Adobe Export PDF
Convert PDF Files to Word or Excel Online
Select PDF File
Royal Vist... - Per .pdf
Convert to
Microsoft Word (*.docx)
Document Language
English (U.S.) Change
Convert
Convert, edit and e-sign PDF forms & agreements
Free 7-Day Trial
Feedback
30

20055 Colima Rd, Walnut, CA 91789-3502, Los Angeles County

APN: 8762-022-005 **CLIP:** 1119040618

Beds	Full Baths	Half Baths	Sale Price	Sale Date
N/A	**N/A**	**N/A**	**$15,000,000**	**03/27/2023**

Bldg Sq Ft	Lot Sq Ft	Yr Built	Type
N/A	**287,119**	**1964**	**GOLF CRSE**

OWNER INFORMATION

Owner Name	**Sunjoint Dev LLC**	Tax Billing Zip	**91789**
Mail Owner Name	**Sunjoint Dev LLC**	Tax Billing Zip+4	**3026**
Tax Billing Address	**280 Machlin Ct**	Owner Occupied	**No**
Tax Billing City & State	**City Of Industry, CA**		

LOCATION INFORMATION

Zip Code	**91789**	School District	**Rowland**
Carrier Route	**C032**	Comm College District Code	**Mt San Antonio**
Zoning	**LCA11-R110000***	Census Tract	**4033.26**
Tract Number	**9494**		

TAX INFORMATION

APN	**8762-022-005**	Lot	**1**
% Improved	**10%**	Water Tax Dist	**Three Valleys Walnut**
Tax Area	**8366**	Fire Dept Tax Dist	**Consolidated Co**
Legal Description	**TRACT NO 9494 LOT COM S 79 18' E 8.19 FT AND N 57 45' E 319.33 FT AND S 40 22'19" E 385.02 FT AND S 56 32'35" E 209.39 FT AND S 46 06'13" E 259.08 FT FROM NW COR OF LOT 1 TH S 46 06'13" E PART OF LOT 1**		

ASSESSMENT & TAX

Assessment Year	2022	2021	2020
Assessed Value - Total	**$388,509**	**$380,892**	**$376,987**
Assessed Value - Land	**$349,668**	**$342,812**	**$339,297**
Assessed Value - Improved	**$38,841**	**$38,080**	**$37,690**
YOY Assessed Change ($)	**$7,617**	**$3,905**	
YOY Assessed Change (%)	**2%**	**1.04%**	

Tax Year	Total Tax	Change ($)	Change (%)
2020	**$7,307**		
2021	**$7,389**	**$82**	**1.13%**
2022	**$7,621**	**$231**	**3.13%**

Special Assessment	Tax Amount
Solid Waste Fee 62	**$35.10**
Consldated Sewer62	**$151.50**
3valleysmwdchg86	**$913.52**
Laco Vectr Cntrl80	**$14.67**
Safe Clean Water83	**$144.10**
Wlntvlywtrsby86	**$369.04**
Flood Control 62	**$56.71**
County Library 56	**$33.20**
Cntysandist2156	**$1,244.88**
Combined Liens	**$169.65**
Total Of Special Assessments	**$3,132.37**

CHARACTERISTICS

County Land Use	**Golf Course**	Lot Area	**287,119**
Universal Land Use	**Golf Course**	Year Built	**1964**
Lot Acres	**6.5913**	# of Buildings	**1**

SELL SCORE

LAST MARKET SALE & SALES HISTORY

Recording Date	**03/31/2023**	Sale Type	**Full**
Sale Date	**03/27/2023**	Deed Type	**Grant Deed**
Sale Price	**$15,000,000**	Owner Name	**Sunjoint Dev LLC**
Multi/Split Sale	**Multi**	Seller	**Taylor Matthew**
Document Number	**206353**		

Recording Date	03/31/2023	07/19/2021	12/14/2020	10/14/2020	11/21/2019
Sale Date	**03/27/2023**	**05/27/2021**	**11/06/2020**	**08/26/2020**	**09/27/2019**
Sale Price	**$15,000,000**				
Nominal		**Y**	**Y**	**Y**	**Y**
Buyer Name	**Sunjoint Dev LLC**	**Airey Regina M Trust**	**Airey E & M Trust**	**Owner Record**	**Airey Mary K 2019 Trust**
Seller Name	**Taylor Matthew**	**Airey E & M Trust**	**Airey Edmund F Jr**	**Airey Mary K**	**Airey Mary K**
Document Number	**206353**	**1112199**	**1652538**	**1274285**	**1277064**
Document Type	**Grant Deed**	**Trustee's Deed(Transfer)**	**Affidavit**	**Affidavit**	**Grant Deed**

Recording Date	11/21/2019	05/01/2018	09/01/2017
Sale Date	**09/27/2019**	**02/15/2018**	**08/31/2017**
Sale Price			
Nominal	**Y**	**Y**	**Y**
Buyer Name	**Airey Mary K**	**Airey Regina M Trust**	**Airey Living Trust**
Seller Name	**Airey Jean B**	**Airey Regina M**	**Airey Matthew**
Document Number	**1277063**	**420240**	**1002388**
Document Type	**Affidavit**	**Trustee's Deed(Transfer)**	**Quit Claim Deed**

MORTGAGE HISTORY

Mortgage Date	07/07/2014
Mortgage Amount	**$1,000,000**
Mortgage Lender	**Open Bk**
Mortgage Code	**Conventional**

FORECLOSURE HISTORY

Document Type	Lis Pendens
Foreclosure Filing Date	**04/05/2019**
Recording Date	**04/23/2019**
Document Number	**358077**
Lien Type	**Other**

PROPERTY MAP

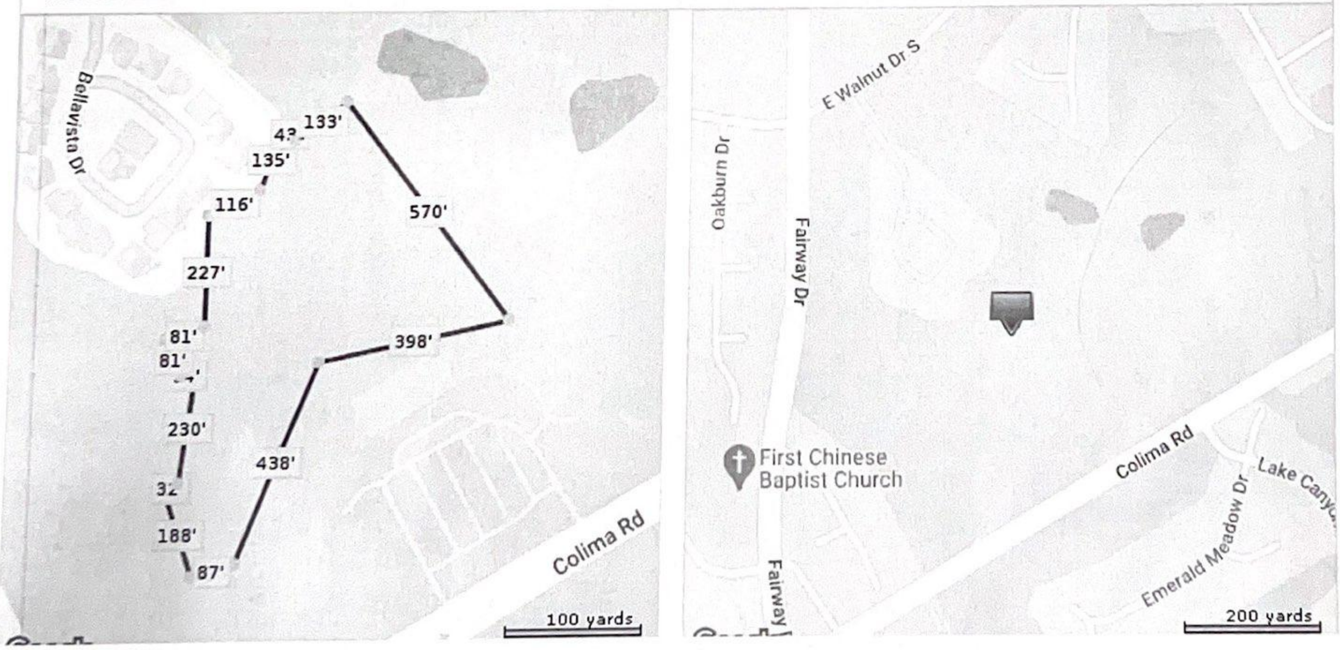
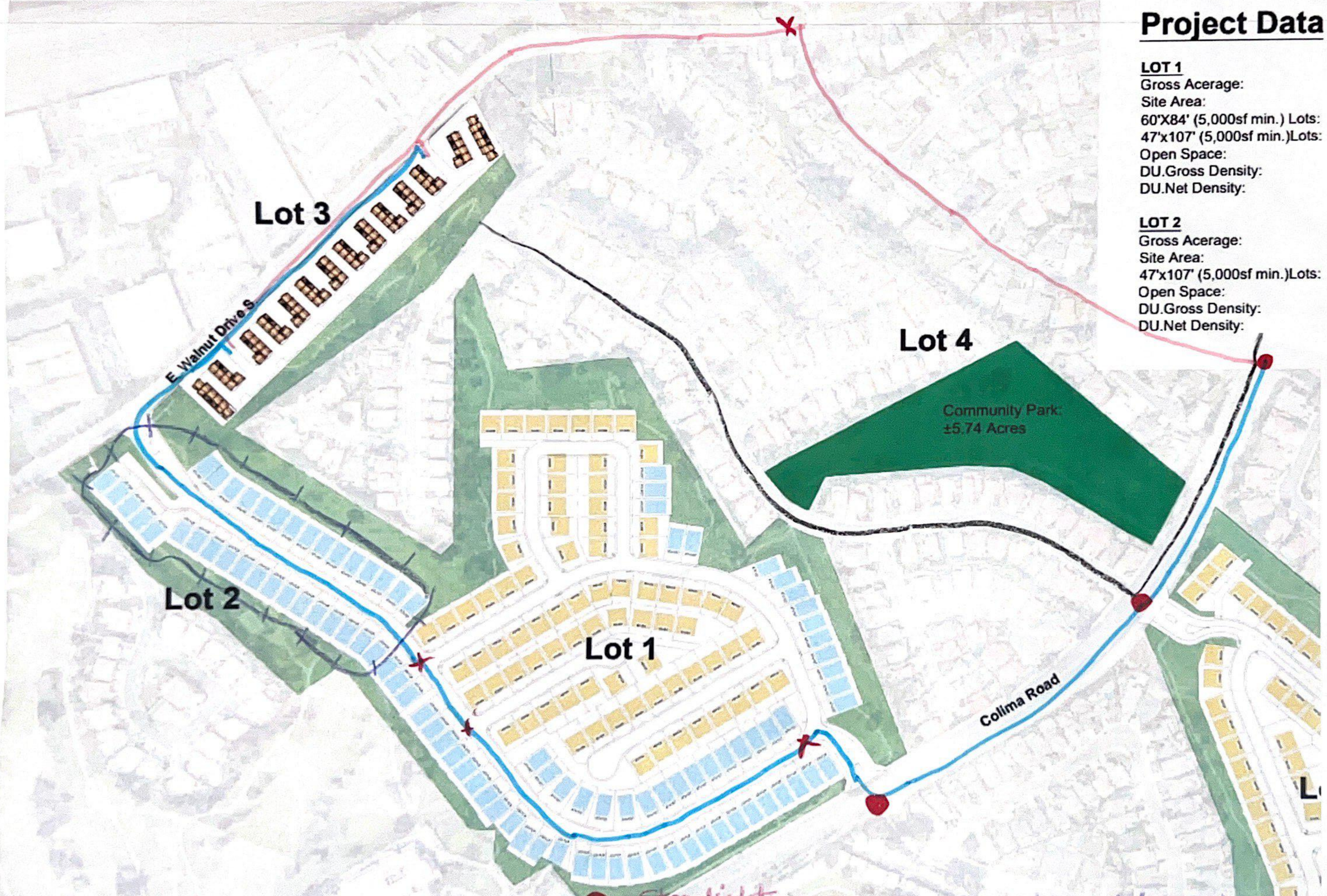


Exhibit B

-Exhibit B-



Project Data

LOT 1
Gross Acerage:
Site Area:
60'X84' (5,000sf min.) Lots:
47'x107' (5,000sf min.)Lots:
Open Space:
DU.Gross Density:
DU.Net Density:

LOT 2
Gross Acerage:
Site Area:
47'x107' (5,000sf min.)Lots:
Open Space:
DU.Gross Density:
DU.Net Density:

X - Stop sign
● - Stop light
++ possible cut thru homes
—— as stated in DEIR
—— cut thru Calbourne
—— Tierra Luna

Exhibit C

Response to Comment Letter IND 22

Shelley Gentry

Response IND 22-1

Comment noted. The NOP comment period began on October 13, 2022, and ended on December 12, 2022, which included a 14-day extension. The public review period for the DEIR was from October 30, 2023, to January 5, 2024, which included a 22-day extension.

Response IND 22-2

The Project does not include any portion of the 8 golf course parcels referenced in the comment, which the commenter states are owned by Sunjoint (Sunjoint Property). The Sunjoint Property is located adjacent to the Project Site on a separate portion of the Royal Vista Golf Club golf course.

No general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the 8 golf course parcels referenced in the comment (Sunjoint Property), nor has the LA County Planning received a request for environmental review of any development on the Sunjoint Property. Following the close of the public review period for the DEIR, LA County Planning received a request for preliminary consultation regarding potential development on the Sunjoint Property. This request for preliminary consultation seeks an informational review and does not seek approval of any project or development. It is unknown whether any discretionary entitlement application or request for environmental review regarding development of the Sunjoint Property will be submitted.

The sale of the Sunjoint Property and the website posting by the community group Save Royal Vista Open Space (not the Sunjoint Property owner or developer) do not establish that a project on that site is “reasonably foreseeable.” In addition, the sale of the Sunjoint Property has been identified as occurring on March 31, 2023, which is after the release of the Notice of Preparation (NOP) for the Project. CEQA Guidelines Section 15125(a) requires EIRs to contain a description of the physical environmental conditions in the vicinity of the project as they exist at the time the NOP is published, or if no NOP is published, at the time environmental analysis is commenced. The NOP release date for the Royal Vista Residential Project was October 13, 2022. The commenter does not provide any evidence that a project on the Sunjoint Property was proposed, officially announced or otherwise identified prior to the release of the NOP for the Project.

The fact that a group posted a potential concept plan on their website does not make a hypothetical 419-unit residential project “reasonably foreseeable” as it was not posted by the developer and is not associated with a development application. Additionally, the sale of this property does not make a project of any kind “reasonably foreseeable” and discussion of any particular project, especially a project requiring a zone change, would be speculative.

At the time the of the NOP, and at the time the DEIR was prepared and circulated for public review, the Royal Vista Golf Club golf course was in full operation. The golf course closed all operation in February, 2024[25]. Given the current zoning of the Sunjoint Property, the absence of any pending discretionary entitlement application for a project on the Sunjoint site, and the continuing operation of the golf course at the time of the release of the NOP and the DEIR, it was reasonable to assume that the golf course use would continue, as any other uses would have been speculative.

Response IND 22-3

See Response IND 22-2. Exhibit A to the comment includes an undated document with a heading that references 419 units, but the document appears to be provided by the community group Save Royal Vista Open Space and does not indicate that it is attributable to the Sunjoint Property owner or developer, or that it was in fact proposed as a development project for the Sunjoint Property. The documents in Exhibit A to the comment do not provide evidence that a general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project on the Sunjoint Property, or that the LA County Planning received a request for environmental review of any development on the Sunjoint Property. The documentation appears to include portions of email correspondence which appear to relate to inquiries to the County regarding the nature of existing streets and access for the Sunjoint Property, but do not evidence any specific proposed project or submitted discretionary entitlement application. In addition, the earliest date in the email correspondence included in the Exhibit A is February of 2023, which is after the Project NOP issuance on October 13, 2022.

Response IND 22-4

CEQA Guidelines Section 15125(a) requires EIRs to contain a description of the physical environmental conditions in the vicinity of the project as they exist at the time the Notice of Preparation (NOP) is published, or if no NOP is published, at the time environmental analysis is commenced. The NOP release date for the Royal Vista Residential Project was October 13, 2022, which establishes the cut-off date for consideration of cumulative projects.

The inclusion of a cumulative project must be based on substantial evidence that such project is reasonably foreseeable. The Sunjoint Property is not currently zoned for residential development, and no general plan amendment, zone change, subdivision or other discretionary development application has been filed with LA County Planning for a project the Sunjoint Property, nor has LA County Planning received a request for environmental review of any development on the Sunjoint Property. See Response FORM 1-2.

The sale of the Sunjoint Property and inquiries as to the nature of existing public streets are not sufficient to establish that a project is “reasonably foreseeable.” In addition, all of the events identified by the commenter post-date the NOP and therefore occurred outside the cut-off date for inclusion as a cumulative project. The email inquiries regarding existing streets in the commenter’s Exhibit A were dated February 2023. The commenter states that the sale of the

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[25] https://www.koreadailyus.com/royal-vista-favored-golf-course-among-korean-golfers-in-socal-closes-on-feb-29/, accessed 5/1/2024.

Sunjoint Property occurred on March 31, 2023. This activity is all after the release of the Project NOP on October 13, 2022. See Response IND 22-3.

As such there is no substantial evidence that a residential development project on the Sunjoint Property is reasonably foreseeable at the time of the NOP issuance, or otherwise.

CEQA does not require analysis of speculative impacts. (CEQA Guidelines section 15145.)

Response IND 22-5

See Response IND 22-4 and Response ORG 3a-2.

Response IND 22-6

The commenter expresses concerns regarding changes in traffic volume or congestion on the local roadway network, which are not used for purposes of assessing transportation impacts due to development Projects under CEQA. See Response AG 3-5.

Response IND 22-7

The commenter expresses concerns regarding changes in traffic volume or congestion on the local roadway network, which are not used for purposes of assessing transportation impacts due to development Projects under CEQA. See Response AG 3-5. Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. Evaluation of traffic volumes on a subject roadway, including volumes considered "cut-through" traffic, is an evaluation of vehicular capacity, which by statute cannot be considered an environmental impact under CEQA. See Response IND 22-6 for a discussion regarding the non-CEQA review of local residential streets provided in the TIA contained in Appendix M of the DEIR. The commenter describes two route choices for future residents of Planning Area 3 to access Colima Road-Golden Springs Drive and travel east of the Project Site, which include: use of the proposed roadways located in Planning Areas 2 and 1; or use of Calbourne Drive, which is described by the commenter as resulting in "cut-through traffic". The commenter suggests existing residents along East Walnut Drive west of the proposed Project Site currently utilize Calbourne Drive in order to access Golden Springs Drive and travel east, and that the TIA analysis should assume that residents of Planning Area 3 would do the same.

See Response IND 17-29 assuming the commenter is correct and all forecast vehicle trips destined to and from the east (15%) generated by Planning Area 3 were to utilize Calbourne Drive for travel instead of SR-60 and Fairview Drive, it would result in approximately 3 additional outbound trips in the AM peak hour and 3 additional trips during the PM peak hour, or approximately one additional vehicle on Calbourne Drive every 20 minutes during peak travel hours during the day (23 vehicle trips x .15=3 trips per hour or 3 trips every 20 minutes). This nominal increase in vehicle traffic would not warrant any changes to the Project or to Calbourne Drive based on the Los Angeles County Public Works Guidelines. In the transportation engineering profession, cut-through trips refer to trips which travel along a local residential street and which do not have an origin or destination in the neighborhood in which the local street is located. The Guidelines indicate that cut-through trips may result from development projects that add vehicle trips to congested arterial streets segments, which then results in trip diversion from the arterial roadway to a parallel and reasonably adjacent route utilizing local streets. Further, as previously noted, changes in traffic volume or congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development Projects under CEQA.

Response IND 22-8

The commenter expresses concerns regarding changes in traffic volume or congestion on the local roadway network, which are not used for purposes of assessing transportation impacts due to development Projects under CEQA. See Response AG 3-5, pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. Evaluation of traffic volumes on a subject roadway, including volumes considered "cut-through" traffic, is an evaluation of vehicular capacity, which by statute cannot be considered an environmental impact under CEQA See Response IND 22-6 and 23-7 for a discussion regarding the non-CEQA review of local residential streets provided in the TIA contained in Appendix M of the DEIR. See Response IND 23-7 regarding the trip generation forecast prepared for the Project as provided in the TIA, as well as the potential number of vehicles that could potentially utilize Calbourne Drive based on the assertions provided in the comment. As noted in Response IND 23-7, if vehicles generated by Planning Area 3 were to utilize Calbourne Drive as asserted in the comment, it would result in one additional vehicle added to Calbourne Drive every 20 minutes during the peak hours of travel during a typical weekday. This nominal increase in vehicle traffic would not warrant any changes to the Project or to Calbourne Drive based on the Los Angeles County Public Works Guidelines. Changes in traffic volume or congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development Projects under CEQA.

Response IND 22-9

The commenter expresses concerns regarding changes in traffic volume or congestion on the local roadway network, which are not used for purposes of assessing transportation impacts due to development Projects under CEQA. See Response AG 3-5, IND 23-6 and 23-7 for a discussion regarding the non-CEQA review of local residential streets provided in the TIA contained in Appendix M of the DEIR. The commenter references anecdotal comments provided by a representative of the Project at a community meeting, not information contained in the DEIR. The referenced comments were not representations regarding information contained in the DEIR or the TIA, and have no bearing on the transportation analyses which were provided by the traffic expert. As noted above, changes in traffic volume or congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development Projects under CEQA.

Response IND 22-10

The commenter expresses concerns regarding changes in traffic volume or congestion on the local roadway network, which are not used for purposes of assessing transportation impacts due to development Projects under CEQA. The commenter includes an excerpt from the TIA provided in Appendix M of the DEIR describing the proposed access to Planning Area 3, and notes that the driveways on East Walnut Drive South will accommodate outbound right-turns and inbound left-turns, which imply travel to and from the east along East Walnut Drive South. See Response AG 3-5, pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, automobile delay as described by Level of Service or similar measures of vehicular capacity or traffic congestion is not considered a significant impact on the environment. Evaluation of traffic volumes on a subject roadway, including volumes considered “cut-through” traffic, is an evaluation of vehicular capacity, which by statute cannot be considered an environmental impact under CEQA.

No turning restrictions are planned for the proposed driveways which will provide access to Planning Area 3. As previously described in Response IND 22-7, a small percentage of Project-generated trips may utilize Calbourne Drive or other roadways to travel to the east of the Project Site.

Response IND 22-11

The commenter expresses concerns regarding changes in traffic volume or congestion on the local roadway network, which are not used for purposes of assessing transportation impacts due to development Projects under CEQA. The commenter states that the City of Industry may pursue development on a parcel located at the northerly terminus of Calbourne Drive. There is no evidence that development has been formally proposed through submittal of a development Application for this parcel, and the commenter acknowledges that no decision has been made regarding development of this parcel; therefore, any development is speculative in nature. CEQA does not require analysis of speculative impacts. (CEQA Guidelines section 15145.) In addition, in the event development is proposed in the future the proposed project would be required to comply with CEQA and any local transportation analysis requirements as applicable.

Response IND 22-12

The commenter asserts that Calbourne Drive is not designed to accommodate increased traffic volume. Response IND 22-7 discusses that the changes in traffic volume or congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development Projects under CEQA. In addition, the commenter makes general assertions, without evidence, that additional traffic will have impacts due to increased noise, speeding and privacy, dust and pollution, and real estate values. The DEIR concluded that the Project operations would result in a less than significant impact associated with air quality and noise.

The City of Diamond Bar’s General Plan 2040 Circulation Element provides a summary of classifications and high-level design characteristics for roadways within its jurisdiction. As presented in Table 4-1: “Hierarchy of Streets and Street Standards” of the Circulation Element, Local Streets such as Calbourne Drive may carry up to 2,500 vehicles per day, and approximately 200-300 vehicles per hour during peak periods. The potential traffic volume increase of one additional vehicle on Calbourne Drive every 20 minutes during peak travel hours resulting from the Project, as described in Response IND 22-7, will not change the character or function of Calbourne Drive.

Response IND 22-13

This comment does not raise CEQA issues, but is noted for the record.

Response IND 22-14

The commenter expresses concerns regarding changes in traffic volume or congestion on the local roadway network, which are not used for purposes of assessing transportation impacts due to development Projects under CEQA. The potential increase in traffic volumes resulting from the proposed Project will not adversely affect the character or function of Calbourne Drive. The commenter recommends a change in the Project Description which includes removing a driveway access related to Planning Area 3 on East Walnut Drive and extending Tierra Luna Drive to Planning Area 3. See Response AG 3-5, because changes in traffic volume or congestion on the local roadway network are not impacts under CEQA, and because no other CEQA impacts would result from the Project's increase on Calbourne Drive as discussed in Response IND 22-12 above these changes are not required to mitigate a significant transportation impact related to the Project.

Response IND 22-15

The comment is a conclusion statement and refers to the comments provided previously in the letter. Refer to the related Responses IND 22-6 through IND 22-12, provided above.

Response IND 22-16

See Response AG 3-2.

The commenter expresses a general concern that residential development would result in heightened crime rates, but does not provide any evidence that crime rates will increase as a result of developing the Project or identify any deficiency in the environmental analysis in the DEIR. The Los Angeles County Sheriff's Department (LASD) has indicated that any increase in service calls as a result of the population increase associated with the Project would be within LASD's goal of response times. See DEIR Section 4.15, Public Services, Impact PS-2. In addition, the Project would include general principles of Crime Prevention Thru Environmental Design (CPTED) as recommended by the Walnut-Diamond Bar Sheriff Station, such as lighting and landscaping. The CPTED reduces opportunities for criminal activities by employing physical design features that discourage anti-social behavior, while encouraging legitimate use of the Project Site. The incorporation of CPTED design principles is an element of the Project Description, but would also be secured through Project conditions of approval. Thus, as concluded in the DEIR, Section 4-15.5, impacts on sheriff protection services during operation would be less than significant.

Response IND 22-17

See Response AG 3-2 and FORM 2-2. In City of Hayward v. Board of Trustee of California State University (2015) 242 Cal. App. 4th 833, the court found that Section 35 of Article XIII of the California Constitution requires local agencies to provide public safety services, including fire protection and emergency medical services, and it is reasonable to conclude that the County will comply with that provision to ensure that public safety services are provided. Regarding staffing and response times, as noted on DEIR page 4.15-18,

The LASD has indicated that the average and/or anticipated response times for emergent, priority, and routine calls for service received at the Project Site would be 4.5 minutes for emergent calls, 6.9 minutes for priority calls, and 31 minutes for routine response calls. As a result, the average response time for emergent and priority calls would be within LASD's goal response times of 10 minutes for emergent calls, 20 minutes for priority calls, and 60 minutes for routine response calls (LASD 2021). Therefore, the potential increase in calls for service as a result of the Project would be less than significant.

Additionally, the DEIR determined that the proposed Project would not result in a substantial adverse impact to Sheriff protection necessitating the provision of new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for sheriff protection.

Response IND 22-18

The NOP was reviewed and commented on by the Los Angeles County Sheriff's Department. In a letter dated November 30, 2022, the Sheriff's Department recommended that the Project include CPTED principles to be applied to the Project during design. In response to the recommendation, the Project proposes to include general principles of Crime Prevention Thru Environmental Design (CPTED) as recommended by the Walnut-Diamond Bar Sheriff Station, such as lighting and landscaping. The incorporation of CPTED design principles is an element of the Project description, as noted on DEIR page 4.15-19, but would also be secured through Project conditions of approval. Section 4.15 Public Services determined that the Project would have a less than significant impact on sheriff services.

Response IND 22-19

The Project does not include any public parks but does include publicly accessible open space in Planning Areas 4 and 6. A prior version of the Project did include proposed public parks, but the proposed public parks were removed as part of a design change prior to public release of the DEIR, in response to neighborhood concerns and direction from the Los Angeles County Department of Parks and Recreation. The Project includes 28 acres of open space, including a publicly accessible open space trail system that meanders throughout the proposed residential development. The Project Homeowners Association will maintain all publicly accessible Project open space areas, including landscaping, and lighting throughout the Project Site to minimize overgrown vegetation and prevent dark hiding places, void of light. See Response IND 22-17.

Response IND 22-20

The commenter asserts that an unsafe condition would occur related to maintaining existing pedestrian access. It should be noted that the current golf cart path south of Colima Road will be removed to accommodate the proposed development in Planning Area 5. PDF T-7 described on pages 4.17-27 and 4.17-28 of the DEIR includes the proposed relocation of the existing traffic signal on Colima Road at the golf cart path to the Tierra Luna Drive intersection opposite a Project driveway to Planning Area 5. The southerly connection for the proposed multi-use path will align with the planned signalized intersection of Tierra Luna-Project Driveway/Colima Road, which will provide a protected pedestrian crossing opportunity. The planned relocated traffic signal will be located approximately 100 feet east of the south end of the existing golf cart and pedestrian crossing, and approximately 140 feet east of the north end of the existing crossing. It is reasonable to assume that pedestrians will divert between 100 and 150 feet to cross Colima Road at the future signalized intersection.

The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

January 4, 2024

Marie Pavlovic
Los Angeles County Department of Regional Planning
320 West Temple Street
Los Angeles, CA 90012

Dear Ms. Pavlovic,

The following are my comments on the Draft EIR for the proposed Royal Vista Residential Project No. PRJ2021-002011. I wish to express my firm opposition to this development based on the following key concerns:

IND 23-1

Project Landscaping Unsustainable
In the Vesting Tentative Tract Map Exhibit A, pages 27-37, thirty species of ornamental trees are listed in the Tree Planting Legend for the proposed project and **only** 8 are native to California and the Southwest US. Quantities of each variety are NOT indicated. Planting invasive trees and shrubs can disrupt the delicate balance of our state ecosystem. This can result in the decline of native species and negatively impact California, the most biodiverse state in the nation. The majority of the proposed Royal Vista Residential landscaping trees are native to Australia, Africa, South America, Asia and the Mediterranean. Research shows that plants that have evolved elsewhere in the world impact the food webs. Insects, the heart of the food web, are specialists, feeding on a narrow spectrum of plant life. Foreign ornamentals do not support native insects and their larva, as evidenced by the **disappearance of 3 billion birds in North America over the past 50 years**.

On December 13, Jon Conk informed the community that native plants and oaks would be planted in the proposed development, a deceptive tactic. The two oak species listed on the Tree Planting Legend are **NOT** California natives but the Quercus Ilex, native to the Mediterranean and the Quercus Virginiana, native to Southeastern United States. There are five prominent species that thrive in southern California, which should be the obvious choice when planting an oak. Native oaks are a keystone species meaning they are trees that **entire ecosystems depend on for survival and habitat**. One oak tree in its native habitat can provide food for hundreds of different caterpillars, more than 100 animals feed on the oak's acorns and up to 2300 species are associated with oaks.

IND 23-2

In the Vesting Tentative Tract Map Exhibit A, pages 27-37, fifty-four species of shrubs and grasses are listed in the Shrub Planting Legend for the proposed project and **only** 8 are native to California and the Southwest US. Additionally, the Desert Carpet Prostrate Acacia, Horse Tail and Berkeley Sedge are 3 **invasive species** that should not be introduced in the landscape of the proposed project. It is of deep concern that 75 acres of open space will be planted with non-native species. Advocating for the use of California natives would be more beneficial for the environment and less destructive to the local ecosystem.

Absence of fencing between Royal Vista Residential Project and existing homes
An "average" buffer of 75 feet between the existing homes the proposed project is minimal, and many areas appear to be far less than 75 feet. The majority of existing homes have a simple chain-link fence or no fencing between them and the privately owned golf course. Public trails are an attraction to unhoused encampments, as experienced by nearby Diamond Bar. The proposed public trails are also a draw for other illegal activities, leaving the existing homes, with little fencing, open to crime.

IND 23-3

The DEIR omits exportation of excess dirt

The most glaring omission relates to the exportation of excess dirt (133,700 cubic yards) from the site to prepare it for construction. The truck trips to/from the site to carry this dirt was not evaluated in the DEIR. The DEIR states 11,400 trucks. The calculation is approximately 8,900 truckloads would be needed to remove this dirt to the Olinda Landfill in Brea (which the DEIR assumes is the likely repository), requiring approximately 17,800 truck roundtrips. IND 23-4

Blue Line Streams

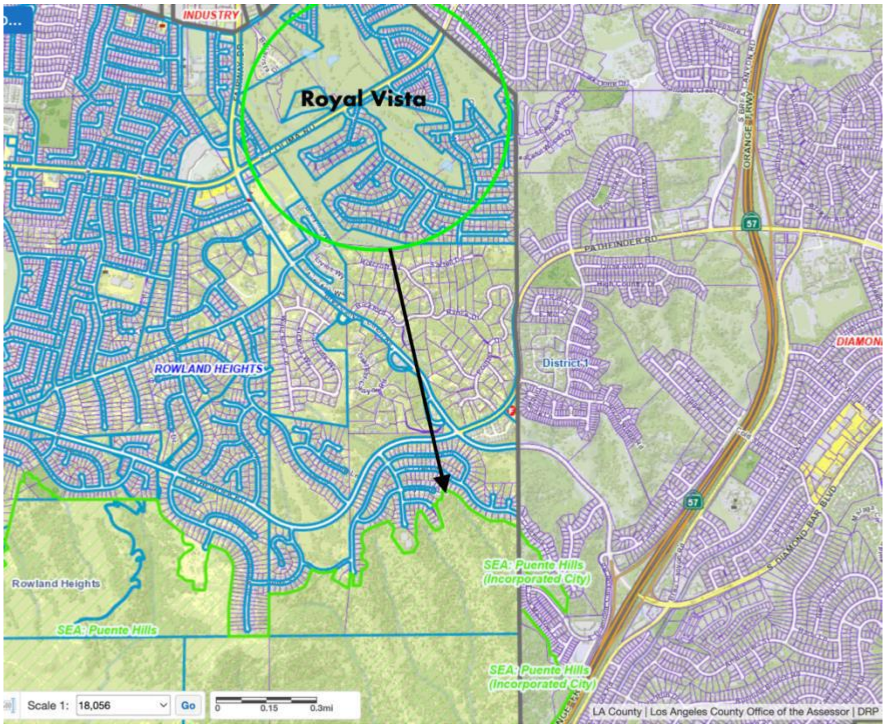
Amidst the golf course landscape, there exist numerous blue line streams and two lakes/ponds, receiving water from upstream drainages. Contrary to the delineation report's assertion of low water levels and the draining of the ponds in October 2022, residents’ photographic evidence attests otherwise. Pond #1, in particular, retains water and serves as a habitat for ducks, Canada geese, various water birds, and as a water source for other wildlife. These blue line streams and ponds play a pivotal role in the local ecosystem, contributing to groundwater replenishment. Preserving these water features is not only crucial for the diverse wildlife they support, but also for maintaining the delicate hydrological balance of the area. IND 23-5

Impact on Ground Permeability

Rainwater currently permeates the ground in the proposed development area serving a critical role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. The loss of this permeability due to the proposed development could have adverse effects on water quality, aquifer replenishment, and overall environmental sustainability. It is disconcerting that the **DEIR neglects to address the potential loss of this watershed, sidestepping its considerable impact on groundwater recharge** IND 23-6

Disruption of Crucial Habitat and Corridor

Royal Vista currently provides a vital habitat and corridor to the Puente Hills Significant Ecological Area, merely 1.2 miles away. This information is corroborated by experts from the Watershed Conservation Authority. The LA County map below verifies this information. The disruption of this corridor would have far-reaching consequences for regional wildlife and the integrity of the open space corridor. IND 23-7



Insufficient Details on Lighting for Streets, Walking and Biking Paths
The DEIR fails to provide adequate information regarding the specifications and elevation of lighting fixtures along the proposed walking and biking paths. In addition to the probability of bright lights projecting into the yards of existing properties, my primary concern lies in the adverse effects of bright LED lights on local wildlife. It is imperative to address the possible repercussions considering the disruptive impact of intense nighttime lighting on both human inhabitants and local wildlife.

Royal Vista is an essential stopover for observed migratory bird species including Canada geese, Barn swallows, American robins and Western bluebirds. Bright night lights pose a threat to bird migrations by causing disorientation, attracting birds away from their intended routes, disrupting circadian rhythms, increasing vulnerability to collisions, and disturbing stopover areas. Conservation efforts emphasize the importance of minimizing light pollution to protect the natural behaviors and survival of migrating bird species.

IND 23-8

DEIR Fails to Acknowledge the Existence of Bats & Important Wildlife
The DEIR overlooks reports and evidence of bats provided by residents. There are sightings of special status bat species within the Puente Hills Significant Ecological Area, merely 1.2 miles away from the Royal Vista corridor.
Bats play a pivotal role in ecosystem health, contributing to pest control and pollination. Their presence is integral to maintaining a balanced and thriving ecosystem. It is especially concerning that the proposed Royal Vista project involves the removal of palm trees, which may serve as nesting sites for these bats. This action poses a direct threat to their habitat, emphasizing the urgency of considering and mitigating potential impacts on bat populations during the project assessment.

IND 23-9

The Placeworks biological reconnaissance conducted on July 13, 2020, for 75 acres proved to be incomplete, as it omitted crucial species such as Cooper's Hawks, egrets, and herons, which residents consistently observe in the area. Notably, Placeworks documented only three mammal species on Royal Vista, neglecting several others integral to the local ecosystem, including skunks, raccoons, possums, rabbits, and more. These diverse animal species contribute significantly to the ecosystem's balance, with roles ranging from pest control to pollination. **The oversight in the reconnaissance raises concerns about the thoroughness of the assessment and emphasizes the necessity of a comprehensive evaluation to safeguard the biodiversity and ecological integrity of the Royal Vista area.**

IND 23-10

Diverse & Sustainable Uses for Open Spaces
Open spaces offer multifaceted opportunities for community enrichment beyond conventional development. Passive recreation areas, such as walking trails, picnic spots, and green spaces, provide residents with serene environments for relaxation and social interaction. Integrating native plant landscapes not only enhances the aesthetic appeal but also promotes biodiversity, supporting local ecosystems and attracting indigenous wildlife. These spaces can serve as educational hubs, fostering environmental awareness through interpretive signage and community workshops. Additionally, dedicating open areas to community gardens fosters a sense of stewardship, encouraging sustainable practices and providing fresh produce to local residents. By embracing alternative uses of open space, communities can cultivate a healthier and more vibrant environment, promoting physical well-being, ecological resilience, and a sense of shared ownership among its members.

IND 23-11

I strongly urge the Los Angeles County Department of Regional Planning to consider these concerns. It is crucial that decisions regarding development align with the values of preserving open space, protecting wildlife, and maintaining the ecological balance of the region.

Sincerely,
Wanda Ewing

IND 23-12

Response to Comment Letter IND 23

Wanda Ewing

Response IND 23-1

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The comment is noted for the record.

Response IND 23-2

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The comment is noted for the record.

Response IND 23-3

See Response IND 22-16, above.

Response IND 23-4

The commenter is referred to Chapter 2, Project Description for the grading and export material quantities. The grading and required exported material are based on the geotechnical evaluation prepared for the Project. See DEIR Appendix G for detailed calculations. As provided therein, it is expected that the construction vehicles that are planned to be utilized for import and export activities would have a capacity of 13 cubic yards per truck. During the Grading/Excavation phase (which is expected to occur over 262 work days), a total of 10,277 haul trucks will be required (i.e., 133,600 CY material export/13 CY trucks = 10,277 truckloads of material export). Therefore, on average a total of 40 haul trucks are expected to travel to and from the Project Site on a daily basis (i.e., 10,277 truckloads/262 days = 40 truckloads/day). During the most intensive ("worst-case") material hauling activities, a maximum of up to 50 truckloads may access the site per day. The maximum of up to 50 truckloads per day corresponds to approximately six (6) truckloads per hour, assuming that hauling overlaps with the AM peak hour but concludes by 3:30 PM (i.e., prior to the PM peak hour) after an 8-hour workday. This equates to 15 inbound and 15 outbound passenger car equivalent (PCE) vehicle trips, or a total of 30 PCE-adjusted vehicle trips during the AM peak hour (i.e., when accounting for a passenger car equivalency factor [PCE] of 2.5 for each 13 cubic yard capacity haul truck)**.** The commenter does not specify how the commenter calculated truck trips or provide evidence in support of its calculation.

Response IND 23-5

The Project Site does include two blue-line drainages as depicted on the U.S. Geological Survey (USGS) topographic map dated 1964 and photo revised 1981). These drainages are constructed v-ditches which convey drainage from some of the adjacent residential tracts which run through portions of the golf course until the drainages enter into the storm drain system. The golf course does include two man-made lined water features which are golf course irrigation ponds. These ponds are fed from groundwater being pumped into them from the San Gabriel Valley Groundwater Basin, in addition to golf course irrigation runoff and other drainages. Refer to DEIR Appendix D – Jurisdictional Delineation Report, Section III.A.3 and III.A.4. The man-made ponds do not play a vital role in the local ecosystem or contribute to groundwater replenishment. As designed and constructed in 1961, these 2 small ponds were lined with vinyl /

plastic in order to retain water and not allow water to permeate into the ground. Additionally, the Project Site golf course use actually depletes groundwater from the groundwater basin. The Project site (75 acres of the former golf course) uses up to approximately 198-acre feet annually or 176,340 gallons per day, of groundwater from the San Gabriel Valley Groundwater Basin / Puente Subbasin in order to irrigate this portion of the golf course. The Project would not pump groundwater, as the Project's water would be supplied by the Walnut Valley Water District, eliminating the need for extraction of groundwater from the Puente Subbasin.

Response IND 23-6

See Response FORM 1-5 for permeable ground filters pollutants, replenishment of the Puente Basin Aquifer, and urban heat island. Further, the proposed Project Site is not a watershed but rather a man-made golf course. Once constructed the proposed Project would include on-site storm drain facilities that would consist of a combination of low flow water quality and peak flow conveyance systems. The low flow water quality systems would intercept the low flows and provide water quality treatment in order to meet the requirements of the LA County LID Ordinance. The peak flow conveyance systems would provide peak flow reduction via detention basin systems, in order to control flows to meet the capacity requirements of the existing LACFCD storm drain systems. The Project would include new filtration BMPs to the Project design and new landscaped areas throughout the Project Site, all designed to meet a 25-year storm event. The intercepted storm flows would be treated onsite through applicable BMPs (e.g., bioretention, rainfall storage, and/or biofiltration) prior to being discharged into the storm drains and returned to the environment for groundwater recharge. The DEIR Section 4.10, Hydrology and Water Quality, concluded a less than significant impact associated with groundwater replenishment.

Response IND 23-7

See Response FORM 1-4. The proposed Project is an infill development on an existing golf course. The golf course is not considered suitable habitat for protected wildlife species (see DEIR Section 4.4, Biological Resources). Further, the Project Site does not connect or provide a corridor for wildlife to the Puente Hills SEA. As such, the Project will not impact or disrupt the SEA, contrary to the commenter's unsupported claim. The Site is surrounded by existing residential and commercial uses. No open space or wildlife corridor exists between the Project Site and the SEA.

Response IND 23-8

See Response FORM 1-7 and Response FORM 1-8. The Project is a residential development that would include similar lighting as the existing residential development to the northwest, east and south. All lighting would be shielded to promote dark skies and would not impact bird populations.

Response IND 23-9

See Response FORM 3-6. The proposed Project is an infill development on an existing (recently closed) golf course. The golf course is not considered suitable habitat for protected wildlife species (see DEIR Section 4.4, Biological Resources). Further, the Project Site does not connect or provide a corridor for wildlife to the Puente Hills SEA. The Project Site is surrounded by existing residential and commercial uses. No open space or wildlife corridor exists between the Project Site and the SEA.

Response IND 23-10

See Response FORM 3-6 and FORM 3-7.

Response IND 23-11

This comment does not raise CEQA issues, but is noted for the record. The approximately 75-acre Project Site is not publicly accessible, and the golf course was limited to those paying to play golf. The proposed Project will create approximately 28 acres (37 percent of the Project Site) of publicly accessible open space including over 2 miles of publicly accessible recreational trails for walking, biking, and hiking. The trail system will also include outdoor exercise equipment, and passive recreation opportunities as mentioned by the commenter including seating, picnic spots, green spaces and environments for relaxation and social interaction. The surrounding community currently has no such similar amenities.

Response IND 23-12

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Linda Himes <familycat2@msn.com>
Sent: Thursday, January 4, 2024 8:09 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>; Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

Dear LA County Department of Regional Planning,

I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned member of the community, I appreciate the opportunity to express our views on the project and its potential impacts. IND 24-1

The proposed dense development comprising nearly 400 units (upwards of 800 units including the Sunjoint proposed development on Lake Canyon) poses a significant threat to our community's quality of life. IND 24-2

This influx of at least 2000 additional vehicles clogging our roads and emitting pollutants, IND 24-3

and the irrevocable destruction of the wildlife habitat, including the vital corridor to the Puente Hills SEA conservation area located just 1.2 miles away. IND 24-4

In addition, the current permeable ground filters pollutants, replenishes the Puente Basin Aquifer, and mitigates the urban heat island effect as it cools the surrounding area. This microclimate is one of the few remaining open spaces. Industry, which borders our community to the north continues to plow over the remaining hillside ecosystems with more industrial space. This final open space must be preserved. IND 24-5

The space is designated as Open Space in the Rowland Heights Community Plan, as a recreation area. Our community of Rowland Heights, along with surrounding communities of Hacienda Heights, Walnut, and Diamond Bar have been highly developed. This is one of the very few spaces set aside for recreation. I urge you to keep this in mind and to allow this to be used as a recreation space. Our community plan was created by our community, for our community. We chose to live here and remain here because of the rural nature of our community. What use is a plan if it can be changed by those who do not live in our community? IND 24-6

Air Quality: Concerns arise over Valley Fever risk due to excavation during construction near the proposed site. A previous case during a similar development led to a resident's diagnosis and ongoing treatment. Excavation dust is also linked to respiratory issues like asthma and mucormycosis. IND 24-7

The extensive 3.8 million cubic yards of grading, equivalent to 10,277 haul trucks on major roads, raises worries about traffic control on Colima Road and East Walnut Dr. South, especially during school hours. IND 24-8

A four-year construction period may extend to eight with the Sunjoint development, impacting residents significantly. IND 24-9

Royal Vista Golf Course, a vital carbon sink, borders the City of Industry's Good Transit Corridor, absorbing carbon near the 57/60 Freeways. The SCAQMD recommends a health risk assessment for mobile sources, and uncertainty surrounds its inclusion in the EIR. IND 24-10

Residents propose a fund by the developer to upgrade windows and AC units for homes lacking proper ventilation, given the aging infrastructure and increased home-stay due to remote work post-pandemic. IND 24-11

According to the EIR, greenhouse emissions would remain "significant and unavoidable." IND 24-12

Particulate Matter Exposure: Freeways emit significant PM2.5 and PM10, causing respiratory and cardiovascular problems. Prolonged exposure raises health concerns as these fine particles can penetrate deep into the lungs and enter the bloodstream, posing health risks such as respiratory issues, aggravated asthma, bronchitis, and heightened cardiovascular disease risk. IND 24-13

Traffic:
There is one main road through Rowland Heights, Colima. This road runs parallel to the 60 freeway and the 60/57 interchange. This is known as the worst interchange and glutted with traffic even at non-peak times. The additional cars trafficking this road is a danger and will cause additional pollutants as cars wait during peak traffic times.

The developers are proposing additional road intersecting with Colima. While there is no traffic light at the intersection of Walnut Leaf and Colima proposed, it is a no-win situation. Adding a light will make it safer, but due to the short distance between intersections, this will cause even more traffic jams. Lights at Fairway, Lake Canyon, the new street, and Calbourne make for 4 stoplights within less than one mile. Even without the additional cars, this creates traffic issues. IND 24-14

There has also been no plan for the additional traffic caused by the new multiple dwelling units on Walnut Drive South. While some traffic will go out onto Fairway, it is feasible that many will choose to go east, requiring them to exit on Calbourne. This is the only way to exit to the east of the proposed development.

Noise:
I see no allowances made to reduce the noise levels which will continue for a minimum of four years. If this project is approved, are there ways to mitigate this through greener methods? Can electric vehicles be required? Is there a way to reduce the amount of grading and disruption of earth? IND 24-15

I urge you to strongly consider approving Alternative 1 to allow our plan to continue to stand, allow us a much-needed space for recreation to the surrounding communities and eliminate all of the aforementioned risks to our health and wellbeing. IND 24-16

Linda Himes
Resident

Response to Comment Letter IND 24

Linda Himes

Response IND 24-1

Comment noted.

Response IND 24-2

See Response FORM 1-2.

Response IND 24-3

See Response FORM 1-3.

Response IND 24-4

See Response FORM 1-4.

Response IND 24-5

See Response FORM 1-5.

Response IND 24-6

The Conservation Element of the Rowland Heights Community General Plan calls for the identification and preservation of natural resources. The Project Site has not been identified as open space for the preservation of natural resources or for the managed production of resources. These areas are identified by a Significant Ecological Area, Hillside Management, Wildlife Corridor, and/or Mineral Resources zoning overlay. The Community Plan classifies the private golf course as outdoor recreation which is a permitted use in the Open Space Land Use Category, but it is not considered undeveloped, containing natural resources, or producing natural resources.

Response IND 24-7

See Response FORM 2-6.

Response IND 24-8

See Response FORM 2-7.

Response IND 24-9

See Response FORM 2-8.

Response IND 24-10

See Response FORM 2-9.

Response IND 24-11

See Response FORM 2-10.

Response IND 24-12

Comment noted.

Response IND 24-13

See Response FORM 2-11.

Response IND 24-14

Pursuant to Public Resources Code Section 21099 (b)(2) and CEQA Guidelines Section 15064.3, traffic impacts under CEQA are analyzed in terms of Vehicle Miles Traveled (VMT), and not in terms of automobile delay as described by Level of Service (LOS) or similar measures of vehicular capacity or traffic congestion. See Response 1-3. Although changes in LOS or other measures of congestion on the local roadway network are not used for purposes of assessing transportation impacts due to development projects under CEQA, a "non-CEQA" Operational Analysis was conducted for the proposed Project, beginning on page 64 of the Transportation Impact Analysis (TIA), included in Appendix M of the DEIR, in accordance with requirements of the Los Angeles County Public Works "Transportation Impact Analysis Guidelines" ("Guidelines"). The Guidelines state: "Intersection level of service (LOS) and queuing methodologies from the latest edition of the Transportation Research Board Highway Capacity Manual (HCM) should be used to evaluate the operation of the project driveways and nearby intersections." In addition, the DEIR evaluated queuing at Project driveways and concluded that vehicle queues would be accommodated by existing queue storage areas and would not result in queue spill-backs that would block adjacent through-lanes or intersections, and would not substantially increase hazards due to a geometric design feature. Although the DEIR concluded that the Project would not result in transportation impacts under CEQA, the Project voluntarily includes Project Design Features (T-3 through T-8) to further facilitate traffic flow. The PDF T-3 through T-8 improvements are described on pages 4.17-24 through 4.17-29 of the DEIR.

Response IND 24-15

Section 4.13 Noise discusses that the Project is required to comply with several Mitigation Measures (Mitigation Measure NOI-1 through NOI-4) and Project Design Features (PDF NOI-1) that are designed to reduce noise impacts associated with the construction of the Project. See Response IND 17-19 for additional details on Noise impacts. Electric construction equipment is a newer concept and therefore will cost more for equipment than traditional diesel equipment. Furthermore, since the market for this type of machinery is smaller now than the one for diesel-powered construction equipment is, the cost for repairs is consequently going to be higher and there will be limited options for buying used equipment limiting the amount of equipment available on the market for the contractor to use. In addition, battery technology limits the range and operational time for equipment being used as compared to traditional diesel equipment. Further, batteries in heavy-duty electric powered equipment take a very long time to recharge and require a power source, potentially requiring additional equipment to be on standby while equipment is being charged.

With respect to construction emissions, the DEIR concluded that construction activities would have a significant DPM impact before the implementation of mitigation measures. However, once mitigation AQ-1 is implemented air quality impacts will be less than significant. Mitigation Measure AQ-1 requires the use of Tier 4 Final off-road diesel construction equipment for any equipment greater than 50 horsepower, which reduces DPM emissions by at least 84.4 percent compared to the default CalEEMod fleet mix, which includes Tier 0 to Tier 2 equipment that produce larger amounts of DPM emissions.[26] Furthermore, construction contractors would be required to comply with regulations that limit diesel emissions, such as the CARB Air Toxics Control Measure that limits diesel vehicle idling to no more than five minutes at a location (Section 2485 in Title 13 of the California Code of Regulations [CCR]), the Truck and Bus regulation that reduces NOX, PM10, and PM2.5 emissions from existing diesel vehicles operating in California (13 CCR, Section 2025) and the In-Use Off-Road Diesel Fueled Fleets regulation that reduces emissions by the installation of diesel soot filters and encouraging the retirement, replacement, or repower of older, dirtier engines with newer emission controlled models (13 CCR, Section 2449). In addition, construction is scheduled to last for three years, not four as stated by the commenter.

Response IND 24-16

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

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[26] As shown in the CalEEMod results in Appendix B of the Draft EIR, the incorporation of Tier 4 Final construction equipment reduces the off-road PM exhaust emissions by approximately 84.4 percent during the winter and summer construction scenarios.

Dear Marie Pavlovic,

I am writing to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No. PRJ2021-002011.

The DEIR did not address significant irreversible change caused by the development. With the passage of SB337, California has committed to the goal of conserving 30% of our lands and coastal waters by 2030 (30x30). The development of Royal Vista causes the loss of 68.42 acres of open space and the lost opportunity to acquire and preserve the area as parkland. IND 25-1

The proposed dense development, which could reach up to 800 units when considering Sunjoint development on Lake Canyon, poses a significant risk to our community's well-being. Sunjoint, a reasonably foreseeable project, was not included in the DEIR cumulative project list with the claim of no known growth inducing action for the remaining parcels. IND 25-2

The additional density brings with it a surge in crime rates, IND 25-3

the addition of at least 2,000 vehicles causing congestion and emitting pollutants, and the irreversible damage to our wildlife habitat. IND 25-4

This habitat, including a crucial corridor to the Puente Hills SEA conservation area just 1.2 miles away, is at stake. IND 25-5

In addition, the existing permeable ground plays a vital role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. IND 25-6

Air Quality: Concerns arise over Valley Fever risk due to excavation during construction near the proposed site. A previous case during a similar development led to a resident's diagnosis and ongoing treatment. Excavation dust is also linked to respiratory issues like asthma and mucormycosis. IND 25-7

The extensive 3.8 million cubic yards of grading, equivalent to 10,277 haul trucks on major roads, raises worries about traffic control on Colima Road and East Walnut Dr. South, especially during school hours. IND 25-8

A four-year construction period may extend to eight with the Sunjoint development, impacting residents significantly. IND 25-9

Royal Vista Golf Course, a vital carbon sink, borders the City of Industry's Good Transit Corridor, absorbing carbon near the 57/60 Freeways. The SCAQMD recommends a health risk assessment for mobile sources, and uncertainty surrounds its inclusion in the EIR. IND 25-10

Residents propose a fund by the developer to upgrade windows and AC units for homes lacking proper ventilation, given the aging infrastructure and increased home-stay due to remote work post-pandemic. IND 25-11

Particulate Matter Exposure: Freeways emit significant PM2.5 and PM10, causing respiratory and cardiovascular problems. Prolonged exposure raises health concerns as these fine particles can penetrate deep into the lungs and enter the bloodstream, posing health risks such as respiratory issues, aggravated asthma, bronchitis, and heightened cardiovascular disease risk. IND 25-12

Solar Panel Glare: It is crucial to address potential impacts on residents due to direct glare or reflection. How will the glare from solar panels be minimized to reduce reflection on current homes, especially those situated on higher elevations? IND 25-13

Lighting on Walking and Biking Paths: The DEIR lacks information on the type and height of lighting along proposed walking and biking paths. We are particularly concerned about bright lights projecting into neighboring private backyards. It is essential to address potential impacts on residents' privacy and well-being. IND 25-14

Thank you,
Edward O. Ewing
Homeowner adjacent to Royal Vista

Response to Comment Letter IND 25

Edward Ewing

Response IND 25-1

The local need for parks has been assessed by the LA County Department of Parks and Recreation and it was determined that the park obligation for this Project will be met by the payment of in-lieu fees. Further, the Project will include 37 percent open space, including 28 acres of publicly accessible open space with over 2 miles of recreational trails. Further, this bill refers to natural land. The former golf course is considered developed land.

Response IND 25-2

See Response FORM 1-2 and Response AG 3-8.

Response IND 25-3

See Response FORM 3-2. There is no evidence that the implementation of the Project would increase crime rates.

Response IND 25-4

See Response FORM 3-3.

Response IND 25-5

See Response FORM 3-4.

Response IND 25-6

See Response FORM 3-5.

Response IND 25-7

See Response FORM 2-6.

Response IND 25-8

See Response FORM 2-7.

Response IND 25-9

See Response FORM 2-8.

Response IND 25-10

See Response FORM 2-9.

Response IND 25-11

See Response FORM 2-10.

Response IND 25-12

See Response FORM 2-11.

Response IND 25-13

See Response FORM 1-6.

Response IND 25-14

See Response FORM 1-7. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Karen Gerloff <karengerloff66@gmail.com>
Sent: Friday, January 5, 2024 4:39 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: abodek@planning.lacounty; GDuran-Medina@bos.la; wrehman@bos.lacoun; cchen@bos.la; amoreno@bos.la; RSerrano@bos.la; savroyalvista@gmail.com
Subject: Project No. PRJ2021-002011 Draft EIR Comments

Dear LA County Department of Regional Planning,

I am writing to share feedback on the Draft Environmental Impact Report concerning the proposed Royal Vista Residential Project No. PRJ2021-002011. As a long term actively involved community member, I value this opportunity to be heard and listened to on my perspective on this proposed project and its potential consequences. IND 26a-1

The proposed high density development (reaching 800 units with the inclusion of the Sunjoint development on Lake Canyon), poses a threat to our communities welfare. IND 26a-2

This has been a model American community which has accepted and embraced change through the years as our local demographics have changed dramatically. We have tolerated living beside one of the busiest freeway freight corridors in the nation. We have weathered this by having the benefit of open visitas, large trees, abundant bird life, and a government that listened to our needs for the most part although not being a city, we have had a distant county supervisor to represent our point of view. IND 26a-3

Back to the DRIE.... we know that this development will increase vehicle traffic by at least 2,000 vehicles causing even worse traffic congestion and emitting pollutants. We live near the Quemetco lead battery recycling facility which has operated on a long extended permit and raised lead pollution to a high level and we live with particulate matter pollution from heavy truck traffic 24/7 on the 60/57 freeway. These 2,000 added cars will harm the health of the many aging residents who live in the local neighborhoods. The PM2.5 and PM10 exposure will cause respiratory and cardiovascular problems and exacerbate conditions and in those like me who already have those conditions. IND 26a-4

We have kept our sanity and mental health by enjoying the vistas of snow covered mountains, not from my home but along Walnut Leaf drive looking over Parcel 5. I am not alone; many cars park there to enjoy the view and take pictures of rainbows across the valley or snow covered mountains with a beautiful grassy foreground in the picture. I noticed that the DEIR stated that there were no views to be spoiled, I strongly disagree and you would too if you saw the view. IND 26a-5

The biological reconnaissance conducted by Placeworks on July 13, 2020, was incomplete, missing key species such as the Cooper's Hawks, egrets, and herons. I have had a Cooper's Hawk cool off in the fountain in my yard for over a half an hour and have amazing pictures to prove it. Beautiful white egrets and the great blue heron are frequently seen here and the comical looking night heron is sometimes spotted. I have listed the birds that I have observed on the golf course and they include the tricolored blackbird, plain titmouse, black headed grosbeak, acorn woodpecker, common ground dove, inca dove, banded tailed pigeon, house finch, hooded oriole, bewick's wren, american robin, pin-tailed whydah, spice finch, lonchura, nutmeg mannikin, spotted munia, Canadian geese and other ducks. Of course those who live along the golf course hear great horned owls and barn owls also. We also smell skunks often and see possums occasionally. We also have gophers, ground squirrels, and tree squirrels, rabbits and lots of coyotes. IND 26a-6

The animals have found refuge here because we have a water source for them and tall marsh vegetation around the ponds and large mature trees. There are blueline streams and two ponds which are fed from upstream drainage. This beautiful open space has been a blessing for the people, birds, and animals. Such wonderful open space will be gone forever and hard to impossible to reclaim as the county is now attempting to do adding trees here and there where they can in crowded overbuilt urban areas. IND 26a-7

Thank you for your attention to these concerns and your commitment to ensuring that the Royal Vista Residential Project aligns with the values and needs of our nature loving but otherwise diverse community.

Sincerely,

Karen Gerloff karengerloff66@gmail.com 909 348-2168

IND
26a-8

Response to Comment Letter IND 26a

Karen Gerloff

Response IND 26a-1

Comment noted.

Response IND 26a-2

See Response FORM 1-2.

Response IND 26a-3

Comment noted.

Response IND 26a-4

See Response FORM 1-3 regarding traffic and Response FORM 2-11 regarding particulate matter.

Response IND 26a-5

As described in Section 4.1 Aesthetics, no designated scenic vistas are identified to be present within the Project Site or vicinity. Several mountain ranges are partially visible from the surrounding roadways. The Puente Hills are located approximately 2 miles southwest of the Project Site but are not visible from the Project Site due to intervening structures and topography. The Puente Hills are partially visible while looking west along the Colima Road corridor. Facing north from the Planning Area 3, in the distance San Gabriel Mountains are partially visible, but are obstructed by the commercial and retail businesses along East Walnut Drive South. Facing east from the Planning Area 1 and along the Colima Road corridor, partially obstructed views exist of the more distant San Bernardino Mountains, which are located in San Bernardino County. Due to the varying topography mature vegetation including trees and the existing fencing from the driving range, the views of the San Bernardino Mountains from the Project Site (Colima Road) are largely screened. In addition, the implementation of the proposed Project is an urban in-fill project that would not change or impact views of potentially scenic resources in the area from the surrounding public roadways. As such, the DEIR concluded that there would be no adverse environmental impacts to scenic vistas during temporary construction of the proposed Project or during long-term operation of the proposed Project.

Response IND 26a-6

See Response FORM 3-6 and FORM 3-7.

Response IND 26a-7

The Project Site is a man-made golf course and does not provide native habitat. In addition, see Response FORM 1-4 regarding habitat. The Project Site does include two blue-line drainages as depicted on the U.S. Geological Survey (USGS) topographic map dated 1964 and photo revised 1981. These drainages are constructed v-ditches which convey drainage from the adjacent residential tracts which run through portions of the golf course until the drainages enter into the storm drain system. The golf course does include two man-made lined water features which are golf course irrigation ponds. These ponds are fed from groundwater being pumped into them from the San Gabriel Valley Groundwater Basin, in addition to golf course irrigation runoff and other drainages. Refer to DEIR Appendix D – Jurisdictional Delineation Report, Section III.A.3 and III.A.4.

Response IND 26a-8

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Karen Gerloff <karengerloff66@gmail.com>
Sent: Friday, January 5, 2024 6:08 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft EIR Comments

Dear LA County Department of Regional Planning,

IND 26b-1

Thank you for accepting this note of comment on Project No. PrJ2021-002011 the Royal Vista Residential Project. I have written comments previously but forgot to mention that the Draft EIR document stated that Valley fever is quite usually very mild. That may be for young healthy people but for older compromised people,of which, there are many in the homes surrounding this development, Valley fever can be very serious. The strong anti fungal medicines used to treat it can be poorly tolerated. I personally know a family whose patriarch has Valley Fever and after a long period of no diagnosis was finally diagnosed and is being treated. His outlook is not good. He has had seizures, heart problems and now suddenly dementia. This has been a terrible emotional and financial blow to the family, for them Valley Fever is not just a mild inconvenience as the DEIR suggested.

Thank you for taking these additional comments.
Sincerely,

Karen Gerloff
karengerloff66@gmail.com
909 348-2168

Response to Comment Letter IND 26b

Karen Gerloff

Response IND 26b-1

See Response FORM 2-6. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Dear LA County Department of Regional Planning,

I am writing to provide input on the Draft Environmental Impact Report (DEIR) concerning the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned community member, I value the chance to convey our perspectives on the project and its potential consequences. IND 27-1

The proposed dense development, which could reach up to 800 units when considering Sunjoint
development on Lake Canyon, poses a considerable threat to our community's welfare. Sunjoint, a IND 27-2
reasonably foreseeable project was not included in the DEIR cumulative project list.This threat is evident in
the expected increase in crime rates, the introduction of at least 2,000 vehicles causing traffic congestion and IND 27-3
emitting pollutants, and the irreversible harm to our wildlife habitat. This habitat, a critical corridor to the
Puente Hills SEA conservation area just 1.2 miles away, is in jeopardy. Additionally, the current permeable IND 27-4
ground serves a crucial role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the
urban heat island effect by cooling the surrounding area. IND 27-5

My home is one of twenty-one that are situated in a landslide zone resulting from the Morning Sun landslide in May 1995, with subsequent incidents. One resident notes above-ground water piping on streets for five years. The theory suggests that the construction of South Point Middle School led to landslides due to dumped excavation dirt obstructing blue line streams. The EIR lacks detailed mitigation plans for the landslide zone during excavation. IND 27-6

Concerns arise from groundwater found as shallow as 2.5 feet near East Walnut Dr. South and Bellavista, especially given its proximity to two ponds. This area's wet soil poses risks as water drains towards it due to its low elevation. IND 27-7

In terms of Population and Housing, the mentioned parcels are not part of the 2021-2029 Housing Element inventory for rezoning in unincorporated areas to meet state housing mandates. Rowland Heights is already contributing to housing requirements with over fifty properties potentially developing 2,228 units. This project falls outside the scope of the Housing Element, impacting park-poor areas by reducing open space. IND 27-8

Thank you for your attention to these concerns and your commitment to ensuring that the proposed Royal Vista Residential Project aligns with the values and needs of our community. IND 27-9

Sincerely: THOMAS PRINLÉ

Response to Comment Letter IND 27

Thomas Prince

Response IND 27-1

Comment noted.

Response IND 27-2

See Response FORM 1-2.

Response IND 27-3

See Response FORM 1-3.

Response IND 27-4

See Response FORM 1-4.

Response IND 27-5

See Response FORM 1-5.

Response IND 27-6

See Response FORM 4-6.

Response IND 27-7

See Response FORM 4-7.

Response IND 27-8

See Response FORM 4-8.

Response IND 27-9

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

Dear LA County Department of Regional Planning,

I am writing to provide input on the Draft Environmental Impact Report (DEIR) concerning the proposed Royal Vista Residential Project No. PRJ2021-002011. As a concerned community member, I value the chance to convey our perspectives on the project and its potential consequences. IND 28-1

The proposed dense development, which could reach up to 800 units when considering Sunjoint development on Lake Canyon, poses a considerable threat to our community's welfare. IND 28-2 **Sunjoint, a reasonably foreseeable project was not included in the DEIR cumulative project list**. This threat is evident in the expected increase in crime rates, the introduction of at least 2,000 vehicles causing traffic congestion and IND 28-3 emitting pollutants, and the irreversible harm to our wildlife habitat. This habitat, a critical corridor to the Puente Hills SEA conservation area just 1.2 miles away, is in jeopardy. IND 28-4 Additionally, the current permeable ground serves a crucial role in filtering pollutants, replenishing the Puente Basin Aquifer, and mitigating the urban heat island effect by cooling the surrounding area. IND 28-5

My home is one of twenty-one that are situated in a landslide zone resulting from the Morning Sun landslide in May 1995, with subsequent incidents. One resident notes above-ground water piping on streets for five years. The theory suggests that the construction of South Point Middle School led to landslides due to dumped excavation dirt obstructing blue line streams. The EIR lacks detailed mitigation plans for the landslide zone during excavation. IND 28-6

Concerns arise from groundwater found as shallow as 2.5 feet near East Walnut Dr. South and Bellavista, especially given its proximity to two ponds. This area's wet soil poses risks as water drains towards it due to its low elevation. IND 28-7

In terms of Population and Housing, the mentioned parcels are not part of the 2021-2029 Housing Element inventory for rezoning in unincorporated areas to meet state housing mandates. Rowland Heights is already contributing to housing requirements with over fifty properties potentially developing 2,228 units. This project falls outside the scope of the Housing Element, impacting park-poor areas by reducing open space. IND 28-8

Thank you for your attention to these concerns and your commitment to ensuring that the proposed Royal Vista Residential Project aligns with the values and needs of our community. IND 28-9

Sincerely,

1435 FAIRLANCE DR.
WALNUT, CA 91789

Response to Comment Letter IND 28

1435 Fairlance Dr.

Response IND 28-1

Comment noted.

Response IND 28-2

See Response FORM 1-2.

Response IND 28-3

See Response FORM 2-3.

Response IND 28-4

See Response FORM 2-4.

Response IND 28-5

See Response FORM 2-5.

Response IND 28-6

See Response FORM 4-6.

Response IND 28-7

See Response FORM 4-7

Response IND 28-8

See Response FORM 4-8.

Response IND 28-9

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Susan Trautz <dstrautz81@gmail.com>
Sent: Friday, January 5, 2024 12:20 AM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; Amy Bodek <ABodek@planning.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; citycouncil@diamondbarca.gov; firstdistrict@bos.lacounty.gov
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

CAUTION: External Email. Proceed Responsibly.

IND 29-1

Dear Ms. Pavlovic,

We appreciate the opportunity to comment on the subject DEIR. Our comments are in blue ink.

Politics

At the December 11, 2023, Rowland Heights Community Coordinating Council meeting, Mr. Jon Conk, Vice President of Project Dimensions, made a presentation to the Community outlining the proposed Project. Mr. Conk quoted Hilda Solis, the Los Angeles County Board of Supervisor who represents this area (District 1), as stating “The only way out of the housing crisis is to build more homes.”

IND 29-2

The Project proposes to contribute 360 residential units with 82 units set aside for sale to middle- and moderate-income households. Unincorporated Los Angeles County’s Regional Housing Needs Allocation is 90,052.

What political forces are at play that allow the **unused and underutilized land** of City of Industry’s Puente Hills Mall, to remain underutilized? Why is the Regional Housing Needs Allocation at less than ten for the City of Industry? Albeit, the City of Industry is not part of unincorporated Los Angeles County, it is part of Los Angeles County, part of the State of California, part of the region that is impacted by a housing crisis. The City of Industry is mentioned merely to point out discrepancies in what should be combined-efforts to solve the housing crisis. This leaves reasonable people to wonder what political forces are at play.

IND 29-3

ES.6.2 Significant Irreversible Environmental Changes ends with this statement. “Thus, the Project’s irreversible changes to the environment related to the consumption of non-renewable resources would not be significant.”

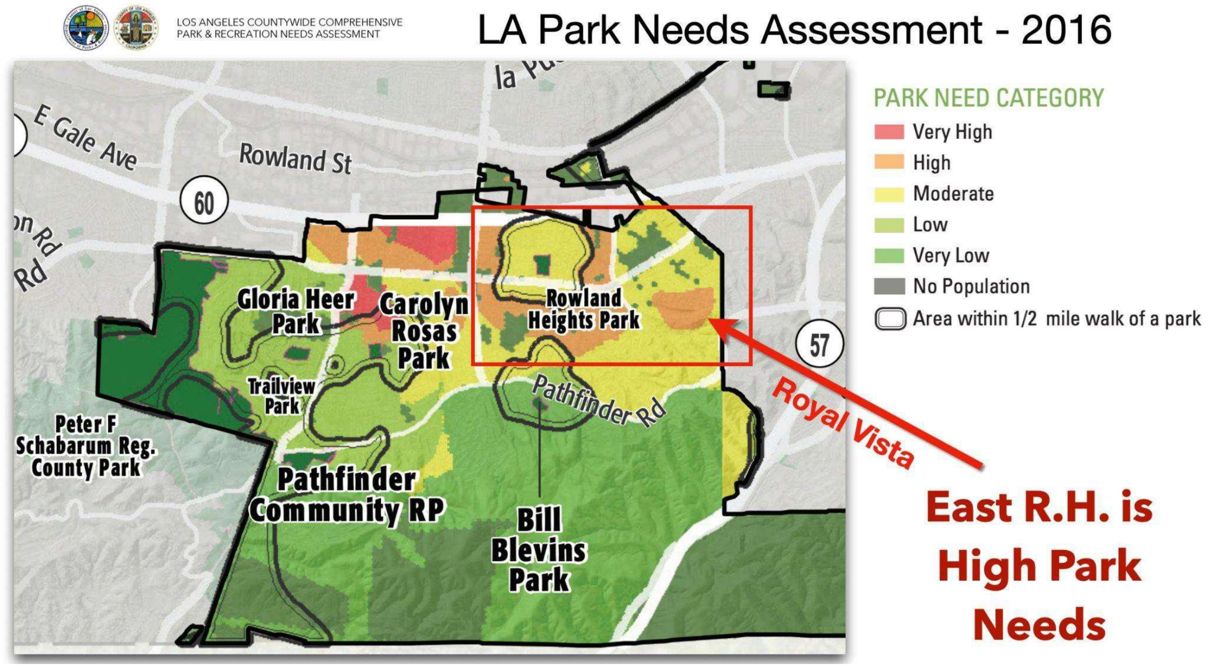
All our actions matter. We are all asked to conserve gas and electric energy; use less water; reduce, reuse, recycle; walk or bike instead of drive whenever possible; separate green/organic waste from trash; and the list goes on. Every action matters. It begs the question how rezoning, building on, and permanently destroying nature on 76-acres of Open Space would not have **Significant** Irreversible Environmental Changes. This leaves reasonable people to wonder what political forces are at play.

Conflict of Interest

IND 29-4

The closure of the privately-owned Royal Vista Golf Course benefits Los Angeles County financially by excluding competition. Royal Vista Golf Course is a short, 3.2-mile drive from the L.A. County-owned Diamond Bar Golf Course. When the Diamond Bar Golf Course closed for the 57/60 Confluence Project, the Southern California Council of Governments circulated a list of alternative golf courses open for golfing. Royal Vista Golf Course was excluded from that list. The Los Angeles County Board of Supervisors have the deciding vote to approve or deny this Project. This leaves reasonable people to wonder what political forces are at play.

The Diamond Bar Golf Course is being renovated as part of the transfer of land and funds involving several governmental entities including the San Gabriel Valley Council of Governments, Los Angeles County, Metropolitan Transportation Authority, and Caltrans. Besides renovating the Golf Course, the agreement included funds earmarked for park development. None of the designated park funds were used to develop a park in the eastern unincorporated portion of Rowland Heights, that portion directly affected by the loss of the Open Space of Royal Vista Golf Course. We voted for and paid into Los Angeles County Measure A funds, yet we have seen none of the funds used here in the eastern portion of Study Area 92 of the Los Angeles County Parks Needs Assessment, despite the high environmental burdens, low proximity to regional recreation sites, and designation as High Park Needs. This leaves reasonable people to wonder what political forces are at play.



Environment

ES.6.1 Significant and Unavoidable Environmental Effects - page 27

The Project will develop 76 acres of Open Space, necessitating rezoning, with three Significant and Unavoidable Environmental Effects on the surrounding neighborhoods and adjacent communities. **ES. 6.1** lists them as **Greenhouse Gas Emissions**, **Noise**, and **Transportation**.

Environmental Analysis, Chapter 4
4.8.8 Environmental Impact Analysis - page 401

Impact GHG-1 - page 401
"The proposed Project would generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment. (Significant and Unavoidable)" IND 29-5

Impact GHG-2 - page 404
"The proposed Project would conflict with any applicable plan, policy, regulation, or recommendation of an agency adopted for the purpose of reducing the emissions of GHGs. (Significant and Unavoidable)"

Impact TR-2 - page 616
"The Project would conflict or be inconsistent with State CEQA Guidelines Section 15064.3, Subdivision (b). (Significant and Unavoidable)"

Mitigation Measures - page 621
Implementation of Mitigation Measure TR-1 and TR-2.

"The Project would generate greenhouse gas emissions, either directly or indirectly, that would have a significant and unavoidable impact on the environment. The proposed Project would generate greenhouse gas emissions that would exceed the net zero threshold and would be inconsistent with some applicable plans to reduce GHG. With implementation of Mitigation Measures TR-1, TR-2, PDF GHG-1, and PDF GHG-2, emissions would be reduced, but GHG impacts would still remain significant and unavoidable."

- PDF GHG-1 and PDF GHG-2 were difficult to find in the DEIR, but I located them under Project Design Features, not listed as mitigation measures. This DEIR is dense, so maybe I missed it somewhere else? IND 29-6
- While TR1 and TR2 are considerate mitigation measures, there is no assurance these measures will have any significant impact on reducing the number of vehicles on the road. Southern California residents do not choose public transportation easily. Public transportation in Southern California is neither efficient nor safe. IND 29-7
- Electric bikes will most likely be used by most as recreation on the trails. Cycling along Colima and at busy intersections is dangerous. In fact, if you see cyclists on this stretch of Colima, they ride on the sidewalk.
- Therefore, we cannot rely on these mitigation measures to have any measurable impact in reducing greenhouse gas emissions or mitigating traffic concerns
- Public safety - Before offering electric bikes to every residence, the bike lanes planned to link the Colima/Fairway and Diamond Bar bike lanes should be striped and ready to go to make every possible effort to protect cyclists. Is it possible to create some sort of barrier along Colima to protect cyclists from vehicles? IND 29-8
- Page 212 - Sensitive Receptors and Locations "Certain population groups, such as children, elderly, and acutely and chronically ill persons (especially those with cardio-respiratory diseases), are considered more sensitive to the potential effects of air pollution than others. Sensitive land uses within 500 feet of the Project Site are shown in Figure 4.3-3." IND 29-9
- Figure 4.3-3 - page 216 Sensitive Receptor Locations Nearest to the Project Site
  - The sensitive receptor locations include single family residential areas, an assisted-living facility, 4 schools, 2 parks, and a school district office.
- If there is no other way to reduce greenhouse gas emissions or protect community members, then choose the Environmentally Superior Alternative #3, Existing Zoning Alternative - page 27.

4.7 Geology and Soils

Mitigation Measure GEO-1 - page 356
How do we analyze the condition of geology and soils without a Final Geotechnical Engineering Investigation Report? The area of landslide has been of interest for some time. How do we know the potential for landslides is less than significant with mitigation? Page 358. Is missing information acceptable in a DEIR? Is it possible for this project to be approved without a Final Geotechnical Engineering Investigation report? IND 29-10

4.15.1 Existing Conditions Fire Protection - page 557

"The Project Site is not located within a Fire Hazard Severity Zone but is partially located within the wildland-urban interface: the zone of transition between developed areas and undeveloped wildland (CalFire, 2021)." IND 29-11

Throughout the planning period and up to the May 2023 Subdivision Committee Report, the project was located in the High Fire Hazard Severity Zone. What caused the change in designation and when did that occur? Who or what entity was responsible for that decision and on what was it based?

4.20 Wildfire

Fire History - page 673

"Fire history information can provide an understanding of fire frequency, fire type, most vulnerable locations, and significant ignition sources. The fire history data for the proposed Project area is based on CAL FIRE's California Statewide Fire Map that displays fires from 1950 to present, and CAL FIRE's Fire Resource Assessment Program (FRAP) database that assesses the amount and extent of California's forests and rangelands, analyzes their conditions, and identifies alternative management and policy guidelines. These tools show there is not a significant potential for wildfire near the Project Site, but the Project vicinity could be subject to the occasional wildfire encroachment, most likely originating from open space and residential/rural areas south and east of the Project Site (CAL FIRE 2022c). There are records of one brush fire occurring recently in the Project area; the 2019 Brea Fire began near Brea Canyon Road and State Route 57 (SR-57) approximately two miles south of the Project Site and expanded to 16 acres but did not encroach into the Project Site (City of Diamond Bar 2022)." IND 29-12

The Freeway Complex Fire and Landfill Fire in 2008 closed many schools due to heavy smoke. The fire made its way to Diamond Bar. We could see the flames cresting over the hills south of our neighborhood. While these wildfires did not encroach into the Project Site, they had a major effect on our communities. At that time, we had the Royal Vista Golf Course as open space in case of evacuation. Water dropping aircraft used the lakes at Royal Vista Golf Course to help fight the fires.What is the plan without these resources?

ES.6 Areas of Controversy - page 27

“Pursuant to State CEQA Guidelines Section 15123(b)(2), a lead agency is required to include areas of controversy raised by agencies and the public in the EIR summary. Areas of controversy have been identified for the proposed Project based on comments made during the 60-day public review period in response to information published in the Notice of Preparation (NOP). Areas of controversy included concerns about impacts to biological resources from developing private open space, air quality due to construction, health and safety due to construction, hydrology due to flooding, noise due to construction, and traffic due to the introduction of new residential homes.”

As part of the NOP process, I outlined additional concerns in an email to Marie Pavlovic on 12.12.2022. Some of those concerns were not included in section ES.6, Areas of Controversy. I have included them here with some edits to reflect new information.

- If the development is approved, it will encourage more pedestrian traffic on Colima Road, particularly back and forth across Colima to access the parks. You will want to put the following or similar protections in place for public safety. Besides neighborhood residents, the local high school uses Colima for their long-distance running students.Public safety should be prioritized.

- Monthly cleaning and maintenance of sidewalks - There are several slip and fall hazards along the south side of Colima from Walnut Leaf east toward the Golf Course through to Calbourne caused by tree debris, water coming down the retaining walls, puddling of water, and poor maintenance of trees. We know the locations of these hazards, and we navigate around them. Walkers new to the area will not have the benefit of experience. (We now see more regular maintenance occurring along Colima. Thank you.)

- Creation of bike lanes protected by a barrier similar to this image. It is not pretty, but it will protect pedestrians and cyclists.

- Funding for replacement and maintenance of existing single family homes’ retaining walls along Colima adjacent to the development. These are in disrepair and will need fortifying. There is a safety concern as the walls and railings are deteriorating and could possibly fail.

- A traffic signal is safer than a 4-way stop on Colima and Walnut Leaf. (The DEIR notes there will not be a 4-way stop after all. Just an additional stop sign for traffic entering and exiting the Project. That is an unsafe plan.)

- At the December scoping meeting, the traffic study proposed is standard protocol. Consider studying the number of homes whose residents’ only egress is Colima Road. The Lennar Diamond Bar housing development’s residents are not to use Walnut Leaf or Lake Canyon as egress points. However, it is a regular occurrence. In a major emergency where evacuation must take place, there will be major congestion thwarting quick evacuation.

IND
29-13

- If the proposed development includes building of any retaining walls, have a fund in place for maintenance and repair.
- More parking spaces at the proposed dog park and park north of Colima.(The DEIR reports no parking at all at these locations. This will cause more pedestrians along Colima.)
- Beautify the landscaping along Colima. Plant trees (natives such as Palo verde or western sycamore).
- Build and landscape a center divider as exists in Diamond Bar at the Rowland Heights border. Use a landscape plan that includes native plants, widened green belts, and pollinator gardens.
- Landscape the dirt patch on the south side of Colima (southeast Colima between Walnut Leaf and PA-5). This is a no-man's land with L.A. County declining responsibility for maintenance and landscaping.
- What is the plan to build a local hospital? The DEIR cites Whittier hospital is 9 miles away. Paramedics will transport to Pomona Valley, approximately 10-12 miles away depending upon the route. Any delay in receiving emergency services costs lives. Timely emergency care should not be jeopardized. With more residents comes more need. What is the plan?

Thank you for the opportunity to review and comment on the DEIR for the Royal Vista Residential and Parks Project.

Sincerely,
Derrick and Susan Trautz

Response to Comment Letter IND 29

Derrick and Susan Trautz

Response IND 29-1

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response IND 29-2

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA.

Response IND 29-3

The former golf course is a man-made commercial development that was constructed in 1961. The commenter quotes the DEIR conclusion sentence but did not include the support for reaching the conclusion. Project construction would be consistent with regional and local growth forecasts in the area, as well as State and local goals for reductions in the consumption of non-renewable resources. The Project Site contains no energy resources that would be precluded from future use through Project implementation. The Project provides a diverse range of new housing while reducing reliance on non-renewable resources by eliminating natural gas usage and providing all-electric residences.

Response IND 29-4

Comment noted. The subdivider will pay the in-lieu fees of $986,332, calculated in the Park Obligation Report (Appendix L), to satisfy the Project's Quimby park obligation requirements. These fees are allocated for parks in the Department of Parks and Recreation's Rowland Heights Park Planning Area. The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a further response is not required pursuant to CEQA.

Response IND 29-5

Comment noted. The commenter restated several conclusions from the DEIR.

Response IND 29-6

PDF GHG-1 and PDF GHG-2 are Project Design Features, not mitigation measures, and are located in Section 4.8 Greenhouse Gas Emissions, Chapter 2, Project Description and in the Executive Summary, Table ES-1.

Response IND 29-7

The vehicle miles traveled (VMT) reductions calculated to result from implementation of Mitigation Measures T-1 and T-2 are based on the recommended quantification methodology and substantial evidence provided in the California Air Pollution Control Officer's Association (CAPCOA) Handbook for Analyzing Greenhouse Gas Emissions Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity ("2021 Handbook"), which is described beginning on page 4.17-17 of the DEIR. Mitigation Measures TR-1 and TR-2 are expected to result in a quantifiable VMT reduction of 0.45 percent. See DEIR page 4.17-21 and page 61 of the Transportation Impact Analysis (Appendix M of the DEIR).

Response IND 29-8

The current County of Los Angeles Bicycle Master Plan (adopted in March 2012) indicates that bicycle lanes are planned for Colima Road. See page 4.17-5 of the DEIR. No off-site bicycle facilities are planned to be provided as part of the proposed Project. Installation of bicycle lanes on Colima Road would be the responsibility of the Los Angeles County Department of Public Works and would be beyond the scope of the Project to implement.

Response IND 29-9

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and will be included in the Project record, but a response is not required pursuant to CEQA. Further, Alternative 3 only meets one of the five Project Objectives.

Response IND 29-10

See Response FORM 4-6. In addition, DEIR Section 4.7 Geology and Soils, page 4.7-18 states, "While the Geotechnical Reports provide sufficient detail to determine whether the Project Site is suitable for the intended use and identifies design considerations to be considered in the design of the Project, the report acknowledges that more detailed studies based on final grading plans are required to address specific geological issues. Accordingly, and as required by LACBC Section 111 and Mitigation Measure GEO-1, a final geotechnical report based on the final grading plans must also be prepared and reviewed by the County prior to issuance of grading permits. As a result, all potential geologic/geotechnical hazards would be mitigated to the satisfaction of Public Works prior to the issuance of a grading permit". Therefore, the Geotechnical Report provided in Appendix G to the DEIR is sufficient for CEQA purposes. A final Geotechnical Report would be required prior to issuance of grading permits.

Response IND 29-11

The Project Site is not located within a Fire Hazard Severity Zone. See DEIR Section 4.20, Wildfire, and Figure 4.20-1. To clarify, during initial review of the Project Tentative Tract Map application, the Project Site was incorrectly identified by the County of Los Angeles Fire Department – Fire Prevention Division as being located within a High Fire Hazard Severity Zone, but as subsequently recognized by the Fire Prevention Division, the Project Site is not located in a Fire Hazard Severity Zone.

Response IND 29-12

Comment noted. See Response IND 29-4.

Response IND 29-13

Comments noted. The comments are related to beautifying the surrounding area and do not relate to the Project or fall under the categories identified in the Executive Summary under Areas of Controversy which included concerns about impacts to biological resources from developing private open space, air quality due to construction, health and safety due to construction, hydrology due to flooding, noise due to construction, and traffic due to the introduction of new residential homes. Pedestrian safety circulation was addressed in DEIR Section 4.17 Transportation, which includes signalizing the crossing on Colima. The TIA concluded that no additional safety features are needed. See IND 29-4 above regarding evacuation routes. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Edmundo Asuncion <edmundo.asuncion@lacity.org>
Sent: Friday, January 5, 2024 12:22 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; GDuran@bos.lacounty.gov; wrehman@bos.lacounty; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Propose new Housing Project

Hello Everyone,

My name is Edmundo Asuncion and my wife Edna Asuncion have live in this area (Royal Vista) for 26 years now and we love the area because of wide open space and the wildlife that made the this place their home. I've seen wild ducks with their ducklings, wild geese, rabbits and other wildlife. Also, the air quality is fresh because of the open space.

I understand that a proposal to build 800 units of housing which estimately would bring about a minimum of 2400 new residents and at least 2000 new vehicles would definitely change our way of life. There will be traffic and the quality of air would be compromise.

IND 30-1

I therefore do not agree with this new housing project and I hopefully pray that the board will not approve this project.

Sincerely,
Edmundo and Edna Asuncion
20201 Wyn Terrace, Walnut CA. 91789

Response to Comment Letter IND 30

Edmundo Asuncion

Response IND 30-1

Chapter 2, Project Description, discusses that the Royal Vista Residential Project (Project) proposes to redevelop an approximately 76-acre site, which currently comprises a portion of the existing Royal Vista Golf Club golf course, with residential and open space. The Project would develop a total of 360 residential units, consisting of 200 detached single-family homes, 88 attached residential condominium units (58 duplex units, 30 triplex units) and 72 townhomes. All 72 townhomes and ten triplex units would be set aside for sale to middle- and moderate-income households. The Project would also set aside approximately 28 acres of open space areas. See Response FORM 1-2.

The commenter does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. Therefore, the comment is noted and the comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

-----Original Message-----
From: Lisa Valladares <cesarnlisa@icloud.com>
Sent: Friday, January 5, 2024 1:41 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: Royal Vista Opposition

CAUTION: External Email. Proceed Responsibly.

Royal Vista Housing Opposition

IND 31-1 My name is Lisa Valladares and my family and I strongly oppose the housing project for Royal Vista Golf and would like to have my voice heard.

IND 31-2 Constructing homes in the area poses a significant threat to the existing ecosystems. The disruption caused by clearing land for development results in the loss of crucial habitats for various species, potentially leading to declines in biodiversity and even local extinctions. Wildlife, dependent on the natural environment, may face displacement, struggles for resources, and fragmentation of their habitats, making it challenging for them to thrive.

IND 31-3 Furthermore, the construction process itself introduces a range of pollutants into the air and water. Dust, noise, and chemical runoff from building sites can negatively impact the surrounding environment and pose risks to the health of nearby communities. The air quality may deteriorate, affecting respiratory health, and water sources could be contaminated, posing risks to both wildlife and human populations.

IND 31-4 Preserving open areas not only supports the conservation of diverse ecosystems but also plays a crucial role in maintaining the overall health and well-being of the community. By prioritizing the protection of these natural spaces, we can sustain a harmonious balance between human development and the environment, ensuring a healthier and more sustainable future for both wildlife and residents.

IND 31-5 The proposed housing development not only poses environmental concerns but also has potential implications for traffic congestion, crime rates, and the utilization of available space in the area.

1. Traffic Impact:
The influx of new residents resulting from the housing development could significantly impact traffic in the area. Increased population density often leads to higher vehicle numbers, potentially causing congestion on existing roadways. This not only affects the convenience of current residents but may also strain local infrastructure, necessitating upgrades to accommodate the heightened demand on transportation networks.

IND 31-6 2. Crime Rates:
Urbanization and population growth associated with housing developments can sometimes correlate with changes in crime rates. An upsurge in population density may lead to increased anonymity, potentially providing opportunities for criminal activities. As the community expands, law enforcement and security measures might need to be reassessed and enhanced to ensure the safety of both existing and new residents.

3. Space Utilization:

The construction of additional housing can lead to changes in the utilization of available space. Open areas that were once used for recreational activities or natural landscapes may be repurposed for housing units and infrastructure. This transformation could impact the overall aesthetic and functionality of the community. Preserving open spaces is crucial not only for environmental reasons but also for maintaining a sense of community well-being and providing recreational areas for residents. IND 31-7

In conclusion, the proposed housing development poses challenges such as traffic congestion, crime management, and the alteration of available space. Tackling these issues necessitates meticulous urban planning, taking into account the overall impact on the community. It is imperative to prioritize the well-being of long-standing residents who have invested their sweat and tears to foster a peaceful and healthy community. We urge a denial of the housing project for the sake of those who have dedicated themselves to building a thriving and harmonious neighborhood. IND 31-8

Thank you,
Lisa Valladares and family

Response to Comment Letter IND 31

Lisa Valladares

Response IND 31-1

Comment noted.

Response IND 31-2

The proposed Project is an infill development on a portion of an existing (and recently closed) golf course. The Project Site is not considered suitable habitat for protected wildlife species (see DEIR Section 4.4, Biological Resources and GLA Supplemental Memorandum in Appendix P of this FEIR). Further, Planning Areas 4 and 6 would remain open space during construction and would provide foraging opportunities for wildlife. There are also off-site parks and open space areas such as the Larkstone Park and surrounding areas in the City of Diamond Bar that would continue to provide foraging habitat for a variety of species, and the species known to forage within residential communities, as well.

Response IND 31-3

The commenter expresses general concerns regarding air quality, hydrology and water quality and noise, but does not state a specific concern about the adequacy of the DEIR or otherwise comment on the contents of the DEIR analysis. The DEIR provided a thorough analysis of the topics raised by the commenter. The DEIR concludes the potential impacts of Project construction and operations on air quality (Section 4.3) would be less than significant with mitigation incorporated, hydrology and water quality (Section 4.10) would be less than significant with mitigation incorporated, and noise (Section 4.13) would result in a significant and unavoidable construction impact with mitigation incorporated during construction.

Response IND 31-4

The proposed Project is an infill development on a portion of an existing (recently closed) golf course. The Project Site is not considered suitable habitat for protected wildlife species. However, the Project would provide approximately 28 acres of open space that would remain as a vegetated surface to retain moisture and will include a net gain in the number of trees on the Project Site from 411 trees to 1,864 trees. This will increase the number of trees by more than 4 times.

Response IND 31-5

See Response FORM 1-2 and Response FORM 1-3.

Response IND 31-6

See Response FORM 1-2. DEIR Section 4.15 Public Services, discusses that the implementation of the Project is not anticipated to increase crime. However, Public Services Impact PS-2, the DEIR discusses that the Project would include general principles of Crime Prevention Thru Environmental Design (CPTED) as recommended by the Walnut-Diamond Bar Sheriff Station, such as lighting and landscaping. The CPTED reduces opportunities for criminal activities by employing physical design features that discourage anti-social behavior, while encouraging legitimate use of the site. The incorporation of CPTED design principles is an element of the Project description, but would also be secured through Project conditions of approval. There is no evidence presented that crime rates will increase as a result of developing the Project.

Response IND 31-7

See Response IND 31-4, above.

Response IND 31-8

The comment is noted, and the comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR

From: LUIS AVALOS <avalosl_97@msn.com>
Sent: Friday, January 5, 2024 3:50 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Chen, Cindy <cchen@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; Amy Bodek <ABodek@planning.lacounty.gov>
Subject: Project No. PRJ2021-002011 Royal Vista

CAUTION: External Email. Proceed Responsibly.

I writing you to provide comments on the Draft Environmental Impact Report (DEIR) for the proposed Royal Vista Residential Project No.PRJ2021-002011 .

I am here encourage you all to consider the irreversible damage that the ecosystem will suffer for generations to come, do yo really want to have you name associated with approving such a project that will alter native bird migration and possible end refuge for animals such a foxes, racoons frogs and others ? not to mention I believe something like 300 trees I been told.

IND 32-1

I have lived in this community since 1998 and I seen all these animals mentioned above, I know if we work together we can preserve present ecosystem for future generations and be part of the solutions not part of destruction of little green spaces that we have left for our grand kids

I know some of my neighbors are opposing this project for the noise traffic increased this project will bring not to mention crime.

Please consider how many lives will be affected in a negative way.

Thank you for attention to these concerns and you commitment to ensuring that the proposed Royal Vista Project aligns with the values and needs of our community

Sincerely
Luis Avalos

IND 32-2

Response to Comment Letter IND 32

Luis Avalos

Response IND 32-1

See Response FORM 1-4. In addition, the Biological Resources Section 4.4 of the DEIR discusses that the biological impacts will be less than significant with mitigation. Regarding trees, the Project will remove 367 of the 411 existing trees, and will plant approximately 1,820 new trees. The Project will have a net gain in the number of trees on the Project Site from 411 trees to 1,864 trees. This is more than 4 times the number of existing trees.

Response IND 32-2

The comment is noted, and the comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 9:17 AM
To: Kevin Smith
Subject: FW: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov

Our field offices are currently open to the public. Please visit planning.lacounty.gov for information about available services, public meeting schedules, and planning projects.

From: Mary Happy Price <maryhprice1968@gmail.com>
Sent: Friday, January 5, 2024 8:00 AM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Cc: Amy Bodek <ABodek@planning.lacounty.gov>; Duran-Medina, Guadalupe <GDuran-Medina@bos.lacounty.gov>; wrehman@bos.lacounty.gov; Chen, Cindy <cchen@bos.lacounty.gov>; Moreno, Andrea <amoreno@bos.lacounty.gov>; Serrano, Ryan <RSerrano@bos.lacounty.gov>; saveroyalvista <saveroyalvista@gmail.com>
Subject: Project No. PRJ2021-002011 Draft Environmental Impact Report (DEIR) Comments

Dear Marie Pavlovic,

I am writing to voice my concern about the DEIR of the proposed project of developing 360 units on a beautiful golf course. .

1) Traffic - The traffic impact study was only for this proposed project. What about the future traffic impact of the potential Sunjoint development of having a concept of building 419 units on the remaining lots of the golf course? What about any potential SB9, ADU and JADU going to be built in and around the community?

IND
33-1

To encourage people to utilize the Metrolink for daily commute is a reimbursement subsidy of up to 50 % of the cost of one Metrolink and bus pass monthly per residential dwelling unit as stated in the report. The majority of these units have 3 + bedrooms, are the developer suggesting only encourage one person per household to commute using public transportation?
I live in the neighborhood for over 27 years and never notice anyone ride their bicycle to work, and less student ride their bicycle to school now due to safety reason.

2) Greenhouse Gas Emissions - Due to climate change, Governor Newson pledged to reduce greenhouse gas. In contrast, this proposed project contributes to air pollution and environmental injustices. And it's stated in the report "With implementation of Mitigation Measures TR-1, TR-2, PDF GHG-1, and PDF GHG-2, emissions would be reduced, but GHG impacts would still remain significant and unavoidable." The 60 freeway is close by the side of the golf course, removing all the mature trees that help combat air pollution from the freeway and planting smaller trees after is not the same.

IND 33-2

Sincerely,

Mary “Happy” Price
626-824-7974

20043 Emerald Meadow Dr, Walnut, CA 91789

Response to Comment Letter IND 33

Mary Price

Response IND 33-1

See Response FORM 1-2. Comment regarding bicycles is noted.

Response IND 33-2

Section 4.8, Greenhouse Gas Emissions, of the DEIR, discusses that the Project would have a significant and unavoidable VMT Impact (see 4.17 Transportation of the DEIR) and significant and unavoidable impact to greenhouse gas emissions (see 4.8 Greenhouse Gas Emissions). The Project would be consistent with the goals and policies of SCAG 2020 Connect SoCal, the General Plan and the County's Sustainability Plan but would be inconsistent with some VMT related key project attributes under the 2022 Scoping Plan and thus is concluded to be inconsistent with applicable GHG reduction plans and policies. Mitigation Measures TR-1, TR-2, PDF GHG 1, and PDF GHG-2 would reduce emissions, but GHG impacts would remain significant and unavoidable as discussed in Section 4.8 Greenhouse Gas Emissions.

In addition, the Project will include planting 1,820 new trees. This is more than 4 times the number of existing trees on the Project Site.

The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Sent: Monday, January 8, 2024 9:21 AM
To: Kevin Smith
Subject: FW: Royal Vista Project # PRJ-2021-002011-1

MARIE PAVLOVIC
SENIOR PLANNER, Subdivisions
Office: (213) 974-6433 • Direct: (213) 459-3586
Email: mpavlovic@planning.lacounty.gov

Los Angeles County Department of Regional Planning
320 West Temple Street, 13th Floor, Los Angeles, CA 90012
planning.lacounty.gov

From: The Malkin Family <dtmalkin@gmail.com>
Sent: Friday, January 5, 2024 12:49 PM
To: Marie Pavlovic <mpavlovic@planning.lacounty.gov>
Subject: Royal Vista Project # PRJ-2021-002011-1

I think it fails to adequately consider traffic in the area, water limitations, need for open space and wildlife crossing.

Teri Malkin
18021 Galatina St.
Rowland Hts., cA 91748

IND
34-1

Response to Comment Letter IND 34

Teri Malkin

Response IND 34-1

Comment noted. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Karen Gerloff <karengerloff66@gmail.com>
Sent: Friday, January 5, 2024 6:08 PM
To: Marie Pavlovic
Cc: Amy Bodek; Duran-Medina, Guadalupe; Rehman, Waqas; Chen, Cindy; Moreno, Andrea; Serrano, Ryan; saveroyalvista
Subject: Project No. PRJ2021-002011 Draft EIR Comments

Follow Up Flag: Follow up
Flag Status: Flagged

Dear LA County Department of Regional Planning,

Thank you for accepting this note of comment on Project No. PrJ2021-002011 the Royal Vista Residential Project. I have written comments previously but forgot to mention that the Draft EIR document stated that Valley fever is quite usually very mild. That may be for young healthy people but for older compromised people,of which, there are many in the homes surrounding this development, Valley fever can be very serious. The strong anti fungal medicines used to treat it can be poorly tolerated. I personally know a family whose patriarch has Valley Fever and after a long period of no diagnosis was finally diagnosed and is being treated. His outlook is not good. He has had seizures, heart problems and now suddenly dementia. This has been a terrible emotional and financial blow to the family, for them Valley Fever is not just a mild inconvenience as the DEIR suggested. IND 35-1

Thank you for taking these additional comments.
Sincerely,

Karen Gerloff
karengerloff66@gmail.com
909 348-2168

Response to Comment Letter IND 35

Karen Gerloff

Response IND 35-1

See Response FORM 2-6. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: Jim and Jo Cromer <jimnjocromz@juno.com>
Sent: Wednesday, October 4, 2023 3:22 PM
To: Marie Pavlovic
Subject: RE: Royal Vista
Attachments: RE: Royal Vista

Follow Up Flag: Follow up
Flag Status: Flagged

CAUTION: External Email. Proceed Responsibly.

Hello Marie,
I am sending this email in response to yet another project submitted for an additional 419 homes proposed now on the property of the Los Angeles Royal Vista Golf Course. After receiving a letter from my Senator, Bob Archuleta, describing California's multi million investment in parks and open spaces I am horrified and upset to learn that our county is considering re-zoning the golf course to allow for a total of 780 residences. We are already overcrowded and have poor air quality as it is. Everywhere I go I see large residential communities being built. This is in La Habra, Whittier, Brea, Diamond Bar, Covina, and Rowland Heights etc. How possibly do we need more? What can be done to stop this?

IND 36-1

Jo Ann Cromer
20010 Esquiline Ave
Walnut CA 91789
909 595-8590

Please note: message attached

From: "Marie A. Pavlovic" <mpavlovic@planning.lacounty.gov>
To: jimnjocromz <jimnjocromz@juno.com>
Subject: RE: Royal Vista
Date: Tue, 27 Jun 2023 14:34:41 +0000

Response to Comment Letter IND 36

Jo Ann Cromer

Response IND 36-1

The Project proposes 360 units. See Response FORM 1-2. Section 4.3, Air Quality, of the DEIR concluded that the Project would result in a less than significant impact to air quality with the mitigation measures proposed. The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

From: jimnjocromz <jimnjocromz@juno.com>
Sent: Tuesday, February 14, 2023 10:42 AM
To: Marie Pavlovic
Subject: Royal Vista

Follow Up Flag: Follow up
Flag Status: Flagged

My husband and I attended a meeting last night regarding the elimination of the Royal Vista Golf Course to build yet another housing project. We have lived adjacent to the golf course for 47 years. As a 2 time cancer survivor I am extremely concerned about the health issues this causes. (My husband has lung issues as well). Both increased pollution from the elimination of our green space and Valley Fever are extremely concerning. In addition to the health issues, our traffic here is already at maximum capacity. We cannot handle an additional 750+ cars! I also believe this is putting a strain on our already limited water supply and contributes to climate change. THIS PROJECT SHOULD NOT BE ALLOWED TO MOVE FORWARD.

IND 37-1

Thank you,
Jo Ann Cromer
20010 Esquiline Ave
Walnut, Ca
909 595-8590

Sent from my Galaxy

Response to Comment Letter IND 37

Jo Ann Cromer

Response IND 37-1

See Response FORM 2-6 for Valley Fever, Response FORM 1-3 for traffic, and Response FORM 1-10 for water supply. The Project includes approximately 28 acres of publicly accessible open space onsite which is in addition to the $986,332 in lieu fee which will be paid to satisfy the Project's Quimby requirement as provided in Department of Parks and Recreation (DPR) Park Obligation Report dated April 17, 2023, Park Obligation Report (see Appendix L of the DEIR). The in-lieu fees will be used by the DPR to improve existing parks and/or develop additional parkland in the Rowland Heights area. The Project's 28 acres of open space also exceeds the 3.52-acre parkland dedication requirement indicated on DPR's Park Obligation Report and, together with the in-lieu fee, ensures that the Project would meet the additional park and recreation needs created by the Project and expected population increase.

The comment letter will be available to the decision-makers for their review and consideration as part of the Final EIR.

CHAPTER 11

Corrections, Clarifications, and Additions

11.1 Introduction

This chapter describes the modifications that were made between the Draft Environmental Impact Report (DEIR) and the Final Environmental Impact Report (Final EIR). Modifications in the final document include all revisions related to public comments, updates, and clarifications, as determined necessary by the County of Los Angeles (County), the lead agency.

Three new chapters are added to the Final EIR. Chapter 9, which includes an introduction to the Final EIR; Chapter 10, which includes the comments received during the 60-day comment period for the DEIR and the responses to those comments; and Chapter 11, which presents changes, clarifications and additions made to the DEIR during the preparation of the Final EIR.

Section 11.2 sets forth those revisions made to the DEIR, with the exception of nonsubstantive changes that do not alter the meaning of the text, including errors in grammar, punctuation, spelling, acronyms, references, and typography. Such nominal nonsubstantive changes have been corrected for the final documents but are not included in this chapter. None of the revisions to the DEIR result in changes to significance findings in the DEIR and the DEIR does not meet the criteria of CEQA Guidelines Section 15088.5 requiring recirculation.

More specifically, CEQA requires recirculation of a Draft EIR only when "significant new information" is added to a Draft EIR after public notice of the availability of the Draft EIR has occurred (refer to PRC Section 21092.1 and CEQA Guidelines Section 15088.5) but before the EIR is certified. CEQA Guidelines Section 15088.5 specifically states the following:

> *New information added to an EIR is not 'significant' unless the EIR is changed in a way that deprives the public of a meaningful opportunity to comment upon a substantial adverse environmental effect of the project or a feasible way to mitigate or avoid such an effect (including a feasible project alternative) that the project's proponents have declined to implement. 'Significant new information' requiring recirculation includes, for example, a disclosure showing that:*
>
> - *A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.*
> - *A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted to reduce the impact to a level of insignificance.*

- *A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the significant environmental impacts of the project, but the project's proponents decline to adopt it.*
- *The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.*

CEQA Guidelines Section 15088.5 also provides that "[re]circulation is not required where the new information added to the EIR merely clarifies or amplifies or makes insignificant modifications in an adequate EIR … A decision not to recirculate an EIR must be supported by substantial evidence in the administrative record."

As demonstrated in this Final EIR, including any changes to the environmental analysis in Chapter 4 of the Draft EIR, the changes presented in this chapter do not constitute new significant information warranting recirculation of the Draft EIR as set forth in CEQA Guidelines Section 15088.5. Rather, the Draft EIR is comprehensive and has been prepared in accordance with CEQA.

11.2 Modifications to the DEIR

Revisions to the text as presented herein are incorporated into the Final EIR. Underlines indicate where additions were made to the original text. ~~Strikeout~~ indicates where the original text was deleted. The locations of revisions are identified according to section number, page number and/or heading from the DEIR; table and figure numbers from the DEIR are used where applicable.

Executive Summary

Page: ES 7: The text of the DEIR has been revised as follows:

> Project grading will require approximately 387,100 cubic yards of cut and approximately 253,400 cubic yards of fill, with a net export of approximately 133,700 cubic yards for the Project Site. Over excavation and re-compaction of up to 1,544,500 cubic yards each is anticipated. The maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during the construction of the golf course, except for one isolated area within Planning Area 5 that may be as deep as 30 feet. During Project excavation the 1,544,500 cubic yards would be temporarily stockpiled on site and when the site is ready for re-compaction, the 1,544,500 cubic yards soil would be redistributed on site and compacted to create roadways and the residential lots (Project grading plus over-excavation, re-compaction and export totals approximately 3,863,200 cubic yards).[1] Export materials will be hauled to the closest landfill, which is expected to be the Olinda Landfill in the City of Brea. The haul route is expected to be the SR-60 Freeway East from the Project Site using Colima Road and Fairway Avenue,

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[1] Cut and fill, over-excavation and export grading quantities are rounded up and may differ slightly from quantities used for the tentative tract map review and air quality modeling assumptions.

to the SR-57 Freeway South, and then exiting at ~~Lambert Road~~ Imperial Highway (approximately 12~~0~~ miles away). The final haul route will be reviewed by County DPW, Fire, and Sheriff prior to grading.

Table ES-2 Biological Resources: Mitigation Measures BIO-1 has been modified as shown below to include more detail on the requirements of a Qualified Biologist:

~~BIO-1:~~ ~~Project-related construction and tree maintenance activities should occur outside of the general avian breeding season (February 1st to through August 31st) to the extent feasible. If Project-related construction and tree maintenance activities cannot occur outside of the general avian breeding season, a pre-activity nesting bird survey shall be conducted prior to the onset of the aforementioned activities, within a maximum of 7 days prior to commencement. The survey shall be conducted by a qualified biologist. The survey shall be conducted within all suitable nesting habitat located within the area of activity, which includes a 300-foot survey buffer around the activity site to account for all potentially nesting birds on and in the immediate vicinity. If no nesting birds are found, the Project-related activities may commence without potential impacts to nesting birds.~~

~~If any active nests or sign of nesting activity (e.g., carrying nesting material or food) is observed during the pre-activity survey, a suitable buffer shall be established around the nest as determined by a qualified biologist to ensure no direct or indirect impacts occur to the nest. Many avian species that would nest in the area are accustomed to urban environments and human activities; therefore, the buffer distance will be determined based on the location of the nest as well as the species tolerance to human presence. A qualified biologist will monitor the nesting activity after the buffer is delineated and during typical Project-related noises to verify that the buffer is adequately placed and to confirm that breeding is not compromised by the Project. Any excessive noise or lighting that could potentially impact the nest shall be directed away from the nest to the greatest extent feasible. The buffer shall remain in place for the duration the nest is active as determined by a qualified biologist.~~

BIO-1 Designated Biologist. Prior to initiating ground- or vegetation-disturbing activities, subdivider shall submit to CDFW for review and approval a list of biological monitors (Designated Biologist) that will be involved with the Project. The list shall include their names, qualifications, experience, and contact information. Designated Biologists shall: a) be knowledgeable and experienced in the biology and natural history of local plant and wildlife resources; b) be able to identify resources that are or have the potential to be present at the Project area; c) have previous biological monitoring experience on construction Projects; d) for any required nesting bird surveys, the biologist must have at least three (3) years of field experience conducting general and protocol-level surveys related to finding nests and monitoring them for a specific purpose of determining breeding status, egg incubation, chick maturity, and estimating fledge date; e) have the necessary experience and/or certifications for conducting protocol and focused surveys for species that may be present in the Project area; f) when needed, have obtained the proper documentation in regards to Scientific Collecting Permits (SCP) or Memorandum of Understanding (MOU).

Nesting and/or Breeding Bird Avoidance. Subdivider shall not conduct vegetation alteration or removal from February 1 to September 15 (January 1 to June 30 if raptors are present) to avoid impacts to breeding/nesting birds and other special status and common species. For all other activities if the nesting season cannot be avoided, a Designated Biologist shall complete surveys to identify active nests which may be impacted directly or indirectly by Project activities. If the survey identifies an active nest, a buffer shall be established between the construction activities and the active nest so that nesting activities are not interrupted. The buffer shall be delineated by temporary fencing if site conditions allow and does not create additional disturbance, and shall be in effect throughout construction or until the nest is no longer active. If the survey identifies and active nest, Permittee shall implement one of the following to avoid and minimize impacts to nesting bird species:

a) Implement default 300-foot minimum avoidance buffers for all non-special status passerine birds and 500-foot minimum avoidance buffer for all special status passerine and raptor species. The breeding habitat/nest site shall be fenced and/or flagged in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the Project.

b) Subdivider may propose an alternative plan for avoidance of nesting birds for CDFW concurrence.

c) Should at any time during monitoring, the Designated Biologist determine that an active nest is potentially subject to adverse impacts from construction in any way, the Designated Biologist will be empowered to suspend work to ensure protection of the nest and will monitor the nest site until the nestlings have fledged and are no longer dependent on the nest.

Table ES-2 Biological Resources: Mitigation Measures BIO-2 has been modified as shown below to include jurisdictional language for California Department of Fish and Wildlife:

BIO-2: Riparian Habitat/Jurisdictional Resources.

Prior to the issuance of any grading permit for permanent impacts in the areas designated as jurisdictional features (Earthen Drainage Ditch) or riparian habitat, the Project subdivider shall obtain a CWA Section 404 permit from the USACE, a CWA Section 401 certificate from the RWQCB, and a Streambed Alteration Agreement permit under Section 1602 of the California Fish and Game Code from the CDFW, where the project warrants. The following shall be incorporated into the permitting, subject to approval by the regulatory agencies:

- On- and/or off-site restoration and/or enhancement of USACE/RWQCB/CDFW jurisdictional "waters of the U.S."/"waters of the State" and wetlands at a ratio no less than 1:1 for permanent impacts. The mitigation program would be developed in consultation with the regulatory agencies and would be based on the maximum amount of impact which is expected to be CDFW jurisdiction. ~~, and~~ fFor temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate) or through off-site restoration or enhancement. Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank).

- On- and/or off-site restoration and/or enhancement of CDFW jurisdictional streambed and associated riparian habitat at a ratio no less than 1:1 for permanent impacts, and for temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate). Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank).

Table ES-2 Biological Resources: Mitigation Measures BIO-3, Bat Surveys, has been added to Table ES-2 of the DEIR. Mitigation Measure BIO-3 is shown below:

BIO-3: Bat Surveys

Prior to site disturbance for Project construction, including removal of any vegetation, sheds and/or maintenance building that could be used by roosting bats, a qualified biologist shall conduct a pre-construction bat roost survey for roosting bats. The survey shall be conducted no more than 14 days prior to site disturbance and shall include daytime surveys to search for sign such as guano, visual “emergence” surveys at dusk, followed by night time surveys using acoustic recognition equipment specific for bat detection. The pre-construction bat roost survey shall consist of a minimum of two bat surveys (conducted consecutively or as determined by the qualified biologist). If roosting bats are detected onsite outside of the bat maternity season, the roost tree or building shall be removed in a manner to avoid and/or minimize injury to roosting bats. This may include using mechanical equipment to gently nudge the tree trunk multiple times or building as directed by the qualified biologist prior to removal or for palm trees and other tree species, to de-frond or de-branch the tree using a mechanical lift and gently lower the cut branches to the ground. Regardless of the method, the fallen tree and/or material shall be left undisturbed overnight until at least the next morning to give roosting bats time to exit before complete removal of the tree or structure. Similar and appropriate measures shall be implemented for building removal.

If roosting bats are detected onsite during the maternity season (March 1 to September 30), the Project shall avoid the subject roost(s) and incorporate an avoidance buffer (as determined by a qualified biologist) until after the maternity season or until a qualified biologist determines no maternity roosting is occurring. Once the qualified biologist approves removal of the subject roost tree(s), or buildings, the same tree and building removal procedures as outlined above shall be implemented prior to tree or building removal.

Table ES-2 Geology and Soils: Mitigation Measures Geo-1 has been modified as shown below:

> Mitigation Measure GEO-1: Final Geotechnical Engineering Investigation. Prior to the issuance of a grading permit, the subdivider shall prepare and obtain approval from the Los Angeles County Department of Public Works (LACDPW) of a Final Geotechnical Engineering Investigation Report based on the final Project design and 40-scale grading plans to address the Project's specific foundation design. Specific field work, additional and/or modified geotechnical recommendations, and laboratory testing may be required in connection with the preparation of the Final Geotechnical Engineering Investigation Report, in order to comply with the recommendations contained within the Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (July 26, 2021), Geotechnical Addendum Report and Response to Geotechnical Review Comments Regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, Los Angeles County, California (May 1, 2023), and Response to Geotechnical Review Comments dated May 31, 2023 and July 7, 2023 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (~~July~~ September 27, 2023). The subdivider shall comply with the conditions contained within the LACDPW Geology and Soils Report Approval Letter for the Project, and as it may be subsequently amended or modified by LACDPW. Furthermore, the Project's final grading, drainage, and erosion control plans must be reviewed and approved by LACDPW before the issuance of a grading permit.

Project Description

Page 2-9: The text of the DEIR has been revised as follows:

> The Project would also include approximately 28 acres of onsite retained open space which is made up of open space buffers between Planning Areas, trail system and open space on Planning Areas 4 and 6. In addition, trees will be planted along trails for shade, in Planning Area 4 and Planning Area 6 open space areas, as a condition of the Project. The Project will include the planting of approximately 1,453 ~~990~~ new trees. The Project will increase the number of trees on the Project Site from 411 trees to 1,864 trees. The new trees would include oaks, sycamores, cedar, acacia, olives, peppers, crepe myrtle, ash, pines, sweet bay, and jacaranda throughout the Project Site.

Page 2-10: The text of the DEIR has been revised as follows:

> Project grading will require approximately 387,100 cubic yards of cut and approximately 253,400 cubic yards of fill, with a net export of approximately 133,700 cubic yards for the Project Site. Over excavation and re-compaction of up to 1,544,500 cubic yards each is anticipated. The maximum depth of excavation within the Project Site would be approximately 25 feet in areas where fill was deposited during the construction of the golf course, except for one isolated area within Planning Area 5 that may be as deep as 30 feet. During Project excavation the 1,544,500 cubic yards would be temporarily stockpiled on site and when the site is ready for re-compaction, the 1,544,500 cubic yards soil would be redistributed on site and compacted to create roadways and the residential

> lots (Project grading plus over-excavation, re-compaction and export totals approximately 3,863,200 cubic yards).[2] Export materials will be hauled to the closest landfill, which is expected to be the Olinda Landfill in the City of Brea. The haul route is expected to be the SR-60 Freeway East from the Project Site using Colima Road and Fairway Avenue, to the SR-57 Freeway South, and then exiting at ~~Lambert Road~~ Imperial Highway (approximately 12~~0~~ miles away). The final haul route will be reviewed by County DPW, Fire, and Sheriff prior to grading.

Air Quality

Page 4.3-9: The text of the DEIR has been revised as follows:

- Microscopic identification of the fungal spherules in infected tissue, sputum or body fluid sample.
- Growing a culture of *Coccidioides* *~~innitis~~* *immitis* from a tissue specimen, sputum, or body fluid.
- Detection of antibodies (serological test specifically for Valley Fever) against the fungus in blood serum or other body fluids.

Page 4.3-54: The text of the DEIR has been revised as follows:

> In addition, compliance with independently enforceable rules and other measures that reduce emissions of fugitive dust, such as SCAQMD fugitive dust control rules (e.g., Rule 403), would reduce the potential for Coccidioides ~~emits~~ immitis spores in soil to become airborne. Applicable California Division of Occupational Safety and Health (Cal/OSHA) requirements would provide additional protection of construction workers, as well as the nearby community.

Biological Resources

Page 4.4-5: The text of the DEIR has been revised to include a "high potential" category for special status species and clarify that the "moderate potential" category does not include "high potential." The text has been revised as follows:

> Following the database searches and literature review, special-status species with potential to occur within and/or adjacent to the Project Site were assessed using the categories listed below:

- **Present:** Species is known to occur within the Project Site, based on recent (within 20 years) CNDDB or other records, and there is suitable habitat present within the Project Site, or the species was observed within the Project Site during field surveys.
- **High Potential:** Species expected or likely to occur due to the ecological requirements of the species, including presence of preferred habitat types and documented presence of the species within the vicinity or region.

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[2] Cut and fill, over-excavation and export grading quantities are rounded up and may differ slightly from quantities used for the tentative tract map review and air quality modeling assumptions.

- **Moderate Potential:** Species is known to occur in the vicinity of the Project Site (based on recent [within 20 years] CNDDB or other records or based on professional expertise specific to the project area or species), and there is suitable habitat within the Project Site that makes the probability of the species occurring there moderate ~~to high~~. Alternatively, there is suitable habitat within the Project Site and within the known range of the species.
- **Low Potential:** Species is known to occur in the vicinity of the Project Site (within the area comprised by the surrounding United States Geological Survey [USGS] quadrangles); however, there is only poor quality or marginal habitat within the Project Site and the probability of the species occurring is low.
- **None/Not Observed:** There is no suitable habitat for the species within the Project Site, or the area is located outside the known range of the species. Alternatively, a species was surveyed for during the appropriate season with unequivocal negative results for species occurrence.

Page 4.4-6: The text of the DEIR has been revised to correct the number of California Species of Special Concern as follows:

> Of the non-listed special-status animals reported from the Project area with the potential to occur, ~~five~~ six California Species of Special Concern (SSC) have low potential to occur on the Project Site: coastal whiptail (*Aspidoscelis tigris stejnegeri*), San Diego coast horned lizard (*Phrynosoma blainvillii*), western pond turtle (*Emys marmorata*), burrowing owl (*Athene cunicularia*), pallid bat (*Antrozous pallidus*), and big free-tailed bat (*Nyctinomops macrotis*).

Page 4.4-6: The text of the DEIR has been revised to include four additional special status bat species and to evaluate their potential to occur on the Project site, and to change the potential to occur for the western mastiff bat from none to low potential as a result of the conclusions in the GLA Supplemental Technical Memorandum re: Special Status Bats (Appendix O of this FEIR). The text has also been revised to clarify the summary of the number of species with low and low to moderate potential to occur. The text has been revised as follows:

> …No threatened or endangered wildlife species are recorded from the Project Site. Of the non-listed special-status animals reported from the Project area with the potential to occur, ~~six~~ nine California Species of Special Concern (SSC) have low potential to occur on the Project Site: coastal whiptail (*Aspidoscelis tigris stejnegeri*), San Diego coast horned lizard (*Phrynosoma blainvillii*), western pond turtle (*Emys marmorata*), burrowing owl (*Athene cunicularia*), pallid bat (*Antrozous pallidus*), *western mastiff bat (Eumops perotis californicus), Yuma myotis (Myotis yumanensis), western red bat (Lasiurus blossevillii), and big free-tailed bat (Nyctinomops macrotis).* *~~Three~~* *Five California SSC have low to moderate potential to occur on the Project Site: southern California legless lizard (Anniella stebbinsi), northwestern San Diego pocket mouse (Chaetodipus fallax fallax), western yellow bat (Lasiurus xanthinus), hoary bat (Lasiurus cinereus), and San Diego desert woodrat (Neotoma lepida intermedia).*

Page 4.4-7: Table 4.4-2 Special-Status Wildlife Species with Potential to Occur within the Project Site has been revised to include four additional bat species and change the potential to occur for one species as follows:

Species Name	Status	Habitat Requirements	Potential for Occurrence
MAMMALS			
San Diego black-tailed jackrabbit *Lepus californicus bennetti*	None / SSC / None	Occurs in a variety of habitats, including sage scrubs, chaparral, agricultural lands and other disturbed habitats, but prefers open grassland.	None. There is no suitable general or micro-habitat on-site.
pallid bat *Antrozous pallidus*	None / SSC / None	Occurs in a variety of habitats, including woodlands, scrub, rocky canyons, farmland, and desert. Roosts in rock crevices, old buildings, bridges, caves, mines, and tree cavities. In the region this species is generally associated with sycamore and oak woodlands.	Low potential for roosting on-site.
pocketed free-tailed bat *Nyctinomops femorosaccus*	None / SSC / None	Occurs in creosote bush and chaparral habitats, mainly with prominent rock features. Roosts in crevices located in high cliffs and rugged rock outcroppings but has also been found in caves and buildings.	None. There is no suitable general or micro-habitat on-site.
big free-tailed bat *Nyctinomops macrotis*	None / SSC / None	Arid floodplain habitats, such as arroyo, shrub desert, and woodlands. Typically roosts in rock crevices in canyon settings, but also known to roost in buildings and caves. Not known whether this species breeds in California.	Low potential to occur for foraging.
western mastiff bat *Eumops perotis californicus*	None / SSC / None	Variety of habitats, from desert scrub and chaparral to oak woodland and ponderosa pine, but only where there are significant rock features for roosting. Natural roosts are often found under large exfoliating slabs of granite, sandstone slabs, or in columnar basalt, on cliff faces, or in large boulders. Some roosts have been found in buildings.	~~None. There is no suitable general or micro-habitat for roosting on-site.~~ Low potential for roosting on-site
western red bat (Lasiurus blossevillii)	None / SSC / None	Western red bats are solitary animals that prefer riparian habitats that include walnuts, oaks, willows, sycamores, and ash trees where they roost exclusively in the foliage. The Project site contains no riparian habitat	Low habitat for roosting on-site
hoary bat (Lasiurus cinereus)	None / SSC / None	The hoary bat is a solitary animal that roosts in in foliage of trees in dense forests, along the edges of forest openings and can be found in urban areas such as parks and street trees	Low to Moderate habitat for roosting on-site
western yellow bat (Lasiurus xanthinus)	None / SSC / None	Western yellow bats are solitary animals that prefer foliage for roosting including dead fronds of fan palms such that there is moderate potential for western yellow bat to occur on the site due to the presence of over 100 Mexican fan palms. It is important to note that use of palm trees on the site by western yellow bat would be associated only with dead fronds (to the extent they remain) that form large skirts in the absence of maintenance	Moderate habitat for roosting on-site
Yuma myotis (Myotis yumanensis)	None / SSC / None	The Yuma myotis can be found in the hundreds or thousands roosting in caves, attics, buildings, mines, underneath bridges, and other similar structures. As noted for the pallid and western mastiff bats, there is very limited potential habitat in the forms of existing structures (small sheds).	Low habitat for roosting on-site
Los Angeles pocket mouse *Perognathus longimembris brevinasus*	None / SSC / None	Inhabits coastal sage scrub and alluvial fan sage scrub habitats	None. There is no suitable general or micro-habitat on-site.

Species Name	Status	Habitat Requirements	Potential for Occurrence
Northwestern San Diego pocket mouse *Chaetodipus fallax fallax*	None / SSC / None	Occurs mainly in sage scrub, chaparral, and grassland habitats.	Low to moderate potential for occurrence in non-native grassland areas that border the golf course.
San Diego desert woodrat *Neotoma lepida intermedia*	None / SSC / None	Occurs in scrub and desert habitats, usually in association with rock outcroppings, boulders, cacti, or areas of dense undergrowth.	Low to moderate potential for occurrence in non-native grassland areas that border the golf course.

SOURCE: CNDDB, 2021

a. CDFW Status
  FP = Fully Protected. species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock.
  SSC = Species of Special Concern. Species are given this designation by CDFW due to declining population levels, limited ranges, and/or continuing threats have made them vulnerable to extinction.
  WL = Watch List. For species that were previously SSC but no longer merit SSC status, or which do not meet SSC criteria but for which there is concern and a need for additional information to clarify its status.
b. General Habitat and Micro-Habitat are taken from the CNDDB descriptions of the species and/or Placeworks 2020.

Page 4.4-23: The text of the DEIR has been revised to include four additional bat species with a low or a low to moderate potential to occur on the Project site and to change the potential to occur of one bat species. The text has been revised as follows:

> Construction could impact the ~~eight~~ fourteen California Species of Special Concern with low or low to moderate potential to occur: (coastal whiptail, San Diego coast horned lizard, western pond turtle, burrowing owl, pallid bat, western mastiff bat, Yuma myotis, western red bat, big free-tailed bat, southern California legless lizard, northwestern San Diego pocket mouse, western yellow bat, hoary bat, and San Diego desert woodrat) if these species occur on-site. The Project site contains limited potential habitat for special status species bats including small sheds, a golf course maintenance building with a metal roof and no attic or crevices and a few trees with cavities, all of which exhibit limited potential for roosting. While dead fronds of Mexican Fan Palm trees could provide potential habitat for some species, the palm trees on the Project Site are regularly maintained to remove the dead fronds in order to limit the potential for fire and pest species such as Norwegian rats that are known to utilize palms. Thus, based on routine maintenance requirements and practices on the Project Site, no long-term habitat is maintained and therefore the existing palm trees are not appropriately considered suitable habitat.
>
> Because there is a low or low to moderate potential for these species to occur, and the majority of the habitat found on-site is not suitable to support these species, any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species.

> In addition, to ensure that individuals are not harmed, Mitigation Measure BIO-3 will be added to the Final EIR so that prior to construction activities, a qualified bat specialist shall conduct bat surveys within the Project Site.
>
> ~~The existing landscape trees and maintenance structure on the Project Site provide low potential for suitable habitat that would support special-status bat species. The maintenance structure is currently in use and the maintained landscape trees do not constitute a woodland setting, which combined result in a low potential for special-status bat species to occur. In addition, the biological reconnaissance survey did not observe bat species. However, because there is a low or low to moderate potential for these species to occur, and the majority of the habitat found on-site is not suitable to support these species, any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species. Therefore, no mitigation is warranted~~

Page 4.4-23: Impact BIO-1 of the DEIR has been revised to include a new mitigation measure requiring bat surveys prior to construction and to specify measures to be taken in the event the pre-construction surveys identify roosting bats on the Project Site. Mitigation Measure BIO-3 has been added to the DEIR and is shown below:

> Mitigation Measure BIO-3: Prior to site disturbance for Project construction, including removal of any vegetation, sheds and/or maintenance building that could be used by roosting bats, a qualified biologist shall conduct a pre-construction bat roost survey for roosting bats. The survey shall be conducted no more than 14 days prior to site disturbance and shall include daytime surveys to search for sign such as guano, visual “emergence” surveys at dusk, followed by night time surveys using acoustic recognition equipment specific for bat detection. The pre-construction bat roost survey shall consist of a minimum of two bat surveys (conducted consecutively or as determined by the qualified biologist). If roosting bats are detected onsite outside of the bat maternity season, the roost tree or building shall be removed in a manner to avoid and/or minimize injury to roosting bats. This may include using mechanical equipment to gently nudge the tree trunk multiple times or building as directed by the qualified biologist prior to removal or for palm trees and other tree species, to de-frond or de-branch the tree using a mechanical lift and gently lower the cut branches to the ground. Regardless of the method, the fallen tree and/or material shall be left undisturbed overnight until at least the next morning to give roosting bats time to exit before complete removal of the tree or structure. Similar and appropriate measures shall be implemented for building removal.
>
> If roosting bats are detected onsite during the maternity season (March 1 to September 30), the Project shall avoid the subject roost(s) and incorporate an avoidance buffer (as determined by a qualified biologist) until after the maternity season or until a qualified biologist determines no maternity roosting is occurring. Once the qualified biologist approves removal of the subject roost tree(s), or buildings, the same tree and building removal procedures as outlined above shall be implemented prior to tree or building removal.

Page 4.4-23: Mitigation Measures BIO-1 has been modified as shown below to include more detail on the requirements of a biologist:

> ~~**BIO-1:** Project-related construction and tree maintenance activities should occur outside of the general avian breeding season (February 1st to through August 31st) to the extent feasible. If Project-related construction and tree maintenance activities cannot occur outside of the general avian breeding season, a pre-activity nesting bird survey shall be conducted prior to the onset of the aforementioned activities, within a maximum of 7 days prior to commencement. The survey shall be conducted by a qualified biologist. The survey shall be conducted within all suitable nesting habitat located within the area of activity, which includes a 300-foot survey buffer around the activity site to account for all potentially nesting birds on and in the immediate vicinity. If no nesting birds are found, the Project-related activities may commence without potential impacts to nesting birds.~~
>
> ~~If any active nests or sign of nesting activity (e.g., carrying nesting material or food) is observed during the pre-activity survey, a suitable buffer shall be established around the nest as determined by a qualified biologist to ensure no direct or indirect impacts occur to the nest. Many avian species that would nest in the area are accustomed to urban environments and human activities; therefore, the buffer distance will be determined based on the location of the nest as well as the species tolerance to human presence. A qualified biologist will monitor the nesting activity after the buffer is delineated and during typical Project-related noises to verify that the buffer is adequately placed and to confirm that breeding is not compromised by the Project. Any excessive noise or lighting that could potentially impact the nest shall be directed away from the nest to the greatest extent feasible. The buffer shall remain in place for the duration the nest is active as determined by a qualified biologist.~~
>
> **BIO-1 Designated Biologist.**
>
> Prior to initiating ground- or vegetation-disturbing activities, subdivider shall submit to CDFW for review and approval a list of biological monitors (Designated Biologist) that will be involved with the Project. The list shall include their names, qualifications, experience, and contact information. Designated Biologists shall: a) be knowledgeable and experienced in the biology and natural history of local plant and wildlife resources; b) be able to identify resources that are or have the potential to be present at the Project area; c) have previous biological monitoring experience on construction Projects; d) for any required nesting bird surveys, the biologist must have at least three (3) years of field experience conducting general and protocol-level surveys related to finding nests and monitoring them for a specific purpose of determining breeding status, egg incubation, chick maturity, and estimating fledge date; e) have the necessary experience and/or certifications for conducting protocol and focused surveys for species that may be present in the Project area; f) when needed, have obtained the proper documentation in regards to Scientific Collecting Permits (SCP) or Memorandum of Understanding (MOU).
>
> Nesting and/or Breeding Bird Avoidance. Subdivider shall not conduct vegetation alteration or removal from February 1 to September 15 (January 1 to June 30 if raptors

are present) to avoid impacts to breeding/nesting birds and other special status and common species. For all other activities if the nesting season cannot be avoided, a Designated Biologist shall complete surveys to identify active nests which may be impacted directly or indirectly by Project activities. If the survey identifies an active nest, a buffer shall be established between the construction activities and the active nest so that nesting activities are not interrupted. The buffer shall be delineated by temporary fencing if site conditions allow and does not create additional disturbance, and shall be in effect throughout construction or until the nest is no longer active. If the survey identifies and active nest, Permittee shall implement one of the following to avoid and minimize impacts to nesting bird species:

a) Implement default 300-foot minimum avoidance buffers for all non-special status passerine birds and 500-foot minimum avoidance buffer for all special status passerine and raptor species. The breeding habitat/nest site shall be fenced and/or flagged in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the Project.

b) Subdivider may propose an alternative plan for avoidance of nesting birds for CDFW concurrence.

c) Should at any time during monitoring, the Designated Biologist determine that an active nest is potentially subject to adverse impacts from construction in any way, the Designated Biologist will be empowered to suspend work to ensure protection of the nest and will monitor the nest site until the nestlings have fledged and are no longer dependent on the nest.

Page 4.4-25: Mitigation Measures BIO-2 has been modified as shown below to include jurisdictional language for California Department of Fish and Wildlife:

BIO-2: Riparian Habitat/Jurisdictional Resources.

Prior to the issuance of any grading permit for permanent impacts in the areas designated as jurisdictional features (Earthen Drainage Ditch) or riparian habitat, the Project subdivider shall obtain a CWA Section 404 permit from the USACE, a CWA Section 401 certificate from the RWQCB, and a Streambed Alteration Agreement permit under Section 1602 of the California Fish and Game Code from the CDFW, where the project warrants. The following shall be incorporated into the permitting, subject to approval by the regulatory agencies:

- On- and/or off-site restoration and/or enhancement of USACE/RWQCB/CDFW jurisdictional “waters of the U.S.”/“waters of the State” and wetlands at a ratio no less than 1:1 for permanent impacts. The mitigation program would be developed in consultation with the regulatory agencies and would be based on the maximum amount of impact which is expected to be CDFW jurisdiction. ~~, and~~ fFor temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate) or through off-site restoration or enhancement. Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank).

- On- and/or off-site restoration and/or enhancement of CDFW jurisdictional streambed and associated riparian habitat at a ratio no less than 1:1 for permanent impacts, and for temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate). Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank).

Geology and Soils

Page 4.7-20: Mitigation Measures GEO-1 has been modified as shown below:

> Mitigation Measure GEO-1: Final Geotechnical Engineering Investigation. Prior to the issuance of a grading permit, the subdivider shall prepare and obtain approval from the Los Angeles County Department of Public Works (LACDPW) of a Final Geotechnical Engineering Investigation Report based on the final Project design and 40-scale grading plans to address the Project's specific foundation design. Specific field work, additional and/or modified geotechnical recommendations, and laboratory testing may be required in connection with the preparation of the Final Geotechnical Engineering Investigation Report, in order to comply with the recommendations contained within the Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (July 26, 2021), Geotechnical Addendum Report and Response to Geotechnical Review Comments Regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, Los Angeles County, California (May 1, 2023), and Response to Geotechnical Review Comments dated May 31, 2023 and July 7, 2023 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (~~July~~ September 27, 2023). The subdivider shall comply with the conditions contained within the LACDPW Geology and Soils Report Approval Letter for the Project, and as it may be subsequently amended or modified by LACDPW. Furthermore, the Project's final grading, drainage, and erosion control plans must be reviewed and approved by LACDPW before the issuance of a grading permit.

Transportation

Page 4.17-1: The text of the DEIR has been revised as follows:

> …The Project study area includes the following ~~ten~~ 14 intersections:

1. Fairway Drive/SR-60 Freeway Westbound Ramps
2. Fairway Drive/SR-60 Freeway Eastbound Off-Ramp
3. Fairway Drive/East Walnut Drive South
4. Fairway Drive-Brea Canyon Cutoff Road/Colima Road
5. Brea Canyon Cutoff Road/Pathfinder Road
6. Planning Area 1 and 2 Driveway/East Walnut Drive South
7. Lake Canyon Drive/Colima Road

8. Planning Area 1 and 2 Driveway-Walnut Leaf Drive/Colima Road
9. Tierra Luna- Planning Area 5 Driveway/Colima Road
10. Lemon Avenue/Golden Springs Drive
11. SR-60 Freeway Eastbound and Westbound Off-Ramps/Fairway Drive
12. SR-60 Freeway Eastbound and Westbound Off-Ramps/Lemon Avenue
13. SR-57 Freeway Northbound and Southbound Off-Ramps/Pathfinder Road
14. SR-57 Freeway Northbound and Southbound Off-Ramps/Brea Canyon Cut-off Road-Diamond Bar Boulevard

Page 4.17-28: Impact TR-3 has been revised to include the requested freeway off-ramp analysis requested by Caltrans in the November 21, 2022 NOP letter. The methodology and complete analysis can be found in the Royal Vista Residential and Parks Project – Supplemental Caltrans Off-Ramp Analysis (Appendix R of the FEIR). The text of the DEIR has been revised as follows:

> Further the following analysis of the Project's effect on off-ramp queuing at the SR-60 Freeway off-ramps at Fairway Drive was prepared in order to determine if the proposed Project would cause, or contribute towards, slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes.
>
> **SR-60 Freeway Eastbound and Westbound Off-Ramps/Fairway Drive**
>
> The analysis of off-ramp queuing at the SR-60 Freeway Eastbound and Westbound off-ramps at Fairway Drive is included in the TIA Report prepared for the proposed Project. It is also noted that no westbound off-ramp is provided at the SR-60 Freeway interchange with Lemon Avenue.
>
> **SR-60 Freeway Eastbound Off-Ramp/Lemon Avenue**
>
> No Project trips are assumed to utilize the SR-60 Freeway eastbound off-ramp at Lemon Avenue. Therefore, the proposed Project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes in the area of the SR-60 Freeway eastbound off-ramp at Lemon Avenue.
>
> **SR-57 Freeway Southbound Off-Ramp/Pathfinder Road**
>
> No Project trips are assumed to utilize the SR-57 Freeway southbound off-ramp at Pathfinder Road. Therefore, the proposed Project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes in the area of the SR-57 Freeway southbound off-ramp at Pathfinder Road.
>
> **SR-57 Freeway Northbound Off-Ramp/Pathfinder Road**
>
> No Project trips are assumed to utilize the SR-57 Freeway northbound off-ramp at Pathfinder Road. Therefore, the proposed Project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed

differentials between adjacent lanes in the area of the SR-57 Freeway northbound off-ramp at Pathfinder Road.

SR-57 Freeway Southbound Off-Ramp/Brea Canyon Cutoff Road-Diamond Bar Boulevard

No Project trips are assumed to utilize the SR-57 Freeway southbound off-ramp at Brea Canyon Cutoff Road-Diamond Bar Boulevard. Therefore, the proposed Project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes in the area of the SR-57 Freeway southbound off-ramp at Brea Canyon Cutoff Road-Diamond Bar Boulevard.

SR-57 Freeway Northbound Off-Ramp/Diamond Bar Boulevard

A portion of Project trips are assumed to utilize the SR-57 Freeway northbound off-ramp at Diamond Bar Boulevard. Therefore, a supplemental analysis of off-ramp queuing has been prepared in order to determine if the proposed Project would cause or contribute towards unsafe conditions on the State Highway System.

Caltrans's Interim Safety Review Practitioners Guidance requires a review of traffic safety impacts for locations where a proposed development project adds two (2) or more car lengths to a ramp queue that will extend into the freeway mainline. Since Project generated traffic is expected to result in more than two (2) vehicle lengths being added to a queue which extends into the freeway mainline travel lanes, the supplemental study intersection is required to be reviewed for safety impacts.

The review of traffic safety impacts includes a review of the speed differential between the off-ramp queue and the mainline of the freeway during the same peak hour. Speed differentials of 30 MPH or greater in congestion related rear-end collisions have shown the potential to increase severe injury and fatal injuries exponentially as the speed differential increases above 30 MPH. If the speed differential between the mainline speeds and the ramp traffic is below 30 MPH, the Project would be considered to cause a less-than-significant safety impact, and no traffic safety impact mitigation would be required.

For the purpose of the safety analysis, it is assumed that the maximum back of off-ramp queue is slowing and near stopped. Therefore, a speed of less than five (5) MPH is assumed for the back of queue. The freeway mainline travel speeds were obtained from the Caltrans Performance Measurement System (PeMS). Speeds were obtained for the month of September 2019, corresponding to the month of the manual intersection traffic counts at the study intersection. The data represents an approximately one-mile segment of the SR-57 Freeway upstream of the point of gore for the off-ramp (i.e., postmiles R0.62 to R1.82, with point of gore at approximately postmile R1.751). An average travel speed was calculated based on five-minute interval speed data provided at three detector locations within the postmile range. It should be noted that the three detector locations had varying degrees of detector health, ranging from a high percent of direct observation to fully imputed (i.e., estimated) speed values. Thus, averaging the speed data from the three locations minimizes potential variation due to the differing data validation processes. The PM peak period speeds obtained from PeMS and the computed average speed is presented in Table 2 of the Royal Vista Residential and Parks Project – Supplemental Caltrans Off-Ramp Analysis (Appendix P of the FEIR). As presented in Table 2, the average speed of the SR-57 northbound freeway mainline travel lanes in the vicinity of the supplemental study intersection is 29.61 MPH during the PM peak period. Therefore, a speed differential of less than 30 MPH is anticipated between the freeway mainline and the back of the off-ramp queue during the PM peak hour. Pursuant to the Interim Safety Review Practitioners Guidance, the Project would be considered to cause a less-than-significant safety impact, and no traffic safety impact mitigation is required.

In addition, as noted in the TIA, Project access and circulation have been reviewed by the LACDPW with respect to Caltrans/Los Angeles County standards to ensure that the Project does not substantially increase hazards due to a design feature. The County of Los Angeles would also periodically review traffic operations in the Project vicinity once the Project is constructed to ensure that traffic operations are satisfactory. Impacts would be less than significant.

Significance Determination: Less than Significant.

Mitigation Measures

No Mitigation is Required.

Utilities and Service Systems

Page 4.19-1: The text of the DEIR has been revised as follows:

Water Supply

The Project Site is located within the Walnut Valley Water District (WVWD) boundary. WVWD is a California Special Water District and is a sub-agency of Three Valleys Municipal Water District (TVMWD) ~~WVWD is a subagency of Three Valleys Municipal Water District (TVMWD), and~~ WVWD maintains ~~510~~ 426 miles of distribution mains, ~~31~~ 32 reservoirs and ~~17~~ 19 pump stations throughout southern California ~~regulated by the California Public Utilities Commission (CPUC)~~. Located in Los Angeles County, the WVWD serves the City of Diamond Bar, portions of the cities of Walnut, Industry, West Covina, and Pomona, as well as the part of easterly unincorporated Rowland Heights in Los Angeles County.

Page 4.19-1: The text of the DEIR has been revised as follows:

The northern portion of the Project Site along East Walnut Drive South is currently adjacent to a WVWD 12-inch domestic water line that runs underneath East Walnut Drive South. The middle portions and southern portions of the site along Colima Road are currently adjacent to a WVWD 12-inch domestic water line and ~~a 12-inch recycled water line~~ an existing 12-inch PVC recycled water line along Colima Road and 6-inch PVC recycled water line along East Walnut Drive South terminating at the northwest corner of the Project's property. There are seven (7) fire hydrants located within the public right-of-way along portions of the Project Site on Colima Road, East Walnut Drive South, and Iluso Avenue. Each fire hydrant is approximately 40-50 feet away from the Project boundary as they are located on the opposite side of the street as the Project Site. These fire hydrants connect to WVWD water lines.

Page 4.19-7: Table 4.19-4 of the DEIR has been revised as follows:

TABLE 4.19-4
WALNUT VALLEY WATER DISTRICT MULTIPLE DRY YEAR SUPPLY AND DEMAND COMPARISON

Water Sources	2025	2030	2035	2040	2045
First Year					
Supply Totals	22,300	22,574	22,853	23,113	23,377
Demand Totals	22,300	22,574	22,853	23,113	23,377
Difference	0	0	0	0	0
Second Year					
Supply Totals	22,965	23,247	23,534	23,801	24,073
Demand Totals	22,965	23,247	23,534	23,801	24,073
Difference	0	0	0	0	0
Third Year					
Supply Totals	23,580	23,869	24,164	24,439	24,718
Demand Totals	23,580	23,869	24,164	24,439	24,718
Difference	0	0	0	0	0
Fourth Year					
Supply Totals	21,118	21,378	~~21,841~~ 21,641	21,888	22,138
Demand Totals	21,118	21,378	~~21,841~~ 21,641	21,888	22,138
Difference	0	0	0	0	0
Fifth Year					
Supply Totals	17,896	18,116	18,340	18,548	18,760
Demand Totals	17,896	18,116	18,340	18,548	18,760
Difference	0	0	0	0	0

SOURCE: Walnut Valley Water District, 2021

Page 4.19-14: The text of the DEIR has been revised as follows:

Construction

During construction, water will be required intermittently for dust control, equipment cleaning, soil grading and preparation during the early phases of the Project. The latter phases of construction normally require less water usage. Construction water demands are typically less than the long-term operational water demand of a project and are temporary. ~~There are seven fire hydrants located within the public Right-of-Way along portions of the Project Site on Colima Road, Walnut Drive and Iluso Avenue. Each fire~~

~~hydrant is approximately 40-50 feet away from the Project Site boundary. These fire hydrants connect to WVWD water lines. Construction demands will be met using existing water infrastructure that surrounds the Project Site (e.g., existing fire hydrants).~~ Due to the proximity to recycled mainlines, temporary service(s) will provide construction water to the Project Site.

Alternatives

Page 5-32: The text of the DEIR has been revised as follows:

> As presented in Section 4.17, *Transportation* of this Draft EIR, the Proposed Project would result in significant VMT/capita impacts. The proposed Project was forecast to generate 16.~~3~~2 VMT/capita for Planning Areas 1, 2, and 3 (TAZ-1), and was forecast to generate 21.~~1~~0 VMT/capita for Planning Area 5 (TAZ-2) with mitigation. Thus, the proposed Project was determined to exceed the County's threshold of 10.0 VMT/capita by 6.~~3~~2 VMT/capita and 11.~~1~~0 VMT/capita, respectively. In comparison, the Mixed-Use Alternative residential component was found to exceed the threshold by 6.4 VMT/capita and 11.2 VMT/capita with mitigation, respectively, which represents a greater VMT impact than the proposed Project. The Mixed-Use Alternative therefore results in significant VMT impacts greater than the impact generated by the proposed Project. Further, as the degree of impact is greater than that of the proposed Project, the significant VMT impact generated by the Mixed-Use Alternative would remain significant and unavoidable after application of mitigation measures.

Page 5-33: Table 5-4 of the DEIR has been revised as follows:

TABLE 5-4
SUMMARY OF MILES TRAVELED (VMT) ANALYSIS MIXED USE ALTERNATIVE [1]

	Proposed Project	**Proposed Project**	**Alternative 2**	**Alternative 2**
VMT Analysis Conditions	**Planning Areas 1, 2, and 3 (TAZ-1)**	**Planning Area 5 (TAZ-2)**	**Planning Areas 1, 2, and 4 (TAZ-1)**	**Planning Area 5 (TAZ-2)**
Baseline VMT per Capita Forecast From VMT Tool [2]	18.8	21.6	18.7	21.6
Project-Generated VMT per Capita after Adjustments [3]	16.~~3~~2	21.~~1~~0	16.4	21.2
South County residential VMT threshold per capita	10	10	10	10
Significant Impact? (Yes/No) [4]	YES	YES	YES	YES

[1] The VMT reduction calculations are presented in Appendix N of this Draft EIR.
[2] LA County Public Works VMT Tool Version 1.0 Worksheets are provided in Appendix N of this Draft EIR.
[3] Measure T-1: Increase Residential Density has been applied as a project design feature.
[4] A significant impact occurs when the project-generated VMT per Capita exceeds the South County threshold of 10.0 VMT per Capita.

Page 5-50: The text of the DEIR has been revised as follows:

> As presented in Section 4.17, *Transportation* of this Draft EIR, the proposed Project would result in significant VMT/capita impacts. The proposed Project was forecast to generate 16.~~3~~2 VMT/capita for Planning Areas 1, 2, and 3 (TAZ-1), and was forecast to generate 21.~~1~~0 VMT/capita for Planning Area 5 (TAZ-2) with mitigation. Thus, the Proposed Project was determined to exceed the County's threshold of 10.0 VMT/capita by 6.~~3~~23 VMT/capita and 11.~~1~~0 VMT/capita, respectively. In comparison, the 322 Unit Alternative residential component was found to exceed the threshold by 6.5 VMT/capita and 11.2 VMT/capita with mitigation, respectively, which represents a greater VMT impact than the Proposed Project. The 322 Unit Alternative, therefore, results in significant VMT impacts greater than the impact generated by the proposed Project. Further, as the degree of impact is greater than that of the proposed Project, the significant VMT impact generated by the 322 Unit Alternative would remain significant and unavoidable after application of mitigation measures.

Page 5-50: Table 5-5 of the DEIR has been revised as follows:

TABLE 5-5
SUMMARY OF MILES TRAVELED (VMT) ANALYSIS 322 UNIT ALTERNATIVE[1]

	Proposed Project	Proposed Project	Alternative 4	Alternative 4
VMT Analysis Conditions	Planning Areas 1, 2, and 3	Planning Area 5	Planning Areas 1, 2, And 4	Planning Area 5
Baseline VMT per Capita Forecast From VMT Tool [2]	18.8	21.6	18.7	21.6
Project-Generated VMT per Capita after Adjustments [3]	16.~~3~~2	21.~~1~~0	16.5	21.2
South County residential VMT threshold per capita	10	10	10	10
Significant Impact? (Yes/No) [4]	YES	YES	YES	YES

[1] The VMT reduction calculations are presented in Appendix N of this Draft EIR.
[2] LA County Public Works VMT Tool Version 1.0 Worksheets are provided in Appendix N of this Draft EIR.
[3] Measure T-1: Increase Residential Density has been applied as a project design feature.
[4] A significant impact occurs when the project-generated VMT per Capita exceeds the South County threshold of 10.0 VMT per Capita.

References

Chapter 7.0, *References* has been updated to include the following new references:

California Department of Industrial Relations, 2022. Protection from Valley Fever, April. https://www.dir.ca.gov/dosh/valley-fever-home.html

County of Los Angeles, 2019. Coccidioidomycois (Valley Fever) Management Plan: Guidelines for Employers, August. http://www.ph.lacounty.gov/acd/docs/valleyfeverplan2019.pdf

FHWA, *Special Report – Measurement, Prediction, and Mitigation*, Chapter 4 Mitigation, https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm. Accessed July 16, 2021

National Renewable Energy Laboratory, Research and Analysis Demonstrate the Lack of Impacts of Glare from Photovoltaic Modules, July 31, 2018

The Korean Daily; https://www.koreadailyus.com/royal-vista-favored-golf-course-among-korean-golfers-in-socal-closes-on-feb-29/, accessed 5/1/2024

Appendix K-Noise and Vibration Technical Report

Page 39: The text of the Noise and Vibration Technical Report Table 16 has been revised as follows. The edits make the estimated noise levels consistent with Table 9 of the Noise and Vibration Technical Report and Table 4.13-13 and Table 4.13-14 of the DEIR:

TABLE 16
INCREASE IN AMBIENT NOISE LEVELS (L_{EQ}) AT EXISTING OFF-SITE SENSITIVE RECEPTOR LOCATIONS

Off-site Sensitive Land Uses	Existing Ambient Noise Levels (dBA L_{eq})	Estimated Construction Noise Levels - Unmitigated (dBA L_{eq}) [a]	Estimated Mitigation Measure Noise Levels Reductions (dBA L_{eq}) [b]	Estimated Construction Noise Levels - Mitigated (dBA L_{eq})	Combined Ambient Plus Mitigated Construction Noise Levels (dBA L_{eq})	Increase over Existing Ambient	Exceed Significance Threshold after Mitigation?
R1	62.1	~~86~~89.0	-15.0	~~71~~74.0	~~71.5~~74.3	~~9.4~~12.2	~~No~~**Yes**
R2	49.9	~~85~~88.2	-15.0	~~71~~73.2	~~71.2~~73.3	~~21.3~~23.4	**Yes**
R3	48.0	~~86~~89.0	-15.0	~~62~~74.0	~~62.2~~74.0	~~14.2~~26.0	**Yes**
R4	46.9	~~85~~88.2	-15.0	~~61.2~~73.2	~~61.4~~73.2	~~14.9~~26.3	**Yes**
R5	44.6	~~86~~89.5	-15.0	~~62.5~~74.5	~~62.6~~74.5	~~18~~29.9	**Yes**
R6	61.1	~~79~~82.9	-15.0	~~55.9~~67.9	~~62.2~~68.7	~~1.1~~7.6	No

NOTE: Noise levels added logarithmically.

[a] The noise levels were estimated by including the assumption that there will be some Infrastructure phases overlap with the Building Construction phase.

[b] Mitigation noise levels include incorporation of Mitigation Measures NOI-1 and NOI-2, accounting for a reduction of 12 dBA from MM NOI-1 and 3 dBA from MM NOI-2.

SOURCE: ESA, 2022.

New Appendices

Appendix O - GLA Supplemental Technical Memorandum re: Special Status Bats. A new Appendix has been added to the FEIR providing additional information related to special status species bats in response to Attachment C to Comment ORG-6.

Appendix P -GLA Responses to Draft EIR Comment ORG 6, Attachment C; Royal Vista Residential Project, Rowland Heights, Los Angeles County. A new Appendix has been added to the FEIR in response to Attachment C to Comment ORG-6.

Appendix Q-–"Reference materials supporting Attachment C of the Channel Law Group Letter". Materials submitted separately in connection with Comment ORG-6 have been added to the FEIR.

Appendix R – LLG Supplemental Caltrans Off-Ramp Analysis. A new Appendix has been added to the FEIR in response to the Caltrans Comment Letter.

CHAPTER 12
Mitigation Monitoring and Reporting Program

12.1 Introduction

California Public Resources Code section 21081.6 and Section 15097 of the California Environmental Quality Act (CEQA) Guidelines require public agencies to establish monitoring and reporting programs for projects approved by a public agency whenever approval involves the adoption of either a mitigated negative declaration or specified environmental findings related to environmental impact reports.

This is the Mitigation Monitoring and Reporting Program (MMRP) for the Royal Vista Residential Project (Project). The intent of the MMRP is to ensure the successful implementation of the mitigation measures identified in the Final Environmental Impact Report (Final EIR) for the Project.

California Public Resources Code Section 21081.6 requires that, upon certification of an EIR, "the public agency shall adopt a reporting or monitoring program for the changes made to the project or conditions of project approval, adopted in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation."

This chapter contains the MMRP for the Royal Vista Residential Project (Project). This MMRP has been developed in compliance with Public Resources Code Section 21081.6 and Section 15097 of the CEQA Guidelines. The mitigation measures in the table are coded by alphanumeric identification consistent with the EIR (**Table 12-1**).

TABLE 12-1
MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)
PROJECT NO. PRJ2021-002011-(1) / PERMIT NO. TR83534 (RPPL2021007149) / ENV NO. RPPL2021007150

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
Aesthetics				
PDF AES-1 Project Lighting: All light sources associated with the Project would be shielded and/or angled in a manner to minimize illumination that would spill outside of the Project Site boundary. Lighting would be designed to improve safety and to add visual interest to the Project Site, including accentuating key landscape and architectural features. Street lighting would be shielded and/or angled to illuminate the streets, promote dark skies, and inhibit any unnecessary nighttime lighting or glare.	Provide streetlights on concrete poles with underground wiring on all streets and highways within and around TR 74650 to the satisfaction of Department of Public Works or as modified by Department of Public Works. The streetlights shall be designed to County standard. The private street lighting system shall be owned and maintained by the Homeowners Association (HOA). Prior to Final Map recordation, submit street lighting plans and proposed underground utilities plans to Traffic Safety and Mobility Division, Street Lighting Section, for processing and approval. Submit a street lighting plan for all non-street lighting to the satisfaction of Building and Safety or as modified by Building and Safety.	• Streetlights prior to issuance of the Final Map • All other lighting prior to issuance of a Building Permit.	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Planning and Public Works
Air Quality				
AQ-1: The construction contractor shall require that all off-road diesel equipment greater than 50 horsepower (hp) used during construction of the Project shall be registered with CARB and meet CARB Tier 4 final off-road emission standards. Such equipment shall be outfitted with Best Available Control Technology (BACT) devices including a California Air Resources Board-certified Level 3 Diesel Particulate Filter. In order to ensure compliance with this measure, all contractors that utilize off-road diesel equipment that is greater than 50 horsepower shall participate in CARB's DOORS which is the State's online tool for Off-Road Diesel Reporting and shall submit a copy of the report to LA County Planning prior to issuance of a grading permit. Documentation of equipment emissions standards or Tier 4 certification shall also be kept onsite at all times during construction activities.	Prior to issuance of a grading permit, provide a copy of the DOORS Report for Equipment over 50 HP Used During Construction During construction, all equipment over 50 HP that is used shall meet CARB Tier 4 off-road emission standards.	During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
AQ-2: During the construction phases with any soil disturbance, the construction contractor(s) shall comply with the 2019 County of Los Angeles Coccidioidomycosis (Valley Fever) Management Plan: Guidelines for Employers, as well as the following measures, as feasible, to reduce potential Valley Fever impacts. Compliance with the 2019 County of Los Angeles Valley Fever Management Plan would reduce Valley Fever impacts for on-site workers, as well as the off-site neighboring communities. • Equipment, vehicles, and other items shall be thoroughly cleaned of dust before they are moved off-site to other work locations. • Wherever possible, grading and trenching work shall be phased so that earth-moving equipment is working well ahead or downwind of workers on the ground and nearby sensitive uses. • The area immediately behind grading or trenching equipment shall be sprayed with water before ground workers move into the area to limit dust from blowing off-site. • To the greatest extent feasible, heavy-duty earth-moving vehicles shall be closed-cab and equipped with a high-efficiency particulate (HEP)-filtered air system. • Workers shall receive training in procedures to minimize activities that may result in the release of airborne *Coccidioides immitis* spores on-site and off-site, to recognize the symptoms of Valley Fever, and shall be instructed to promptly report suspected symptoms of work-related Valley Fever to a supervisor. Evidence of training shall be provided to the LA County Planning within 5 days of the training session. • A Valley Fever informational handout shall be provided to all onsite construction personnel, as well as neighboring off-site sensitive uses within 100 feet of the Project Site. The handout shall, at a minimum, provide information regarding the symptoms, health effects, preventative measures, and treatment. • On-site personnel shall be trained on the proper use of personal protective equipment, including respiratory equipment. National Institute for Occupational Safety and Health–approved respirators shall be provided to on-site personal, upon request. When exposure to dust is unavoidable, provide appropriate National Institute for Occupational Safety and Health-approved respiratory protection to affected workers and off-site receptors. If respiratory protection is deemed necessary, employers must develop and implement a respiratory protection program in accordance with Cal/OSHA's Respiratory Protection standard (8 CCR 5144).	Comply with SCAQMD Rule 403	During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Health

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
***AQ PDF-1:* (Operations)** The Project shall incorporate the following energy and emission saving features as project design features: • The 360 dwelling units will be wired for solar roof panels which can save energy by producing solar electricity and offer credit for excess solar electricity produced. • Each garage will be wired for EV car charging. • Radiant barrier roof sheathing to improve cooling energy efficiency. • Low-E, dual pane windows block 95 percent of UV rays will reduce window heat gain by 64 percent compared to ordinary glass. • Improved insulation techniques will help to minimize gaps and higher thermal properties (R-value) add to energy efficiency. • Designed and properly sealed duct system will improve comfort and efficiency. • Programmable thermostats will be included to regulate home temperatures year-round. • High efficiency ENERGY STAR® rated water heater, refrigerator, and dishwashers will help save money by using less power. • All lighting on the Project Site would be light-emitting diode (LED). • The Project would include open space buffers adjacent to most existing adjacent residential land uses, within which public trails will be included to facilitate pedestrian and bicycle circulation within the Project Site.	Incorporate Energy and Emission Saving Features	Prior to issuance of a Building Permit for a residential unit.	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Planning and Public Works
Biological Resources				
BIO-1: Designated Biologist. Prior to initiating ground- or vegetation-disturbing activities, Subdivider shall submit to CDFW for review and approval a list of biological monitors (Designated Biologist) that will be involved with the Project. The list shall include their names, qualifications, experience, and contact information. Designated Biologists shall: a) be knowledgeable and experienced in the biology and natural history of local plant and wildlife resources; b) be able to identify resources that are or have the potential to be present at the Project area; c) have previous biological monitoring experience on construction Projects; d) for any required nesting bird surveys, the biologist must have at least three (3) years of field experience conducting general and protocol-level surveys related to finding nests and monitoring them for a specific purpose of determining breeding status, egg incubation, chick maturity, and estimating fledge date; e) have the necessary experience	Provide a copy of the Nesting Bird Survey. Include Mitigation Measure BIO-1 in Construction Contract Specifications.	Prior to Ground Disturbance	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
and/or certifications for conducting protocol and focused surveys for species that may be present in the Project area; f) when needed, have obtained the proper documentation in regards to Scientific Collecting Permits (SCP) or Memorandum of Understanding (MOU). Nesting and/or Breeding Bird Avoidance. Subdivider shall not conduct vegetation alteration or removal from February 1 to September 15 (January 1 to June 30 if raptors are present) to avoid impacts to breeding/nesting birds, and other special status and common species. For all other activities, if the nesting season cannot be avoided, a Designated Biologist shall complete surveys to identify active nests which may be impacted directly or indirectly by Project activities. If the survey identifies an active nest, a buffer shall be established between the construction activities and the active nest so that nesting activities are not interrupted. The buffer shall be delineated by temporary fencing if site conditions allow and does not create additional disturbance, and shall be in effect throughout construction or until the nest is no longer active. If the survey identifies an active nest, Subdivider shall implement one of the following to avoid and minimize impacts to nesting bird species: a) Implement default 300-foot minimum avoidance buffers for all non-special status passerine birds and 500-foot minimum avoidance buffer for all special status passerine and raptor species. The breeding habitat/nest site shall be fenced and/or flagged in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the Project. b) Subdivider may propose an alternative plan for avoidance of nesting birds for CDFW concurrence. c) Should at any time during monitoring, the Designated Biologist determine that an active nest is potentially subject to adverse impacts from construction in any way, the Designated Biologist will be empowered to suspend work to ensure protection of the nest and will monitor the nest site until the nestlings have fledged and are no longer dependent on the nest.				

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
BIO-2: Riparian Habitat/Jurisdictional Resources. Prior to the issuance of any grading permit for permanent impacts in the areas designated as jurisdictional features (Earthen Drainage Ditch) or riparian habitat, the Project subdivider shall obtain a CWA Section 404 permit from the USACE, a CWA Section 401 certificate from the RWQCB, and a Streambed Alteration Agreement permit under Section 1602 of the California Fish and Game Code from the CDFW, where the project warrants. The following shall be incorporated into the permitting, subject to approval by the regulatory agencies: • On- and/or off-site restoration and/or enhancement of USACE/RWQCB/CDFW jurisdictional "waters of the U.S."/"waters of the State" and wetlands at a ratio no less than 1:1 for permanent impacts. The mitigation program would be developed in consultation with the regulatory agencies and would be based on the maximum amount of impact which is expected to be CDFW jurisdiction, and for temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate) or through off-site restoration or enhancement. Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank). • On- and/or off-site restoration and/or enhancement of CDFW jurisdictional streambed and associated riparian habitat at a ratio no less than 1:1 for permanent impacts, and for temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate). Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank).	Obtain a CWA Section 404 permit from the USACE, a CWA Section 401 certificate from the RWQCB, and a Streambed Alteration Agreement permit under Section 1602 of the California Fish and Game Code from the CDFW. Include Mitigation Measure BIO-2 in Construction Contract Specifications.	Prior to approval of a grading plan.	Subdivider or Successor, Permittee	County of Los Angeles Department of Planning
BIO-3: Prior to site disturbance for Project construction, including removal of any vegetation, sheds and/or maintenance building that could be used by roosting bats, a qualified biologist shall conduct a pre-construction bat roost survey for roosting bats. The survey shall be conducted no more than 14 days prior to site disturbance and shall include daytime surveys to search for sign such as guano, visual "emergence" surveys at dusk, followed by night time surveys using acoustic recognition equipment specific for bat detection. The pre-construction bat roost survey shall consist of a minimum of two bat surveys (conducted consecutively or as determined by the qualified biologist). If roosting bats are detected onsite outside of the bat maternity season, the roost tree or building shall be removed in a	Provide a copy of the Bat Survey. Include Mitigation Measure BIO-3 in Construction Contract Specifications.	Prior to Ground Disturbance	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
manner to avoid and/or minimize injury to roosting bats. This may include using mechanical equipment to gently nudge the tree trunk multiple times or building as directed by the qualified biologist prior to removal or for palm trees and other tree species, to de-frond or de-branch the tree using a mechanical lift and gently lower the cut branches to the ground. Regardless of the method, the fallen tree and/or material shall be left undisturbed overnight until at least the next morning to give roosting bats time to exit before complete removal of the tree or structure. Similar and appropriate measures shall be implemented for building removal. If roosting bats are detected onsite during the maternity season (March 1 to September 30), the Project shall avoid the subject roost(s) and incorporate an avoidance buffer (as determined by a qualified biologist) until after the maternity season or until a qualified biologist determines no maternity roosting is occurring. Once the qualified biologist approves removal of the subject roost tree(s), or buildings, the same tree and building removal procedures as outlined above shall be implemented prior to tree or building removal.				
Cultural Resources				
CUL-1: Prior to the start of ground-disturbing activities, a Qualified Archaeologist (defined as meeting the Secretary of the Interior's Professional Qualification Standards for archaeology) shall be retained in the event of an archaeological find and to conduct cultural resources sensitivity training for all construction personnel. Construction personnel shall be informed of the types of archaeological resources that may be encountered, the proper procedures to be enacted in the event of an inadvertent discovery of archaeological resources or human remains, and safety precautions to be taken when working with archaeological monitors. The County shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance. A copy of the retainer shall be provided to the LA County Planning prior to grading plan approval.	Provide proof that a qualified Archaeologist has been retained prior to grading plan approval. Conduct Cultural Resource Sensitivity Training and Monitoring for all construction personnel. Include Mitigation Measure CUL-1 in Construction Contract Specifications.	Prior to approval of a grading plan.	Subdivider or Successor, Permittee	County of Los Angeles Department of Planning
CUL-2: In the event that historic (e.g., bottles, foundations, refuse dumps/privies, railroads, etc.) or prehistoric (e.g., hearths, burials, stone tools, shell and faunal bone remains, etc.) archaeological resources are unearthed, ground-disturbing activities shall be halted in the vicinity of the find and a Qualified Archaeologist shall be notified. An appropriate buffer area shall be established by the Qualified Archaeologist around the find where construction activities shall not be allowed to continue until resources have been recovered. Work shall be allowed to continue outside of the buffer area. All archaeological resources unearthed by project construction activities shall be evaluated by the Qualified Archaeologist. The County shall consult with appropriate Native American representatives in determining	Stop Work Upon Cultural Resource Discovery	During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
treatment for prehistoric or Native American resources to ensure cultural values ascribed to the resource, beyond those that are is scientifically important, are considered. If a resource is determined by the Qualified Archaeologist to constitute a "historical resource" pursuant to State CEQA Guidelines Section 15064.5(a) or a "unique archaeological resource" pursuant to Public Resources Code Section 21083.2(g), the Qualified Archaeologist shall coordinate with the Subdivider and the County to develop a formal treatment plan that would serve to reduce impacts to the resources. The treatment plan established for the resources shall be in accordance with State CEQA Guidelines Section 15064.5(f) for historical resources and Public Resources Code Sections 21083.2(b) for unique archaeological resources. If preservation in place is not feasible, treatment may include implementation of archaeological data recovery excavations to remove the resource along with subsequent laboratory processing and analysis. The treatment plan shall include measures regarding the curation of the recovered resources that may include curation at an accredited public, non-profit institution with a research interest in the materials, such as the Natural History Museum of Los Angeles, if such an institution agrees to accept the material. If no accredited institution accepts the materials, they may be donated to a local school or historical society in the area for educational purposes. The Qualified Archaeologist shall determine the need for archaeological construction monitoring in the vicinity of the find thereafter. The Qualified Archaeologist shall prepare a final report and appropriate California Department of Parks and Recreation Site Forms at the conclusion of treatment and/or the any follow-up archaeological construction monitoring. The report shall include a description of resources unearthed, if any, treatment of the resources, results of the artifact processing, analysis, and research, and evaluation of the resources with respect to the California Register of Historical Resources. The report and the Site Forms shall be submitted by the Subdivider to the County, the South Central Coastal Information Center, and representatives of other appropriate or concerned agencies to signify the satisfactory completion of the project and required mitigation measures.				

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
CUL-3: If human remains are encountered during implementation of the project, in accordance with State Health and Safety Code Section 7050.5 no further disturbance shall occur until the County Coroner has made the necessary findings as to origin and disposition pursuant to PRC Section 5097.98. If human remains are discovered during excavation activities, the following procedure shall be observed: • Stop immediately and contact the County Coroner: • If the remains are determined to be of Native American descent, the coroner has 24 hours to notify the NAHC. • The NAHC will immediately notify the person it believes to be the MLD of the deceased Native American. • The MLD has 48 hours to make recommendations to the owner, or representative, for the treatment or disposition, with proper dignity, of the human remains and grave goods. • If the owner does not accept the MLD's recommendations, the owner or the MLD may request mediation by the NAHC.	Comply with state law in the event human remains are encountered. Include Mitigation Measure CUL-3 in Construction Contract Specifications	During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning
Geology and Soils				
GEO-1: Prior to the issuance of a grading permit, the subdivider shall prepare and obtain approval from the Los Angeles County Department of Public Works (LACDPW) of a Final Geotechnical Engineering Investigation Report based on the final Project design and 40-scale grading plans to address the Project's specific foundation design. Specific field work, additional and/or modified geotechnical recommendations and laboratory testing may be required in connection with the preparation of the Final Geotechnical Engineering Investigation Report, in order to comply with the recommendations contained within the Updated Summary of Geotechnical Evaluation and Feasibility Study, Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (July 26, 2021), Geotechnical Addendum Report and Response to Geotechnical Review Comments Regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, Los Angeles County, California (May 1, 2023), and Response to Geotechnical Review Comments dated May 31, 2023 and July 7, 2023 regarding the Proposed Residential Development, Portions of Royal Vista Golf Course, Rowland Heights, California (September 27, 2023). The subdivider shall comply with the conditions contained within the LACDPW Geology and Soils Report Approval Letter for the Project, and as it may be subsequently amended or modified by LACDPW. Furthermore, the Project's final grading, drainage, and erosion control plans must be reviewed and approved by LACDPW before the issuance of a grading permit.	Submit a Final Geotechnical Engineering Investigation Report for review and approval.	Prior to grading permit. issuance	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
GEO-2: Prior to grading permit issuance, the subdivider shall retain a paleontologist who meets the Society of Vertebrate Paleontology's (SVP, 2010) definition for qualified professional paleontologist (Qualified Paleontologist) to carry out all mitigation related to paleontological resources and provide a copy of the retainer to the LA County Planning. Prior to the start of ground-disturbing activities, the Qualified Paleontologist or their designee shall conduct construction worker paleontological resources sensitivity training for all construction personnel. Construction personnel shall be informed on how to identify the types of paleontological resources that may be encountered, the proper procedures to be enacted in the event of an inadvertent discovery of paleontological resources, and safety precautions to be taken when working with paleontological monitors. The Subdivider shall ensure that construction personnel are made available for and attend the training and retain documentation demonstrating attendance.	Provide a copy of the Qualified Paleontologist Retainer Paleontological Sensitivity Training and Monitoring for all construction personnel. Include Mitigation Measures GEO-2 through GEO-5 in the Construction Contract Specifications	Prior to issuance of Grading Permit and During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning
GEO- 3: Paleontological monitoring shall be conducted by a qualified paleontological monitor (SVP, 210) working under the direct supervision of the Qualified Paleontologist for the three formations along the following lines: during all ground-disturbing activities below 5 feet in Quaternary alluvium; at all depths within the Yorba Member of the Puente Formation; and initial excavations into the Soquel Sandstone Member of the Monterey Formation. Monitoring within the Soquel Sandstone Member of the Monterey Formation may be discontinued or extended based on geologic conditions at surface at depth. Monitoring shall consist of visually inspecting fresh exposures of rock for larger fossil remains and, where appropriate, collecting sediment samples to wet or dry screen to test promising horizons for smaller fossil remains. If the Qualified Paleontologist determines that full-time monitoring is no longer warranted, based on the specific geologic conditions at the surface or at depth, the Qualified Paleontologist may recommend that monitoring be reduced to periodic spot-checking or cease entirely.			Subdivider or Successor, Permittee, and Qualified Project Paleontologist	County of Los Angeles Department of Planning
GEO-4: If a potential fossil is found, the paleontological monitor shall be allowed to temporarily divert or redirect grading and excavation activities in the area of the exposed fossil to facilitate evaluation of the discovery. An appropriate buffer area shall be established around the find where construction activities shall not be allowed to continue. Work shall be allowed to continue outside of the buffer area. At the monitor's discretion, and to reduce any construction delay, the grading and excavation contractor shall assist in removing rock/sediment samples for initial processing and evaluation. If a fossil is determined to be significant, the Qualified Paleontologist shall implement a paleontological salvage program to remove the resources from their location, following the guidelines of the SVP (2010). Any fossils			Subdivider or Successor, Permittee, and Qualified Project Paleontologist	County of Los Angeles Department of Planning

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
encountered and recovered shall be prepared to the point of identification, catalogued, and curated at a public, non-profit institution with a research interest in the material and with retrievable storage, such as the Natural History Museum of Los Angeles County, if such an institution agrees to accept the fossils. If no institution accepts the fossil collection, they shall be donated to a local school in the area for educational purposes. Accompanying notes, maps, and photographs shall also be filed at the repository and/or school. If construction personnel discover any potential fossils during construction while the paleontological monitor is not present, regardless of the depth of work or location, work at the discovery location shall cease in a 50-foot radius of the discovery until the Qualified Paleontologist has assessed the discovery and recommended and implemented appropriate treatment as described earlier in this measure.				
GEO- 5: At the conclusion of paleontological monitoring and prior to the release of the grading bond, the Qualified Paleontologist shall prepare a report summarizing the results of the monitoring and salvage efforts, the methodology used in these efforts, as well as a description of the fossils collected and their significance. The subdivider shall submit the report to the LA County Planning and the Natural History Museum of Los Angeles County.			Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Works and Planning
Greenhouse Gas Emissions				
Implement Mitigation TR-1 and TR-2	Establish and Fund the Metrolink Pass Subsidy Program. Provide an Electric Bicycle to each household.	Prior to Issuance of Building Permit for the First Dwelling Unit	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Works and Planning
PDF GHG-1: Non-quantifiable GHG Reduction Measures. Each dwelling unit shall incorporate the following design features: • The 360 dwelling units will be wired for solar roof panels which can save energy by producing solar electricity and offer credit for excess solar electricity produced. • Each garage will be wired for EV car charging. • Radiant barrier roof sheathing to improve cooling energy efficiency. • Low-E, dual pane windows block to 95 percent of UV rays. • Improved insulation techniques to help to minimize gaps and higher thermal properties (R-value) add to energy efficiency. • Designed and properly sealed duct system to improve comfort and efficiency.	Implement Energy and Emission Saving Features	Prior to issuance of a Building Permit for residential unit	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Works and Planning

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
• Programmable thermostats to regulate home temperatures year-round. • Open space buffers adjacent to most existing adjacent residential land uses that include, within which public trails to facilitate pedestrian and bicycle circulation within the Project Site as depicted on the approved Vesting Tentative Tract Map. • To incorporate teleworking, each residential unit would be sized appropriately to accommodate home offices and be equipped with new and efficient internet and phone cable systems. (2021 CAPCOA GHG Handbook Measure Transportation T-4).				
PDF GHG-2: Quantifiable GHG Reduction Measures. The project shall incorporate the following design features: • Each unit shall be equipped with high efficiency ENERGY STAR® rated water heater, refrigerator, and dishwashers. (2021 CAPCOA GHG Handbook Measure Energy E-2) • All lighting on the Project Site would be light-emitting diode (LED). (2021 CAPCOA GHG Handbook Measure Energy E-2) • The proposed Project would not include any natural gas infrastructure. (2021 CAPCOA GHG Handbook Measure Energy E-15) • Electricity would be provided by the Clean Power Alliance and would be 100 percent renewable, unless the resident(s) opt-out. (2021 CAPCOA GHG Handbook Measure Energy E-11) • Low-flow water fixtures and native landscaping. (2021 CAPCOA GHG Handbook Measure Water W-5.	Implement Energy and Emission Saving Features	Prior to issuance for a residential unit Building Permit	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works
Hazards and Hazardous Materials				
HAZ 1: Soil Management Plan. The subdivider shall require that its contractor(s) develop and implement a Soil Management Plan (SMP) for the management of soil and soil gas before any ground-disturbing activity within the vicinity of the maintenance facility building. The SMP shall include the following, at a minimum: • Site description, including the hazardous materials that may be encountered. • Roles and responsibilities of onsite workers, supervisors. • Training for site workers focused on the recognition of and response to encountering hazardous materials. • Protocols for the materials testing, handling, removing, transporting, and disposing of all excavated materials in a safe, appropriate, and lawful manner.	Submit a Soil Management Plan for review and approval.	Prior to issuance of Grading Permit	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
• In the event that hazardous materials are encountered, reporting requirement to the local regulatory agency with jurisdiction, documenting that site activities were conducted in accordance with the SMP. The SMP shall be provided to the County of Los Angeles Department of Public Works for their review and approval prior to issuance of a grading permit.				
Implement Mitigation Measure TR-3	Submit a Construction Staging and Traffic Management Plan for review and approval.	Prior to issuance of Grading Permit and During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works, Fire, and Sheriffs
Hydrology and Water Quality				
Implement Mitigation Measure HAZ-1	Submit a Soil Management Plan for review and approval. Comply with MS4 permit.	Prior to issuance of Grading Permit	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works
Noise				
NOI-1: Prior to issuance of a grading permit, temporary construction noise barriers shall be erected along Project boundary that separates on-site active construction area and off-site sensitive receivers within 200 feet of the Project boundary. Such noise barriers shall have a minimum height of 10 feet above ground to block the direct line-of-sight between onsite active construction area. Temporary barriers shall include acoustical blankets with a minimum sound transmission class (STC) rating of 25 and noise reduction coefficient (NRC) of 0.75. Temporary noise barriers shall achieve a minimum of 12 dBA reduction in construction noise.	Install Noise Barriers	Prior to issuance of a Grading Permit and During Construction Phases of Demolition, Site Preparation, Grading/Excavation and Drainage/Utilities/Trenching	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Health and Public Works
NOI-2: Prior to issuance of grading permits, the County/Project subdivider shall incorporate the following measures as a note on the grading plan cover sheet: • Construction equipment, fixed or mobile, shall be equipped with properly operating and maintained noise mufflers consistent with manufacturers' standards and capable of reducing equipment noise levels by a minimum of 3 dBA. • Construction staging areas shall be located at the greatest distance feasible from off-site sensitive uses during Project construction. • The Project contractor shall place all stationary construction equipment so that emitted noise is directed away from sensitive receptors nearest the Project Site, whenever feasible.	Add noise measures to grading plan cover sheet.	Prior to issuance of a Grading Permit and During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Health and Public Works

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
NOI-3: For off-site improvements related to the traffic signal installation, the contractor shall install temporary noise barriers, prior to the issuance of grading and building permits, between the active construction area and the off-site noise-sensitive receptors. The mobile noise barriers shall achieve sound level reductions of a minimum of 10 dBA between the Project construction sites and the sensitive receptor location. These temporary noise barriers shall be used to block the line-of-sight between the engine of the crane and similarly elevated ground-level noise-sensitive receptors. The barriers should allow for repositioning in order to block the noise at the sensitive receptor as construction activities move along the Project boundary. A noise barrier is not required if it would pose a safety risk or unreasonably prevent access to the construction area as deemed by the on-site construction manager such as in areas that have limited equipment maneuvering space or access. Any barrier capable of a reduction greater than 12 dBA would require greater height and heavier noise insulation which would make mobility of the barrier infeasible and cause safety concerns related to barrier stability. Further, noise barriers would only be effective if they block the line-of-sight to sensitive receptors. The contractor shall provide documentation verifying compliance with this measure.	Install Noise Barriers	Prior to issuance of Grading and Building Permits and During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Health and Public Works
NOI-4: During construction, vibratory pile drivers and/or vibratory rollers shall not be used within 75 feet of residential buildings adjacent to the Project Site	Ban Pile Driving/Vibration equipment within 75 feet of residential buildings. Include Mitigation Measures NOI-4 in the Construction Contract Specifications	During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Health
PDF NOI-1: Construction activities occurring as part of the Project shall be subject to the limitations which states that construction activities may occur between 7:00 a.m. and 7:00 p.m. Mondays through Saturdays. No construction activities shall be permitted outside of these hours or on Sundays and federal holidays unless a temporary waiver is granted by the Chief Building Official or his or her authorized representative.	Comply with Title 22 which regulates construction hours. Include Mitigation Measures PDF NOI-1 in the Construction Contract Specifications	During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Health
Public Services				
Implement of Mitigation Measure TR-3.	Construction Staging and Traffic Management Plan	Prior to issuance of a Grading Permit and During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
Transportation				
TR 1: Implement Subsidized or Discounted Transit Program In order to encourage use of the Metrolink commuter rail system and reduce commute-related VMT in the region, the homeowner's association (HOA) shall provide a reimbursement subsidy of up to 50 percent of the cost of one Metrolink monthly pass per residential dwelling unit for five (5) years (the subdivider shall administer and fund the reimbursement subsidy program for the first three [3] years, at which point the HOA shall take over administration and funding).. Consistent with the guidance provided in the 2021 Handbook which states that projects may be located up to two (2) miles from high-quality transit service when access is supported by bicycle, the subdivider will also provide an electric bicycle with the purchase of each dwelling unit in order to support the effectiveness of this measure (discussed in further detail below). It should be noted that monthly passes for the Metrolink system are sold based on the specific origin and destination stations both for cost and ticketing purposes (e.g., a monthly pass from Industry Station to L.A. Union Station costs approximately $238.00, while a monthly pass from Industry Station to Riverside – Downtown Station costs approximately $259.00). As the destination stations for future residents cannot be determined in advance, it is not feasible for the subdivider to pre-purchase and distribute passes along with the purchase of each dwelling unit. Instead, the subdivider/HOA will advertise the subsidy program to future residents at the time of purchase, and once a year for the remaining years of the subsidy program. As the total cost of the transit passes cannot be determined in advance, the total yearly homeowner transit subsidy reimbursement cost for Metrolink passes shall not exceed $20,250.00 to the subdivider /HOA. The project site is also served by public bus transit. As described in Section 3.2, public bus transit service in the vicinity is provided by Foothill Transit. Public bus stops are provided at the intersections of Fairway Drive-Brea Canyon Cutoff Road/Colima Road and Lake Canyon Drive/Colima Road, with service approximately every 20-30 minutes during the peak commute hours. Therefore, in addition to the Metrolink subsidies, the subdivider /HOA shall also provide a reimbursement subsidy of up to 50 percent of the cost of one Foothill Transit monthly bus pass per residential dwelling unit for five (5) years (the subdivider shall administer and fund the reimbursement subsidy program for the first three [3] years, at which point the HOA shall take over administration and funding) in order to encourage the use of bus transit and reduce residential VMT in the region. A 31-day Foothill Transit bus pass costs approximately $60.00. The subdivider /HOA shall advertise the subsidy program to future residents at the time of purchase, and once a year for the remaining years of the subsidy	Establish and fund a Subsidized or Discounted Transit Program (Metrolink / Foothill Transit Pass Subsidy) Provide a copy of the final CC&R which includes the above requirement to provide the above mitigation.	Prior to Final Map Recordation	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Works and Planning

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
program. As the total cost of the transit passes cannot be determined in advance, the total yearly homeowner transit subsidy reimbursement for Foothill Transit bus passes shall not exceed $24,750.00 to the subdivider /HOA. Total annual transit reimbursement subsidies (Metrolink and Foothill Transit) paid by the subdivider/HOA will not exceed $45,000 per year for the five (5)-year period. The subdivider/HOA will provide a report to Los Angeles County Departments of Public Works and Planning six (6) months prior to the end of the fifth year, detailing the use of the transit subsidy program. The County will determine within 90 days if the use of the transit subsidy program should continue for an additional five (5) years. In no event shall the transit subsidy program last more than a total of 10 years. To ensure the transfer of the transit subsidy program, the subdivider shall provide in the CC&Rs a method for the continuous maintenance, administration, operation of the fund for the period specified, to the satisfaction of the Director of Planning.				
TR-2: Electric Bicycles. The subdivider shall provide an electric bicycle along with the purchase of each dwelling unit at the close of escrow. The provision of electric bicycles is expected to support implementation of the transit subsidy program by providing an alternative last-mile connection to the nearby Metrolink Industry Station.	Demonstrate the program has been established and funded. Provide each household with an Electric Bicycle Provide a copy of the final CC&R which includes the above requirements to provide the above mitigation.	Prior to Final Map Recordation.	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works and Planning
TR 3: Construction Staging and Traffic Management Plan. Prior to commencement of Project construction, the Subdivider shall submit a detailed Construction Staging and Traffic Management Plan (CSTMP) to the LACDPW, the LACSD, and the Fire Department for review and approval. The CSTMP shall include any applicable street/lane/sidewalk closure information, a detour plan, haul route(s), identify emergency evacuation routes, and a staging plan. The CSTMP would be based on the nature and timing of the Project's specific construction activities and would consider other projects under construction in the immediate vicinity of the Project Site, if any. The CSTMP also would include features such as notification to adjacent property owners and occupants of upcoming construction activities, advance notification regarding any temporary transit stop relocations, and limitation of any potential roadway lane closure(s) to off-peak travel periods, to the extent feasible. Accordingly, the CSTMP shall include, but not be limited to, the following features, as appropriate: • Provide advanced notification to adjacent property owners and occupants, as well as nearby schools, of upcoming construction activities, including durations and daily hours of construction. Provide a posted sign on the Project Site with hotline information for adjacent	Submit a Construction Staging and Traffic Management Plan for review and approval.	Prior to issuance of Grading Permit and During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Departments of Public Works, Fire, and Sheriff's.

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
property owners to call and address specific issues or activities that may potentially cause problems at on-and-off-site locations; • Coordinate with the County and emergency service providers to ensure adequate access is maintained to the Project Site and neighboring businesses; • Coordinate with Foothill Transit to provide advanced notifications of any temporary stop relocations and durations and follow all safety required procedures required by the transit agency; • Limit any potential roadway lane closure/s to off-peak travel periods, to the extent feasible; • Provide traffic control for any potential roadway lane closure, detour, or other disruption to traffic circulation; • To the extent feasible, store any construction equipment within the perimeter fence of the construction site. Should temporary storage of a large piece of equipment be necessary outside of the perimeter fence (e.g., within a designated lane closure area), that area must comply with County and/or State-approved detour/traffic control plans; • Provide safety precautions for pedestrians and bicyclists through such measures as alternate routing and protection barriers. Should any temporary closure of an existing sidewalk be required, appropriate pedestrian detours will be established and signed as such so as to maintain public pedestrian circulation. The Subdivider shall submit all necessary permit applications prior to commencing construction activities which might encroach on public right-of-way; • Identify the routes that construction vehicles would utilize for the delivery of construction materials (i.e., lumber, tiles, piping, windows, etc.), to access the Project Site, traffic controls and detours, and proposed construction phasing plan for the Project; • Require the Subdivider to keep all public roadways adjacent to the Project Site clean and free of debris including, but not limited to, gravel and dirt as a result of its construction activities; • Schedule delivery of construction materials and hauling/transport of oversize loads to nonpeak travel periods, to the extent possible; • Obtain a Caltrans transportation permit for use of oversized transport vehicles on Caltrans facilities (i.e., the Orange and Pomona freeways), if needed; • Haul trucks entering or exiting public streets shall at all times yield to public traffic; • Construction-related parking and staging of vehicles shall occur on-site to the extent possible;				

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
• Coordinate deliveries to reduce the potential of trucks waiting to unload for protracted periods of times; • Prohibit parking by construction workers on nearby streets and direct construction workers to available/designated parking areas within and adjacent to the Project Site; and • The construction zone traffic control plans detailed in the CSTMP shall meet standards established in the current California Manual on Uniform Traffic Control Devices (MUTCD) as well as Los Angeles County requirements. The traffic control plans should be prepared by either a Civil or Traffic Engineer licensed by the State of California.				
PDF T-1. Increase Residential Density This measure accounts for the VMT reduction achieved by a project that is designed with a higher density (residential density of 2.72 dwelling units per acre) of dwelling units compared to the average residential density in the country. When reductions are being calculated from a baseline derived from a travel demand model, the residential density of the relevant TAZ is used for the comparison instead. Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing residential density results in shorter and fewer trips by single-occupancy vehicles and thus a reduction in VMT. The Project-generated VMT is derived from the County's VMT Tool, which is based on SCAG travel demand model data. Therefore, the Project's potential VMT reduction is determined by comparing the residential density without and with the Project's proposed residential development proposed for Planning Areas 1, 2 and 3, and comparing the residential density TAZ without and with the residential development proposed for Planning Area 5. The residential density of each TAZ was determined based on parcel-level data obtained from the Los Angeles County Office of the Assessor, which reports the type of residential development (e.g., single family, duplex, multi-family), the number of units, and the acreage of each parcel.	Implement PDF.	Project attribute, any future changes to the project cannot include a density reduction. Any reduction in the proposed project's residential density would require the project to submit a revised traffic impact analysis for review and approval to the satisfaction of Public Works.	Subdivider, or Successor, and Permittee	County of Los Angeles Departments of Public Works and I Planning
PDF T-2. Locate Project near Bike Path/Bike Lane This measure requires projects to be located within a 0.5-mile bicycling distance from an existing Class I bike path or Class II bike lane. A project that is designed around an existing or planned bicycle facility encourages sustainable mode use. The project design should include a comparable network that connects the project uses to the existing off-site facilities that connect to work/retail destinations. The proposed Project Site is located within a 0.5-mile distance of the existing Class I bicycle lanes along Fairway Drive and along Golden Springs Road. As noted in Section 3.1.2, future bicycle lanes are	Implement PDF	Project attribute, monitoring not needed.	Subdivider, or Successor, and Permittee	County of Los Angeles Department of Public Works

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
planned for Colima Road and Brea Canyon Cutoff Road in the immediate vicinity of the Project Site, which would provide connections to the existing bicycle lanes west and south of the site. Upon installation of the planned bicycle lanes, the Project Site would be served by regional-serving bicycle facilities that connect to work/retail destinations and facilitate bicycle commuting. The proposed Project is planned to provide recreational multi-use trails within the Project Site which are expected to accommodate pedestrians, bicycles, and other non-motorized modes of travel. The multi-use trail system will connect to the internal project roadways as well as public sidewalks and roadways at various places, including along Colima Road. Therefore, the Project Site is planned to provide convenient connections to the future bicycle lanes for residents of the Project Site as well as the general public. It is expected that providing connections throughout the Project Site to regional bicycle facilities will result in greater substitution of bicycle trips for vehicle trips. Therefore, the Project is well-located and designed to attain expanded VMT reductions in the future when the planned bicycle facilities are installed.				
PDF T-3. Fairway Drive/SR-60 Freeway Ramps The exclusive northbound right-turn lane at the SR-60 Freeway EB on-ramp would be restriped to accommodate a shared through/right-turn lane, and the other northbound lanes would be restriped to accommodate the full extent of the forecast northbound left-turn queue. It is not anticipated that any roadway widening would be required in order to accommodate the proposed lane configuration on Fairway Drive. It should be noted that the reconfiguration of the northbound lanes at the SR-60 Freeway ramp intersections would require approval from Caltrans prior to being implemented by the Project Subdivider. If the Caltrans does not concur with this improvement, this improvement will not be required.	Submit for review and approval traffic signal plan and signing and striping plan and bond for the improvement to the satisfaction of Public Works/Caltrans.	Prior to Final Map Recordation.	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works
PDF T-4. Fairway Drive/East Walnut Drive South The westbound approach along East Walnut Drive South is approximately 20 feet wide, and is currently striped to provide one 10-foot-wide shared through/left-turn lane and one 10-foot-wide right turn lane. In order to better accommodate the forecast right-turn queues, the westbound right-turn lane striping shall be extended to provide an additional 50 feet of storage space. The lane striping will terminate prior to the existing driveway along the north side of the roadway in order to maintain full access to the existing parcel. The roadway width along the westbound approach of East Walnut Drive South is adequate for vehicles to utilize the curb lane (i.e., a de facto turn lane) should additional storage space be required	Submit signing and striping plans for review and approval, and bonds for the improvement to the satisfaction of Public Works.	Prior to Final Map Recordation	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
PDF T-5. Fairway Drive-Brea Canyon Cutoff Road/Colima Road • Northbound Left-Turn: To better accommodate the left-turn queues and improve overall operations at the intersection, the raised concrete median adjacent to the northbound left-turn lane shall be modified and narrowed in order to accommodate the extension of the left-turn lane by 60 feet. In order to maintain full access to the existing parcel along the west side of the roadway, the median should not extend further to the south. • Northbound Right-Turn: In order to adequately accommodate the forecast right-turn queues, the lane striping would be extended to provide an additional 10 feet of storage space for the northbound right-turn lane. • Eastbound Left-Turn: In order to adequately accommodate the left-turn queues, the raised concrete median adjacent to the eastbound left-turn lane would be modified to accommodate the extension left-turn lane by 60 feet. • Westbound Left-Turn: In order to adequately accommodate the left-turn queues, the raised concrete median adjacent to the westbound left-turn lane will be modified to accommodate the extension left-turn lane by 105 feet.	Submit traffic signal plan, signing and striping plan for review and approval, and bonds for the improvements to the satisfaction of Public Works	Prior to Final Map Recordation	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works
PDF T-6. Project Driveway-Walnut Leaf Drive/Colima Road The Walnut Leaf Drive approach would be restriped to accommodate eastbound left-turns into the project driveway, located at north approach by an exclusive left-turn lane, restriped to provide one southbound departure lane, as well as one shared left-through lane and one right-turn lane on the northbound approach. It is not anticipated that any roadway widening would be required in order to accommodate the proposed lane configuration on Walnut Leaf Drive.	Submit signing and striping plan for review and approval, and bonds for the improvement to the satisfaction of Public Works	Prior to Final Map Recordation	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works
PDF T-7. Tierra Luna-Project Driveway/Colima Road The proposed Project would construct a driveway at the existing Tierra Luna/Colima Road intersection. The Project driveway will tie-in to the intersection as the new south leg of the existing unsignalized "T"-intersection. The existing signalized pedestrian and golf cart crossing across Colima Road is planned to be relocated with a traffic signal installed at the future Tierra Luna/Colima Road intersection in order to maintain pedestrian access across Colima Road. The golf cart path south of Colima Road will be removed in order to accommodate the open space on Planning Area 4 and the proposed single-family homes on Planning Area 5; therefore, pedestrian crossings across Colima Road are planned to be accommodated at the Tierra Luna/Colima Road intersection instead. Colima Road shall be restriped to accommodate exclusive westbound left turns into the project driveway.	Submit for review and approval traffic signal plan and signing and striping plan and bond for the improvements to the satisfaction of Public Works.	Prior to Final Map Recordation	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works

Mitigation Measure	Action Required	When Monitoring to Occur	Responsible Agency/Party	Monitoring Agency/Party
PDF T-8. Lemon Avenue/Golden Springs Drive The traffic signal shall be modified to provide a westbound right-turn overlap phase (i.e., the westbound right-turns would receive a green arrow concurrent with the existing protected southbound phase). The improvement is anticipated to result in a reduction in the westbound right-turn queues. This improvement will require approval from the City of Diamond Bar prior to implementing this improvement. If the City does not concur with this improvement, this improvement will not be required.	Submit approved traffic signal plan and signing and striping plan and bond for the improvement to the satisfaction of Public Works/City of Diamond Bar.	Prior to Final Map Recordation	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works
Tribal Cultural Resources				
TCR 1: A qualified Native American Monitor from the Gabrieleno Band of Mission Indians-Kizh Nation shall be retained to monitor all grading activities within the Project Site. Prior to ground disturbing activities, the subdivider shall provide evidence of a separate executed monitoring agreement with the Gabrieleno Band of Mission Indians-Kizh Nation for the monitoring of all grading activities, to the satisfaction of the monitoring agency. In the event archaeological resources are encountered during Project grading, all ground-disturbing activities within the vicinity of the find shall cease. The Native American Monitor shall evaluate and record all tribal cultural resources. The Native American Monitor shall also maintain a daily monitoring log that contains descriptions of the daily construction activities, locations with diagrams, soils, and documentation of tribal cultural resources identified. The monitoring log and photo documentation, accompanied by a photo key, shall be submitted to the LA County Planning upon completion of the grading activity	Provide a copy of the retainer for a Tribal Cultural Resources Monitor.	Prior to issuance of a Grading Permit	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning
TCR-2: If the Native American Monitor determines the resources are not tribal cultural resources, a qualified archaeologist shall be notified of the find and the action set forth in Mitigation Measure CUL-2 shall be taken.	Provide a copy of the retainer for a Tribal Cultural Resources Monitor.	Prior to issuance of a Grading Permit	Subdivider or Successor, and Permittee	County of Los Angeles Department of Planning
Wildfire				
Implement of Mitigation Measure TR-3	Submit a Construction Staging and Traffic Management Plan for review and approval.	Prior to issuance of a Grading Permit and During Construction	Subdivider or Successor, and Permittee	County of Los Angeles Department of Public Works

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Appendix O

GLA Supplemental Technical Memorandum re: Special Status Bats

TECHNICAL MEMORANDUM

GLENN LUKOS ASSOCIATES
Regulatory Services

PROJECT NUMBER: 1086-8ROYA

TO: Kevin Smith, ESA

FROM: Tony Bomkamp

DATE: April 13, 2024

SUBJECT: Supplemental Technical Memorandum re: Special Status Bats

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The Biological Resources Section of the Draft Environmental Impact Report (DEIR) addressed four species of special-status bats, and their potential for occurrence at the 75-acre Royal Vista Golf Course Project site. Specifically, in Table 4.4-2 of the DEIR, which is supported by Table 2 of the December 1, 2021 Technical Memorandum prepared by Placeworks, that was included as Appendix C to the DEIR (the "Technical Memorandum"), the following bats and their potential for occurrence were addressed as follows: pallid bat (*Antrozous pallidus*), "low potential for roosting onsite"; pocketed free-tailed bat (*Nyctinomops femorosaccus*), "None. There is no suitable general or micro-habitat on-site"; big free-tail bat (*Nyctinomops macrotis*), "Low potential to occur for foraging" and western mastiff bat (*Eumops perotis californicus*), "None. There is no suitable general or micro-habitat for roosting on-site."

Glenn Lukos Associates (GLA) has reviewed the DEIR and the comments on the DEIR submitted by the Channel Law Group LLP (Comment ORG-6) and Exhibit C thereto, and has prepared this Supplemental Technical Memorandum to clarify and amplify the DEIR analysis and impact determination with respect to special status bats. As discussed further below, the DEIR evaluation of potential to occur on the Project Site is accurate for the Pallid bat (low potential), for the pocketed free-tailed bat (none, due to absence of suitable habitat), and big free-tailed bat (low potential). GLA has clarified that the Western Mastiff bat exhibits low potential rather than no potential, but that this clarification does not modify the impact conclusions of the DEIR. Each of these species is addressed in detail below.

In addition, GLA considered four additional special status bat species including the Western yellow bat (*Lasiurus xanthinus*), Western red bat (*Lasiurus blossevillii*), Hoary bat (*Lasiurus cinereus*), and Yuma myotis (*Myotis yumanensis*), which are added to the DEIR biological resources analysis to clarify and amplify the analysis, but do not change the DEIR impact conclusions. As discussed below, the Project would not result in a significant impact with respect to any of the four additional species.

A. Bats Addressed in the DEIR

1. Pallid Bat

Table 4.4-2 of the DEIR described habitat for the Pallid bat as "…Occurs in a variety of habitats, including woodlands, scrub, rocky canyons, farmland, and desert. Roosts in rock crevices, old buildings, bridges, caves, mines, and tree cavities. In the region this species is generally associated with sycamore and oak woodlands." The DEIR concluded that the pallid bat has a low potential for roosting onsite. GLA concurs with the DEIR analysis. The Project site does not contain bridges, caves, or mines. It does contain a few tree cavities, and two small sheds and a maintenance building. However, tree cavities are limited to a few trees and the two sheds each account for less than 40 square feet each and are approximately six feet in height. The maintenance building has a metal roof with no attic and contains no crevices and also provides limited habitat. As such, while there is potential habitat, the habitat is extremely limited and the potential for roosting is low. Given these factors, any potential impacts to the pallid bat would be very limited and would not be considered "substantial" as required by the Appendix G, CEQA Guidelines, and therefore not significant. Additionally, the DEIR has been revised to include Mitigation Measure (MM) BIO-3 that would ensure that impacts associated with pallid bat would continue to be less-than-significant.

2. Pocketed Free-Tailed Bat

Table 4.4-2 of the DEIR described habitat for the pocketed free-tailed bat as "Occurs in creosote bush and chaparral habitats, mainly with prominent rock features. Roosts in crevices located in high cliffs and rugged rock outcroppings but has also been found in caves and buildings." The DEIR concluded that the pocketed free-tailed bat has no potential to occur onsite due to absence of suitable habitat. GLA concurs with the DEIR analysis. The site is not located within creosote bush (exclusively a desert habitat) and contains no chaparral thus, the site contains no suitable habitat. The presence of the two small sheds and a maintenance building with a metal roof and no attic or crevices, is not sufficient for a finding that the site contains suitable habitat. Given these factors, any potential impacts to pocketed free-tailed bat would not be considered "substantial" as required by the Appendix G, CEQA Guidelines, and therefore not significant. In addition, the DEIR has been revised to include MM BIO-3 that would ensure that any impacts to the pocketed free-tailed bat remain less than significant.

3. Big Free-Tailed Bat

Table 4.4-2 of the DEIR described habitat for the big free-tailed bat as "Arid floodplain habitats, such as arroyo, shrub desert, and woodlands. Typically roosts in rock crevices in canyon settings, but also known to roost in buildings and caves. Not known whether this species breeds in California." The DEIR concluded that the big free-tailed bat has a low potential to occur for foraging. GLA concurs with the DEIR analysis. The Project site is not associated with floodplains, arroyos or canyons with rock crevices. As noted for the pocketed free-tailed bat above, the presence of the two small sheds and a maintenance building with a metal roof and no attic or crevices, is not sufficient for a finding that the site contains suitable habitat. Given these factors, any potential impacts to the big free-tailed bat would not be considered "substantial" as required by the Appendix G, CEQA Guidelines, and therefore not significant. In addition, the DEIR has been revised to include MM BIO-3, which would ensure that any impacts to big free-tailed bat remain less than significant.

4. Western Mastiff Bat

Table 4.4-2 of the DEIR described habitat for the western mastiff bat as "Variety of habitats, from desert scrub and chaparral to oak woodland and ponderosa pine, but only where there are significant rock features for roosting. Natural roosts are often found under large exfoliating slabs of granite, sandstone slabs, or in columnar basalt, on cliff faces, or in large boulders. Some roosts have been found in buildings." The DEIR concluded that the western mastiff bat has no potential to occur due to lack of suitable habitat. As for the three special status bat species noted above, none of the referenced habitats are associated with the Project site. While there is a report of western mastiff bats utilizing a palm tree,[1] this is not the favored habitat. Similarly, while they have been found in buildings, this is not the preferred habitat.

Further, it is important to note that use of palm trees on the site by mastiff (and pallid) bats would be associated only with dead fronds (to the extent they remain) that form large skirts in the absence of maintenance. Typical maintenance of palm trees includes the removal of the dead fronds in order to limit the potential for fire and pest species such as Norwegian rats that are known to utilize palms. A desktop review of the palms on the Project site (based on Google Earth aerial from February 2024) show that nearly all the palms are regularly maintained such that the dead fronds are regularly removed and there are few to none fan palms with extensive frond skirts. The regular maintenance substantially limits the development of potential roost sites, precluding suitable habitat. In other words, regular maintenance of palms substantially limits or fully eliminates potential habitat. Thus, based on routine maintenance requirements and practices on the Project Site, no long-term habitat is maintained and therefore the existing palm trees are not considered suitable bat habitat.

Nonetheless, given the number of palm trees on the Project site, along with the two sheds and maintenance building (which are not preferred habitat), GLA determined that the potential for habitat for the western mastiff bat should be revised from "none" in DEIR Table 4.4-2, to low potential. However, despite this clarification of the species potential to occur on-site, given the

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[1] Remington S. 2011. Bat Surveys of the Proposed Whittier Matrix Oil Project, Whittier, California. Final Report prepared for the Puente Hills Habitat Preservation Authority.

factors discussed in the DEIR and above, any potential impacts to the western mastiff bat would not be considered "substantial" as required by the Appendix G, CEQA Guidelines, and therefore not significant. In addition, the DEIR has been revised to include MM BIO-3 that would ensure that any impacts to the western mastiff bat would remain less than significant.

B. Additional Bats Not Addressed in the DEIR

GLA determined that four additional bat species should be addressed in the DEIR in order to fully cover all bat species with any potential to occur. As noted, these include western red bat, western yellow bat, hoary bat, and Yuma myotis. Each is addressed below. As discussed below, the Project would not result in significant impacts with respect to any of these four species and the conclusions of the DEIR remain unchanged.

1. Western Red Bat

Western red bats are solitary animals that prefer riparian habitats that include walnuts, oaks, willows, sycamores, and ash trees where they roost exclusively in the foliage. The Project site contains no riparian habitat and as noted in the LSA, 2023 Royal Vista Residential Project Arborist Tree Report. May 31, 2023 (Tree Survey) contains only five oaks off-site, all of which are avoided by the Project. Given the lack of riparian habitat, there is low potential for this species to occur on the Project site. Given the low potential for occurrence and avoidance of non-riparian oaks there is no potential for the Project to have significant impacts on the western red bat. In addition, the DEIR has been revised to include MM BIO-3 that would ensure that any impacts to the western red bat remain less than significant.

2. Western Yellow Bat

Western yellow bats are solitary animals that prefer foliage for roosting including dead fronds of fan palms. Given this preference and the presence of over 100 Mexican fan palms on the Project site there is moderate potential for the western yellow bat to occur on the site. However, as with the western mastiff and pallid bats discussed above, use of palm trees on the site by western yellow bats would be associated only with dead fronds (to the extent they remain) that form large skirts in the absence of maintenance. As discussed above, based on routine maintenance requirements and practices for palm trees on the Project site, no long-term habitat is maintained and the existing palm trees are not considered suitable bat habitat, and there would be no significant impacts. In addition, the DEIR has been revised to include MM BIO-3 that would ensure that any impacts to the western yellow bat would remain less than significant.

3. Hoary Bat

The hoary bat is a solitary animal that roosts in in foliage of trees in dense forests, along the edges of forest openings and can be found in urban areas such as parks and street trees. The Project site does not contain a dense forest and thus, based on the limited trees, exhibits low to moderate potential for the hoary bat; however, given the solitary nature of the species, numbers would be low and there is no potential for the Project to have significant impacts on the hoary bat. In addition, the DEIR has been revised to include MM BIO-3 that would ensure that any impacts to the hoary bat would remain less than significant.

4. Yuma Myotis

The Yuma myotis can be found in the hundreds or thousands roosting in caves, attics, buildings, mines, underneath bridges, and other similar structures. As noted for the pallid and western mastiff bats, there is very limited potential habitat in the forms of existing structures (two small sheds and a maintenance building with a metal roof and no attic or crevices) and low potential for occurrence. Because of the limited amount of habitat in the form of structures, any potential impacts would be limited and not significant. In addition, including MM BIO-3 would ensure that any impacts to the Yuma myotis would remain less than significant.

C. Other Nearby Surveys

In further support of the above analysis, GLA provides the results of focused bat surveys conducted by GLA at one nearby golf course in 2018. Specifically, GLA conducted focused surveys at the Westridge Golf Course in La Habra which is approximately 7.75 miles to the southwest of the Project site. No special-status bats were found. It is important to note that the Westridge Golf Course contains native riparian habitats including willows and cottonwoods as well as Mexican fan palms and contains three water features. In contrast, the Project site only contains Mexican fan palms and two water features. Thus, the results of the Westridge Golf Course bat surveys further supports the analysis and conclusions above that the Project would have less than significant impacts on special status bat species.

The methodology and results set forth in the Westridge Golf Course report are excerpted below:

> ### 2.0 METHODOLOGY
>
> Focused surveys were conducted by GLA biologist Jeff Ahrens on July 10, 2018; GLA biologists Stephanie Cashin and April Nakagawa on July 23, and July 30, 2018; and Mr. Ahrens and Ms. Cashin on August 29, 2018. All surveys were conducted beginning at least 30 minutes before dusk and extended for approximately two hours after full darkness. Potential roost trees were surveyed visually and with the aid of the Seek

Thermal Pro during darkness looking for emerging bats. Acoustic surveys continued for approximately two hours after dark. Equipment included: (1) Wildlife Acoustics Echometer Touch 2 Pro bat detectors used to record bat echolocation calls; (2) a Seek Compact Pr+o Thermal imager attached to an iPhone to assist in detecting emerging bats from existing roosts; and (3) Sonobat 4.2.2 bat analysis software to process acoustic files.

3.0. RESULTS

No roost sites were detected within potential tree species including Gooddingii's black willow, Fremont Cottonwood, western sycamore, and Mexican fan palm. A total of three bat species, none of which have special-status, were detected foraging or flying over the survey areas on the site (see Exhibit 3) including the Mexican free-tailed bat (*Tadarida brasiliensis*), big brown bat (*Eptesicus fuscus*), and California myotis (*Myotis californicus*). Because there were no special-status bats detected and detections consisted of flyover or potentially foraging bats, specific detections were not mapped.

In general, bat use of the site was lower than expected given the open water on the site associated the golf course water features and limited emergent vegetation; however, it is possible that use of pesticides and herbicides on the golf course limited insects which provide forage for bats. The following species are recorded by the California Natural Diversity Database as occurring in the La Habra California USGS 7.5 minute topographical map (dated 1964, photorevised 1981), or adjacent USGS 7.5 minute topographical maps.

Table 1 below is also excerpted from the report.[2]

TABLE 1: SPECIAL-STATUS BAT WITH POTENTIAL TO OCCUR			
Species Name	**Status**	**Habitat Requirements**	**Potential for Occurrence**
Big free-tailed bat *Nyctinomops macrotis*	Federal: None State: None CDFW: SSC WBWG: Medium	Occurs in low-lying arid areas in Southern California. Roosts in high cliffs or rocky outcrops.	Not expected to roost on site. Not detected roosting or foraging.
Hoary bat *Lasiurus cinereus*	Federal: None State: None CDFW: None WBWG: Medium	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths. Requires water.	Not expected to occur. Not detected roosting or foraging.
Pallid Bat *Antrozous pallidus*	Federal: None State: None CDFW: SSC WBWG: High	Habitats with rocky, outcropped areas.	Not expected to roost on site. Not detected roosting or foraging.
Pocketed free-tailed bat *Nyctinomops femorosaccus*	Federal: None State: None CDFW: SSC WBWG: Medium	Rocky areas with high cliffs in pine-juniper woodlands, desert scrub, palm oasis, desert wash, and desert riparian.	Not expected to roost on site. Not detected roosting or foraging.
Western mastiff bat *Eumops perotis californicus*	Federal: None State: None CDFW: SSC WBWG: High	Prefers habitat edges and mosaics with trees that are protected from above and open from below with open areas for foraging. Roosts primarily in trees, 2-40 feet above ground, from sea level up through mixed conifer forests.	Not expected to occur. Not detected roosting or foraging.
Western yellow bat *Lasiurus xanthinus*	Federal: None State: None CDFW: SSC WBWG: High	Found in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. Roosts in trees, particularly palms. Forages over water and among trees. Currently increasing throughout its range.	Potential to occur but not detected roosting or foraging on site.
Yuma myotis *Myotis yumanensis*	Federal: None State: None CDFW: None WBWG: Low	Optimal habitats are open forests and woodlands with sources of water over which to feed. Distribution is closely tied to bodies of water. Maternity colonies in caves, mines, buildings or crevices.	Not expected to occur. Not detected roosting or foraging.

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[2] Glenn Lukos Associates. August 28, 2019. Results of Focused Surveys for Special-Status Bats at the Westridge Golf Course, City of La Habra, Orange County, California.

As noted, the Westridge Golf Course bat surveys detected three common bat species including Mexican free-tailed bat, big brown bat, and California myotis and it is likely that such common species would also be most common on the Project site. However, despite the greater potential for species status bats to occur on the Westridge Golf Course site, no special status bats were found. The findings of the Westridge Golf Course bat surveys provide further support for the conclusion that potential impacts to special-status bats at the Project site is less than significant. In addition, Mitigation Measure BIO-3 will further ensure that any potential impacts to special-status bats on the Project site would remain less than significant.

Appendix P

GLA Responses to Draft EIR Comment ORG 6, Attachment C; Royal Vista Residential Project, Rowland Heights, Los Angeles County

TECHNICAL MEMORANDUM

GLENN LUKOS ASSOCIATES
Regulatory Services

PROJECT NUMBER: 1086-8ROYA

TO: Marie Pavlovic, LA County Planning

FROM: Tony Bomkamp

DATE: April 13, 2024

SUBJECT: Responses to Draft EIR Comment ORG 6, Attachment C; Royal Vista Residential Project, Rowland Heights, Los Angeles County

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The following are responses prepared by Glenn Lukos Associates (GLA) to Comments on the Draft EIR provided by biologist Scott Cashen, and included as Attachment C to Comment Letter ORG 6 (Channel Law Group). The Comments from Biologist Cashen are set forth in a document entitled "Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project" dated January 4, 2024 and addressed to Mr. Jamie T. Hall at the Channel Law Group LLP.[1] Biologist Cashen also submitted references cited in the 26-page document *directly to the County of Los Angeles entitled: "References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1); Vesting Tentative Tract Map No.: TR83534 (RPPL2021007149); General Plan Amendment No. RPPL2021004860; Zone Change No. RPPL2021007152; Conditional Use Permit No. RPPL2021007151; Housing Permit No. RPPL2021007161; Environmental Assessment No. RPPL2021007150; and, State Clearinghouse Number 2022100204".*[2]

The following responses to the comments from Biologist Cashen were prepared by GLA Senior Biologist and Technical Director Tony Bomkamp. Mr. Bomkamp is Biologist and Wetland Ecologist with over 30 years of experience in Biological Consulting and is on the County of Los Angeles list of approved biologists for preparing biological reports associated with the County of Los Angeles Significant Ecological Areas and has conducted biological surveys and jurisdictional delineations throughout Los Angeles, Orange, Riverside, Ventura, San Diego counties and beyond, and prepared associated Biological Technical Reports and Jurisdictional Delineation Reports. In addition to his consulting duties at GLA, Mr. Bomkamp served as adjunct faculty for the California State University, Fullerton, Graduate Environmental Studies Program from 1993 to 2022 teaching

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[1] Scott Cashen, January 4, 2024. "Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project", addressed to Jamie T. Hall, Channel Law Group, pp. 26. Biologist Cashen also submitted references cited in the 26-page document. Biologist Cashen's Curriculum vitae was appended to the 26-page document.

[2] Scott Cashen, January 5, 2024, Electronic Mail submittal to Marie Pavlovic, Los Angeles County Planning, pp 795.

courses on Endangered Habitats of Southern California, Wetlands, and Conservation of Migratory Birds. Mr. Bomkamp's Resume is attached.

In preparing the responses below, Mr. Bomkamp considered the following, in addition to his general expertise and knowledge of biological resources: GLA site visits (discussed in the responses), GLA's Jurisdictional Delineation Report (Appendix D to the DEIR), Biological Resources Section of the Project's Draft Environmental Impact Report (DEIR), Biologist Cashen's comments and references noted in footnotes 1 and 2 above, the December 1, 2021 Technical Memorandum prepared by Placeworks ("Technical Memorandum") (Appendix C of DEIR), and Comments received from the California Department of Fish and Wildlife (CDFW).

GLA also prepared a Supplemental Technical Memorandum re Special-Status Bats dated April 13, 2024 (the "GLA Supplemental Technical Memorandum"), included as Appendix O to the FEIR, which further addresses special status bat species.

Comment ORG 6-92: A detailed description of the environmental setting is critical to an EIR's ability to accurately analyze a project's environmental impacts, and subsequently, for the EIR to incorporate effective mitigation that will reduce the project's potentially significant impacts to less-than-significant levels.

Response ORG 6-92: *The Placeworks Technical Memorandum provides an accurate and adequate description of the environmental setting for the Royal Vista Residential Project (Project), including each of the five vegetation alliances or land cover types with descriptions (i.e., Ornamental, Constructed Ponds, Disturbed, Non-native grassland and Ruderal Habitats, and Developed Areas). Page 3 of the Technical Memorandum is a site aerial photograph showing that the environmental setting consists of an area that is fully developed with residential and commercial land uses and no contiguous open space with large blocks of native communities or even smaller areas of native habitat.*

As described in the Technical Memorandum, the Project site covers approximately 75 acres of golf course that is surrounded almost entirely by dense residential development and a limited area of adjacent golf course land use. The 75-acre golf course area contains no native habitat, which GLA confirmed during site visits. Further, in reviewing the Technical Memorandum and other information discussed above, GLA noted that approximately 95.6-percent of the adjacent land uses consist of single-family residences or major roadways such as Colima Drive. Only 4.4-percent of the adjacent land use is golf course which has no contiguous open space or native habitat. To reiterate, GLA confirmed that there is no natural open space or other areas that support native habitat adjacent to the 75-acre Project area. As discussed below in various responses, the fact that the 75-acre area of golf course contains no areas of native habitat, is an important factor relative to Cashen's comments. As depicted on the site aerial photograph on page 3 of the Technical Memorandum, and confirmed by GLA, the Project site supports a low density of trees, including about 410 trees of which 102 are Mexican fan palms. This results in a *density of 5.5 trees/acre. Off-site but adjacent to the Project site are five native coast live oaks, none of which would be impacted by the Project (including the required five-foot protection zone), as reported in the Arborist Report appended to the Technical Memorandum.*[3] *The remaining trees on the site consist of ornamental trees including weeping willow (Salix babylonica), palm trees (Washingtonia spp), sycamore (Platanus racemosa) (which in this case is functioning as an ornamental tree, although native), various pine tree species (Pinus spp.), several eucalyptus species (Eucalyptus globulus, E. camaldulensis, E. sp.), and Araucaria (Araucaria sp.). As will be discussed throughout the responses below, Cashen fails to consider the total absence of any native habitat within or in proximity to the Project site. This severely limits the potential for special-status plants or animals, and to the extent that certain special-status species could occur, the conservation value of the golf course for special-status species is very low to non-existent due to the absence of native habitat. Additionally, the site and surrounding areas were subject to agricultural use prior to the development of the golf course, as depicted on Exhibit 7A of the GLA Jurisdictional Delineation Report, (Appendix D to the DEIR) which is a 1953 aerial photograph that shows portions of the site and adjacent areas under cultivation, while other areas appear to have been cleared and support no native vegetation. Thus, there is no suitable habitat for special-status species.*

Comment ORG 6-93: Field efforts to establish the Project's biological resources setting were limited to a Jurisdictional Delineation, a "brief site visit" to search for regulated trees, and a single reconnaissance survey of unspecified duration "to assess potential biological resource constraints." Contrary to California Department of Fish and Wildlife ("CDFW") guidance, focused surveys to document baseline conditions with respect to plants and animals were not conducted.

Response ORG 6-93: *The field efforts to assess the potential for special-status biological resources as reflected in the Technical Memorandum are commensurate with the conditions at the Project site described above. In addition to the site visit by Placeworks in support of the Technical Memorandum, GLA conducted four site visits as set forth in the Jurisdictional Delineation Report* [4]*that confirmed the lack of native habitat as follows: "On March 1 and April 21, 2021, November 3, 2022, and January 25, 2023 regulatory specialists (all of which are biologists) of GLA examined the Project site ..." Given the complete lack of native habitat within the 75-acre site and complete lack of native habitat adjacent to the 75-acre Project site, combined with the extensive areas of surrounding dense urban development, the information in the Technical Memorandum provides for an accurate description of the Project site and fully addresses the potential for special-status plants and, together with the clarifications and amplification in the GLA Supplemental Technical Memorandum (see Appendix O of the FEIR), fully addresses the potential for special-status animal species. CDFW guidance does not require*

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[3] LSA. May 31, 2023. Memorandum: Royal Vista Residential Project Arborist Tree Report, pp.8.

[4] Glenn Lukos Associates. March 13, 2023. Jurisdictional Delineation of Golf Course Drainage and Water Storage Features at Royal Vista Golf Course Located in Rowland Heights, Los Angeles County, California.

focused surveys when baseline site conditions are completely devoid of native habitat. The Technical Memorandum is accurate which, as noted, was also confirmed by GLA during the jurisdictional delineation visits which allowed review of the entire 75-acre area over the period between March of 2021 and January 2023. While impacts are less than significant, in response to CDFW's comment on the DEIR, Mitigation Measure BIO-3 will be added to provide for pre-construction surveys for special-status bats on the Project site, and corresponding measures, as needed, to avoid harm to individuals, in order to further ensure that impacts to special status bats remain less than significant. See also Responses ORG 6-104 through ORG 6-109 below.

Comment ORG 6-94: Although the Applicant's consultant, Placeworks, determined nine special-status animal species have at least some potential to occur at the Project site, and although no surveys were conducted, the DEIR speculates that eight of these species either are absent, or would only be present in "limited amounts." This speculation serves as the sole basis for the DEIR's additional speculation that impacts to these eight species "would be expected to be less than significant," and therefore mitigation is not warranted. The determination by a Lead Agency on whether a project may have a significant effect on the environment calls for careful judgment, based to the extent possible, on scientific and factual data (State CEQA Guidelines § 15064(b)(1)). Two layers of speculation does not constitute scientific and factual data.

Response ORG 6-94: *The Technical Memorandum identifies three animal species with "Low to Moderate" (L-M) Potential and six with "Low Potential" (L) to occur including Southern California legless lizard (Anniella stebbinsi) (L-M), Coastal western whiptail (Aspidoscelis tigris stejnegeri) (L), San Diego coast horned lizard Phrynosoma coronatum blainvillei) (L), Southwestern pond turtle (Actinemys marmorata) (L), Burrowing owl (Athene cunicularia) (L), Pallid bat (Antrozous pallidus) (L), Big free-tail bat (Nyctinomops macrotis) (L), Northwestern San Diego pocket mouse (Chaetodipus fallax) (L-M), and San Diego desert woodrat (Neotoma bryanti intermedia) (L-M). Two of these nine species are bat species.*

During the jurisdictional delineation, GLA Senior Biologist and Technical Director Tony Bomkamp conducted site surveys to review all areas for potential jurisdictional drainages or other aquatic resources, which allowed for assessment of the entire 75-acre site. This included surveys of the golf course ponds. Based on my onsite observations, it is my opinion that the determination that there is "Low Potential" for the Coastal western whiptail, San Diego coast horned lizard, Southwestern pond turtle, and burrowing owl is accurate and is likely an overstatement regarding the potential for these species to occur. Similarly, the "Low to Moderate Potential" for Southern California legless lizard, San Diego pocket mouse, and San Diego desert woodrat is also conservative and likely overstated and is best designated as "Low Potential." The potential for occurrence of special-status bats is addressed in more detail under Response ORG 6-104 through ORG 6-109, below.

Before addressing each of the seven non-bat species below in more detail (the two bat species are addressed in Response ORG 6-104 through ORG 6-109), the concept of "occurrence" *requires additional discussion. This also needs to be considered in the context of the CEQA Appendix G, Guidelines, Biological Resources, impact category (a) which considers whether a project would: "Have **a substantial adverse effect**, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.' [Emphasis Added]. As demonstrated below, Low to Moderate potential would not result in a "substantial adverse effect."*

In this context, occurrence has a range of meanings that would include brief one-time visits, which would be typical of avifauna, foraging by bats which roost elsewhere, and residence by less mobile species such as reptiles or small mammals. As discussed below, likelihood of occurrence is informed by first, the agricultural land uses well before development began as reflected in the 1953 aerial photograph (Exhibit 7A of the Jurisdictional Delineation Report), followed by the decade-long presence of surrounding development which would prevent reptiles and small mammals from reaching the 75-acre site due to the isolation noted above; i.e., no contiguous open space or native habitat. For avian species such as burrowing owl, a migrating owl could reach the site and remain for hours or a few days during migration; however, this would be extremely rare (if it were ever to occur) and would not mean that the 75-acre area of turf, ornamental trees, and development is in fact "suitable habitat." For the reptiles and small mammals, in the very unlikely scenario where any have persisted since the golf course was developed in 1961, such individuals would be completely isolated from regional populations and do not contribute to the gene pool or overall vigor of the regional populations and are functionally extinct. These considerations are important in various discussions below. It is important to note that both Placeworks and GLA are highly familiar with the species addressed below. GLA has experience in conducting habitat assessments for each of the following species and has conducted focused surveys for all but the Northwestern San Diego pocket mouse.

***Southern California legless lizard** is typically associated with dune habitats or other sandy areas with moist areas below the surface as well as oak woodlands with accumulated leaf litter that provides cover and moisture. Suitable substrate must allow for burrowing as the legless lizard spends much of its time below the ground surface. Thus, the golf course turf and adjacent areas of "rough" which in some areas consist of non-native grassland do not exhibit suitable conditions for the legless lizard. If legless lizards were present on the site prior to agricultural uses followed by construction, suitable habitat was destroyed during grading to the extent any persisted following agricultural uses. In the unlikely event that any legless lizards survived agricultural and/or grading and installation of the turf and ornamental trees, ongoing maintenance including herbicide and pesticides use that is typical in golf course maintenance would have further degraded the habitat through killing of potential prey and direct poisoning. Given these factors, the determination by the Technical Memorandum that the potential for occurrence is Low to Medium is a conservative estimate of potential for the 75-acre site. This species has very low mobility and there is no potential for this species to reach the site given the* *dense surrounding development. Thus, this species could only be present if it was a resident at the time of construction of the golf course and it was able to persist within the 75 acres for the past 60-plus years which does not contain dune habitats or other sandy areas with moist areas below the surface as well as oak woodlands with accumulated leaf litter that provides cover and moisture. Therefore, the finding of DEIR that there is no potential for significant impacts to this species is correct.*

***Coastal western whiptail** habitat is noted in Table 2 of the Technical Memorandum as follows: "occurs in coastal sage scrub, chaparral, and wash habitats". The site contains no coastal sage scrub, chaparral, or wash habitats (implicit in the description or wash habitats would be "sandy washes with gravel and cobble" which do not occur on the site). Rather the drainage features on the Project site consist of concrete V-ditches, drainage ditches that consist of turf underlain by Urban land-Sorrento-Arbolado complex, 2 to 9 percent slopes, which is described in the Jurisdictional Delineation Report as:*

> *The Sorrento series consists of very deep, well drained soils that formed in alluvium mostly from sedimentary rocks. Sorrento soils are on alluvial fans and stabilized floodplains and have slopes of 0 to 15 percent. The Arbolado series is classified as fine, spolic, smectitic, thermic Entic Haploxerolls that consist of very deep, well drained soils that formed in human-transported materials (HTM) that originate from alluvium derived from sedimentary sources. Arbolado soils are in high density urban residential and recreational areas. Vegetation is mostly non-native and ornamental in urban areas and annual grasses and forbs in natural areas.*

These modified soils do not include "wash" habitat and do not include areas suitable for the coastal western whiptail. This species has low mobility and there is no potential for this species to reach the site given the dense surrounding development. Thus, this species could only present if it was a resident at the time of construction of the golf course in 1961 and it was able to persist within the 75 acres for the past 60-plus years that included agricultural uses, which do not contain coastal sage scrub, chaparral, or wash habitat. Therefore, the finding of the DEIR that there is no potential for significant impacts to this species is correct.

***San Diego coast horned lizard** habitat is described in the Technical Memorandum as follows: "Occurs in variety of habitats including coastal sage, grassland, chaparral, oak woodland, and riparian woodland with loose sandy soils and abundant native ants or other insects." The 75-acre site contains none of the referenced native habitats and lacks areas with loose sandy soil with abundant native ants and other insects. The primary diet for the San Diego coast horned lizard consists of mainly ants, especially harvester ants, but can also consume other small* *invertebrates such as spiders, beetles, termites, flies, bees, and grasshoppers.*[5] *Areas such as urban golf courses do not typically contain the native harvester ants due to the presence of non-native Argentine ants which thrive in irrigated areas such as golf courses and the edge of residential areas. Combined with the use of herbicides and pesticides, prey species for this species would be very limited on the site. Combined with the lack of sandy soils, the potential for this species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species in correct.*

***Southwestern pond turtle** habitat was described in the Technical Memorandum as "Slow-water aquatic habitats with available basking sites (e.g., submerged logs, open mud banks). The 75-acre Project site includes two golf course irrigation ponds designated in the Jurisdictional Delineation Report as Golf Course Irrigation Pond 1 and Golf Course Irrigation Pond 2. It is important to note that the Golf Course Ponds were created for the golf course and there were no water features that would support pond turtles during the agricultural period as reflected in the 1953 aerial photograph, Exhibit 7A of the Jurisdictional Delineation Report. Specific to current conditions, Golf Course Irrigation Pond 1 exhibits a wooden revetment around the entire perimeter preventing access by pond turtles. During numerous visits as part of the jurisdictional delineation and for preparation of an Approved Jurisdictional Determination by GLA biologists, as noted above, pond turtles were not detected in either feature. During the course of the delineation visits the ponds were drained for maintenance and visits during the draining of the ponds, no pond turtles were detected. Given these factors including the lack of detection during numerous site visits, the potential for this species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species is correct.*

***Burrowing owl** habitat is described in the Technical Memorandum as "Open grassland, fallow fields, sparsely vegetated desert scrub, and edges of disturbed lands, where soil is friable for nesting burrows." A number of factors must be considered regarding suitability of habitat for the burrowing owl. While the Project site exhibits suitable topography (i.e., mostly flat land) for burrowing owl, other factors indicate that the 75-acre site does not have potential for supporting this species. First, both breeding and wintering burrowing owls have been largely (completely) extirpated from the coastal areas of Los Angeles County, which includes the project site*[6] *and any occurrence of a burrowing would be a highly rare brief stopover during migration. Second, burrowing owls avoid areas with trees that provide perches for raptors which prey on burrowing owl, further limiting site use. Finally, the high level of activity that is associated with golf courses would limit any potential for burrowing owl. Given these factors the potential for this*

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[5] https://www.nps.gov/samo/learn/nature/hornedlizard.htm#:~:text=The%20Coast%20Horned%20Lizard%20has%20a%20distinctive%20flat%20body.&text=Adult%20lizards%20eat%20mainly%20ants,flies%2C%20bees%2C%20and%20grasshoppers.

[6] In the context of the project site, "coastal southern California" includes the greater Los Angeles "Basin" from the immediate coast to the transverse and peninsular mountain ranges.

species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species is correct.

Northwestern San Diego *pocket* ***mouse*** *habitat is described in the Technical Memorandum as: "Occurs mainly in sage scrub, chaparral, and grassland habitats". The Technical Memorandum also noted: "Low to moderate potential for occurrence in non-native grassland hillsides that border the golf course". As noted, the site contains no coastal sage scrub or chaparral habitats and areas of non-native grassland are limited to isolated strips and patches between the golf course fairways and adjacent roads and residential areas resulting in only a handful of acres of potentially suitable habitat. As for the reptiles discussed above, this species has low mobility and could not access the site from other suitable areas in the region. The only potential for this species to occur would be for individuals that survived construction and have been able to persist in the small habitat patches on the edges of golf course, which has low potential. Given these factors the potential for this species is very low and the determination by the DEIR that there would be no potential for significant impacts on this species is correct.*

San Diego desert woodrat *habitat is described in the Technical Memorandum as follows: Occurs in scrub and desert habitats, usually in association with rock outcroppings, boulders, cacti, or areas of dense undergrowth." The Technical Memorandum also noted: "Low to moderate potential for occurrence in non-native grassland hillsides that border the golf course." As noted, the 75-acre site contains no scrub and no outcroppings, boulders, cacti, or areas of dense undergrowth. As noted for the pocket mouse in the paragraph above, areas of non-native grassland are limited to isolated strips and patches between the golf course fairways and adjacent roads and residential areas resulting in only a handful of acres of potentially suitable habitat. Of particular note is the absence of rock outcroppings, boulders, cacti, or areas of dense undergrowth within the small strips and patches of non-native grassland. Given these factors, the determination of low to moderate is conservative and is better described as low. As discussed for the reptiles and small mammals there is no potential for significant impacts to this species.*

Comment ORG 6-95: The DEIR states: "[b]ased on a desktop review of aerial photographs and brief site visit conducted by ESA biologist Daryl Koutnik on January 11, 2021, there are approximately 410 landscape trees within the Project footprint, 102 of which are Mexican fan palms." The DEIR provides no additional information on these trees, such as: (a) the species composition and relative abundance; (b) the diameter, height, and structure of the trees; and (c) the habitat elements provided by the trees (e.g., cavities, loose bark, broken top, fruits, nuts, among other habitat elements). These deficiencies preclude proper understanding of the environmental setting, the Project site's value to wildlife, and its potential to support special-status species associated with trees.

Response ORG 6-95: *In addressing Comment ORG 6-95 it is necessary to consider two factors: 1) the site context set forth in the Response ORG 6-92 which shows that the Project site is within a dense urban environment, with a history of agriculture, with no native habitat and 2) the* *special-status species which have at most low to moderate potential to occur on the site. Specifically, whether the ornamental trees on the site have any potential for support of the nine special-status species discussed in the Technical Memorandum that have low to moderate or low potential. In evaluating the trees, it is necessary to separate the palms from the non-palms as the palms could provide potential habitat for certain of the special-status bats if they were not regularly maintained and trimmed (as discussed below associated with the Response ORG 6-104 through ORG 6-109). None of the seven non-bat special-status species addressed in Response ORG 6-94 above would utilize the non-palm tree habitat or the palms as none of the ornamental trees including the palms are suitable habitat for the referenced species. Thus, evaluating "(a) the species composition and relative abundance; (b) the diameter, height, and structure of the trees; and (c) the habitat elements provided by the trees (e.g., cavities, loose bark, broken top, fruits, nuts, among other habitat elements)" would not affect the determination that the site does not provide suitable habitat for the seven non-bat species addressed in Response ORG 6-94. Thus, there are no deficiencies as asserted by Cashen and there is nothing in the comment that would change the finding of no significant impact for the above-referenced species.*

Comment ORG 6-96: The DEIR fails to accurately describe the Project's environmental setting with respect to wildlife. Efforts to document wildlife at the Project site were limited to a reconnaissance survey, of unspecified duration, by Placeworks biologist Phil Brylski on July 13, 2020. The purpose of this survey was "to assess potential biological resource constraints within the Project Site"—*not to inventory the plant and animal species at the site*. Indeed, a mere 15 wildlife species (12 birds and 3 mammals) were detected during the survey. No efforts were made to identify reptiles and amphibians at the site, birds that use the site for nesting or stopover habitat during migration, or nocturnal wildlife (e.g., bats). In addition, there were no efforts to determine presence of special-status species that could occur at the Project site. These deficiencies preclude understanding of the Project's impacts on biological resources.

Response ORG 6-96: *As discussed in Response ORG 6-92 through Response ORG 6-95, above, the Project site contains no native habitat and is fully surrounded by dense urban and commercial development as confirmed during the site visit by Placeworks biologist Phil Brylski on July 13, 2020, and as reflected in the Technical Memorandum. This was further confirmed by site visits by GLA Senior Biologist on March 1 and April 21, 2021 and GLA Biologist Velvet Park in the subsequent site visits. Conducting an inventory of special-status species on the site was not necessary, due to the lack of suitable native habitat as discussed in Response to ORG 6-94. Specifically, detailed biological inventories are only possible when sensitive resources are confirmed to have potential for occurrence based on the presence of suitable native habitat, which in the context of other factors noted above, such as history of agriculture followed by intense urban development including and surrounding the site, does not exist on the Project site. In the absence of such native habitat and associated suitable conditions, including site history detailed inventories are not needed or required.*

Comment ORG 6-97: The DEIR uses four categories to categorize the potential for various special-status species to occur at the Project site: Present, Moderate Potential, Low Potential, and None/Not Observed. The DEIR defines the "Present" category as: "[s]pecies is known to occur within the Project Site, based on recent (within 20 years) CNDDB or other records, and there is suitable habitat present within the Project Site, or the species was observed within the Project Site during field surveys." The CNDDB [California Natural Diversity Database] is a positive detection database. Records in the database exist only where a given species was detected and subsequently reported to the CNDDB. Thus, absence of CNDDB records does not mean that special-status species are absent from the Project site, only that no data has been entered into the CNDDB inventory, possibly because the site has never been surveyed for special-status species. Protocol-level or other comprehensive field surveys during the appropriate season(s), at the appropriate time of day, and that employ species-specific survey techniques are generally required to generate a determination on presence or absence of special-status species. These surveys were not conducted for the Project, thus eliminating the potential for any of the species contemplated in the DEIR to be classified as "Present."

Response ORG 6-97: *Again, the commenter fails to acknowledge the actual conditions, including prior agricultural uses, on the site which consist entirely of golf course uses wherein the 75-acre site contains no native habitat and thus lacks potential for special-status species, except potentially for special-status bats as discussed below under Response ORG 6-104 through ORG 6-109. Regarding use of the CNDDB as a screening tool, which is a surrogate for direct observations, it is important to note that the DEIR included two criteria to be considered in combination. First, is CNDDB occurrences (or other records) in the last 20 years (again, in the absence of observation) in conjunction with the presence of the second criterion which is the presence of suitable habitat. Given the lack of native vegetation and associated lack of suitable habitat for the seven non-bat species discussed in Response ORG 6-94, the determination in the Technical Memorandum that the site contains no suitable habitat supports the conclusion that the Project would not have significant impacts on any of the seven special-status species addressed in Response ORG 6-94. In other words, a nearby occurrence in the CNDDB during the last 20 years would not result in a finding that one of the seven non-bat species would be subject to impacts because the Project Site exhibits a complete lack of native or otherwise suitable habitat and thus the second criterion is not met.*

Comment ORG 6-98: The DEIR did not include a "High Potential" category. Consequently, the next highest category (below "Present") is "Moderate Potential," followed by "Low Potential." Based on the July 13, 2020, reconnaissance survey, Placeworks determined that three California Species of Special Concern have "low to moderate potential" to occur on the Project Site. This is deceptive and confusing because the DEIR's classification scheme does not include a "low to moderate" category. According to the DEIR, species with "Moderate Potential" have a moderate to high probability of occurring at the Project site, while species with "Low Potential" have a low probability of occurring. Therefore, it appears that the probability of occurrence of species with a "low to moderate potential" is somewhere between low probability *and high probability*.

Response ORG 6-98: *The DEIR description of the categories of potential to occur has been clarified in the FEIR. As used by biologists evaluating potential of a species to occur, "low potential," "moderate potential," and "high potential," are three separate and distinct categories of potential to occur. The category "moderate potential" does not include "high potential" and a species with a "low to moderate" potential to occur would not have a "high" potential to occur. The DEIR has been clarified in Chapter 11, Correction, Clarifications and Additions to reflect this, by adding the "high potential" category as a separate category. The clarified categories are those that were used in GLA's Supplemental Technical Memorandum, and reflect the standard understanding of the categories used by biologists when evaluating the potential of a species to occur. Thus, the clarification to the DEIR is consistent with the analysis of the Placeworks Technical Memorandum as well as the GLA Supplemental Technical Memorandum. As discussed in both technical memoranda, due to the lack of suitable habitat, there there are no species that would be considered to have high potential, or moderate to high potential, with the sole exception of Cooper's Hawk, which has a high potential to forage on the Project Site. The clarification of these categories in the DEIR is consistent with the analysis, and does not affect the conclusions in the DEIR.*

ORG 6-99: In addition to the three species with "low to moderate potential" to occur on the Project Site, Placeworks determined that five California Species of Special Concern have "low potential" to occur on the Project Site, and that the Cooper's hawk, a CDFW Watch List species, has a high potential to forage on the Project site and a moderate potential to nest at the site. No or minimal efforts were made to determine whether any of these nine special-status species actually occur at the Project site. For example, although Placeworks determined that two special-status bats have the potential to occur at the site, no bat surveys (e.g., using bat detectors or other techniques appropriate for bat detection) were conducted at the Project site.

Response ORG 6-99: *As set forth in Response ORG 6-94, there is no potential for significant impacts to the seven non-bat species determined to have either low to moderate or low potential to occur due the various factors described above. See Responses ORG-104 through ORG 6-109 regarding special status bats. Further, the potential for Cooper's hawk to forage on the site is high as noted in the Technical Memorandum and there is also moderate potential for nesting on the site; as such there is no need to conduct actual surveys of occurrences given this assumption. The Cooper's hawk is highly adapted to the urban environment and regularly nests in urban areas including landscape trees in residential areas. The loss of foraging habitat would not be significant as Cooper's hawks forage in a variety of land cover types including residential neighborhoods. The potential impacts to nesting Cooper's hawks would be addressed through Mitigation Measure BIO-1 (as revised per discussion in Response ORG 6-123, below) to protect nesting birds through removal of trees outside the avian breeding season and/or performance of surveys for active nests during the breeding season to avoid potential impact. Thus, impacts to Cooper's hawk would be less than significant.*

Comment ORG 6-100: The DEIR states: "[n]o special-status wildlife species are expected to occur within the Project Site, including those with low or moderate potential to occur, with the exception of Cooper's hawk." This statement is inconsistent with the DEIR's categorization of species with "moderate potential" or "low potential" to occur at the Project site. The DEIR provides the following definition of "Moderate Potential" species:

> "Species is known to occur in the vicinity of the Project Site (based on recent [within 20 years] CNDDB or other records or based on professional expertise specific to the project area or species), and **there is suitable habitat within the Project Site that makes the probability of the species occurring there moderate to high**. Alternatively, there is suitable habitat within the Project Site and within the known range of the species."

Response ORG 6-100: *See Response ORG 6-94, Response ORG 6-97, Response ORG 6-98, and Response ORG 6-99.*

Comment ORG 6-101:

> The DEIR provides the following definition of "Low Potential" species: "Species is known to occur in the vicinity of the Project Site (within the area comprised by the surrounding United States Geological Survey [USGS] quadrangles); however, there is only poor quality or marginal habitat within the Project Site and the probability of the species occurring is low."

Response to ORG 6-101: *See Response ORG 6-94, ORG 6-97, and ORG 6-98.*

Comment ORG 6-102: The DEIR assumes that the probability of a species' presence is correlated with habitat quality and that presence of poor quality or "marginal" habitat at the Project site makes it unlikely that the species occurs at the site. However, this assumption may not be valid for various reasons. For example, dominant individuals may prevent subdominant individuals from entering the high-quality habitat, forcing the subdominant individuals to use poor quality habitat. Although the animals in the poor-quality habitat may have low survivorship and reproductive output, their density may actually be greater than the animals in the high-quality habitat because there is no social interaction factor to prevent high densities (in contrast to high-quality habitats where dominant animals exclude subordinate animals to maintain a low population density). Alternatively, animals may be forced to occupy poor quality or "marginal" habitats when higher quality habitats are unavailable. This circumstance occurs at the Project site, which is surrounded by residential development and commercial uses. Consequently, special-status species may occupy habitat (albeit poor quality) at the Project site because there is no high-quality habitat in the surrounding areas for those species to occupy.

Response to ORG 6-102: *The commenter confuses poor or marginal habitat with the complete absence of suitable habitat for non-bat species on the Project Site, as discussed in Response ORG 6-94. The comment is also highly "theoretical," does not provide any evidence and includes assumptions that are not valid for the 75-acre Project site. It is also important to note the definition of "occurrence" as discussed in Response ORG 6-94 because an occurrence does not necessarily equate to the presence of suitable habitat. This also needs to be considered in* *the context of the CEQA Appendix G, Guidelines, paragraph (a) which considers whether a project would: "Have* ***a substantial adverse effect****, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service.' [Emphasis Added]. A potential effect on such a rare occurrence of any of the seven non-bat special-status or special-status bats addressed in the Supplemental Technical Memorandum would not result in a "substantial adverse effect". For example, a migrating burrowing owl could reach the site and stay on the site for a short period (e.g., hours or a few days) and then depart due to the absence of suitable habitat or because conditions (lots of golfers and high activity) create unsuitable conditions. Thus, it would be accurate to say that the site has low potential for an "occurrence" however, this would not equate to presence of suitable habitat. For the seven non-bat species addressed in Response ORG 6-94, the theoretical conditions described by Cashen do not apply due to the complete lack of suitable habitat. See Responses ORG 6-104 to ORGH 6-109 regarding special status bat species.*

Comment ORG 6-103: Furthermore, "low potential" is not equivalent to "no potential" or "absent." As stated in the DEIR, a determination of absence can only be made if there is no suitable habitat for the species, or if the species was surveyed for during the appropriate season with unequivocal negative results for species occurrence. Therefore, speculation by Placeworks that "no special-status wildlife species [except the Cooper's hawk] are expected to occur within the Project Site" is not evidence that the Project would have less-than-significant impacts on those species, and consequently, that no mitigation is warranted.

Response to ORG 6-103: *The Technical Memorandum is not speculative in its findings because there is no suitable habitat for the seven listed non-bat species addressed in Response ORG 6-94 such that no potential significant impacts would occur to these seven non-bat species. Cashen presents no evidence of suitable habitat. See Responses ORG 6-104 through ORG 6-109 regarding special status bats.*

Comment ORG 6-104:
Pallid Bat
The DEIR states that the pallid bat occurs in a variety of habitats, and that it roosts in rock crevices, old buildings, bridges, caves, mines, and tree cavities. The DEIR then states, without justification, that there is "low potential for [pallid bat] roosting on-site." The Project site contains an old maintenance building. The Project site also contains old sheds and several trees with cavities (Figures 1-3). These features were not disclosed in the DEIR's description of the Project's environmental setting. Pallid bats were detected in the eastern Puente Hills during surveys in 2004. Therefore, based on the DEIR's classification scheme, the pallid bat has moderate potential to occur at the Project site.

Response to ORG 6-104: *As noted, in Responses ORG 6-105, 106, and 107, the Project site contains limited habitat for the pallid bat including small sheds, a golf course maintenance building with a metal roof and no attic or crevices, and a few trees with cavities that exhibit at* *most, limited potential for roosting pallid bat individuals. Impacts to the limited habitat would not result in a substantial effect on the species in accordance with Appendix G, Paragraph (a) and would not result in a significant impact on pallid bat within the region.*

In addition, as recommended by CDFW in Comment AG-6-1, pre-construction bat surveys will be included in the Final EIR as Mitigation Measure BIO-3 (see Chapter 11 Correction, Clarifications and Additions). Mitigation Measure BIO-3, set forth below, provides for surveys to take place closer to the start of actual construction, rather than prior to completion of the Final EIR as suggested by CDFW. Implementing such surveys in proximity to the actual start of construction exhibits a much higher probability of capturing presence should the pallid bat be present during construction. In addition, Mitigation Measure BIO-3 includes the mitigation to be implemented in the event the pre-construction surveys identify roosting bats on the Project Site. Mitigation Measure 3 will ensure that individuals are not harmed and that any potential impacts to special-status bats including the pallid bat would continue to be less-than-significant.

> ***MITIGATION MEASURE BIO-3****: Prior to site disturbance for Project construction, including removal of any vegetation, shed and/or maintenance building that could be used by roosting bats, a qualified biologist shall conduct a pre-construction bat roost survey for roosting bats. The survey shall be conducted no more than 14 days prior to site disturbance and shall include daytime surveys to search for sign such as guano, visual "emergence" surveys at dusk, followed by night time surveys using acoustic recognition equipment specific for bat detection. The pre-construction bat roost survey shall consist of a minimum of two bat surveys (conducted consecutively or as determined by the qualified biologist). If roosting bats are detected onsite outside of the bat maternity season, the roost tree or building shall be removed in a manner to avoid and/or minimize injury to roosting bats. This may include using mechanical equipment to gently nudge the tree trunk multiple times or building as directed by the qualified biologist prior to removal or for palm trees and other tree species, to de-frond or de-branch the tree using a mechanical lift and gently lower the cut branches to the ground. Regardless of the method, the fallen tree and/or material shall be left undisturbed overnight until at least the next morning to give roosting bats time to exit before complete removal of the tree or structure. Similar and appropriate measures shall be implemented for building removal.*
>
> *If roosting bats are detected onsite during the maternity season (March 1 to September 30), the Project shall avoid the subject roost(s) and incorporate an avoidance buffer (as determined by a qualified biologist) until after the maternity season or until a qualified biologist determines no maternity roosting is occurring. Once the qualified biologist approves removal of the subject roost*

> *tree(s), or buildings, the same tree and building removal procedures as outlined above shall be implemented prior to tree or building removal.*

Comment ORG 6-105: Western Mastiff Bat
The DEIR states there is no potential for the western mastiff bat to occur at the Project site because "[t]here is no suitable general or micro-habitat for roosting on-site." The DEIR is incorrect. Western mastiff bat roosts have been detected in buildings and a palm tree. As a result, the buildings and palm trees at the Project site provide potential roost sites for the western mastiff bat.

Response to ORG 6-105: *It is important to note that use of palm trees on the site by Pallid or Mastiff bats (or any other bat species) would be associated only with dead fronds (to the extent they remain) that form large skirts in the absence of maintenance. Typical maintenance of palm trees includes the removal of the dead fronds in order to limit the potential for fire and pest species such as Norwegian rats that are known to utilize palms. A desktop review of the palms on the Project site (based on Google Earth aerial from February 2024) show that nearly all the palms are regularly maintained such that the dead fronds are regularly removed and there are few to none fan palms with extensive frond skirts. The regular maintenance substantially limits the development of potential roost sites, precluding suitable habitat. In other words, regular maintenance of palms substantially limits or fully eliminates potential habitat. Thus, based on the routine maintenance requirements and practices at the Project Site, no long-term habitat is maintained and therefore the existing palm trees are not considered suitable bat habitat. See GLA Supplemental Technical Memorandum, Appendix O to the FEIR.*

In addition, see Mitigation Measure BIO- 3 in Response ORG 6-104. Although impacts to special status bat species are less than significant, Mitigation Measure BIO-3 would ensure that individuals are not harmed and that that any potential impacts remain less-than-significant.

Comment ORG 6-106: The DEIR's analysis of special-status bats is limited to four bat species included in the 1998 Draft Update of *Terrestrial Mammal Species of Special Concern in California*. Inexplicably, the DEIR omits consideration of other special-status bats that occur in the Project region. These include the western yellow bat, western red bat, hoary bat, and Yuma myotis. The western yellow bat, western red bat, and hoary bat are tree-roosting species. The Yuma myotis roosts in a variety of locations, including bridges, buildings, cliff crevices, caves, mines, and trees. The Project site contains trees and building that provide potential roosting sites for these bat species.

Response to ORG 6-106: *Western yellow bat is addressed below in Response ORG 6-107. Western red bats are solitary animals that prefer riparian habitats that include walnuts, oaks, willows, sycamores, and ash trees where they roost exclusively in the foliage. The Project site contains no riparian habitat and, as noted in the LSA, 2023 Royal Vista Residential Project Arborist Tree Report. May 31, 2023 (Tree Survey), contains only five oaks off-site, all of which are avoided by the Project. Given the lack of riparian habitat, there is low potential for this species to occur on the Project site. Given the low potential for occurrence and avoidance of* *non-riparian oaks there is no potential for the Project to have significant impacts on the western red bat.*

The hoary bat is a solitary animal that roosts in in foliage of trees in dense forests, along the edges of forest openings and can be found in urban areas such as parks and street trees. The Project site does not contain a dense forest and based on the limited trees, exhibits low to moderate potential for the hoary bat; however, given the solitary nature of the species, numbers would be low and there is no potential for the Project to have significant impacts on the hoary bat.

The Yuma myotis can be found in the hundreds or thousands roosting in caves, attics, buildings, mines, underneath bridges, and other similar structures. As noted for the pallid bat, there is very limited potential habitat in the forms of existing structures and low potential for occurrence. Because of the limited amount of habitat in the form of structures, any potential impacts would be limited and not significant. See GLA Supplemental Technical Memorandum, Appendix O to the FEIR.

In addition, while impacts are less than significant, the DEIR has been revised to include Mitigation Measure BIO-3 that would ensure that individuals are not harmed and that any potential impacts associated with roosting bats, including the western mastiff bat, pallid bat, western red bat, or Yuma myotis on the Project site, would remain less-than-significant. See Response ORG 6-104 and Response ORG 6-105, above.

Comment ORG 6-107: The western yellow bat is a foliage-roosting species that has been detected near the Project site. This species occurs in the southern portions of California, where it appears to roost exclusively in the skirts of palm trees, often near open water or wetlands. The Project site contains Mexican fan palms located near open water (i.e., the irrigation ponds). Many of these palms have large skirts that provide the preferred roosting habitat for western yellow bats (Figures 4 and 5). As a result, there is at least a moderate potential for western yellow bats to occur at the Project site.

Response to ORG 6-107: *GLA concurs that there is moderate potential for western yellow bat to occur on the site due to the presence of over 100 Mexican fan palms. However, as discussed in Response ORG 6-105 and the GLA Supplemental Technical Memorandum (Appendix O to the FEIR), the palms on the Project site are regularly maintained such that the dead fronds are regularly removed and there are few fan palms with extensive frond skirts, precluding the establishment of suitable habitat in the palm trees for the western yellow bat or any other bat species, and thus impacts would be less than significant. In addition, implementation of Mitigation Measure BIO-3 as set forth above in Response ORG 6-104 will ensure that should any western yellow bats occur they would not be harmed and impacts would remain less than significant.*

Comment ORG 6-108: Bats have been seen at the Project site (Attachment 1). However, the Applicant made no efforts to determine: (a) the particular bat species that occur at the Project site; (b) the importance of the Project site as habitat for bats; (c) the presence, abundance, and distribution of bat roosts at the Project site; and (d) whether the Project site contains nursery sites for bats. The DEIR's failure to establish the environmental setting with respect to bats precludes the public from understanding the severity of the Project's impacts on bat populations, and it precludes the County from making an accurate determination on the significance of the Project's environmental impacts. To properly disclose, analyze, and mitigate the Project's impacts on bats, the County must conduct surveys to document the environmental setting with respect to bats, and the subsequent survey data must be released to the public in a recirculated DEIR.

Response to ORG 6-108: *Attachment 1 includes three "Affidavits of Bat Sightings" one 20467 Tam O' Shanter Drive which references bat sighting over the subject residence but not over the golf course. One references bats sighting on Fairlance Drive and "in the golf course" with no additional details. The third, from 1500 Leanne Terr, "late at night in golf course area".[7] No additional information is provided. While foraging by bats would be expected over the golf course and adjacent residential areas, the affidavits provide no evidence of special-status bats. As discussed in the GLA Supplemental Technical Memorandum (Appendix O to the FEIR) GLA has conducted focused bat surveys of one nearby golf course in 2018 and found no special-status bats. Specifically, GLA conducted focused surveys at the Westridge Golf Course in La Habra which is approximately 7.75 miles to the southwest of the Project Site. See GLA Supplemental Technical Memorandum.*

Comment ORG 6-109: The DEIR assumes the Project site has a low potential to contain special-status bats, that any bat populations at the site "would be in limited amounts," and that any potential impacts associated with the Project "would be expected to be less than significant to regional populations of these species." The basis for these assumptions is that the Project site provides only poor-quality habitat for bats. To the contrary, golf courses provide local landscape features that may provide relatively high-quality habitat for bats. The greater shape complexity of golf courses at the site scale provides increased edge habitat that bats are known to favor for movement and foraging activity, and the characteristic design of golf courses is commensurate with prime foraging habitat. Water features at golf courses provide bats with drinking water and a source of insect prey. These water features may be extremely valuable to bats in hot arid urban landscapes where water is a limiting factor for bats. In addition, golf courses contain large open patches of grass, which is a preferred foraging habitat type for several of California's special-status bat species (e.g., western yellow bat, hoary bat, pallid bat). Grass and other vegetation at golf courses stays greener for longer periods of time (due to irrigation). This likely increases concentrations of prey that are available for longer periods of time, providing reliable foraging habitat for bats.

Several studies have found high bat species richness and activity at golf courses. The results of these studies reveal that golf courses are hotspots for bat species richness, and that they serve as important habitat refuges for special-status bats. Golf courses in urban landscapes support biodiversity and are

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[7] Cashen, Scott, Appendix 1 of Attachment C to Channel Law Group Comment Letter. January 5, 2024.

especially important to bats. For example, Drake et al. (2023) found that for most species, bat activity was greater on golf courses when the surrounding landscape contained fewer open spaces and more developed land. The led to the conclusion that golf courses may play an important role in wildlife conservation in human-altered landscapes.

Response to ORG 6-109: *Most of the bat studies referenced by Cashen are from other regions of the U.S. specifically Arizona and Delaware as well as a study from Sydney, Australia and do not directly inform the presence of bats on the Project site. The study from Whittier does have proximity to the site; however, that study was conducted in a large area of regional open space, which the Project site is not and thus also does not directly inform the presence of bats on the Project Site. As noted in Response ORG 6-108, GLA has conducted focused bat surveys of one nearby golf course in 2018 and found no special-status bats. In addition, pre-construction surveys will be conducted in accordance with Mitigation Measure BIO-3, as discussed in Response ORG 6-104.*

Comment ORG 6-110: The DEIR states that the Crotch bumble bee, a candidate for listing under the California Endangered Species Act ("CESA"), occurs on *Eriogonum* and other [unspecified] host plants in the project region. The DEIR then states that there is no potential for the Crotch bumble bee at the Project site because "[t]here is no suitable general or micro-habitat on-site." The DEIR's determination is not supported by evidence. Contrary to what is suggested in the DEIR, the Crotch bumble bee is not confined to sites containing *Eriogonum.* Crotch bumble bees are generalist foragers and have been reported visiting a wide variety of flowering plants. The CDFW has developed guidelines for evaluating a project's potential for causing impacts to CESA-protected bumble bees. The guidelines entail three steps. The first step involves evaluating historical and current occurrence data to determine whether one of the candidate species is likely to occur within or near a given project area. There are numerous occurrence records of the Crotch bumble bee in the vicinity of the Project site. These include several recent "research grade" records in the iNaturalist database. The second step in evaluating a project's potential for causing impacts to CESA-protected bumble bees is a habitat assessment. According to the CDFW guidelines:

> "A habitat assessment evaluating the likelihood of bumble bees occurring within and adjacent to the project area should occur and results should be submitted to CDFW prior to initiation of ground disturbing project activities. The assessment should include historical and current species occurrences as well as proximity to the last known sighting. The habitat assessment should include data from site visits to observe and document potential habitat including potential foraging, nesting, and/or overwintering resources. The habitat assessment should quantify which plant species are in bloom and what their percent cover is. General plant diversity should also be assessed and documented. The foraging resources should be quantified across multiple site visits, corresponding with the Colony Active Season (see Table 1) of the candidate species in the region where the project is located. Foraging resources recorded should not be limited to the preferred plant species known to be favored by a given candidate species but should include all flowering plants including non-natives and invasives. Nesting resources quantified can include bare ground, rodent burrows, and other potential nesting sites that may support

> bumble bee colonies. Leaf litter and woody forest edge that could provide overwintering habitat should also be described."

Response to ORG 6-110: *As stated in the DEIR, there is a complete absence of suitable habitat for the Crotch bumblebee. The discussion in the DEIR is not limited to the absence of Eriogonum spp. (buckwheat), but notes that other suitable habitat is not present on the Project Site. In addition, as noted* d*uring the jurisdictional delineation, GLA Senior Biologist and Technical Director Tony Bomkamp conducted site surveys to review all areas for potential jurisdictional drainages or other aquatic resources, which allowed for assessment of the entire 75-acre site. Based on this assessment, GLA verified that there is no native habitat on the site including floral resources typically used by the Crotch bumblebee including not just Eriogonum mentioned above but Salvia (sage species), Phacelia spp. and other native floral resources. The CDFW guidelines referenced in the comment are not applicable where, as here, there is a complete absence of suitable habitat. Note also that CDFW has reviewed the DEIR and did not note crotch bumblebee as a concern.*

Comment ORG 6-111: The DEIR provides no information on the floral resources, nesting resources, or potential overwintering habitat for Crotch bumble bees at the Project site. However, according to a homeowner adjacent to the Project site, the Project site and nearby properties contain abundant floral resources during the Colony Active Season (April through August for Crotch bumble bee) and bumble bees have been observed on native plants at 20467 Tam O'Shanter Drive in Walnut (which borders the Project site). In addition, presence of burrowing mammals (California ground squirrel and Botta's pocket gopher) at the Project site indicates the site contains potential nesting resources for the Crotch bumble bee, and a photograph in the Project's Bio Assessment suggests the Project site provides potential overwintering habitat for the Crotch bumble bee. The third step is on-site surveys, which provide the most valuable information for determining potential impacts of a project on bumble bees. According to CDFW, the survey efforts should include multiple on-site surveys, should be developed to detect foraging bumble bees and potential nesting sites, and should be conducted during the Colony Active Period. The Applicant made no effort to survey bumble bees at the Project site. Collectively, these deficiencies in the DEIR's assessment of the Crotch bumble bee preclude the County from making the determination that the Project has no potential to cause significant impacts on the Crotch bumble bee.

Response to ORG 6-111: *As noted in Response ORG 6-110, the site was confirmed to have no floral resources for Crotch bumblebee such as Salvia (sage) Phacelia spp., and Eriogonum (buckwheat). The DEIR's conclusion that there is no potential for this species due to absence of suitable habitat is correct, and CDFW survey guidelines do not apply. See Response ORG 6-110. In addition, as noted above, CDFW has reviewed the DEIR and did not identify crotch bumblebee as a concern.*

PROJECT IMPACTS

Special-Status Bats

Comment ORG 6-112: The DEIR states that Project construction activities could impact the eight California Species of Special Concern that have the potential to occur at the site. The DEIR then provides the following analysis of impacts to special-status bats:

"The existing landscape trees and maintenance structure on the Project Site provide low potential for suitable habitat that would support special-status bat species. The maintenance structure is currently in use and the maintained landscape trees do not constitute a woodland setting, which combined result in a low potential for special-status bat species to occur. In addition, the biological reconnaissance survey did not observe bat species. However, because there is a low or low to moderate potential for these species to occur, and the majority of the habitat found on-site is not suitable to support these species, any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species. Therefore, no mitigation is warranted."

The DEIR's analysis is inconsistent with scientific information pertaining to special-status bats. First, the DEIR's statement that "[t]he existing landscape trees and maintenance structure on the Project Site provide low potential for suitable habitat that would support special-status bat species" is inconsistent with scientific information. As discussed previously, the western yellow bat appears to roost exclusively in the skirts of palm trees. Most of the 102 Mexican fan palms at the Project site have large skirts, which provide excellent roosting habitat for the western yellow bat and potentially other bat species. The assertion that the palms and other trees at the Project site do not constitute a woodland setting *does not* mean that those trees have low potential for special-status bats. For many bat species, the primary factor in habitat selection is the presence of roost sites that contain specific thermal and physical properties—not the presence of a woodland setting (or other land cover type). This is reflected in the DEIR, which acknowledges the pallid bat and western mastiff bat occur in a "variety of habitats." As discussed above, research has shown that golf courses in urban settings may function as important habitat refugia for bats, including special-status species.

Second, the fact that the maintenance structure is currently in use does not preclude occupation by bats. There are numerous records of special-status bat roosts (e.g., pallid bat, western mastiff bat, Yuma myotis) in structures occupied by humans.

Third, some bat species can be detected at dusk. However, other species (e.g., western mastiff bat, western red bat, hoary bat, among others) do not emerge from roosts until it is dark and thus require special survey techniques (e.g., acoustic monitoring, mist netting, night vision goggles) to facilitate detection. In addition, most bat roosts are well concealed in areas that are not easily detected through visual inspection surveys. Therefore, the fact that bats were not observed during the reconnaissance survey, which apparently was limited to daylight hours, is not evidence that bats do not occur at the site. To the contrary, local residents have confirmed that bats occur at the Project site (Attachment 1).

Response to ORG 6-112: *As discussed in Responses ORG 6-104 through ORG 6-109, the DEIR's findings that there is generally low potential for special-status bats is accurate. Regarding the western yellow bat, Response ORG 6-107 notes that there is moderate potential for western yellow bat to occur on the site due to the presence of over 100 Mexican fan palms.*

However, as noted in Response ORG 6-105 and the GLA Supplemental Technical Memorandum, a desktop review of the palms on the site (based on Google Earth aerial from February 2024) show that nearly all the palms are regularly maintained such that the dead fronds are regularly removed and there are few to none fan palms with extensive frond skirts. The regular maintenance substantially limits the development of potential roost sites, precluding suitable habitat. In other words, regular maintenance of palms substantially limits or fully eliminates potential habitat. Thus, based on routine maintenance requirements and practices on the Project site, no long-term habitat is maintained and therefore the existing palm trees are not considered suitable bat habitat. See GLA Supplemental Technical Memorandum, Appendix O to the FEIR. Cashen is not correct that the western yellow bat "appears to roost exclusively in the skirts of palm trees" as according to Bat Conservation International suitable habitat is described as "trees such as Populus Fremontii, *Platanus Wrightii*, and *Quercus Arizonica".*[8] *None of the listed tree species are palm trees such as the Mexican palm tree. These bats preferentially roost in trees, including the dead fronds of fan palms in the southern United States; sometimes they roost in hackberry, sycamore, cottonwood, giant dagger yucca, vines, or other sites.*[9] *While it is possible that the existing structures and any dead fronds of the Mexican fan palms could be used by western mastiff bat, pallid bat and Yuma myotis (buildings only for this species), these very limited features are not sufficient to provide suitable habitat, and the study, at nearby Westridge Golf Course further confirms that any potential impacts would be less than significant. In addition, Mitigation Measure BIO-3 would further ensure that individuals would not be harmed and that impacts to all bat species would continue to be less than significant. Regarding daytime versus nighttime surveys, as noted, implementation of Mitigation Measure BIO-3 would include use of acoustic survey equipment (as GLA used at Westridge Golf Course in 2018) to capture species that emerge after dark.*

Comment ORG 6-113: Finally, the DEIR's statement that "any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species" is speculative because no efforts were made to document the size and composition of bat populations at the site. The availability of suitable roost sites is the limiting factor for most bat populations. Most California bat species, including some of the species that may occur at the Project site, form nursery colonies in the summer. These maternity roosts can contain hundreds of individuals. Thus, the loss of even a single roost site can have relatively severe implications on the overall population. Furthermore, the CEQA significance threshold adopted in the DEIR is whether the Project would have a "substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species…" Most of the bat species that have the potential to occur at the Project site have a State Rank of S3. This means they are "[a]t moderate risk of extirpation in the state due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors." Bat populations are susceptible to numerous threats, including habitat loss, wind turbine strikes, pesticides, and white-nose syndrome (among other threats). Due to their low fecundity (most bat species produce

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[8] https://www.batcon.org/bat/lasiurus-xanthinus/

[9] https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.103577/Lasiurus_xanthinus

only one young per year), many bat populations cannot withstand any additional losses. Therefore, any impacts to special-status bats at the Project site are potentially significant, and because the DEIR does not incorporate mitigation, those impacts remain unmitigated.

Response to ORG 6-113: *Regarding colony size, three of the bat species noted, western red bat, western yellow bat, and pallid bat, are solitary and do not roost in large colonies. The colonial roosting bats, such as the Yuma myotis, have very limited potential habitat such as structures, which are very limited on the Project Site, and there would be no potential for significant impacts. Implementation of Mitigation Measure BIO-3 would ensure that individuals are not harmed and that any potential impacts remain less-than-significant. See Response ORG 6-104 through ORG 6-109 and Response ORG 6-112.*

Other Special-Status Species
Comment ORG 6-114: The DEIR determined: "[c]onstruction could impact the eight California Species of Special Concern with low or low to moderate potential to occur: (Southern California legless lizard, coastal whiptail, San Diego coast horned lizard, burrowing owl, pallid bat, big free-tailed bat, northwestern San Diego pocket mouse, and San Diego desert woodrat) if these species occur onsite."

The DEIR does not incorporate mitigation for this impact. Instead, the DEIR speculates that: "any populations of these species present would be in limited amounts and any potential impacts associated with the proposed Project would be expected to be less than significant to regional populations of these species." This expectation does not address the CEQA significance thresholds adopted by the DEIR and it conflicts with CDFW's statement that (any) impacts to a California Species of Special are a significant direct and cumulative adverse effect unless appropriate avoidance and/or mitigation measures are implemented.

The DEIR's speculation that there would be an unquantified "limited amount" of special-status species at the Project site is not supported by survey data or other scientific evidence. Perhaps more importantly, the DEIR fails to justify its determination that any "small" populations of special-status species at the Project site are unimportant to the conservation of those species, and therefore, elimination of those populations would not be significant.

Small, relatively isolated populations, such as those that may occur at the Project site, have conservation value because they have the potential to: (a) harbor unique genetic traits, which are important to biodiversity and the species' ability to adapt to climate change; (b) promote population persistence by providing individuals capable of recolonizing other habitat areas following local extinctions; and (c) help maintain the overall geographic range of the species. For these reasons, Project impacts to special-status species populations of any size would be potentially significant.

Response to ORG 6-114: *As demonstrated in Response ORG 6-94, there is no potential for significant impacts to the seven non-bat species addressed in that response. As such, no mitigation is necessary to reduce impacts to less-than-significant. Response ORG 6-94 also demonstrates that for the reptiles and non-bat small mammals that were determined to have moderate or low potential, any such remnant populations that survived previous agriculture uses* *and subsequent construction are completely isolated and have no ability to contribute to regional populations and as such, the determination that in the unlikely event a remnant population of one of these species persists, any impact to such would not be significant.*

Specially, CEQA states as a goal:

> *"Prevent the elimination of fish or wildlife species due to man's activities, ensure that fish and wildlife populations do not drop below self-perpetuating levels, and preserve for future generations representations of all plant and animal communities..."*
>
> *In accordance with Appendix G (Environmental Checklist Form) to the State CEQA Guidelines, the Project would have a significant biota impact if it would:*
>
> *(a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

For the non-bat species, such species would not be able to recolonize other sites due to very low mobility combined with complete isolation. Should any of the seven non-bat species persist, the populations would not be sustainable due to small size and isolation, and the population would not contribute to regional fitness or self-perpetuating levels as already noted. Thus, any potential impacts would not contribute to substantial adverse impacts. As to bats, See Responses ORG 6-104 through ORG 6-109 and the GLA Supplemental Technical Memorandum. Implementation of Mitigation Measure BIO-3 would ensure that individual bats are not harmed and that any potential impacts would remain less-than-significant.

Jurisdictional Features

Comment ORG 6-115: The DEIR states the following regarding impacts to riparian habitat and Sensitive Natural Communities: "[a]s set forth in the Jurisdictional Delineation, the proposed Project would impact various golf course drainage features including concrete V-ditches, earthen drainage ditches, and the mostly unvegetated golf course irrigation ponds." This statement is incorrect: the Jurisdictional Delineation does not discuss or quantify the Project's impacts on riparian habitat, Sensitive Natural Communities, wetlands, or other jurisdictional features. The DEIR does not resolve this issue because it only identifies the total amount of each resource (e.g., waters of the U.S.) that *could* be impacted by the Project. The DEIR's failure to quantify permanent and temporary impacts to jurisdictional features has implications on the value of Mitigation Measure BIO-2, which requires the Applicant to mitigate the Project's temporary impacts by restoring the impact area to pre-project conditions. As stated in the Jurisdictional Delineation, drainage features at the Project site convey surface flow with the potential to support beneficial uses. The ability of the drainages to support beneficial uses is eliminated if the Project eliminates connectivity with downstream waters. Therefore, restoring segments of the drainages that have been temporarily impacted by the Project would not mitigate the Project's impacts if the Project's permanent impacts eliminate connectivity to downstream waters. In other words, restoring an isolated stream fragment surrounded by Project development does not effectively mitigate the Project's impacts to downstream waters. The DEIR's failure to: (a) quantify the Project's permanent and temporary impacts to jurisdictional features, and (b) identify the spatial relationship of those impacts, precludes the public's ability to evaluate the efficacy of the DEIR's proposed mitigation in reducing the impacts to less-than-significant levels.

Response to ORG 6-115: *Contrary to Cashen's assertion, the Project would not impact riparian habitat or sensitive natural communities. The Project would impact 0.04 acre of artificial wetland dominated by non-native species. The remaining jurisdictional features consist of concrete golf course V- Ditches and earthen golf course drainage ditches none of which support riparian or other native habitat. As such, beneficial uses as described in the Los Angeles Regional Board's Basin Plan are very limited. All the features exhibit limited flow due to their small cross sections and all drain into the regional storm drain system and do not support areas of downstream habitat except where the water is discharged to downstream resources after significant mixing with other water sources and would not contribute to beneficial use. As such, there is no evidence of downstream impacts.*

Nursery Sites
Comment ORG 6-116: The DEIR's analysis of Project impacts to native wildlife nursery sites is limited to birds; there is no analysis of potentially significant impacts to nursery sites of other wildlife taxa. Because the Project site functions as an "island" of habitat surrounded by residential and industrial development, it likely serves as a nursery site for many of the mammal species that are known to occur at the site (e.g., bats, racoons, coyotes, California ground squirrels, Botta's pocket gophers, among others).

Response to ORG 6-116: *The fact that the 75-acre site is an island fully surrounded by dense urban development that contains no native habitat of any sort and is limited to turf, and approximately 5.5 ornamental trees/acres eliminates the site as nursery site defined as: "Nursery sites are locations where fish and wildlife* ***concentrate for hatching and/or raising young****, such as nesting rookeries for birds, spawning areas for native fish, fawning areas for deer, monarch overwintering sites, and maternal roosts for bats."*[10] *For the special status bats addressed in Response ORG 6-104 through ORG 6-109 and ORG 6-112, there is no evidence of communal maternal roosting on the Project site as three of the bat species are solitary and do not form a "concentrated roost." For the other bat species, the presence of small buildings such as the sheds and the maintenance building (which has a metal roof and no attic or crevices) do not constitute areas that would meet the definition of a nursery where species concentrate for breeding. It is also important to note that of the example given, racoons, coyotes, California ground squirrels, Botta's pocket gophers are common and widespread and have no special status and none of these breed communally such that it would constitute a "wildlife nursery".*

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[10] https://docs.vcrma.org/images/pdf/planning/plans/VCGPU-EIR_4.04_Bio_Resources_.pdf

Birds
Comment ORG 6-117: The DEIR acknowledges that the existing landscape trees and structures on the Project Site provide suitable nesting habitat for avian species, that areas containing active bird nests are considered a wildlife nursery site, and that construction of the Project would remove those nursery sites. The DEIR then concludes that implementation of Mitigation Measure BIO-1 (requiring buffers around bird nests during the nesting season) would reduce impacts to active bird nests to less than significant. A fundamental flaw with this reasoning is that although Mitigation Measure BIO-1 may reduce impacts to nesting birds during a particular reproductive cycle, it does nothing to mitigate the permanent loss of the nursery (nest) sites and the associated loss of productivity (population recruitment) from those nursery sites. As a result, Project impacts to wildlife nursery sites are not mitigated and remain potentially significant.

Response to ORG 6-117: *Occasional or isolated avian nesting does not constitute nursery sites per se, based on the appropriate definition of a nursery site as set forth in Response ORG 6-116, above. Moreover, single nest sites do not by definition constitute nursery sites. Nursery sites would be concentrated heronries or other egret, cormorant rookeries, which are not present on the Project Site. The Project's removal of ornamental trees would not result in impacts to avian rookeries or other nursery sites as these trees do not constitute a nursery site. See also Response ORG 6-116, above.*

Comment ORG 6-118: Young (1948) calculated a density of 32.8 nests per acre at an urban park in Madison, Wisconsin. The two main plant communities at the park were mowed lawn of blue grass (*Poa* spp.) covering approximately 40% of the total area, and numerous plantings of closely spaced arbor vitae (*Thuja occidentalis*), covering approximately 26% of the total area. These plantings were arranged in irregular patterns, making for extensive environmental edges with the grass area. Thus, the Project site and the park in Young's study have similar habitat characteristics. Assuming Young's study site provides a relatively accurate estimate of nest density at the Project site, development at the Project would permanently eliminate 1,563 to 2,481 nest sites (Project Alternative 4 and Project Alternative 3, respectively) and the associated capacity of those nest sites to maintain bird populations.

Response to ORG 6-118: *The comment does not provide substantial evidence to support its assumption that the Madison Wisconsin "urban park" is sufficiently similar to the Project Site to serve as a proxy for estimating nest density on the Project Site. To the contrary, as noted in Response ORG 6-95, the entire 75-acre site contains approximately 410 trees of which 102 are Mexican fan palms which are subject to regular maintenance. Based on desktop visual estimates on aerial photographs, including a recent Google Earth aerial review dated February 2024), the 75-acre area exhibits between five and ten percent cover by trees such that the potential for nesting birds is substantially lower than the example from Madison Wisconsin in 1948. It is also important to note that arbor vitae (Thuja occidentalis) noted at the Madison site, exhibits highly dense foliage such that it would be capable of support many more nests than the vegetation on the 75-acre area of golf course with between five and ten-percent cover. Moreover, arbor vitae does not occur on the Project Site. Importantly, as demonstrated in Response ORG 6-94, there is no suitable habitat for special-status avifauna (i.e., birds). In addition, BIO-1 (revised as set* *forth in Response ORG 6-123, below) ensures that no nesting birds would be impacted during removal or trees or other potential nesting site, eliminating impacts. Therefore, impacts to common avifauna would not be considered significant.*

Comment ORG 6-119: The DEIR states the following regarding impacts to birds during operation of the Project:

> "Regular tree and landscape maintenance is expected to occur during the operation of the new residential development. As part of the operational practices, tree and landscape maintenance should be conducted from September 2 to January 31 to avoid conflicts with nesting birds protected under the MBTA and California Fish and Game Code which may occur onsite. These typical maintenance activities would result in less than significant impacts. Operational impacts would be less than significant."

The provision for tree and landscape maintenance activities to occur only between September 2 and January 31 is not incorporated as an enforceable mitigation measure. As a result, impacts to nesting birds during the operations phase of the Project remain potentially significant.

Response to ORG 6-119: *As stated above, any maintenance would avoid the avian nesting season pursuant to Mitigation Measure BIO-1, as revised as described in Response ORG 6-123, below, to the extent feasible or other measures would be employed to protect nesting activity such that there would be no significant impacts associated with routine maintenance.*

Cumulative Impacts

Comment ORG 6-120: The DEIR provides the following analysis of the Project's contribution to cumulative impacts:

> "The twelve cumulative projects listed in Table 3-1, Cumulative Projects, are almost entirely located within urban settings where there would be no change to biological resources. The proposed Project does not contain sensitive biological resources, aside from the regulated jurisdictional features described above, but it does have the potential to support nesting by birds protected by State and federal regulation. Impacts to nesting birds for the proposed Project and the cumulative projects would be below the level of significance with the incorporation of the stated mitigation measure and compliance with regulations protecting nesting birds. Thus, impacts to biological resources would not be cumulatively significant. Further, given the developed nature of the Project Site and limited potential impacts of the proposed Project, implementation of the Project would not have a cumulatively considerable contribution to cumulative effects on biological resources. Therefore, cumulative impacts to biological resources as a result of implementation of the proposed Project would not be expected to be significant."

The assertion that the Project site does not contain sensitive biological resources, aside from the regulated jurisdictional features, is not supported by evidence. Indeed, the DEIR states that there is at least some potential for nine different special-status animals to occur at the site, none of which were subject to surveys sufficient to infer their absence.

Response to ORG 6-120: *As noted in Response ORG 6-94, the statement that the Project would not have significant impacts on the seven non-bat special-status species addressed in the response is accurate. Thus, the statement that the Project would not have cumulatively significant impacts on biological resources is correct. Similarly, impacts to special status bats would be less than significant as discussed in the GLA Supplemental Technical Memorandum and Responses ORG 6-104 through ORG 6-109, and Mitigation Measure BIO-3 would ensure that individuals are not harmed and any potential impacts would remain less than significant; thus, cumulative impacts on special-status bats would also be less than significant.*

Comment ORG 6-121: The statement that the Project would not have a cumulatively considerable contribution to cumulative effects on biological resources is based on the false premise that the Project site is developed. Aside from the maintenance building, sheds, and paved golf cart paths, the Project site *is not* "developed," but rather, consists of turf grass, non-native grasslands, two ponds, several drainage features, and ornamental vegetation. The presence of native wildlife at the site demonstrates that these habitats function as surrogates for native habitat types, and they may provide relatively high-quality habitat for special-status bat species.

Response to ORG 6-121: *Contrary to the statement by Cashen, the 75-acre Project site was subject to agricultural uses and later developed with a golf course through grading which changed the topography, character of the soils and removal of any remaining native habitat, with conversion to turf with about five to ten percent covered by ornamental trees which do not provide habitat for the seven non-bat special status species addressed in Response ORG 6-94. For bats, Response ORG 6-104 through 109 and ORG 6-112 demonstrate that the Project site does not contain suitable habitat for special status bat species and impacts are less than significant, and, in addition, implementation of Mitigation Measure BIO-3 would ensure that individuals are not harmed and that any potential impacts would remain less than significant; thus, cumulative impacts on special-status bats would be less than significant.*

Comment ORG 6-122: The DEIR's analysis of cumulative impacts to nesting birds is fundamentally flawed because it only considers direct impacts to bird nests, not the long-term impact habitat loss has on bird populations. In the 48-year period between 1970 and 2018, there was a net loss of nearly a billion birds across the U.S. and Canada, or 29% of 1970 abundance. Common birds—the species that many people see every day—have suffered the greatest losses, but there have been devastating losses among birds in every biome. The Project site provides breeding habitat for birds (Figure 6). The Project would eliminate that breeding habitat, thereby further reducing the reproductive capacity of the various bird species that use the Project site for reproduction. Therefore, if the 12 cumulative projects considered in the DEIR are almost entirely located within urban settings "where there would be no change to biological resources" (presumably because biological resource values have already been eliminated), it is illogical for the DEIR to conclude that the Project—which would cause significant changes to avian breeding habitat—would have no contribution to a cumulative impact.

Response to ORG 6-122: *In accordance with the CEQA Appendix G Guidelines, impacts, either direct, indirect, or cumulative to common wildlife, including avifauna are not considered significant. As set forth in Response to ORG 6-94 and other responses, the Project would not have an adverse impact on special-status avifauna, either directly or indirectly or cumulatively or a long-term impact to habitat loss as the developed golf course does not contain habitat for the seven non-bat species. As to special status bats, as discussed in the GLA Supplemental Memorandum and Responses ORG 6-104 through ORG 6-109, the Project Site does not contain suitable habitat and impacts are less than significant. Thus, the Project would not result in significant impacts to special-status bats or common avifauna including cumulative impacts.*

MITIGATION

Mitigation Measure BIO-1 (Nesting Birds)

Comment ORG 6-123: Mitigation Measure BIO-1 states:

"If Project-related construction and tree maintenance activities cannot occur outside of the general avian breeding season, a pre-activity nesting bird survey shall be conducted prior to the onset of the aforementioned activities, within a maximum of 7 days prior to commencement. The survey shall be conducted by a qualified biologist."

Most bird species construct well-concealed or camouflaged nests, and as a result, finding bird nests generally requires extensive efforts that include observations of bird behaviors (e.g., territorial defense behavior, food deliveries) that are only evident during certain periods of the nesting cycle. In addition, the success of any nest-searching method depends on the surveyor's knowledge of where birds nest, how nesting birds behave, and the best time of day to search for nests. Attaining this knowledge requires training and experience. Because Mitigation Measure BIO-1 fails to establish standards (minimum qualifications) for the "qualified biologist" that would conduct the nesting bird surveys, it does not ensure that person would have the qualifications needed to successfully locate all nests prior to an activity that could result in take of nesting birds.

Response to ORG 6-123: *To further define the requirements for nesting surveys, the following measures currently incorporated as part of the Streambed Alteration Agreement application for the Project will be included in Mitigation Measure BIO-1, which will be modified to provide as set forth below to ensure consistency of implementation of the surveys:*

Mitigation Measure BIO-1:

> *Designated Biologist. Prior to initiating ground- or vegetation-disturbing activities, Subdivider shall submit to CDFW for review and approval a list of biological monitors (Designated Biologist) that will be involved with the Project. The list shall include their names, qualifications, experience, and contact information. Designated Biologists shall: a)*

be knowledgeable and experienced in the biology and natural history of local plant and wildlife resources; b) be able to identify resources that are or have the potential to be present at the Project area; c) have previous biological monitoring experience on construction Projects; d) for any required nesting bird surveys, the biologist must have at least three (3) years of field experience conducting general and protocol-level surveys related to finding nests and monitoring them for a specific purpose of determining breeding status, egg incubation, chick maturity, and estimating fledge date; e) have the necessary experience and/or certifications for conducting protocol and focused surveys for species that may be present in the Project area; f) when needed, have obtained the proper documentation in regards to Scientific Collecting Permits (SCP) or Memorandum of Understanding (MOU).

Nesting and/or Breeding Bird Avoidance. Subdivider shall not conduct vegetation alteration or removal from February 1 to September 15 (January 1 to June 30 if raptors are present) to avoid impacts to breeding/nesting birds, and other special status and common species. For all other activities if the nesting season cannot be avoided, a Designated Biologist shall complete surveys to identify active nests which may be impacted directly or indirectly by Project activities. If the survey identifies an active nest, a buffer shall be established between the construction activities and the active nest so that nesting activities are not interrupted. The buffer shall be delineated by temporary fencing if site conditions allow and does not create additional disturbance, and shall be in effect throughout construction or until the nest is no longer active. If the survey identifies an active nest, Subdivider shall implement one of the following to avoid and minimize impacts to nesting bird species:

a) Implement default 300-foot minimum avoidance buffers for all non-special status passerine birds and 500-foot minimum avoidance buffer for all special status passerine and raptor species. The breeding habitat/nest site shall be fenced and/or flagged in all directions, and this area shall not be disturbed until the nest becomes inactive, the young have fledged, the young are no longer being fed by the parents, the young have left the area, and the young will no longer be impacted by the Project.

b) Subdivider may propose an alternative plan for avoidance of nesting birds for CDFW concurrence.

c) Should at any time during monitoring, the Designated Biologist determine that an active nest is potentially subject to adverse impacts from construction in any way, the Designated Biologist will be empowered to suspend work to ensure protection of the nest and will monitor the nest site until the nestlings have fledged and are no longer dependent on the nest.

Comment ORG 6-124: Mitigation Measure BIO-1 further states: "[a]ny excessive noise or lighting that could potentially impact the nest shall be directed away from the nest to the greatest extent feasible." Thus, if it is not feasible for the construction contractors to alter the construction schedule or activities, nests would be exposed to noise and lighting, and impacts to nesting birds would remain potentially significant. Based my experience conducting biological monitoring at construction sites, it is almost certain that construction activities will not be modified to accommodate nesting birds if feasibility is determined by the construction contractors. As a result, unless Mitigation Measure BIO-1 is modified to give the Project biologist the authority to limit construction activities in the vicinity of bird nests, impacts to nesting birds would remain potentially significant.

Response to ORG 6-124: *See Subparagraph (c) of Mitigation Measure BIO-1, as revised in Response ORG 6-123, above, which addresses the responsibilities and powers of the Designated Biologist. It is important to note that the commenter is not accurate. For example, GLA conducts numerous nesting bird surveys in support of construction activities and, based on site specific conditions based on the Project biologist's discretion, is often required to suspend grading or other construction activities to ensure nest protection during the avian breeding season.*

Comment ORG 6-125: **Mitigation Measure BIO-2 (Jurisdictional Features)**

Mitigation Measure BIO-2 states the following:

> "On- and/or off-site restoration and/or enhancement of USACE/RWQCB jurisdictional "waters of the U.S."/"waters of the State" and wetlands at a ratio no less than 1:1 for permanent impacts, and for temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate). Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank)."

Mitigation Measure BIO-2 proposes the same mitigation for impacts to CDFW jurisdictional streambed and associated riparian habitat.

Mitigation Measure BIO-2 suffers several deficiencies. First, the DEIR fails to demonstrate that on-site restoration or enhancement of jurisdictional waters and riparian habitat is a feasible strategy for mitigating the Project's impacts given the proposed development plan and alternatives. Similarly, even if on-site mitigation is feasible, the DEIR fails to provide evidence that on-site mitigation would have any ecological value given the surrounding development.

Second, Mitigation Measure BIO-2 fails to identify how many credits would be purchased at the off-site mitigation bank and which variable(s) would be replaced at a 1:1 ratio. At the Soquel Canyon Mitigation Bank, one ephemeral stream credit is used to preserve, restore, and/or enhance 0.01 acres of stream, 0.17 acres of riparian buffer, and 0.82 acres of upland buffer. Therefore, if the 1:1 ratio is based solely on permanent impacts to the Project's jurisdictional waters and wetlands, the Project would result in a substantial net loss of aquatic resources. For example, if the Applicant is allowed to purchase 0.36 credits at the Soquel Canyon Mitigation Bank to mitigate impacts to 0.36 acres of jurisdictional waters at the Project site, a mere 0.0036 acres of ephemeral stream would be preserved, restored, and/or enhanced at the Soquel Canyon Mitigation Bank. This would not achieve the state and federal "no net loss" standard and thus the Project's impacts to jurisdictional waters would remain significant.

Third, Mitigation Measure BIO-2 allows the Applicant to enhance jurisdictional waters as mitigation. Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource functions(s), but may also lead to a decline in other aquatic resource function(s). By definition, enhancement as a form of mitigation results in net loss of aquatic resource area, and thus, requires a mitigation ratio greater than 1:1 to mitigate a project's impacts to less-than-significant levels.

This concludes my comments on the DEIR.

Response to ORG 6-125: *In addressing mitigation for the jurisdictional features, all of which consist of artificial golf course drainage ditches including a substantial component of concrete V-ditches, it is important to consider the aquatic function of the features. None of the features support riparian habitat and only a single feature contains wetlands totaling 0.04 acre which is dominated by non-native vegetation. The concrete ditches do not contribute to such hydrologic functions such as groundwater recharge and biogeochemical functions such as reduction of sediment transport are negligible. Mitigation Measure BIO-2 includes programmatic mitigation that allows for a variety of mitigation options based on specific performance criteria provides for the replacement of functions by opting for the best alternative whether onsite or offsite at a mitigation bank. The final determination for the mitigation will be determined in consultation with ACOE, CDFW and the Regional Board during the permitting process implementing the mitigation measure performance criteria, as permitted under CEQA. It is recommended that Mitigation Measure BIO-2 be revised as set forth below to clarify that CDFW is the agency with jurisdiction and that the maximum amount of impact serves as the basis for the mitigation program:*

> "On- and/or off-site restoration and/or enhancement of USACE/RWQCB*/CDFW* jurisdictional "waters of the U.S."/"waters of the State" and wetlands at a ratio no less than 1:1 for permanent impacts. *The mitigation program would be developed in consultation with the regulatory agencies and would be based on the maximum amount of impact which is expected to be CDFW jurisdiction*. ~~and f~~*F*or temporary impacts, restore impact area to pre-project conditions (i.e., revegetate with native species, where appropriate) *or through off-site restoration or enhancement*. Off-site restoration and/or enhancement at a ratio no less than 1:1 may include the purchase of mitigation credits at an agency-approved off-site mitigation bank or in-lieu fee program (e.g., Soquel Canyon Mitigation Bank)."

TONY BOMKAMP

Senior Biologist / Regulatory Specialist

YEARS OF EXPERIENCE

Professional start date: 1993

Years at GLA: 30

EDUCATION

MS, Environmental Studies,
California State University, Fullerton,
1993

BA, Biology,
California State University, Fullerton,
1976

TEACHING EXPERIENCE

Adjunct Staff at California State University Fullerton, Wetlands Endangered Habitats and Conservation of Migratory Birds, 1993 – 2021

Los Angeles Department of Water & Power, 2017

California Wetlands Conferences Wetland Delineation/Wetlands Consultants Ethics/ Arid West Supplement Field Delineating/ Arid West Supplement, CLE International, 2005/2006/2007/2009

Wetlands Law and Regulation, ALI-ABA, 2006

TRAININGS ATTENDED

Arid West Supplement Wetland Delineation Course, Wetland Training Institute, 2007

Wetland Delineation with Emphasis on Hydric Soils, Wetland Training Institute, 2005

Basic Wetland Delineation Course with Practicum, Wetland Training Institute, 1996

PROFESSIONAL SUMMARY

Tony Bomkamp is a Botanist, Field Biologist, Wetlands Ecologist, and Regulatory Specialist with extensive wetlands expertise and diverse field experience and his botanical background spans 42 years working with all major vegetation communities in Southern California. He is a recognized authority in wetland delineation having conducted and supervised scores of wetland delineations, riparian habitat evaluations, and wetland functional assessments throughout California. Tony has processed hundreds of regulatory permits pursuant to Section 404 of the Clean Water Act, Section 1602 of the Fish and Game Code and Section 401 of the Clean Water Act. Tony has also designed and monitored numerous wetland mitigation sites throughout southern California. In addition to his own project work, Tony serves as GLA's Technical Director mentoring and supporting the biologists and regulatory specialists at GLA on well over 100 projects in a senior advisory role at GLA.

For 28 years Tony served as an adjunct faculty member at California State University, Fullerton in the graduate environmental studies program instructing courses in wetlands and endangered habitats as well as conservation of migratory birds. He additionally has served as faculty for numerous Continuing Legal Education conferences on wetland delineation, wetland consultant ethics, and the Arid West Supplement from 2005 – 2009 and instructed a course on wetlands law and regulation for the American Law Institute in 2006.

SELECTED PROJECT EXPERIENCE

ORANGE COUNTY GREAT PARK – HERITAGE FIELDS EL TORO; IRVINE, CALIFORNIA

Serving as Lead Biologist/Project Manager. Work includes managing extensive biological work to finalize the CEQA process with the City of Irvine including conducting surveys for rare plants, least Bell's vireo, burrowing owl, and raptors; directing and conducting biological monitoring; supervising pre-demolition surveys; and designing a wildlife corridor. Prepared responses to comments on the final EIR, which has been approved. Updated the jurisdictional delineation for the 3,580-acre area and prepared a jurisdictional delineation report. Provided support for obtaining Clean Water Act (CWA) Section 401 and 404 and Fish and Game Code (FGC) Section 1602 authorizations, including design of the habitat mitigation site within Agua Chino during the permitting process. Prepared an environmental assessment (EA)/alternatives analysis as well as habitat mitigation and monitoring plans. Finally, Mr. Bomkamp served as the lead biologist in developing and designing the Irvine Wildlife Corridor which is currently under construction.

EAST ORANGE GENERAL PLAN COMMUNITY — THE IRVINE COMPANY; ORANGE COUNTY, CALIFORNIA

Served as Lead Biologist/Project Manager. Conducted extensive vegetation mapping of native habitats within the 10,000-acre study area including coastal sage scrub, native grassland, chaparral and riparian communities. Performed surveys for fairy shrimp, western spadefoot toad, and special-status plants including intermediate mariposa lily and many-stemmed dudleya. Conducted focused surveys for least Bell's vireo, protocol surveys for coastal California gnatcatcher, and a habitat assessment for special-status bats. Prepared a biological technical report for use in preparation of draft and final EIRs pursuant to CEQA, which included detailed impact analyses as well as development of mitigation measures necessary to ensure that all impacts to biological resources were reduced to less than significant. Additionally, prepared responses to comments on the final EIR, which the City of Orange certified. Additional work included conducting a jurisdictional delineation and preparing a jurisdictional delineation report as well as regulatory permit applications for which Section 401, 404, and 1600 authorizations were issued.

BIOLOGICAL FUEL MODIFICATION ZONE PROJECTS — CITY OF LAGUNA BEACH; LAGUNA BEACH, CALIFORNIA

Served as Senior Biologist. Mr. Bomkamp has served as Project Biologist for the City of Laguna Beach Fire Department since 1994, providing coastal expertise for numerous fuel modification projects. Work has included conducting general and focused surveys for sensitive wildlife and plant species including coastal California gnatcatcher, least Bell's vireo (Vireo bellii pusillus), Pacific pocket mouse, tidewater goby, Laguna Beach dudleya, and big-leaved crownbeard to performing habitat assessments and vegetation mapping. Additionally, Tony has prepared a biological technical report addressing wildlife movement corridors, impacts to biological resources including special-status species, and mitigation measures. Tasks have included rare plant surveys within all fuel modification zones throughout City, providing Biological Support in accordance with the CEQA for new fuel modification zones, and preparing/processing Coastal Development Permits for areas subject to Chapter 3 Policies of the Coastal Act.

NEWPORT BANNING RANCH — NEWPORT BANNING RANCH, LLC; NEWPORT BEACH, CALIFORNIA

Serving as Senior Biological/Regulatory Consultant. Managed biological work required for CEQA authorization including directing and conducting general biological surveys; rare plant surveys; and focused least Bell's vireo, raptor, burrowing owl, and fairy shrimp surveys. Additionally, supervised and conducted focused surveys for coastal California gnatcatcher, southwestern willow flycatcher, and cactus wren. Conducted vegetation mapping, prepared a biological technical report for use in preparation of draft and final EIRs pursuant to CEQA, and prepared responses to comments on the final EIR. Additionally, led a team of regulatory specialists in updating the CWA Section 404 jurisdictional delineation for the site, prepared a jurisdictional delineation report, and directed and participated in public outreach workshops. The City of Newport Beach has approved the project and certified the EIR.

ON-CALL CONTRACT TO PROVIDE ENVIRONMENTAL TECHNICAL STUDIES — CITY OF COSTA MESA; COSTA MESA, CALIFORNIA

Serving as Senior Biologist. Project consists of providing environmental technical studies, conducting endangered species surveys, conducting surveys for special-status plants, assisting the City of Costa Mesa in obtaining a Section 10(a)(1)(a) Recovery Permit for listed fairy shrimp that occur in Fairview Park, preparation and implementation of a vernal pool habitat mitigation and monitoring plan for vernal pools and associated upland buffers, and performance of mitigation monitoring. To date, work has included conducting wet season fairy shrimp sampling in vernal pools, mapping special-status plant locations, reporting to USFWS, and performing post rain event site assessments for hydrology suitable for fairy shrimp in accordance with USFWS sampling protocol. Mr. Bomkamp conducted all tasks described herein.

ORANGE COUNTY TRANSPORTATION AUTHORITY MEASURE M2 REGULATORY AND BIOLOGICAL SUPPORT — ORANGE COUNTY, CALIFORNIA

Serving as Senior Technical Advisor/Coastal Regulations Specialist. Work includes biological resources monitoring for seven Preserves totaling over 1,300 acres to determine threats and stressors that may impact Covered Species and natural communities, conducting overall assessments (e.g., invasive species, erosion, unauthorized trail cutting, and trail condition) to help determine areas of highest management priority, conducting focused species surveys, updating vegetation mapping, and documenting unauthorized activities and related effects to biological resources. GLA conducts ongoing site visits, photo monitoring, and reporting to address results of research and monitoring activities, recommend appropriate adaptive management actions, and discuss anticipated activities for the upcoming year. Specific to Laguna Beach, GLA provides biological monitoring at the Pacific Horizon Preserve, including monitoring the burn area associated with the May 2022 Coastal Fire and leading public hikes. Mr. Bomkamp's primary role is to provide coastal regulations support for the Pacific Horizon Preserve.

WESTERN SNOWY PLOVER PROJECT — CITY OF NEWPORT BEACH; NEWPORT BEACH, CALIFORNIA

Serving as Senior Biologist. Project consists of preparation of a Management Plan for Western Snowy Plover in support of a Coastal Development Permit for areas of the Balboa Peninsula. Tasks include preparation of Western Snowy Plover Management Plan; focused surveys for wintering western snowy plovers; vegetation mapping for areas of dune habitat on Balboa Peninsula; focused plant surveys and vegetation census for dune and beach areas on Balboa peninsula; coordination with various City departments during development of management plan; coordination with U.S. Fish and Wildlife Service during development of the management plan; coordination with Coastal Commission staff; and attendance at public meetings to present management plan to various stakeholders concerned about western snowy plover. Mr. Bomkamp oversees all biological task.

SPECIAL AREA MANAGEMENT PLAN (SAMP), VARIOUS PLANNING AREAS, AND INFRASTRUCTURE — RANCHO MISSION VIEJO (RMV); SAN JUAN CAPISTRANO, CALIFORNIA

Serving as Project Manager/Wetland Regulatory Specialist/Botanist. Work has included providing biological support relevant to CEQA and NEPA in addition to regulatory and mitigation support including conducting a jurisdictional delineation for approximately 8,000 acres of the 23,000-acre special area management plan (SAMP) study area associated with Rancho Mission Viejo's "Ranch Plan" (i.e., EIR) study area and verifying the delineation with the U.S. Army Corps of Engineers and California Department of Fish and Wildlife (CDFW); preparing responses to comments on the Ranch Plan; applying for permits and coordinating CWA Section 404 processing in accordance with SAMP and the master streambed alteration agreement with CDFW; analyzing impact assessments and preparing a wetland functional assessment for the Regional Water Quality Control Board; reviewing grading plans; performing and directing rare plant surveys throughout the study area; designing and implementing protocols for a rare plant translocation program including for many-stemmed dudleya, intermediate mariposa lily, thread-leaved brodiaea, and southern tarplant; implementing a five-year management action plan for thread-leaved brodiaea, many-stemmed dudleya, Coulter's saltbush, and southern tarplant as well as a large-scale many-stemmed dudleya restoration project with five receptor sites and more than 3,100 plants installed, which are meeting success criteria. The County of Orange has approved the Ranch Plan and certified the EIR.

ESPERANZA HILLS DEVELOPMENT PROJECT — YORBA LINDA ESTATES; LLC, CITY OF YORBA LINDA, CALIFORNIA

Serving as Lead Biologist. Conducted a jurisdictional delineation of the 631-acre site and prepared a jurisdictional delineation report. Directed and performed protocol surveys for coastal California gnatcatcher and least Bell's vireo. Prepared a biological assessment as well as a biological technical report for use in preparation of draft and final EIRs pursuant to CEQA. Prepared CWA Section 401 and 404 and FGC Section 1602 notifications, an EA/alternatives analysis, as well as habitat restoration/mitigation plans. Currently processing CWA Section 401 and 404 and FGC Section 1602 authorizations. Prepared responses to comments on the public notice as well as the final EIR, which the County of Orange has certified. Attended public hearings.

SEASP ESHA EVALUATION — PLACEWORKS FOR CITY OF LONG BEACH, CALIFORNIA

Served as Senior Biologist. GLA conducted an evaluation of Environmentally Sensitive Habitat Area (ESHA) as defined under the California Coastal Act for the Southeast Area Specific Plan (SEASP). Tasks included: development of ESHA Criteria based on previous Commission ESHA determinations and guidance from the Commission's ecologists, vegetation mapping consistent with current Commission standards for identifying "rare" and "endangered" vegetation alliances, surveys for special-status plants that meet the Commission's criteria for ESHA; conducted habitat assessments and surveys for special-status animals that meet the Commission's criteria for ESHA; prepare report identifying all areas within the SEASP area that meeting the Commission's ESHA criteria; coordination with City staff and stakeholders.

MARBLEHEAD COASTAL DEVELOPMENT PROJECT — R.J.MEADE CONSULTING; SAN CLEMENTE, CALIFORNIA

Served as Senior Biologist/Project Manager. Conducted a jurisdictional delineation for obtaining CWA Section 401 and 404 and FGC Section 1602 authorizations as well as a Coastal Development Permit for the 250-acre site. Directed and performed vegetation mapping, wildlife movement studies, burrowing owl surveys, and coastal California gnatcatcher surveys. Conducted rare plant surveys for and mapped locations of Coulter's saltbush. Designed and prepared a habitat restoration/mitigation plan. Directed and conducted construction monitoring and implemented habitat restoration. Attended meetings with the U.S. Fish and Wildlife Service and California Coastal Commission.

UPPER LOS CERRITOS WETLAND MITIGATION BANK — BEACH OIL MINERAL PARTNERS; CITY OF LONG BEACH, CALIFORNIA

Served as Lead Biologist. Performed and/or directed all biological studies and surveys in support of the Los Cerritos Mitigation Bank. Tasks included: coordination of expert biologists in performing various focused flora and faunal surveys; performance of the wetland delineation for federal and state jurisdictional wetlands; and performance of focused botanical surveys and surveys for the State-listed Belding's savannah sparrow.

CANYON HILLS DEVELOPMENT PROJECT — CHRISTOPHER A. JOSEPH & ASSOCIATES; CITY OF LOS ANGELES, CALIFORNIA

Served as Lead Biologist/Project Manager. Conducted the jurisdictional delineation for the 900-acre site and prepared a jurisdictional delineation report. Conducted vegetation mapping, general wildlife surveys, and general and focused botanical surveys. Performed protocol surveys for coastal California gnatcatcher and focused surveys for least Bell's vireo. Produced a biological technical report for use in preparation of environmental documents pursuant to CEQA. Prepared Section 401, 404, and 1602 notifications and an EA/alternatives analysis. Processed 401, 404, and 1602 authorizations and prepared a wetland/riparian mitigation plan. Responded to public notice comments to finalize the CEQA process. CEQA was approved for the project.

ST. MICHAEL'S ABBEY PROJECT — ST. MICHAEL'S ABBEY; SILVERADO, CALIFORNIA

Serving as Senior Biologist. Performs and directs biological surveys for purposes of CEQA including vegetation mapping and focused surveys for coastal California gnatcatcher, cactus wren, raptors, burrowing owl, arroyo toad, and rare plants. Prepared a biological technical report for use in draft and final EIRs and responses to comments for the final EIR. The County of Orange approved the project and certified the EIR. Habitat restoration has been implemented and construction monitoring is ongoing as needed.

INTERSTATE 215 WIDENING FROM SCOTT ROAD TO NUEVO ROAD — ICF INTERNATIONAL/RIVERSIDE COUNTY TRANSPORTATION COMMISSION; CITIES OF PERRIS AND MENIFEE AND UNINCORPORATED RIVERSIDE COUNTY, CALIFORNIA

Serving as Project Manager. The project consists of the widening of the section of I-215 between Scott Road and Nuevo Road. GLA conducted a California Rapid Assessment Method (CRAM) analysis of vernal pools that would be impacted by the project and designed a mitigation program to compensate for the impacts which included creation of vernal pools immediately south of Ramona Expressway and west of the San Jacinto River channel. GLA also designed and implemented mitigation for two-special status plant species, smooth tarplant (Centromadia pungens ssp. laevis) and San Jacinto Valley crownscale (Atriplex coronata var. notatior). The project is in its fourth year of implementation.

ROAD CROSSING OF THE SAN JACINTO RIVER BETWEEN GOETZ ROAD AND 2,500 LINEAR FEET SOUTHERLY OF ETHANAC ROAD — RICHLAND COMMUNITIES; CITY OF PERRIS, RIVERSIDE COUNTY, CALIFORNIA

Serving as Project Manager. The project consists of construction of a road crossing over the San Jacinto River between Goetz Road and 2,500 linear feet southerly of Ethanac Road. GLA's work includes preparation of a Biological Technical Report and a jurisdictional delineation report to satisfy the requirements of CEQA and regulatory agency permitting requirements. Specifically, GLA conducted a jurisdictional delineation, vegetation mapping, habitat assessments, and performed focused surveys for special-status plants and focused protocol surveys for least Bell's vireo and southwestern willow flycatcher.

SANTA MARGARITA WATER DISTRICT GOBERNADORA MULTIPURPOSE BASIN, DOWNSTREAM MONITORING OF RIPARIAN HABITAT IN GOBERNADORA CREEK, RANCHO MISSION VIEJO, ORANGE COUNTY

Served as Project Manager. Conducted a jurisdictional delineation of Gobernadora and Wagon Wheel Creeks and obtained Section 404, 401 and 1602 Authorizations for the Santa Margarita Water District's (SMWD) Gobernadora Multipurpose Basin, which includes water quality, flood control components as well as water harvesting (surface water and groundwater) for non-domestic uses for SMWD. A condition of the Section 1602 Streambed Alteration Agreement requires development of an Adaptive Management Plan (AMP) for assessing potential impacts on downstream riparian habitat within Gobernadora Creek, which supports State and federally listed species such as least Bell's vireo. Working with WEI and SMWD, prepared a detailed AMP to assess potential impacts on downstream riparian habitat associated with surface and groundwater withdrawals. Monitoring program is tiered and includes monitoring of groundwater wells, surface flows, soil moisture and leaf water potential based upon thresholds that trigger each tier of the monitoring.

WASTEWATER DISCHARGE ANALYSIS — WESTERN RIVERSIDE COUNTY REGIONAL WASTEWATER AUTHORITY

Serving as Lead Biologist. Providing biological support for WRCRWA's petition for change in wastewater discharges to Prado Basin. Tasks include preparation of water budget in collaboration with project hydrologist, assessment of areas of riparian habitat within Prado Basin, jurisdictional delineation, habitat assessment and surveys for federally listed species (e.g., least Bell's vireo), preparation of detailed riparian habitat monitoring program that includes use of historic hydrology data, groundwater monitoring wells, stream gaging, quantitative and qualitative riparian habitat assessments. The riparian habitat monitoring program has been prepared in collaboration with USFWS and CDFW. In addition, the project includes assisting the WRCRWA team with preparation of Environmental Assessment in support of the Corps' Out-grant Process. Project requires extensive coordination with USFWS and CDFW as well as Corps' planning branch.

ARROYO TRABUCO GOLF COURSE, MONITORING OF RIPARIAN HABITAT IN TRABUCO CREEK — RANCHO MISSION VIEJO, ORANGE COUNTY

GLA conducted jurisdictional delineation of Trabuco Creek and obtained Section 404, 401 and 1602 Authorizations for the Arroyo Trabuco Golf Course in Orange County. Irrigation water for the golf course includes water from obtained from Trabuco Creek. A condition of the project Final EIR required development of a program for monitoring potential impacts on riparian habitat within Trabuco Creek, which supports State and federally listed species such as least Bell's vireo. Working with WEI and Rancho Mission Viejo, GLA developed a monitoring program to assess potential impacts on associated with surface water withdrawals. The monitoring program included qualitative assessment of riparian habitat downstream from diversion point, correlation of surface flow data collected by WEI, and collection of leaf water potential data.

TRAMPAS RECYCLED WATER RESERVOIR — SANTA MARGARITA WATER DISTRICT

Serving as Senior Biologist. Providing biological and regulatory support for SMWD's Trampas Canyon Recycled Water Reservoir project on Rancho Mission Viejo, Orange County. Tasks include preparation of biological technical report that included a jurisdictional delineation component, preparation of and processing Section 404, 401 and 1600 authorizations, biological surveys, delineation review of the project with Corps and CDFW, and development of a mitigation program.

EMPLOYMENT HISTORY

Glenn Lukos Associates. Senior Biologist/Regulatory Specialist. Lake Forest, California. 1993 – 1995 and 1997 – Present.

California State University, Fullerton. Adjunct Faculty – Environmental Studies Program. Fullerton, California. 1993 – 2021.

Michael Brandman Associates. Botanist/Wetlands Specialist. Irvine, California. 1995 – 1997.

California State University, Fullerton. Graduate Assistant for Southern California Waterbody Study. Fullerton, California. 1990 – 1993.

California State University, Fullerton. Graduate Assistant for Field Botany. Fullerton, California. 1992.

Appendix Q

“Reference materials supporting Attachment C of the Channel Law Group Letter”

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January 5, 2024

VIA ELECTRONIC MAIL

Marie Pavlovic
LA County Planning
Subdivisions Section
320 W. Temple Street, Room #160
Los Angeles, CA 90012
mpavlovic@planning.lacounty.gov

Re: References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1); Vesting Tentative Tract Map No.: TR83534 (RPPL2021007149); General Plan Amendment No. RPPL2021004860; Zone Change No. RPPL2021007152; Conditional Use Permit No. RPPL2021007151; Housing Permit No. RPPL2021007161; Environmental Assessment No. RPPL2021007150; and, State Clearinghouse Number 2022100204

Dear Ms. Pavlovic:

This firm represents Royal Vista Open Spaces. As a courtesy to the County of Los Angeles, we submit the attached documents referenced in biological resources consultant Scott Cashen's, M.S. comment letter, which is included as **Attachment C** to our comment letter on the Draft Environmental Impact Report.

Please ensure this document is included in the administrative record for the above-referenced matter.

Sincerely,

Jamie T. Hall

Encls.
Attachments 1 through 19

Channel Law Group, LLP

January 5, 2024

References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 1

Bazelman
Effects of Urbanization on Bat Habitat Use in the Phoenix Metropolitan Region, Arizona, USA: A Multi-Scale Landscape Analysis

Effects of Urbanization on Bat Habitat Use in the Phoenix Metropolitan Region, Arizona, USA: A Multi-Scale Landscape Analysis

by

Tracy C. Bazelman

A Thesis Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Science

Approved November 2016 by the
Graduate Supervisory Committee:

Jianguo Wu, Co-Chair
Carol L. Chambers, Co-Chair
Andrew T. Smith

ARIZONA STATE UNIVERSITY

December 2016

ABSTRACT

Context – Urbanization can have negative effects on bat habitat use through the loss and isolation of habitat even for volant bats. Yet, how bats respond to the changing landscape composition and configuration of urban environments remains poorly understood.

Objective – This study examines the relationship between bat habitat use and landscape pattern across multiple scales in the Phoenix metropolitan region. My research explores how landscape composition and configuration affects bat activity, foraging activity, and species richness (response variables), and the distinct habitats that they use.

Methods – I used a multi-scale landscape approach and acoustic monitoring data to create predictive models that identified the key predictor variables across multiple scales within the study area. I selected three scales with the intent of capturing the landscape, home range, and site scales, which may all be relevant for understanding bat habitat use.

Results – Overall, class-level metrics and configuration metrics best explained bat habitat use for bat species associated with this urban setting. The extent and extensiveness of water (corresponding to small water bodies and watercourses) were the most important predictor variables across all response variables. Bat activity was predicted to be high in native vegetation remnants, and low in native vegetation at the city periphery. Foraging activity was predicted to be high in fine-scale land cover heterogeneity. Species richness was predicted to be high in golf courses, and low in commercial areas. Bat habitat use was affected by urban landscape pattern mainly at the landscape and site scale.

Conclusions – My results suggested in hot arid urban landscapes water is a limiting factor for bats, even in urban landscapes where the availability of water may be greater than in outlying native desert habitat. Golf courses had the highest species richness, and included the detection of the uncommon pocketed free-tailed bat (*Nyctinomops femorosaccus*). Water cover types had the second highest species richness. Golf courses may serve as important stop-overs or refuges for rare or elusive bats. Urban waterways and golf courses are novel urban cover types that can serve as compliments to urban preserves, and other green spaces for bat conservation.

ACKNOWLEDGMENTS

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CHAPTER 1

URBANIZATION AND BATS: AN OVERVIEW

Urbanization and Biodiversity

Urbanization is a globally-dominant driving force altering spatial patterns and ecological processes within and beyond the physical boundaries of cities (Wu 2004, Grimm et al. 2008, Wu et al. 2013, Liu et al. 2014, Liu et al. 2016). Habitat loss and fragmentation, driven by rapid urban expansion, affects biodiversity, as well as ecosystem processes and services that depend on the diversity of species making up ecosystems (Loreau et al. 2001, Hooper et al. 2005, Grimm et al. 2008). The most marked reductions of biodiversity can be seen in our cities, where ecosystem structure and function have been negatively affected by urbanization-induced environmental changes (Grimm et al. 2000, Hooper et al. 2005, Buyantuyev and Wu 2008, Litteral and Wu 2012).

Similarities in the composition of urban landscapes (e.g., commercial, residential, roads, and remnant natural vegetation) tend to homogenize biotic communities worldwide, with a few urban adapted species dominating urban ecosystems whose resiliency is reduced by the lack of species functional redundancy (McKinney 2006, Grimm et al. 2008). Moreover, the number and size of urban landscapes are dramatically increasing (Liu et al. 2014, Wu et al. 2014, Ma et al. 2016), making the examination of urban landscape development pattern important for evaluating the impacts of urbanization on biodiversity conservation, and for promoting ecosystem services and sustainability (Wu 2014).

Urban landscape patterns – including landscape composition (e.g., the number of patch types and their relative abundance), and landscape configuration (e.g., the size, geometry, and spatial arrangement of patches) – can affect animal movement, which often reduces native species diversity in urban areas, even for the most volant species such as birds and bats (Fahrig 2003, Duchamp and Swihart 2008, Litteral and Wu 2012, Mendes et al. 2016). To date, urban biodiversity studies have been dominated by birds and arthropods, and few studies have focused on mammals (McKinney 2008, Wu 2014). Most bird studies indicate that habitat loss is more influential than habitat fragmentation per se where the composition or habitat area is the most important predictor of bird occurrence and species richness (Cushman and McGargal 2003, Hostetler and Knowles-Yanez 2003, Litteral and Wu 2012). Bird species richness decreases in urban environments relative to natural environments, but in urban areas species richness tends to peak in large high-quality habitat such as large native vegetation remnants or affluent residential neighborhoods. Conversely, the urban core is dominated by a few opportunistic urban adapted species (McKinney 2002, Hostetler and Knowles-Yanez 2003, Litteral and Wu 2012, Wu 2014).

Importance of Bats

Bats are among the most diverse mammals and arguable one of the most diverse mammals in urban landscapes (Kunz et al. 2011). Insectivorous bats, members of the suborder Yangochiroptera (Teeling et al. 2005, Lei and Dong 2016), provide an important ecosystem service as biological pest control, feeding on a variety of nocturnal insects and other arthropods (Kalka et al. 2008, Boyles et al. 2011, Kunz et al. 2011). A single lactating female Mexican free-tailed bat (*Tadarida brasiliensis*) weighing 12 g can consume up to 70% of her body mass in insects each night (Kunz et al. 2011). Extrapolating this figure to an average colony of Mexican free-tailed bats, one million bats could consume 8.4 metric tons of insects in a single night (Kunz et al. 2011). In North America, the economic value of bats to the agricultural industry is estimated at $3.7 billion dollars per year in reduced crop damage and pesticide use, reducing the need for the use of pesticides that would then enter ecosystems (Boyles et al. 2011). Bats are also an important dietary component of predatory animals such as birds, reptiles and mammals (Kunz and Parsons 2009).

Regrettably, some bat populations in North America are experiencing precipitous declines in response to anthropogenic changes (Kunz and Parsons 2009, Frick et al. 2010, Boyles et al. 2011, Kunz et al. 2011). The overarching threat to bats is the loss of habitat while the spread of White-Nose Syndrome, an infectious disease caused by the fungus *Pseudogymnoascus destructans*, and high mortalities caused by current wind-energy facilities are leading threats to bat populations (Frick et al. 2010, Boyles et al. 2011, Kunz et al. 2011, Roscioni et al. 2014). Despite the documented ecological and economic importance of bats, bat populations have been declining worldwide, and this may result in unpredictable changes in ecosystem processes and services (Boyles et al. 2011, Kunz et al. 2011).

Bats are often missing from management and conservation strategies due in part to the inherent challenges of studying highly variable, mobile, nocturnal animals (Hinman and Snow 2003, Limpert et al. 2009). Additionally, bats are often perceived negatively by the public, which can further hinder conservation efforts. However, understanding the effects of urbanization on bats will allow wildlife managers to answer important questions relevant to land-use planning and policy questions. For example, how does the composition and spatial configuration of an urban landscape affect bat habitat use? What cover types provide habitat requirements? To what degree can bats tolerate urbanization, and which species are particularly sensitive to the effects of urbanization? How can potential deleterious effects of urbanization on bats be minimized through land use planning and design? Answering these questions will provide a better understanding of bat species dynamics and help preserve the ecosystem services that bats provide to society.

Ecological Studies of Bats in Urban Landscapes

Habitat Requirements for Bats

Insectivorous bats may be particularly sensitive to the effects of urbanization due to the loss of habitat requirements: roosting habitat, foraging habitat, and drinking water (Gehrt and Chelsvig 2003, Duchamp and Swihart 2008, Luck et al. 2013). It is not clear why some bats select urban environments and others do not, but the occurrence of bats in any location is dependent on the availability of shelter and food (Evelyn et al. 2004, Avila-Flores and Fenton 2005, Limpert et al. 2009).

Generally, the availability of roosting habitat is considered to be the strongest limiting factor for bat habitat use (Evelyn et al. 2004, Limpert et al. 2009, Ethier and Fahrig 2011) because bats select roosting sites for specific criteria such as microclimatic conditions and roost structure (Lewis 1995, Fenton 1997, Boyles 2007, Neubaum et al. 2007, Mering and Chambers 2014). Conversely, bats are generally considered to be less selective of foraging habitat because they opportunistically feed on a wide variety of prey according to their availability (Ethier and Fahrig 2011, Kunz et al. 2011, Hagen and Sabo 2012). Bats are also strongly correlated with arthropod abundance (Kalka et al. 2008, Kunz et al. 2011). Thus, urban areas that support concentrations of arthropods and other insects should be foraging areas for bats.

Bats require drinking water for survival, but its relative importance is not well known (Rabe and Rosenstock 2005, Tuttle et al. 2006, Adams and Hayes 2008), and can vary among climatic conditions (Adams and Hayes 2008). In hot arid climates like the southwestern US, where the availability of surface water is limited, water may be an equally important resource to that of roosting and foraging habitat (Rabe and Rosenstock 2005, Tuttle et al. 2006, Ethier and Fahrig 2011, Hagen and Sabo 2012). For instance, high ambient temperature and low relative humidity cause high rates of daily evaporative water loss in bats, which must be replenished in part by drinking (Tuttle et al. 2006, Adams and Hayes 2008). Under these conditions, some bats may loss as much as 30% of their body water over a 12-hour period (Webb et al. 1995, Tuttle et al. 2006, Adams and Hayes 2008, Rainho and Palmeirim 2011).

In addition to accessible drinking water, the proximity to water may also influence the selection of roosting and foraging habitat for some bats (Evelyn et al. 2004, Ober and Hayes 2008, Hagen and Sabo 2011, Rainho and Palmeirim 2011). In natural environments, rivers and riparian areas are important foraging habitat for bats because insect abundance is high in adjacent vegetation and over water, and waterways are flyways for movement (Ober and Hayes 2008, Hagen and Sabo 2011). Additionally, some bats tend to roost close to water, and bats also require a diversity of water conditions that can be accessible by species with different morphological characteristics (Evelyn et al. 2004, Rabe and Rosenstock 2005, Tuttle et al. 2006, Duchamp and Swihart 2008, Limpert et al. 2009). Thus, urban landscapes that have a diversity of water conditions in proximity to roosting and foraging habitat, as well as provide connectivity among resources should be areas of high overall bat activity and species richness.

Key Factors Affecting Bats in an Urban Environment

Habitat requirements for bats may be altered in different ways in an urban environment. The key factor affecting bats in an urban environment, like other taxa, is the loss of habitat, which has a strong negative effect on overall bat activity and species richness (Fahrig 2003, Ethier and Fahrig 2011). Bats in an urban environment are also affected by fragmentation per se – implying an increased number of smaller patches and increased isolation of patches – of remaining bat habitat (Fahrig 2003, Ethier and Fahrig 2011). However, the process of fragmentation may have a positive or a negative effect on overall bat activity and species richness (Fahrig 2003, Ethier and Fahrig 2011).

Examination of the composition and configuration of fragmented bat habitat is essential to understanding bat habitat use in an urban environment.

Because bats are mobile, it is commonly assumed that they can easily traverse the urban matrix mitigating potential negative effects of urban fragmentation (Gehrt and Chelsvig 2003). However, barriers such as roads make animal movement difficult, and more costly energetically in fragmented landscapes (Johnson et al. 1992, Lintott et al. 2015). The urban environment may increase the abundance of roosting habitat for bats that use man-made structures such as buildings and bridges (Wolf and Shaw 2002, Evelyn et al. 2004, Avila-Flores and Fenton 2005). However, human disturbance and exclusion practices may reduce the availability of suitable roosts for bats such as the Mexican free-tail bat, big brown bat (*Eptesicus fuscus*), and Yuma myotis (*Myotis yumanensis*) (Wolf and Shaw 2002, Evelyn et al. 2004, Avila-Flores and Fenton 2005). Likewise, the urban environment may increase the abundance of water sources (e.g., irrigation ditches, pools, canals, and golf course ponds), but pesticide use, stormwater pollution, and alterations of historic hydrologic regimes may directly or indirectly affect bat populations or prey abundance (Evelyn et al. 2004, Rabe and Rosenstock 2005, Boyles et al. 2011, Kunz et al. 2011, Hagen and Sabo 2014).

Soundscape ecology recognizes urban landscapes create a ‘sound footprint’ (Pijanowski et al. 2011) analogous to the effects of light. Thus, human-altered acoustic environments may be a novel selective force that can affect communication patterns and behavior of sound sensitive species, including people (Pijanowski et al. 2011, Rocaa et al.

2016). Alterations of bat habitat in the physical environment and the acoustic environment may have potential negative effects on the bats that rely on these areas year after year (Evelyn et al. 2004, Duchamp and Swihart 2008, Schaub et al. 2008, Pijanowski et al. 2011).

Anthropogenic noise may impede bat echolocation calls and prey capture, as well as other sound related behaviors (e.g., interspecific competition, social calls and mating) (Bunkley et al. 2015). Traffic and traffic noise affect bat activity and foraging activity beyond the structural boundaries of the road (10-15 m) (Schaub et al. 2008, Zurcher et al. 2010). Bunkley et al. (2015), found that loud compressor stations associated with natural gas extraction led to a marked reduction in activity for bats emitting low frequency echolocation calls (< 35 kHz) such as the Mexican free-tail bat, compared to quieter stations with no change in activity for bats emitting high frequency calls (> 35 kHz), such as the canyon bat (*Parastrellus hesperus*). Other species also respond to the human-acoustic environment; a meta-analysis of bird and anuran (frog and toad) species indicated that urban song birds shifted their song frequencies in response to anthropogenic noise, but anurans were less prone to frequency shifts (Rocaa et al. 2016).

Urban environments can also create conditions that are beneficial to bats (Gehrt and Chelsvig 2003, Duchamp and Swihart 2008, Hourigan et al. 2010, Luck et al. 2013). For example, urban green spaces and native vegetation fragments can provide complementary resources for bats and other wildlife (Loeb et al. 2009, Goddard et al. 2010, Threlfall et al. 2016). In the Phoenix metropolitan region, Buyantuyev and Wu (2008) found that arid urban environments have increased regional net primary production (NPP) (e.g., agriculture, cultivated grasses, and high-density urban vegetation cover types). Therefore, in arid urban environments vegetation should stays greener for longer periods of time, which should increase concentrations of prey that are available for longer periods of time, providing reliable foraging habitat for bats (Ober and Hayes 2008, Hagen and Sabo 2012, Threlfall et al. 2016). Urban environments may also increase the availability of water sources (Rabe and Rosenstock 2005, Tuttle et al. 2006), and urban waterways may act as suitable flyways for movement through the urban matrix (Everette et al. 2001, Lintott et al. 2015). Some bats also take advantage of artificial concentrations of insects, consuming insects under streetlights (Kurta and Teramino 1992, Avila-Flores and Fenton 2005, Hourigan et al. 2006), but some bats may be light sensitive, and therefore, disadvantaged in urban landscapes (McGuire and Fenton 2010, Rainho and Palmeirim 2011, Lacoeuilhe et al. 2014).

Acoustic Monitoring of Bats in an Urban Landscape

Bats exhibit considerable plasticity in their echolocation calls, changing their calls to meet the needs of each task (e.g., commuting, foraging, intraspecific communication, and other sound related behaviors) (Kunz and Parsons 2009). Acoustic monitoring of bat calls is a well-established method, that provides a useful means of assessing relative bat habitat use across different cover types, and to detect species (O'Farrell et al. 1999, Gehrt and Chelsvig 2003, 2004, Gorresen et al. 2005, Kunz and Parsons 2009). Acoustic studies are especially useful in urban landscapes where capture efforts, typically conducted over water, are not possible (Gehrt and Chelsvig 2003, Duchamp and Swihart

2008, Kunz and Parsons 2009). When using acoustic monitoring it is not possible to distinguish if one individual or multiple individuals were recorded across the data set (Hayes 1997, O'Farrell et al. 1999). For this reason, acoustic monitoring is a measure of the relative amount of use of a cover type, and not a proxy for abundance (Hayes 1997, O'Farrell et al. 1999, Brigham et al. 2004, Kunz and Parsons 2009). Acoustic monitoring data varies both spatially and temporally (Hayes 1997, O'Farrell et al. 1999, Kunz and Parsons 2009). Thus, replication efforts are used to account for the spatio-temperal variations (e.g., maintain spatially independent sites, and account for nightly conditions that can influence bat activity such as temperate or prey abundance) (Hayes 1997, O'Farrell et al. 1999, Kunz and Parsons 2009).

A call is an individual, discrete vocal pulse, and call sequence is a series of consecutive calls produced by a bat (O'Farrell et al. 1999). Each call and call sequence has a frequency range (kHz), a duration (time in milliseconds), and shape (curvilinear to distinctly bilinear, also referred to as narrow or broad bandwidth) (O'Farrell et al. 1999). Thus, a call sequence produced by a bat exhibits species-specific characteristics in frequency, duration and shape (Table 1). The number of call sequences is a proxy for bat activity, which indicates a bat is commuting (or passing) through a habitat patch, and is a measure of time spent in a cover type (Johnson 1980, O'Farrell et al. 1999).

Foraging activity indicated by a feeding buzz, is biologically relevant because it signifies a bat has attempted to capture prey in the cover type, and is a measure of time spent foraging (Corben and Livengood 2009, Kunz and Parsons 2009). A feeding buzz is a component of a call sequence, recognized as a characteristic change in frequency, duration, and shape of calls showing the search, attack and feeding buzz phase corresponding to the tracking and capture of prey (Brigham et al. 2004, Avila-Flores and Fenton 2005, Hourigan et al. 2006, Threlfall et al. 2012a). Moreover, the structure of a feeding buzz is relatively uniform across species making them identifiable when present and multiple feeding buzzes can be present within a call sequence. Identifying cover types that support foraging activity is of considerable importance to understanding bat habitat use in an urban environment to inform urban land-use planning and conservation efforts.

Key Ecological Studies of Bats in Urban Landscapes

In the last decade a series of studies have begun to inform our understanding of how bats respond to urban landscapes, many of which have been conducted by researchers from Australia (Hourigan et al. 2006, Hourigan et al. 2010, Threlfall et al. 2011, Luck et al. 2013) and North America (Kurta and Teramino 1992, Gehrt and Chelsvig 2003, Evelyn et al. 2004, Gehrt and Chelsvig 2004, Duchamp and Swihart 2008). There also seemed to be a surge of studies in recent years from around the globe, that have examined how bats respond to rapid urban expansion (Roscioni et al. 2014, Bunkley et al. 2015, Ducci et al. 2015, Lintott et al. 2016, Mendes et al. 2016, Threlfall et al. 2016). The current body of research showed bat activity and species richness decreased in highly urbanized areas, and increased bat activity and species richness was in less urbanized areas that are well vegetated (Duchamp and Swihart 2008, Hourigan et al. 2010, Luck et al. 2013). However, the effects of urbanization on bat habitat use in less urbanized areas have been mixed, and the underlying causes for this phenomenon remain unclear. Studies have identified multiple possible factors: species-specific response to urban landscapes, the context of the urban landscape, and differences in methods (Gehrt and Chelsvig 2003, 2004, Duchamp and Swihart 2008).

Work in Australia, found that bat activity and species richness increased in low-density residential areas with tree cover and/or in proximity to native vegetation remnants, and decreased in high-density residential areas (Hourigan et al. 2010, Threlfall et al. 2012b, Luck et al. 2013). These areas may also have increased residential green spaces (Hourigan et al. 2010, Threlfall et al. 2012b, Luck et al. 2013). In contrast, in Illinois, Gehrt and Chelsvig (2003, 2004) found bat activity and species richness increased near urban areas with forest fragments than in rural areas, and concluded that urban areas may provide islands of habitat in an agricultural dominated landscape. In a comparable study in Indiana, (the same region and landscape context) Duchamp and Swihart (2008) found that overall species richness was positively correlated with the amount of forest fragments within urban areas, but in contrast to the results of Gehrt and Chelsvig (2003, 2004) overall species richness was negatively correlated with the amount of urban development. Duchamp and Swihart (2008) found that species better adapted to flight in open areas (areas that are abundant in this region) were positively correlated with the total urban area, whereas clutter-adapted species were positively correlated with the amount of forests in urban areas; and concluded that clutter-adapted species may be more sensitive to the effects of urbanization (Duchamp and Swihart 2008). Although, study methods differed between the two studies, both studies supported the conservation value of forest fragments in urban areas for bats (Gehrt and Chelsvig 2003, 2004, Duchamp and Swihart 2008).

A number of urban cover types had high levels of bat activity and species richness such as urban parks, green spaces, water bodies, native vegetation remnants, rural areas, and low-density residential areas (Kurta and Teramino 1992, Everette et al. 2001, Evelyn et al. 2004, Avila-Flores and Fenton 2005, Loeb et al. 2009, Hourigan et al. 2010). Conversely, industrial and commercial cover types with little surface water or vegetation to support concentrations of prey should have low overall bat activity and species richness (Duchamp and Swihart 2008, Hourigan et al. 2010, Luck et al. 2013). This suggests the potential utility of these urban cover types to provide habitat for bats, as well as areas of overlap for other wildlife.

Urban environments caused changes in bat community structure. A few opportunistic species such as the big brown bat, and the Mexican free-tail bat tended to dominate urban areas (Everette et al. 2001, Gehrt and Chelsvig 2004, Avila-Flores and Fenton 2005, McKinney 2006, Loeb et al. 2009, Hourigan et al. 2010). Well vegetated urban areas provided refuges for some species, including rare or elusive species (Gehrt and Chelsvig 2004, Loeb et al. 2009). Two foraging strategies tended to dominate urban areas: 1) open-habitat foragers - fast, agile flyers with long, narrow wings, and have a low energetic cost of flight, and 2) clutter-habitat foragers – slower, more maneuverable bats with short, broad wings, and have a high energetic cost of flight (Duchamp and Swihart 2008).

Landscape Ecology of Bats in Urban Landscapes

The study of landscape composition and configuration and their influence on ecological processes across multiple spatial scales is central to landscape ecology (Wu and Hobbs 2002, Wu et al. 2013). Bat habitat use may occur as a series of decisions made across hierarchically nested scales (e.g., landscape/regional, home range, and site scales) (Johnson 1980, Gorresen et al. 2005, McGarigal et al. 2013, McGarigal et al. 2016). For example, a bat exhibiting high fidelity to a small water body at the site scale may simultaneously be aware of vegetation cover discernable in flight at the landscape scale (Gorresen et al. 2005, McGarigal et al. 2013, Ducci et al. 2015). When characteristic scales of pattern and process are unknown, the examination of multiple scales is necessary to understand the anthropogenic effects on biodiversity (Wu and Loucks 1995, Wu 2004, Gorresen et al. 2005, McGarigal et al. 2016).

Little is known about the home range of bats (Gorresen et al. 2005, Johnson et al. 2008, Klingbeil and Willig 2009, Ethier and Fahrig 2011), or the scales at which bats perceive natural or urban landscapes (Gehrt and Chelsvig 2003, Evelyn et al. 2004, Gehrt and Chelsvig 2004, Gorresen et al. 2005, Duff and Morrell 2007). The home range scale should be the minimum scale that will encompass habitat requirements. I selected three hierarchical scales to elucidate the scales at which bats perceive their environment in a dispersed urban matrix, with the intent of capturing the landscape or regional distribution scale, the home range scale, and the site scale (3000 m, 1500 m, and 180 m), all of which may be relevant to the bats associated with my study area (Gehrt and Chelsvig 2003, Evelyn et al. 2004, Gehrt and Chelsvig 2004, Gorresen et al. 2005, Duff and Morrell

2007). The broad scales (3000 m and 15000 m) may also encompass the home range of bats with differing mobility. Examination of the limits of the home range of bats in a dispersed urban environment should provide valuable knowledge about how bat behavior is affected by urbanization.

There are a growing number of studies examining the scale dependence of bat habitat use (Gehrt and Chelsvig 2003, Gorresen et al. 2005, Johnson et al. 2008, Ober and Hayes 2008, Limpert et al. 2009, Ethier and Fahrig 2011, Dixon 2012, Ducci et al. 2015, Chambers et al. 2016, Charbonnier et al. 2016, Lintott et al. 2016, Mendes et al. 2016), but such research on bats is still rather limited. The scale dependence of habitat use occurred at both broad and fine scales (Gorresen et al. 2005, Chambers et al. 2016, Mendes et al. 2016). At broad scales, bats are thought to respond to the configuration of landscape features that provided required resources and landscape connectivity (Gorresen et al. 2005, Ethier and Fahrig 2011, Chambers et al. 2016, Lintott et al. 2016, Mendes et al. 2016). At fine scales, bats are thought to respond to microhabitat characteristics, such as the availability of prey, water, vegetation, and roosting sites (Gehrt and Chelsvig 2003, Evelyn et al. 2004, Limpert et al. 2009, Chambers et al. 2016, Charbonnier et al. 2016, Mendes et al. 2016). The relationship between habitat use and scale is context specific, and can vary among functional guilds and feeding guild (Gorresen et al. 2005, Ethier and Fahrig 2011, Ducci et al. 2015, Chambers et al. 2016, Charbonnier et al. 2016, McGarigal et al. 2016). Therefore, a multi-scale approach based on empirical data will be more representative of a bat's perception of the landscape than a single-scaled approach (Gorresen et al. 2005, McGarigal et al. 2016).

Natural landscapes with access to habitat resources in close proximity to each other should have high overall bat activity and species richness, and bats may move less in these areas due to the proximity of resources (Ethier and Fahrig 2011, Mendes et al. 2016). The term "landscape complementation" describes the extent to which a landscape facilitates movement (or access) between required resources (Ethier and Fahrig 2011). The fragmented nature of urban landscapes should provide access to connected areas that have interspersed patches of habitats (i.e., landscape complementation) (Ethier and Fahrig 2011). Examination of the attributes and connectedness of habitats is important to understanding bat habitat use in urban landscapes.

Bats of Arizona Using Urban Areas

Little study has been done on the effects of urbanization on bats in Arizona where land conversion is the primary threat, and the effects of urbanization on bats in arid desert climates is poorly understood (Hinman and Snow 2003). Arizona has 28 species representing four families, second only to Texas with 34 species (Bat Conservation International 2016). The Phoenix metropolitan region is an excellent laboratory to study the effects of urbanization on bats because it supports such a rich diversity of bats, and is experiencing rapid urban expansion exhibiting a dispersed urbanization pattern. The effects of urbanization on bats are not known, hindered by the lack of understanding of basic natural history of bat species in this region, and is therefore, a primary concern for conservations efforts within Arizona (Hinman and Snow 2003).

Wolf and Shaw (2002) conducted a study of bridge-roosting bats along a gradient of urbanization in the Tucson metropolitan region, , Arizona's second largest city. Wolf and Shaw (2002) found rural bridges had higher species richness than urban bridges, counts included active roosting and bats active in the immediate area. The urban bridges near the city core supported a maximum of two species: Mexican free-tail bat and big brown bat, and the rural bridges supported up to five species: Mexican free-tail bat, canyon bat, cave myotis (*Myotis velifer*), California myotis (*Myotis californicus*), and Yuma myotis. The bridges with the highest species richness were located at the urban-agricultural interface and adjacent to natural open desert areas (Wolf and Shaw 2002). In Las Vegas, Nevada, , a comparable arid desert city, O'Farrell (2003) found bat activity decreased within the urban core and the highest activity was at the periphery of the city (Altenbach et al. 2003).

Arizona has 11 bats thought to use habitat resources within the Phoenix metropolitan region (Table 1) (Hinman and Snow 2003, A. McIntire, Bat Specialist, Terrestrial Wildlife Branch, Arizona Game and Fish Department, Personal Communication May 12, 2009). However, other bats of Arizona may utilize the urban environment that have not been documented as of the date of the current study. *Myotis* species have similar call characteristics; therefore, are often grouped based on their characteristic call frequencies (i.e., 40 kHz myotis and the 50 kHz myotis) (O'Farrell et al. 1999, Corben and Livengood 2009). All the bats in the study area are insectivorous.

Table 1 Bat species expected to utilize urban areas within the Phoenix metropolitan region (Hinman and Snow 2003, A. McIntire, Bat Specialist, Terrestrial Wildlife Branch, Arizona Game and Fish Department, Personal Communication May 12, 2009). Foraging guild abbreviations: AI = Aerial Insectivore, AF = Aerial Forager, AG = Aerial Gleaner, GI = Gleaning Insectivore. Frequency and call characteristics information was obtained from Corben and Livengood (2009). Feeding guild and behavior information was obtained from Everette et al. (2001), Hinman and Snow (2003), O'Shea and Bogan (2003), and Evelyn et al. (2004).

Scientific name	Common name	Family	Feeding guild	Characteristic call frequency (kHz)	Call characteristics	Behavior
Antrozous pallidus	Pallid bat	Vespertilionidae	GI/ AG	25	Calls always very steep. Confusing species: Mexican free-tailed bat, and the big brown bat.	Forages in open habitat and fallow agricultural land. Roosting habitats: buildings, caves/mines, rock crevices and bridges.
Eptesicus fuscus	Big brown bat	Vespertilionidae	AI/ AF	30-25	Search-phase call sequence shows a high degree of uniformity. Can be difficult to identify from the Mexican free-tailed bat in clutter (i.e., built structures or vegetation).	Common in urban areas. A generalist species. Commonly found in agricultural areas. Can travel long distances and may travel from natural areas to urban areas or vice versa, traveling up to 9 – 19 km. Roosting habitat: buildings, caves/mines, bridges, and other.
Eumops perotis	Greater western mastiff bat	Molossidae	AI/AF	7	Extremely distinctive calls at low frequency.	Shows high fidelity to large open water sources (> 30 m) and to cliff habitat to get proper lift. Roost sites are associated with mine and excavation sites and are close to high fidelity water sources. Travels long distances to forage 25 km. Roosting habitat: buildings and rock crevices.
Lasiurus blossevillii	Western red bat	Vespertilionidae	AI/AF	50-40	Hooked shaped calls with erratic changes in frequency and the shape. Confused with the canyon bat, the western yellow bat, and 40 kHz myotis.	Not attracted to man-made structures, solitary, migrates, and hunts in open tree tops. Roosting habitat: foliage and bridges.

Scientific name	Common name	Family	Feeding guild	Characteristic call frequency (kHz)	Call characteristics	Behavior
Lasiurus xanthinus	Western yellow bat	Vespertilionidae	AI/ AF	35	Hooked shaped calls that jump around in frequency and shape, but are less exaggerated in this species compared to other *Lasiurus* species.	Does not migrate, may be expanding range due to untrimmed ornamental palm trees in urban areas. Roosts in foliage.
Myotis californicus	California myotis	Vespertilionidae	AI/AF	50	50 kHz myotis, very steep calls. Very difficult to distinguish from California myotis.	Hunts near foliage, edges and open habitat. Roosting habitat: buildings, cave/mines, and tree cavities /bark crevices.
Myotis velifer	Cave bat	Vespertilionidae	AI/AF	40	40 kHz myotis, steep calls, very difficult to distinguish from other 40 kHz myotis.	Forages most often over water and in open areas. Can hunt low in vegetation. Roosting habitat: buildings, cave/mines, and bridges.
Myotis yumanensis	Yuma myotis	Vespertilionidae	AI/AF	50	50 kHz myotis, steep calls slightly lesser than California myotis. Very difficult to distinguish from the California myotis.	Most often found foraging over near water and open habitat. Linear home range, and 2000 m average distance between roost, may be limited by suitable roost near water site. Uses man-made structures. Roosting habitat: buildings, cave/mines, rock crevices, bridges, and other.
Nyctinomops femorosaccus	Pocketed free-tailed bat	Molossidae	AI/ AF	16	Low frequency calls, can range from steep calls in clutter to flat calls in no clutter having a backslash- type appearance.	Probably does not migrate, may go into torpor. Can travel up to 25 km. Roosting habitat: buildings, caves/mines, and rock crevices.

Scientific name	Common name	Family	Feeding guild	Characteristic call frequency (kHz)	Call characteristics	Behavior
Parastrellus hesperus	Canyon bat	Vespertilionidae	AI/ AF	45	Very distinctive, uniform low slow slope call sequence. Confusing species 50 kHz myotis.	Arizona's smallest bat, and common in urban areas. Usually roost near water, easily blown off course, may uses linear structures for protection from wind and predators. Roosting habitat: buildings, cave/mines, and bridges. Flight pattern resembles a butterfly flying and one of the few bats that can be identified visually.
Tadarida brasiliensis	Mexican free-tailed bat	Molossidae	AI/AF	25-20	Highly variable, with commuting calls with a low slope can appear flat in shape. Calls in clutter are difficult to distinguish from the big brown bat.	Common bat in urban areas. Agile flyer and hunts over water and agriculture. Migratory species that commutes long distances (25 – 50 km), which may aid dispersal in fragmented landscapes. Roosting habitat: buildings, cave/mines, and bridges.

Main Purpose of This Study

The main purpose of this study is to understand the relationship between bat habitat use, and landscape pattern across multiple scales in the Phoenix metropolitan region – one of the most rapidly urbanizing landscapes in the US (Figure 1). Examination of the relationship between urban landscape composition and configuration, and bat activity, foraging activity, and species richness (response variables) will elucidate how bats respond to the urban environment. To achieve this purpose, I used a multi-scale landscape approach to quantify the landscape composition and configuration for three scale, 180 m, 1500 m and 3000 m, with the intent of capturing the scales at which urban landscape pattern influences bat habitat use. I used an information-theoretic (I-T) approach based on acoustic monitoring data to create predictive models that identify the most important predictor variables that influenced predicted values of bat activity, foraging activity, and species richness across the study area.

This is the first study to examine the effects of urbanization on bats in the Phoenix metropolitan region – a highly, dispersed urban landscape. This is also the first study to examine the effects of urbanization on insectivorous bats in the hot arid desert climate of the southwestern US. It is expected to provide new and useful scientific evidence to reveal relevant scales of bat habitat use for better understanding urban bat activities, and the habitats that they use to inform the conservation of bats in urban landscapes. The results of this study have been organized to address data gaps, and provide recommendations for the management and conservation of bats inhabiting an urban desert city.

Research Questions and Hypotheses

To accomplish the main purpose of this study I have defined two specific research questions:

- Research Question #1: How does landscape composition and configuration affect bat activity and foraging activity in an urban environment?
- Research Question #2: How does landscape composition and configuration affect species richness in an urban environment?

Based on the above research questions, I have developed several hypotheses as follows:

- Hypothesis #1: The abundance of natural vegetation remnants is positively correlated with bat activity, foraging activity and species richness. This is reasonable since native vegetation should support insects and other arthropod populations (prey) that are relatively similar to the lowland desert habitat, and the mountainous native vegetation remnants should provide natural roosting sites, thereby increasing overall bat habitat use within this cover type.
- Hypothesis #2: Golf courses with water sources are positively correlated with overall bat activity. This hypothesis is based on the general observation that cover types with a reliable water source should have increased overall bat activity and species richness. Additionally, the configuration and the characteristics of golf courses (e.g., long green fairways, golf course pond, and edge vegetation) will also contribute to the use of this cover type. This is plausible because golf courses should have prime foraging habitat accessible to a variety of bats with differing foraging strategies, and have water and

vegetation necessary to support concentrations of prey.

- Hypothesis #3: Highly urbanized cover types such as commercial and industrial areas will have decreased bat habitat use due to the lack of adequate vegetation to support prey abundance, which should result in low or no overall bat activity in these cover types.
- Hypothesis #4: The spatial scale that is commensurate with the home range of bats is the most effective and relevant scale for detecting, and understanding overall bat activity. This is because the home range scale is probably the minimum spatial extent to capture required bat habitat (roosting habitat, foraging habitat, and drinkable water).

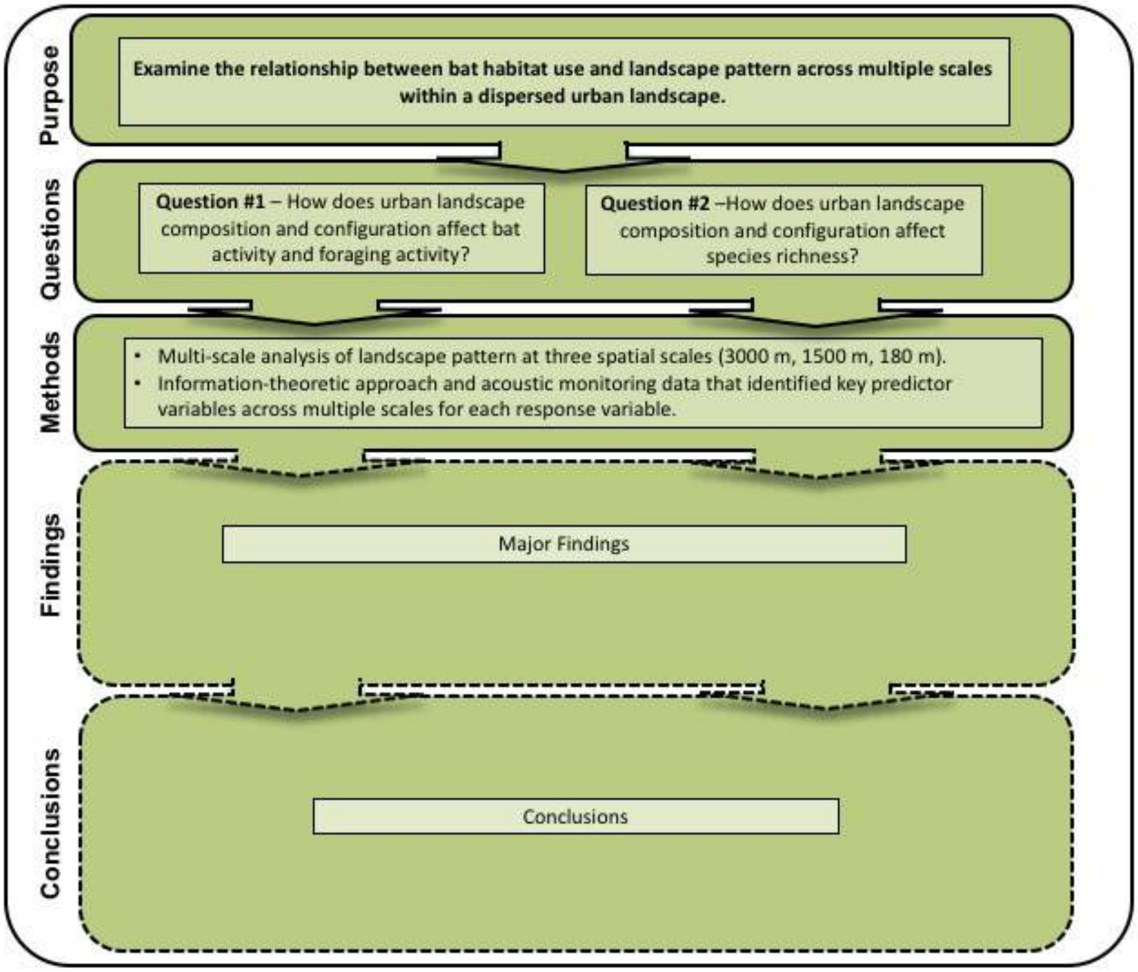


Figure 1 Initial thesis research flow chart: Effects of urbanization on bat habitat use in the Phoenix metropolitan region, showing the purpose, research questions, and methods that will be used to address the main purpose of the study.

CHAPTER 2

EFFECTS OF URBANIZATION ON BAT HABITAT USE IN THE PHOENIX METROPOLITAN REGION: A MULTI-SCALE LANDSCAPE ANALYSIS

Abstract

Context – Urbanization can have negative effects on bat habitat use through the loss and isolation of habitat even for volant bats. Yet, how bats respond to the changing landscape composition and configuration of urban environments remains poorly understood.

Objective – This study examines the relationship between bat habitat use and landscape pattern across multiple scales in the Phoenix metropolitan region. My research explores how landscape composition and configuration affects bat activity, foraging activity, and species richness (response variables), and the distinct habitats that they use.

Methods – I used a multi-scale landscape approach and acoustic monitoring data to create predictive models that identified the key predictor variables across multiple scales within the study area. I selected three scales with the intent of capturing the landscape, home range, and site scales, which may all be relevant for understanding bat habitat use.

Results – Overall, class-level metrics and configuration metrics best explained bat habitat use for bat species associated with this urban setting. The extent and extensiveness of water (corresponding to small water bodies and watercourses) were the most important predictor variables across all response variables. Bat activity was predicted to be high in native vegetation remnants, and low in native vegetation at the city periphery. Foraging activity was predicted to be high in fine-scale land cover heterogeneity. Species richness was predicted to be high in golf courses, and low in commercial areas. Bat habitat use was affected by urban landscape pattern mainly at the landscape and site scale.

Conclusions – My results suggested in hot arid urban landscapes water is a limiting factor for bats, even in urban landscapes where the availability of water may be greater than in outlying native desert habitat. Golf courses had the highest species richness, and included the detection of the uncommon pocketed free-tailed bat. Water cover types had the second highest species richness. Golf courses may serve as important stop-overs or refuges for rare or elusive bats. Urban waterways and golf courses are novel urban cover types that can serve as compliments to urban preserves, and other green spaces for bat conservation and other wildlife.

Introduction

The study of landscape composition and configuration, and their influence on ecological processes across multiple spatial scales is central to landscape ecology (Wu and Hobbs 2002, Wu et al. 2013). Urban landscape patterns – including landscape composition (e.g., the number of patch types and their relative abundance), and landscape configuration (e.g., the size, geometry, and spatial arrangement of patches) – can affect animal movement, which often reduces native species diversity in urban areas, even for the most volant species such as birds and bats (Fahrig 2003, Duchamp and Swihart 2008, Litteral and Wu 2012, Mendes et al. 2016). Insectivorous bats, members of the suborder Yangochiroptera (Teeling et al. 2005, Lei and Dong 2016), provide an important ecosystem service as biological pest control agents, feeding on a variety of nocturnal insects and other arthropods (Kalka et al. 2008, Boyles et al. 2011, Kunz et al. 2011). Urban environments can create conditions that are beneficial to some bats, but also create conditions that are detrimental to rare or sensitive species (Gehrt and Chelsvig 2003, Duchamp and Swihart 2008, Hourigan et al. 2010, Luck et al. 2013). Examination of the effects of urbanization on insectivorous bats will provide a better understanding of bat species dynamics, and help preserve the ecosystem services that bats provide to society.

Methods

Study Area

The study area is the Phoenix metropolitan region, Maricopa County, Arizona, located in the southwestern US, situated in the northern part of the Sonoran Desert in south-central Arizona (33.4277° N, 112.004° W) (Figure 2). This region has a hot dry climate, characterized by hot summers and mild winters with two distinct rainy seasons in summer and winter (Roach et al. 2008, Wu et al. 2011). The average summer temperature is 30.8 °C and the average winter temperature is 11.3 °C, with an annual precipitation of 180 mm (Roach et al. 2008, Wu et al. 2011). The Phoenix metropolitan region (elevation 337 m) is located in the Basin and Range Physiographic province, characterized by broad alluvial valleys surrounded by elongated mountain ranges trending to the northwest with remnant mountain ranges within the urban landscape (Arizona Bureau of Mines and US Geological Survey 1969). The arid climate supports desert biological communities of the Sonoran Desert scrub: Arizona Upland subdivision with Paloverde-Mixed Cacti series and Lower Colorado River subdivision with Creosotebush-Bursage series, and are the dominate remnant vegetation series within the metropolitan region (Buyantuyev et al. 2010, Wu et al. 2011).

The Phoenix metropolitan region is situated at the confluence of the Gila and Salt Rivers, called the Salt River Valley (the Valley). Drainage is southward and westward respectively, when the rivers are flowing. Both rivers are characterized as dry riverbeds with managed perennial flow where dams and urban development have altered historical hydrological regimes (Roach et al. 2008). The Salt River was an important source of water driving early landscape development and population growth (Knowles-Yánez et al. 1999, Wu et al. 2011). Historically, the Hohokam civilization (beginning in 500–700 AD) settled the Valley and excavated canals along the Salt River to water crops (Knowles-Yánez et al. 1999, Wu et al. 2011). Re-settlement of this region began in the late 1800s when agricultural activities became prominent due to the re-excavation and extension of these prehistoric Hohokam canals (Knowles-Yánez et al. 1999, Wu et al. 2011). Because the growing season is so dry, agriculture in the Valley continues to rely on irrigation (Knowles-Yánez et al. 1999, Roach et al. 2008). Currently, the Central Arizona Project canal system, diverting water from the Colorado River, is an influence on landscape development and population growth, supplying water to the majority of Arizona's population and agricultural lands (Roach et al. 2008). The Phoenix metropolitan region has 291 km of canals, more than Venice with 205 km, that extend across the city (Ellin et al. 2009).

The Phoenix metropolitan region is among the fastest growing cities in the US and spans approximately 2.4 million hectares with a total population of approximately four million (Luck and Wu 2002, Buyantuyev and Wu 2008, Wu et al. 2011). The city's development pattern is dispersed urbanization also referred to as 'urban sprawl', and is highly correlated to population growth (Luck and Wu 2002, Grimm et al. 2008). Early urban expansion involved the conversion of open desert to agriculture and agriculture to urban and, more recently, open desert and agriculture to urban land use (Grimm et al. 2000, Jenerette and Wu 2001, Luck and Wu 2002). The resulting urban landscape pattern is a patchwork of competing cover types that generally shift from desert to agriculture, to residential-urban, to agriculture and then back to desert along an east-west urbanization gradient (Luck and Wu 2002).

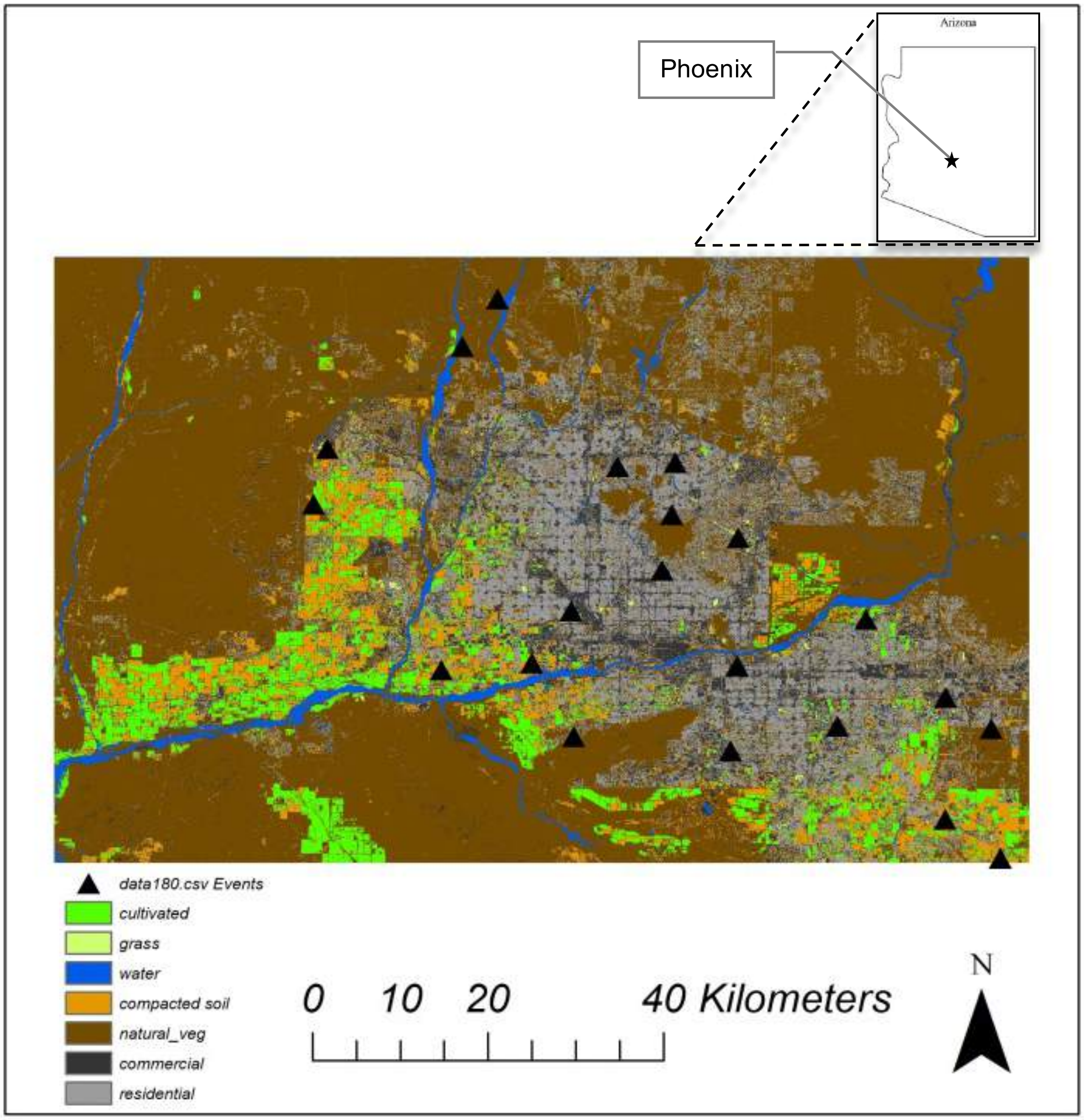


Figure 2 Study area orientation map for the Phoenix metropolitan region (reclassified 2005 CAP-LTER land cover classification map), showing the sampling sites in black triangles, and the distribution of seven reclassified cover types: agriculture, cultivated grass (golf courses), water, vacant land, natural vegetation, commercial and residential. Sampling sites were monitored from May to October 2010.

Land Use and Land Cover Map

I used the 2005 land cover classification map of central Arizona-Phoenix and created by the Central Arizona-Phoenix Long-Term Ecological Research project (CAP-LTER) using Landsat Enhanced Thematic Mapper (ETM) imagery (Buyantuyev 2005). I added a clip of a satellite-derived estimate of artificial lakes in 2000 for the Phoenix metropolitan region to the land cover map also created by the CAP-LTER (Larson 2000). The land cover map has 13 cover types that I reclassified into seven cover types determined to be the most relevant to bats based on *a prior* ecological knowledge: agriculture, cultivated grass, water, vacant land, natural vegetation, commercial/industrial and residential (Table 2) (Gehrt and Chelsvig 2003, 2004, Hourigan et al. 2006, Loeb and O'Keefe 2006, Duchamp and Swihart 2008).

I used a stratified random sampling approach to select sampling sites from a subset of the CAP-LTER 200 survey points, located in each of the seven land cover types. Sites were ground-truthed, and when the cover map was inaccurate I generated additional sampling sites independent of the CAP-LTER survey 200 points, using the same approach. I chose three sites in each of the seven cover types (n = 21) to capture variations of the cover type within the study area. The minimum distance between sites was 3000 m radius, and was also the landscape scale. I used stratified random sampling and a minimum distance of 3000 m radius between sampling site to reduce the potential for spatial autocorrelation of the data. All cultivated grass cover type sampling sites were in golf courses therefore, interpretations for this cover type are limited to golf courses. Of the 21 sampling sites, 17 (80%) were CAP-LTER survey 200 points and four were independently generated sampling sites.

Table 2 Reclassified cover types in the CAP-LTER 2005 land cover classification map of the Phoenix metropolitan region. Cover/class codes were randomly assigned to each cover type.

Cover type	Cover type code	Description
Agriculture	2	Active agricultural or cultivated vegetation.
Cultivated grass	3	Golf courses, urban parks, and other managed green spaces.
Water	4	Water bodies man-made or natural, including canals.
Vacant land	5	Graded lots, vacant lots, fallow land.
Natural vegetation	6	Natural/native vegetation.
Commercial	7	Commercial, industrial, commercial services, and concrete and asphalt.
Residential	8	Xeriscape, Mesicscape

Acoustic Monitoring

Bat calls were recorded using broadband ultrasonic bat detectors Anabat SD1 and SD2 (Titley Electronics, Ballina, New South Wales, Australia). I passively monitored 21 sampling sites from May to October 2010 (sampling season) when bats are active. Each site was monitored three nights each month to account for temporal (nightly and monthly) variations in bat activity (Hayes 1997). Sites were generally sampled on three consecutive nights barring re-sampling efforts due to unfavorable weather conditions or equipment malfunctions. I monitored sites each night 30 minutes prior to sunset to 30 minutes past sunrise (nightly monitoring duration) to capture a full night of bat activity (Hayes 1997). I sampled 126 nights over the sampling season and obtained equal sample sizes. I standardized response variables (bat activity, foraging activity and species richness) obtained from the acoustic data into a per hour rate for data recorded two hours after sunset and two hours prior to sunrise, considered to be two of the most active time periods for the majority of bats (Hayes 1997, O'Shea and Bogan 2003). Therefore, the number of species detected may be underestimated for bats active outside of the standardized time.

Bat detectors were placed in a camouflaged, tarp pouch on the ground with the microphone protruding and oriented at a 45° angle towards likely flight paths within the cover type (Corben and Livengood 2009). The placement of the detectors at the sampling sites were determined by both optimization of recording efforts (orientation to likely flight paths) and to minimize detection by people (i.e., damage or theft of equipment). Primary factors affecting the detector sensitivity are atmospheric attenuation (i.e., changes in humidity) and the amount of clutter. The study area had both atmospheric attenuation during the monsoon season and varying degrees of clutter inherent to the urban landscape. Detectors were set at the same sensitivity and randomly rotated among sites.

When rain was likely, detector microphones were wrapped in plasticwrap and secured with a rubber band using methods of Corben and Livengood (2009). The plasticwrap method reduces detector sensitivity but protects the microphone from water damage that causes microphones to fail and may result in complete microphone failure. Reduced detector sensitivity is equivalent to losing files with bats. Because detector sensitivity was uniformly reduced across all detectors, the potential for the loss of files with bats was also uniformly reduced. Since storm events in the region are characterized as intense storm events of short duration, detectors were allowed to record the full monitoring duration, because bat activity resumed shortly after the rain stopped per my personal observations during my 2009 pilot study in the metropolitan area. When a full nightly monitoring duration was not obtained due to equipment malfunction or unfavorable weather conditions, I eliminated the data, and the site was re-sampled within the same month.

Predictor and Response Variables

I qualitatively analyzed files using AnalookW version 3.8 (Titley Electronics, Ballina, New South Wales, Australia). A qualitative approach to identification of vocal signatures of bats is analogous to auditory identification of birds (O'Farrell et al. 1999). Therefore, I analyzed the acoustic data set to maintain consistency (O'Farrell et al. 1999, Kunz and Parsons 2009). I used the Orange County bat call library recorded in the southwestern US prepared by Corben and Livengood (2009) as a reference for species identification (O'Farrell et al. 1999, Kunz and Parsons 2009). Interpretation and identification methods are consistent with those taught at the Anabat Techniques Workshop and the AnalookW Analysis Course, and that of O'Farrell (1999) (Corben and Livengood 2009, Corben et al. 2010).

Bat activity, the number of call sequences per hour, included call sequences from species that were confidently identified, myotis groups and unidentified call sequences (O'Farrell et al. 1999). Unidentified calls sequences contributed only to bat activity. Foraging activity was the number of feeding buzzes per hour. Species richness was the number of species and myotis groups detected per hour. Call sequences identified to species or myotis group were identified by the species' characteristic frequency range and the visual assessment of characteristic call sequence shape.

Prior to analysis, I removed files with poor quality calls (i.e., less than five calls) or files that contained spurious noise using a quantitative filter. I modified the default software filter, provided by the AnalookW version 3.8, to detect bat calls emitted at ≥ 7 kHz to include calls produced by the greater western mastiff bat (*Eumops perotis*) expected in the study area. The data set was then manually inspected to eliminate remaining poor quality files.

I modified three parameters of the default software filter to detect greater western mastiff bat calls: 1) the minimum frequency parameter was changed to 7 kHz (from 14 kHz); 2) the minimum characteristic frequency parameter, referring to the bottom of the call where it is flattest was changed to 7 kHz (from 14 kHz); and 3) the body over parameter, referring to the amount of time a bat spends emitting frequencies in the band where the call is flattest, was changed to the proper setting 1000 microseconds (1 millisecond). The version of the default software filter provided was set to 350 microseconds in error by Corben et al. (2010), and was noted during the course. Thus, prior to running the modified filter the correct value, 1000 microseconds, was changed as recommended (Corben et al. 2010).

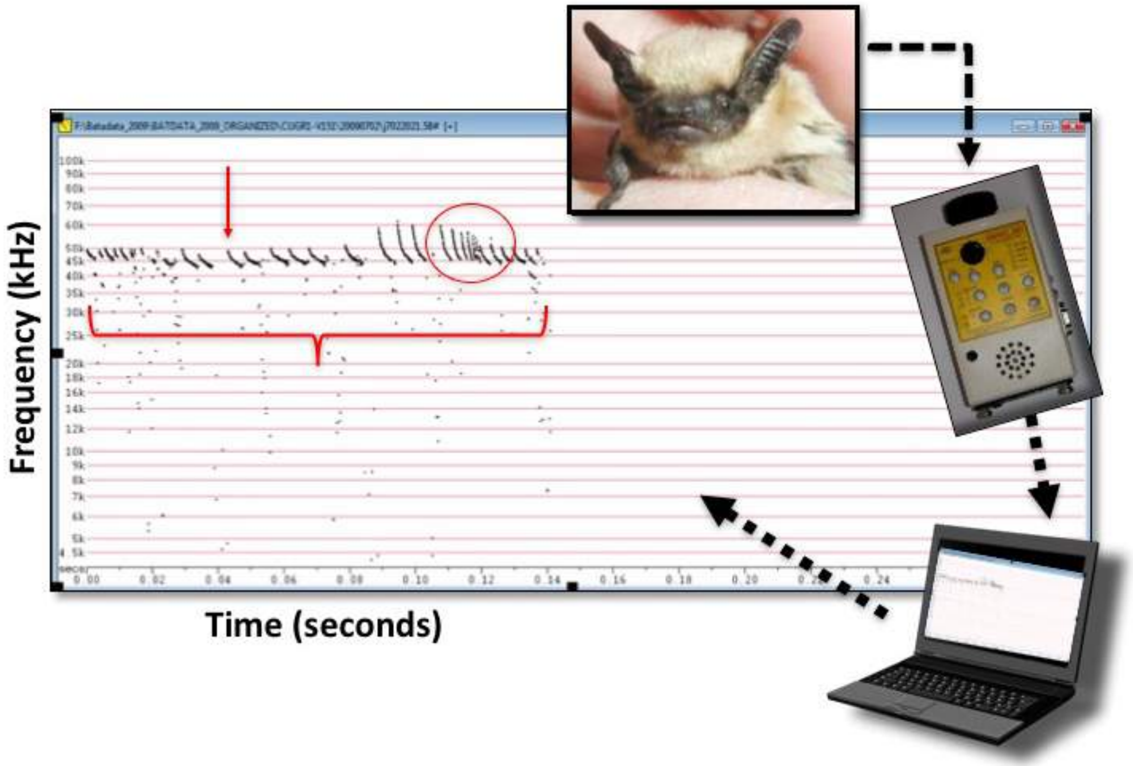


Figure 3 Acoustic monitoring and analysis flow chart showing a time/frequency plot (output) of a call sequence recorded by the Anabat detector illustrating how to determine units of activity and acoustic characteristics of a canyon bat. This bat is emitting at 45 kHz, its characteristic frequency, producing long call sequences of similar shape and medium duration. The duration between calls is measured in milliseconds. The first portion of the call sequence indicates the bat is either behind clutter (e.g. vegetation) or is farther away from the bat detector. As the bat gets closer to the detector, the calls become less distorted showing characteristically uniform calls of similar shape and duration. The bat is in search-phase at the beginning portion of the call sequence. As the call becomes steeper and of shorter duration, prey has been detected, and the bat is in the attack-phase. The feeding-phase immediately following the attack-phase is indicated by a terminal phase of rapid calls that are very steep and of very short duration. The feeding-phase calls have a dotted like appearance at the upper portion of the call. In the feeding-phase, prey has been captured and the bat is feeding on the wing.

Statistical Analysis

I used FRAGSTATS 4.0 (McGarigal et al. 2013) to analyze the composition and configuration of the landscape as defined by the seven cover types in the land cover map (agriculture, cultivated grass, water, vacant land, natural vegetation, commercial and residential). I chose four landscape-level metrics which quantify the structure of the entire habitat mosaic of the seven cover types and five class-level metrics focusing on the area and configuration of each of the cover types individually, based on past studies of metric behavior (Neel et al. 2004) and parsimony (Cushman et al. 2008). The methods used to examine effects of urbanization across multiple scales for each response variable is schematically illustrated in Figure 4.

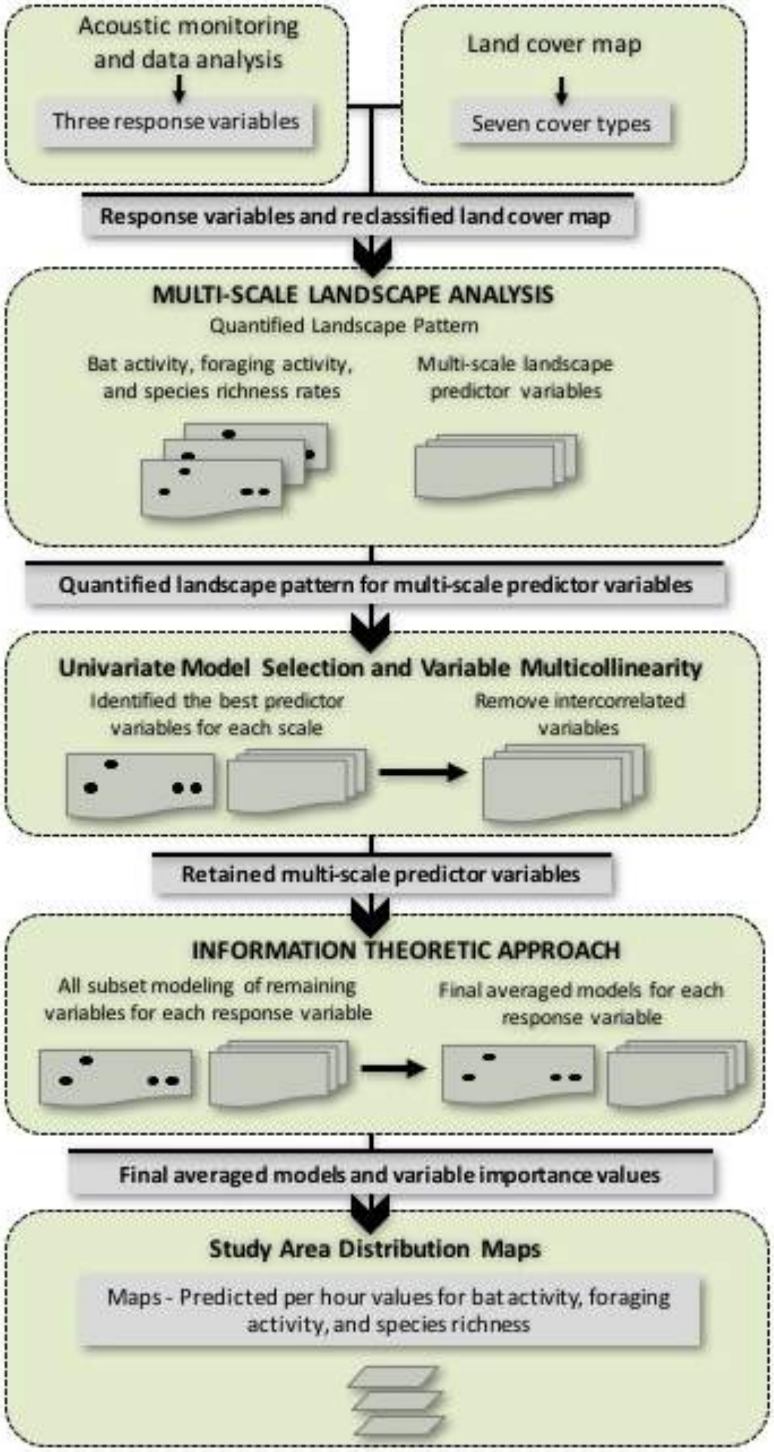


Figure 4 Methods flowchart summarizing the procedures used to examine the effects of urbanization on bat activity, foraging activity, and species richness across sampling sites for the Phoenix metropolitan region (May to October 2010). The green boxes represent processes and the grey boxes are the output from each process.

At the landscape-level I calculated the follow metrics: edge density (ED), which measures the total edge among dissimilar patch types without contrast weighting; aggregation index (AI), which measures the degree to which a patch type consists of a single compact patch; largest patch index (LPI), which measures the percentage of the landscape occupied by the single largest patch; and patch density (PD), which measures the total number of patches in the landscape across patch types.

At the class-level I calculated the following metrics: percentage of the landscape occupied by each cover type (PLAND); patch density (PD), which measures the number of patches per unit area of each cover type; largest patch index (LPI) of each cover type, which measures the percentage of the landscape occupied by the single largest patch; the correlation length of each cover type (GYRATE_AM), which measures the degree to which patches of each cover type extend across the study area providing broad connectivity; and area-weighted mean patch size of each cover type (AREA_AM), which measures the expected size of a patch of each cover type when selecting a random pixel. All metrics are configuration metrics, except percentage of the landscape occupied by each cover type (PLAND), which is a composition metric. Metrics were chosen *a priori* based on their relevancy to bats.

I conducted a multi-scale analysis of landscape pattern, calculating each of the FRAGSTATS metrics listed above at a range of focal scales using a moving window analysis (McGarigal and Cushman 2005), which quantifies the landscape pattern (i.e., landscape composition and configuration) surrounding each location in the landscape at a specified scale. This approach has a major advantage for habitat analysis given that occurrence and activity patterns at a location are likely driven by the habitat conditions surrounding that location, and that different variables may affect occurrence patterns at different spatial scales (Grand et al. 2004, Wasserman et al. 2011). Accordingly, for each FRAGSTATS metric I calculated focal moving windows at three scales, 180 m, 1500 m and 3000 m radii centered on each site, with the intent to capture the site, home range, and landscape scales that are relevant to the bats in the study area.

The *grain* or the smallest unit of the study, 180 m, represents the site scale, comprising the quality of the immediate habitat, and is also the minimum scale analyzed in FRAGSTATS 4.0 (McGarigal et al. 2013). A trend in studies show fine scale and broad scales are the most common scales correlated with bat habitat use (Chambers et al. 2016, Charbonnier et al. 2016, Gorreson et al. 2005). Fine scales, range from tree, plot, microhabitat or site scale, typically within 100 m. Site characteristics, such as the distance to and diversity of water conditions, prey abundance, edge effects, vegetation density or cover, distance to native vegetation, and anthropogenic site characteristics (the amount of impervious surface and distance to roads) explained habitat use (Evelyn et al. 2004, Gehrt and Chelsvig 2004, Hourigan et al. 2006, Loeb and O'Keefe 2006, Limpert et al. 2009, Hagen and Sabo 2011, Dixon 2012, Chambers et al. 2016, Charbonnier et al. 2016). Evelyn et al. (2004) found the site scale drove roost selection of the Yuma myotis in a residential area of California. Roost sites (trees or built structures) close to water with forest cover in the surrounding 100 m radius were positively correlated with roost selection (Evelyn et al. 2004). Therefore, I chose 180 m, the minimum scale analyzed in

FRAGSTATS 4.0, to examine site scale dependence of response variables (McGarigal et al. 2013).

The spatial scale that is commensurate with the home range of bats is the most effective and relevant scale for detecting and understanding overall bat activity. This is because the home range is likely the minimum spatial extent capturing habitat requirements for bats. I selected 1500 m as the home range scale based upon an estimated average of the home range for bats within the Southwest (Evelyn et al. 2004, Duff and Morrell 2007), and in the absence of relevant home range information, scale selection was informed by other landscape scale bat studies (Gehrt and Chelsvig 2003, Gorresen et al. 2005).

Some birds, mammals, and reptiles have smaller home ranges in areas of increased urbanization possibly due to an increased abundance in prey, and restrictions on movement due to barriers in the urban matrix (Sullivan et al. 2013). However, volant bats may be able to travel longer distances to exploit resources within an urban landscape (Gehrt and Chelsvig 2004, Loeb and O'Keefe 2006, Ober and Hayes 2008). Bats with the ability to travel long distances such as the Mexican free-tail bat, the big brown bat, and the larger Molossid bats, may increase their home range to account for dispersed resources scattered across the urban landscape, and/or rely on resources inside and outside of the urban mosaic (Everette et al. 2001, Gehrt and Chelsvig 2004, Neubaum et al. 2007, Duchamp and Swihart 2008, Sullivan et al. 2013). To examine bat occurrence Duff and Morrell (2007) selected 1500 m as the estimated average home range of bats in

California, which had similar species expected in the Phoenix metropolitan region. Duff and Morrell (2007) also selected this scale because there was little difference between 3000 m and 5000 m. The 1500 m scale was examined by other authors to represent the home range of some bats, and sites were separated by 1 to 2.5 km (Ober and Hayes 2008, Ethier and Fahrig 2011, Mendes et al. 2016). I selected the 1500 m scale to examine the limits of the home range of bats in the study area.

The landscape scale (3000 m) represents the regional distribution bats, where habitat is used and avoided in a non-random manner. This scale was also the minimum distance between sample sites, and the maximum limit to which predictions can be made. Gehrt and Chelsvig (2003) examined landscape variables in an urban landscape at one scale, 2000 m, because there was little change in variables at larger scales (i.e., 5000 m). Gorresen et al. (2005) examined the effects of fragmentation on bat habitat use at multiple scales (1000 m, 3000 m, 5000 m), and found all species responded to landscape characteristics at broad scales (3000 and 5000 m). In a scale optimization study, Chambers et al. (2016) examined multiple scales (100 m through 1000 m), and found fine and broad scales, (100 m and 1000 m) were most associated with bat occurrence in the tropical forests of Nicaragua. Chambers et al. (2016) recommended future studies examine broader scales that may capture the home range of bats beyond the broadest scale they examined.

I selected the 3000 m to represent the landscape scale or the regional distribution of bats within the study area. However, this could also be the home range scale of bats in the study area that are more mobile. Therefore, this scale represents the landscape scale for most bats in this study, but may also capture the home range of bats with intermediate home ranges. Thus, examination of the 1500 m scale and the 3000 m will provide information on the limits of the home range of bats within the study area. The *extent* of this study refers to the larger study area, the Phoenix metropolitan region.

For each combination of response variable and predictor variable, I identified the best of the three scales for each predictor variable (Grand et al. 2004, Wasserman et al. 2011). This was accomplished by running three univariate regressions for each predictor variable-response variable combination, one at each scale, and identifying the scale that produced the lowest Akaike information criterion (AICc) corrected for low sample sizes (Burnham et al. 2011). Any predictor variables that did not have scales at which the P-value of the univariate regression was < 0.20 were dropped. I used the 0.20 P-value cut-off for the univariate analysis because variables that are individually non-significant may interact significantly in multivariate models (Grand et al. 2004).

After the univariate model selection, I further reduced the variables included for analysis for each response variable by evaluating pairwise correlations between all remaining predictor variables and dropped highly correlated variables. If two predictor variables were correlated with a Pearson's correlation coefficient > 0.7, I dropped the member of the pair with the highest AICc value in the univariate model selection (Chok 2010). I used the Pearson's correlation coefficient because it has greater statistical power for my data (continuously distributed with a moderately non-normal distribution, and no outliers) (Chok 2010).

With an I-T approach, I used generalized linear modeling to predict relationships between landscape variables in the final predictor variable model sets and each response variable (Garamszegi et al. 2009, Burnham et al. 2011). All response variables were continuously distributed, and I used the generalized linear model (GLM) function with a Gaussian family to conduct all subsets regressions using the Dredge function on r library MuMin (Burnham et al. 2011). I reported AICc variable importance for each predictor variable, and used model averaging to produce a final averaged model for each response variable from all individual models within 4 AICc units of the most supported model (Garamszegi et al. 2009, Burnham et al. 2011). The major advantage of the I-T process is that it allows model averaging (Garamszegi et al. 2009, Burnham et al. 2011), which shifts the focus from the probability of models to the independent effect of each final predictor variable represented as the variable importance value (Garamszegi et al. 2009). I used the final averaged model for each response variable to map predicted values for each response variable across the study area.

Results

Empirical Data

Nine species and two groups of *Myotis* species were identified in the Phoenix metropolitan region (Table 3). The western red bat (*Lasiurus blossevillii*) was the only bat not detected that was expected to occur within the metropolitan area (Table 1). Two additional species were detected in the study area: Townsend's big-eared bat (*Corynorhinus townsendii*) and the hoary bat (*Lasiurus cinereus*), which were not present on the original list of bats expected to be in the study area (Table 1).

Table 3 Bat species and genus groups that were detected across sampling sites within the Phoenix metropolitan region (May to October 2010). This is a revised list of the bat species expected to utilize urban areas within the Phoenix metropolitan region. Foraging guild abbreviations: AI = Aerial Insectivore, AF = Aerial Forager, AG = Aerial Gleaner, GI = Gleaning Insectivore. Frequency and call characteristics information was obtained from Corben and Livengood (2009). Feeding guild and behavior information was obtained from Everette et al. (2001), Hinman and Snow (2003), O'Shea and Bogan (2003), Evelyn et al. (2004), and Gruver and Keinath (2006).

Scientific name/ Genus group	Common name	Family	Feeding guild	Characteristic call frequency (kHz)	Call characteristics	Behavior
Antrozous pallidus **	Pallid bat	Vespertilionidae	GI/AG	25	Calls always very steep. Confusing species: Mexican free-tailed bat and the big brown bat.	Forages in open habitat and fallow land. Roosting habitats: buildings, caves/mines, rock crevices and bridges.
Corynorhinus townsendii *; **	Townsend's big-eared bat	Vespertilionidae	GI/AG	20-70	Difficult to identify, but some calls are distinctive because of two levels of harmonic produced simultaneously. Some calls have a distinctive shape, a backwards candy cane-shape produced at 30 kHz range. Calls are steep, of medium duration and can be visible across a range of frequencies simultaneously.	Highly maneuverable, slow flight with the ability to hover, typical of gleaning foraging behavior allowing gleaning of prey from foliage. Forages along edge habitat, and may have high fidelity to foraging habitat a patchwork of preferred habitat. May not travel far from roost site to foraging area, 2-3000 m. Small foraging areas indicates the landscape may constrain activity. Roosting habitats: buildings, caves/mines, bridges and other. Very sensitive to human-disturbance.

Scientific name/ Genus group	Common name	Family	Feeding guild	Characteristic call frequency (kHz)	Call characteristics	Behavior
Eptesicus fuscus	Big brown bat	Vespertilionidae	AI/AF	30-25	Search-phase call sequences show a high degree of uniformity. Can be difficult to identify from the Mexican free-tailed bat in clutter (e.g., built structures or vegetation).	Generalist, commonly found in agriculture. Can travel long distances and may travel from natural areas to urban areas or vice versa, traveling up to 9 – 19 km. Roosting habitat: buildings, caves/mines, bridges, and other.
Eumops perotis **	Greater western mastiff bat	Molossidae	AI/AF	7	Extremely distinctive calls because they are produced at low frequency.	Obligated to larger open water (> 30 m) and to cliff habitat to get proper lift. Roost sites are associated with mine and excavation sites and are close to high fidelity water sources. Travels long distances to forage 25 km. Roosting habitat: buildings and rock crevices.
Lasiurus cinereus **	Hoary bat	Vespertilionidae	AI/AF	30-18	Hooked shaped calls that jump around in frequency with little change in shape. Calls are lower in frequency than other *Lasiurus* species.	Not attracted to human structure, solitary, migrate, hunts in open tree tops
Lasiurus xanthinus **	Western yellow bat	Vespertilionidae	AI/AF	35	Hooked shaped calls that jump around in frequency and shape, but are less exaggerated in this species compared to other *Lasiurus* species.	Does not migrate, maybe expanding range due to untrimmed ornamental palm trees in urban areas. Roosts in foliage.

Scientific name/ Genus group	Common name	Family	Feeding guild	Characteristic call frequency (kHz)	Call characteristics	Behavior
Nyctinomops femorosaccus	Pocketed free-tailed bat	Molossidae	AI/AF	16	Low frequency calls, can range from steep calls in clutter (e.g., built structures or vegetation) to flat calls in no clutter having a backslash-shaped appearance.	Probably does not migrate, may go into torpor. Can travel up to 25 km. Roosting habitat: buildings, caves/mines, and rock crevices. Relatively uncommon bat.
Parastrellus hesperus	Canyon bat	Vespertilionidae	AI/AF	45	Very distinctive, uniform low slow slope call sequence. Can be confused with 50 kHz myotis.	Arizona's smallest bat. Usually roost near water, easily blown off course, may uses linear structures for protection from wind and predators. Roosting habitat: buildings, cave/mines, and bridges. Flight pattern resembles a butterfly flying, and is one of the few bats that can be identified visually.
Tadarida brasiliensis	Mexican free-tailed bat	Molossidae	AI/AF	25-20	Highly variable, with commuting calls with a low slope that can appear flat in shape. Calls in clutter (e.g., habitat clutter) are difficult to distinguish from the big brown bat.	Agile flyer and hunts over water and agriculture. A migratory species that commutes long distances (25 -50 km), which may aid dispersal in fragmented landscapes. Roosting habitat: buildings, cave/mines, and bridges.

Scientific name/ Genus group	Common name	Family	Feeding guild	Characteristic call frequency (kHz)	Call characteristics	Behavior
40 kHz myotis	40 kHz myotis	Vespertilionidae	AI/AF	40	Within the study area this group most likely includes only the cave bat. Calls are steep, and very difficult to distinguish from other 40 kHz myotis.	Forages most often over water and in open areas. Can hunt low in vegetation. Roosting habitat: buildings, cave/mines, and bridges.
50 kHz myotis	50 kHz myotis	Vespertilionidae	AI/AF	50	Within the study area this group most likely includes California myotis and Yuma myotis. Calls are difficult to distinguish between these species and other 40 kHz myotis. The California myotis calls are very steep, and the Yuma myotis calls are slightly less steep, comparatively.	The California myotis hunts near foliage, edges and open habitat. Roosting habitat: buildings, cave/mines, and tree cavities /bark crevices. The Yuma myotis is most often found foraging over or near water and open habitat. May have linear home range preferring to travel along edge habitat. The average distance between roosts, and water is 2000 m. The bat is most likely limited by suitable roosting habitat that is near water. Uses man-made structures. Roosting habitat: buildings, cave/mines, rock crevices, bridges, and other.

* Species not on the original list bats of that were expected to utilize urban areas within the metropolitan region.

** Species eliminated after data standardization.

I obtained 16,605 call sequences, of those 11,306 (68%) were confidently identified to species or to myotis groups, and 5,299 (32%) were unidentified call sequences. Nine species and two myotis groups were detected, and 1,865 feeding buzzes were recorded (Table 4). The species and myotis groups, and the percentage of the total call sequences recorded were: 1) canyon bat (35%), 2) 50 kHz myotis (24%), 3) Mexican free-tailed bat (5%), 4) 40 kHz myotis (2%), 5) pocketed free-tailed bat (1%), and 6) big brown bat (1%). Calls for the hoary bat, greater western mastiff bat, western red bat, Townsend's big-eared bat, and the pallid bat (*Antrozous pallidus*) comprised ≤ 0.1% of the total call sequences recorded.

Table 4 Total numbers for each response variable recorded per cover type in the Phoenix metropolitan region (May to October 2010). Adjacent to total numbers are the proportion of call sequences recorded (16,605 in total), the proportion of feeding buzzes recorded (1,865 in total), and the proportion of the number of species/myotis groups detected (species richness, 11 in total) per cover type across the study area.

Response variable	Cover type														Total
	Water		Native vegetation		Agriculture		Vacant land		Cultivated grass		Residential		Commercial		
Bat activity	7,957	47.9%	604	3.6%	425	2.6%	880	5.3%	3,662	22.1%	2,251	13.6%	826	5.0%	16,605
Feeding buzzes	859	46.1%	22	1.2%	18	1.0%	37	2.0%	634	34.0%	255	13.7%	40	2.1%	1,865
Species richness	9	81.8%	7	63.6%	7	63.6%	8	72.7%	8	72.7%	5	45.5%	3	27.3%	11

Taxon call sequences	Cover type														Total
	Water		Native vegetation		Agriculture		Vacant land		Cultivated grass		Residential		Commercial		
Parastrellus hesperus	1,544	9.3%	182	1.1%	205	1.2%	593	3.6%	1,318	7.9%	2,021	12.2%	12	0.1%	5,875
50 kHz myotis	2,283	13.7%	14	0.1%	8	0.0%	27	0.2%	1,651	9.9%	2	0.0%	0	0.0%	3,985
Tadarida brasiliensis	149	0.9%	166	1.0%	84	0.5%	62	0.4%	62	0.4%	96	0.6%	192	1.2%	811
40 kHz myotis	293	1.8%	22	0.1%	2	0.0%	14	0.1%	57	0.3%	3	0.0%	0	0.0%	391
Nyctinomops femorosaccus	6	0.0%	23	0.1%	8	0.0%	4	0.0%	65	0.4%	0	0.0%	0	0.0%	106
Eptesicus fuscus	20	0.1%	8	0.0%	11	0.1%	31	0.2%	29	0.2%	3	0.0%	3	0.0%	105
Lasiurus cinereus *; **	10	0.1%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	10
Eumops perotis **	0	0.0%	8	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	8
Lasiurus xanthinus **	1	0.0%	0	0.0%	1	0.0%	3	0.0%	1	0.0%	0	0.0%	0	0.0%	6
*Corynorhinus townsendii *; **	4	0.0%	0	0.0%	0	0.0%	0	0.0%	1	0.0%	0	0.0%	0	0.0%	5
Antrozous pallidus **	0	0.0%	0	0.0%	0	0.0%	4	0.0%	0	0.0%	0	0.0%	0	0.0%	4
Unidentified	3,647	22.0%	181	1.1%	106	0.6%	142	0.9%	478	2.9%	126	0.8%	619	3.7%	5,299

* Species not present on the original list of bats expected to be present in the Phoenix metropolitan region.

** Species eliminated after data standardization.

I used the standardized response variables (number per hour) for bat activity, foraging activity, and species richness to examine predictor-response variable relationships. Six species and two myotis groups were retained after standardization (Table 5). Species richness per hour, included the detection of individual species and myotis groups, but the individual species/myotis groups were not modeled individually. Thus, the species/myotis groups rates reflect patterns of bat activity per cover type. The average number of call sequences per hour for identified species/myotis groups for all cover types were: 1) canyon bat (3.24/hour), 2) 50 kHz myotis (1.27/hour), 3) Mexican free-tailed bat (0.22/hour), 4) 40 kHz myotis (0.10/hour), 5) big brown bat (0.03/hour), and 6) pocketed free-tailed bat (0.01/hour). We restricted all further analyses reported in this paper to those species and myotis groups (Table 5).

Table 5 Standardized response variables (number per hour) for bat activity, foraging activity, and species richness recorded per cover type in the Phoenix metropolitan region (May to October 2010). Species richness per hour includes the detection of individual species and myotis groups, but the individual species and myotis groups were not modeled individually. All bats below were on the original list of expected species to be within the metropolitan area.

	Cover type						
Response variable/hour	Water	Native vegetation	Agriculture	Vacant land	Cultivated grass	Residential	Commercial
Bat activity	16.15	0.88	1.23	3.13	13.44	7.62	1.00
Feeding buzzes	2.20	0.02	0.07	0.15	2.81	0.90	0.04
Species richness	0.42	0.17	0.14	0.31	0.61	0.23	0.06

	Cover type						
Taxon call sequences/hour	Water	Native vegetation	Agriculture	Vacant land	Cultivated grass	Residential	Commercial
Parastrellus hesperus	5.84	0.52	0.90	2.62	5.72	7.05	0.01
50 kHz myotis	2.72	0.01	0.00	0.01	6.13	0.00	0.00
Tadarida brasiliensis	0.44	0.19	0.17	0.10	0.16	0.20	0.26
40 kHz myotis	0.50	0.02	0.00	0.05	0.16	0.00	0.00
Eptesicus fuscus	0.03	0.00	0.00	0.08	0.06	0.00	0.00
Nyctinomops femorosaccus	0.00	0.03	0.01	0.00	0.03	0.00	0.00

Univariate Model Selection and Variable Multicollinearity

For the response variable bat activity, six predictor variables were retained (Table 6, Table 7). These included one landscape-level metric at the site scale (LPI_180) and five class-level metrics, which were included at both the site scale (AREA_AM_4_180, PLAND_4_180) and the landscape scale (GYRATE_AM_4_3000, GYRATE_AM_6_3000, PLAND_6_3000).

Table 6 Retained predictor variables at the scale of the strongest univariate model use (lowest AICc value), and removal of intercorrelated variables for bat activity, foraging activity and species richness recorded across sampling sites in the Phoenix metropolitan region (May to October 2010). Cover/class codes: 3 = golf courses (cultivated grass), 4 = water, 6 = natural vegetation, 7 = commercial.

Response variable	Predictor variable	Predictor variable abbreviation/ cover code/scale	Univariate P-value
Bat activity	Largest patch index at the site scale	LPI_180	0.026
	Area-weighted mean patch area of water at the site scale	AREA_AM_4_180	0.004
	Correlation length of water at the landscape scale	GYRATE_AM_4_3000	0.057
	Correlation length of natural vegetation at the landscape scale	GYRATE_AM_6_3000	0.059
	Percentage of the landscape occupied by water at the site scale	PLAND_4_180	0.004
	Percentage of the landscape occupied by natural vegetation at the landscape scale	PLAND_6_3000	0.080
Foraging activity	Patch density at the site scale	PD_180	0.004
	Correlation length of water at the landscape scale	GYRATE_AM_4_3000	0.020
	Largest patch index of water at the site scale	LPI_4_180	0.063
Species richness	Area-weighted mean patch area of commercial at the site scale	AREA_AM_7_180	0.063
	Correlation length of golf courses at the site scale	GYRATE_AM_3_180	0.003
	Largest patch index of golf courses at the home range scale	LPI_3_1500	0.007
	Percentage of the landscape occupied by water at the site scale	PLAND_4_180	0.069

For the response variable foraging activity, three variables were retained (Table 6, Table 7). These included one landscape-level metric, patch density at the site scale (PD_180), and two class-level metrics, one at the site scale (LPI_4_180), and one at the landscape scale (GYRATE_AM_4_3000).

For the response variable species richness, four variables were retained (Table 6; Table 7). These included only class-level metrics. The retained class-level metrics were quantified primarily at the site scale (AREA_AM_7_180, GYRATE_AM_3_180, PLAND_4_180), with only one variable at the home range scale (LPI_3_1500).

Table 7 Metrics tested as predictors of change in bat activity, foraging activity and species richness, respectively. Metrics and abbreviations, metric levels, landscape pattern category and metric descriptions are shown. Descriptions are per McGarigal et al. (2013). Metrics were computed using FRAGSTATS 4.0 (McGarigal et al. 2013).

Landscape-level variable	Category	Description
Patch Density (PD)	Configuration	Number of patches in the landscape per unit area.
Largest Patch Index (LPI)	Configuration	Percentage of the total landscape area comprised by the largest patch. A simple measure of dominance.
Class-level variable	**Category**	**Description**
Percentage of the landscape occupied by a patch (PLAND)	Composition	Percentage of the landscape occupied by the corresponding patch.
Largest patch index of a patch (LPI)	Configuration	Percentage of the total landscape area comprised by the largest patch of the corresponding patch. A simple measure of dominance.
Area-weighted mean patch radius of gyration (GYRATE AM)	Configuration	Also known as correlation length, measures the average distance one can move from a random starting point/pixel and traveling in a random direction without leaving the corresponding patch. A measure of broad connectivity.
Area-weighted mean patch area (AREA AM)	Configuration	Measures the expected size of a patch when selecting a random point/pixel.

All-Subsets Modeling

Bat Activity

There were 14 models within 4 AICc units of the lowest AICc model predicting bat activity. There was universal consistency in the sign of the coefficient of each variable across all included models, indicating stability in parameter estimation with variable interaction. The final averaged model of the selected model set showed that the correlation length of natural vegetation at the landscape scale (GYRATE_AM_6_3000) and largest patch index at the site scale (LPI_180) were the most important variables (Table 8). The final averaged model indicated call sequences per hour detected at each site increased with the correlation length of natural vegetation at the landscape scale (GYRATE_AM_6_3000), the patch size and the extent of water at the site scale (AREA_AM_4_180, PLAND_4_180), the correlation length of water at the landscape scale (GYRATE_AM_4_3000), and decreased with the largest patch index at the site scale (LPI_180), and the total extent of natural vegetation at the landscape scale (PLAND_6_3000; Table 8). Bat activity was predicted to be highest along major waterways that spanned the study area, and high in regions with a high density of smaller water bodies (Figure 5).

Table 8 Final averaged models to predict per hour values (i.e., model averaged coefficients for all subsets modeling) for bat activity, foraging activity and species richness detected across sampling sites within the Phoenix metropolitan regions (May to October 2010), and the variable importance values for each predictor variable. The landscape and site scale are the dominant scales for bat activity and foraging activity. The site scale is the dominant scale for species richness. Overall, class-level and configuration metrics were the most common metrics retained. Cover/class codes: 3 = cultivated grass (golf courses), 4 = water, 6 = natural vegetation, 7 = commercial.

Scale	3000 m		1500 m		180 m	
Response variable	Predictor variable	Variable importance [a]	Predictor variable	Variable importance [a]	Predictor variable	Variable importance [a]
Bat activity	GYRATE_AM_6 [c] (0.012838)	1.00			LPI [b] (-0.18375)	1.00
	PLAND_6 [c] (-0.30355)	0.37			AREA_AM_4 [c] (7.057923)	0.60
	GYRATE_AM_4 [c] (0.003459804)	0.23			PLAND_4 [c] (0.58816)	0.30
Foraging activity	GYRATE_AM _4 [c] (0.002117)	1.00			PD [b] (0.015005)	1.00
					LPI_4 [c] (0.05593)	0.22
Species richness			LPI_3 [c] (0.064889)	0.28	PLAND_4 [c] (0.017945)	1.00
					GYRATE_AM _3 [c] (0.004604)	0.80
					AREA_AM_7 [c] (-0.02988)	0.37

[a] The summed Akaike weight for the predictor variable, that is, the individual importance of each variable independently. For example, GYRATE_AM_6_3000 with a parameter weight of 1.00, is interpreted as aspects of the correlation length of native vegetation (cover type = 6) at the landscape scale (3000 m) has a 100% probability that it plays a role in determining predicted patterns of bat activity, relative only to the best model. Conversely, GYRATE_AM_4_3000 with an importance variable of 0.23, is interpreted as having a 20% probability that it plays a role in determining patterns of bat activity relative only to the best model.

[b] Landscape-level metric.

[c] Class-level metric.

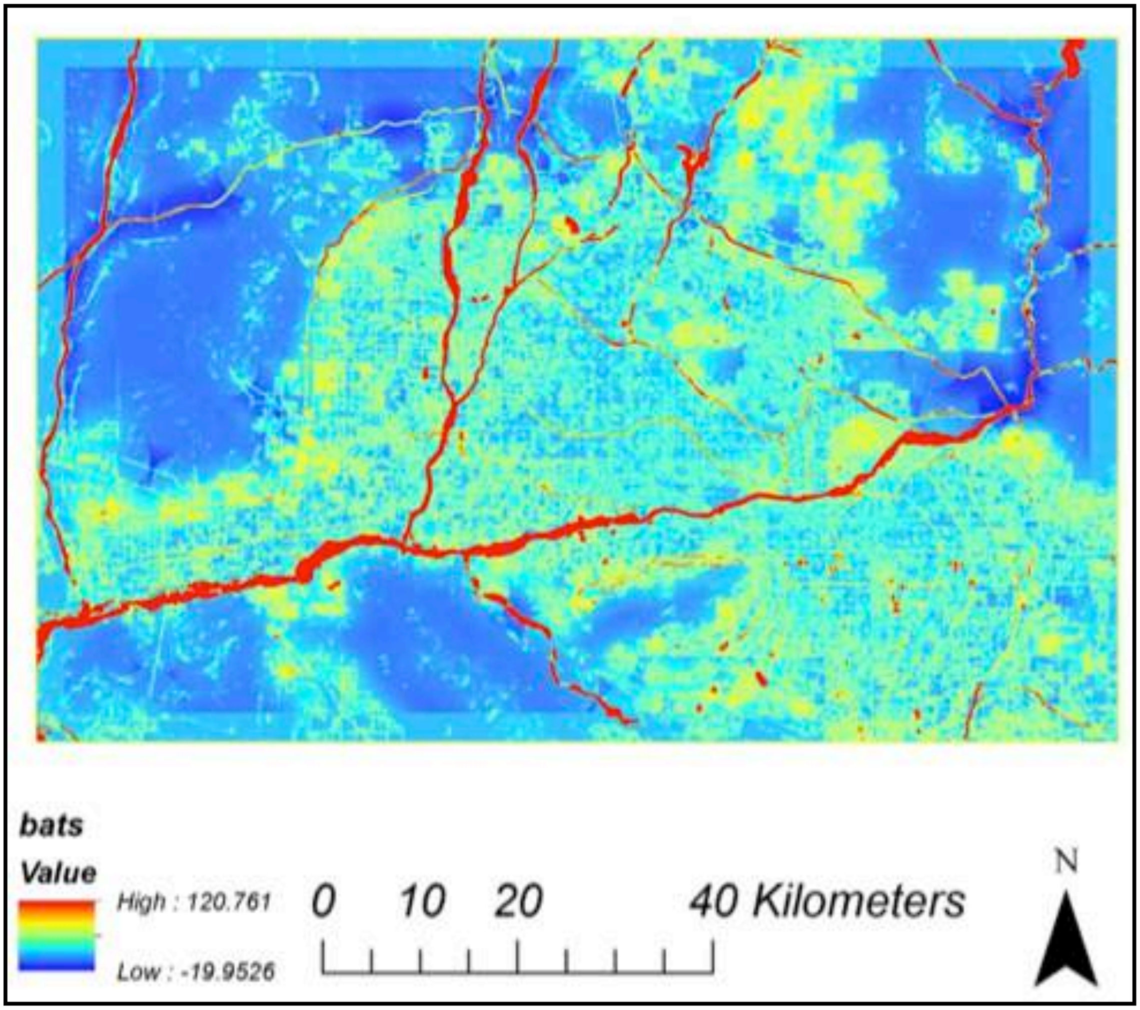


Figure 5 Predicted values for call sequences detected per hour (bat activity) across the Phoenix metropolitan region (May to October 2010).

Foraging Activity

There were two models within 4 AICc units of the lowest AICc model predicting foraging activity. The final averaged model of the selected model set showed that the correlation length of water at the landscape scale (GYRATE_AM_4_3000), and patch density of all patches at the site scale (PD_180) were the most important variables (Table 8). The final averaged model indicates feeding buzzes per hour increased with the extensiveness of water at the landscape scale (GYRATE_AM_4_3000), patch density of all patch types at the site scale (PD_180), and the largest single patch of water at the site scale (LPI_4_180) (Table 8). Foraging activity was predicted to be highest surrounding large watercourses that span the study area, and in regions of the landscape with a high density of smaller water bodies, and high landscape heterogeneity (Figure 6).

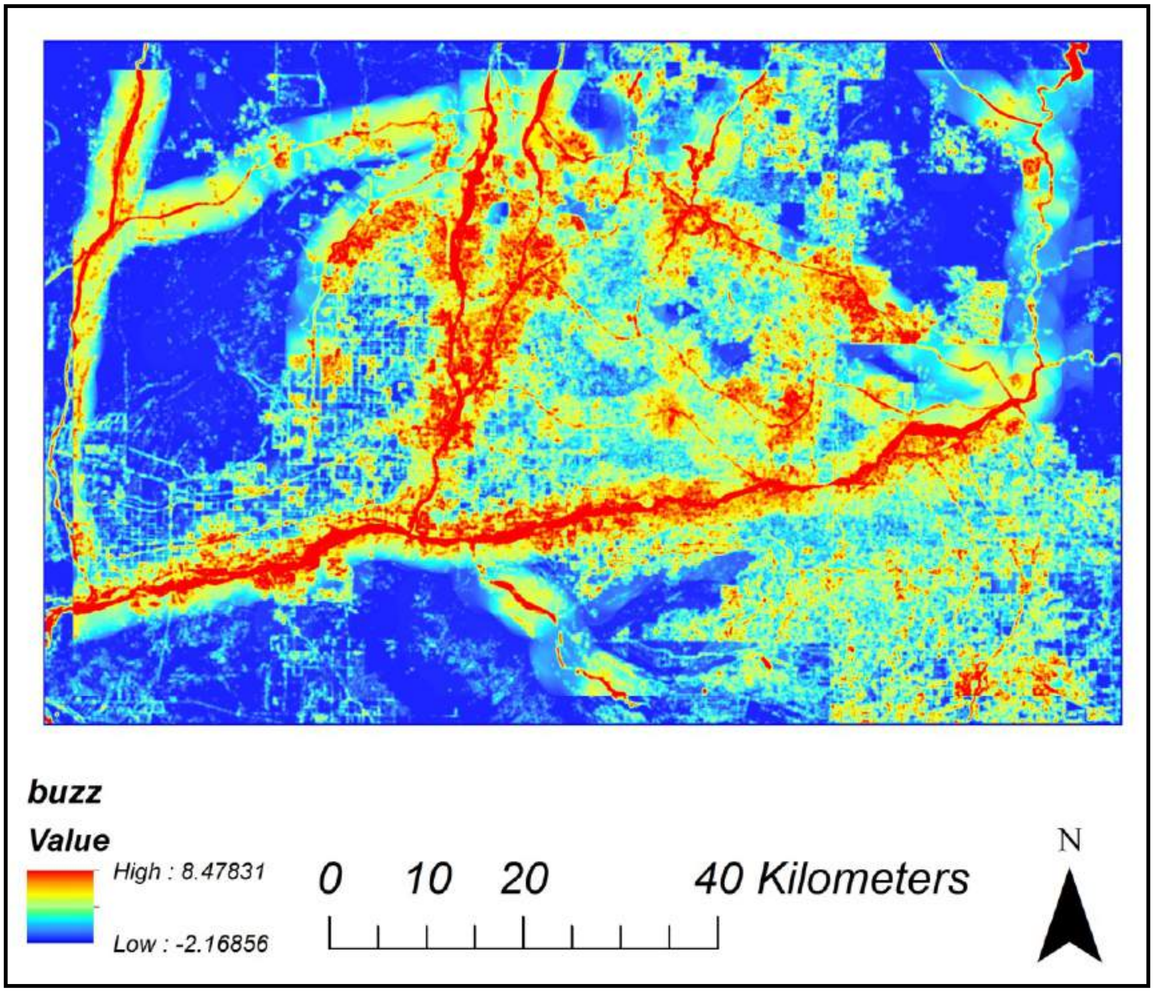


Figure 6 Predicted values for feeding buzzes detected per hour (foraging activity) across the Phoenix metropolitan region (May to October 2010).

Species Richness

There were five models within 4 AICc units of the lowest AICc model that predicted species richness. Species richness included both presence of species and myotis groups. There was universal consistency in the sign of the coefficient of each variable across all included models, indicating stability of parameter estimation with variable interaction. The final averaged model of the selected model set showed that the extent of water at the site scale (PLAND_4_180) was the most important variable, followed by the correlation length of golf courses (cultivated grass) at the site scale (GYRATE_AM_3_180) (Table 8). The final averaged model indicated the number of species detected per hour increased with the extent of water at the site scale (PLAND_4_180), the correlation length of golf courses (cultivated grass) at the site scale (GYRATE_AM_3_180), and the largest patch of golf courses (cultivated grass) at the home range scale (LPI_3_1500) (Table 8). In contrast, species richness at each site decreased with the size of commercial areas at the site scale (AREA_AM_7_180). Species richness was predicted to be highest along the major waterways that span the study area, and at several isolated patches corresponding to large golf courses with ponds. In contrast, species richness is predicted to be very low in commercial areas with little surface water (Figure 7).

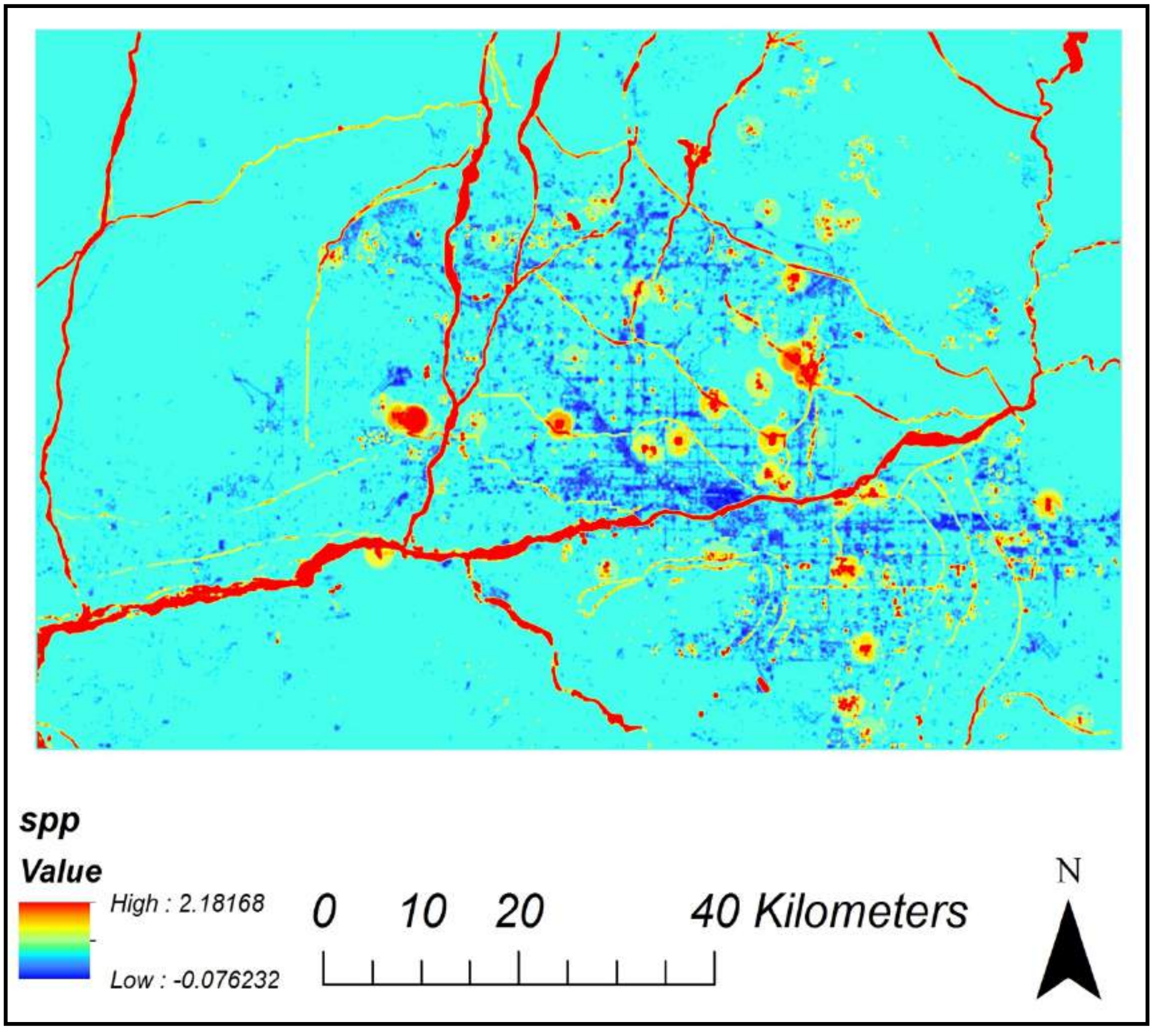


Figure 7 Predicted values for the number of species (species richness) detected per hour across the Phoenix metropolitan area (May to October 2010).

Discussion and Conclusions

Landscape-Level versus Class-Level Metrics

My results showed that bat activity, foraging activity, and species richness in the Phoenix metropolitan region were correlated mainly with class-level, not landscape-level, pattern metrics. The only landscape-level metric that had a strong influence on bat foraging activity at the site scale was patch density, which indicated fine-scale landscape fragmentation. All commonly used class-level metrics, except the percentage of the landscape occupied by a patch, were configuration metrics (McGarigal et al. 2013). In my study, the selected class-level metrics measured the size, shape, connectivity, and distributional pattern of potential bat habitat, individually. Because landscape-level metrics focused on the general pattern of the entire urban mosaic, they combined all land cover types, and did not consider the spatial attributes and relationships of patches. Consequently, if a species responds mainly to the pattern of habitat patches, not the pattern of all patches, then landscape-level metrics are less useful for understanding the species-habitat relationship. My study suggests that this seems the case for bats.

The only class-level composition metric, the percent of the landscape occupied by water, had a strong influence on species richness at the site scale. Numerous studies of birds have suggested total habitat area (an aspect of landscape composition) was more influential than habitat fragmentation per se (an aspect of landscape configuration) (Cushman and McGargal 2003, Hostetler and Knowles-Yanez 2003, Litteral and Wu 2012). The usefulness of class-level configuration metrics were consistent with the findings of Chambers et al. (2016), the first formal effort to explore scales at which different categories of landscape metrics were most associated with bat species occurrence. Overall, Chambers et al. (2016) found that habitat configuration at broad and fine scales (1000 m and 100 m, respectively) influenced bat occurrence for several species representing a diverse range of feeding guilds in tropical forests of Nicaragua. Patch density at both the landscape-level and the class-level outperformed all other variables to explain patterns of bat occurrence across all species (Chambers et al. 2016).

Specifically, Chambers et al. (2016) found that aerial insectivores were more frequently captured in areas with a high density of open canopy forest patches (measured by class-level patch density), than in extensive areas of closed canopy forests (Chambers et al. 2016). Also, habitat configuration at broad and fine scales (1000 m, 900 m, and 300 m, 200 m) influenced the occurrence of aerial insectivores. Chambers et al. (2016) concluded that even small forest fragments had high conservational values for this feeding guild (Chambers et al. 2016).

Similarly, Mendes et al. (2016) found that configuration metrics best explained patterns of activity for two bat foraging guilds in a heterogeneous landscape in Portugal. Specifically, at broader scales (6000 m and 3000 m) high patch density of the landscape (measured by landscape-level patch density) was positively correlated to open-habitat foraging activity. In contrast, edge-habitat foraging activity had a weak, positive relationship with landscape patch density, but had a strong positive relationship to the total amount of edge habitat across the landscape (Mendes et al. 2016). Areas with a diversity of small interspersed patches seemed to provide required resources near each other, and greater access to those resources. Cushman and McGargal (2003) found that forest birds have also been shown to have a positive relationship to areas of landscape habitat diversity.

The results of Chambers et al. (2016) and Mendes et al. (2016) suggest that the complementation of resources (i.e., resources in close proximity to each other) is an important attribute of landscape pattern for some bats. Patch density holds promise as an intuitive configuration metric to identify foraging habitat, and possibly to explain the habitat use of other taxa (Chambers et al. 2016, Mendes et al. 2016). Metrics that provide areas of conservation overlap are of great value to wildlife managers (Chambers et al. 2016).

Urban landscapes by nature are highly fragmented where changes in landscape pattern tend to increase the complexity of patch shape, and the diversity of patches and edges, but not in all cases. These findings are important because the use of metrics that are relevant to bat is an important initial component to conduct for studies of bat habitat use in urban landscapes, and to inform conservation strategies. The results of my study indicated that in general, class-level configuration metrics were effective for studying bat activity, foraging activity and species richness in changing urban landscapes. These results corroborate other studies, and provide new insights into how landscape pattern affects the behavior and ecology of bats in urban environment.

Effects of Landscape Pattern on Bat Activity

All class-level metrics retained for bat activity quantified the extent and extensiveness of water at the landscape and the site scale, and the extent and extensiveness of natural vegetation at the landscape scale. Native vegetation remnants corresponded to mountain preserves was the most important variable to predict values of bat activity at the landscape scale, but there was no relationship with foraging activity or species richness. In contrast, the extent of native vegetation at the landscape scale corresponded to large patches of open desert at the city periphery negatively influenced predicted values of bat activity. Mountain preserves have a more complex patch shape that extends across the landscape versus the composition of large patches of desert habitat at the city periphery.

Possible functions of the mountain preserves are: orientation cues, and increased edge habitat for movement, increased prey abundance, increased vegetation cover, and the availability of roosting habitat for bats that use rock crevices or require roosts that are high enough to get proper lift (e.g. canyon bat, Yuma myotis/50 kHz myotis, and pocketed free-tailed bat) (Table 3). The importance of mountain preserves was not limited to its immediate vicinity. This suggests that available foraging and roosting habitat (primarily determined by the immediate habitat quality) explains part of the importance of this variable. The remnant mountain preserves may also provide connectivity across the landscape that are used for orientation cues, and for ease of movement across the urban matrix. Bats are known to travel along edge vegetation (favored for low energetic cost of movement and cover from predators), and the conservation value of remnant vegetation for bats in urban landscapes has been well documented (Verboom and Huitema 1997, Gehrt and Chelsvig 2004, Duchamp and Swihart 2008, Ethier and Fahrig 2011, Luck et al. 2013). The mountain remnants would be useful for bats that commute long distances to access dispersed resources (e.g., Mexican free-tailed bat), and bats with lower mobility that roost in mountain habitat near water (e.g. the canyon bat), bats that were abundant in the study area and in this cover type. This finding is important because the remnant mountain preserves allow bats to access resources in this dispersed urban landscape – that spans approximately 2.4 million hectares (Wu et al. 2011).

The map of the study area, showed bat activity was predicted to be highest along riverbeds and reaches of the canals, and areas with a high density of smaller water bodies (Figure 5). Water is very important for bats in this region because bats require drinking water to replenish water body loss in the hot arid conditions, and the availability of surface water is subject to drought in the outlying desert habitat (Rabe and Rosenstock 2005, Tuttle et al. 2006, Adams and Hayes 2008). Additionally, bats are correlated with riparian areas and rivers that provide concentrations of prey (Ober and Hayes 2008, Hagen and Sabo 2011, 2012, Lintott et al. 2015), flyways and orientation cues for some bats (Ober and Hayes 2008, Hagen and Sabo 2011, Rainho and Palmeirim 2011). The availability of water and the diversity of water conditions may increase in urban desert cities compared to outlying desert habitat. Possible functions of the diversity of water conditions are: orientation cues, edge habitat and linear structures for ease of movement (e.g., reduced energetic costs) through the urban matrix, increase echolocation clarity, foraging habitat, drinkable water, and protection from predators and wind (Verboom and

Huitema 1997, Duff and Morrell 2007, Limpert et al. 2009, Lintott et al. 2015). Other studies have also shown some bats prefer to travel along edge habitat and linear structures including hedges, trails and urban waterways (Verboom and Huitema 1997, Duff and Morrell 2007, Limpert et al. 2009, Lintott et al. 2015).

These findings are surprising because the dispersed urban landscape of the metropolitan region, should impede movement into urbanized areas, even for volant bats, due to the city's size and extensiveness. My results suggest riverbeds and reaches of canals are important landscape features that provide foraging and roosting habitat (e.g. bridges and flood tunnels), drinkable water, and act as corridors of movement to access other resources, functioning in a similar manner as riparian areas (Roach et al. 2008, Hagen and Sabo 2012, Lintott et al. 2015). It is not surprising that the riverbeds are areas of high activity because they were areas of historical use by bats prior to urbanization and alteration of hydrologic regimes (Roach et al. 2008, Hagen and Sabo 2012).

However, high bat activity along the canals is a surprising finding because they are a neglected urban landscape features with low native or ornamental vegetation, and in some reaches, act as barriers impeding the movement of bats and other wildlife (Roach et al. 2008, Lintott et al. 2015). In Britain, Lintott et al. (2015) found that urban waterways have the potential to provide foraging habitat, but the lack of vegetation limited their use by bats. However, in the arid region of the southwestern US, water is a limiting factor for most desert-dwelling bats. Therefore, the canals are important urban waterways for most bats. Restoration of riverbeds and enhancement of canals with increased vegetation and access will be important strategies for bat conservation and benefit other wildlife.

Effects of Landscape Pattern on Foraging Activity

Patch density at the site scale was one of the most important variables to predict foraging activity, and the only landscape-level metric retained. All class-level metrics retained for foraging activity (third order, Johnson 1980) quantified the extensiveness of water at the landscape scale, the size of water at the site scale. Highest predicted values of foraging activity again, are along the riverbeds and canals, and in regions with a high density of smaller water bodies, but also in areas of high heterogeneity (i.e., fine scale fragmentation). Areas of high heterogeneity corresponded to areas that surrounded watercourses and small waterbodies in the study area, some of which corresponded to golf courses with water hazards. Fine scale fragmentation, that is, many small, interspersed patches of habitat, increased the complementation of resources at the site scale (i.e., prey abundance, water, vegetation, and possibly roosting habitat). Through the process of fragmentation bats have increased access to available resources. My results suggest that bat activity alone underestimated available habitat. This finding is important because conservation efforts based solely on bat activity may underestimate foraging habitat and potentially roosts that are near foraging habitat. Like bat activity, the landscape scale and the site scale were the dominant scales for predicted foraging activity.

Interestingly, studies that measured feeding buzzes tended to be in urban landscapes (Avila-Flores and Fenton 2005, Hourigan et al. 2006, Threlfall et al. 2012a, Silva de Araújo and Bernard 2016). But the examination of feeding buzzes seemed to be lacking in studies of natural landscape, even when foraging activity was the focus (Ober and Hayes 2008, Hagen and Sabo 2012). This suggested that feeding buzzes may be more frequently detected in urban than natural landscapes; and bat activity alone underestimated available habitat use. Possible explanations for higher frequency of detected feeding buzzes in urban landscapes are that the abundance of water and vegetation to support higher concentrations of prey and the longer availability of abundant prey due to increased NPP in arid urban landscapes (Avila-Flores and Fenton 2005, Hourigan et al. 2006, Buyantuyev and Wu 2008, Goddard et al. 2010). This finding is important because conservation efforts based solely on bat activity may underestimate available bat habitat.

Furthermore, in Australia Threlfall et al. (2012a) found insect biomass alone did not explain increased detection of feeding buzzes (the only response variable examined), suggesting other factors such as availability of roosting habitat may affect feeding buzz rates in an urban landscape. In Mexico, Avila-Flores and Fenton (2005) found that feeding buzzes were not positively correlated with insect biomass, but that bat activity and the number of taxa were positively correlated to insect biomass. Avila-Flores and Fenton (2005) found that feeding buzzes were detected more often in illuminated open areas and large parks compared to small parks and residential areas, and feeding buzzes were detected more often in illuminated open areas compared to natural areas. However, values of insect biomass may be inflated in illuminated areas due to the light source.

Possible explanations for predicted patterns of foraging activity within the study area are the availability of prey, water, and vegetation, but it is not clear if there is a relationship between frequency of feeding buzz detection in urban landscape versus natural landscapes, and such conclusions are beyond the scope of this study. This is however, an important first step to identify patterns of predicted detected feeding buzzes, but the mechanism driving the patterns warranting further research.

The riverbeds and canals, although neglected landscape features lacking vegetation cover and diversity compared to riparian areas, do appear to function in a similar manner for some bats connecting a network of prime foraging habitat across the metropolitan area. Thus, building on the findings of this study for predicted bat activity, the extensiveness of native vegetation fragments and the linear nature of waterways, together with the correlation of bats with riparian areas, suggest that these landscape features may be potential important linkages and corridors of movement to access fine scale fragmented areas commensurate with foraging habitat (e.g. abundance of prey, vegetation, and water) within the metropolitan region. Since the availability of foraging habitat is determined by the abundance of bats, the current study identified landscape scale factors and site scale factors that potentially influence the use of foraging habitat. At the landscape scale, movement constrains access to foraging habitat. At the site scale, bats make decisions on where to forage most likely based on the availability and size of water sources, suggesting either prey abundance over water or water that provides vegetation for prey abundance or a combination these two factors are driving predicted fine scale foraging activity. Therefore, water sources and associated vegetation should be key areas of consideration to minimize the negative effects of the surrounding urban matrix on the bats.

The results of this study are consistent with other multi-scaled studies showing broad scale activity is most likely influenced by landscape structure (Gehrt and Chelsvig 2003, Gorresen et al. 2005, Johnson et al. 2008, Ober and Hayes 2008, Limpert et al. 2009, Ethier and Fahrig 2011, Dixon 2012, Ducci et al. 2015, Chambers et al. 2016, Charbonnier et al. 2016, Lintott et al. 2016, Mendes et al. 2016). These same studies also showed at fine scales the complementation of resources, and is a possible factor that influences the positive response of bats to fragmented landscapes (Gehrt and Chelsvig 2003, Gorresen et al. 2005, Johnson et al. 2008, Ober and Hayes 2008, Limpert et al. 2009, Ethier and Fahrig 2011, Dixon 2012, Ducci et al. 2015, Chambers et al. 2016, Charbonnier et al. 2016, Lintott et al. 2016, Mendes et al. 2016).

Effects of Landscape Pattern on Species Richness

The only class-level composition metric retained for species richness is the percent of the landscape occupied by water (PLAND) which had the strongest influence, all other retained metrics were class-level configuration metrics. The highest predicted number of bat species in the metropolitan area was along the riverbeds and canals, and at several isolated patches, that correspond to large golf courses, most similar to the results for predicted values of foraging activity. Conversely, bat species richness is predicted to be low in commercial areas with little surface water.

I found golf courses had a strong influence on predicted patterns of species richness, but no influence on bat activity or foraging activity. Golf courses were the only water-rich cover type that had a strong positive influence on predicted values of species richness, other than water cover types. The greater shape complexity of golf courses at the site scale provides increased edge habitat that bats are known to favor for movement and foraging activity and the characteristic design of golf courses is commensurate with prime foraging habitat (Verboom and Huitema 1997, Duff and Morrell 2007).

The dominant scale for species richness is the site scale, indicating the majority of bat species are mostly likely making decisions to forage in golf courses due to concentrations of prey or other factors such as roosting habitat. I found that high predicted foraging activity were in areas with a high density of small water bodies. Some of those water bodies corresponded to large golf courses with ponds. But, unlike predicted values of foraging activity, predicted species richness included the totality of the golf course in which the water source was located. My result clearly showed that the examination of each response enhanced how bats respond to urban landscape patterns.

The percentage of the total landscape area dominated by golf courses at the home range scale suggested that, for some bats, the landscape configuration of golf courses constrains access to the complementation of habitat provided by golf courses (Ethier and

Fahrig 2011), but decisions on where to forage for the majority of bats selecting golf courses are primarily determined by the quality of the immediate habitat. Golf courses provide a variety of foraging conditions (edge habitat, water, open areas and edge vegetation) that could be used by bats with varying foraging and commuting strategies. For example, the Mexican free-tailed bat, a fast flyer that has low energetic costs of flight are adapted for long commutes, and forages in more open habitats. Compared to the canyon bat, Arizona's smallest bat with a small linear home range (second order) that prefers to roost near water and fly along edge vegetation or man-made linear structures to avoid being blown off course to reduce the high energetic cost of flight (Table 3). Moreover, the maintained ground conditions at golf courses means vegetation stays greener for longer periods of time, and so does the corresponding abundance of prey. Therefore, golf courses may provide sustained areas of prime foraging habitat that are selected by more species.

I found only one published source that examined the explicit uses of golf courses by bats (Threlfall et al. 2016). Threlfall et al. (2016) examined 39 urban green spaces including golf courses, public parks and residential neighborhoods in Australia to assess the efficacy of common vegetation management strategies and their impact on urban bird and bat communities. Threlfall et al. (2016) found both bird and bat species richness increased with the proportion of native plants. Bird species richness increased with the amount of understory vegetation and bat activity increased with large tree density, in particular native trees (Threlfall et al. 2016). Threlfall et al. (2016) concluded vegetation management approaches that increased the abundance of native vegetation and understory vegetation including the retention of large trees, typically removed as hazards, are practical vegetation management approaches that improve green spaces for urban birds and bats.

Studies that examine urban parks, modestly comparable to the park-like conditions of golf courses, and the availability of bat habitat resources show urban parks were utilized by a few species suggesting the utility of urban parks to provide improved conditions for bat communities (Kurta and Teramino 1992, Avila-Flores and Fenton 2005, Loeb et al. 2009). Loeb et al. (2009) concluded that large parks have the greatest value due to species-area relationships, but small parks have more unique species indicating that urban parks may play an important role as refuges for bats within the urban landscape (Loeb et al. 2009). High predicted species richness in golf courses is a major finding because it suggests golf courses are a novel cover type for bat conservation and may play an important role as stop overs or refuges for rare or elusive bats within the urban landscape with access prime foraging habitat, drinking water and potential roosting habitat.

Vulinec (2014) examined bat habitat use of micro-habitat characteristics of golf courses in Delaware and found tall, maintained canopy habitat on golf courses had seven times more activity than the most undisturbed habitat, and tall, natural canopy and ponds had the second highest amount of activity (Ogale 2001, Vulinec 2014). High bat activity in the maintained high canopy areas (maintained for golf cart transit) was explained by an interaction of both cover from predators and a clear flying corridor (Ogale 2001, Vulinec 2014). Additionally, in 2014 the Florida bonneted bat (*Eumops floridanus*), was discovered foraging on a golf course in Florida (US Fish and Wildlife Service 2014). Limpert et al. (2009) in Maryland found one radio tagged female Eastern red bat (*Lasiurus borealis*) consistently foraged in a golf course adjacent to state park land. The results of these studies and mine reveal golf courses as unlikely hotspots for bat species richness, globally serving as stop-overs or refuges for rare or elusive bats (Limpert et al. 2009, Loeb et al. 2009, Threlfall et al. 2016).

In contrast, I found species richness is predicted to decrease with the size of commercial areas at the site scale with moderate influence (40% probability) on predicted values. This was the only finding that indicated a negative relationship between urbanization and habitat use. Studies show species richness and overall activity tend to decline in highly urbanized cover types (Kurta and Teramino 1992, Hourigan et al. 2006, Hourigan et al. 2010, Threlfall et al. 2012b, Luck et al. 2013). In contrast, (Gehrt and Chelsvig 2003, 2004) found species richness was correlated with highly urbanized area, and concluded that the urban area with forested fragments, acted as islands of suitable habitat within an agricultural dominated landscape, areas that lacked suitable trees/habitat for clutter-adapted species. As with my study the context of the landscape is a factor that determines the response of bats to urban landscape pattern (Gehrt and Chelsvig 2003).

The trend among the current body of research showed overall bat activity and species richness decline in areas of high urbanization (e.g., commercial and industrial areas), but bat activity and species richness does not increase with decreasing urbanization, but rather increased in cover types that provide required resources (Duchamp and Swihart

2008, Hourigan et al. 2010, Luck et al. 2013). My results support this trend and indicate the availability of water was the most important factor that influences bat habitat use in my study area. Unfavorable conditions within commercial cover types are best explained by little surface water. However, other factors such as increased impermeable surface, lack of vegetation to support prey abundance, and if surface water is present poor water quality due to stormwater run-off contamination. This finding adds to the body of evidence that highly urbanized areas have a negative effect on species richness in urban landscapes, but what causes the response to these patterns are context specific.

Scale Effects

I found that the home range scale had a weak positive influence on bat species richness when golf courses were the dominate cover type at a1500 m radius. These results suggest that the 1500 m captures the minimum spatial extent for bats with smaller home ranges in the study area, like the canyon bat, Arizona's smallest bat, and the Yuma myotis. Thus, the 3000 m scale represents the regional landscape distribution of bat with smaller home ranges. Conversely, the 3000 m scale mostly likely represents the lower limit of the home range scale for some of the bats in the study area. Also, since landscape pattern at the 3000 m scale had a strong influence on bat and foraging activity, this result suggests for some bats many of the required resources may be present within the study area. For some bats like the big brown bat may eliminate the need to commute between natural landscape and urban landscapes. The scales I examined did not capture the home range of bats with larger home ranges, like the Mexican free-tailed bat, and the pocketed free-tailed bat.

Since little is known about bat home ranges and much less is known of the effects of urbanization on bat home ranges, I selected the 1500 m and the 3000 m to elucidate the upper and lower limits of the estimated home range of bats and the regional distribution of bats. This finding is important because I identified a range of broad scales that influence bat activity and foraging activity, and identified the some of the bats that may be influence by landscape pattern at broader scales, and identified the fine scale that is an important scale at which landscape pattern influences bat activity, foraging activity and species richness. This study is a first step to inform future research that will guide bat conservation.

The picture that emerged was that for some bats, bat activity and foraging activity were constrained by the configuration of riverbeds and reaches of the canal, and remnant mountain ranges at the 3000 m scale. These landscape features acted as orientation cues that provided connectivity to areas of fine-scale land cover heterogeneity in golf courses, areas with a high density of small waterbodies, and surrounding watercourse. The number of species detected within the study area was influenced by site scale (180 m) conditions where the availability of water, prey, and roosting habitat most likely affected decisions on where to forage.

The Effects of Water

Water had a strong influence across all three response variables. In the hot arid climate of Arizona, the surface water is limited, therefore, water may impose additional constraints on habitat use for insectivorous bats (Rabe and Rosenstock 2005, Tuttle et al.

2006, Ethier and Fahrig 2011, Hagen and Sabo 2012). It is not surprising that water is an important factor that influences bat habitat use, as drinking water is a habitat requirement. However, even in an urban environment where the availability and diversity of suitable water sources may increase, water remains a limiting factor for bats in the metropolitan area. These findings are important because, in arid desert climates, it can be inferred that for desert-dwelling bats water availability and diversity are of equal, if not of greater importance, than roosting and foraging habitats. Therefore, studies of bats in arid desert climates should put equal emphasis on quantifying the landscape configuration of the diversity of water conditions available within the landscape. The continuous nature of waterways and the correlation of bats with riparian habitat make waterways and urban waterway an important landscape feature in favor of bat activity, foraging activity and species richness.

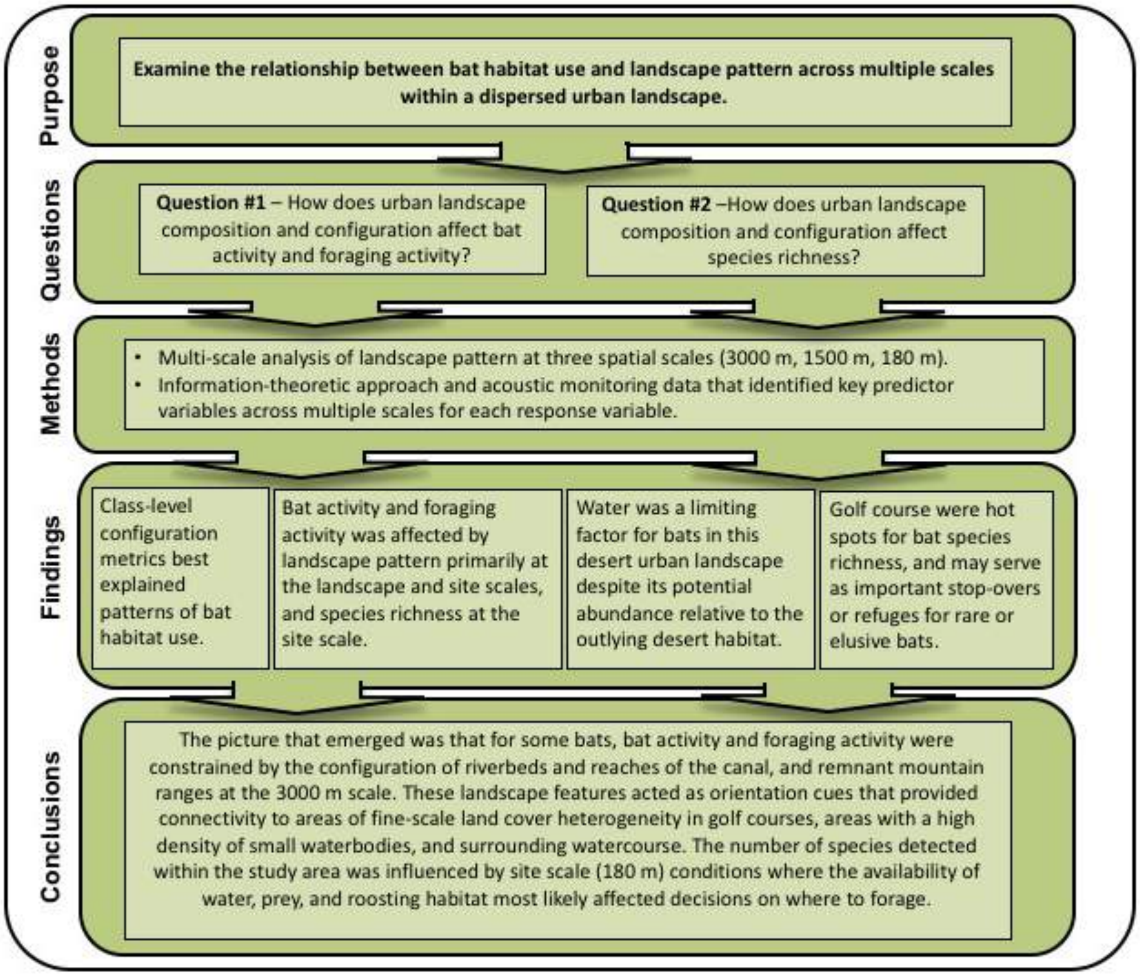
Water was not controlled for in this study so water-rich and water-poor cover types may confound our results. However, our model sets were ranked based on parsimony, and model averaging assessed the effects of water configuration and the effects of water composition independently for each response variable. Additionally, our results showed that not all water-rich cover types had a positive relationship with bat habitat use. For example, high bat activity was predicted in native vegetation remnants, whereas agricultural areas, considered to be a water rich cover type and a habitat that has been shown to be an area of high activity in other regions of the US, was not represented in any of the model sets. For these reasons, the importance of water and the constraint it may impose on desert-dwelling bats in an arid desert urban landscape appears to be appropriately assessed using the I-T approach.

However, caution should be used when making broad generalizations about foraging guild or species-specific habitat use or relative sensitivity to human disturbance due to the variability of species-specific behavior as well as individual variability. Species-specific patterns of habitat use are beyond the scope of the current study.

Other Findings

Several authors show agricultural areas are used by bats and bats provide valued biological pest control (Boyles et al. 2011). I did not find any direct evidence showing habitat use in agricultural areas with the study area. Agricultural land is a water-rich cover type that did not have any relationship with habitat use in the study area. Other studies in North America and in Arizona have shown high activity and species richness in rural/agricultural areas, contrary to the findings of my study (Wolf and Shaw 2002). Perhaps increased pesticide use negatively affected irrigation water as drinking water source and prey abundance factor. In addition to the potential poor water quality, the narrow concrete irrigation channels are less suitable to the majority of bats, except for generalist species like the big brown bat and the Mexican free-tail bat typically associated with agricultural areas (Hinman and Snow 2003).

Quantitative studies in the arid Southwest do not include agricultural areas, so most reported results do not directly examine the suitability of such cover types for bats (Altenbach et al. 2003, Hinman and Snow 2003). Although, agricultural areas may provide an abundance of insects and drinking water, these benefits may be negated by increased pesticides use explaining this cover types absence from our findings (Altenbach et al. 2003, Boyles et al. 2011).



Examine the relationship between bat habitat use and landscape pattern across multiple scales within a dispersed urban landscape.

Question #1 – How does urban landscape composition and configuration affect bat activity and foraging activity?

Question #2 –How does urban landscape composition and configuration affect species richness?

- Multi-scale analysis of landscape pattern at three spatial scales (3000 m, 1500 m, 180 m).
- Information-theoretic approach and acoustic monitoring data that identified key predictor variables across multiple scales for each response variable.

Class-level configuration metrics best explained patterns of bat habitat use.

Bat activity and foraging activity was affected by landscape pattern primarily at the landscape and site scales, and species richness at the site scale.

Water was a limiting factor for bats in this desert urban landscape despite its potential abundance relative to the outlying desert habitat.

Golf course were hot spots for bat species richness, and may serve as important stop-overs or refuges for rare or elusive bats.

The picture that emerged was that for some bats, bat activity and foraging activity were constrained by the configuration of riverbeds and reaches of the canal, and remnant mountain ranges at the 3000 m scale. These landscape features acted as orientation cues that provided connectivity to areas of fine-scale land cover heterogeneity in golf courses, areas with a high density of small waterbodies, and surrounding watercourse. The number of species detected within the study area was influenced by site scale (180 m) conditions where the availability of water, prey, and roosting habitat most likely affected decisions on where to forage.

Figure 8 Final research flow chart.

CHAPTER 3

SYNTHESIS AND CONSERVATION IMPLICATIONS

Major Findings

- Class-level configuration metrics best explained patterns of bat habitat use for all three response variables than landscape-level metrics. Patch density was the only relevant landscape-level metric, and the percentage of the landscape occupied by a patch was the only relevant composition metric.
- Overall, bat habitat use was affected by land use and land cover pattern primarily at the landscape and the site scales. Specifically, landscape pattern influenced bat activity and foraging activity mainly at the landscape and site scale, and bat species richness only at the site scale.
- In the arid urban landscapes of the southwestern US, water is a limiting factor for bats even in urban landscapes where the availability of water may be greater than in outlying native desert habitat.
- Golf courses may serve as important stop-overs or refuges for rare or elusive bats, and provide a novel opportunity for bat conservation. Golf courses had the highest species richness, and included the detection of the uncommon pocketed free-tailed bat.

Future Research

This study provided a first step into the activity patterns of urban bats within the study area and has identified relationships between landscape patterns and habitat use, their scale dependence and important metrics. This study directly answered some of the urban research goal outlined in the Arizona Bat Conservation Strategic Plan (2003), but additional research is needed. Future research should examine species-specific response of bats in this urban setting across multiple scales that are relevant to examined species to build upon the findings of this study. Studies that examine foraging guilds at a range of scales, broader than the scales I examine would be equally useful.

The CAP-LTER is conducting long term studies at the 200 CAP-LTER survey points that includes arthropod abundance and diversity surveys (Faeth et al. 2005). Future research should examine the relationship between bat activity, foraging activity, and species richness to arthropod data at the same 200 survey points I used as a follow up to this study. Since bat occurrence is strongly correlated to arthropod abundance (Kunz et al. 2011), such research will provide insight into predator-prey dynamics in urban landscapes. This research could also test the hypothesis that the frequency of detecting feeding buzzes increases in urban landscapes compared to natural landscapes.

Conservation Implications

Bats can be a useful indicator of ecosystem health in the arid desert climate of the southwest because patterns of occurrence are determined by roosting and foraging habitat, and, as shown by my study, the availability of water. Bats are an important dietary component of medium-sized predators in urban landscapes. For golf courses bats, can be an indicator of environmentally responsibly managed golf courses consistent with both sustainable and economically-beneficial management practices. For example, increased insect abundance with increased pesticide application indicates reliance on pesticides to control insect populations. Reduction of pesticides allows for a balanced approach to insect management that is commensurate with environmentally responsible management and reduced management costs. Synthetic pesticide use in urban landscapes (e.g., crop damage and the suppression of insect borne diseases) has resulted in unintended consequences, that have contributed to the decline of some beneficial insect populations, pesticides entering water supplies, and adverse health risks to humans (Kunz et al. 2011, Woodcock et al. 2016).

In addition to bats, wildlife has also been documented on golf courses, including reptiles, predatory birds and large mammals over natural habitat providing a reliable water source, movement corridors, vegetation cover and opportunistic hunting grounds (Terman 1997, Porter et al. 2005, Tanner and Gange 2005, Yasuda and Koike 2006, Hodgkison et al. 2007, Colding and Folke 2009). For example, Tiger rattlesnakes in the Tucson region were observed as having larger body size and more offspring near golf courses, with overall smaller home ranges, most likely explained by both increased numbers of rodent prey and barriers to movement through the urban matrix (Sullivan et al. 2013). The role of golf courses to provide refuge for urban biodiversity has been the focus of some studies (Porter et al. 2005, Tanner and Gange 2005, Yasuda and Koike 2006, Hodgkison et al. 2007, Colding and Folke 2009), and practices that benefit birds can also benefit bats such as snag retention, reduced pesticides and artificial roosts (Threlfall et al. 2016). The Audubon Cooperative Sanctuary Program for Golf Courses is an example of an international initiative that to promote environmental stewardship, conservation of biological diversity, and sustainable resource management through education and assistance (Audubon International 2014).

Golf courses are rejected by some people in arid climates for the amount of water, or perceived amount of water, needed to maintain the park-like conditions and for the long-term use of pesticides. My findings encourage environmentally responsible management of golf courses, including maintaining golf course characteristics, retain mature trees, and planting native vegetation. These sustainable practices should reduce some of the maintenance costs that will encourage golf course participation, and provide positive public relation opportunities to encourage community ownership.

New water practices in the metropolitan area ensures that the majority of water used by golf courses is reclaimed water, reducing the conflicts with resource conservation, habitat conservation and public perception. As the popularity of the game wanes golf courses are an increased source of residential expansion. At the landscape scale golf courses should be factored into land use planning and valued as important habitat for diverse range of wildlife. When golf courses are considered for residential expansion, ecosystem processes and services benefiting both biodiversity and humans should be factored into the goals of the desired culture of residential development. Golf course management can incorporate landscaping practices that retain mature trees, planting native vegetation, reduce pesticide use, and maintain golf course characteristics. Additionally, I recommend former golf courses should be preserved as green spaces for wildlife and recreational use. This study shines new light on the novel benefits of golf courses to bat species richness, urban biodiversity and the surrounding urban community.

Similarly, canals in the metropolitan area are a neglected cover type lacking vegetation, not typically considered to be useful habitat for bats or wildlife. My results showed opportunities to increase their value for bats and wildlife by planting native trees and mature trees. This should be an integral component of land-use planning for the city (Ellin et al. 2009, Lintott et al. 2016). Also, the examination of other novel urban cover types or infrastructure to provide opportunities to enhance bat and urban biodiversity conservation should be explored.

For Phoenix to attain its objective of becoming “the sustainable desert city,” (Ellin et al. 2009) its policy framework should include an urban biodiversity component that includes bats, to enhance ecosystem processes and services, to achieve a more sustainable urban ecosystem.

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APPENDIX A

METRICS AND DESCRIPTIONS

Table 1 Considered variables/metrics and variables tested as predictors of change in bat activity, foraging activity and species richness, respectively. Metrics, abbreviation codes, metric level, landscape pattern category and metric descriptions are presented. Descriptions are per McGarigal et al. (2013) and metrics were computed using FRAGSTATS 4.0 (McGarigal et al. 2013).

Landscape-level variable	Category	Description
Patch Density (PD) [a]	Configuration	Number of patches in the landscape per unit area.
Largest Patch Index (LPI) [a]	Configuration	Percentage of the total landscape area comprised by the largest patch. A simple measure of dominance.
Edge Density (ED) [b]	Configuration	Edge length per unit area.
Aggregation Index (AI) [b]	Configuration	Measures the degree to which the total landscape area consists of a single compact patch.
Class-level variable	**Category**	**Description**
Percentage of the landscape occupied by a patch (PLAND) [a]	Composition	Percentage of the landscape occupied by the corresponding patch.
Largest patch index of a patch (LPI) [a]	Configuration	Percentage of the total landscape area comprised by the largest patch of the corresponding patch. A simple measure of dominance.
Area-weighted mean patch radius of gyration (GYRATE AM) [a]	Configuration	Also known as correlation length, measures the average distance one can move from a random starting point/pixel and traveling in a random direction without leaving the corresponding patch. A measure of broad connectivity.
Area-weighted mean patch area (AREA AM) [a]	Configuration	Measures the expected size of a patch when selecting a random point/pixel.
Patch density of a patch (PD) [b]	Configuration	Number of patches in the landscape of the corresponding patch per unit area.

[a] Final predictor variables tested as predictors of change in respective response variables.

[b] Variables discarded after univariate model selection and multicollinearity screening.

APPENDIX B

UNIVARIATE MODEL SELECTION AND VARIABLE MULTICOLLINEARITY RESULTS

Table 1 Retained predictor variables (in bold) after univariate model selection and multicollinearity screening.

Response variable	Predictor variable	Univariate P-value	Result of multicollinearity screen
Bat Activity	AI_180	0.0618	drop
	ED_180	0.0552	drop
	LPI_180	0.02641	**keep**
	PD_180	0.0552	drop
	AREA_AM_4_180	0.00394	**keep**
	GYRATE_AM_4_3000	0.0569	**keep**
	GYRATE_AM_6_3000	0.0594	**keep**
	PLAND_4_180	0.00394	**keep**
	PLAND_6_3000	0.08	**keep**
Foraging Activity	AI_180	0.01725	drop
	ED_180	0.0184	drop
	PD_180	0.00391	**keep**
	LPI_180	0.01996	drop
	GYRATE_AM_4_3000	0.0202	**keep**
	LPI_4_180	0.063	**keep**
Species Richness	AREA_AM_3_1500	0.009	drop
	AREA_AM_4_180	0.0686	drop
	AREA_AM_7_180	0.063	**keep**
	GYRATE_AM_3_180	0.0034	**keep**
	LPI_3_1500	0.00723	**keep**
	LPI_4_180	0.0686	drop
	LPI_7_180	0.0713	drop
	PLAND_3_180	0.01	drop
	PLAND_4_180	0.0686	**keep**

APPENDIX C

RAW DATA

Table 1 Absolute numbers of files and call sequences recorded across sampling sites in the Phoenix metropolitan region (May – October 2010) prior to standardization. Table shows data before and after the data was cleaned (i.e., removed poor quality files), and the total number of species and myotis groups identified.

Description	Total
Total files recorded	177,450
Total files after filter was applied	85,480
Total call sequences after manual inspection and analysis	16,605
Total number of species identified	9
Total number of myotis groups identified (40 kHz and 50 kHz myotis)	2

APPENDIX D

ALL SUBSET MODELS AND FINAL AVERAGED MODELS

Table 1 Model parameters for the 14 models within 4 AICc units predicting call sequences per hour (bat activity) detected across sampling sites in the Phoenix metropolitan region (May - October 2010).

(Intercept)	AREA_AM_4_180	GYRATE_AM_4_3000	GYRATE_AM_6_3000	LPI_180	PLAND_4_180	PLAND_6_3000	k	logLik	AICc	AICc Δ[a]	Weights[b]
10.54	6.099	x	0.00875	-0.1889	x	x	5	-64.02	142	0	0.143
10.54	x	x	0.00875	-0.1889	0.5082	x	5	-64.02	142	0	0.143
10.54	6.099	x	0.00875	-0.1889	x	x	5	-64.02	142	0	0.143
10.66	8.82	x	0.01935	-0.1637	x	-0.2928	6	-62.439	142.9	0.84	0.094
10.66	x	x	0.01935	-0.1637	0.735	-0.2928	6	-62.439	142.9	0.84	0.094
10.66	8.82	x	0.01935	-0.1637	x	-0.2928	6	-62.439	142.9	0.84	0.094
14.15	x	x	0.01011	-0.2471	x	x	4	-66.599	143.7	1.66	0.063
11.4	x	0.004461	0.009134	-0.23	x	x	5	-65.378	144.8	2.72	0.037
9.318	5.262	0.002779	0.008328	-0.1862	x	x	6	-63.49	145	2.94	0.033
9.318	x	0.002779	0.008328	-0.1862	0.4385	x	6	-63.49	145	2.94	0.033
9.318	5.262	0.002779	0.008328	-0.1862	x	x	6	-63.49	145	2.94	0.033
9.018	8.093	0.003804	0.0204	-0.1562	x	-0.3379	7	-61.293	145.2	3.16	0.03
9.018	x	0.003804	0.0204	-0.1562	0.6744	-0.3379	7	-61.293	145.2	3.16	0.03
9.018	8.093	0.003804	0.0204	-0.1562	x	-0.3379	7	-61.293	145.2	3.16	0.03
Variable Importance	0.60	0.23	1.00	1.00	0.30	0.37					

[a] The difference in AICc between the first-ranked model and the given model.

[b] Akaike weight, is the weight of evidence that a given model is the best approximating model. For example, a weight of 0.143 indicates that it is only just a better model compared to the models/hypothesis tested.

Table 2 Final averaged model for bat activity, showing model averaged coefficients for all subsets modeling to predict call sequences per hour detected across sampling sites in the Phoenix metropolitan region (May-October 2010), in order of variable importance, strong to weak influence.

(Intercept)	GYRATE_AM_6_3000	LPI_180	AREA_AM_4_180	PLAND_6_3000	PLAND_4_180	GYRATE_AM_4_3000
10.57568	0.012838	-0.18375	7.057923	-0.30355	0.58816	0.003459804
Variable Importance [a]	1.00	1.00	0.60	0.37	0.30	0.23

[a] The summed Akaike weight for the predictor variable, that is, the individual importance of each variable independently. For example, GYRATE_AM_6_3000 with a parameter weight of 1.00, is interpreted as aspects of the correlation length of native vegetation (cover code = 6) at the landscape scale (3000 m) has a 100% probability that it plays a role in determining predicted patterns of bat activity.

Table 3 Model parameters for the two models within 4 AICc units to predict detected feeding buzzes per hour (foraging activity) detected across sampling sites in the Phoenix metropolitan region (May-October 2010).

(Intercept)	GYRATE_AM_4_3000	LPI_4_180	PD_180	k	logLik	AICc	AICc Δ [a]	Weights [b]
-2.192	0.002178	x	0.01516	4	-36.99	84.5	0	0.776
-2.087	0.001906	0.05593	0.01446	5	-36.484	87	2.49	0.224
Variable Importance	1.00	0.22	1.00					

[a] The difference in AICc between the first-ranked model and the given model.

[b] Akaike weight, is the weight of evidence that a given model is the best approximating model.

Table 4 Final averaged model for foraging activity. Model averaged coefficients for all subsets modeling to predict feeding buzzes per hour (foraging activity) detected across sites in the Phoenix metropolitan region (May - October 2010), in order of AICc variable importance, strong to weak influence.

(Intercept)	GYRATE_AM_4_3000	PD_180	LPI_4_180
0.192688	0.002117	0.015005	0.05593
Variable Importance [a]	1.00	1.00	0.22

[a] The summed Akaike weight for the predictor variable, that is, the individual importance of each variable independently.

Table 5 Model parameters for the six models within 4 AICc units to predict the number of species detected per hour (species richness) across sampling sites in the Phoenix metropolitan region (May - October 2010).

(Intercept)	AREA_AM _7_180	GYRATE_AM _3_180	LPI_3_1500	PLAND_4_180	k	logLik	AICc	AIC$_c$ Δ [a]	Weight [b]
0.1783	x	0.004774	x	0.01829	4	12.579	-14.7	0	0.439
0.2162	-0.02939	0.004359	x	0.01741	5	13.899	-13.8	0.86	0.285
0.1799	x	x	0.09143	0.0182	4	11.274	-12	2.61	0.119
0.2206	-0.03163	x	0.0827	0.01726	5	12.635	-11.3	3.39	0.081
0.178	x	0.004549	0.00486	0.01831	5	12.583	-11.2	3.49	0.077
Variable Importance	0.37	0.80	0.28	1.00					

[a] The difference in AICc between the first-ranked model and the given model.

[b] Akaike weight, is the weight of evidence that a given model is the best approximating model.

Table 6 Final averaged model for species richness. Model averaged coefficients for all subsets modeling to predict number of species detected per hour across sampling sites, in order of AICc variable importance, strong to weak influence.

(Intercept)	PLAND_4_180	GYRATE_AM_3_180	AREA_AM_7_180	LPI_3_1500
0.192688	0.017945	0.004604	-0.02988	0.064889
Variable Importance [a]	1.00	0.80	0.37	0.28

[a] The summed Akaike weight for the predictor variable, that is, the individual importance of each variable independently.

Channel Law Group, LLP

January 5, 2024

References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 2

State of California Natural Resources Agency
Department of Fish and Wildlife
EVALUATION OF THE PETITION FROM THE XERCES SOCIETY, DEFENDERS OF WILDLIFE, AND THE CENTER FOR FOOD SAFETY TO LIST FOUR SPECIES OF BUMBLE BEES AS ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

State of California
Natural Resources Agency
Department of Fish and Wildlife

REPORT TO THE FISH AND GAME COMMISSION

EVALUATION OF THE PETITION FROM THE XERCES SOCIETY, DEFENDERS OF WILDLIFE, AND THE CENTER FOR FOOD SAFETY TO LIST FOUR SPECIES OF BUMBLE BEES AS ENDANGERED UNDER THE CALIFORNIA ENDANGERED SPECIES ACT

Prepared by
California Department of Fish and Wildlife

April 4, 2019

I. Executive Summary

The Xerces Society, Defenders of Wildlife, and the Center for Food Safety (Petitioners) submitted a petition (Petition) to the Fish and Game Commission (Commission) to list four bumble bee species – Crotch bumble bee, Franklin bumble bee, Western bumble bee, and Suckley cuckoo bumble bee (*Bombus crotchii, B. franklini, B. occidentalis occidentalis,* and *B. suckleyi*, respectively) – as endangered pursuant to the California Endangered Species Act (CESA), Fish and Game Code Section 2050 *et seq*.

The Commission referred the Petition to the Department of Fish and Wildlife (Department) in accordance with Fish and Game Code Section 2073. (Cal. Reg. Notice Register 2018, No. 45-Z, p. 1986.) Pursuant to Fish and Game Code Section 2073.5 and Section 670.1 of Title 14 of the California Code of Regulations, the Department has prepared this evaluation report (Petition Evaluation) for the Petition. The Petition Evaluation assesses the scientific information discussed and cited in the Petition in relation to other relevant and available scientific information possessed or received by the Department during the evaluation period. The Department's recommendation as to whether to make any of the four bumble bee species a candidate for listing under CESA is based on an assessment of whether the scientific information in the Petition is sufficient under criteria prescribed by CESA to consider listing the species as endangered or threatened.

After reviewing the Petition and other relevant information, the Department finds:

A. Crotch bumble bee

The Crotch bumble bee is nearly endemic to California, and historically occupied grasslands and shrublands in southern to central California, with occasional records in the northern portion of the state. Like all bumble bees, the species requires floral resources, and undisturbed nest sites and overwintering sites.

The Crotch bumble bee's abundance relative to other bumble bee species has declined significantly in recent decades, and it is no longer found in a significant portion of its historical range: the Central Valley. Habitat loss and degradation, toxins, disease, competition, and climate change appear to threaten this species, and no known management efforts specifically designed to conserve or recover the species exist.

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate the petitioned action may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

B. Franklin bumble bee

The Franklin bumble bee has the smallest range of any bumble bee in North America. It is only found in the Klamath Mountains of northwest California and southwest Oregon. The species inhabits prairies and meadows and requires floral resources, and undisturbed nest sites and overwintering sites.

Surveys in California and the rest of its range in adjacent Oregon suggest Franklin bumble bee distribution and abundance are in steep decline. The species has not been detected in California surveys since 1998 or in Oregon surveys since 2006, although given the amount of remote unsurveyed area, the variability of insect populations in general, and the variability of Franklin bumble bee populations in particular, there is not yet reason to believe the species is extinct. Habitat loss or degradation, disease, competition, toxins, and climate change may threaten the Franklin bumble bee, and no known management efforts specifically designed to conserve or recover the species exist.

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate the petitioned action may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

C. Western bumble bee

Formerly found in much of California, the Western bumble bee is now much reduced in abundance and mostly restricted to high meadows or coastal environments. Population declines throughout the western U.S. have been documented since the mid to late 1990s, perhaps coincident with a disease outbreak in commercial colonies of the species. The species requires floral resources, and undisturbed nest sites and overwintering sites. Disease, toxins, habitat loss or degradation, competition, and climate change appear to threaten the Western bumble bee, and no known management efforts specifically designed to conserve or recover the species exist.

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate that the petitioned action may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

D. Suckley cuckoo bumble bee

The Suckley cuckoo bumble bee is known in California only from a few records in the Klamath Mountains region. Its reproductive success appears to be dependent on its host species, the Western bumble bee, another species petitioned for listing due to an apparent decline. The Suckley cuckoo bumble bee's range, distribution, and abundance in California are not well known due to the rarity of observations of the species in the state. There is evidence the species is in decline in other parts of its range, along with evidence its host, the Western bumble bee, is in decline. The Suckley cuckoo bumble bee requires floral resources, the presence of its host in sufficient abundance, and overwintering sites to reproduce and survive. The decline of its host, the Western bumble bee, may be the primary threat to continued survival of the species. However, the factors—diseases , toxins, habitat loss or degradation, competition, and climate change—that indirectly affect the Suckley cuckoo bumble bee through their impacts on its host may also directly affect the Suckley cuckoo bumble bee.

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate that the petitioned action may be warranted. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

II. Introduction

A. Candidacy Evaluation

The Commission has the authority to list certain "species" or "subspecies" as threatened or endangered under CESA. (Fish & G. Code, §§ 2062, 2067, 2070.) The listing process is the same for species and subspecies. (Fish & G. Code, §§ 2070-2079.1.)

CESA sets forth a two-step process for listing a species as threatened or endangered. First, the Commission determines whether to designate a species as a candidate for listing by evaluating whether the petition provides "sufficient information to indicate that the petitioned action may be warranted." (Fish & G. Code, § 2074.2, subd. (e)(2).) If the petition is accepted for consideration, the second step first requires the Department to produce, within 12 months of the Commission's acceptance of the petition, a peer reviewed report based upon the best scientific information available that advises the Commission whether the petitioned action is warranted. (Fish & G. Code, § 2074.6.) Finally, the Commission, based on that report and other information in the administrative record, then determines whether or not the petitioned action to list the species as threatened or endangered is warranted. (Fish & G. Code, § 2075.5.)

A petition to list a species under CESA must include "information regarding the population trend, range, distribution, abundance, and life history of a species, the factors affecting the ability of the population to survive and reproduce, the degree and immediacy of the threat, the impact of existing management efforts, suggestions for future management, and the availability and sources of information. The petition shall also include information regarding the kind of habitat necessary for species survival, a detailed distribution map, and any other factors that the petitioner deems relevant." (Fish & G. Code, § 2072.3; see also Cal. Code Regs., tit. 14, § 670.1, subd. (d)(1).) The range of a species for the Department's petition evaluation and recommendation is the species' California range. (*Cal. Forestry Assn. v. Cal. Fish and Game Com.* (2007) 156 Cal. App. 4th 1535, 1551.)

Within ten days of receipt of a petition, the Commission must refer the petition to the Department for evaluation. (Fish & G. Code, § 2073.) The Commission must also publish notice of receipt of the petition in the California Regulatory Notice Register. (Fish & G. Code, § 2073.3.) Within 90 days of receipt of the petition (or 120 days if the Commission grants an extension), the Department must evaluate the petition on its face and in relation to other relevant information and submit to the Commission a written evaluation report with one of the following recommendations:

- Based upon the information contained in the petition, there is not sufficient information to indicate that the petitioned action may be warranted, and the petition should be rejected; or
- Based upon the information contained in the petition, there is sufficient information to indicate that the petitioned action may be warranted, and the petition should be accepted and considered.

(Fish & G. Code, § 2073.5, subds. (a)-(b).) The Department's candidacy recommendation to the Commission is based on an evaluation of whether the petition provides sufficient scientific information relevant to the petition components set forth in Fish and Game Code Section 2072.3 and the California Code of Regulations, Title 14, Section 670.1, subdivision (d)(1).

In *Center for Biological Diversity v. California Fish and Game Commission* (2008) 166 Cal.App.4th 597, the California Court of Appeals addressed the parameters of the Commission's determination of whether a petitioned action should be accepted for consideration pursuant to Fish and Game Code Section 2074.2, subdivision (e), resulting in the species being listed as a candidate species. The court began its discussion by describing the standard for accepting a petition for consideration previously set forth in *Natural Resources Defense Council v. California Fish and Game Commission* (1994) 28 Cal.App.4th 1104:

> As we explained in *Natural Resources Defense Council*, "the term 'sufficient information' in section 2074.2 means that amount of information, when considered with the Department's written report and the comments received, that would lead a reasonable person to conclude the petitioned action may be warranted." The phrase "may be warranted" "is appropriately characterized as a 'substantial possibility that listing could occur.'" "Substantial possibility," in turn, means something more than the one-sided "reasonable possibility" test for an environmental impact report but does not require that listing be more likely than not.

(*Center for Biological Diversity*, *supra*, 166 Cal.App.4th at pp. 609-10 [internal citations omitted].) The court acknowledged, "the Commission is the finder of fact in the first instance in evaluating the information in the record." (*Id.* at p. 611.) However, the court clarified:

> [T]he standard, at this threshold in the listing process, requires only that a substantial possibility of listing could be found by an objective, reasonable person. The Commission is not free to choose between conflicting inferences on subordinate issues and thereafter rely upon those choices in assessing how a reasonable person would view the listing decision. Its decision turns not on rationally based doubt about listing, but on the absence of any substantial possibility that the species could be listed after the requisite review of the status of the species by the Department under [Fish and Game Code] section 2074.6.

(*Ibid.*)

B. Petition History

On October 17, 2018, Petitioners submitted this Petition to the Commission to list the four bumble bee species as endangered under CESA. On October 26, 2018, the Commission referred the Petition to the Department for evaluation. In December 2018, the Department requested, and the Commission granted, a 30-day extension of the 90-day Petition evaluation period. The Department submitted this Petition Evaluation report to the Commission on April 4, 2019.

The Department evaluated the scientific information presented in the Petition as well as other relevant information the Department possessed at the time of review. The Commission did not receive any new information from the public during the Petition Evaluation period pursuant to Fish and Game Code Section 2073.4. Pursuant to Fish and Game Code Section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations, the Department evaluated whether the Petition included sufficient scientific information regarding each of the following petition components to indicate whether the petitioned action may be warranted:

- Population trend;
- Range;
- Distribution;
- Abundance;
- Life history;
- Kind of habitat necessary for survival;
- Factors affecting the ability to survive and reproduce;
- Degree and immediacy of threat;
- Impact of existing management efforts;
- Suggestions for future management;
- Availability and sources of information; and
- A detailed distribution map.

C. Overview of Bumble Bee Ecology

Bumble bee (or bumblebee, bumble-bee or humble-bee) species, genus *Bombus*, are members of the main insect family of social bees, Apidae. Bumble bees often inhabit cooler areas such as at higher elevations or latitudes, but some species are found in deserts and the tropics. Twenty-six bumble bee species have been found in California (Koch et al. 2012).

Most bumble bees are social, typically forming colonies of 50-1000 workers with a single queen. In California, bumble bees usually have an annual life cycle: reproductive females (queens) overwinter alone, establish a nest in spring and begin to rear workers to form a “colony,” the colony grows as more and more workers are produced, then the queen begins to produce males and new queens, which emerge, find mates, and the cycle repeats. The old queen, workers, and males die at the end of the breeding season (Heinrich 2004, Koch et al. 2012).

A few bumble bee species, including the petitioned Suckley Cuckoo, evolved to become “social parasites” on other, colony-forming bumble bees. Because of the parallels to the brood-parasitic birds, these species are called cuckoo bumble bees (formerly genus *Psithyrus*, now considered *Bombus*). Cuckoo bumble bee females invade and take over the nests of their host bumble bee species, killing or subduing the queen and co-opting the colony workers to raise the cuckoo bumble bee’s eggs and young. These offspring all become reproductive male and female cuckoo bumble bees. Cuckoo bumble bees tend to be larger and more heavily armored than their host queens (Heinrich 2004, Kearns and Thomson 2001), and may mimic or repel their hosts chemically (Martin et al. 2010).

Bumble bees are typically large, sturdy, hairy bees with aposematic (warning) coloration of contrasting yellow, black, or reddish bands (Thorp et al. 1983). In colony-forming bumble bees, the structure and hairs of the hind legs of queens and workers are shaped to form a pollen basket that is used to collect and return pollen to the colony. Worker bumble bees and foraging queens gather pollen – which contains protein – to feed their larvae and young workers. Queens also require the protein to produce eggs (Heinrich 2004). Cuckoo bumble bees do not have pollen baskets and are dependent on their hosts for foraging and provisioning young. Bumble bees also feed on nectar for energy and store small amounts of honey in open wax “honeypots” in the colony (Heinrich 2004).

Bumble bees have a mutualistic relationship with many plants—floral resources are vital to bumble bees and bumble bees are important pollinators. Most species visit a variety of plant species for nectar and/or pollen. They are effective pollinators for many plants, including plants like nightshades (tomatoes, peppers, eggplant) and blueberries, whose pollen is not easily released by other pollinators. Some bumble bee species are propagated commercially and marketed for pollination services such as in greenhouses (Koch et al. 2012).

Bumble bees occur in a wide variety of habitats with sufficient abundance and duration of flowers for nectar and pollen resources. Because they thermoregulate using muscle tension to generate heat (Heinrich 2004), bumble bees can initiate flight at colder temperatures and colder times of day. Because of this, they inhabit cooler places than many other bees.

Bumble bees require suitable substrate in which to nest and in which to overwinter. Most bumble bee species nest in the ground, utilizing abandoned rodent burrows or similar cavities, or aboveground, utilizing cavities in logs or similar structures. Some species may make aboveground nests in dense tufts of grass and dead vegetation including abandoned mouse and bird nests. Overwintering habitats are poorly known, but newly mated queens have been observed burying themselves in loose soil or sheltering under plant litter (Koch and Strange 2009).

D. Factors Broadly Affecting the Ability of California Bumble Bee Populations to Survive and Reproduce

The Petition outlines, on pages 37-62, a variety of factors it describes as posing a substantial threat to the survival or reproduction of all four petitioned species. The general material applying to all four petitioned species is summarized here.

Factors or threats affecting the ability of all the petitioned species to survive and reproduce fall into four main categories: 1) present or threatened modification or destruction of their habitat; 2) competition; 3) disease; and 4) other natural and human-related factors, including pesticide use, genetic factors, and climate change. The Petition also discusses overexploitation for scientific or commercial purposes (pp. 44-45) but concludes that such uses do not pose a substantial threat at this time.

1. Scientific Information in the Petition: Present or Threatened Modification or Destruction of Habitat

The Petition indicates that habitat modification and destruction pose a threat to bumble bees by reducing access to sufficient food, nesting sites, and overwintering sites (pp. 37-44). It describes how several factors, including agricultural conversion, urban development, fire suppression, invasive species, livestock grazing, and climate change, have contributed to the loss or fragmentation of bumble bee habitat. The Petition notes habitat loss as particularly pronounced in montane meadows and California's Central Valley, both of which are historical habitats for the petitioned species. It also highlights that bumble bees in fragmented habitats exhibit reduced foraging rates and altered foraging patterns, which may affect population health and limit potential for recolonizing extirpated sites. In addition, the Petition notes that bumble bees' unique method of sex determination and colonial life cycle can lead to inbreeding depression in fragmented habitat, thus exacerbating its negative effects.

2. Scientific Information in the Petition: Competition with Other Species

The Petition describes threats posed by competition with other species, particularly other bee species imported and managed to pollinate crops or produce honey (pp. 47-55). Although many of the studies cited in the petition were conducted outside California, they reasonably apply within California and indicate that competition with managed bees may pose a threat to the four petitioned species.

The Petition indicates competition with European honey bees and other managed bees poses a threat to bumble bees by reducing pollen and nectar resources, displacing native bumble bees, and transmitting disease (discussed separately in the following section). The petition specifically notes a growing body of research demonstrates competition with managed bees can lead to lower reproductive success, smaller body size, and changes to foraging behavior – notably a reduction in pollen gathering (Evans 2001; Goulson et al. 2002; Thomson 2004, 2006; Paini & Roberts 2005; Walther-Hellwig et al. 2006; Goulson & Sparrow 2009; Elbgami et al. 2014). The Petition notes European honey bee colonies and large apiaries require substantial resources to survive and can impact native bee communities by depleting available supplies of pollen and nectar (Anderson & Anderson 1989; Paton 1990, 1996; Wills et al. 1990; Dafni & Shmida 1996; Horskins & Turner 1999; Cane & Tepedino 2016). It further describes how honey bees can competitively exclude native bees from preferred floral resources, forcing them to switch to other, less abundant and less rewarding plant species (Wratt 1968; Eickwort & Ginsberg 1980; Pleasants 1981; Ginsberg 1983; Paton 1993; 1996; Buchmann 1996; Horskins & Turner 1999; Dupont et al. 2004; Thomson 2004; Walther-Hellwig et al. 2006; Tepedino et al. 2007; Roubik 2009; Shavit et al. 2009; Hudewenz & Klein 2013; Rogers et al. 2013; but see Butz-Huryn 1997; Steffan-Dewenter & Tscharntke 2000; Minckley et al. 2003).

3. Scientific Information in the Petition: Disease

The Petition presents extensive information regarding disease threats to bumble bees (pp. 47-55). Although much of this information is from studies outside California, it reasonably applies within California as well and indicates that disease may pose a threat to the four petitioned species.

The Petition indicates that disease poses a substantial threat to bumble bees by reducing longevity and colony fitness, altering reproductive success, and affecting foraging behaviors. In particular, the Petition focuses on the potential impacts from fungal microsporidians (*Nosema bombi and N. ceranae*), protozoan gut parasites (*Crithidia bombi* and *C. expoeki*), and the tracheal mite *Locustacarus buchneri*. It cites research indicating *N. bombi* can decrease survival rates for bumble bee workers and reduce survival and reproductive rates of new queens and males (Otti and Schmid-Hempel 2007, 2008; Rutrecht and Brown 2009), and *N. ceranae* can reduce bumble bee survival by 48 percent (Graystock et al. 2013). The Petition further notes *C. bombi* can dramatically reduce bumble bee longevity and colony fitness (Brown et al. 2003; Otterstatter & Whidden 2004), interfere with learning among bumble bee foragers (Otterstatter et al. 2005), increase ovary development in workers (Shykoff & Schmid-Hempel 1991), and decrease pollen loads carried by workers (Shykoff and Schmid-Hempel 1991). Research cited in the petition also indicates *L. buchneri* is associated with reduced foraging and lethargic behavior (Husband & Shina 1970) and a significantly reduced lifespan in male bumble bees (Otterstatter & Whidden 2004).

The petition describes an increased prevalence of these diseases among native bumble bees, including the petitioned species, and indicates this may be due to transmission from commercial bees, which frequently harbor high pathogen loads.

4. Scientific Information in the Petition: Other Factors – Toxins, Climate Change, Population Dynamics and Structure

The Petition presents information regarding three other factors that may threaten the four petitioned species: (1) toxins, (2) climate change, and (3) population dynamics and structure (pp. 56-62). Some of this information is from studies outside California, but it reasonably applies to the four petitioned species and their status in California.

The Petition indicates that use of herbicides and pesticides has several negative impacts on native bumble bees, including degrading habitat and removing floral resources, causing direct mortality and sublethal effects, reducing population success and survival rates, and increasing disease risk. The Petition notes the widespread use of herbicides and pesticides in the four petitioned species' ranges and describes their impacts. Herbicide use has contributed to the loss of bumble bee habitat resulting in indirect impacts to bumble bees. It reduces floral resources for all bumble bees, nesting habitat for bumble bees that nest above ground (Smallidge & Leopold 1997), and could cause a decline in bumble bee reproductive success and/or survival rates. Pesticide use, including various types of insecticides and fungicides, could directly impact bumble bees through mortality and sublethal effects. The use of insecticides, of which neonicotinoids are addressed in detail, is most likely to directly harm bumble bees since they are broadly toxic to insects and thus could kill or otherwise harm exposed bumble bees. The Petition cites numerous studies on their potential effects, including reduced production of new queens and colony growth rates, reduced survival of hibernating queens, reduced foraging ability and increased foraging times, reduced food storage and brood production, reduced male and worker survival, and impaired learning and memory. It also notes that fungicides can lead to increased susceptibility to pathogens and parasites.

The Petition also identifies threats from climate change and indicates changes in temperature and precipitation pose a significant threat to bumble bees by decreasing the availability of floral and overwintering resources, increasing pathogen pressure, and decreasing available nesting habitat. Variability in climate can lead to phenological asynchrony between bumble bees and the plants they rely on for food and nesting (Aldridge et al. 2011; Memmott et al. 2007; Thomson 2010). While bumble bees do not require synchrony with a specific plant, asynchrony with key resources could lead to diminished resource availability at times critical to bumble bee colony success. The Petition also presents information indicating the shift in climate has altered bumble bee morphology by reducing their tongue length in response to the changed availability of food plants (Miller-Struttmann et al. 2015). This could lead to increased competition between bumble bee species due to greater niche overlap. The Petition also notes that as the climate warms in North America, the southern range of bumble bees is contracting and there is no evidence that populations are moving northward (Kerr et al., 2015), which could reduce habitat availability and further increase competition.

Bumble bee population dynamics and structure may exacerbate the threats outlined above and increase the likelihood of rapid population declines. The Petition states that reduced genetic diversity resulting from any of the described threats may be particularly concerning for bumble bees because their genetic diversity already tends to be low due to their colonial life cycle (Goulson 2010; Hatfield et al. 2012; but see Cameron et al. 2011a and Lozier et al. 2011). For species that have undergone declines in range and relative abundance, which the Petition states includes the petitioned species (Kevan 2008; Hatfield et al. 2015a, 2015c, unpublished data), genetic factors (including reduced genetic diversity, depressed survival or reproduction due to inbreeding, and the method of sex determination utilized by bumble bees) are likely among the most significant threats to their long-term survival (reviewed in Zayed 2009). The petition also describes how the loss of genetic diversity, frequently the result of reduced population size, inbreeding, or random drift, can pose a significant threat to small, isolated populations of bumble bees (Whitehorn et al. 2009), limiting their ability to adapt (Altizer et al. 2003).

III. Sufficiency of Scientific Information to Indicate the Petitioned Action May Be Warranted

The Petition components are evaluated for each of the four petitioned species separately, below, with respect to Fish and Game Code section 2072.3 and Section 670.1, subdivision (d)(1), of Title 14 of the California Code of Regulations.

III.1. Crotch bumble bee (*Bombus crotchii*)

A. Population Trend

1. Scientific Information in the Petition

The Petition discusses population trend for the Crotch bumble bee on pages 6 to 11 and cites two sources to support its conclusions, Hatfield et al. 2014 and Richardson et al. 2014. The Petition presents an approach for estimating the relative abundance of *B crotchii*. This approach analyzed the ratio of all Crotch bumble bee records to the records for all North American bumble bee species. Although this analysis included all North American records for the Crotch bumble bee, it likely approximates population decline in California because the Crotch bumble bee's range is largely confined to California. Comparing two time periods – historic (1805-2001) *versus* recent (2002-2012) - the Petition concludes the species' relative abundance has declined by 97.7 percent. The Petition also highlights the particular severity of population decline in the Central Valley, where the Crotch bumble bee was historically common but is now largely absent.

2. Other Relevant Scientific Information

One record in the Department's California Natural Diversity Data Base (CNDDB) does not appear in the Petitioners' data: an August 9, 2012 observation from McGrath State Beach, Oxnard, Ventura County. This single record is unlikely to alter Petitioner's conclusion that *B. crotchii* is in decline.

3. Conclusion

The information provided indicates Crotch bumble bee populations have significantly declined in recent decades. This trend has been particularly pronounced in the former epicenter of the bee's range, the Central Valley, where Crotch bumble bee populations are now severely depressed.

B. Range

1. Scientific Information in the Petition

Information regarding range appears on pages 6 to 10 of the Petition. The Crotch bumble bee is nearly endemic to California, historically ranging across southern California, from the coast and coastal ranges, through the Central Valley, and to the adjacent foothills (Williams et al. 2014). It only ranges beyond California in Baja California, Mexico and southwest Nevada near the California border. The Petition indicates the Crotch bumble bee's range declined 25 percent relative to its historical range in recent years, with this decline particularly pronounced in the center of its historical range, the Central Valley.

2. Conclusion

The Petition adequately demonstrates a decline in the Crotch bumble bee's range, including a pronounced decline in the Central Valley.

C. Distribution

1. Scientific Information in the Petition

The Petition discusses distribution on pages 6 to 10. It examines Crotch bumble bee persistence or change in distribution in 50-km grid squares across the bee's historic range. The Petition reports a 79.5 percent decline in persistence in recent decades. This change is particularly pronounced in the Central Valley, where the Crotch bumble bee has not recently been reported.

2. Other Relevant Scientific Information

One recent record in the Department's CNDDB does not appear in the Petitioners' data: an August 9, 2012 observation from McGrath State Beach, Oxnard, Ventura County. This single record is unlikely to alter Petitioner's conclusions about distribution.

3. Conclusion

Although the Petition provides limited data about the Crotch bumble bee's current distribution in California, the data provided appears consistent with other information in the Petition that indicates the species' distribution is declining, particularly in the Central Valley.

D. Abundance

1. Scientific Information in the Petition

The Petition discusses abundance on pages 6 to 11. There is limited information available on the Crotch bumble bee's absolute abundance in California. The Petition presents approximately ten records in the years 2002 to 2012.

2. Other Relevant Scientific Information

One recent record in the Department's CNDDB does not appear in the Petitioners' data: an August 9, 2012 observation from McGrath State Beach, Oxnard, Ventura County. Koch et al. (2012) call the species "uncommon".

3. Conclusion

The Petition adequately addresses what little is known about the abundance of the Crotch bumble bee.

E. Life History

1. Scientific Information in the Petition

The information concerning life history appears on page 24 and pages 32 to 33. The flight period for Crotch bumble bee queens in California is from late February to late October. Their flight period peaks in early April and there is a second pulse in July. The flight period for workers and males in California is from late March through September; worker and male abundance peak in early July (Thorp et al. 1983). The Crotch bumble bee, like most other species of bumble bees, primarily nests underground (Williams et al. 2014). The size of Crotch bumble bee colonies has not been well documented. Little is known about the hibernacula, or overwintering sites, of the Crotch bumble bee, but if the behavior of queens of most other bumble bee species is indicative, it likely overwinters in soft soil (Goulson 2010) or under leaf litter or other debris (Williams et al. 2014).

2. Conclusion

The Petition presents sufficient information on what little is known about Crotch bumble bee life history.

F. Kind of Habitat Necessary for Survival

1. Scientific Information in the Petition

The Petition addresses the Crotch bumble bees' habitat requirements on pages 30 to 33. It states that in California, the Crotch bumble bee inhabits open grassland and scrub habitats. It was historically common in the Central Valley where this type of habitat was previously abundant, but it has been largely extirpated from the region because agricultural and urban expansion have modified and fragmented native grasslands.

All bumble bees, including the Crotch bumble bee, require nesting habitat, foraging resources, and overwintering habitat. The petition notes Crotch bumble bees construct their nests underground and may rely on sufficient availability of rodent and other animal burrows to provide potential nesting sites.

Crotch bumble bees are generalist foragers and have been reported visiting a wide variety of flowering plants. The Crotch bumble bee has a short tongue, and thus is best suited to forage at open flowers with short corollas. The plant families most commonly visited in California include Fabaceae, Apocynaceae, Asteraceae, Lamiaceae, Hydrophyllacae, Asclepiadaceae and Boraginaceae (Thorp et al. 1983; Richardson 2017).

Little is known about the hibernacula, or overwintering sites of the Crotch bumble bee. Generally, bumble bees overwinter in soft, disturbed soil (Goulson 2010), or under leaf litter or other debris (Williams et al. 2014).

2. Conclusion

The Petition presents sufficient information regarding the kind of habitat necessary to the Crotch bumble bee for survival.

G. Factors Affecting the Ability to Survive and Reproduce

1. Scientific Information in the Petition

The Petition discusses factors affecting the Crotch bumble bee's ability to survive and reproduce on pages 37 to 62. As outlined in section II.D., the Petition highlights several threats to all bumble bees, including the Crotch bumble bee. These include habitat modification, herbicides, competition with managed bees, disease, pesticides, and population dynamics.

The Petition notes that the Crotch bumble bee is particularly affected by habitat modification, pesticides, and herbicides. The Crotch bumble bee was historically known throughout California's Central Valley, which once contained extensive prairies rich with wildflowers. This area has largely been converted to agricultural or urban uses, modifying and fragmenting the bee's habitat. The Petition notes this land conversion has coincided with the Crotch bumble bee's near extirpation from the Central Valley (Thorp 2014, pers. comm.; Hatfield et al. 2015a).

The Central Valley's conversion to agriculture has also led to high uses of glyphosate, the most commonly used herbicide in California (CDPR 2014). The Petition states that glyphosate application has reduced the availability of wildflowers in field margins, lowered the diversity of flowering weeds, and led to an increase in herbicide application. It asserts these factors may have a causal link to the Crotch bumble bee's decline in the Central Valley.

2. Other Relevant Scientific Information

Sleeter et al. (2012) estimate more than 70 percent of total Central Valley area was converted to agricultural use by 2000, and an additional nine percent was converted to urban/developed uses.

3. Conclusion

The Petition adequately describes factors affecting the Crotch bumble bee's ability to survive and reproduce. Crotch bumble bee populations have severely declined in the Central Valley, and available data suggests some combination of habitat modification, pesticides, and herbicides contributed to this decline. Other factors affecting bumble bee populations in agricultural settings, such as competition with managed bees and disease, may have also contributed to population declines.

H. Degree and Immediacy of Threat

1. Scientific Information in the Petition

The Petition notes the Crotch bumble bee was once common throughout the southern two-thirds of California but is now largely absent from much of that area. It has been nearly extirpated from the center of its historic range, the Central Valley, where agriculture and urban development have transformed the landscape. The Petition concludes the bee's population abundance and persistence have sharply declined over the past ten years.

2. Conclusion

The Petition presents sufficient information to suggest a sharp decline in Crotch bumble bee populations and available habitat and indicates the Crotch bumble bee may be subject to a substantial and present threat within California.

I. Impact of Existing Management Efforts

1. Scientific Information in the Petition

The Petition discusses the impact of existing management efforts on page 63. The Petition notes the Crotch bumble bee does not currently receive substantive protection under federal or California law. The Crotch bumble bee appears on the Special Animals List of the California Department of Fish and Wildlife (CDFW 2018) and is included as Endangered on the International Union for the Conservation of Nature ("IUCN") Red List (Hatfield et al. 2015a). NatureServe (a non-profit conservation organization) ranks the species with a Global Status rank of G3G4 (Vulnerable to Apparently Secure) and a state rank of S1S2 (critically imperiled or imperiled) in California (NatureServe 2018).

2. Other Relevant Scientific Information

Some factors that may result in threats to the petitioned species, including herbicides and pesticides, competition, and disease, are subject to various forms of federal and State regulatory oversight. However, these regulatory mechanisms are not specifically designed to conserve or recover Crotch bumble bee populations.

3. Conclusion

The Petition suggests a sharp population decline and provides sufficient information to raise concerns about whether existing management adequately offsets possible threats to the species. Although the species appears on the Department's Special Animals list and on other organizations' lists, these designations do not afford the species specific protections, and the Petition does not indicate any other management actions specifically designed and implemented to conserve or recover the Crotch bumble bee.

J. Suggestions for Future Management

1. Scientific Information in the Petition

The Petition provides suggestions for future management on pages 65 to 73. The Petition first outlines management actions that would benefit all bumble bees, including the petitioned species. Management actions to protect or enhance flower, nesting, and overwintering resources are expected to benefit these species. These include: practices that ameliorate or reduce the frequency of ground disturbance of nesting or overwintering habitat (Black et al. 2011, Osborne et al. 2008); restoring appropriate native flower resources throughout the flight period (Aldridge et al. 2011, Mäder et al. 2011); reducing exposure to harmful pesticides, diseases, and competitors, such as non-native honey bees and bumble bees (Cane and Tepedino 2016, Geldmann & González-Varo 2018, Mallinger et al. 2017); and preserving burrowing animal populations that provide important nesting sites for bumble bees (McFrederick and LeBuhn 2006).

Concerning the Crotch bumble bee specifically, the Petition asserts that known populations should be protected from insecticide and pesticide use, particularly in the Central Valley. Practices such as livestock grazing and other practices that may threaten essential habitat, reduce available nectar and pollen sources throughout the colony season, and/or reduce the availability of underground nest sites and hibernacula, should be minimized where this species is extant. Placement of non-native bees in areas that may be occupied by the Crotch bumble bee should be managed to reduce threats of competition or disease (*see* Hatfield et al. 2016 for more detail).

2. Conclusion

The Petition indicates additional, known management actions may aid in conserving the Crotch bumble bee in California.

K. Detailed Distribution Map

1. Scientific Information in the Petition

Crotch bumble bee (*Bombus crotchii*) Global Distribution

2. Other Relevant Scientific Information

One recent record in the Department’s CNDDB does not appear in the Petitioners’ data: an August 9, 2012 observation from McGrath State Beach, Oxnard, Ventura County.

3. Conclusion

The distribution map illustrates the Crotch bumble bee’s historic distribution and what little is known about its current distribution.

III.2. Franklin bumble bee (*Bombus franklini*)

A. Population Trend

1. Scientific Information in the Petition

The Petition discusses population trend for the Franklin bumble bee on pages 6 to 9 and pages 11 to 16. It indicates a significant and steady decline in population. Annual surveys conducted between 1998 and 2007 in California and adjacent Oregon documented a decline from 84 individuals observed in the early years of the survey period to a total of four individuals observed in the last five years surveyed combined. Survey efforts ranged from eight sites and 19 total visits (2007) to 31 sites and 55 or more total visits (2005). The Franklin bumble bee was last seen in California in 1998, and annual surveys since 2007 (2007-2017) have all failed to find any individuals of the species in California or Oregon. The Petition highlights these numbers are variable, but clearly trend substantially downward.

2. Conclusion

The information provided indicates Franklin bumble bee populations have significantly declined in recent years. The fact that no individuals have been observed for more than a decade in annual surveys indicates the species may be extinct. However, doubt remains, considering how difficult it is to locate species with low and variable population levels inhabiting remote terrain.

B. Range

1. Scientific Information in the Petition

Information regarding the range of Franklin bumble bee appears on pages 6 to 9 and pages 11 to 16 of the Petition. The Franklin bumble bee has the smallest range of any bumble bee in North America (Williams 1998). Since the early 20th century, it has only been found in a 190 mile by 70 mile area in the Klamath Mountain region, which extends from Siskiyou and Trinity counties in California to southern Oregon. Based on the information provided, the Franklin bumble bee was last observed in 2006.

2. Conclusion

The Petition provides sufficient information on the historic range of the Franklin bumble bee in California. The species was last observed in its range in 2006.

C. Distribution

1. Scientific Information in the Petition

The Petition discusses species distribution on pages 6 to 9 and pages 11 to 16. It notes that prior to 2003, the Franklin bumble bee was known from more than 35 localities, including six general locations in California and three sites near the California-Oregon border. From 2003 to 2006, the species was only found at a single site in Oregon, and from 2007 onward has not been found anywhere despite expert surveys. The Petition reports that in 1998 Franklin bumble bees were detected at 75 percent of the localities known to support the species. By 2000, it dropped to 24 percent and continued dropping to 14 percent in 2002, 13 percent in 2006, and then to zero in subsequent years. The species was last observed in California in 1998.

2. Conclusion

The Petition provides sufficient information on the contracting distribution of the Franklin bumble bee. This trend is particularly pronounced in California, where the species has not been observed since 1998.

D. Abundance

1. Scientific Information in the Petition

Information regarding abundance appears on pages 6 to 9 and pages 11 to 16 of the Petition. As noted in the Population Trend section above, the total number of Franklin bumble bees observed in annual surveys from 1998-2007 in California and adjacent Oregon ranged from 94 to zero individuals, with only four individuals observed in the last five surveys combined and no observations during annual surveys from 2007-2017.

2. Conclusion

The Department concludes the Petition provides sufficient information on the historical abundance and steep decline in abundance of the Franklin bumble bee in California.

E. Life History

1. Scientific Information in the Petition

The information concerning life history appears on pages 25 to 26 and page 33 of the Petition. So far as is known, the life history of the Franklin bumble bee is similar to the life history of other bumble bees, which is described in section II.C above. The flight season of the Franklin bumble bee is from mid-May to the end of September (Thorp et al. 1983).

2. Conclusion

The Petition provides sufficient information on what little is known about the Franklin bumble bee’s life history.

F. Kind of Habitat Necessary for Survival

1. Scientific Information in the Petition

The Petition addresses the Franklin bumble bees' habitat requirements on page 33. It states that the Franklin bumble bee inhabits open coastal prairies and coast range meadows at elevations ranging from 540 feet (162 m) in the north to above 7800 feet (2340 m) in the southern part of its historical range in northwest California and southwest Oregon.

All bumble bees, including the Franklin bumble bee, require nesting habitat, foraging resources, and overwintering habitat. The Petition notes the specific nesting habits of the Franklin bumble bee are unknown, but it likely nests in abandoned rodent burrows as is typical for other members of its subgenus, *Bombus sensu stricto* (Hobbs 1968). Similarly, little is known about the Franklin bumble bee's hibernacula, or overwintering sites, but bumble bees generally overwinter in soft soil (Goulson 2010), or under leaf litter or other debris (Williams et al. 2014).

The Petition describes the Franklin bumble bee as a generalist forager because it has been reported visiting a wide variety of flowering plants. It has been observed collecting pollen from lupine (*Lupinus* spp.) and California poppy (*Eschscholzia californica*) and collecting nectar from horsemint or nettle-leaf giant hyssop (*Agastache urticifolia*) and mountain monardella (*Monardella odoratissima*) (Thorp et al. 2010). This species may also collect both pollen and nectar from vetch (*Vicia* spp.) (Thorp et al. 2010).

2. Conclusion

The Petition presents sufficient information regarding the kind of habitat necessary for survival of the Franklin bumble bee in California.

G. Factors Affecting the Ability to Survive and Reproduce

1. Scientific Information in the Petition

The Petition discusses factors affecting the Franklin bumble bee's ability to survive and reproduce on pages 37 to 62. As outlined in section II.D., the Petition highlights several threats to all bumble bees, including the Franklin bumble bee. These include habitat loss and degradation, disease, competition, toxins, climate change, and population dynamics.

The Petition notes the transmission of pathogens from commercial bumble bees has been implicated in the decline of the Franklin bumble bee (Cameron et al. 2016, Graystock et al. 2016, Otterstatter and Thomson 2008). The Petition also describes threats associated with grazing, construction-related soil excavation, and habitat loss from wildfires. In addition, it highlights that increasing aridity due to warming temperatures from climate change may be particularly detrimental for the Franklin bumble bee since it appears to have a very narrow climatic specialization compared to most bumble bees (NatureServe 2018).

2. Conclusion

The Petition adequately describes factors affecting the Franklin bumble bee's ability to survive and reproduce and indicates these factors, particularly diseases transmitted by commercial bees, habitat modification, and climate change, contribute to the species' population decline.

H. Degree and Immediacy of Threat

1. Scientific Information in the Petition

The Petition discusses the degree and immediacy of the threat to the Franklin bumble bee on pages 62 to 63. The Petition highlights that bumble bees as a whole are threatened by a number of factors, including agricultural intensification, habitat loss and degradation, pesticide use, pathogens from managed pollinators, competition with non-native bees, climate change, and genetic factors (reviewed in Goulson 2010; Williams et al. 2009; Williams and Osborne 2009; Cameron et al. 2011b; Hatfield et al. 2012; Fürst et al. 2014). It notes the magnitude of loss and rate of decline experienced by the Franklin bumble bee and that, without protective measures, the Franklin bumble bee is likely to go extinct in California.

2. Conclusion

The Petition presents sufficient information to indicate the Franklin bumble bee may be subject to a substantial and present threat within California. The Petition describes a sharp decline in Franklin bumble bee populations with no observations in California since 1998.

I. Impact of Existing Management Efforts

1. Scientific Information in the Petition

The Petition discusses the impact of existing management efforts on pages 63 to 64. Until 1996, the U.S. Fish and Wildlife Service classed Franklin bumble bee as a "Category 2" Candidate Species. In 2010, it was petitioned for endangered species status under the federal Endangered Species Act (ESA). It received a 90-day finding that federal listing may be warranted and is currently the focus of a Species Status Assessment by USFWS to determine if the species warrants ESA listing (USFWS 2011). The U.S. Forest Service and the U.S. Fish and Wildlife Service commissioned research to try to locate and assess populations of the species (e.g. Thorp 1999, 2008).

The Franklin bumble bee is on the California Department of Fish and Wildlife Special Animals List (CDFW 2018) and has been included as Critically Endangered on the IUCN Red List for more than a decade (Kevan 2008). The species has a NatureServe Global Status rank of G1 (Critically Imperiled) and a State rank of S1 (Critically Imperiled) both in California and in Oregon (NatureServe 2018). The Xerces Society (a nonprofit insect conservation group and a petitioner) lists the species as Critically Imperiled in their Red List of Pollinator Insects of North America (Thorp 2005).

2. Other Relevant Scientific Information

Under Forest Service policy, Sensitive Species are to be managed in a way that ensures their viability and precludes trends toward endangerment. All Forest Service planned, funded, executed, or permitted programs and activities are reviewed under the National Environmental Policy Act (NEPA) for possible adverse effects on Sensitive Species. However, the Sensitive Species designation and the NEPA process only require consideration and disclosure of impacts, not necessarily avoidance, so even if it is determined that Franklin bumble bees will be harmed or killed by an action, that action may still be undertaken.

Some factors the Petition identifies as threats to the petitioned species, including herbicide and pesticide application, commercial bees, and disease, are subject to various forms of federal and State regulatory oversight. However, these regulatory mechanisms are not specifically designed to conserve or recover Franklin bumble bee populations.

3. Conclusion

The Petition suggests a sharp decline in Franklin bumble bee populations and indicates that existing management efforts are inadequate to offset possible threats to the species. Although the species is being considered for listing under the ESA and is on the Department’s Special Animals List, these designations do not afford specific protections.

J. Suggestions for Future Management

1. Scientific Information in the Petition

The Petition provides suggestions for future management on pages 65 to 73. It first outlines management actions that would benefit all bumble bees, including the petitioned species. Management actions to protect or enhance flower, nesting, and overwintering resources are expected to benefit the species. These include: practices that ameliorate or reduce the frequency of ground disturbance of nesting habitat or overwintering habitat (Black et al. 2011, Osborne et al. 2008); restoring appropriate native flower resources throughout the flight period (Aldridge et al. 2011, Mäder et al. 2011); reducing exposure to harmful pesticides, diseases, and competitors such as nonnative bees (Cane and Tepedino 2016, Mallinger et al. 2017, Geldmann & González-Varo 2018); and managing land use in a manner compatible with burrowing animal populations that provide important nesting sites for bumble bees (McFrederick and LeBuhn 2006).

Concerning the Franklin bumble bee specifically, the Petition asserts that comprehensive surveys in the species’ historic range need to continue along with additional research on the life history of the species and, should an extant population be discovered, factors contributing to its decline. It also notes protection of the Franklin bumble bee's habitat and suitable nest sites should be prioritized to help conserve the species and aid its recovery.

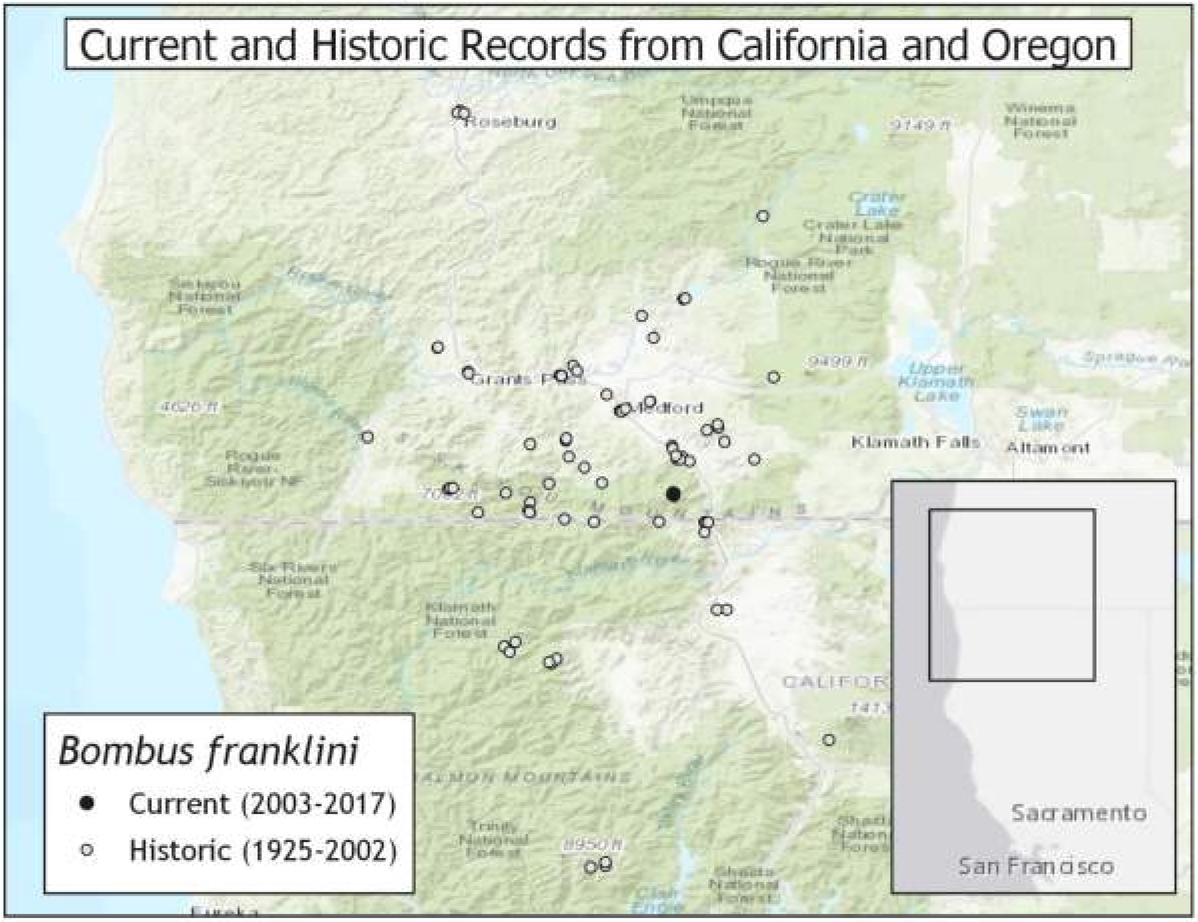
2. Conclusion

The Petition indicates additional, known management actions may aid in conserving the Franklin bumble bee in California, and additional research may help to determine where and how to best implement these measures.

K. Detailed Distribution Map

1. Scientific Information in the Petition

Franklin's bumble bee (*Bombus franklini*) Global Distribution



2. Conclusion

The distribution map illustrates the Franklin bumble bee's historic distribution and what little is known about its current distribution.

III.3. Western bumble bee (*Bombus occidentalis occidentalis*)

A. Population Trend

1. Scientific Information in the Petition

The Petition discusses population trend for the Western bumble bee on pages 6 to 9 and pages 16 to 19. The Petition notes the Western bumble bee was once very common in the western United States, but it has recently undergone a dramatic decline in abundance and distribution and is no longer present across much of its historic range. The Petition presents an approach for estimating the relative abundance of the Western bumble bee. This approach analyzed the ratio of all Western bumble bee records to the records for all North American bumble bee species. This analysis included all North American records for the Western bumble bee, so it is related, but not limited to, California. Comparing two time periods – historic (1805-2001) *versus* recent (2002-2012) – the Petition concludes the species' relative abundance has declined by 84 percent. Although the Petition does not include a California-specific relative abundance analysis, it does indicate decline is most significant at the edges of the species' range, including California (unpublished).

2. Other Relevant Scientific Information

Williams et al. (2014) state that the Western bumble bee was "[f]ormerly common throughout much of its range, but populations from central CA [California] to southern BC [British Columbia] and west of the Sierra-Cascade Ranges have declined sharply since the late 1990s."
Thorp (2008) reported a collapse of the Western bumble bee population in his Franklin bumble bee survey area (northwest California and southwest Oregon) from 12 percent of all bumble bee individuals in 1998 to none observed between 2003 and 2007.

3. Conclusion

The information provided in the Petition and other relevant scientific information indicates a significant decline in abundance, including in the California portion of its range.

B. Range

1. Scientific Information in the Petition

The Petition discusses the species' range on pages 6 to 9, pages 16 to 19, and page 116. The Petition describes the historical range of the Western bumble bee in California as stretching from the Channel Islands to the northern extent of the state, primarily in the coastal and Sierra Nevada ranges and mostly excluding the Central Valley and drier, warmer areas. It notes that Cameron et al. (2011a), comparing 2007-2009 records versus 1900-1999, estimated a 28 percent range decline in North America, and in recent years (2002-2012), the North American range of this species has declined by about half. A California-specific analysis is not included, but the Petition notes the species appears to be increasingly restricted to the Sierra-Cascades and coastal areas.

2. Conclusion

The Petition presents what limited information is available regarding the current California range of the Western bumble bee. Preliminary information suggests its range may be retracting at warmer or lower-elevation margins.

C. Distribution

1. Scientific Information in the Petition

Information concerning distribution appears on pages 6 to 9 and pages 16 to 19 of the petition. The Petition examines Western bumble bee persistence, or change in distribution, in 50-km grid squares across the bee's historic range. The Petition reports a 33 percent decline in persistence. In California, Western bumble bee populations are now largely restricted to high elevation sites in the Sierra Nevada (Xerces Society 2012) and scattered observations along the California coast (Xerces Society et al. 2017).

2. Other Relevant Scientific Information

The Department is aware of a Western bumble bee observation on October 5, 2017 in the Sierra Nevada seven miles south of Sierraville, in Sierra County, California. There are a small number of other post-2002 records in the Department's CNDDB/Rarefind/BIOS system that may not be included in the Petition.

3. Conclusion

The Petition presents sufficient information on the historical and current distribution of the Western bumble bee and indicates the distribution in California is now largely restricted to high elevation sites in the Sierra Nevada and a few scattered areas along the California coast.

D. Abundance

1. Scientific Information in the Petition

The petition discusses abundance on pages 6 to 9 and pages 16 to 19. Although the Petition only provides approximately 20 records concerning the species' current abundance and distribution in the state, it does note that in California, Western bumble bee populations are now largely restricted to high elevation sites in the Sierra Nevada (Xerces Society 2012), though there have been a few observations of this species near the coast.

2. Other Relevant Scientific Information

Williams et al. (2014) state that Western bumble bee populations, formerly common, have declined sharply since the late 1990s from central California to southern British Columbia. Koch et al. (2012) refer to a "severe population decline west of the Sierra-Cascade Crest." Thorp

(2008) reported a collapse of Western bumble bee abundance in his Franklin bumble bee survey area in northwest California and southwest Oregon from 12 percent of all bumblebee individuals in 1998 to no observation during surveys conducted from 2003 to 2007. In a study of four Sierra Nevada meadows examining 415 bumble bee individuals, a single Western bumble bee was found (Terry et al. 2018).

3. Conclusion

The information in the Petition and other relevant scientific information indicate a decline in abundance in California.

E. Life History

1. Scientific Information in the Petition

Information concerning life history appears on pages 27 to 28 and pages 33 to 35 of the Petition. The Petition states that the flight period for the Western bumble bee in California is from early February to late November, peaking in late June and late September. The flight period for workers and males in California is from early April to early November, with worker abundance peaking in early August and male abundance peaking in early September (Thorp et al. 1983). It notes Western bumble bees primarily nest in underground cavities such as old squirrel burrows or other animal nests on open west-southwest slopes bordered by trees, although a few nests have been reported in above-ground locations (Plath 1922; Hobbs 1968; Thorp et al. 1983; Macfarlane et al. 1994). Western bumble bee colonies can contain as many as 1,685 workers and produce up to 360 new queens; this colony size is considered large relative to many other species of bumble bees (Macfarlane et al. 1994). Little is known about the hibernacula, or overwintering sites, of Western bumble bees, although Hobbs (1968) reported Western bumble bee hibernacula that were two inches deep in a “steep west slope of the mound of earth.” The Petition also notes the closely related *B. terrestris* reportedly hibernates beneath trees (Sladen 1912 in Hobbs 1968).

2. Conclusion

The Petition provides sufficient scientific information about the life history of the Western bumble bee in California.

F. Kind of Habitat Necessary for Survival

1. Scientific Information in the Petition

The Petition addresses Western bumble bee habitat requirements on pages 33 to 35. It states that the Western bumble bee nests, forages, and overwinters in meadows and grasslands with abundant floral resources and may be found in some natural areas within urban environments

(Williams et al, 2014). The Petition notes that, in recent years, the species has become restricted to higher elevations and coastal habitats of this type in California.

Western bumble bees are generalist foragers that have been reported visiting a wide variety of flowering plants, but they require plants that bloom and provide adequate nectar and pollen throughout the colony's flight period from as early as February to late November. The Petition describes nesting habitat as typically underground, such as in old animal burrows, and notes that the availability of nest sites may be tied to the presence of such burrows (Evans et al. 2008). However, the Petition also notes that the species may also be able to nest aboveground such as in log cavities (Hobbs 1968, Macfarlane et al. 1994). Little is known about the hibernacula, or overwintering sites, of Western bumble bees, but they are probably in friable soil or under plant litter or debris.

2. Conclusion

The Petition provides sufficient information about the kind of habitat necessary for survival of the Western bumble bee in California.

G. Factors Affecting the Ability to Survive and Reproduce

1. Scientific Information in the Petition

The Petition discusses factors affecting the Western bumble bee's ability to survive and reproduce on pages 37 to 62. As outlined in section II.D., the Petition describes several threats to all bumble bees, including the Western bumble bee. These include habitat loss and degradation, disease, competition, toxins, and climate change.

The Petition indicates the fungal pathogen *N. bombi* has been implicated in the decline of the Western bumble bee (Colla et al. 2006; Otterstatter & Thomson 2008; Murray et al. 2013; Graystock et al. 2016; Cameron et al. 2016). This pathogen may be transmitted by commercial bees. The Petition also highlights research indicating declining Western bumble bee populations have lower genetic diversity compared to populations of co-occurring stable species (Cameron et al. 2011a; Lozier et al. 2011). Low genetic diversity can reduce evolutionary adaptability and increase developmental defects or mortality, thereby further threatening population viability.

In addition, the Petition notes the Western bumble bee's historical range overlaps marginally with the Central Valley of California, which experiences high use of glyphosate – the most commonly used pesticide within the state of California (CDPR 2014). See Section II.D.4, for a discussion of potential threats of glyphosate to bumble bees. The Petition states that agricultural and urban expansion also limit the utility of the Central Valley as habitat for the Western bumble bee.

2. Conclusion

The Petition adequately describes factors affecting the Western bumble bee's ability to survive and reproduce. It indicates that disease, habitat loss, genetic diversity, and pesticides may be contributing to the species' decline.

H. Degree and Immediacy of Threat

1. Scientific Information in the Petition

The Petition discusses the degree and immediacy of threats to the Western bumble bee on pages 16 to 17 and pages 62 to 63. The Petition highlights that bumble bees as a whole are threatened by a number of factors, including agricultural intensification, habitat loss and degradation, pesticide use, pathogens from managed pollinators, competition with non-native bees, climate change, and genetic factors (reviewed in Goulson 2010; Williams et al. 2009; Williams and Osborne 2009; Cameron et al. 2011b; Hatfield et al. 2012; Fürst et al. 2014). It notes the species is declining in California and states that current regulations and regulatory mechanisms are inadequate to protect Western bumble bees against the threats they face within California. The Petition states that, without protective measures, the Western bumble bee is likely to go extinct in California.

2. Conclusion

The Petition presents sufficient information to indicate the Western bumble bee may be subject to substantial and present threats within California. The Petition suggests a decline in Western bumble bee population and distribution within California, and that this trend may continue without action to conserve the species.

I. Impact of Existing Management Efforts

1. Scientific Information in the Petition

The Petition discusses the impact of existing management efforts on page 64. The Petition notes the Western bumble bee does not receive formal protection under federal or California law. The full species, *B. occidentalis,* has been petitioned for federal endangered species status and received a substantial 90-day finding that federal listing of the species may be warranted, and it is currently the focus of a Species Status Assessment by the U.S. Fish and Wildlife Service to determine if the species warrants ESA listing (USFWS 2016).

The Western bumble bee is on the Department's Special Animals List (CDFW 2018), which may encourage its consideration in review of projects under CEQA. The subspecies has a NatureServe Global Status rank of T1T3, its status is in the range between "Vulnerable" and "Critically Imperiled" is not secure" (NatureServe 2018). An IUCN Red List category has not yet been formally assigned for *B. o. occidentalis,* but the full species (*B. occidentalis*) is listed as

Vulnerable to extinction (Hatfield et al. 2015b). The species is listed as a “Sensitive Species” by the U.S. Forest Service in California (USFS 2013), and the Petition notes that although it does not receive formal protection, any conservation or management actions implemented on National Forests in California may provide some benefit to this species due to its “Sensitive Species” status. The Petition did not identify any known specific management actions or recovery plans in the state of California being implemented for the species.

2. Other Relevant Scientific Information

Under Forest Service policy, Sensitive Species are to be managed in a way that ensures their viability and precludes trends toward endangerment. All Forest Service planned, funded, executed, or permitted programs and activities receive review under NEPA for possible adverse effects on Sensitive Species. However, the Sensitive Species designation and the NEPA process only require that impacts to the species be considered and disclosed, not necessarily avoided, so even if it is determined that Western bumble bees will be harmed or killed by an action, that action may still be undertaken.

Some factors that may result in threats to the petitioned species, including herbicide and pesticides, competition, and disease, are subject to various forms of federal and State regulatory oversight. However, these regulatory mechanisms are not specifically designed to conserve or recover Western bumble bee populations.

3. Conclusion

The Petition suggests a steep decline in the Western bumble bee’s abundance and distribution and provides sufficient information to raise concerns about whether existing management adequately offsets possible threats to the species. Although the species is on the Department’s Special Animals List and the full species, *B. occidentalis,* is being evaluated for federal listing under the ESA, these designations do not afford the species any specific protections.

J. Suggestions for Future Management

1. Scientific Information in the Petition

The Petition provides suggestions for future management on pages 65-73. The Petition first outlines management actions that would benefit all bumble bees, including the petitioned species. Management actions to protect or enhance flower, nesting, and overwintering resources are expected to benefit the species. These include: practices that ameliorate or reduce the frequency of ground disturbance of nesting habitat or overwintering habitat (Osborne et al. 2008, Black et al. 2011); restoring appropriate native flower resources throughout the flight period (Aldridge et al. 2011, Mäder et al. 2011); reducing exposure to harmful pesticides, diseases, and competitors, such as nonnative honeybees (Cane and Tepedino 2016, Mallinger et al. 2017, Geldmann & González-Varo 2018); and managing land use in a way that is compatible with burrowing animal populations that provide nesting sites for the species (McFrederick and LeBuhn 2006).

Concerning the Western bumble bee specifically, the Petition asserts the need for additional comprehensive surveys of this species at historic and potential sites throughout its California range and the need for more research to evaluate basic life history and ecological needs. The Petition also recommends protecting known and potential sites from practices, such as livestock grazing, and other threats, such as conifer encroachment, that can interfere with the species' habitat requirements. It also states that the placement of managed bees in areas that may be occupied by Western bumble bees should be carefully considered to reduce competition and exposure to pathogens.

2. Conclusion

The Petition indicates there are known management actions that may aid in conserving the Western bumble bee in California.

K. Detailed Distribution Map

1. Scientific Information in the Petition

Western bumble bee (*Bombus occidentalis occidentalis*) California Distribution

2. Conclusion

The distribution map illustrates the Western bumble bee's historical and contemporary distribution in California.

III.4. Suckley cuckoo bumble bee (*Bombus suckleyi*)

A. Population Trend

1. Scientific Information in the Petition

The Petition discusses population trend for the Suckley cuckoo bumble bee on pages 6 to 9 and pages 16 to 20. The Petition presents scientific information regarding the population trend of the Suckley cuckoo bumble bee throughout its range in North America, suggesting a dramatic decline. The Petition only provides two data points concerning the Suckley cuckoo bumble bee's current range in California.

However, the Petition does provide additional indirect evidence of the Suckley cuckoo bumble bee's population trend in California. The Petition states that the Suckley cuckoo bumble bee is entirely dependent upon Western bumble bees for reproduction and therefore, Suckley cuckoo bumble bee population trends are directly linked to Western bumble bee population trends. Regarding the population trend of the host, the Petition estimates Western bumble bee abundance has declined by more than 75 percent in North America during 2002 to 2012 relative to prior records, and that roughly half as many localities are occupied. The Petition notes that the Western bumble bee's decline is most significant at the edges of its range, including California, and the host species' distribution has retracted to higher elevation sites in the Sierra Nevada and scattered locations near the coast, which would presumably limit Suckley cuckoo bumble bee distribution and abundance.

2. Conclusion

The Petition presents sufficient information on what little is known about population trend of the Suckley cuckoo bumble bee in California. Although the two California data points are insufficient direct evidence to estimate a California population trend, the Western bumble bee's trend in California indicates that the Suckley Cuckoo bumble bee may be declining in the state because of its dependence on its declining host for reproduction.

B. Range

1. Scientific Information in the Petition

Information on the range of the Suckley cuckoo bumble bee appears on pages 16 to 20 and page 118 of the Petition. The Suckley cuckoo bumble bee's historical range includes the

Klamath Mountain region in northern California, as well as portions of 11 other states and three Canadian provinces.

The Petition states that the Suckley cuckoo bumble bee's North American range has declined by roughly one-half in size, although this determination is based on the little data available about the species' current range and may not accurately capture the exact rate of decline (2002-2012). The Petition only provides two data points on the Suckley cuckoo bumble bee's current California range, making it difficult to determine if the species' range has declined in California.

2. Other Relevant Scientific Information

The Department is aware of a historical report that the Suckley cuckoo bumble bee was observed in Orleans, Humboldt County, California, but details of observations or collections were not provided (Thorp et al. 1983).

3. Conclusion

The Petition adequately addresses what little is known about the Suckley cuckoo bumble bee's California range. However, given the lack of data about the species' current range, it is difficult to know if its California range has declined or is declining.

C. Distribution

1. Scientific Information in the Petition

Information regarding distribution appears on pages 6 to 9 and 16 to 20 of the Petition. Only three or four localities with few or no repeat surveys are known in California, and the Petition does not specifically address Suckley bumble bee distribution within California.

However, the Petition describes a steep decline in occupied localities throughout the Suckley cuckoo bumble bee's North American range, including an apparent reduction in occupied range and localities within the range. The Petition adds that while the species' range has significantly declined, the exact rate of decline is difficult to determine given the lack of information available on its current range. Declining distribution of its host, the Western bumble bee, may also plausibly cause the Suckley cuckoo bumble bee's distribution to contract.

2. Other Relevant Scientific Information

The Department is aware of a historic report that the Suckley cuckoo bumble bee was observed in Orleans, Humboldt County, California, but details of observations or collections were not provided (Thorp et al. 1983).

3. Conclusion

The Petition sufficiently addresses the known scientific information on the distribution of the Suckley bumble bee in California. This information indicates a decline in distribution throughout the species' North American range. The decline in its host species, the Western bumble bee, may be responsible or a contributing factor. It is difficult to determine if the Suckley cuckoo bumble bee's California distribution has declined considering the paucity of available data.

D. Abundance

1. Scientific Information in the Petition

The Petition discusses abundance on pages 6 to 9 and pages 16 to 20. The Petition estimates the Suckley cuckoo bumble bee's abundance has declined by approximately 90 percent throughout its range in North America, but it does not present an estimate regarding abundance within California. The Petition notes only two observations of the species reported in the state since 2002.

However, the Petition does present indirect evidence on the Suckley cuckoo bumble bee's abundance in California. Because the species is dependent on its host, the Western bumble bee, for reproduction, its abundance and distribution are also tied to its host. The Petition estimates Western bumble bee abundance has declined by more than three-quarters in North America, comparing 2002-2012 with prior years, and that roughly half as many localities are occupied. The Petition does not include an explicit discussion of Western bumble bee abundance trends within California, but it notes that in California, the host species' distribution has retracted to higher elevation sites in the Sierra Nevada and scattered locations near the coast, which would presumably limit Suckley bumble bee distribution and abundance. The Western bumble bee's current distribution map (see III.3.K) indicates the host species has not recently been observed within the Suckley cuckoo bumble bee's historic range, although there have been sightings nearby.

2. Conclusion

The Petition presents sufficient information on what little is known about the abundance of the Suckley cuckoo bumble bee in California. Although little direct evidence is available on the species' current abundance in California, data for its host species, the Western bumble bee, indicates the Suckley cuckoo bumble bee may be declining in abundance within the state.

E. Life History

1. Scientific Information in the Petition

Information concerning life history appears on pages 28 to 29 and pages 35 to 36 of the Petition. The Petition describes the Suckley cuckoo bumble bee as a social parasite that has only been documented to reproduce successfully within colonies of the Western bumble bee (Thorp et al. 1983). The Petition notes spatial and temporal co-occurrence with the host are essential. See section III.3.E for more information on the life history of the Western bumble bee.

The Petition also notes cuckoo bumble bees emerge from their hibernacula later in spring than other bumble bees. Suckley cuckoo bumble bee's flight period for females ranges from late May through October, peaking in June. Males fly July through September (Thorp et al. 1983). Upon emerging from hibernation, the female forages (visits flowers) while searching for a suitable host bumble bee nest. Upon finding a nest, she enters, kills or subdues the queen, and using pheromones or physical attacks, "enslaves" the host workers. Then she lays her own eggs and forces the host workers to feed her and her young. All resulting Suckley cuckoo bumble bee offspring are reproductive – not workers – and leave the colony to mate. Male Suckley cuckoo bumble bees patrol circuits in search of mates. Mated females seek a place to overwinter, and the cycle repeats. Little is known about the hibernacula, or overwintering sites, of the Suckley cuckoo bumble bee, although bumble bees of other species are known to overwinter in soft, disturbed soil (Goulson 2010) or under leaf litter or other debris (Williams et al. 2014).

2. Other Relevant Scientific Information

Male bumble bees visit flowers for energy while they look for females (Thorp et al. 1983).

3. Conclusion

The Petition provides sufficient scientific information regarding the Suckley cuckoo bumble bee's life history.

F. Kind of Habitat Necessary for Survival

1. Scientific Information in the Petition

The Petition addresses the Suckley cuckoo bumble bee's habitat requirements on pages 35 to 36. The Petition notes that Suckley cuckoo bumble bees require floral resources during the free-flying portions of their life. They have been observed primarily visiting composite flowers (e.g., *Aster*, *Centaurea*, *Cirsium*, *Solidago*) and also *Penstemon* and *Salix* (Thorp et al. 1983). Overwintering requirements of Suckley cuckoo bumble bees are not specifically known. Other species generally bury themselves in soft soil or under leaf litter or other debris.

The Petition notes that Suckley cuckoo bumble bees use Western bumble bee colonies as hosts and have only been observed reproducing in Western bumble bee nests. As a result, their essential habitat not only must include their own floral and overwintering requirements, but also those of their host species (see section III.3.F for discussion of the Western bumble bee's habitat requirements).

2. Conclusion

The Petition presents sufficient information regarding the kind of habitat necessary to the Suckley cuckoo bumble bee for survival. It indicates the species requires habitat with resources that support its own needs and also those of its host, the Western bumble bee.

G. Factors Affecting the Ability to Survive and Reproduce

1. Scientific Information in the Petition

The Petition discusses factors affecting the Suckley cuckoo bumble bee's ability to survive and reproduce on pages 37 to 62. As outlined in section II.D., the Petition highlights several threats to all bumble bees, including the Suckley cuckoo bumble bee. These include habitat modification, herbicides, pesticides, competition, disease, and population dynamics. Additionally, factors affecting the Western bumble bee (see section III.3.G.) indirectly impact the Suckley cuckoo bumble bee due to their host-parasite relationship. The Petition highlights that the pathogen *N. bombi* may threaten the continued existence of the species directly, as well as indirectly by reducing the population of its host, the Western bumble bee.

2. Conclusion

The Petition adequately describes factors affecting the Suckley cuckoo bumble bee's ability to survive and reproduce, including the factors affecting its host, the Western bumble bee.

H. Degree and Immediacy of Threat

1. Scientific Information in the Petition

The Petition discusses the degree and immediacy of the threat to the Suckley cuckoo bumble bee on pages 62 to 63. The Petition highlights that bumble bees as a whole are threatened by a number of factors including agricultural intensification, habitat loss and degradation, pesticide use, pathogens from managed pollinators, competition with non-native bees, climate change, and genetic factors (reviewed in Goulson 2010; Williams et al. 2009; Williams and Osborne 2009; Cameron et al. 2011b; Hatfield et al. 2012; Fürst et al. 2014). It notes the magnitude of loss and rate of decline the Suckley cuckoo bumble bee has experienced and states that current regulations and regulatory mechanisms are inadequate to protect Suckley cuckoo bumble bees against the threats they face within California. The Petition states that, without protective measures, the Suckley cuckoo bumble bee is likely to go extinct in California. Potential loss of its host, the Western bumble bee, is noted as a particular threat to this cuckoo bumble bee.

2. Conclusion

The Petition presents sufficient information to indicate that the Suckley cuckoo bumble bee may be subject to substantial and present threats within California, due to the decline of its host, the Western bumble bee, and from disease and other factors.

I. Impact of Existing Management Efforts

1. Scientific Information in the Petition

The Petition discusses the impact of existing management efforts on page 63. The Petition notes that the Suckley cuckoo bumble bee is on the Department's Special Animals List (CDFW 2018) and is listed as Critically Endangered by the IUCN Red List (Hatfield et al. 2015c). Range wide, the species has a NatureServe Global Status rank of G1G3 (Critically Imperiled to Vulnerable) and a state rank of S1 (Critically Imperiled) in California (NatureServe 2018).

2. Other Relevant Scientific Information

Some factors that may result in threats to the petitioned species, including herbicides and pesticides, competition, and disease, are subject to various forms of federal and State regulatory oversight. However, these regulatory mechanisms are not specifically designed to conserve or recover Suckley cuckoo bumble bee populations.

3. Conclusion

The Petition provides sufficient information to raise concerns about whether existing management adequately offsets possible threats to the species. Although the species is on the Department's Special Animals list and designated on other organizations' lists, these designations do not afford the species specific protections, and the Petition does not indicate there are any other management actions specifically designed and implemented to conserve or recover the Suckley cuckoo bumble bee.

J. Suggestions for Future Management

1. Scientific Information in the Petition

The Petition provides suggestions for future management on pages 65 to 73. The Petition first outlines management actions that would benefit all bumble bees, including the petitioned species. Management actions to protect or enhance flower, nesting, and overwintering resources are expected to benefit the species. These include: practices that ameliorate or reduce the frequency of ground disturbance of nesting habitat or overwintering habitat (Black et al. 2011, Osborne et al. 2008); restoring appropriate native flower resources throughout the flight period (Aldridge et al. 2011, Mäder et al. 2011); reducing exposure to harmful pesticides, diseases, and competitors such as nonnative bees (Cane and Tepedino 2016, Geldmann & González-Varo 2018, Mallinger et al. 2017); and managing land use in a way that is compatible with burrowing animal populations that provide nesting sites for native bumble bees (McFrederick and LeBuhn 2006).

Addressing the Suckley cuckoo bumble bee specifically, the Petition asserts that more research is needed to determine if the species can use species other than the Western bumble bee to reproduce and notes additional life history information could improve understanding of the species' biological needs. The Petition also notes this species would benefit from management actions to protect known and potential sites from practices, such as livestock grazing, and other threats, such as conifer encroachment, that may interfere with the habitat requirements of this species or its host.

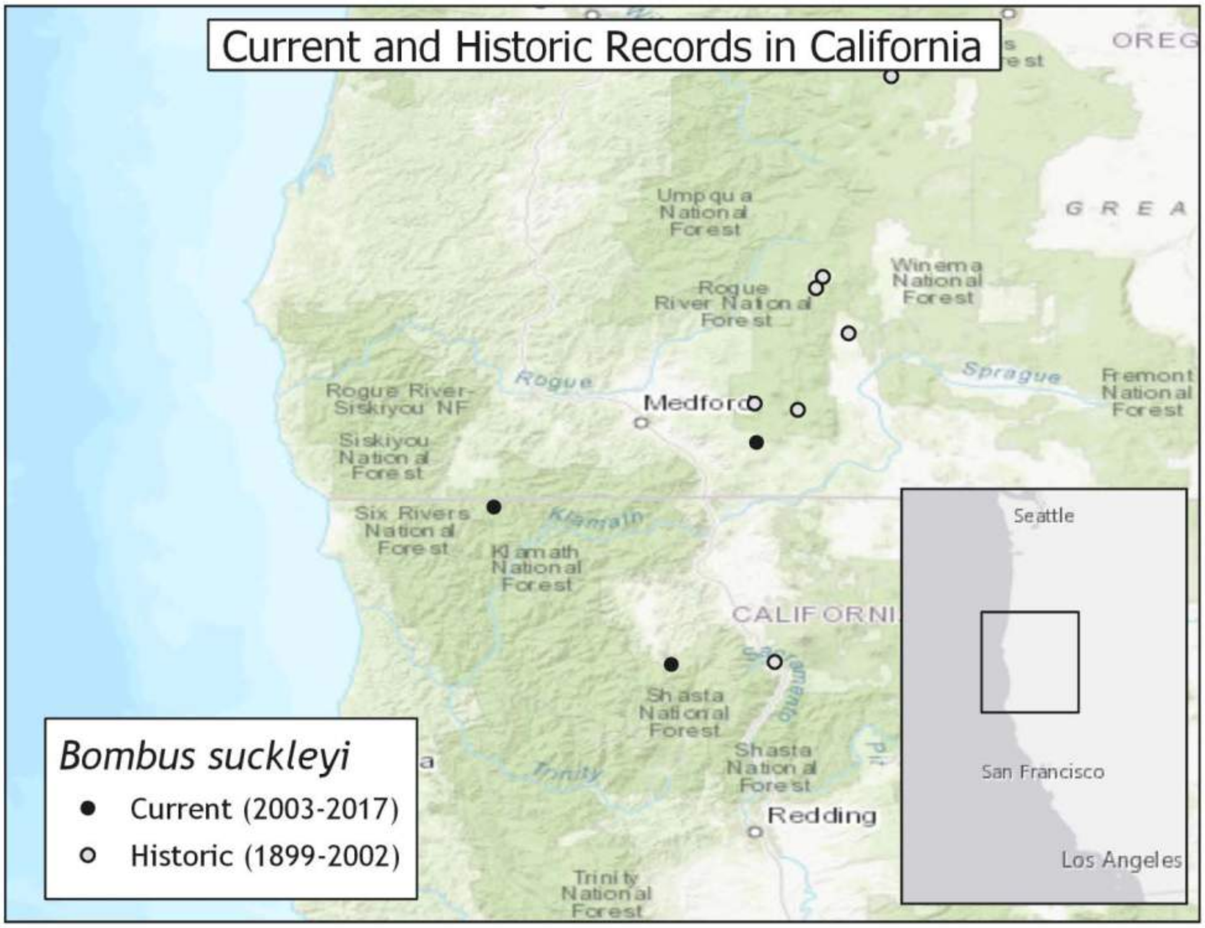
2. Conclusion

The Petition indicates additional, known management actions may aid in conserving the Suckley cuckoo bumble bee in California. The Petition also notes that further research into the species' life history and reproductive habits would improve understanding of the species, and this would contribute to the development of beneficial management practices.

K. Detailed Distribution Map

1. Scientific Information in the Petition

Suckley Cuckoo Bumble Bee (*Bombus suckleyi*) California Distribution



2. Other Relevant Scientific Information

One record of undetermined provenance may have been omitted from the map (see section III.4.B above).

3. Conclusion

The distribution map illustrates the Suckley cuckoo bumble bee's historic and contemporary distribution in California.

III.5. Sources and Availability of Information

A. Scientific Information in the Petition

The Petition cited over 300 sources of scientific information related to bumble bees, most of which are publicly available. Approximately 20 of these were cited specifically in relation to the Crotch bumble bee, 37 in relation to the Franklin bumble bee, 53 in relation to the Western bumble bee, and 22 in relation to the Suckley cuckoo bumble bee, in addition to references about related species or relevant to bumble bee biology generally. A small fraction of the cited sources are not readily available. The Petitioners provided electronic copies of most sources they cited in the Petition, including some unpublished sources, to the Department.

B. Other Relevant Scientific Information

The Department used additional sources of scientific information which are cited in this Petition Evaluation document.

C. Conclusion

The Petition contains sufficient available sources of information to inform whether the petitioned action may be warranted.

IV. Recommendation to the Commission

In completing its Petition Evaluation, the Department has determined the Petition provides sufficient scientific information to indicate the petitioned action may be warranted for the Crotch bumble bee, the Franklin bumble bee, the Western bumble bee, and the Suckley cuckoo bumble bee. Therefore, the Department recommends the Commission accept the Petition for further consideration under CESA.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 3

Burgin and Wotherspoon

The potential for golf courses to support restoration of biodiversity for BioBanking offsets

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The potential for golf courses to support restoration of biodiversity for BioBanking offsets

Shelley Burgin · Danny Wotherspoon

Abstract In golf course development there is frequently remnant vegetation on the areas unused for infrastructure. We propose that these areas, together with a whole range of other reserves including sporting fields, cemeteries, railway reserves and educational facilities may be the source of degraded remnant vegetation and associated open space that could be used to provide offsets for biodiversity. We followed the changes in vertebrate biodiversity with low key alteration to management of the Camden Lakeside Golf Course to assess if such areas had the potential for biodiversity banking offsets. Birds, bats, frogs and reptiles increased in species diversity over time. Frogs and reptiles tended to peak in species numbers during the observational period but bat and bird diversity continued to increase. We concluded that on this 'island' within a matrix of urbanisation and cleared agricultural lands without remnant vegetation, observed changes in diversity made such areas potential sites for biodiversity banking offsets.

Keywords Fauna · Habitat · Restoration · Biodiversity offset · Remnant woodland

Introduction

Throughout the world golf is a popular sport (Anon. 2008). There are more than 25,000 golf courses worldwide (Gange et al. 2003) and within Australia alone there are more than 1,500 (Anon. 2008). The historical origins of land for these courses varies but they are often constructed on areas of 'low' land value, such as that subject to flooding, considered poor agricultural land or simply available lands at a convenient distance from the centre of settlements. More recently golf courses, such as Camden Lakeside Golf Course on the

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Cumberland Plain in south-western Sydney which was constructed 15 years ago (Anon. 2008), has been developed on degraded pasture land.

The land required to provide a competition-sized golf course is rarely less than 40 ha and has been more than double (Anon. 2008). As an irrigated landscape, they usually encompass extensive aquatic habitat used for water storages, water quality control ponds and/or drainage line riparian zones. Remnant native vegetation not removed for infrastructure, such as fairways and the club house, are frequently retained as remnants of native vegetation, neglected and invaded by weeds.

The increased fragmentation of natural vegetation due to the expansion of cities, such as Sydney, has resulted in the loss of habitat for native species both within and beyond the city limits. For example, the on-going erosion of the woodlands of the Cumberland Plain in western Sydney has resulted in approximately 95% loss of the original extent of these native ecosystems: this community is now classified as an endangered ecological community under the *New South Wales Threatened Species Conservation Act 1995* (DECC 2005). Even with this classification, the remaining woodland remnants continue to be lost largely due to the pressures of urban expansion in Western Sydney (Burgin 2008a, b; Wotherspoon and Burgin 2009). The fragmented remnants on golf courses provide islands of (often) degraded remnants that, by default, will become increasingly important for the maintenance of the area's biodiversity.

Over recent decades Australian governments have provided substantial on-going funding to encourage environmental restoration (Burgin 2002; Lunney et al. 2002). Most recently, Burke (2008) announced that the Federal Government would be providing $2.25 billion over 5 years to 'care for our country'. A major underlying concept of this on-going support has been the enhancement of biodiversity.

The *Threatened Species Conservation Amendment* (*Biodiversity Banking*) *Act 2006* was introduced in New South Wales to provide opportunities for the offset of vegetation loss, including in Western Sydney (Burgin 2008a). Degraded remnants associated with golf courses could therefore potentially be restored as an offset for degradation or loss of native habitat elsewhere. For example, for the restoration and/or expansion of remnants and extension of corridor linkages, together with additional landscape scale functions (Terman 1997; Alberti et al. 2003).

While it is often assumed that biodiversity has been enhanced by human intervention including the tree planting and weed eradication efforts of the local community through the Landcare network (Burgin et al. 2005), the demonstration that enhanced biodiversity can occur on small, degraded and irregular shaped remnants of habitat left by 'accident' in an increasingly urbanised landscape is effectively untested. In 1996 the Camden Lakeside Golf Course management switched from effectively ignoring their native remnants of Cumberland Plain Woodland to a focus on their restoration to enhance biodiversity. In this paper we review the outcomes of 5 years of intervention to enhance biodiversity, and comment on the efficiency of such areas as offsets for biodiversity (cf. BioBanking).

Study site

Site description

The Cumberland Plain at the western edge of Sydney has suffered clearing for over 200 years, first for grazing and more recently for expanding urbanisation and intensified agriculture. Currently, less than 6% natural vegetation remains (Tozer 2003; Burgin

2008a, b). Most remnants are small and may constitute a single habitat tree, dispersed throughout the landscape (Wotherspoon and Burgin 2009) and degraded due to exotic weed invasion, soil erosion, poor water quality in freshwater streams and loss of structural habitat for fauna.

The Camden Lakeside Golf Course lands covers 93 ha (10 ha club infrastructure, 20 ha golf course, 63 ha Cumberland Plain Woodland and grasslands) in the south-west of the Cumberland Plain. The Golf course is adjacent to cleared land, currently used for tourism activities, grazing and two additional golf courses (with no stands of endemic trees). Urbanisation separates the site from intact woodlands leaving remnants within the golf course isolated.

Prior to development of the golf course, the vegetation was degraded open woodland and grassland that had been part of an over-grazed cattle property with no intact water bodies, and existing water courses were eroded. With the subsequent golf course development impoundments including storage lakes and ponds were constructed. Beyond the infrastructure boundary, degraded remnant vegetation was initially ignored: left to uncontrolled growth of grasses and herbs where exotic species dominated (Fig. 1). Without grazing to reduce herbage there was no control on the accumulation of vegetative biomass.

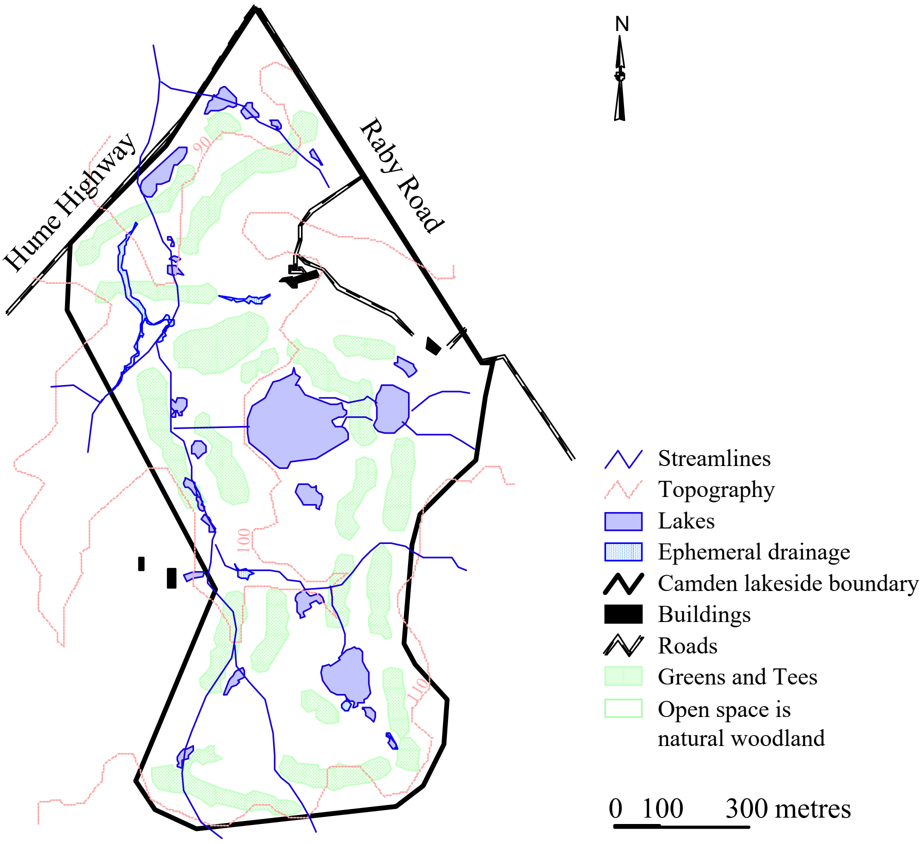

Fig. 1 Map of the Camden Lakeside Golf Course

The golf course was designed in 1993 (Anon. 2008), during 1996 a targeted 5 year (1997–2001) program was introduced to increase faunal biodiversity. This included a planting regime of endemic species to provide shrubs and trees for structural habitat, exotic weed removal, and the reintroduction of coarse woody debris onto the woodland floor. A changed mowing regime was introduced to allow the development of grasslands. The mowing pattern was also changed to allow areas of rough to maintain greater height, and where the previous mown area had extended to the water's edge around ponds, a narrow band of herb vegetation was retained as a 'frog fringe'. Changes in the approach to on-site tree lopping also occurred to promote tree hollow development since several local mammal and bird species require these for nesting and shelter sites.

By 2004 tree cover consisted of both clumps and scattered individual trees of mixed age stands with healthy re-growth. Reintroduction of local endemic species was a management priority. The lack of tree hollows for fauna nest and shelter sites has been supplemented with artificial hollows. Regeneration in the cleared areas consists of early pioneer species including developing dense stands of wattles (*Acacia* spp.). Along the watercourses aquatic plants have flourished with large emergent species established, introduced by natural dispersal from adjacent areas.

The endemic grass community is managed to promote biodiversity and coverage and is therefore largely intact, with invasive weeds and grasses the target of intensive eradication measures.

Fauna surveys

Seasonal surveys (as appropriate for the suite of species targeted) were undertaken between 1996 and 2004. The timing of surveys was determined by the junior author who has 20 years of fauna survey experience in Western Sydney. The aim of the surveys was to maximise the number of species recorded across a year, and thus weather conditions and season were considered for each suite of species (e.g., frogs, migratory birds, reptiles) in determining timing of surveys. The sampling effort for each suite of species was equivalent for each year that sampling was undertaken.

Nocturnal searches were carried out for a maximum of 6 h duration, and consisted of a spotlight search for arboreal mammals and nocturnal birds. During or immediately after, frogs were sampled by walking the perimeter of each pond to identify calling frogs (cf. Ferraro and Burgin 1993; Lane and Burgin 2008). In addition daytime searches for birds and reptiles were conducted. The bird census was carried out at 11 sites that included a range of habitats. At each site 10 min counts were made of all birds within a 50 m radius. The reptile search of up to four man-hour duration was made in each season. This was achieved by specifically targeting potential natural shelter sites. Twelve artificial shelters (roof tiles), distributed randomly across the site were also checked during surveys. Bat calls were recorded for 4 h at dusk, and identified by two independent experts. Throughout the study, incidental observations by golf course staff were incorporated into the dataset. Cumulative species numbers from seasonal surveys and incidental observations were the basis for the annual figure.

To compare the probable historical biodiversity with current fauna, frog, reptile and bat records were collated primarily from the *Atlas of New South Wales Wildlife* (NPWS 2004) but supplemented with other available data (Wotherspoon unpbl.; Cumberland Bird Observers Club, Anon. 2004). These data were used as the basis for predicted biodiversity.

Results of surveys

The record of animals is presented in Table 1. In all vertebrate groups, the numbers of species using the site increased over the 5 year period of survey (frogs 30%, reptiles 62.5%, birds 53.6%; bats 63.8%, see Fig. 2). Effectively all species observed either became established or subsequently visited the area as part of their migratory movement. Recovery as a percentage of predicted species for the area was less than 25% for the reptiles and birds, and closer to 50% for the frogs and bats (see Table 2). Despite these observations, after an initial increase in species numbers, the frog and reptile species' numbers tended to plateau, while 'new' species of birds and bats continued to be collected in subsequent years of the survey.

Discussion

Changes in frog diversity

Before biodiversity became a focus of the management on the Camden Lakeside Golf Course, the numbers of birds, bats and reptiles on the site compared to predicted numbers were uniformly low compared to frogs. Over the 5 years of study all groups increased substantially although the increase in the frog species diversity was minimal compared to the other taxa. Moreover, their diversity was the first taxon to plateau (see Fig. 2). White and Burgin (2004) reported on herpetofauna of four urban reserves across Sydney's eastern suburbs that had been bounded by urbanisation for over 50 years. They deduced that between 25 and 41.2% of the frog species predicted to be historically present were extant. The diversity of frogs on the golf course when the survey began was close to the upper limit of this range (38.9%) and within 1 year of survey the numbers had reached a plateau of 55.6% of the predicted historical fauna, substantially above that found in the remnants of Eastern Sydney suburbs. However, in intact remnants of the Cumberland Plain Woodland within a peri-urban matrix, approximately 80% of the predicted diversity was present (White and Burgin 2004), and at least one of the missing species, *Heleioporus australiacus* the giant burrowing frog, may be missed in the *ad hoc* collection of data because of its burrowing habit (Burgin 2008b).

The frog species that were absent from the golf course were those considered to have limited tolerance to human disturbance, for example Bibron's toadlet *Pseudophryne bibroni* (White 2004) in contrast to those that commonly occur in association with human habitation, for example, *Limnodynastes peronii* (Hengl and Burgin 2002). Other species (e.g., Tyler's tree frog *Litoria tyleri*) are more selective in their habitat preference and tend to be found amongst vegetation adjacent to or overhanging permanent wetlands (Barker et al. 1995). The lack of increase beyond the first year of survey indicated that this group may have reached their peak of biodiversity under current management regimes, or there was a lack of available source animals and/or opportunities for immigration into the area.

Changes in reptile diversity

Less than 10% of the reptile diversity predicted to be present was recorded in the surveys; the number of species has remained unchanged after an initial increase. Unlike frog diversity that increased to equivalent levels of eastern Sydney reserves, the predicted diversity remained below that previously recorded (28.1–45.7%). The reptile fauna on the

Table 1 Fauna species associated with remnants on the Camden Lakeside Golf Course 1996–2004 by survey and supplemented by data collected opportunistically

Common name	Scientific name
Birds	
Brown quail	*Coturnix ypsilophora*
Black swan	*Cygnus atratus*
Australian wood duck	*Chenonetta jubafa*
Pacific black duck	*Anas superciliosa*
Grey teal	*Anas gracilis*
Chestnut teal	*Anas castanea*
Australasian grebe	*Tachybaptus novaehollandiae*
Little pied cormorant	*Phalacrocorax melanoleucos*
Little black cormorant	*Phalacrocorax sulcirostris*
Australian pelican	*Pelecanus conspicillatus*
White-faced heron	*Egretta novaehollandiae*
Great egret	*Ardea alba*
Intermediate egret	*Ardea intermedia*
Cattle egret	*Ardea ibis*
Australian white ibis	*Threskiornis molucca*
Straw-necked ibis	*Threskiornis spinicollis*
Yellow-billed spoonbill	*Platelea flavipes*
Pacific baza	*Aviceda subscistata*
Black-shouldered kite	*Elanus axillaris*
Wedge-tailed eagle	*Aquila audax*
Little eagle	*Heiraetus morphnoides*
Brown falcon	*Falco berigora*
Australian hobby	*Falco longipennis*
Peregrine falcon	*Falco peregrinus*
Nankeen kestrel	*Falco cechroides*
Purple swamphen	*Porhyrio porhyrio*
Dusky moorhen	*Gallinula tenebrosa*
Eurasian coot	*Fulica atra*
Masked lapwing	*Vanellus miles*
Rock dove	*Columba livia*
Spotted turtle-dove	*Streptopelia chinensis*
Common bronzewing	*Phaps chalcoptera*
Crested pigeon	*Ocyphaps lophotes*
Gang-gang cockatoo	*Callocephalon fimbriatum*
Galah	*Cacatua rosiecapilla*
Long-billed corella	*Cacatua tenuirostris*
Little corella	*Cacatua sanguinea*
Sulphur-crested cockatoo	*Cacatua galerita*
Rainbow lorikeet	*Trichoglossus haematodus*
Eastern rosella	*Platycerus eximius*
Red-rumped parrot	*Psephotus haematonotus*
Fantailed cuckoo	*Cacomantis flabelliformis*
Tawny frogmouth	*Podargus strigoides*
Azure kingfisher	*Alcedo azurea*
Laughing kookaburra	*Dacelo novaeguineae*
Superb fairy-wren	*Malurus cyaneus*
Striated pardalote	*Pardalotus striatus*
Yellow-rumped thornbill	*Acanthiza chrysorrhoa*

Table 1 (continued)

Common name	Scientific name
Yellow thornbill	*Acanthiza nana*
Brown gerygone	*Gerygone mouki*
Red wattle bird	*Anthochaera carnunculata*
Noisy miner	*Manorina melanocephala*
White-plumed honeyeater	*Lichenostromus penicillatus*
Jacky winter	*Microeca fascinans*
Restless flycatcher	*Myiagar inquieta*
Magpie-lark	*Grallina cyanoleuca*
Grey fantail	*Rhipidura fulliginosa*
Willie wagtail	*Rhipidura leucophrys*
Black-faced cuckoo-shrike	*Coracina novaehollandiae*
White-winged triller	*Lalage sueurii*
Olive-backed oriole	*Oriolus sagittatus*
Grey butcherbird	*Cracticus torquatus*
Australian magpie	*Gymnorhina tibicen*
Australian raven	*Corvus coronoides*
White-winged chough	*Corcorax melanorhamphos*
Welcome swallow	*Hirundo noexena*
Tree martin	*Hirundo nigricans*
Fairy martin	*Hirundo ariel*
Clamourous reed-warbler	*Acrocephalus stentoreus*
Silvereye	*Zosterops laterali*
Common starling	*Sturnus vulgaris*
Common myna	*Acridotheres tristis*
Reptiles	
Long-necked tortoise	*Chelodina longicollis*
Lace monitor	*Varanus varius*
Striped skink	*Ctenotus robustus*
Eastern water skink	*Eulamprus quoyii*
Garden skink	*Lampropholis delicata*
Sun skink	*Lampropholis guichenoti*
Blue-tongued lizard	*Tiliqua scincoides*
Red-bellied black snake	*Pseudechis porphyriacus*
Eastern brown snake	*Pseudonaja textilis*
Frogs	
Eastern froglet	*Crinia signifera*
Striped marsh frog	*Limnodynastes peroni*
Spotted marsh frog	*Limnodynastes tasmaniensis*
Smooth toadlet	*Uperoleia laevigata*
Bleating tree frog	*Litoria dentata*
Green reed frog	*Litoria fallax*
Broad-palmed frog	*Litoria latopalmata*
Peron's frog	*Litoria peroni*
Tyler's frog	*Litoria tyleri*
Verreaux's tree frog	*Litoria verreauxii*
Bats	
Grey-headed fruit bat	*Pteropus poliocephalus*
Eastern broad-nosed bat/ Greater broad-nosed bat	*Scotorepens orion/ Scoteanax rueppellii*
Long-eared bat	*Nyctophilus sp.*
White-striped mastiff bat	*Tadarida australis*

Table 1 (continued)

Common name	Scientific name
Large-eared pied bat	*Chalinolobus dwyeri*
Large-footed myotis bat	*Myotis macropus*
Eastern little mastiff-bat	*Mormopterus norfolkensis*
Gould's wattled bat	*Chalinolobus gouldii*

golf course was in stark contrast to the 64% of predicted biodiversity reported for remnants in north-western Sydney (White and Burgin 2004), where most of the species not observed were either nocturnal or otherwise cryptic and therefore have been present but not targeted in the collation of data from the area (Burgin 2008b). Some species with potential source populations nearby, for example, the agamid *Pogona barbata* and the gecko *Underwoodisaurus millii*, were not present. Although Burgin (2008b) noted that the agamid *Amphibolurus muricatus* and the skink *Ctenotus robustus* were present in an adjacent area but not present in the small woodland fragments discussed. She suggested that this may have been due to a lack of appropriate habitat. However, it has been observed that generalist predatory species (e.g., Australian magpie *Gymnorhina tibicen*, grey butcherbird *Cracticus torquatus*, laughing kookaburra *Dacelo novaeguineae*) cross forage between woodlands and adjacent urban areas, and have a significant impact on small reptiles in small fragmented woodlands adjacent to urbanisation (Anderson and Burgin 2008). Predation pressure from such species could provide an explanation for why skink and snake diversity remained low on the golf course, with locally common and abundant species such as the yellow-faced whip snake *Demansia psammophis* apparently absent. In contrast, a range of

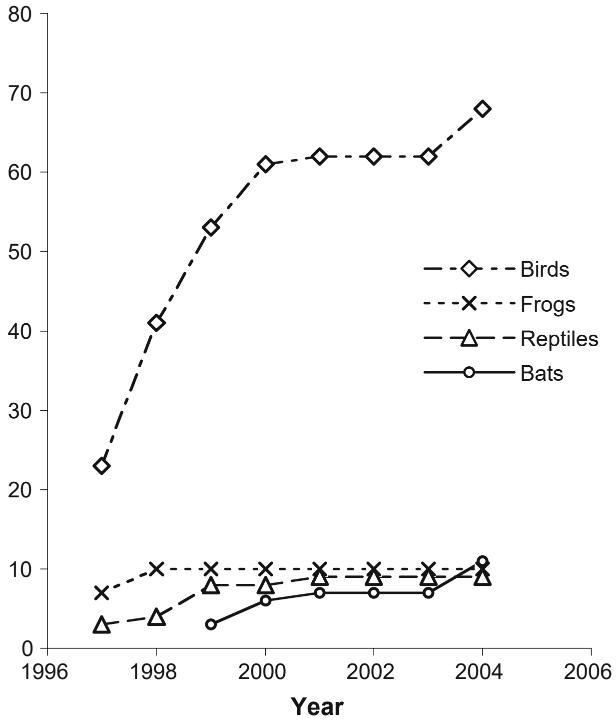

Fig. 2 Accumulated species curves from surveys undertaken at Camden Lakeside Golf Course between 1997 and 2004

Table 2 Number of species recorded in 1996 when the restoration of habitat was first introduced on the Camden Lakeview Golf Course, numbers after 5 years of intervention, together with percentage increase in species/group and percentage of predicted species for the area at the end of the survey period. Source of data for predicted numbers predominantly (NPWS 2004)

Animal group	Predicted number of species	Number in 1996 (% predicted)	Number in 2004 (% predicted)	% increase across survey
Birds	291	32 (11)	69 (23.7)	53.6
Bats	23	2 (8.7)	11 (47.8)	81.8
Frogs	18	7 (38.9)	10 (55.6)	30
Reptiles	37	3(8.1)	8 (21.6)	62.5

wetland types were available to encourage frogs to become established but since they are generally nocturnal (see Cogger 2000) they would not suffer the same predation pressure from the common predatory birds.

Change in bat diversity

Compared to herpetofauna, bats are more mobile and many species may range over great distances to find appropriate resources (Strahan 1995). The observation of Wotherspoon and Burgin (2009) that bats use even small, degraded remnants set aside for residential development, indicates that if an appropriate fragment of habitat is available, bats are likely to visit the area. In our study, the diversity was initially low and the increase in bats was the greatest of any taxon (Table 2). However despite this increase in diversity, fewer bat species were observed than Burgin (2008b) recorded in peri-urban remnants of north-western Sydney where overall mammals represented one-third of the extant species listed for Western Sydney (NPWS 1997). The bats that were recorded in the golf course surveys were generally those that are active above the canopy, whereas most of the species not recorded by Burgin (2008b) were ground dwelling mammals not surveyed on the golf course.

Changes in bird diversity

The bird fauna provides a conspicuous example of a taxon that is affected by urbanisation (Parsons and Major 2004). For example, Keast (1995) observed that between 1945 and 1995 there was a substantial decline in bird species across Sydney. The historical impact on birds of the survey area resulted in a low initial diversity and although the species number doubled during the survey period, the diversity remained low (Table 2). Burgin (2008b) recorded 94 species that represented 32.2% of the recorded extant species across western Sydney; however, distinct differences in species composition between the edge and core of remnants were recorded. The endemic small-bodied birds had been lost from edge areas and replaced by species that can cross-forage between the edge of remnants and the surrounding peri-urban matrix (e.g., laughing kookaburra, Australian magpie, noisy miner *Manorina melanocephala*) (Anderson and Burgin 2008). The same pattern of changed species composition occurred in our study as has been previously observed elsewhere with the encroachment of urbanisation (e.g., Catterall 2004; Parsons and Major 2004), and even within parklands (e.g., Recher 2004). Within urban Sydney, there have been major increases in the flocks of several parrot species (e.g., *Cacatua galerita* sulphur-crested cockatoo, *Cacatua sanguinea* little corella; Burgin and Saunders 2007), together with increased numbers of *Platalea regia* royal spoonbill, *Theskiornis molucca* white ibis, and

Threskiornis spinicollis straw-necked ibis (Burgin and Saunders 2007), including on the Cumberland Plain (Burgin 2008b). These species were also commonly observed within the golf course environs.

Conclusion

While under current management regimes two taxa (reptiles, frogs) may have reached their maximum within and surrounding the golf course, the bird and bat species diversities continue to increase. Although the percentage of historical diversity on the golf course falls well short of that found in intact, minimally disturbed remnants of Cumberland Plain Woodland (Burgin 2008b), and no equivalent figures are available for the early intervention stage in the Cumberland Plain Woodland, there appears to be the potential for a continued increase in animal diversity over time.

Although the restoration efforts of remnants tended to be ‘broad-brush’, without specifically targeting the requirements of any specific species, the number of taxa have increased, and although not quantified so has their abundance (pers. obs.). This was achieved without an alteration to the basic land use; the golf course continued to function as developed, without any restriction on golfers but with a perceived improvement in the local aesthetics.

While restoration of mine sites that mimic natural ecosystems have been demonstrated to create habitat for native species (e.g., Munro et al. 2007; Nichols and Grant 2007), there has been no such demonstration in highly fragmented communities such as golf courses, that have also suffered long-term challenges to their biodiversity, and the presence of urban expansion. In this study it was demonstrated that with limited planning and low key changes such as the introduction of shelter sites, weed removal and planting, a change in focus to habitat for local endemic fauna can result in substantial biodiversity changes that have been on-going. This demonstrates that there is the potential to use such areas as offsets for biodiversity.

Such opportunities are not restricted to golf courses, within urban centres and in their peri-urban boundaries and beyond there are a range of reserves that may have excess degraded land, for example, show grounds, race courses, sporting fields, education facilities, riparian zones, open space parks, railway reserves and travelling stock routes, that may have neglected remnants that could be enhanced to promote biodiversity within the local landscape, and therefore act as BioBanking reserves, without the requirement to change land use.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 4

Colding and Folke
The Role of Golf Courses in Biodiversity Conservation
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ECOSYSTEMS

The Role of Golf Courses in Biodiversity Conservation and Ecosystem Management

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ABSTRACT

We assessed the ecological value of golf courses based on a quantitative synthesis of studies in the scientific literature that have measured and compared biota on golf courses to that of biota in green-area habitats related to other land uses. We found that golf courses had higher ecological value in 64% of comparative cases. This pattern was consistent also for comparisons based on measures of species richness, as well as for comparisons of overall measures of birds and insects—the fauna groups most widely examined in the studies. Many golf courses also contribute to the preservation of fauna of conservation concern. More broadly, we found that the ecological value of golf courses significantly decreases with land types having low levels of anthropogenic impact, like natural and nature-protected areas. Conversely, the value of golf courses significantly increases with land that has high levels of anthropogenic impact, like agricultural and urban lands. From an ecosystem management perspective, golf courses represent a promising measure for restoring and enhancing biodiversity in ecologically simplified landscapes. Furthermore, the review suggests that golf courses hold a real potential to be designed and managed to promote critical ecosystem services, like pollination and natural pest control, providing an opportunity for joint collaboration among conservation, restoration and recreational interests.

Key words: golf; golf courses; biodiversity conservation; restoration; urban; land-use comparison; ecosystem services.

INTRODUCTION

Golf courses are subject to much debate in environmental terms because their construction often involves modification of natural habitats (Warnken and others 2001), and their management may involve excessive use of chemicals and irrigation (Pearce 1993). Although chemical contamination of water bodies from golf-course establishments still evokes concern (Joyce 1998; Neo 2001), a large-scale review in the United States concluded that there are generally no significant human toxicological impacts from golf courses to groundwater and surface water (Cohen and others 1999). During the last decade, scholars have proposed that golf courses play a role in the support of biodiversity, with an increasing number of case studies having assessed their values in ecological terms. However, no synthesis of those studies has been compiled, making it difficult to more comprehensively understand what role golf courses hold in

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J.C. have designed the study, performed research, the analysis of data and writing the paper, and C.F. has especially contributed to the latter two.

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biodiversity conservation and ecosystem management. In this article, our goal is to elucidate this relationship.

A more comprehensive understanding of the recreational land use of golf is motivated for several reasons. First, the number of courses is rapidly increasing in many parts of the world, with a strong correlation between golf-course development and economic growth (Dair and Schofield 1990). Given the recreational demands from rising urban populations, the number of golf courses will likely increase in the years to come, with a current estimate of over 31,500 courses worldwide (Tanner and Gange 2005). As of 2004, there were 16,057 golf courses in the United States alone (National Golf Foundation 2005), with some 300 new ones annually built over the past 30 years (Nicholls and Crompton 2007). Europe, holding about 5,800 courses, witnessed a yearly increase of 5% from 1990 to 2000, with one new golf course opened per week in the United Kingdom (European Institute of Golf Course Architects 2007; Hodgkison and others 2007a). The number of golf courses is also rising in suburban Australia (Hodgkison and others 2007a), Japan (Yasuda and Koike 2006), Southeast Asia (Neo 2001), and is presently booming in China where local governments believe that new courses will attract investors.

Second, golf courses in urban settings constitute large green-area habitats, even surpassing many nature reserves in size (Colding and others 2006a). Although they can cover landscape units up to 250 ha (Jones and others 2005), a typical 18-hole golf course averages about 54 ha of land. Between 40 and 70% of this land is non-playable, often with diverse native habitats (Tanner and Gange 2005). Potentially, urban golf courses could become more purposefully designed and managed for biodiversity and the promotion of critical ecosystem services.

Third, given the immense task of managing ecosystems and their services in more sustainable ways, the golfing sector could become an important partner in sustaining biota and processes in ecosystems. Both the Millennium Ecosystem Assessment and the Ecological Society of America have encouraged the development of land-management approaches that draw on cooperation among a greater set of scientists, land-use practitioners, the public and different sectors in society (MA, Millennium Ecosystem Assessment 2005; Palmer and others 2005). For this reason, a review of this kind may be particularly useful because it may foster a broadened understanding of what constraints and potentials the land use of golf holds in ecosystem management.

In this study, we assessed the ecological value of golf courses based on a quantitative synthesis of studies in the scientific literature that have measured and compared biota on golf courses to that of biota in green-area habitats related to other land uses. We refer to such studies as 'case–control studies'. We back up results from the quantitative analyses of case–control studies with other ecological findings on golf courses, as derived from the peer-reviewed ecological literature. We thoroughly discuss the obtained results in relation to biodiversity conservation and ecosystem management.

MATERIALS AND METHODS

Case–Control Study Characteristics

Databases primarily used to acquire case–control studies and other relevant, ecological findings on golf courses, included Google Scholars, the ISI Web of Knowledge, and the LIBRIS Web Search. Search terms encompassed ''golf'' and ''golf courses'' in combination with terms such as ''biodiversity'', ''biology'', ''birds'', ''conservation'', ''ecology'', ''ecosystems'', ''fauna'', ''flora'', ''mammals'', ''insects'', ''plants'', ''species'' and ''threatened species''.

A total of 17 case–control studies were found in the literature that described and compared biota on golf courses with other land types. These studies were published between 1996 and 2007 and encompassed 190 golf courses, with ten studies from the United States, and the rest from Europe, Australia, Canada, Japan and Trinidad (WI) (Table 1). Our sample derived mainly from the humid temperate climatic zones, with only two studies covering the dry and humid tropical domains, respectively (studies #5 and #16 in Table 1). We do not claim that we have found all the case–control studies related to biodiversity on golf courses, but a majority of those available in peer-reviewed scientific journals and books.

Taxa sampled in case–control studies included single species to whole assemblages of species. Eleven studies addressed birds (#1–9, #14, #17 in Table 1) with nine solely targeting this class. Six case–control studies targeted insects (#10–13, #16–17), and two each targeted amphibians (#12 and #14), reptiles (#15 and #17), macroinvetebrates (#12 and #13) and plants (#15 and #17).

Methods used for surveillance of taxa in case–control studies included installation of artificial nesting devices for birds (#1, #2, #3 in Table 1);

Table 1. Case–Control Studies Analyzed for Review, Including Surveyed Taxa, Origin and Type of Study

#	Taxa and location	Study type
1	Burrowing owl, *Athene cunicularia*. South-central Washington, USA	Use of natural and artificial burrows. Eight Gc vs. Cs in moderately disturbed industrial areas with little human presence
2	Eastern blue-bird, *S. sialis*. North Carolina, USA	Survey of reproductive parameters. Seven Gc vs. Cs in hayfields, old fields, and pastures
3	Eastern blue-bird, *S. sialis*, York County, Virginia, USA	Breeding performance. Nine G.c vs. ten structurally similar non-golf sites (parks, campuses, pastures, and recreational areas)
4	Birds of conservation concern. Virginia, USA	Survey determining whether golf courses provide habitat for birds of conservation concern. Eighty-seven Gc vs. Cs of landscapes that golf courses hade replaced (forested, agricultural and residential)
5	Bird assemblages. Albuquerque, New Mexico, USA	Comparative study of indigenous birds. Five Gc vs. five paired, control sites that reflect landscape conditions priror to construction of golf courses
6	Summer resident birds. Palo Alto, California, USA	Survey of summer resident birds across an urban gradient at six different control sites (golf course, biological preserve, recreational area, residential area, office park, business district)
7	Breeding birds. Agricultural and urban areas in Italy	Survey of birds with conservation status. Twenty-three Gc vs. Cs in agricultural and urban areas. Comparison also of bird community parameters at three golf courses with surrounding main land-cover types to evaluate golf courses contribution to bird enrichment at the local landscape-level
8	Breeding birds. Oxford, Ohio, USA	Survey of summer resident birds across an urban gradient at six different control sites (golf course, biological preserve, open space area, residential area, apartment area, business district)
9	Birds. Prairie Dunes, Kansas, USA	Comparison of birds on a golf course and a nearby State park of the same sand dune-grassland habitat
10	Butterflies (Papilionoidae and Hesperiidae). Oxford, Ohio, USA	Survey of butterfly species across an urban gradient at six different sites (golf course, biological preserve, open space area, residential area, apartment area, business district)
11	Butterflies (Papilionoidae and Hesperiidae). Palo Alto, California, USA	Survey of the distribution and abundance of butterfly species across an urban gradient at six different sites (golf course, biological preserve, recreational area, residential area, office park, business district)
12	Amphibians and macro-invertebrates. Stockholm, Sweden	Fauna survey of ponds at six golf courses compared with fauna in 12 off-course ponds located in nature-protected sites and parklands
13	Macroinvertebrates. Muskoka, ON, Canada	Fauna in six streams associated with five golf courses compared with fauna in seven streams in forested habitats
14	Multi-species (birds, mammals, reptiles and frogs). Southeast Queensland, Australia	Survey on what extent regionally threatened species utilized habitats on ten suburban eucalypt-based golf courses relative ten nearby eucalypt fragments and ten suburban residential habitats
15	Multi-species (plants, arthropods and vertebrates. Kanagawa and Chiba, Tokyo, Japan	Comparative survey on occurrence of biota on 12 golf courses and adjacent control sites (paddy fields, parks, roadsides and forests)
16	Multi-species (bumble bee, ground beetle and birds). Wales (UK); Oxford (UK); Lower Saxony, Germany; Moka Estate, Trinidad, WI	Comparative fauna survey of golf courses and adjacent habitats that the courses replaced in their construction. Four courses were analyzed for fauna: Bumble bees at one course in South Wales (UK); ground beetle (Carabidae) at one course in Oxford (UK); and birds in one course in Lower Saxony (Germany) and one in the Moka Estate, Trinidad (WI)
17	Multi-species (vegetation, birds, ground beetles and bumble bees). Surrey, UK	Comparison of trees and herbaceous species and three indicator taxa (birds, ground beetles and bumble bees) between nine golf courses and nine adjacent pasture grasslands for cattle and sheep grazing

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Associated references of study numbers: 1, Smith and others (2005); 2, Stanback and Seifert (2005); 3, LeClerc and others (2005); 4, LeClerc and Cristol (2005); 5, Merola-Zwartjes and De Long (2005); 6, Blair (1996); 7, Sorace and Visentin (2007); 8, Blair (2001a); 9, Terman (1997); 10, Blair (2001b); 11, Blair and Launer (1997); 12, Colding and others (2006b); 13, Winter and others (2002); 14, Hodgkison and others (2007a); 15, Yasuda and Koike (2006); 16, Gange and Lindsay (2002); 17, Tanner and Gange (2005).

Gc = golf courses; Cs = control sites of other non-golf land type.

pitfall traps (#16 and #17) and sweep-net technique for collection of arthropods (#15); point count surveys for birds (#4, #5, #6, #8); straight transect lines, strip transects and walking lines for birds and insects (#7, #9, #10, #11, #14, #15, #16, #17); visual encounter surveys for amphibians (#12, #14); time-based active search surveys for mammals and reptiles (#14); Elliot trapping of mammals (#14); and sample collection of macro-invertebrates (#12 and #13). Furthermore, quadrates and aerial photographs were used for sampling of vegetation (#15 and #17).

Depending on case–study objectives, compared green-area habitats were located adjacent to or nearby studied golf course(s) (studies #2, #7, #9, #13, #15, #16, #17 in Table 1), within a larger area in a particular geographic setting (#1, #3, #4, #5, #12, #14), or along a gradient of landscape alteration (see #6, #8, #10 and #11 in Table 1). Golf courses and other land types in case–control studies were chosen by the researchers based on maps, aerial photographs and/or Geographic Information Systems, and were predominantly deliberately selected with only one case study with comparable land types randomly selected (#14).

Four case–control studies were found that specifically targeted species of conservation concern (#1, #4, #7, #14 in Table 1). This category includes fauna indicated by sources as threatened, or regionally declining, based on international and/or national species conservation prioritization indices (for example, National red lists, the EC Directive, BirdLife International, Partners in Flight [PIF]). Moreover, three case–control studies compared and measured the reproductive/recruitment success of biota on golf courses with that of other land types (#1, #2, #3).

Quantitative Assessments

We determined the ecological value of golf courses based on quantitative treatment of a portfolio of analytical measures on biota as derived from the case–control studies. These measures included estimates on species diversity, richness and abundance, as well as measures on species occurrence, community structure and species reproductive/breeding success. In all cases, the authors of the case–control studies statistically treated these estimates. Obtained results on measures were grouped into three discrete classes, depending on whether a golf course, or a number of golf courses, were found to have *higher*, *similar* or *lower* value for biota relative other types of land use. When golf courses were compared with more than one land type in a case–control study, we treated each comparison as a separate one, referred to as a 'comparative case' in the following. Likewise, if several estimates in the portfolio of analytical measures were assessed in a case–control study, and/or if different taxa (class, family or species) were targeted in a case–control study, we treated each comparison as a separate comparative case.

To distinguish results in a more systematic way, we grouped the different non-golf land types assessed in case–control studies into seven land-use categories, including Natural, Agricultural, Parklands, Nature-protected, Residential, Highly mpacted Urban and Miscellaneous Land. This categorization was based on available information in case–control studies. The grouping enabled us to aggregate comparative cases and to quantitatively determine how golf courses ranked in relation to the different land-use categories. In this way, the 'ecological value' of golf courses is a relative measure determined by how well golf courses perform for biodiversity in relation to other land-use types.

The ecological value of golf courses was determined for three levels of analysis: (1) comparisons based on overall estimates of the portfolio of measures examined in case–control studies; (2) comparisons adjusted for measures only on species richness and (3) comparisons based on overall estimates on portfolio measures for the two most studied fauna groups in case–control studies. In addition, we estimated the role of golf courses for biota of conservation.

Statistical Analysis

We constructed a contingency table with cross-tabulations of frequency counts to draw inference on the dependencies between where in a landscape a golf course is constructed and its resulting ecological value. Due to the lack of comparative cases, we divided the six land-use categories into two basic categories: Low Human-Impacted Areas (natural and nature-protected land) and High Human-Impact Areas (Parklands, Agriculture, Residential, Urban land). The categorical dependencies were evaluated using Pearson's Goodness-of-Fit statistic, which is based on large sample theory. Following usual recommendations, it is required that at least 80% of the expected cell count should be 5 or more and that no expected cell count be less than 1. This is only fulfilled in the two-category case (see Appendix 1 in supplementary material). For further information regarding categorical data analysis, see Agresti (1990).

We checked whether the observed values in the table were significantly different from their expected values using Pearson's Goodness-of-Fit test, which follows a Chi-squared distribution with $(r-1)(c-1)$ degrees of freedom. The null hypothesis that the categorical variables are statistically independent was formulated as follows: H_0: The ecological values of a specific landscape are unaffected when building a golf course in that landscape regardless of whether it was previously a landscape subject to high or low human impact.

RESULTS

Comparisons of Ecological Value

Comparisons between golf courses and other land types are presented in Table 2. As determined by all portfolio measures in comparative cases ($n = 101$), 61 cases showed that golf courses had higher ecological value relative to other green-area habitats (land types), with 18 and 22 cases, respectively, showing that golf courses had an ecological value similar to or lower than non-golf land types (Table 3). Thus, in 64% of comparative cases golf courses had higher ecological value than the compared set of land types.

Comparisons of species richness showed that golf courses had higher ecological value in 59% of comparative cases ($n = 56$), with 21.4 and 19.6% of cases, respectively, showing that species richness was similar to or lower than that of other land types (Table 3). The pattern of golf courses having higher ecological value was consistent also for birds and insects. For birds, we found 16 comparative cases ($n = 32$) showing that golf courses had higher ecological value, as compared with 8 cases each where this value was similar to or lower (Table 2). Thus, in 50% of cases golf courses held higher ecological value for birds. For insects, 11 comparative cases ($n = 18$) were found that golf courses had higher ecological value, with seven cases showing that their ecological value was lower.

When golf courses were analyzed in relation to the different land-use categories, their ecological value increased with the degree of anthropogenic impact (Table 3). In comparison with natural areas, assumed here to be the land-use category with the lowest levels of anthropogenic impact, golf courses held lower or similar ecological value in 81.25% of comparative cases. The ecological value of golf courses, however, increased with the degree of anthropogenic impacts, being progressively higher as one moved from Parkland (44%) to Agricultural (69%), Residential (84%) to Highly urban land uses (94%). This overall relationship was repeated also for species richness (Table 3).

The null hypothesis was strongly rejected on the 1% level ($P = 0.000121$; χ^2 sum: 18.05), so there seems to be evidence that the area in which a golf course is built has an effect on the resulting ecological values of that area. The complete tables containing the adjusted residuals are presented in Appendix 1 in supplementary material.

Regarding fauna of conservation concern, ten comparative cases ($n = 27$) were found showing that golf courses were inferior relative to non-golf land types, with eight and seven cases, respectively, showing that they were superior or comparable to non-golf land types. When golf courses were compared with natural habitats and nature-protected areas, only three comparative cases ($n = 18$) showed that golf courses were superior, with five and ten cases, respectively, showing they were similar, or inferior.

DISCUSSION

Results from the analyses made in this study suggest that golf courses overall hold high ecological value. In comparison with a larger set of land types, ranging from natural habitat types to urbanized sites, golf courses were shown to have higher ecological value in 64% of comparative cases. This pattern was consistent also for species richness of fauna, and when birds and insects separately were analyzed.

Although we could not statistically determine how golf courses ranked relative to individual categories of land use due to limitation of data (see ''Materials and Methods''), a high proportion of golf courses (63%) were found to have ecological values similar to or higher than nature-protected sites.

As also shown in the quantitative analyses, golf courses contribute in the support of species of conservation concern. Again, a rather high proportion of golf courses (44%) scored similar or higher value for this group of biota in comparison with natural land and nature-protected sites.

The null hypothesis of this study was strongly rejected. Interpretation of the analysis of Pearson's adjusted residuals provided us with strong evidence that if we were to build a golf course in a natural habitat, we are not likely to experience higher overall ecological values as a result of this change to the landscape. On the other hand, if we build a golf course in an urban area we will most likely be experiencing increasing ecological values.

Table 2. Comparisons of Golf Courses with Other Land Types ($n = 101$)

#	Compared land-use types	No. of land-use types	Measure	Score
1	Industrial sites[1]	1	Annual fecundity of owls	–
2	Hayfields, old fields, pastures[2] (clustered as agricultural)	1	Reproduction of Eastern bluebird	–
4	Agricultural areas	1	Relative abundance of conservation-status' birds of disturbance-dependent habitats	–
4	Forest areas	1	Species richness and relative abundance of birds with conservation status	–
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of open-habitat birds with conservation status	–
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of Mediterranean birds with conservation status	–
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of raptor birds with conservation status	–
10	Biological preserve, open-space recreational area	2	Species richness of butterflies (Papilionoidae and Hesperioidae)	–
11	Biological preserve	1	Species richness of ''original'' oak woodland butterfly species (Papilionoidae and Hesperioidae) in a preserve	–
11	Biological preserve	1	Abundance of butterflies (Papilionoidae and Hesperioidae)	–
11	Biological preserve	1	Relative abundance of ''original'' oak woodland butterfly species (Papilionoidae and Hesperioidae) in a preserve	–
11	Open-space recreational area	1	Species richness of butterflies (Papilionoidae and Hesperioidae)	–
11	Open-space recreational area, biological preserve, residential area	3	Abundance of butterflies (Papilionoidae and Hesperioidae)	–
11	Open-space recreational area	1	Shannon diversity of butterflies (Papilionoidae and Hesperioidae)	–
13	Forest areas	1	Community structure of macroinvertebrates	–
14	Eucalyptus forests	1	Species richness of reptiles	–
14	Eucalyptus forests	1	Species richness of amphibians	–
14	Eucalyptus forests	1	Relative abundance of amphibians	–
14	Eucalyptus forests	1	Species richness of terrestrial birds	–
4	Agricultural areas, residential areas	2	Relative abundance of birds with conservation status	0
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of field-edge/anthropophilous birds with conservation status	0
7	Agricultural areas and urban residential areas (clustered as miscellaneous in meta-analysis)	1	Species richness of forest birds with conservation status	0
9	State park	1	Species richness of birds	0
12	Protected areas and public parklands (clustered as miscellaneous in meta-analysis)	1	Occurrence of amphibians	0
12	Protected areas and public parklands (clustered as miscellaneous in meta-analysis)	1	Shannon diversity of macroinvertebrates	0

Table 2. continued

#	Compared land-use types	No. of land-use types	Measure	Score
14	Eucalyptus forests	1	Relative abundance of reptiles	0
14	Eucalyptus forests	1	Species richness of mammals	0
14	Eucalyptus forests	1	Relative abundance of mammals	0
14	Eucalyptus forests	1	Species richness of birds	0
14	Eucalyptus forests, residential areas	2	Relative abundance of terrestrial birds	0
15	Urban forests	1	Occurrence of flora and fauna	0
16[3]	Pasture[4]	1	Species richness of bumble bees (Apidae)	0
16	Former cropland designated as set-aside[5]	1	Species richness of birds	0
16	Natural grassland, cocoa plantation[6]	2	Species richness of birds	0
1	Industrial sites[1]	1	Annual site fidelity of owls	+
3[3]	Parks, campuses, livestock pastures, and recreational land (clustered as miscellaneous in meta-analysis)	1	Breeding performance of Eastern bluebird	+
5[3]	Paired control sites of various landscape types (clustered as miscellaneous in meta-analysis)	1	Species richness of native riparian birds	+
6	Biological preserve, open-space area, residential area, office park, business district	5	Species richness of summer resident birds	+
6	Biological preserve, open-space area, residential area, office park, business district	5	Abundance of summer resident birds	+
8	Biological preserve, open space area, residential area, apartments, business district	5	Species richness of summer resident birds	+
8	Biological preserve, open space area, residential area, apartments, business district	5	Abundance of summer resident birds	+
10	Residential area, apartments, business district	3	Species richness of butterflies (Papilionoidae and Hesperioidae)	+
10	Residential area, apartments, business district, open-space, biological preserve	5	Species richness of birds	+
11	Biological preserve, residential area, office park, business district	4	Species richness of butterflies (Papilionoidae and Hesperioidae)	+
11	Office park, business district	2	Abundance of butterflies (Papilionoidae and Hesperioidae)	+
11	Biological preserve, residential area, office park, business district	4	Shannon diversity of butterflies (Papilionoidae and Hesperioidae)	+
12	Nature-protected areas and public parklands (clustered as miscellaneous in meta-analysis)	1	Species richness of disturbance-sensitive macroinvertebrates	+
14	Residential areas	1	Species richness of birds	+
14	Residential areas, eucalyptus forests	2	Relative abundance of birds	+
14	Residential areas, eucalyptus forests	2	Species richness of wetland birds	+
14	Residential areas, eucalyptus forests	2	Relative abundance of wetland birds	+
15	Paddy fields, roadside, and parks (clustered as urban in meta-analysis)	1	Occurrence of flora and fauna	+
16	Pasture[4]	1	Abundance of bumble bees (Apidae)	+

Table 2. continued

#	Compared land-use types	No. of land-use types	Measure	Score
16	Pasture[5]	1	Species richness of birds	+
16	Cocoa plantation[6]	1	Abundance of birds	+
16	Arable farm[7]	1	Species richness of ground beetles (Carabidae)	+
16	Arable farm[7]	1	Abundance of ground beetles (Carabidae)	+
17[3]	Pasture grassland	1	Species richness of birds	+
17[3]	Pasture grassland	1	Abundance of birds	+
17[3]	Pasture grassland	1	Species richness of ground beetles (Carabidae)	+
17[3]	Pasture grassland	1	Abundance of ground beetles (Carabidae)	+
17[3]	Pasture grassland	1	Species richness of bumble bees (Apidae)	+
17[3]	Pasture grassland	1	Abundance of bumble bees (Apidae)	+

Score refers to whether golf courses hold lower (−), similar (0), or higher (+) ecological value (based on analyzed measure) compared with other land types as stated by sources. For references of studies (#), see Table 1.

[1] *Moderately disturbed with low levels of human presence and chemical application.*

[2] *Low levels of human presence and no chemical use.*

[3] *Reflecting conditions prior to golf-course construction.*

[4] *South Wales, UK.*

[5] *Lower Saxony, Germany.*

[6] *Moka Estate, Trinidad.*

[7] *Oxford, UK.*

Table 3. Aggregated Scores for Ecological Value of Golf Courses in Relation to Different Land-Use Categories

	Natural (forest areas, natural grassland, urban forest)	Nature-protected (state parks, biological preserves, nature reserves)	Parkland (public parks, open-space recreational)	Agricultural (hayfields, old fields, pastures, croplands, paddy fields, cocoa plantation)	Residential (residential areas, campuses, apartment areas)	Highly urban (industrial, business district, office park, roadside field)	Miscellaneous	Σ
Lower overall (−)	6	5	4	2	1	1	3	22
Similar overall (0)	7	2	–	3	2	–	4	18
Higher overall (+)	3 (18.8%)	7 (50%)	5 (55.6%)	11 (68.8%)	16 (84.2%)	16 (94,1%)	3	61
Σ cases/category	16	14	9	16	19	17	10	101
Lower S (−)	4	2	2	–	–	–	3	11
Similar S (0)	3	2	–	2	1	–	4	12
Higher S (+)	1 (12.5%)	3 (42.8%)	3 (60%)	5 (71.4%)	11 (91.7%)	7 (100%)	3	33
Σ cases/category	8	7	5	7	12	7	10	56

Values (lower, similar or higher) are presented for both overall comparative measures (n = 101) and for species richness [S] (n = 56) in cases analyzed. Percentage numbers are given to illustrate how the ecological value increases with the degree of anthropogenic impact (from left to right).

Although golf courses dealt with in the case–control studies amount to about 0.6% of the world's golf courses, it is important to emphasize that results obtained here predominantly derive from temperate, climatic zones of the developed world. Thus, we simply do not know what impacts golf courses have on biodiversity in other climatic zones and settings. In the following, we more critically discuss the results of this study.

The Role of Golf Courses in Biodiversity Conservation

Results of this study support the notion that biodiversity conservation should not entirely be centered on protected-area management, which is common in many settings (Colding and others 2006a). That many golf courses support species of conservation concern may, however, not come as a surprise considering that the great majority of threatened and endangered species occur on private lands, such as more than 90% in the United States (Scott and others 2001). Moreover, the results obtained in our study should not be interpreted as if golf courses more generally can be constructed to support threatened flora and fauna. It is important to recognize that measurements on biota in case–control studies are taken after the fact that a golf course has been built in a landscape and do not necessarily reflect preconditions of biota. For example, Blair and Launer (1997, #11), comparing the butterfly fauna along a gradient of landscape alteration in Oxford, Ohio, found that a golf course maintains neither the original species composition nor the abundance of a predevelopment community of butterflies. In fact, the predevelopment butterfly fauna progressively disappeared as sites became more urban. Moreover, Winter and others (2002, #13) showed that golf courses adversely impacted macroinvertebrate communities in natural streams in a region of Canada where agricultural and urban development was minimal and land modifications few. In all cases, golf-course streams were higher in nutrients, dissolved ions, and more alkaline than in forested reference streams. The construction of courses in these settings resulted in a considerable change in the variability of the macroinvertebrate fauna in forest streams.

As studies in ecology show, biodiversity often peaks in moderately disturbed habitats due to an increase in species that are anthropophilous (Blair 1996, 2001a; McKinney 2002). These species are able to exploit many resources and can adapt to forest edges and adjacent open lands. Hence, in landscapes dominated by native natural habitats the construction of a moderately disturbed habitat, like a golf course, may increase biodiversity at the local patch level. However, this may occur at the expense of overall biodiversity in a landscape, for example, eliminating conditions for habitat specialists and species that depend on undisturbed interior habitats. This relationship has been observed in Australia, where golf-course construction

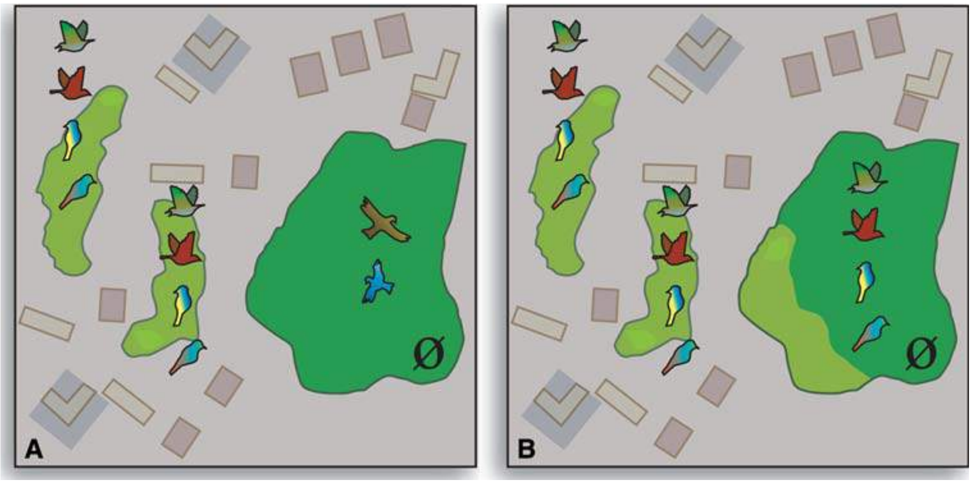

Figure 1. When a golf course is built within a larger native habitat fragment, local biodiversity can increase at the patch-level (ø) at the expense of overall regional biodiversity. In (**A**), the total number of birds is six, whereas in (**B**) the total number has been reduced to four. We refer to this event as the 'biodiversity illusionary phenomenon', or the 'BIP-effect' of habitat-replacement. The phenomenon can be explained in that birds that benefit from human presence ('urban adapters') increase at the expense of anthropogenic disturbance-sensitive birds ('urban avoiders'), such as interior-dependent avifauna.

has contributed to the loss of regionally rare and threatened species (Hodgkison and others 2007a). We refer to this phenomenon as the 'Biodiversity Illusionary Phenomenon', or BIP-effect, further elaborated on in Figure 1.

Nevertheless, a great deal of currently existing golf courses contribute to sustaining threatened flora and fauna at regional levels. For example, in the United Kingdom older golf courses often contain vegetative communities that have been undisturbed for considerable time (Gange and others 2003), containing both coastal dune grassland and inland heathland, with as much as 20% of the dune grassland contained on golf courses on the Sefton Coast (Sorace and Visentin 2007). Over the past 150 years, southern England has experienced a 70% loss of heathland, which is designated as internationally rare and endangered, with golf courses containing over 100 such sites (Gange and Lindsay 2002).

Moreover, golf courses in New Mexico contribute to preserve native riparian vegetative systems and their associated birds (Merola-Zwartjes and De Long 2005, #5). With some 95% of the U.S. western riparian vegetative communities lost or degraded over the past century, these courses play a critical role in conserving riparian birds at regional levels. Golf courses in the United States also contain declining oak savanna and orchards (Rodewald and others 2005), and courses in the suburbs of the southeastern Coastal Plain hold remnant patches of longleaf-pine ecosystems, representing pyrogenic communities, with flora and fauna that depend on periodic low-intensity fires (Heuberger and Putz 2003) (for more examples, see Tables 4 and 5).

The degree to which golf courses support species of conservation concern is contingent upon several factors. For example, the lack of adequate amounts of forested areas render many golf courses incapable of sustaining interior-dependent forest birds and birds of conservation concern (LeClerc and Cristol 2005, #4; Sorace and Visentin 2007, #7). In a study comparing golf courses along a gradient of landscape alteration in South Carolina, Jones and others (2005) found 33% more bird species in less landscape-altered golf courses with nearly 60% of the avifauna having PIF scores. Moreover, habitat characteristics on golf courses in northern and central Ohio, USA, determined their value as habitat for the widely declining red-headed woodpecker (*Melanerpes erythrocephalus*). Courses sustaining this species contained trees that were 12% larger in diameter and had twice as many hard-mast trees (for example, oak, hickory, beech), standing dead trees (snags) and dead limbs as golf

Table 4. Vegetation Communities and Associated Fauna with Conservation Status as Found on Golf Courses

Vegetation communities and associated fauna	Golf course	Source
Magnesian limestone grassland with St. John's wort (*Hypericum montanum*), autumn lady's tresses (*Spiranthes spiralis*), the glow worm beetle (*Lampyris noctiluca*)	Lindrick GC in south Yorkshire, UK	Gange and others (2003)
Chalk grassland with green-winged orchid (*Orchis morio*) and several nationally rare species of fungi	Temple GC in Berkshire, UK	Gange and others (2003)
Dune grassland with sand lizard (*Lacerta agilis*), natterjack toad (*Bufo calamita*), the green tiger beetle (*Cicindela campestris*)	Golf courses on the Sefton coast, Merseyside, UK	Gange and others (2003)
Dune grassland with lizard orchid (*Himantoglossum hircinum*), bedstraw broomrape (*Orobranche caryophyllace*)	Royal St George, Kent, UK	Carey and Brown (1994) and Brennan (1992)
Heathland (*Calluna vulgaris*, *Erica tetralix*, *Erica cinerea*)	Therfield Heath GC, Hertfordshire UK; Ashford GC and Wrotham Heath GC, Kent, UK	Green and Marshall (1987) and Gange and others (2003)
Longleaf pine ecosystems (*Pinus palustris*)	Pine Needles GC, North Carolina, USA; Haile Plantation GC, Gainesville, Florida, USA	Terman (1997) and Heuberger and Putz (2003)
Broad-leaved paperbark communities (such as *Melaleuca quinquinervia*); Ephemeral wetlands (*Juncus* spp., *Typha* spp., *Cyperus* spp.)	Golf courses on the Gold Coast, Australia	Warnken and others (2001)

Table 5. Birds with Conservation Status Found on Golf Courses

Taxa (species, and vegetation communities)	Golf course/location	Source
Red-headed woodpecker (*M. erythrocephalus*), yellow-billed cuckoo (*Coccyzus americanus*), northern flicker (*Colaptes aurratus*), eastern kingbird (*Tyrannus tyrannus*), Baltimore oriole (*Icterus galbula*)	Golf courses in northern and central Ohio, USA	Rodewald and others (2005)
Burrowing owl (*A. cunicularia*)	Golf courses in south-central Washington (WA), USA	Smith and others (2005)
Henslow's sparrow (*Ammodramus henslowii*), Bell's vireo (*Vireo bellii*), dickcissel (*Spiza Americana*), grasshopper sparrow (*Ammodramus savannarum*), yellow-billed cuckoo (*C. americanus*), Mississippi kite (*Ictinia mississippiensis*)	Prairie Dunes Country Club in Kansas, USA	Terman (1997)
Brown-headed nuthatch (*Siita pusilla*), Swainson's warbler (*Limnothlypis swainsonii*), wood trush (*Catharus mustelinus*), northern parula (*Parula americana*), prothonatary warbler (*Protonotaria citrea*), worm-eating warbler (*Helmitheros vermivorus*), Painted bunting (*Passerina ciris*), and others	Golf courses in Georgetown and Horry counties, South Carolina, USA	Jones and others (2005)
Purple heron (*Ardea purpurea*)	Tanah Merah CC, Singapore	Neo (2001)
Barn swallow (*Hirundo rustica*), house martin (*Delichon urbica*), spotted flycatcher (*Muscicapa striata*), turtle dove (*Streptopelia turtur*), hoopoe (*Upupa epops*), common quail (*Coturnix coturnix*), European bee-eater (*Merops apiaster),* barbary partridge (*Alectoris Barbara*), woodchat shrike (*Lanius senator*), common kestrel (*Falco tinnunculus*), and others	Golf courses in the lowlands and hilly territories of Italy	Sorace and Visentin (2007)
The comb-crested jacana (*Jacana gallinacea*), black swan (*Cygnus atratus*), wandering whistling duck (*Dendrocygna arcuata*), buff-banded rail (*Rallus philippensis*)	Golf courses in Southeast Queensland, Australia	Hodgkison and others (2007a)

Conservation status includes threatened and regionally declining taxa based on international and/or national species conservation prioritization indices, as referred to by sources.

courses where this species was not detected (Rodewald and others 2005).

Although forest cover often determines a golf course's value for fauna of conservation concern (Sorace and Visentin 2007), it can negatively affect certain fauna groups such as native grassland birds (LeClerc and Cristol 2005, #4), birds adjusted to open habitats and semiarid pastures (Sorace and Visentin 2007, #7), as well as desert specialists in arid regions (Merola-Zwartjes and De Long 2005, #5). More generally, designs that increase the structural complexity of vegetation on golf courses can enhance their value for urban-avoiding groups like mammals, reptiles and amphibians (Hodgkison and others 2007b, #14). For these fauna groups, it is important to account for variables like tree density, native vegetation cover, number of hollows in golf-course habitats, waterbody heterogeneity (permanent and ephemeral wetlands) and aquatic vegetation complexity (Hodgkison and others 2007b).

Golf Courses as Breeding Habitats

Our analysis suggests that golf courses hold mixed values for fauna reproduction, although very few studies have examined this relationship. For example, Smith and others (2005, #1) and Stanback and Seifert (2005, #2) found that golf courses generally are inferior in providing effective breeding habitats for fauna in comparison with moderately disturbed habitats due to greater anthropogenic disturbance like frequent mowing, watering and golfer traffic. Indirect effects from chemical applications related to turf management might also limit their value as breeding habitats for fauna (Stanback and Seifert 2005).

On the other hand, LeClerc and others (2005 #3) found that nestboxes on golf courses in West Virginia produced a significantly greater number of broods and fledged offspring of higher phenotypic quality (more symmetric) of the Eastern bluebird (*Sialia sialis*) than boxes in structurally similar control sites that shared high levels of human disturbance and development but not the extensive use of pesticides typical of golf courses. They linked this result to greater food availability on these courses and to less competition of bluebirds with other cavity-nesting birds.

Because golf courses often contain ample wetland habitats, studies have shown that they can provide adequate breeding habitats for pond-dependent species, like amphibians (Scott and others 2002; Paton and Egan 2002; Colding and others 2006b; Semlitsch and others 2007). Moreover, a study from Australia showed that suburban golf courses harbor regionally uncommon wetland birds, of which some nested in wetlands on golf courses (Hodgkison and others 2007a). In contrast, White and Main (2005) showed that although water birds used wetlands for foraging and as stationary/resting sites on golf courses in southwest Florida, only a tiny fraction (0.3%) actually nested on these courses.

Although it makes intuitive sense that golf courses due to their sheer size could offer effective breeding locales for less mobile organism groups like reptiles and amphibians, this is not always the case. For example, Hodgkison and others (2007a) found that golf courses in Queensland, Australia, generally served as better refuge for mobile fauna (birds and mammals) than less mobile fauna (reptiles and amphibians) likely due to isolation of many golf courses by built-up suburban land, exposure to herbicides, or greater disruption of ground-level habitats.

Suffice it to say, our literature review suggests that a golf course's value in terms of providing efficient breeding habitats for fauna depends on several factors, including the degree of direct and indirect human disturbance regimes on golf courses, the extent of vegetation cover and the amount of suitable interior habitats, as well as factors such as forage availability, and the degree of isolation of golf courses from other green-area habitats in a landscape.

Golf-Course Construction and Biodiversity

As suggested by the results of this study, the ecological value of a golf course progressively increases with the degree of humanly impacted land. In contrast, when golf courses are constructed in landscapes dominated by natural habitats, we are not likely to experience higher overall ecological values as a result of this change to the landscape. This overall relationship lends support from other findings in ecology. For example, Blair and Launer (1997) and Blair (2001b) showed that the predevelopment fauna community gradually dropped as sites that became more urban, resulting in the homogenization of fauna.

Conversely, several sources of case–control studies suggested that golf-course construction increased biodiversity levels in humanly modified urban and agricultural landscapes because a golf course adds structural diversity in those settings, thereby increasing landscape diversity (Gange and Lindsay 2002; Merola-Zwartjes and De Long 2005; Hodgkison and others 2007b; Tanner and Gange

2005; Sorace and Visentin 2007). For example, suburban golf courses in Queensland, Australia, were found to have high conservation value for wetland birds because they provided additional wetland habitats that were largely missing in the overall suburban landscape (Hodgkison and others 2007a, #14). Colding and others (2006b, #12) found that wetlands on golf courses comprised over a quarter of all available freshwater ponds in the suburban/urban landscapes of Stockholm, Sweden, supporting a number of threatened and red-listed amphibians and aquatic invertebrates.

In regions dominated by agriculture, golf-course development can also positively contribute to biodiversity. For example, Gange and Lindsay (2002, #16) found a higher diversity of taxa on golf courses than the farmland and pastures these courses had replaced. Similarly, Tanner and Gange (2005, #17) found a significantly higher richness and abundance of birds, ground beetles and bumble bees on golf courses than on adjacent farmlands in the UK, constituting the same habitats from which the courses had been constructed. Although introduced tree species were more abundant on older golf courses, they found that courses of any age enhanced local biodiversity in intensively managed agricultural areas by providing a greater variety of habitats.

The increase in landscape diversity likely also promotes essential ecosystem processes (Colding 2007), like those resulting from landscape complementation/supplementation in which species utilize different habitat types to fulfill their lifecycle requirements and use different land types for supplemental foraging (Dunning and others 1992).

Studied Biota and Their Functions in Ecosystems

In a comparative land-use assessment of this kind, it is essential to clarify to what degree targeted taxa in case–control studies actually reflect overall biodiversity patterns of land use, as it is known that species vary considerably in relation to what general ecological inference can be drawn from them (Lawton and others 1998; Simberloff 1998). It is also important to clarify what functions targeted species in case–control studies perform in ecosystems because this is related to what ecological values a particular land type might hold.

Birds, targeted in nearly 65% of the case–control studies, commonly serve as bellwether taxa for assessing environmental impacts in ecosystems such as habitat fragmentation (Wilcove 1985; Blair 2001b), with predator avifauna being effective indicators of organochlorine pesticides in ecosystems (Blair 1999; Stanback and Seifert 2005). Bird diversity also correlates well with the amount of trees, shrubs and grasses contained in ecosystems (Blair 1999). Considering that birds also perform a number of critical ecosystem services like pest control, seed dispersal, spreading of organic materials and functioning as 'mobile links' that connect habitats in space and time (Lundberg and Moberg 2003), bird-based study data can reveal relevant ecological information on land use.

Insects, which were targeted in 35% of the case–control studies, generally provide useful information about habitat availability and quality in ecosystems (compare Blair and Launer 1997), with butterflies often acting as a surrogate for plant diversity in studies because they directly depend on and are highly coevolved with plants (Ehrlich and Raven 1964). Hence, ecosystems that support large numbers of butterflies likely contain rich amounts of plants. Bumblebees (Apidae), having short foraging ranges of a few kilometers (Cane 2001; Kremen and others 2004), reflect habitat characteristics at more local scales in ecosystems. Essential pollinators, such as butterflies and wild bees, have also declined massively in recent years (Kremen and others 2004; Biesmeijer and others 2006) and may therefore be particularly useful to assess in land-use comparative studies.

Ground beetles (Carabidae) have also been used as indicator species in many studies (Tanner and Gange 2005), representing vital omnivorous predators in arable fields, and providing farmers with a natural pest control. Land types that provide adequate habitat for ground beetles can therefore be of high ecological value.

Because macroinvertebrates and amphibians (assessed in nearly 12% of the case–control studies, respectively) have seriously declined in many parts of the world (Alford and Richards 1999; Wood and others 2001), land types that promote these groups have high ecological value, and are worthy of studying in land-use comparative studies.

Although it may be argued that measures on the abundance of species in ecosystems poorly reflect to what degree a land-use holds ecological value, abundant species may carry out important functions in ecosystems. Hence, from an ecosystem management perspective, land types containing abundant species like pollinators, seed dispersers, or pest-regulating species may contribute to the resilience building of landscapes, although we could not determine to what extent this was the situation in the case–control studies examined here.

Golf Courses and Ecosystem Management

Although this review shows that many golf courses play an important role in biodiversity conservation, golf-course development often occurs in an ad hoc manner in many countries (Hodgkison and others 2007b), often with a dodgy expansion in environmentally sensitive areas (Warnken and others 2001). Many golf-course locations also occur without careful consideration of how more fine-scaled climatic conditions in a landscape affect management inputs, as golf courses only a few kilometers apart can greatly vary in terms of moisture levels, temperature and soil composition, and therefore differ regarding their requirement for chemical inputs and irrigation (Joyce 1998). In contrast, the trend of constructing golf courses on closed landfills (Mackey 1996; Amick 1998) represents a particularly instructive example of how golf courses can substantially contribute to important habitat restoration and associated biodiversity enhancement.

The way a golf course is designed and managed also influence what potential it holds in ecosystem management, with several useful recommendations offered in the scientific literature (see Terman 1997; Gange 1998). We propose that golf courses become more widely designed and managed also to promote critical ecosystem services in regions where these are threatened or being disrupted. As shown in this review, golf courses hold a real potential to support functional groups like pollinators, pest-control regulating species and seed dispersers. We also propose that golf courses be more widely considered in urban designs to promote biodiversity conservation, such as in urban designs that promote 'ecological land-use complementation' (Colding 2007)—a land-development strategy that configures land uses more optimally to promote ecosystem processes in urban areas (Figure 2).

As suggested by Marzluff and Ewing (2001), restoration ecologists, land managers and urban planners can help maintain fauna in fragmented landscapes by a combination of short- and long-term actions, such as integrating semi-natural land types into native habitat systems, and seeking creative ways to increase native habitat fragments and manage it collectively in urbanizing regions. We propose that golf courses increasingly become integrated in ecological networks that provide an operational model for conserving biodiversity on ecological principles and at the same time allow a degree of human use of the landscape (Bennett 2004). Such networks should be managed along principles of adaptive co-management (Olsson and others 2004) that integrate different stakeholders and land managers in cooperative management.

CONCLUSIONS

Overall, our literature review shows that golf courses play an essential role in biodiversity conservation and ecosystem management. Many golf courses hold high levels of biodiversity, even surpassing lands designated for nature conservation in many cases. Golf courses also provide habitats for threatened and regionally declining flora and

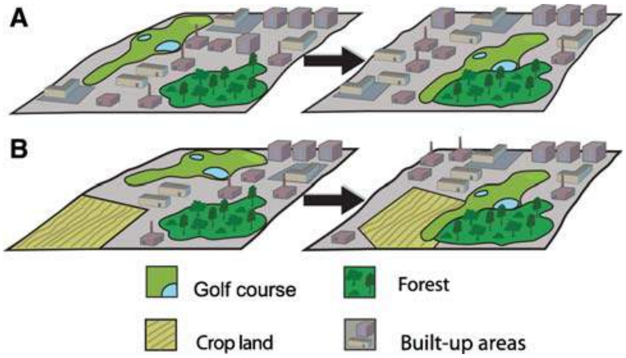

Figure 2. By adopting 'ecological land-use complementation' in urban spatial design, planners could promote ecosystem processes. In situation (**A**) a golf course with freshwater ponds that is located adjacent to a forested area has greater potential to promote amphibians, relative to if it is located in isolation surrounded by urban built-up land. In this sense, the golf course and forested area complement each other, providing necessary habitats for amphibians to breed, forage and over-winter. Similarly, in (**B**) a golf course clustered together with forested patches and crop fields, holds greater chance of supporting pollinators relative to a course located in isolation. If managed adequately, pollinators could use the golf course for foraging while using the forested area for nesting, and perform pollination in the adjacent crop field. *Source*: Colding (2007).

fauna, and can support functional groups that perform critical ecosystem services. However, and as shown here, the ecological value of golf courses is foremost determined by what habitats they replace when they are built. Golf-course construction involving replacement of native habitats generally leads to a regional decline of biodiversity. Conversely, well-planned and adequately designed and managed golf courses may enhance biodiversity in ecologically impoverished landscapes through an increase in landscape diversity. Land-use planners and managers that aspire to increase biodiversity in structurally homogenized landscapes and highly human-impacted regions, like in agricultural and urban settings, should consider golf courses as a means for realizing this. Such considerations need, however, to be accompanied by a careful analysis of *how* and *where* golf courses best can support biodiversity in a region to avoid ecologically adverse effects from golf-course construction. We propose that golf courses, their staff and their various members become more closely integrated in current conservation and management approaches to further enhance golf courses' ecological values. Both the golfing sector and ecologists have much to gain by combining research efforts to adaptively test and seek out ways for how existing and future golf courses could become more environmentally adapted. This could take place within the framework of adaptive co-management that provides a new window of opportunity for joint collaboration among conservation, restoration and recreational interests.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 5

DeSante and Geupel
LANDBIRD PRODUCTIVITY IN CENTRAL COASTAL CALIFORNIA: THE RELATIONSHIP TO ANNUAL RAINFALL, AND A REPRODUCTIVE FAILURE IN 1986

The Condor 89:636–653

LANDBIRD PRODUCTIVITY IN CENTRAL COASTAL CALIFORNIA: THE RELATIONSHIP TO ANNUAL RAINFALL, AND A REPRODUCTIVE FAILURE IN 1986[1]

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Abstract. The avian productivity of 51 locally breeding species in coastal grassland, coastal scrub, and mixed evergreen forest habitats was estimated from 11 years of standardized mist-netting data collected between 10 May and 17 August at Point Reyes Bird Observatory's Palomarin Field Station. A relationship between the number of young birds banded per 100 net hr and the amount of annual (winter) rainfall during the previous season was apparent for the 10 years 1976 to 1985: productivity was low (19 to 32% below the 10-year mean) in years of extremely low rainfall, increased to a maximum (21 to 39% above the 10-year mean) in years of average or slightly above average rainfall, and decreased substantially (20% below the 10-year mean) in years of very heavy rainfall. The number of young birds banded per 100 net hr in 1986, however, was 62.3% below the previous 10-year mean and fell well outside the above relationship. This high level of reproductive failure occurred in most of the 51 locally breeding species and was independent of migratory behavior, habitat choice, and nest location. It was not independent of foraging behavior, however, as swallows and woodpeckers, species that feed their young on insects produced in decomposer- or detritus-based food chains rather than in primary production-based food chains, showed no significant reduction in productivity. Timing of the decrease in young birds suggests that the onset of reproductive failure occurred in mid-May, well after the nesting season began. Such a large-scale reproductive failure of virtually an entire landbird community has not been reported before and no obvious weather factors appear to explain it. Preliminary data indicate that the reproductive failure was not confined to the vicinity of Palomarin or to central coastal California but rather extended over much of northern California even to the west slope of the Sierra Nevada. It is interesting, but perhaps only coincidental, that several circumstances of this phenomenon, including its timing, appear to coincide remarkably well with the passage of a radioactive "cloud" from the Chernobyl nuclear power plant accident and associated rainfall.

Key words: Landbirds; productivity; reproductive failure; annual rainfall; community dynamics; California; mist-netting.

INTRODUCTION

Because the standard procedure for determining avian productivity, the monitoring of individual nests, is extremely time consuming and labor intensive for landbirds with widely dispersed and well hidden nests, little information exists concerning the long-term productivity of an entire landbird community. In fact, most of the existing data concerning the annual variations in landbird reproductive success have arisen from intensive single-species studies (e.g., Nice 1937, Perrins and Moss 1975, Nolan 1978, Pinkowski 1979, Petrinovitch and Patterson 1983, Tiainen 1983). The determination of reproductive success on a community-wide basis, however, must be a necessary and important component of the effort to understand what controls the dynamics and stability of avian communities, a question that continues to be the subject of ecological debate (Wiens 1983, 1984a; Noon et al. 1985; Dunning 1986). Information regarding annual variations in the reproductive success of various species or guilds of species within the community can provide additional insight toward understanding the dynamics of avian communities. Furthermore, long-term data on the extent and causes of natural fluctuations in the productivity of avian communities are necessary for a proper evaluation of the effects of human-caused environmental disturbances upon these communities. Wiens (1984b) provided convincing arguments for the importance of long-term studies of avian populations and communities.

Weather factors, including temperature, rainfall and snowpack, have been implicated as proximate causes of variations in avian productivity

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[1] Received 27 October 1986. Final acceptance 31 March 1987.

in a number of studies (Bryant 1975; Smith and Andersen 1982; Murphy 1983a,b; Tiainen 1983). Coastal central California typically experiences a Mediterranean climate characterized by mild wet winters and warm dry summers. Along the immediate coast, where the Point Reyes Bird Observatory's (PRBO's) Palomarin Field Station is located, the summer drought is ameliorated slightly by the occurrence of persistent fog. Nevertheless, nearly 83% of the annual precipitation falls as rain during the 5 months November to March while only 5% falls during the 5 months May to September. One might expect, therefore, that the amount of annual (essentially, winter) rainfall could affect subsequent reproductive success by affecting the quantity and quality of vegetative growth, which could, in turn, affect the food resources available for raising young as well as the amount of cover available for hiding nests.

For the past 11 years, PRBO personnel have monitored the productivity of 51 locally breeding bird species in coastal grassland, coastal scrub, and mixed evergreen forest habitats at the Palomarin Field Station by means of a standardized mist-netting program. Here, we present some of the results of this study. In particular, we describe the relationship between avian productivity during a given summer and the amount of rainfall during the previous winter, and document an unprecedented reproductive failure that occurred in 1986.

STUDY AREA AND METHODS

An array of 20 12-m nylon mist nets was established at 14 permanent locations at the Palomarin Field Station of the PRBO, just inside the southern end of the Point Reyes National Seashore in Marin County, California (37°56'N and 122°45'W). Fourteen of the 20 nets were located at eight sites along the western edge of the Arroyo Hondo in mixed evergreen forest habitat comprised primarily of coast live oak (*Quercus agrifolia*), California-bay (*Umbellularia californica*), Douglas-fir (*Pseudotsuga Menziesii*), blueblossom (*Ceanothus thyrsiflorus*), and California buckeye (*Aesculus californicus*). The bottom of the arroyo contained a narrow riparian growth of red alder (*Alnus oregona*). Six of these eight forest sites contained double nets stacked one over the other, while the other two forest sites contained single nets. The remaining six single nets were located at six sites in disturbed successional stage coastal scrub habitat adjacent to the arroyo. This habitat was comprised primarily of coyote bush (*Baccharis pilularis*), California sage (*Artemisia californica*), bush monkey flower (*Mimulus aurantiacus*), poison oak (*Rhus diversiloba*), California blackberry (*Rubus vitifolius*), and California coffeeberry (*Rhamnus californica*) interspersed with patches of introduced annual grasses (*Avena, Holcus, Phalaris*), thistles (*Cirseum*), and wild radish (*Raphanus sativa*). Thirty-mm mesh nets were used in the eight protected (from the wind) forest locations whereas 36-mm mesh nets were used in the six more exposed coastal scrub sites.

Disturbed successional stage coastal scrub habitat extended south and southwest for some 450 m from the general location of the nets to the bluffs immediately overlooking the Pacific Ocean. Both disturbed and undisturbed coastal scrub, interspersed with a number of small creeks and drainages, extended west and northwest from the study area for more than 20 km. A second-growth Douglas-fir forest bordered the study area on the north and extended for some 6 km up and over a forested ridge. The mixed evergreen forest of the Arroyo Hondo bordered the study area on the east and was variously 200 to 500 m wide. Moderately grazed coastal grassland and coastal scrub habitat extended for some 5 km to the southeast from the arroyo. Most of the coastal scrub habitat in the area, both to the northwest and to the southeast of the study area as well as that in the study area itself, was located on an old, relatively level marine terrace at about 60 m elevation.

Nets were run daily (weather permitting; i.e., not raining or excessively windy) from 10 May to 17 August during each of the 11 years 1976 to 1986. May 10 corresponds to the earliest date that a HY bird (excluding hummingbirds) was ever captured during the entire 11 years. Hummingbirds were excluded from this analysis because of the unavailability of hummingbird bands during several years of the study. August 17 is 100 days (ten 10-day periods) after 10 May and corresponds to the time after which substantial numbers of migrant birds begin to inundate the study area. There is no doubt that a few migrant individuals of several long-distance migrant species occurred each year prior to 17 August, particularly during the 20 days 29 July to 17 August. These data, however, are included in this analysis because substantial numbers of locally

TABLE 1. Birds banded at the Palomarin Field Station 10 May to 17 August. Comparison of 1986 with the previous 10 years.

	Behavioral class				Hatching-year birds						After-hatching-year birds					
					1976–1985						1976–1985					
Species	M[1]	H[2]	N[3]	F[4]	Mean[5]	SE[6]	1986[5]	% 1986[7]/Mean	No. of SE[8]	CI[9] (%)	Mean[5]	SE[6]	1986[5]	% 1986[7]/Mean	No. of SE[8]	CI[9] (%)
Band-tailed Pigeon	S	W	T	V	0.01	0.01	0.00	0.0	*[10]	*[10]	0.00	0.00	0.00	—	—	—
Mourning Dove	S	G	T	V	0.02	0.02	0.00	0.0	*	*	0.07	0.03	0.00	0.0	*[10]	*[10]
Downy Woodpecker	R	W	C	B	0.57	0.08	0.44	77.2	−1.63	80	0.13	0.05	0.00	0.0	*	*
Hairy Woodpecker	R	W	C	B	0.20	0.06	0.35	175.0	+2.50	95	0.12	0.04	0.00	0.0	*	*
Northern Flicker	S	W	C	B	0.22	0.06	0.53	240.9	+5.17	99.9	0.12	0.03	0.26	216.7	*	*
Olive-sided Flycatcher	L	W	T	S	0.29	0.06	0.09	31.0	−3.33	99	0.60	0.07	0.79	131.7	+2.71	95
Western Wood-Peewee	L	W	T	S	0.12	0.03	0.00	0.0	*	*	0.31	0.11	0.09	29.0	−2.00	90
Western Flycatcher	L	W	B	S	9.03	1.08	3.42	37.9	−5.19	99.9	1.81	0.21	1.40	77.3	−1.95	90
Ash-throated Flycatcher	L	W	C	S	0.02	0.01	0.00	0.0	*	*	0.23	0.06	0.00	0.0	−3.83	99
Tree Swallow	L	G	C	H	0.05	0.03	0.00	0.0	*	*	0.29	0.10	0.44	151.7	+1.50	80
Violet-green Swallow	L	W	C	H	0.10	0.04	0.00	0.0	*	*	0.40	0.11	0.44	110.0	+0.36	20
Northern Rough-winged Swallow	L	G	C	H	0.06	0.03	0.00	0.0	*	*	0.10	0.04	0.00	0.0	*	*
Cliff Swallow	L	S	B	H	0.07	0.03	0.18	257.1	*	*	0.55	0.09	0.00	0.0	−6.11	99.9
Barn Swallow	L	S	B	H	0.84	0.22	0.88	104.8	+0.18	10	0.32	0.08	0.61	190.6	+3.63	99
Steller's Jay	R	W	T	G	0.26	0.05	0.44	169.2	+3.60	99	0.18	0.08	0.35	194.4	*	*
Scrub Jay	R	S	S	G	0.09	0.03	0.00	0.0	*	*	0.09	0.02	0.00	0.0	*	*
Chestnut-backed Chickadee	R	W	C	F	4.76	0.46	1.49	31.3	−7.11	99.99	0.27	0.06	0.61	225.9	+5.67	99.9
Plain Titmouse	R	W	C	F	0.04	0.04	0.00	0.0	*	*	0.00	0.00	0.00	—	—	—
Bushtit	R	S	S	F	4.93	0.86	2.63	53.3	−2.67	95	0.70	0.18	0.53	75.7	−0.94	60
Red-breasted Nuthatch	S	W	C	B	0.11	0.06	0.09	81.8	*	*	0.01	0.01	0.00	0.0	*	*
Brown Creeper	R	W	B	B	2.11	0.25	0.70	33.2	−5.64	99.9	0.09	0.03	0.09	100.0	*	*
Bewick's Wren	R	S	C	F	6.67	0.57	1.76	26.4	−8.61	99.99	0.37	0.09	0.09	24.3	−3.11	98
Winter Wren	R	W	G	G	0.41	0.11	0.00	0.0	−3.73	99	0.06	0.03	0.09	150.0	*	*
Golden-crowned Kinglet	R	W	T	F	0.84	0.31	0.09	10.7	−2.42	95	0.07	0.02	0.00	0.0	*	*
Western Bluebird	R	G	C	G	0.04	0.02	0.00	0.0	*	*	0.16	0.06	0.00	0.0	*	*
Swainson's Thrush	L	W	S	G	2.44	0.34	0.53	21.7	−5.62	99.9	4.77	0.43	5.88	123.3	+2.58	95
Hermit Thrush	L	W	S	G	0.19	0.09	0.09	47.4	*	*	0.04	0.02	0.00	0.0	*	*
American Robin	S	G	T	G	0.20	0.09	0.00	0.0	−2.27	95	0.49	0.09	0.53	108.2	+0.44	30
Wrentit	R	S	S	F	6.81	0.40	3.34	49.0	−8.67	99.99	0.89	0.13	2.46	276.4	+12.08	99.99
European Starling	S	G	C	G	0.06	0.05	0.00	0.0	*	*	0.06	0.03	0.00	0.0	*	*
Hutton's Vireo	R	W	T	F	1.95	0.31	1.05	53.8	−2.90	98	0.15	0.04	0.09	60.0	*	*
Warbling Vireo	L	W	T	F	2.29	0.54	0.00	0.0	−4.24	99	1.83	0.25	1.58	86.3	−1.00	60

TABLE 1. Continued.

	Behavioral class				Hatching-year birds						After-hatching-year birds					
					1976–1985						1976–1985					
Species	M[1]	H[2]	N[3]	F[4]	Mean[5]	SE[6]	1986[5]	% 1986[7] / Mean	No. of SE[8]	CI[9] (%)	Mean[5]	SE[6]	1986[5]	% 1986[7] / Mean	No. of SE[8]	CI[9] (%)
Orange-crowned Warbler	L	W	G	F	4.36	0.45	1.23	28.2	−6.96	99.99	2.44	0.29	0.70	28.7	−6.00	99.9
MacGillivray's Warbler	L	W	G	F	0.28	0.08	0.00	0.0	−3.50	99	0.15	0.04	0.09	60.0	*	*
Wilson's Warbler	L	W	G	F	13.80	1.42	3.86	28.0	−7.00	99.99	2.42	0.17	2.19	90.5	−1.35	70
Black-headed Grosbeak	L	W	T	F	0.58	0.11	0.00	0.0	−5.27	99.9	0.74	0.13	0.70	94.6	−0.31	20
Rufous-sided Towhee	R	S	G	G	1.09	0.14	0.79	72.5	−2.14	90	0.51	0.07	1.05	205.9	+7.71	99.99
Brown Towhee	R	S	S	G	0.26	0.09	0.00	0.0	−2.89	98	0.10	0.02	0.18	180.0	+4.00	99
Rufous-crowned Sparrow	R	S	G	G	0.10	0.03	0.00	0.0	*	*	0.03	0.02	0.00	0.0	*	*
Black-chinned Sparrow	L	S	S	G	0.00	0.00	0.00	—	—	—	0.01	0.01	0.00	0.0	*	*
Savannah Sparrow	S	G	G	G	0.05	0.02	0.00	0.0	*	*	0.01	0.01	0.00	0.0	*	*
Grasshopper Sparrow	L	G	G	G	0.02	0.01	0.09	450.0	*	*	0.02	0.02	0.00	0.0	*	*
Song Sparrow	R	S	S	G	9.88	1.31	3.16	32.0	−5.13	99.9	0.81	0.11	0.79	97.5	−0.18	10
White-crowned Sparrow	R	S	S	G	3.90	0.51	3.51	90.0	−0.76	50	0.40	0.07	0.53	132.5	+1.86	90
Dark-eyed Junco	S	W	G	G	2.57	0.62	0.61	23.7	−3.16	98	0.16	0.04	0.35	218.7	*	*
Red-winged Blackbird	S	G	S	G	0.00	0.00	0.00	—	—	—	0.02	0.01	0.00	0.0	*	*
Brown-headed Cowbird	L	G	S	G	0.00	0.00	0.00	—	—	—	0.09	0.03	0.00	0.0	*	*
Purple Finch	S	W	T	V	2.66	0.64	0.79	29.7	−2.92	98	5.69	1.08	4.74	83.3	−0.88	60
House Finch	S	G	T	V	0.54	0.21	0.09	16.7	−2.14	90	0.76	0.18	0.44	57.9	−1.78	80
Pine Siskin	S	W	T	V	6.37	1.18	1.58	24.8	−4.06	99	4.49	0.78	3.34	74.4	−1.47	80
American Goldfinch	S	S	S	V	1.01	0.23	1.40	138.6	+1.70	80	1.43	0.19	1.14	79.7	−1.53	80
Total					93.26	6.13	35.20	37.7	−9.47	99.99	35.50	2.22	32.57	91.7	−1.32	70

[1] Migratory behavior: L = long-distance migrants, species in which individuals that breed in the neighborhood of the Palomarin Field Station winter primarily in the tropics, and never winter in numbers north of southern California; S = short-distance migrants, in which individuals that breed in the neighborhood of the Palomarin Field Station winter in substantial numbers at the latitude of Palomarin but not in the neighborhood of Palomarin; R = residents, in which individuals that breed in the neighborhood of Palomarin are permanent residents at Palomarin.

[2] Habitat preference: G = grassland species that prefer open, grazed, or mowed grassland habitat or the edges of grassland habitat for foraging when in the neighborhood of the Palomarin Field Station; S = scrubland species that prefer undisturbed or disturbed coastal scrub habitat for foraging when in the neighborhood of Palomarin; W = woodland species that prefer woodland habitat for foraging when in the neighborhood of Palomarin.

[3] Nest location: G = ground nesters; S = shrub nesters; T = tree nesters; C = cavity nesters; B = building or structure nesters. These classifications were made on the basis of observations of individuals nesting in the neighborhood of Palomarin. The four building or structure nesters place their open-cup or closed nests on a human-made structure, against a bank or a tree trunk, or behind the loose bark of a tree trunk.

[4] Foraging behavior during the breeding season: H = hawking; S = sallying; F = foliage gleaning; B = bark gleaning, including both probing and pecking; G = ground gleaning; V = vegetation regurgitating. This last group includes both pigeons and doves and the cardueline finches (Purple and House finches, Pine Siskin, and American Goldfinch), all of which forage, to some extent, during the breeding season on vegetable matter and regurgitate that food to their young.

[5] Birds banded per 1,000 net hr.

[6] Standard error of the mean.

[7] The percentage that the 1986 value was of the previous 10-year mean.

[8] The number of standard errors that the 1986 value was removed from the previous 10-year mean. Calculated as (1986 value − mean value for 1976 to 1985)/SE of the mean for 1976 to 1985.

[9] The largest confidence interval of the 1976 to 1985 mean that the 1986 value was outside of.

[10] Rare species, averaging less than two individuals per year. Sample size too small to allow a meaningful comparison of 1986 with the previous 10 years.

fledged individuals of various resident and short-distance migrant species were still being captured in the nets during these 20 days, especially in years in which the breeding season was prolonged.

The nets were run for 6 hr per day beginning 15 min after local sunrise. The nets were always opened in a standardized order and were always closed in the same order. Thus, 120 net hr were accumulated in each full day of netting. This standardized program was faithfully adhered to from 1979 through 1986. Prior to 1979, the standardization was not quite so rigorous, but the total net hours and timing were quite similar to later years.

All birds captured were brought back to the on-site Field Station (10 to 300 m from the various nets) for processing, banding, weighing, and measuring. Age was determined by the degree of skull pneumatization and other morphological, mensural, and plumage characteristics as appropriate for the various species. Juvenile and immature birds in their first calendar year are referred to as hatching-year (HY) birds. Adult birds in their second or later calendar years are called after-hatching-year (AHY) birds. We were unable to age 0.26% of the birds encountered during the 11 years because of difficulty in determining the degree of skull pneumatization. These individuals were excluded from this analysis.

We used the number of HY birds (primarily dispersing juveniles but also, to a lesser extent, dispersing immatures) banded per 100 net hr of operation, and/or the ratio of HY/AHY birds banded during the same period as our measures of avian productivity. It should be noted that this method cannot be used directly to compare productivity between various species or species groups, either in terms of the number of young birds banded per 100 net hr or in terms of the young/adult ratio. This is because capture rates obtained from mist-netting procedures may be biased because of species-specific or age-specific differences in microhabitat preference, foraging height and behavior, flocking behavior, home range size, dispersal distance, and dispersal rate (Karr 1981, DeSante 1983). This method, however, can be used very effectively to compare the productivity of a given species or species group from year to year, and to compare various species and groups of species in terms of their annual variability in productivity. This is because juvenal and immature dispersal, for the most part, is assumed to be independent of local weather conditions.

This paper deals with data collected on 51 locally breeding species of birds (known to have bred at least once within 2 km of the netting operation) of which at least one individual was banded between 10 May and 17 August during the 11-year period 1976 to 1986 (Table 1; scientific names in Appendix). The 51 species were classified according to migratory behavior (three groups), habitat preference (three groups), nest location (five groups), and foraging behavior (six groups). These classifications were based upon the seasonalities of occurrence, habitat preferences, nest locations, and foraging behaviors of individual birds observed in the neighborhood of the Palomarin Field Station and thus are specific to that location. Additional information useful for migratory behavior and habitat preference classifications was obtained from Grinnell and Miller (1944), and for nest location classifications from Harrison (1979).

The comparisons of 1986 with the previous 10 years were based upon summary statistics (mean, standard error of the mean, confidence intervals for the mean, and range) for the years 1976 to 1985. Statistical significance was assumed if the 1986 value fell outside the 95% confidence interval for the mean for 1976 to 1985. The smoothed curve describing the relationship between annual productivity and annual rainfall, along with the 95% confidence interval of the smooth, was obtained by the B-spline adaptive regression technique (DeBoor 1978, Craven and Wahba 1979, O'Sullivan 1985, Silverman 1985).

RESULTS

The annual variability in the number of birds banded per 100 net hr (between 10 May and 17 August) over the 10-year period 1976 to 1985 was similar for HY (CV = 20.8%) and AHY (CV = 19.8%) birds (Fig. 1). Furthermore, for these same 10 years, the number of HY birds in any given year was positively correlated with the number of AHY birds in that same year (r = 0.849). In 1986, however, the number of HY birds banded per 100 net hr dropped dramatically while the number of AHY birds banded per 100 net hr was consistent with the previous 10 years. In fact, the number of HY birds banded per 100 net hr in 1986 was only 37.7% of the mean of the previous 10 years (Fig. 2a). Not only did the 1986 value fall well outside the 99% con-

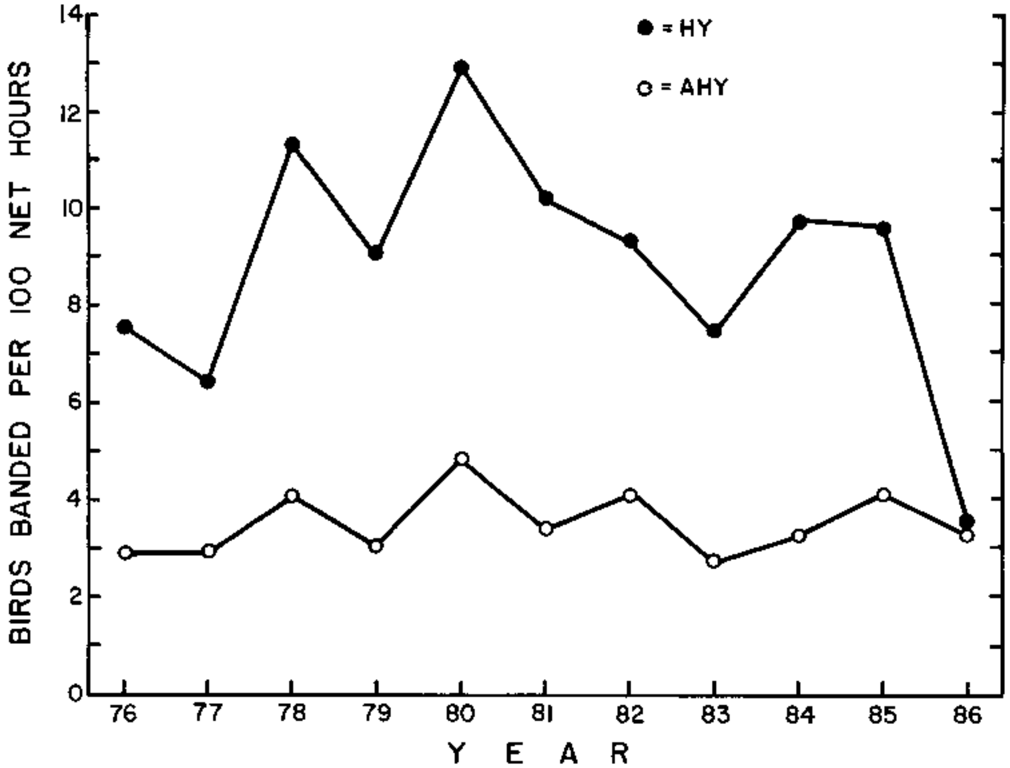


FIGURE 1. Number of birds of all species combined banded per 100 net hr during the period 10 May to 17 August for each of 11 years.

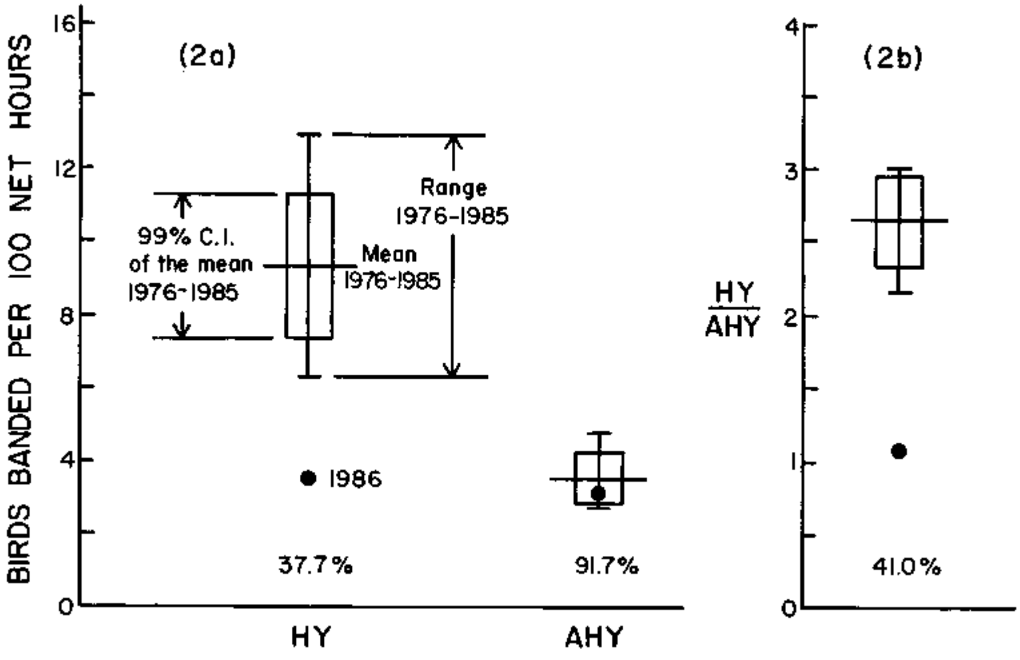


FIGURE 2. Comparison of 1986 with the previous 10 years with respect to banding data during the 100-day period 10 May to 17 August. (2a) Birds banded per 100 net hr. (2b) HY/AHY ratio. Shown in each case are the mean value for the 10 years 1976 to 1985 (long horizontal line), the 99% confidence interval of this 10-year mean (closed rectangle), the range of these 10 years (vertical line terminated by short horizontal lines), the 1986 value (filled circle), and the percentage that the 1986 value was of the previous 10-year mean.

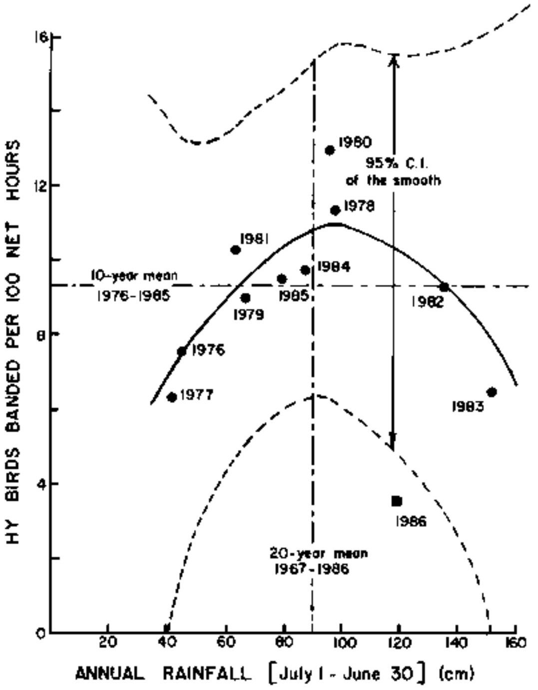


FIGURE 3. Number of HY birds banded per 100 net hr (during the period 10 May to 17 August) as a function of annual rainfall measured from 1 July to 30 June for the 11 years 1976 to 1986. Also shown are the smoothed curve for the 10 years 1976 to 1985 and the 95% confidence interval for the smooth as obtained by the B-spline adaptive regression technique.

fidence interval of the previous 10-year mean (in fact, well outside the 99.99% confidence interval, being 9.47 standard errors from the mean), it also fell well outside the entire range of values for the previous 10 years. In contrast, the number of AHY birds banded per 100 net hr in 1986 was 91.7% of the previous 10-year mean and fell well within the 99% confidence interval of the previous 10-year mean (and within the 80% confidence interval as well, being only 1.32 standard errors from the mean). Thus, a highly significant decrease in the number of young birds occurred in 1986 without a concomitant decrease in the number of adults.

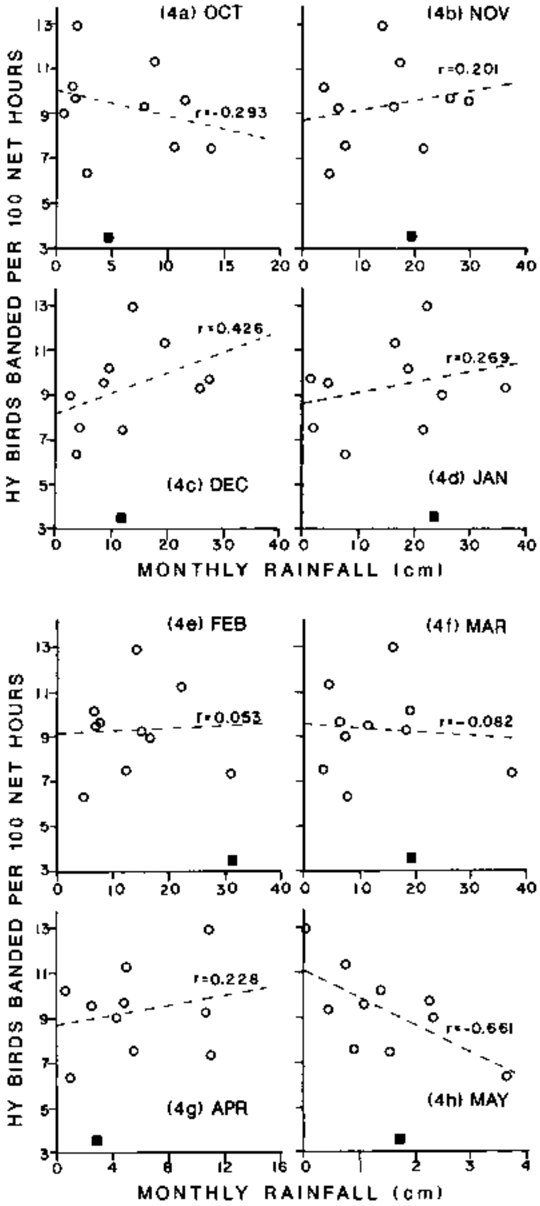


FIGURE 4. Number of HY birds banded per 100 net hr (during the period 10 May to 17 August) as a function of monthly rainfall totals for the 10 years 1976 to 1985 (○) and for 1986 (■). Also shown are the linear regression lines and correlation coefficients for the 10 years 1976 to 1985. (4a) October. (4b) November. (4c) December. (4d) January. (4e) February. (4f) March. (4g) April. (4h) May.

The annual variability in the HY/AHY ratio over the 10-year period 1976 to 1985 (CV = 11.4%) was considerably less than that for either the number of HY or AHY birds. This was because, during this period, the number of HY birds in any given year was directly related to the number of AHY birds in that same year. As a result, the 99% confidence interval of the 10-year mean for the HY/AHY ratio, as well as the 10-year range of the HY/AHY ratio, was quite narrow (Fig. 2b). The 1986 value of the HY/AHY ratio, however, was only 41.0% of the previous 10-year mean and fell far outside both the 99% confidence interval of the mean (in fact, far outside the 99.99% confidence interval, being 16.37 stan-

TABLE 2. Springtime temperatures (°C) during the period 20 April to 31 May for the past 5 years.

	1982	1983	1984	1985	1986
Minimum (range)	1–11	4–10	3–12	2–12	1–12
Minimum (mean)	5.6	7.2	7.6	6.4	6.2
Maximum (range)	11–26	15–28	16–26	15–25	13–27
Maximum (mean)	18.0	18.8	20.0	19.3	20.0

dard errors from the mean) and the range of the previous 10 years, a highly significant decrease.

THE RELATIONSHIP BETWEEN AVIAN PRODUCTIVITY AND WINTER RAINFALL

The relationship between annual productivity (the number of HY birds of all 51 locally breeding species banded per 100 net hr between 10 May and 17 August) and annual rainfall (measured from 1 July of the previous year to 30 June of the year in question) was consistent for the 10 years 1976 to 1985 (Fig. 3). Productivity appeared to be at a maximum (21 to 39% above the 10-year mean) at average or slightly above average rainfall levels and showed pronounced drops (19 to 32% below the 10-year mean) at both extremely low and extremely high levels of winter rainfall. The number of HY birds banded per 100 net hr in 1986, however, was 62.3% below the 10-year mean, and was well outside the 95% confidence limit of the smoothed curve for the previous 10 years. Certainly, variations in the total annual rainfall were not a cause for the drastically lowered productivity in 1986.

It may be suggested that the amount of rain that falls in a given, perhaps critical, month could influence reproductive success as strongly as the total annual rainfall. This, however, was not the case. Annual productivity (the number of HY birds banded per 100 net hr) over the 10-year period 1976 to 1985 showed no obvious relationship to monthly rainfall totals for any of the 8 months October to May (rainfall during the remaining 4 months was nearly negligible), with the possible exception of May when a weak negative correlation between productivity and rainfall occurred (Figs. 4a–h). While this latter case suggests that late spring storms might adversely affect reproductive success, the weak correlation could well be spurious, being driven primarily by the single extreme 1977 data point. It should not be surprising that no obvious relationships emerged between productivity and individual monthly rainfall totals because the monthly rainfall totals themselves were only weakly correlated with total annual rainfall. In fact, Spearman's rank correlation coefficients between monthly rainfall totals and total annual rainfall over the 10-year period 1976 to 1985 ranged from −0.491 to +0.770 for the 8 individual months October to May and averaged only +0.450. Indeed, as is obvious from Figure 4, monthly winter rainfall totals at Palomarin showed very high variabilities. The coefficients of variation over the 10 years 1976 to 1985 ranged from 60.6% to 82.2% for the 8 individual months October to May and averaged 71.3%. In contrast, the coefficient of variation for total annual rainfall over the same 10 years was 41.6%, quite high but considerably less than the average monthly variabilities. Such a situation is probably characteristic of Mediterranean climates.

It is also evident from these data that the 1985–1986 rainfall, while 38.0% above the previous 10-year mean, was extreme during only one month, February, when a record 31.55 cm occurred (Figs. 4a–h). It is unlikely, however, that this high total February rainfall could alone have been responsible for the 1986 reproductive failure because a similarly high total February rainfall (31.19 cm) occurred in 1983 and was followed by extremely heavy March and April total rainfalls as well (a record 37.59 cm in March and a record 11.05 cm in April). Yet, reproductive success in 1983 was reduced only 20.4% from the 10-year mean while reproductive success in 1986 was reduced 62.3% from the 10-year mean. Thus, the various total monthly rainfalls in 1985–1986 provide no obvious explanation for the 1986 reproductive failure.

Springtime temperatures did not provide an obvious explanation for the 1986 reproductive failure at Palomarin either (Table 2). Slightly clearer than usual weather during the period 20 April to 31 May produced nightly minimum temperatures that averaged 7.5% below the previous 4-year mean and daily maximum temperatures that averaged 5.1% above the previous

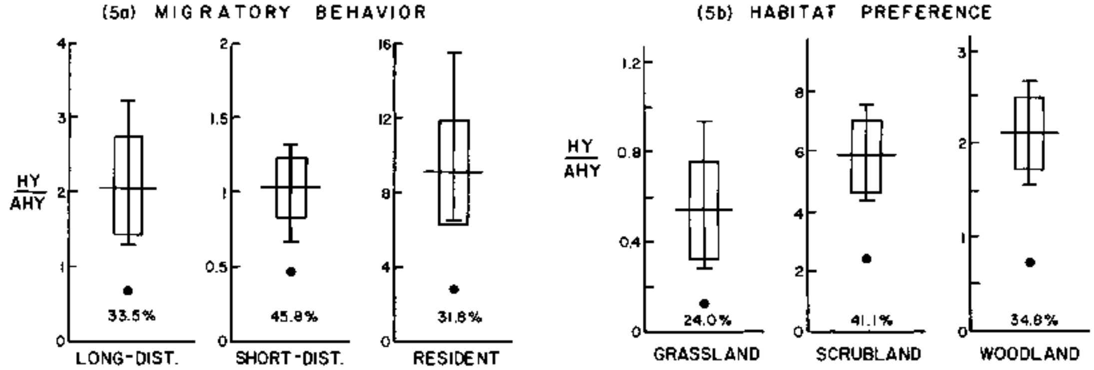


FIGURE 5. Comparison of 1986 with the previous 10 years for the HY/AHY ratio as determined from banding data during the 100-day period 10 May to 17 August for 51 species classified according to (5a) migratory behavior, (5b) habitat preference, (5c) nest location (next page), and (5d) foraging behavior (next page). Symbols and information presented are as in Figure 2.

4-year mean, but in neither case did the range of maximum or minimum temperatures fall outside the range of the previous 4 years.

Finally, no major habitat changes have occurred in the past 11 years within at least 2 km of the study area (which lies inside the Point Reyes National Seashore), other than the gradual continuing natural succession of a portion of the disturbed coastal scrub. Furthermore, no direct application of pesticides, herbicides, or other chemical contaminants were known to have occurred in the past 11 years within at least 2 km of the study area.

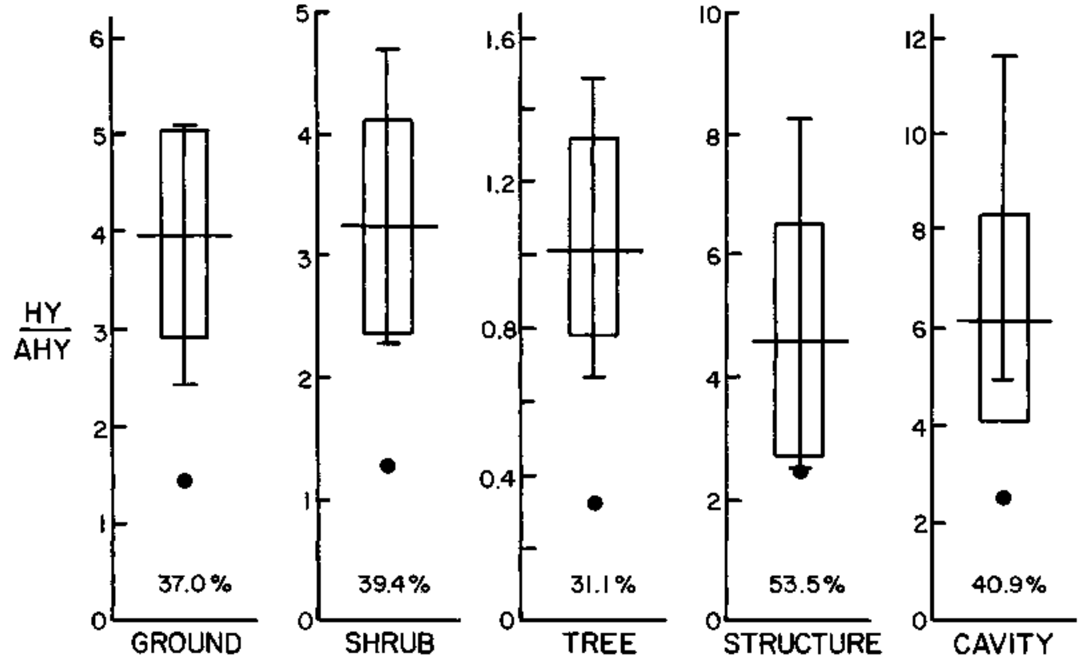
THE 1986 REPRODUCTIVE FAILURE: INDIVIDUAL SPECIES AND SPECIES GROUPS

During the 10-year period 1976 to 1985, HY individuals of 31 of the 51 locally breeding species were captured in large enough numbers to allow meaningful comparisions with 1986 (Table 1). Significant decreases in the number of HY birds banded occurred in 1986 for 22 of these 31 species. In contrast, significant increases in the number of HY birds banded occurred in 1986 for only three species (Hairy Woodpecker, Northern Flicker, and Steller's Jay), while nonsignificant changes (four decreases and two increases) occurred in 1986 for six species (Downy Woodpecker, Barn Swallow, Rufous-sided Towhee, White-crowned Sparrow, House Finch, and American Goldfinch). Furthermore, only four of the 20 rare species showed increases in 1986 in the number of HY birds banded. It appears, therefore, that the 1986 reproductive failure was characteristic of the great majority of individual species as well as being highly significant for all species combined.

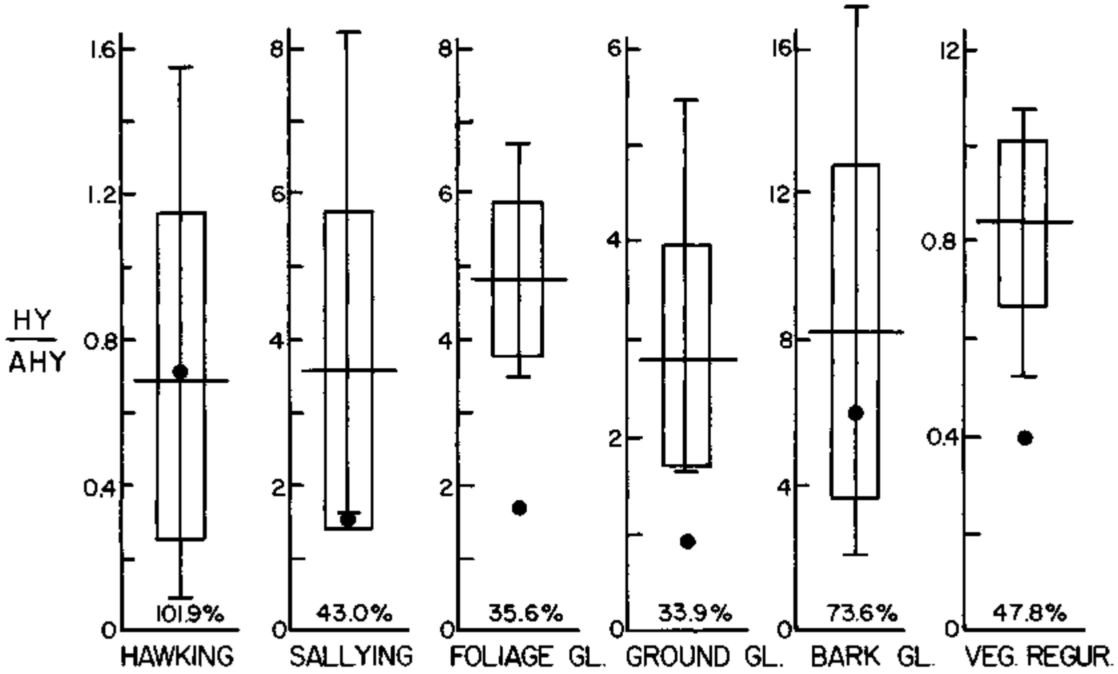
For AHY birds, 26 of the 51 species had large enough sample sizes during the 1976 to 1985 period to permit meaningful comparisons with 1986 (Table 1). In striking contrast to the situation for HY birds, only four of these 26 species showed significant decreases in 1986 in the number of AHY birds banded, while seven species showed significant increases in 1986, and 15 species showed nonsignificant changes in 1986 (11 decreases and four increases). Thus, no consistent increasing or decreasing trends in the number of AHY birds banded in 1986 were characteristic of the various individual species. This is in agreement with the fact that the total number of AHY birds banded in 1986 for all species combined did not differ significantly from the previous 10-year mean.

In order to provide further possible insights into the 1986 reproductive failure, species were grouped according to migratory behavior, habitat preference, nest location, and foraging behavior and the HY/AHY ratios of these groups were examined. (See footnotes to Table 1 for definitions of each of the groups.) Highly significant decreases in the HY/AHY ratio occurred in 1986 for all three groups of species classified by migratory behavior (Fig. 5a; the 1986 value was 6.73 SE from the mean of the previous 10 years for the 19 long-distance migrant species, 9.44 SE from the mean for the 13 short-distance migrant species, and 7.33 SE for the 19 resident species). These results indicate that if the 1986 reproductive failure was related to factors operating during the previous winter on the wintering grounds of the various species, these factors were not confined either to the vicinity of the Palomarin Field Station or to the tropics but

(5c) NEST LOCATION



(5d) FORAGING BEHAVIOR



instead were very widely distributed. Alternatively, these results suggest that the factors involved were more likely operative during the breeding season at Palomarin.

Highly significant decreases in the HY/AHY ratio also occurred in 1986 for species characteristic of each of the major habitat types in the vicinity of the Palomarin Field Station (Fig. 5b;

the 1986 value was 6.20 SE from the mean of the previous 10 years for the 11 grassland species, 9.35 SE from the mean for the 13 scrubland species, and 11.58 SE for the 27 woodland species). The factors that contributed to the 1986 reproductive failure, therefore, were apparently not confined to any one habitat.

We created five nest location classifications in order to determine if the potential susceptibility to nest predators could have had an effect upon the severity of the 1986 reproductive failure. In particular, we felt that cavity nesters and, to a lesser extent, structure nesters should be less susceptible to nest predation than open-cup nesters that nest either on the ground or in shrubs or trees. Species in all five nest location groups, however, showed highly significant decreases in the HY/AHY ratio in 1986, although structure nesters (but not necessarily cavity nesters) were perhaps less severely affected (Fig. 5c; the 1986 value was 7.67 SE from the mean of the previous 10 years for the nine ground-nesting species, 7.32 SE from the mean for the 12 shrub-nesting species, 8.61 SE for the 13 tree-nesting species, 5.67 SE for the 13 cavity nesters, and 3.67 SE for the four structure nesters). This suggests that the factors causing the reduced reproductive success in 1986 were not primarily related to nest predation. The striking consistency across the various species groupings in the magnitude of the 1986 reproductive failure should be noted at this point. For all 11 groups of species classified according to migratory behavior, habitat preference, and nest location, 1986 produced, by far, the poorest HY/AHY ratio. For nine of these 11 groups, the 1986 HY/AHY ratio was only 24 to 41% of the previous 10-year mean.

Finally, we grouped the species according to their breeding season foraging behavior into six groups (Fig. 5d). These groups were developed not only to indicate the type of foraging behavior used by adult birds in the breeding season but also to reflect upon the type of food fed to nestlings. The 12 foliage-gleaning, 19 ground-gleaning, and 6 vegetation-regurgitating species showed highly significant decreases in the HY/AHY ratios in 1986 (being, respectively, 9.62, 5.37, and 8.23 SE from the mean of the previous 10 years). The 4 sallying species also showed a dramatic decrease in productivity in 1986, the HY/AHY ratio being 3.04 SE from the mean of the previous 10 years and thus falling well outside the 98% confidence interval, but barely inside the 99% confidence interval, of the mean. In sharp contrast to those four groups of species, two groups, the five hawking species (swallows) and five bark-gleaning species (woodpeckers, nuthatches, and creepers), showed no significant decreases in productivity in 1986, the HY/AHY ratio being, respectively, only 0.09 and 1.55 SE from the mean of the previous 10 years.

TIMING OF THE 1986 REPRODUCTIVE FAILURE

We next inquired when, during the season, the 1986 reproductive failure occurred. Was it evident from the very start of the season or did it occur sometime after the breeding season had begun? By comparing the 1986 HY capture rates during each of the ten 10-day periods between 10 May and 17 August with those of the previous 10 years, we found that 1986 started out as a perfectly normal year (Fig. 6a). Although the numbers of HY birds captured during the first three 10-day periods are always small, the numbers in 1986 were not significantly different from those in previous years, being some 95%, 109%, and 131%, respectively, of the previous 10-year mean. Beginning in the fourth 10-day period, however, highly significant decreases were detected in 1986 that increased in severity to a low of only 24% of average in the eighth 10-day period in late July. A slight recovery may have occurred in the ninth and tenth periods with decreases only to 34% and 37% of average, respectively. In summary, it was as if the peak of production that normally occurs from late June to mid-August simply never occurred at all in 1986, and numbers of HY birds remained roughly at early June levels.

It must be stressed here that the HY birds captured in our standardized battery of mist nets and shown in Figure 6a were, in the vast majority of cases, birds in juvenal plumage that were undergoing juvenal dispersal. They had fully grown tails and were independent of parental

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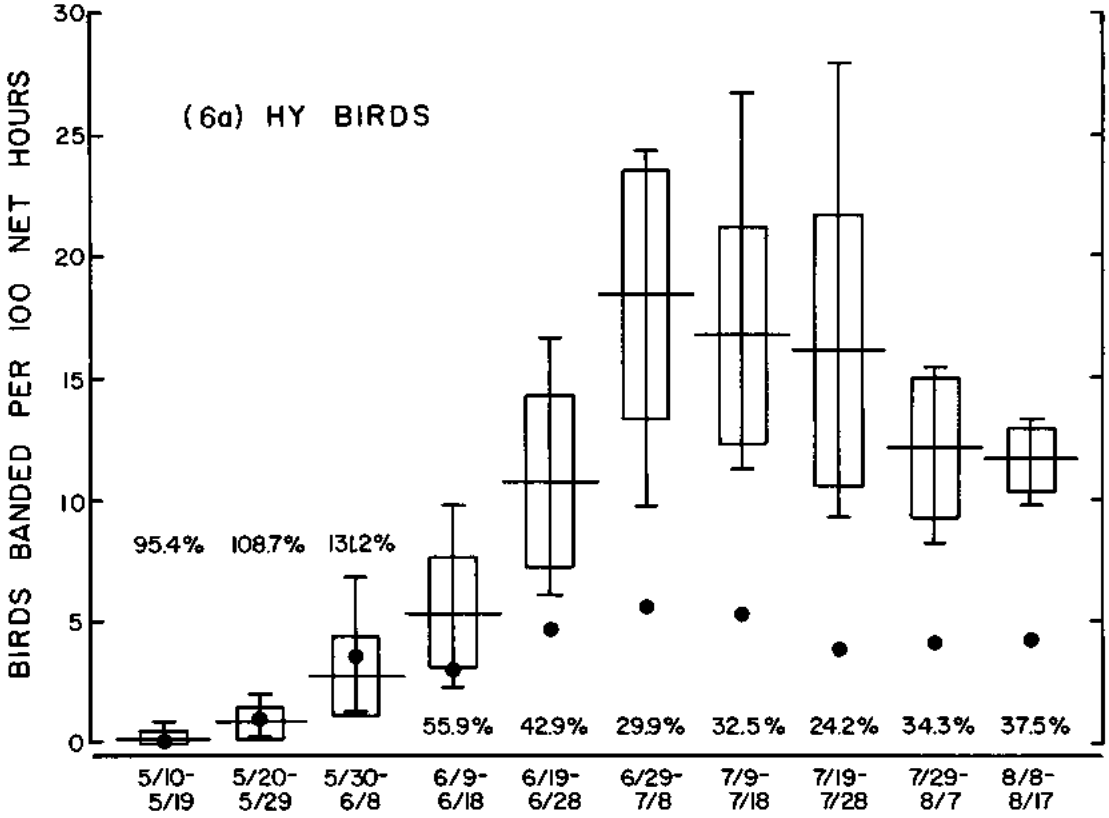
FIGURE 6. Comparison of 1986 with the previous 10 years for the number of birds banded per 100 net hr during each of the ten 10-day periods between 10 May and 17 August. (6a) HY birds. (6b) AHY birds. Symbols and information presented are as in Figures 2 and 5.


(6a) HY BIRDS
BIRDS BANDED PER 100 NET HOURS
0
5
10
15
20
25
30
95.4%
108.7%
131.2%
55.9%
42.9%
29.9%
32.5%
24.2%
34.3%
37.5%
5/10-5/19
5/20-5/29
5/30-6/8
6/9-6/18
6/19-6/28
6/29-7/8
7/9-7/18
7/19-7/28
7/29-8/7
8/8-8/17

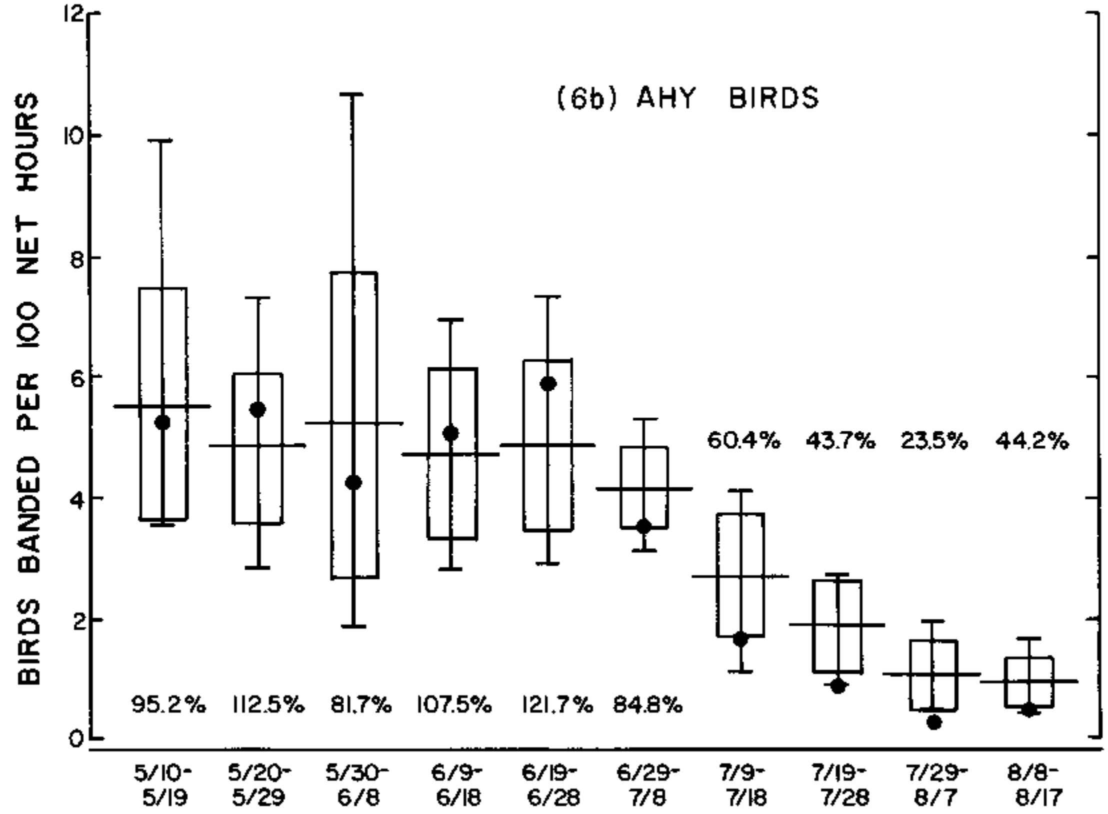

(6b) AHY BIRDS
BIRDS BANDED PER 100 NET HOURS
0
2
4
6
8
10
12
60.4%
43.7%
23.5%
44.2%
95.2%
112.5%
81.7%
107.5%
121.7%
84.8%
5/10-5/19
5/20-5/29
5/30-6/8
6/9-6/18
6/19-6/28
6/29-7/8
7/9-7/18
7/19-7/28
7/29-8/7
8/8-8/17

TABLE 3. Adult birds banded at the Palomarin Field Station 9 July to 17 August. Comparison of 1986 with the previous 10 years.

Classification	1976–1985			1986	% 1986[3]		
	Mean[1]	SE[2]	Range		Mean	No. of SE[4]	CI (%)[5]
Long-distance migrants	25.15	2.46	15.95–40.07	11.40	45.3	−5.59	99.9
Short-distance migrants	31.72	3.82	15.01–55.04	13.98	44.1	−4.64	99
Residents	9.84	1.71	3.34–20.03	6.15	62.5	−2.16	90

[1] Birds banded per 1,000 net hr.
[2] Standard error of the mean.
[3] The percentage that the 1986 value was of the previous 10-year mean.
[4] The number of standard errors that the 1986 value was removed from the previous 10-year mean. Calculated as (1986 value − mean value for 1976 to 1985)/SE of the mean for 1976 to 1985.
[5] The largest confidence interval of the 1976 to 1985 mean that the 1986 value was outside of.

care. In this respect, they had been out of their nests for at least 3 weeks and, in many cases, much longer. Thus, if the reproductive failure that we began to detect about 10 June was caused by an unusually high mortality of nestlings, this mortality must have begun to occur sometime between about 10 May and 20 May. If it was caused by the failure of eggs to hatch, this failure must have begun to occur somewhat earlier, about 25 April to 10 May. If it was caused by the failure of birds to breed or of females to lay eggs, it must have begun even earlier, roughly in mid-April.

We also compared 1986 with the previous 10 years for the number of AHY birds banded per 100 net hr during each of these same 10-day periods (Fig. 6b). We found no significant decreases in the number of adult birds during the first 60 days of 1986, but highly significant decreases during the last 40 days of 1986, at the time when the capture rate of adult birds normally begins to drop off. This significant decrease in 1986 could have been caused by an atypical mortality of adult birds. It could also have been caused by an unseasonably early termination of breeding activities in these birds that, in turn, was caused by their prior reproductive failures. Such an early termination of breeding activity would tend to bring about two related events: an early initiation of prebasic molt in adults, and an early initiation of fall migration in adult migrants. Both of these events would tend to lower the capture rates of adult birds because birds are less mobile and thus less likely to be captured during molt, and because adults of migrant species tend to migrate through interior California and are scarce on the coast where Palomarin is located (Stewart et al. 1974). It is of considerable interest, therefore, that the capture rate of adult birds during the last four 10-day periods of 1986 (9 July to 17 August) was significantly less than that for the previous 10 years for both long- and short-distance migrants but not for residents (Table 3). This provides a strong indication that the early termination of breeding and the consequent early initiation of molt and migration, rather than an abnormally high adult mortality, was the cause for the significantly low late season adult capture rate in 1986.

DISCUSSION

The relationship between landbird productivity in central coastal California and annual (winter) rainfall during the previous season appears to be that productivity is low in years of extremely low rainfall, increases to a maximum in years of average or slightly above average rainfall, and decreases substantially in years of very high rainfall. From an evolutionary standpoint, such a relationship may not be unexpected. It suggests that local breeding populations have become adapted to "average" levels of rainfall and produce fewer young during extreme conditions.

How might winter rainfall affect avian productivity? As winter rainfall increases from drought conditions it will bring about an increase in primary vegetative production. This, in turn, will bring about an increase in the food resources available for raising young as well as an increase in the amount of vegetative cover available for hiding nests from nest predators, at least for ground and shrub nesting species. In addition, in a Mediterranean climate, increased winter and spring rainfall will extend the time into the summer that the vegetation stays green and productive and will thus allow for additional broods or renesting attempts later in the season. All of these factors should tend to increase avian production.

Extremely high levels of winter rainfall, however, may tend to cause high winter mortality among both resident and short-distance migrant species, thus decreasing the size of the breeding populations the following spring. Years of extremely high rainfall are often characterized by inclement spring weather (Figs. 4f, g) that can easily delay the onset of breeding and cause reproductive failures in first brood attempts. It is also conceivable that extremely high rainfall levels could directly impact food resources by negatively affecting the hatching, development, and growth of insects. All of these factors should tend to decrease avian production.

Landbird productivity in 1986, however, did not follow the pattern established over the previous 10 years. Rather, 1986 productivity was 62.3% below the mean for the previous 10 years. In this respect, it is interesting to note that the 1986 rainfall value of 118.97 cm predicts, according to the curve shown in Figure 3, a 1986 productivity value of 10.3 HY birds per 100 net hr, a value that is 110.4% of normal. The actual productivity value for the first 30 days of 1986 in fact averaged 111.7% of normal. Thus, the breeding season of 1986 started out in a perfectly predictable manner until something drastic happened a month or so into the season.

The severity of the factors that brought about the 1986 reproductive failure of landbirds at Palomarin can also be gauged by examination of Figure 3. The most severe drought that occurred in California this century occurred in 1976 and 1977. Accordingly, a drop in productivity of from 19.2% to 32.2% of the 10-year mean occurred during these years. Similarly, one of the highest winter rainfalls in California this century occurred during the Southern Oscillation/"El Niño" year of 1983 and corresponded to a drop in productivity of 20.4% from the 10-year mean. In sharp contrast, the 62.3% decrease in productivity that occurred in 1986 was two to three times as great as those caused by several of the most drastic climatic extremes experienced in California this century. The factors causing the 1986 failure must have been severe indeed.

What then did cause the dramatic decrease in productivity that occurred in most landbird species at Palomarin in 1986? Very simply, we don't know. Additional insight into the situation, however, may be obtained by investigating characteristics of the species that appeared *not* to be affected: the three species of woodpeckers, the swallows (at least the Barn Swallow), and a few other miscellaneous species. It is difficult, at first, to imagine what ecological characteristics swallows and woodpeckers could share that could have prevented them from suffering the reproductive failures that characterized most other species of landbirds in 1986. They both, however, feed their young largely on insects that are produced from detritus- or decomposer-based ecosystems, rather than from ecosystems based on primary production. Woodpeckers, for example, feed largely on grubs and beetles that feed on dying, dead, or decaying wood (Bent 1939). Swallows feed extensively on flying insects, especially Diptera, that often emerge from aquatic ecosystems (Bent 1942). In the neighborhood of the Palomarin Field Station, such aquatic ecosystems occur primarily in the flowing waters of several small, year-round or intermittent creeks, and are almost exclusively detritus-based ecosystems.

Along these same lines, the four flycatcher species partially depend upon flying insects that emerge from aquatic ecosystems. They also take substantial numbers of flying insects that emerge from terrestrial or arboreal primary production-based ecosystems. Nevertheless, their partial dependence upon nonprimary production-based ecosystems may account for their slightly less drastic productivity decline in 1986, as compared to foliage gleaners and ground gleaners (Fig. 5d). These same considerations tend to explain why structure nesters showed a less severe productivity decline in 1986 than species utilizing other nest locations (Fig. 5c): two of the four structure nesters are swallows while a third is a flycatcher.

Vegetation-regurgitating species may also have been slightly less severely affected in 1986 than most other species (Fig. 5d). It would appear that their ability to utilize primary production directly as a food supply for themselves and their young, rather than being entirely dependent upon consumers of primary production, may have helped these species to a small extent. Along these same lines, short-distance migrants seemed to have fared slightly less poorly in 1986 than either long-distance migrants or residents (Fig. 5a). This is readily explainable by the fact that fully 85% of the individual short-distance migrants banded during this study were of the six vegetation-regurgitating species.

Thus, it appears that the birds that were most severely impacted in 1986 were those species that forage and feed their young exclusively on insects that are produced within a primary production-based ecosystem. If this were in fact the case, we might expect that species that forage and feed their young extensively on caterpillars or other large larvae that eat new plant growth might be the most severely affected. Indeed, this seems to be the case. We captured *no* HY Warbling Vireos or Black-headed Grosbeaks at Palomarin during the entire 100 days in 1986 and have no indication that any young of these species were produced anywhere in the vicinity of Palomarin. The previous 10-year means for these two species were 24 and six HY birds respectively.

The five miscellaneous species that showed no significant reproductive decline in 1986 warrant some discussion. The House Finch's 1986 reproductive success was only 16.7% of the previous 10-year mean. This drastic reproductive decline was not statistically significant only because in some years the species does not occur or breed at Palomarin at all. Regarding the Steller's Jay, we can offer no comment.

The three remaining species, Rufous-sided Towhee, White-crowned Sparrow, and American Goldfinch, are three of the four latest breeders at Palomarin and regularly fledge young well into August. (The fourth late breeder, interestingly, is the Barn Swallow which also regularly fledges young in August and occasionally even into early September.) The facts (1) that none of these four species showed significantly reduced productivities in 1986, (2) that for each of these species we banded substantial numbers of young during the final two 10-day periods of 1986, and (3) that the 1986 productivity decline during these final two 10-day periods was somewhat less than that of the three immediately preceding 10-day periods indicate that a recovery of reproductive success may have begun during these last two 10-day periods, but that it could only be detected in species whose breeding seasons regularly extend late into the season. If this were indeed the case, then the factors causing the reproductive failure may only have been operative for about 50 days.

The next obvious question is whether or not the phenomenon described here was limited to the immediate vicinity of Palomarin or extended over a greater area of California. Data from the Harvey Monroe Hall Research Natural Area in the subalpine Sierra Nevada suggests that, for Dark-eyed Juncos at least, a major reproductive failure occurred on the west slope of the central Sierra Nevada (D. DeSante, unpubl. data). Nine previous years of data have shown that numerous flocks of from 30 to 150 HY juncos normally move up the west slope of the Sierra into the subalpine in mid- to late summer. In 1986, the largest flock of dispersing juveniles recorded in the Hall Natural Area was only four individuals. Other workers on the west slope of the Sierra also reported extremely low numbers of juvenile juncos as well as a nearly complete absence of juvenile Warbling Vireos and Black-headed Grosbeaks (D. Gaines, pers. comm.).

An intensive study of the nesting of Mountain and Chestnut-backed chickadees at the Blodgett Forest Preserve on the west slope of the northern Sierra Nevada revealed that these species experienced nestling mortality during the last 2 weeks of May 1986 that was very much higher than that of any previous year (D. Dahlston, pers. comm.). Notably reduced reproductive success in 1986 as compared to 1984 and 1985 was reported for *pugetensis* White-crowned Sparrows at the Lamphere-Christensen Nature Preserve on the north coast of California (C. J. Ralph, pers. comm.). Furthermore, preliminary analysis of migrant *pugetensis* White-crowned Sparrows on Southeast Farallon Island indicates that the HY/AHY ratio for fall migrants in 1986 was 0.50 compared to the previous 5-year average of 2.71 (PRBO, unpubl. data). *Pugetensis* White-crowned Sparrows have a limited breeding range from extreme southwestern British Columbia south, west of the Cascade Range in Washington and Oregon, to northern coastal California (AOU 1957). Thus, it appears that the 1986 reproductive failure documented here for Palomarin was not limited to central coastal California but extended widely over northern California to and including the west slope of the Sierra Nevada, and perhaps north through western Oregon and Washington as well.

Interestingly, preliminary results indicate that the productivity of landbirds on the east side of the Sierra Nevada, both in the subalpine (D. DeSante, unpubl. data) and in the sagebrush shrubsteppe near Mono Lake (D. Gaines, pers. comm.), and specifically for Mountain Chickadees in Modoc County (D. Dahlston, pers. comm.), was at relatively normal levels. Similarly, preliminary data on landbirds from the Channel Islands off southern California indicate relatively normal, or even good, reproductive success (C. Collins, pers. comm.). Landbird reproductive success, therefore, was not uniformly poor throughout all of California but varied geographically. We are currently following up these reports and investigating other reports in order to determine the full extent of the 1986 reproductive failure in western North America and elsewhere.

No obvious explanation, therefore, appears to exist for the unprecedented, drastic decline in the local production of landbirds at Palomarin and elsewhere in California in 1986. Given this situation, we surmise that the reproductive failure must have resulted from either a single very rare event or from a rare combination of not so uncommon events. One rare combination of events occurred during the period 13 to 16 February 1986, when a series of very heavy storms, in conjunction with unseasonably warm weather, deluged central California and caused widespread flooding. Night temperatures during the height of the storms were recorded in excess of 15°C. Nevertheless, it is not at all clear exactly how such a combination of events could have brought on the reproductive failure documented here, especially since the failure did not occur at the start of the breeding season but, rather, part way into it.

A second unprecedented rare combination of events occurred on 6 May 1986, when a rather cold rain coincided with the passage over coastal Washington, Oregon, and northern California of a radioactive "cloud" from the accident at the Chernobyl nuclear power plant in the U.S.S.R. We must stress at this point that there exists absolutely no direct evidence linking the reportedly very small amount of radiation dropped from the Chernobyl cloud to the reproductive failure documented here. Mere coincidence may be a possible explanation for the fact that the timing of the passage of the Chernobyl cloud coincided remarkably well with the timing of the onset of the reproductive failure at Palomarin, and that the geographical area over which substantial rainfall was coincident with the passage of the cloud appears, at first glance, to coincide with the geographical areas that experienced some reproductive failure. Furthermore, the species that tended to be unaffected by the reproductive failure were those that raise their young on insects that tend to be produced in detritus or decomposer, rather than primary production food chains. This suggests that the 1986 reproductive failure could have been caused by radioactivity precipitated from the Chernobyl cloud by rainfall, absorbed and incorporated into the primary production food chain by growing plants, concentrated in the food chain by insect consumers, and fed to nestling birds by their parents that foraged on these insects. Again, however, we must emphasize that this entire scenario is completely hypothetical, that the quantities of radioactivity that were reportedly released from Chernobyl are thought by some experts to be far too small to cause nestling mortalities (I. L. Brisbin, pers. comm.), and that the entire relationship of Chernobyl to the 1986 reproductive failure may be coincidental. Nevertheless, when such an unprecedented and drastic avian reproductive failure occurs without any obvious explanation, as we have documented here, any and all coincidences deserve further investigation.

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The detection of aberrant phenomena in natural processes, such as the 1986 reproductive failure documented here, depends upon the existence of long-term baseline data against which the aberrancy can be compared. It is with gratitude that we acknowledge the efforts of L. Richard Mewaldt, whose unswerving dedication to the importance of long-term biomonitoring played a major role in the establishment and continuation of the Palomarin Field Station. We are most indebted, however, to the members of the PRBO who, through their continuing financial assistance and numerous donations of time, energy, tools, and equipment, have made this long-term study possible. We especially thank Dorothy B. Hunt for her many generous financial contributions to the Palomarin banding program. We also thank the Chevron Corporation for timely financial assistance with the data analysis phase of this project, and the Point Reyes National Seashore for their cooperation.

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APPENDIX

SCIENTIFIC NAMES OF THE SPECIES MENTIONED IN THE TEXT

Band-tailed Pigeon (*Columba fasciata*), Mourning Dove (*Zenaida macroura*), Downy Woodpecker (*Picoides pubescens*), Hairy Woodpecker (*Picoides villosus*), Northern Flicker (*Colaptes auratus*), Olive-sided Flycatcher (*Contopus borealis*), Western Wood-Peewee (*Contopus sordidulus*), Western Flycatcher (*Empidonax difficilis*), Ash-throated Flycatcher (*Myiarchus cinerascens*), Tree Swallow (*Tachycineta bicolor*), Violet-green Swallow (*Tachycineta thalassina*), Northern Rough-winged Swallow (*Stelgidopteryx serripennis*), Cliff Swallow (*Hirundo pyrrhonota*), Barn Swallow (*Hirundo rustica*), Steller's Jay (*Cyanocitta stelleri*), Scrub Jay (*Aphelocoma coerulescens*), Mountain Chickadee (*Parus gambeli*), Chestnut-backed Chickadee (*Parus rufescens*), Plain Titmouse (*Parus inornatus*), Bushtit (*Psaltriparus minimus*), Red-breasted Nuthatch (*Sitta canadensis*), Brown Creeper (*Certhia americana*), Bewick's Wren (*Thryomanes bewickii*), Winter Wren (*Troglodytes troglodytes*), Golden-crowned Kinglet (*Regulus satrapa*), Western Bluebird (*Sialia mexicana*), Swainson's Thrush (*Catharus ustulatus*), Hermit Thrush (*Catharus guttatus*), American Robin (*Turdus migratorius*), Wrentit (*Chamaea fasciata*), European Starling (*Sturnus vulgaris*), Hutton's Vireo (*Vireo huttoni*), Warbling Vireo (*Vireo gilvus*), Orange-crowned Warbler (*Vermivora celata*), MacGillivray's Warbler (*Oporornis tolmiei*), Wilson's Warbler (*Wilsonia pusilla*), Black-headed Grosbeak (*Pheucticus melanocephalus*), Rufous-sided Towhee (*Pipilo erythrophthalmus*), Brown Towhee (*Pipilo fuscus*), Rufous-crowned Sparrow (*Aimophila ruficeps*), Black-chinned Sparrow (*Spizella atrogularis*), Savannah Sparrow (*Passerculus sandwichensis*), Grasshopper Sparrow (*Ammodramus savannarum*), Song Sparrow (*Melospiza melodia*), White-crowned Sparrow (*Zonotrichia leucophrys*), Dark-eyed Junco (*Junco hyemalis*), Red-winged Blackbird (*Agelaius phoeniceus*), Brown-headed Cowbird (*Molothrus ater*), Purple Finch (*Carpodacus purpureus*), House Finch (*Carpodacus mexicanus*), Pine Siskin (*Carduelis pinus*), American Goldfinch (*Carduelis tristis*).

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ATTACHMENT 6

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Bat use of golf courses depends on surrounding landscape context

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Bat use of golf courses depends on surrounding landscape context

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Abstract

Understanding how wildlife responds to altered ecosystems is an important conservation objective. Urban green spaces may support wildlife communities, but their internal and external environments vary substantially. Golf course design and management generally follow standardized best practices, and thus frequently contain similar ecological features. However, studies investigating their conservation value have produced discordant conclusions; therefore, we hypothesize that external environmental factors significantly affect their utility for wildlife. We used acoustic detectors to survey bats at eleven golf courses across a gradient of landscapes (urban, agricultural, and forested) over two years. We used generalized linear mixed models to examine how landscape features surrounding golf courses relate to bat activity. For most species, bat activity was greater on golf courses when the surrounding landscape contained fewer open spaces and more developed land. We conclude that golf courses situated in developed landscapes may provide important foraging habitat for bats. Notably, several species of conservation concern were more active on courses with larger patches of nearby forest. Given that management resources are finite, we recommend using the surrounding landscape to assess the conservation potential of golf courses and allocating effort to improve habitat on golf courses that are most likely to benefit bats and other wildlife.

Keywords Acoustic monitoring · Bats · Conservation planning · Habitat use · Landscape · Urban green space

Introduction

As the extent of undisturbed natural ecosystems continues to decline (Morales-Hidalgo et al. 2015), anthropogenically modified and semi-natural landscapes steadily replace them (Seto et al. 2011). Wildlife populations in such landscapes are forced to find resources in “novel ecosystems” that may be more or less suitable than what they replaced (Kennedy et al. 2018; Martínez-Hesterkamp et al. 2018). The novelty of such ecosystems may be the result of new anthropogenic disturbances (i.e., agriculture, urbanization, pollution, fragmentation, etc.) or the alteration of natural disturbance regimes (i.e., fire suppression, flood mitigation, wind breaks, etc.). While unmodified natural areas are likely to have the highest habitat suitability for many wildlife taxa, they may represent only a fraction of a species’ distribution (e.g., Müller et al. 2017). Because many animal populations are forced to adapt to novel ecosystems, conservation objectives must adapt with them. In fact, many species of conservation concern co-occur in areas of high human population density (Luck 2007). For example, cities in Australia contained more threatened species per unit area than non-urban sites; this pattern was especially notable for animals relative to plants (Ives et al. 2016). Urban wildlife populations tend to rely on patches of vegetation amidst a more modified matrix, but different types of green space vary in their utility as wildlife habitat (Gallo et al. 2017). The conservation value of semi-natural areas (i.e., parks, cemeteries, and other urban green spaces) remains an open question, and it is unclear whether fragmented patches of vegetation in a

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modified matrix can sustainably support an ecological community. Semi-natural areas vary considerably in size, vegetative characteristics, water supply, and degree of landscape modification (Nielsen et al. 2014). Therefore, identifying the internal and external factors determining their utility is crucial for maximizing their conservation potential.

Golf courses represent a relatively large and common semi-natural landscape. As of 2021, > 38,000 golf courses were distributed throughout 206 countries (R&A 2021). Nearly 42% of golf courses globally occur within the United States (16,156 golf courses), making it the number one golfing country in the world by a wide margin (R&A 2021). Given their size and abundance, golf courses alter the environment for both humans and wildlife.

Golf course construction and maintenance result in several negative impacts to local environments (Briassoulis 2010; Palmer 2004; Wheeler and Nauright 2006), including soil composition changes, wetland loss, and groundwater contamination (Doytchev 2019; Winter et al. 2003). Additionally, native vegetation is often replaced with non-native grasses to match the industry standard (McCarty 2018). The large amounts of fertilizers, herbicides, insecticides, and fungicides required to maintain these turf grasses may contaminate nearby bodies of water (Bock and Easton 2020; Grande et al. 2019; Kunimatsu et al. 1999; Sudo et al. 2002), and the irrigation requirements can severely deplete groundwater reserves and natural reservoirs (Platt 1994). Accidental exposure to pesticides has contributed to high-mortality events in waterfowl (Littrell 1986; Stone and Knoch 1982; Zinkl et al. 1978), passerines, and bats (Stansley et al. 2001). However, golf courses can also have conservation value (Hodgkison et al. 2007; Tanner and Gange 2005), supporting populations of threatened or endangered birds (Rodewald et al. 2005; Smith et al. 2005; Terman 1997), amphibians (Montieth and Paton 2006), and mammals (Ditgen et al. 2007), and sometimes exhibiting demographic performance metrics comparable to protected wildlife areas (Winchell and Gibbs 2016). Golf courses may also maintain habitat connectivity in human-dominated environments. Particularly if they retain patches of native habitat, golf courses may provide a refuge for animals dispersing through otherwise developed landscapes.

Discordant conclusions about the effects of golf courses on wildlife suggest that external factors influence their ecological value. Because golf course features tend to converge on a similar design (often referred to as the Augusta National Syndrome; Millington and Wilson 2016), we hypothesize that the surrounding landscape strongly influences the use of golf courses. Where the surrounding matrix is dominated by natural cover, golf courses may have lower benefit to resident wildlife. However, in highly urbanized areas, golf courses should function as habitat refugia and support biodiversity in much the same way as other urban green spaces (Petrosillo et al. 2019).

Compared to more readily observable taxa (i.e. birds, insects, and amphibians), bats are understudied on golf courses (Petrosillo et al. 2019), but they may be especially attracted to golf courses as foraging sites due to the high densities of arthropod prey within the highly heterogeneous habitat types within out-of-play areas (Dale et al. 2020; Mata et al. 2017; Saarikivi et al. 2010; Tanner and Gange 2005). Because bats are frequently reported to make use of comparable urban green spaces (Suarez-Rubio et al. 2018), bats may live on or frequently visit golf courses to feed or roost (Burgin and Wotherspoon 2009; Gitzen et al. 2001). For example, bats occurring in urban areas of London, UK were observed feeding within golf courses; however, light pollution from the surrounding development restricted their use to the course interior (Fure 2006). Australian bats increased golf course use over time in an anthropogenically modified landscape (Burgin and Wotherspoon 2009). North American bats, including the endangered Florida bonneted bat, *Eumops floridanus* (Webb et al. 2021), have also been documented on golf courses (Bazelman 2016; Wallrichs 2019). Although these accounts exist, many are single observational reports rather than quantitative studies (but see Wallrichs 2019). Where robust studies occurred, authors speculated that the pseudo-natural features of the course provided an escape from a less hospitable surrounding landscape (i.e. urban refugia effect; Burgin and Wotherspoon 2009). These previously mentioned studies call for further investigation into the conservation value of golf courses and the novel landscapes in which they are situated. As novel landscapes gradually replace natural ones, understanding how bats use them is likely to become increasingly important for conservation.

We tested our hypothesis by documenting the activity of North American bats on golf courses situated across a gradient of landscape matrices. In this study, we investigated the relationship between surrounding landscape characteristics and bat activity (species-specific and community-level) and foraging rates (community-level) on golf courses. We monitored bat activity levels on golf courses that varied in their surrounding landscape features across New Jersey, USA for two consecutive years using standardized passive acoustic monitoring procedures. In agreement with the urban refugia effect observed in other studies, we predicted that generalist, disturbance tolerant bat species would dominate golf courses surrounded by anthropogenically altered landscape matrices. Additionally, we predicted that golf courses situated in modified landscapes would experience greater total bat activity and foraging rates, while more natural landscapes would correlate with lower golf course use.

Materials and methods

Study area

We conducted our study on 11 golf courses distributed across 10 counties throughout New Jersey, USA (Fig. 1). Sites ranged in size from 10.2 ha to 100.1 ha and were located a minimum of 9.8 km apart. Because we were interested in examining the relationship between the surrounding landscape and golf course use by bats, we deliberately chose sites that represented a gradient of land use types. Landscapes surrounding golf courses ranged from predominantly agricultural areas (e.g., Eastlyn Golf Course; hereafter, "Eastlyn"), predominately urban areas (e.g., Overpeck Golf Course; hereafter, "Overpeck"), to predominantly forested areas (e.g., High Point Golf Club; hereafter, "High Point").

Survey protocol

We surveyed golf courses for bats between June and August in 2019–2020. To develop our survey protocol, we combined guidance presented in two widely-accepted bat monitoring approaches: North American Bat Monitoring Program (NABat; Loeb et al. 2015) and the US Fish

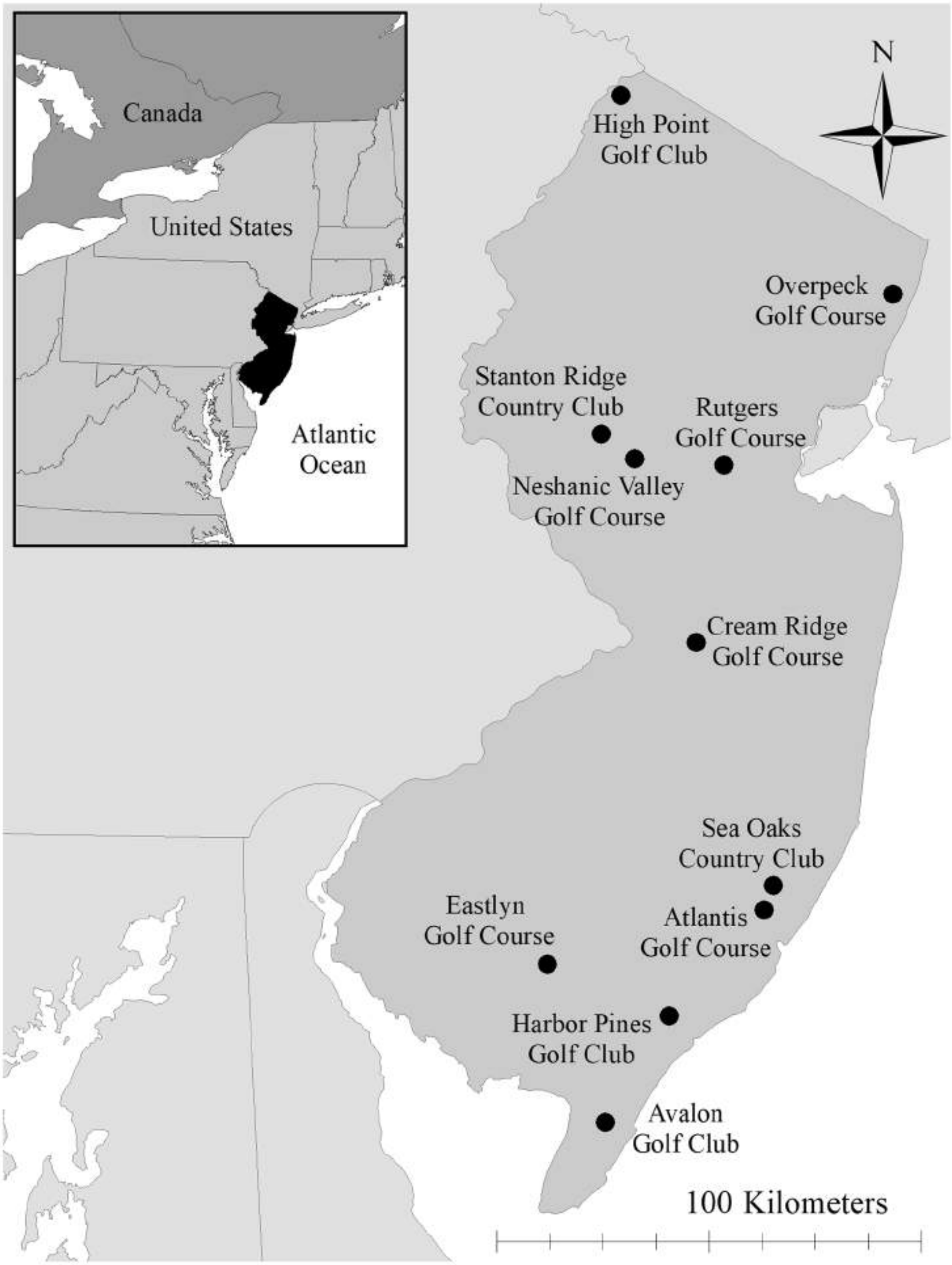

Fig. 1 Golf courses in New Jersey, USA surveyed for bats during June through August 2019–2020. Black dots indicate course name and location. Sea Oaks Country Club closed permanently following the 2019 season and was replaced in 2020 by the nearby Atlantis Golf Course

& Wildlife Service's Range wide Indiana bat and northern long-eared bat summer survey guidelines (U.S. Fish and Wildlife Service 2023), ensuring that surveys were replicated both spatially throughout the golf course and temporally across years (de Torrez et al. 2017). At each study site, we deployed two Pettersson D500X (Pettersson Elektronik AB, Sweden) direct recording full-spectrum acoustic detectors with omni-directional microphones mounted at least 3 m above the ground and placed at least 10 m away from vegetation (Loeb et al. 2015). Microphones were aimed towards the open space above either bodies of water or the fairway adjacent to a forest edge. Microphones deployed simultaneously were positioned at least 200 m apart from one another. We scheduled detectors to passively record bat calls from 15 min prior to sunset until 15 min after sunrise over four total nights (eight detector-nights per course per year) when little/no precipitation was predicted in the forecast and winds were below 10 km/hr. To reduce the number of nontarget noise recordings, we programmed detectors with a 500 kHz sampling rate and a medium trigger sensitivity (for detailed system settings, see Online Resource 1). Once triggered, detectors recorded sound for 3 s and stored recordings as .WAV files for subsequent analysis.

Species classification

We analyzed all detector recordings using SonoBat version 4 and the northeastern North America regional library (Szewczak and Szewczak 2017). We considered a bat call to be any sound produced by a bat, primarily echolocation pulses intended for navigation and foraging. To eliminate extraneous noise files and reduce the number of files that needed manual verification, we used SonoBat's file-scrubbing utility set to the default medium call-quality threshold.

All files that remained after scrubbing were processed using SonoBat's call attributer and compared against the northeastern regional library of bat calls to classify them by species when possible. Measurements to calculate these classifications had an acceptable call quality threshold of 0.80, a species decision threshold of 0.90, and a maximum of 32 echolocation pulses considered per file. For recordings that were below the quality threshold of automatic classification (0.90) but were still clearly visible on the sonogram, a general label was automatically attributed to the file (either "high frequency unknown" or "low frequency unknown"). Similarly, if there were fewer than four clear echolocation pulses in a file, it was labeled generally because a confident species identification cannot be made with so few calls. After files were automatically classified, all calls were manually vetted to verify species classification. We manually identified recordings conservatively to minimize false-positive species detections, adhering to a rubric of known call characteristics for each species. Calls assigned to a species not known to occur in New Jersey (e.g., *Corynorhinus rafinesquii*; IUCN 2008) were manually reclassified as unknown. Because of the highly overlapping call characteristics between *Myotis lucifugus* and *M. sodalis*, and because there were so few recordings attributed to *M. sodalis*, we combined classifications for *M. lucifugus* and *M. sodalis* into a "Luso" category (Szewczak and Harris 2013) and treated it as a single species for all subsequent analyses. Calls with a general label ("high frequency unknown" or "low frequency unknown") were included while calculating total bat activity, but not for species-specific activity measures. We defined nightly bat activity as the count of all bat calls (both species-specific and the sum of all species) detected at a single course each night.

Foraging activity

We quantified foraging rate at each golf course, defined as the count of all terminal buzzes detected at a single course each night. Bats tend to change their echolocation behavior as they approach a food item (Ratcliffe et al. 2013), where evidence of hunting behavior is characterized by a slight drop in the characteristic frequency, increased pulse repetition rate, and increased bandwidth and shorter call duration of each call in the "terminal buzz" (Schnitzler and Kalko 2001). Therefore, we used SonoBat's sonogram viewing window to visually examine every call file for indicators of feeding activity. Buzzes are readily visible on the SonoBat viewing window and can be heard as a distinct cadence when the audio file is played at 10x reduced speed. Because a terminal buzz is accompanied by changes in call characteristics, many sound files containing a terminal buzz did not meet the criteria for reliable species classification. Therefore, we we did not attempt to model differences in foraging activity among species.

Relationship between the surrounding landscape and use of golf courses by bats

We used remotely sensed data and GIS to characterize the surrounding landscape variables likely correlated to the use of golf courses by bats. All spatial data manipulations were performed using ArcMap version 10.8.1 (ESRI 2020). We first projected the polygon shapefiles of study golf courses obtained from the New Jersey Department of Environmental Protection (NJDEP), Division of Science, Research and Technology digital repository (Online Resource 2; NJDEP 2001). The bat species in our study tend to travel approximately 2 km from their roost each night to access foraging areas (Brigham 1991; Crampton and Barclay 1998; Elmore et al. 2005; Sparks et al. 2005; Walters et al. 2007);

therefore, we created a 2-km buffer around the perimeter of each golf course to represent the approximate roost-to-forage distance of local bat species. Thus, all bats roosting in our 2-km buffer could reasonably be expected to consider the golf course as a potential roosting or foraging habitat.

We also downloaded and projected land use data for the state of New Jersey from the NJDEP (Online Resource 2; NJDEP 2019). This dataset classified the state of New Jersey into six land use types: urban, agriculture, forest, water, wetland, and barren land (i.e., bare rock and sand). However, these general land use types may contain more specific land uses hypothesized to be more relevant to bats. Thus, we used the Reclassify tool in ArcMap to reclassify some of these land use types into more specific categories. For example, the label “urban” was used to describe a wide range of land types, including industrial areas, cemeteries, residential areas, and roads. Although most bats tend to avoid highly urban areas (Russo and Ancillotto 2015), they may actively select habitat near small roads and suburban areas (Threlfall et al. 2012). Accordingly, we used these fine-scale labels to reclassify low-density residential areas as a new category, “suburban.” Some bat species may also prefer to forage over open fields of grass or other low-lying vegetation (Barclay 1985; Patriquin and Barclay 2003); however, that type of habitat was not represented by the existing six land-use types. We reclassified the features representing “Cemetery”, “Cemetery on Wetland”, “Recreational Land”, “Athletic Fields (Schools): Community Recreation Areas”, “Managed Wetland in Built-up Maintained Recreation Area”, “Old Field (<25% Brush Covered)”, “Phragmites Dominated Old Field (2002)” as the new land use label “open fields”. Ultimately, the final eight land use types considered in our study were: (1) urban; (2) suburban; (3) agricultural; (4) open fields (non-agricultural); (5) forest (greater than 10% canopy closure); (6) water; (7) wetland; and (8) barren land (beaches, quarries, and bare rock). We overlaid and clipped the NJDEP land use polygon shapefile to each 2-km buffer and converted the resulting polygons to rasters with a 10-m resolution.

Bats also make extensive use of streams (Bergeson et al. 2013; Kniowski and Gehrt 2014), which function as corridors for travel, insect-rich foraging habitat, and a source of drinking water (Pauli et al. 2017). Therefore, we quantified the total length of streams with in the 2-km buffer surrounding each site using the NJ National Hydrography Dataset (NHD) Waterbody and Stream Network (Online Resource 2; NJDEP 2010). This dataset is a subset of the larger NHD dataset that is specific to New Jersey, and we used the most recent 2011 NHDFlowline feature class. We further refined this dataset by considering only streams that are within 100 m of a forested landscape, which retained the relevant spatial data required for analysis while also eliminating legacy land use characterization within the shapefile (i.e., former tidal land that is currently inundated).

From the spatial data gathered, we quantified all landscape characteristics using Fragstats (McGarigal et al. 2012) with the exception of total length of forested streams in the surrounding landscape (calculated directly in ArcGIS). Because forests represent especially important resources for bats (Lacki et al. 2007), we also used Fragstats to determine both the density of forest edge in the surrounding landscape and the largest patch index (LPI) of forest, which is used as a measure of dominance over a landscape. The LPI approaches 0 as the largest patch of forest becomes increasingly small, whereas a forest LPI of 100 would indicate that the largest patch of forest is the same size as the study area.

Statistics and modeling

Analyses and data manipulations were done in R studio version 2022.12.0 (RStudio Team 2020). We first checked for correlations among environmental variables using Pearson’s r (Lee Rodgers and Nicewander 1988), eliminating all but one variable involved in a correlation above 0.70. Forest edge density, percent forested land, and forest largest patch index were highly correlated; therefore, we eliminated forest edge density and percent forested land. We used the R package “lme4” (Douglas Bates et al. 2020) to construct sets of generalized linear mixed effects models (GLMMs)to test the relationship between the surrounding landscape and golf course use by bats. Models included the count of verified total bat recordings per night (as a measure of total nightly bat activity), recordings of each individual species per night (as a measure of species-specific nightly bat activity), and terminal buzzes per night (as a measure of foraging rate) as the response variables. This resulted in eight datasets: total nightly bat activity, total foraging rate, and six subsets of species-specific nightly bat activity. We sought to examine community-level and species-specific habitat associations with the percent urban land, percent open field, percent agricultural land, percent suburban land, forest largest patch index, and length of streams on our response variables. We also included detector location to indicate whether or not the survey location was adjacent to water, as some bat species tend to prey upon aquatic insects (Clare et al. 2011; Maslo et al. 2022; O’Rourke et al. 2021). Finally, to account for intra-course differences in bat activity, as well as repeated sampling sites, we considered golf course and year as random effects. In 2020, New Jersey golf courses were closed until early May due to restrictions relating to COVID-19. Because the closures did not overlap with our survey period, we did not expect this to influence our results.

We constructed 25 *a priori* GLMMs using a negative binomial error distribution (Online Resource 3) to investigate competing hypotheses regarding the effects of landscape composition on golf course use by bats. Global models contained all fixed effects, which were scaled by dividing by the standard deviation of each effect and centered. We ranked candidate models using AICc (Online Resources 4–11) and averaged those within ΔAICc < 2 (Burnham and Anderson 1998) using the MuMIn package in R (Barton 2020) for each of the eight data sets. The residuals of top models were tested for zero inflation, correct distribution, dispersion, and outliers using the DHARMa package (Florian Hartig and Lohse 2021). None of the top models showed significant zero inflation or deviations from expected residuals. We considered variables within the top models to be significant predictors of the dependent variable if the 95% confidence interval of the model estimate did not contain zero.

Results

Community composition of bats on golf courses

After accounting for detector malfunction or battery failure, we secured 132 detector nights across the 2-yr period. We recorded 33,272 total bat echolocation call sequences (course averages ranging from 46.1 to 792.6 calls per detector night; Table 1), with approximately 73% of our recordings occurring in 2020. The most recordings at a site for a single season occurred at Atlantis Golf Course (hereafter, "Atlantis") in 2020 (N = 5,548), whereas the fewest recordings for a single season occurred at Rutgers Golf Course (hereafter, "Rutgers") in 2020 (N = 375). We consistently recorded high nightly activity and foraging rates at Harbor Pines Golf Club (hereafter, "Harbor Pines"), Eastlyn, and Overpeck in both years. Avalon Golf Club (hereafter, "Avalon") and High Point had consistently low total nightly activity, but nightly foraging rate was highly variable between years at these sites.

Eptesicus fuscus was the most common bat species observed in our study, representing ~ 77% of all identifiable recordings. In contrast, we recorded only two recordings each of *Myotis leibii* and *M. septentrionalis*. Therefore, these two species were eliminated from subsequent analyses. Despite having > 500 recordings, we also excluded *Nycticeius humeralis* from our species-specific models because New Jersey is bisected by the northern edge of its geographic range (BCI 2021) and so it was not present at all sites; therefore, *N. humeralis* use of golf courses in our study is confounded with range limits. *N. humeralis* recordings were still included in our measure of total nightly bat activity.

We found *E. fuscus*, *Lasiurus borealis*, and *Lasionycteris noctivagans* at all sites in both 2019 and 2020. While "Luso" calls were predominantly rare, we detected this species complex consistently at Harbor Pines and High Point in both 2019 and 2020. Similarly, *Perimyotis subflavus* was consistently observed only at Overpeck and, to a lesser extent, High Point and Eastlyn. The number of bat species present ranged from 4 to 8, with a mean of 6 bat species per course. The most species were recorded at Atlantis, Eastlyn, and Overpeck and the fewest species were recorded at Rutgers and Cream Ridge Golf Course (hereafter, "Cream Ridge"), which each only contained the four most common species. The same four common species (*E. fuscus*, *L. borealis*, *L. cinereus*, and *L. noctivagans*) were observed at all sites in both years except Avalon in 2019 (where *L. cinereus* was absent).

Influence of surrounding Landscape on Bat Activity

Top models describing total bat activity demonstrated reductions in total bat activity with increasing percentages of open field (-0.64, 95% CI: -1.07, -0.21), agriculture (-0.63, 95% CI: -1.10, -0.17), and forest LPI (-0.34, 95% CI: -0.66, -0.03) within the surrounding landscape (Fig. 2). Total bat activity was lower at microphones placed near open water compared to those that were placed at forest edges (-0.71, 95% CI: -1.18, -0.24).

Increases in percentage of surrounding urban land were associated with greater on-course activity of *L. borealis* (0.94, 95% CI: 0.19, 1.73) and *P. subflavus* (3.77, 95% CI: 1.71, 5.85; Fig. 3). While not statistically significant, the activity of *E. fuscus* (0.35, 95% CI: -0.14, 0.84) and *L. noctivagans* (0.32, 95% CI: -0.24, 0.88) also slightly increased along with increased urban percent. Notably, the majority of *P. subflavus* recordings occurred at Overpeck, the most urban course (28.5% urban land cover) in the study. Meanwhile, increasing extent of surrounding suburban land was significantly associated only with *L. borealis*, serving to reduce on-course activity (-0.59, 95% CI: -1.17, -0.01). Increasing percent of open fields was significantly related to reduced activity on courses for *E. fuscus (*-0.69, 95% CI: -1.21, -0.17*)*, *L. borealis* (-0.88, 95% CI: -1.55, -0.20), and *L. noctivagans* (-0.66, 95% CI: -1.21, -0.11). Higher agricultural coverage had a similar negative association with the activity of *E. fuscus (*-0.68, 95% CI: -1.23, -0.13), *L. noctivagans* (-0.65, 95% CI: -1.26, -0.04), and the Luso complex (-1.66, 95% CI: -3.16, -0.15); however, *P. subflavus* activity significantly increased (3.24, 95% CI: 1.13, 5.35) on courses surrounded by higher amounts of agriculture.

The length of forested streams in the surrounding landscape appeared in the top models for four species but were significant predictors only of *L. borealis* (-0.86, 95% CI: -1.30, -0.41) and *L. cinereus* (-0.78, 95% CI: -1.41, -0.14) activity (Fig. 3). Similarly, greater forest LPI appeared in

Table 1 Nightly average bat activity per site per year (standard error in parentheses). When possible, recordings were identified to a species-level classification. Number of terminal buzzes per site is a measure of foraging activity

Year	Site	N_{night}	Terminal Buzzes		Total Activity		*E. fuscus*		*L. borealis*		*L. cinereus*		*L. noctivagans*		*M. lucifugus/ sodalis*		*P. subflavus*	
2019	Avalon	7	8.3	(5.6)	91.0	(44.7)	48.7	(28.8)	13.1	(8.7)	0.0	-	0.6	(0.4)	0.0	-	0.0	-
	Cream Ridge	8	1.3	(0.7)	51.9	(17.4)	22.8	(7.7)	4.8	(2.0)	2.4	(1.0)	4.8	(2.8)	0.0	-	0.0	-
	Eastlyn	6	9.5	(2.3)	183.2	(49.9)	85.7	(23.4)	38.0	(13.7)	0.8	(0.3)	5.2	(0.9)	0.2	(0.2)	3.0	(2.2)
	Harbor Pines	8	10.8	(4.3)	244.1	(87.1)	132.1	(45.5)	8.9	(3.5)	14.3	(5.7)	15.4	(6.4)	1.9	(1.4)	0.0	-
	High Point	7	9.1	(1.5)	82.7	(12.8)	43.4	(9.9)	1.4	(0.6)	9.3	(2.2)	10.1	(2.7)	6.9	(1.9)	0.6	(0.4)
	Neshanic	8	1.5	(1.1)	54.3	(21.1)	31.0	(14.8)	1.0	(0.5)	2.8	(0.7)	4.8	(1.4)	0.0	-	0.0	-
	Overpeck	8	12.4	(4.0)	146.1	(45.6)	61.8	(25.5)	6.8	(3.3)	55.8	(35.4)	4.5	(2.5)	0.0	-	5.9	(3.1)
	Rutgers	6	11.3	(7.2)	209.8	(130.8)	148.8	(94.1)	2.3	(1.3)	0.2	(0.2)	10.8	(6.3)	0.0	-	0.0	-
	Sea Oaks	8	6.1	(1.4)	114.4	(21.0)	41.6	(13.1)	12.0	(4.0)	9.1	(1.9)	16.8	(3.5)	0.8	(0.4)	0.0	-
	Stanton Ridge	8	3.4	(1.5)	46.1	(15.8)	26.8	(9.9)	3.8	(1.8)	1.0	(0.5)	1.8	(1.0)	0.0	-	0.0	-
2020	Atlantis	7	19.4	(2.6)	792.6	(112.7)	393.9	(79.5)	54.3	(13.1)	14.7	(6.0)	69.0	(14.9)	0.9	(0.4)	0.1	(0.1)
	Avalon	7	4.3	(2.2)	92.7	(23.5)	29.7	(5.6)	7.7	(4.1)	9.0	(1.7)	9.9	(2.8)	0.0	-	0.0	-
	Eastlyn	8	22.0	(4.4)	502.4	(96.9)	333.6	(83.2)	12.9	(2.2)	23.5	(4.3)	18.0	(6.9)	0.5	(0.2)	0.0	-
	Harbor Pines	8	32.9	(3.6)	605.4	(24.7)	356.9	(19.4)	3.8	(1.6)	24.9	(4.3)	54.4	(7.2)	1.3	(0.5)	0.0	-
	High Point	5	1.6	(0.9)	133.2	(40.3)	41.0	(16.9)	0.6	(0.2)	1.0	(0.6)	2.6	(1.2)	1.2	(0.7)	1.2	(1.0)
	Neshanic	6	8.5	(4.4)	413.0	(161.9)	288.8	(140.2)	1.0	(0.5)	3.8	(1.3)	15.0	(4.3)	0.0	-	0.0	-
	Overpeck	6	30.2	(8.0)	621.7	(135.0)	381.5	(108.3)	10.2	(1.9)	24.5	(5.1)	29.7	(3.4)	0.5	(0.2)	0.7	(0.3)
	Rutgers	4	3.5	(1.5)	93.8	(56.5)	46.3	(31.5)	0.3	(0.3)	0.5	(0.5)	0.8	(0.5)	0.0	-	0.0	-
	Stanton Ridge	7	10.1	(2.6)	305.0	(49.0)	154.6	(27.0)	4.0	(0.8)	2.0	(0.6)	3.4	(1.4)	0.1	(0.1)	0.0	-

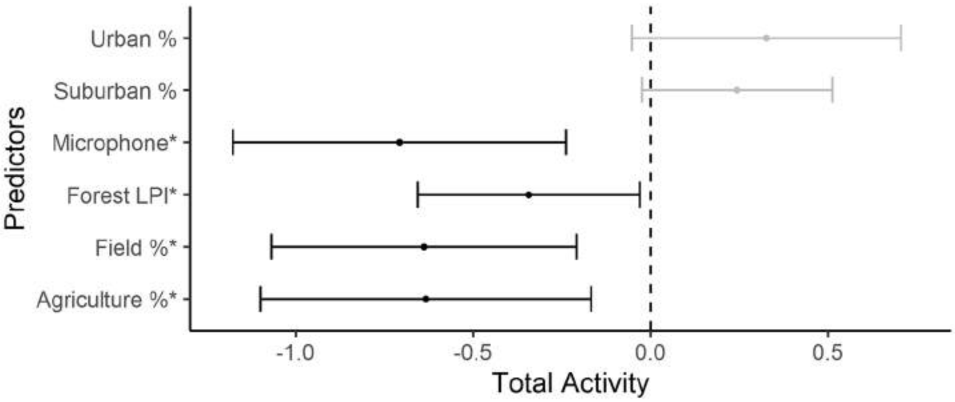

Fig. 2 Model averaged estimates (dots) and 95% confidence intervals (error bars) for variables predicting total nightly bat activity on golf courses. Black dots and error bars indicate significant effects

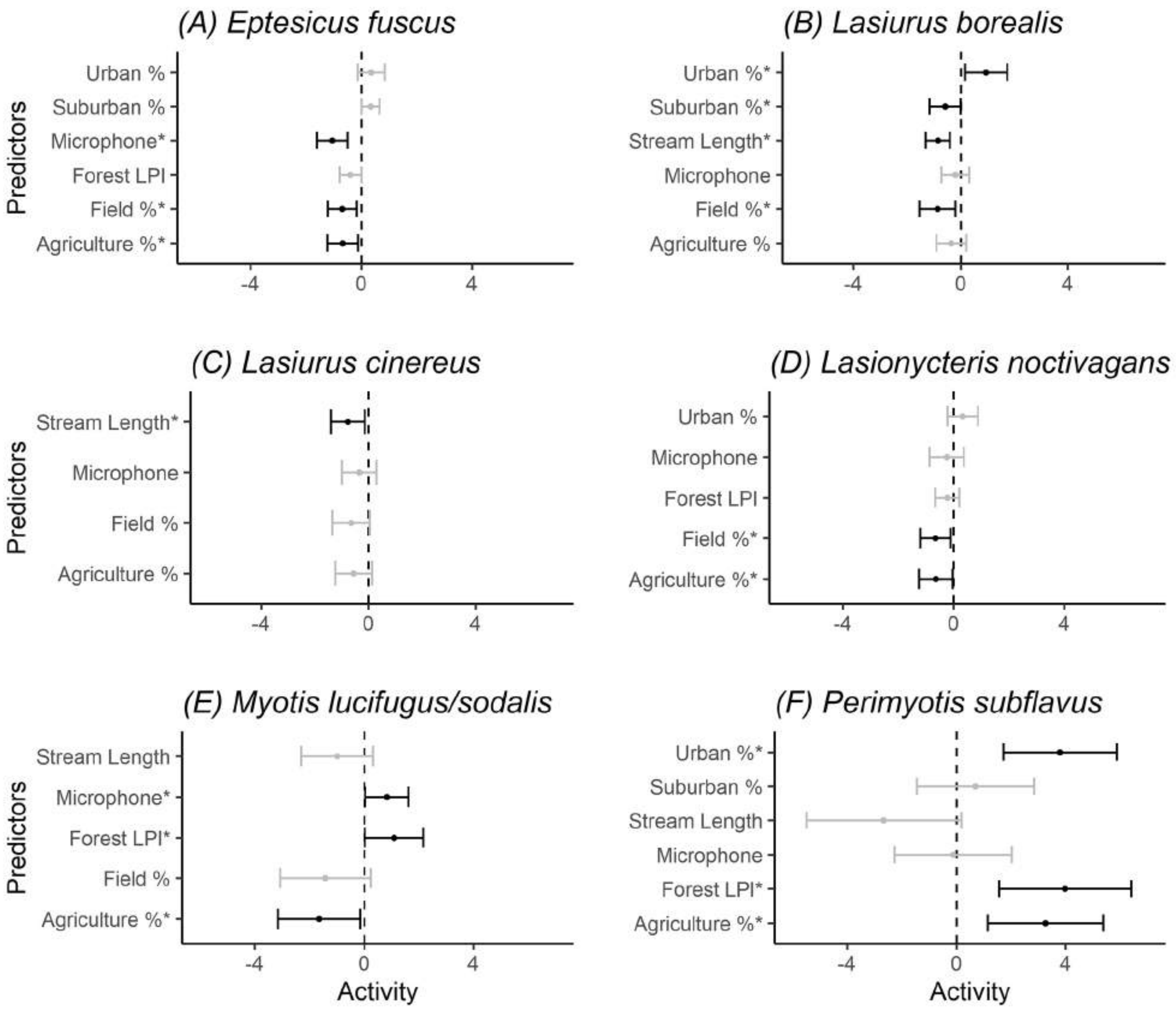

Fig. 3 Model averaged estimates and 95% confidence intervals for predictors influencing species-specific bat activity on golf courses: **(A)***E. fuscus*, **(B)***L. borealis*, **(C)***L. cinereus*, **(D)***L. noctivagans*, **(E)***M. lucifugus/sodalis*, and **(F)***P. subflavus*. Points represent the scaled and centered estimated values, and black indicates statistical significance

the top models for several species, but was only associated with increased activity for Luso (1.09, 95% CI: 0.02, 2.16) and *P. subflavus* (3.93, 95% CI: 1.52, 6.34).

Bat foraging activity on Golf Courses

We identified 1460 terminal buzzes over the two seasons. Harbor Pines, Eastlyn, and Overpeck had consistently high nightly foraging rates. Atlantis was only surveyed in 2020, but it had similarly high foraging rates. Nightly foraging rate increased with greater extent of surrounding suburban land (0.28, 95% CI: 0.01, 0.56) and decreased with agriculture (-0.63, 95% CI: -1.04, -0.22), open field (-0.48, 95% CI: -0.87, -0.09), and length of forested streams (-0.30, 95% CI: -0.59, -0.02) in the surrounding landscape (Fig. 4).

Discussion

Relationship between the surrounding Landscape and Use of Golf Courses by bats

Previous studies have focused on the value of golf courses in an urban setting, but to our knowledge none have quantitatively compared bat activity on golf courses across a gradient of landscape mosaics. In the present study, bat activity on golf courses was significantly associated with the surrounding landscape features. We consistently observed less bat activity on golf courses when the surrounding landscape contained more open spaces. Almost all models demonstrated decreased bat activity and foraging rate on golf courses when the surrounding landscape contained more open fields and/or agricultural land (the sole exception being *P. subflavus*). Vegetation in fields and agricultural areas have little canopy cover, reduced vertical stratification, and uniform ground cover; much like the expansive turf characteristic of golf courses. Because these landscape features are structurally similar to habitats typically found on golf courses, bats may divide their time among open green spaces and golf courses in proportion to their abundance in the landscape. We posit that golf courses, similar to fields and agricultural areas, represent open green space; therefore, bats may use golf courses more often when they have fewer alternatives in the surrounding landscape.

In agreement with our predictions, developed land within the surrounding landscape was associated with greater overall bat activity and foraging rate on golf courses. Although the strength and statistical significance of this relationship varied among bat species, high percentages of developed land were always associated with increased bat activity on golf courses when present in our models (apart from *L. borealis*, which was negatively associated with suburban landscapes). Golf courses in urban areas appear to serve as habitat refugia for bats and other species (Burgin and Wotherspoon 2009; Saarikivi et al. 2010; Threlfall et al. 2016; Wurth et al. 2020), and therefore may support biodiversity in highly modified landscapes (Petrosillo et al. 2019).

The two rarest bats in our analyses were the multispecies complex “Luso” (*M. lucifugus* and *M. sodalis*) and *P. subflavus*. Both Luso and *P. subflavus* populations declined substantially following the introduction of *Pseudogymnoascus destructans* (Pettit and O’Keefe 2017), the pathogen causing white-nose syndrome. *M. sodalis* is listed as endangered in the United States under the U.S. Endangered Species Act of 1973, as amended (16 USC 1531), and *P. subflavus* is being considered for endangered status (USFWS 2017). These species are also listed as either threatened or endangered in Canada (COSEWIC 2013). Thus, it is unlikely that their scarcity on golf courses is solely related to the surrounding landscape. Nevertheless, these species were primarily documented on golf courses adjacent to large tracts of forest; unsurprising, given their habitat preferences (Ethier and Fahrig 2011; Farrow and Broders 2011). While *P. subflavus* can be flexible in its habitat uses (Ellis et al. 2002; Ethier and Fahrig 2011; Loeb and O’Keefe 2006), these species are thought to prefer forested areas, and they tend to avoid landscapes with more open space (Bergeson et al. 2013; Farrow and Broders 2011; Nelson and Gillam 2017; Sparks

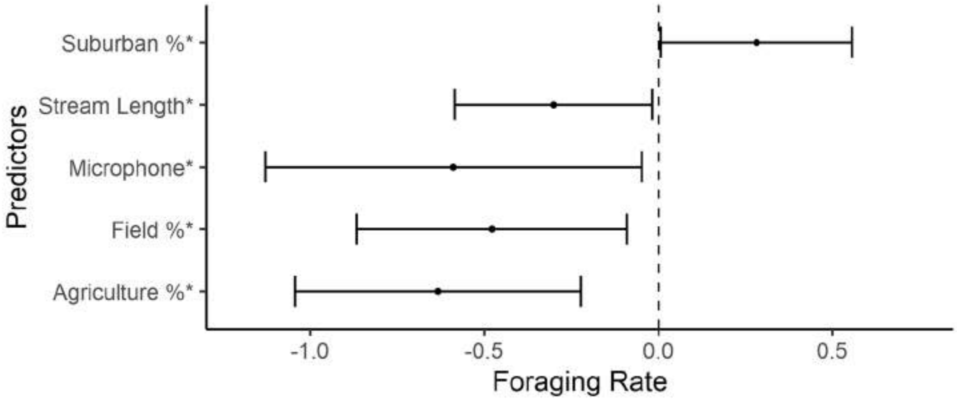

Fig. 4 Model average estimates and 95% confidence intervals of the predictors for bat foraging rate. Black points represent the scaled and centered estimated values

et al. 2005). Because golf courses themselves are a series of connected open spaces, we may not expect to find high Luso or *P. subflavus* activity on golf courses in most landscape contexts. Further, golf courses that fragment or replace undisturbed patches of forest may displace populations of Luso and *P. subflavus*. When these species were present, it may have been because they were using golf courses primarily as a corridor as they commuted to and from their foraging ground in the forest. Further detailed habitat studies of *P. subflavus* in the northeastern United States are clearly warranted.

Implications

Golf courses have been shown to support wildlife and, therefore, may play an important role in wildlife conservation in human-altered landscapes. In the United States, the majority of urban areas are growing faster than their human populations might predict (Bounoua et al. 2018), and these developed areas may interfere with valuable ecosystem services. Therefore, golf courses (and similar anthropogenic green spaces) may demand more conservation attention over time to help mitigate the effects of habitat loss and fragmentation.

Our results indicate that the conservation value of modified green spaces, such as golf courses, depends on landscape context. We demonstrate that the surrounding matrix is significantly associated with bat activity on golf courses. Bat home-ranges may be less likely to overlap with golf courses when suitable bat habitat exists elsewhere in the nearby landscape. Supporting this conclusion, we observed lower bat activity on golf courses when there are more open landscapes in the surrounding area. To a lesser extent, we also observed higher bat activity on golf courses in more developed landscapes. Indeed, a well-placed golf course may provide a stable patch of native trees for bats dispersing throughout dynamic urban landscapes.

Most bats in our study were detected on all golf courses surveyed, though their activity levels differed by site. However, some species (and notably, those of most conservation concern) were only present at certain sites. *M. lucifugus*, *M. sodalis*, and *P. subflavus* are listed by the International Union for Conservation of Nature (IUCN) as endangered, near-threatened, and vulnerable, respectively (Arroyo-Cabrales and Ospina-Garces 2016; Solari 2018, 2021). Determining factors that increase or decrease their use of green spaces (e.g., golf courses) is becoming increasingly relevant as the global human footprint expands. Depending on the landscape context, golf course construction may either fragment or connect bat habitat. In a densely forested ecosystem, golf courses and their associated infrastructure (parking lots, club houses, and roads) may become a barrier for species that specialize in forest interiors. Remnant fragments of forest may not adequately support species that require large patches of forest in their home range. Our study suggests that *P. subflavus* and *M. lucifugus*/*sodalis* require landscapes with continuous patches of intact forest, which is supported by studies of roosting and foraging habitat preferences for these species (Bergeson et al. 2013; Farrow and Broders 2011; Gardner and Cook 2002; Perry et al. 2007; Watrous et al. 2006). Therefore, minimizing the extent to which golf courses fragment forests may be an important goal for bat management in an increasingly fragmented landscape.

Although our study did not address the on-course variability of bat roosting and foraging habitat, proper management of golf courses that serve as habitat refugia could further increase their utility for bats. Tree-roosting bats make use of foliage, crevices, cavities, and exfoliating bark of dead trees (Drake et al. 2020). To improve roosting habitat quality for *Myotis* species, it is recommended that golf courses retain standing dead trees as often as possible, provided that they do not pose a risk to human health or property (Lacki and Schwierjohann 2001). Indeed, the structure and distribution of trees and forests are likely to be important for both roosting and foraging habitat (Froidevaux et al. 2016; Yates and Muzika 2006). Specifically, *Myotis* species tend to prefer forest management practices that avoid creating large canopy gaps, such as thinning and small regenerative cuts that promote structural heterogeneity (Divoll et al. 2022). Improving the connectivity of forest patches within the golf course by allowing natural regeneration in out-of-play areas of the course may increase habitat value for forest-dwelling bats. Additionally, bats may congregate over bodies of water while foraging for arthropod prey (Korine et al. 2016). Our study indicated that the amount of water in the surrounding landscape was an important predictor of bat foraging activity on golf courses. When streams are lacking in the surrounding landscape, bats may be using water bodies on golf courses as both foraging grounds and a source of drinking water. Water sources are present in urban, natural, and agricultural settings, but the quality of water may differ significantly (Baker 2006; Tong and Chen 2002). Maintaining acceptable water quality on golf courses could drastically improve the value of the wildlife habitat that it provides. Reducing run-off of pollutants like fertilizer, road salt, and pesticides should be a high priority of any golf course seeking to participate in conservation action.

Because golf courses are so numerous, allocating equal conservation effort to all courses would be impractical and inefficient. From a landscape perspective, building golf courses in highly developed landscapes can add valuable habitat refugia for bats. Similarly, fragmenting intact forested landscapes with a golf course should be avoided, where possible. Finally, maintaining bat-friendly habitat features on the course can increase suitability for resident bat populations.

Limitations

Because our study does not compare bat activity on golf courses to reference sites, we are unable to draw conclusions regarding habitat quality of golf courses for bats. Additionally, bat species may be active on golf courses in proportion to their presence in the surrounding landscape rather than the features of the landscape itself. The use of reference sites in the surrounding landscape would also provide insights on the relative rarity of each species in the area. We also did not account for all internal differences among golf courses. Golf-course scale factors (i.e., tree composition and pesticide use) may influence which bat species visit each course. Further testing using controlled experiments may further elucidate the causes of differing bat activity on golf courses.

Conclusion

We demonstrate here that the landscape context surrounding a golf course may be used to predict bat activity on the course in this state. While they are not likely to effectively replace natural habitat for many species, golf courses can provide foraging and roosting opportunities for bats, particularly in heavily developed landscapes. They can also serve as travel corridors between patches of undeveloped habitats.

Our findings suggest that golf courses situated in landscapes with fewer open spaces and greater development may provide important habitat for many bat species. Habitat management practices (i.e., retention of suitable roost trees, maintenance of forest connectivity, and construction of bat roosting boxes) on such golf courses are expected to yield greater bat conservation benefits than similar practices on courses in more natural landscapes. We recommend that the surrounding 2-km landscape be used to assess golf courses (and likely other man-made green spaces like parks, cemeteries, and courtyards) for their potential to provide bat habitat in the eastern United States. Other parts of the world with different bat communities may need to adjust the radius of analysis to better match the habits of local species.

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Declarations

Competing interests The authors have no competing interests to declare that are relevant to the content of this article.

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January 5, 2024

References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 7

December 31, 2023
Email communication with Wanda Ewing

From: **Wanda Ewing** wanda649@aol.com
Subject: Re: Royal Vista Biologist Shared Google Drive
Date: December 31, 2023 at 9:13 PM
To: Scott Cashen scottcashen@gmail.com
Cc: [redacted]

Hello Scott,

The photos of flowering plants on the golf course in Google Drive were in December. I have observed the same flowering plants in the time frame of April-August. In addition, the golf course properties are surrounded by hundreds of flowering plants in the yards adjacent. The floral resources in the area are abundant.

My family members and I have also recently observed bumble bees on the native plants on my property, 20467 Tam O Shanter Drive, Walnut, adjacent to the golf course; Abutilon palmeri (Indian Mallow), Arctostaphylos (Manzanitas), Berberis, Ceanothus, Eschscholzia californica (CA Poppy), Heteromeles arbutifolia (Toyon), Quercus agrifolia (coast live oak), Monardella (Mints), Ribes, Salvia (Sages), Solidago californica (Goldenrod), and Romneya coulteri (Matilija Poppy).

Sincerely,

Wanda Ewing

Channel Law Group, LLP

January 5, 2024

References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 8

Frick, Baerwald, Pollock, Barclay, Szymanski, Weller, Russell, Loeb, Medellin, and McGuire
Fatalities at wind turbines may threaten population viability of a migratory bat

Biological Conservation 209 (2017) 172–177

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Fatalities at wind turbines may threaten population viability of a migratory bat

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ABSTRACT

Large numbers of migratory bats are killed every year at wind energy facilities. However, population-level impacts are unknown as we lack basic demographic information about these species. We investigated whether fatalities at wind turbines could impact population viability of migratory bats, focusing on the hoary bat (*Lasiurus cinereus*), the species most frequently killed by turbines in North America. Using expert elicitation and population projection models, we show that mortality from wind turbines may drastically reduce population size and increase the risk of extinction. For example, the hoary bat population could decline by as much as 90% in the next 50 years if the initial population size is near 2.5 million bats and annual population growth rate is similar to rates estimated for other bat species ($\lambda = 1.01$). Our results suggest that wind energy development may pose a substantial threat to migratory bats in North America. If viable populations are to be sustained, conservation measures to reduce mortality from turbine collisions likely need to be initiated soon. Our findings inform policy decisions regarding preventing or mitigating impacts of energy infrastructure development on wildlife.

1. Introduction

Wind energy development is growing rapidly across the globe as a renewable energy source. However, wind energy facilities are not without environmental costs (Saidur et al., 2011). For example, large numbers of bats are killed at wind energy facilities (Arnett et al., 2016; O'Shea et al., 2016). Over 300,000 bats are estimated to be killed annually at wind energy facilities in Germany (Lehnert et al., 2014; Voigt et al., 2012) and over 500,000 are estimated to be killed annually across Canada and the United States (Arnett and Baerwald, 2013; Hayes, 2013; Smallwood, 2013). Over the past decade, substantial numbers of bat fatalities and increased growth in wind energy have raised concern about the impacts of wind energy development on bat populations (Kunz et al., 2007). A critical question for conservation planning is whether these fatalities could drive populations to dangerously low levels or even extinction.

Addressing this question is challenging because bats that migrate latitudinally over long distances have the highest fatalities at wind energy facilities and are among the least studied (Kunz et al., 2007). Basic demographic parameters and even rough empirical estimates of population size do not exist (Lentini et al., 2015). In general, reproductive rates for bats are low, which can impact their ability to respond to mortality threats (Barclay and Harder, 2003). Lack of empirical demographic and population data for migratory bats, especially for non-colonial species, limits the ability to quantitatively assess the potential impact of wind energy on these species (Diffendorfer et al., 2015). The challenges associated with empirical estimation will likely remain insurmountable into the foreseeable future given the ecology of these organisms.

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0006-3207/

Determining the threat of wind energy development on migratory bats highlights the common problem of how to assess threats to species when critical data are lacking. Data from similar species or structured elicitation of expert opinion can be used for conservation decision-making when empirical data for a focal species are unavailable (Burgman et al., 2011; Drescher et al., 2013; Martin et al., 2012). In recent decades, expert elicitation has been used for a variety of conservation problems (Donlan et al., 2010; Martin et al., 2005; Oberhauser et al., 2016; Runge et al., 2011; Smith et al., 2007), and evaluations of the elicitation method provide structured approaches to help guard against subjective biases when eliciting expert opinion (Martin et al., 2012). Deciding whether conservation measures are necessary to prevent or mitigate impacts from wind energy development on populations of migratory bats requires use of expert judgments and/or use of data from similar taxa to quantify reasonable scenarios of population growth and trajectories.

We use population projection models to explore whether fatalities from wind turbines threaten the population viability of hoary bats (*Lasiurus cinereus*), a wide-spread migratory species comprising the highest proportion of bat fatalities (38%) at wind energy facilities in North America (Arnett and Baerwald, 2013). Given the lack of empirical data on key population parameters for hoary bats, we used data from similar species as well as expert elicitation (Martin et al., 2012) to identify available data sources, provide estimates of unknown parameters, and quantify uncertainty. Our objective was to assess the likelihood that mortality from wind energy turbines poses a species-level threat to hoary bats in North America to inform conservation decision-makers about the potential impacts of energy infrastructure development on migratory bats. We hypothesized that mortality from wind energy turbines at installed capacity by 2014 was sufficiently high to substantially reduce the probability of population stability and increase the probability of extinction over the next 50 to 100 years.

2. Materials and methods

2.1. Expert elicitation

We used a structured elicitation method to obtain specific judgments or values from experts. Co-author JAS and colleagues served as eliciting facilitators and identified the conservation problem ("Does mortality from wind turbines pose a threat to population viability of hoary bats in North America?"), selected the experts, and designed the elicitation process. Nine experts (see Supporting Information) were identified based on literature review and discussions with the bat ecology and conservation community and invited to participate by JAS. Experts were chosen based on their research programs and publication records relevant to migratory bat ecology with an intent to represent a range of expertise (e.g. expertise in population dynamics, genetics, physiology, life history, and conservation). The elicitation was conducted over an introductory webinar (September 22, 2014), in-person meeting (October 21–22, 2014), and a working webinar (December 22, 2014).

Experts were instructed on the expert elicitation process and informed of the common pitfalls and biases that often impair expert judgments (Martin et al., 2012), such as anchoring and overconfidence (Speirs-Bridge et al., 2010). Anchoring happens when an expert fixes on a benchmark value and cannot adjust away from the benchmark, while overconfidence occurs when an expert believes their judgement is more accurate than is warranted (Martin et al., 2012). To help minimize anchoring and over-confidence, a four-step elicitation method was used whereby experts provided a lower bound, upper bound, and most likely estimate, and ranked their confidence level that the true value fell within the lower and upper bounds (Speirs-Bridge et al., 2010). Experts were trained on the methodology by practicing seed questions. Judgments were elicited using a modified Delphi method (Burgman et al., 2011) whereby experts provided judgments anonymously, responses were collated and discussed with the group, and then experts were allowed to adjust their estimates anonymously (Burgman et al., 2011; Martin et al., 2012). This structured approach allowed for the benefits of discussion among experts while guarding against group think (Burgman et al., 2011). Experts completed multiple rounds of elicitation until all experts were content with their responses and indicated they were at least 80% confident that the true value fell between their lowest and highest bounds.

Experts estimated the continental-wide population size of hoary bats and four vital rates: adult annual survival, first-year annual survival, adult fecundity, and first-year fecundity (Tables S1, S2). Annual survival was estimated in the absence of mortality related to wind energy. Bats typically cannot be aged after their first autumn which limits most demographic studies to two stages: young-of-the-year and adult (Lentini et al., 2015; O'Shea et al., 2004) (Fig. S1). Empirical studies on demography of other vespertilionid bats were used to inform expert opinions on vital rates because no estimates exist for hoary bats, congeneric, or ecologically equivalent species (Lentini et al., 2015; O'Shea et al., 2004). We calculated population growth rate (λ) as the dominant eigenvalue from a 2-stage Lefkovitch matrix (Caswell, 2001) using the 'most likely' vital rate estimates from each expert using function eigen.analysis in the popbio package of R (Stubben and Milligan, 2007).

2.2. Empirical estimates of bat population growth (λ)

We surveyed the literature for empirical estimates of bat population growth rates based on calculation from vital rate matrices to compare how values from expert elicitation compared to empirical studies of other bat species. We searched the 27 papers used by Lentini et al. (2015) that used vital rate estimation based on Cormack-Jolly-Seber methods for published estimates of population growth and included two additional recent studies that were published after Lentini et al. (2015) to generate 14 published estimates of population growth rate calculated from vital rate matrices for nine bat species (Table S3). There is no indication of population structure for hoary bats in Canada and the continental United States (Russell et al., 2015), so we assumed a single open population and set immigration and emigration to zero.

2.3. Estimates of mortality from wind energy turbines in North America

Arnett and Baerwald (2013) estimated the number of bats killed by wind turbines in Canada and the U.S. in 2012 (range: 196,190–395,886), of which 38% were hoary bats. We calculated fatalities per megawatt (MW) based on installed capacity in North America in 2012 (66,213 MW) and adjusted fatality estimates (F_{wind}) to the installed capacity in 2014 (75,570 MW) (American Wind Energy Association, 2016; Canadian Wind Energy Association, 2016). We kept installed capacity constant at 2014 levels to reduce uncertainty in projecting future MW capacity. We used the midpoint of the adjusted fatality estimate for hoary bats ($F_{wind} = 128.469$) to calculate the proportion of the population killed by wind turbines (F_{wind}/N_i), where N_i is initial population size, and applied that proportional mortality for each year in the simulation. We assumed that an individual bat's probability of colliding with a turbine would not depend on the density of bats, and therefore used a constant mortality rate.

2.4. Population projection model

We projected stochastic population growth with and without mortality from wind turbines across a range of mean population growth rate (λ) values and initial population sizes (N_i) to compare changes in population stability after 50 years and probability of extinction after 100 years to identify the demographic scenarios for which current levels of mortality from wind turbines results in substantial population declines or increased risk of extinction of hoary bats. We performed 100 projections (10,000 simulations per projection) using 10 sequential values of mean population growth rate (λ) from 0.94 to 1.18 and 10 sequential values of initial population size (N_i) from 1 to 10 million bats based on ranges provided by expert elicitation and informed by empirical studies of other bat species.

To account for annual variability in population growth, we used a random draw generated from a log-normal distribution where $\mu = \ln(\lambda)$ and $\sigma^2 = 0.10$ (Morris and Doak, 2002) at each time step in each simulation. We used 0.10 for σ^2 to account for environmental variation and uncertainty in λ (Morris and Doak, 2002). We fixed a ceiling on population growth at 10 times the initial population size to account for carrying capacity and to balance between unbounded and overly constrained population growth. We chose not to include additional complexity of density-dependent population growth given the limitations of available data for parameterization. We set a quasi-extinction threshold at 2500 bats.

Population stability was calculated as the proportion of the remaining population to the initial population after 50 years of projected growth (N_{50}/N_i). Probability of extinction was calculated as the fraction of simulations where the population size fell below the quasi-extinction threshold during 100 years of projected growth. We present the results as isoline contours visualizing the combinations of N_i and λ values that result in population stability or probability of extinction thresholds of interest.

3. Results

Current rates of wind turbine fatalities are sufficiently high to substantially change the probability of population stability and risk of extinction across a range of plausible demographic scenarios for hoary bats (Figs. 1 and 2). Mortality from wind turbines increased the isoline of stable population growth after 50 years indicating that annual population growth rate (λ) would have to be substantially higher, particularly at lower population sizes, to compensate for wind-associated mortality (Fig. 1). The annual population growth rate would need to be at least 6% per year ($\lambda = 1.06$) to maintain a stable population if initial population size was 2.5 million bats and as great as 14% per year if there are only 1 million hoary bats (Fig. 1). Similarly, mortality from wind turbines increased the isoline for population persistence, indicating that mortality from wind turbines could also increase the risk of extinction over the next 100 years (Fig. 2).

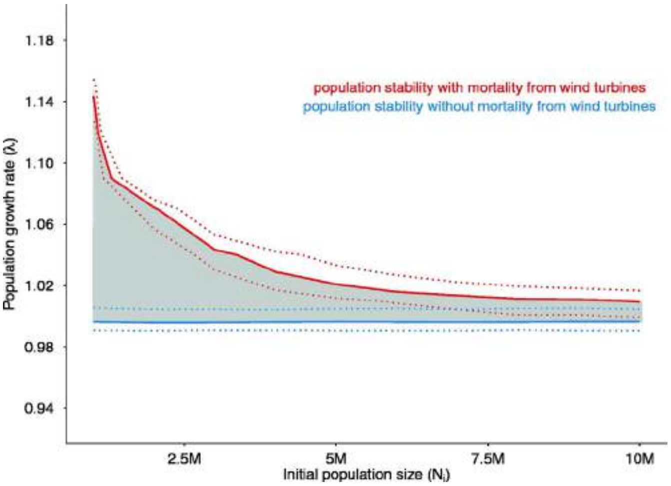

Fig. 1. Comparison of the isolines of stable population growth after 50 years of population growth with (red) and without (blue) mortality from wind energy turbines for hoary bats. Solid lines are the median values from 10,000 simulations and dotted lines show the 25th and 75th quartiles. Population stability is positive above isolines and negative below the isolines. Gray shaded area indicates where proportional mortality from wind turbines changes population trajectories by shifting the isoline of population stability upward, indicating that annual population growth rates must be higher, especially at low population sizes, to compensate for mortality associated with wind energy turbines for populations to remain stable. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

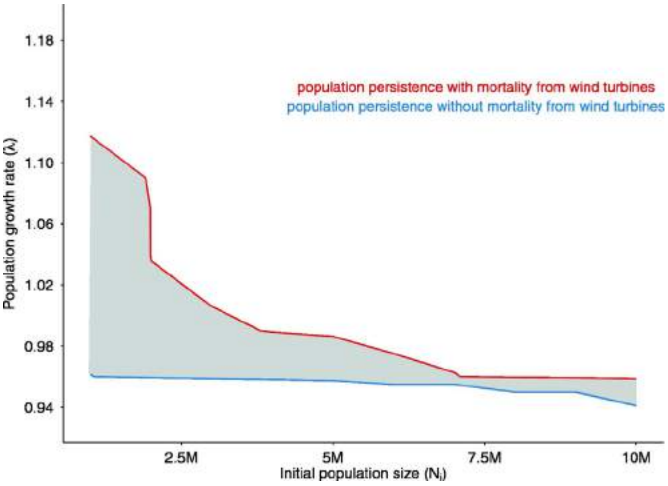

Fig. 2. Comparison of the isolines showing population persistence (e.g. <1% of probability of extinction) after 100 years of population growth with (red) and without (blue) mortality from wind energy turbines for hoary bats. Population persistence is positive above isolines and negative below the isolines. Gray shaded area indicates where proportional mortality from wind turbines changes population trajectories by shifting the isoline upward, indicating that annual population growth rates must be higher, especially at low population sizes, to compensate for mortality associated with wind energy turbines for populations to persist. (For interpretation of the references to colour in this figure legend, the reader is referred to the web version of this article.)

Mortality from wind turbines could result in a 50% reduction in population size in just 50 years even in an optimistic scenario of a hoary bat population as large as 10 million bats and a mean annual growth rate of 1% per year, which would otherwise support stable population growth (Fig. 3). At the 'most likely' demographic scenario from the expert elicitation ($N_i = 2.5$ million bats and pre-wind $\lambda = 1.015$), the median projected population size after 50 years was reduced by 90% (Fig. 3) and the probability of extinction increased to 22% (Fig. 4). Growth rate

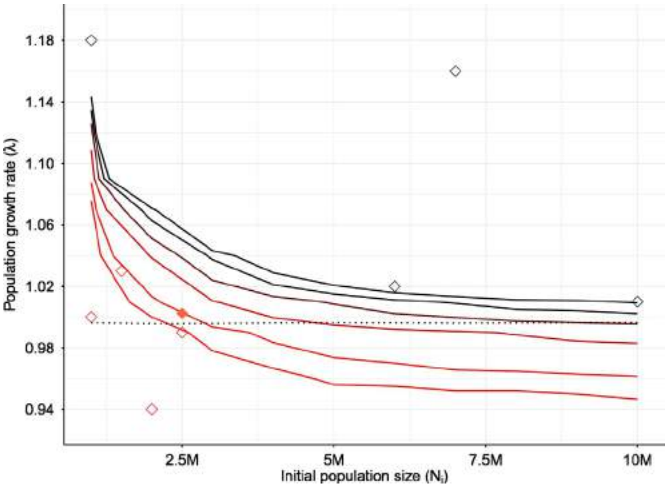

Fig. 3. Isoline contours of projected population declines after 50 years of simulated growth with proportional mortality of hoary bats from wind energy turbines across combinations of possible initial population sizes (N_i) and population growth rates (λ). Isolines display the combinations of N_i and λ where the median population of 10,000 simulations after 50 years of simulated growth was stable (black line) or decreased by 25%, 50%, 75%, 90% and 95%. The dotted line shows the isoline of population stability without wind mortality for comparison as shown in Fig. 1. Open diamonds show the 'most likely' values of N_i and λ from each of 8 experts from the expert elicitation. The orange filled diamond indicates the median 'most likely' value for N_i and λ from expert elicitation. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

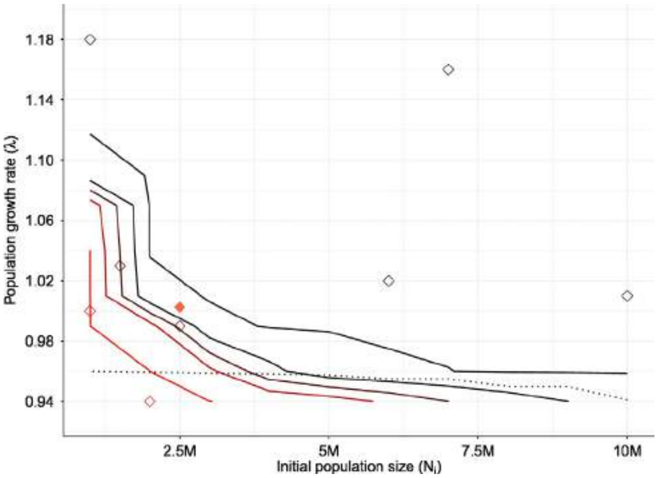

Fig. 4. Isoline contours of probability of extinction after 100 years of simulated population growth with proportional mortality from wind energy turbines across combinations of possible initial population sizes (N_i) and population growth rates (λ) for hoary bats. Isolines display the combinations of N_i and λ where the proportion of populations (<1%, 25%, 50%, 75%, 99%) of 10,000 simulations went extinct during 100 years of simulated population growth. The dotted line shows the isoline of persistence (<1% chance of extinction) without wind mortality for comparison as shown in Fig. 2. Open diamonds show the 'most likely' values of N_i and λ from each of 8 experts from the expert elicitation. The orange filled diamond indicates the median 'most likely' value for N_i and λ from expert elicitation. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

and population size combinations from four experts fell above the isolines for population stability and persistence, but values from the other four experts fell well below the isolines of stability and persistence (Figs. 3 and 4).

The median population growth rate ($\lambda = 1.015$) from the expert elicitation was similar but slightly higher than the median of 14 published estimates of population growth rate calculated from vital rate matrices for other bats species ($\lambda = 1.0025$) (Fig. 5).

4. Discussion

Reports of large numbers of bats killed at wind energy facilities have attracted conservation attention for the past decade (Kunz et al., 2007). However, the lack of basic demographic information about bats in general and migratory bats specifically, has hindered our ability to empirically address whether bat fatalities from wind energy developments presents a serious threat to the viability of these species (Diffendorfer et al., 2015). Likewise, few studies have directly estimated population-level impacts from mortality from wind turbines on bird populations (Carrete et al., 2009; Schaub, 2012; Stewart et al., 2007), although numerous studies have documented collision rates for both birds and bats (see Arnett et al., 2016; Erickson et al., 2014 for recent reviews). We parameterized population models using a range of values from expert elicitation and informed from empirical estimates from other bat species and show that, across a range of plausible demographic scenarios, current mortality from wind turbines could result in rapid and severe declines of bat populations within 50 years and increased risk of extinction in 100 years.

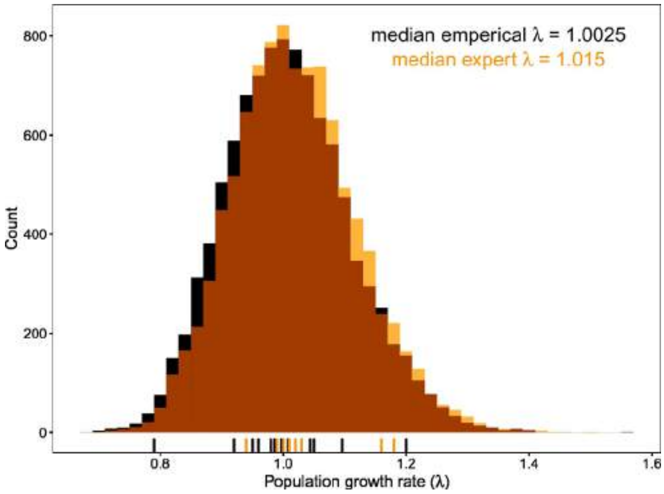

Fig. 5. Histograms of 10,000 simulated λ values drawn from a log normal distribution. The black histogram centers on the median of 14 reported values of λ from empirical studies on bat species. The orange histogram centers on the median λ from expert elicitation. All simulations used a variance at 0.10 to account for environmental variation and uncertainty in population growth. Rug values show reported λ's from published studies (black) and expert elicitation (orange). (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

For hoary bat populations to sustain stable, persisting populations with levels of mortality from wind turbines current through 2014 in North America, the mean annual population growth rate must be substantially higher than what appears most likely from both the expert elicitation exercise and empirical estimates from other bat species. While two experts provided demographic estimates that produced robust population growth rates ($\lambda = 1.16$ and $\lambda = 1.18$; i.e., growth rates of 16–18% more bats per year) and a few empirical estimates were similarly high (Fig. 5), the median values of λ from published studies and expert opinion ($\lambda = 1.0025$ and $\lambda = 1.015$, respectively) suggest much more modest population growth rates that were sufficient for stable populations in the absence of wind energy associated mortality but that are too low to sustain the level of observed mortality currently caused by wind turbines. As expected, the impact of wind energy related mortality is most dramatic and concerning at lower population sizes, although we note that even at the optimistic scenario of at least 10 million bats, the isolines for both population stability and persistence were shifted upwards, indicating that increased population growth is necessary to compensate for wind-associated mortality even at large population sizes. In contrast to the availability of empirical estimates for population growth from other bat species, there is scant information available about the total population sizes of bats. Six of the eight experts put their most likely estimate at or below 2.5 million bats. If the hoary bat population is around 2.5 million bats, our results suggest that growth rates that we expect as reasonable for bat populations ($\lambda = 1.01$) would result in a 90% decline of the population in 50 years.

Although our modeling focused on hoary bats, the qualitative conclusions are likely broadly informative about the relative risk to other migratory species that share similar life histories and high fatality rates at wind turbines, such as eastern red bats (*Lasiurus borealis*) and silver-haired bats (*Lasionycteris noctivagans*) in North America (Arnett and Baerwald, 2013) and noctule bats (*Nyctalus noctula*) in Europe (Lehnert et al., 2014). Future work combining expert elicitation and modeling could examine vulnerability to other species with high fatality rates to identify species most at risk. In North America, species that migrate latitudinally and do not hibernate for extended periods in caves and mines do not appear at high risk from white-nose syndrome, a disease that causes high mortality for hibernating bats (Frick et al., 2010, 2015; Langwig et al., 2015). Fortunately, fatality rates from wind turbines are typically lower for many of the species susceptible to white-nose syndrome (Arnett and Baerwald, 2013; Langwig et al., 2012), yet the combined effects of mortality from disease and wind turbines may threaten some species (Erickson et al., 2016).

The range of scenarios we modeled was based on current available information and conservative estimates of bat fatalities. We used the lowest published estimate of bat fatality rate although higher estimates of annual fatality rates have also been published (Hayes, 2013; Smallwood, 2013). Furthermore, we held megawatt capacity constant at installed capacity in 2014 and did not account for future growth of the wind energy industry to reduce other forms of uncertainty in the models. Wind energy currently represents approximately 5% of electricity generation in Canada and U.S.A., with a target of increasing to 20% by 2025 in Canada and by 2030 in U.S.A (American Wind Energy Association, 2016; Canadian Wind Energy Association, 2016). Installed capacity increased by over 5100 MW (a 7% increase from 2014 installed capacity) in 2015 alone (American Wind Energy Association, 2016; Canadian Wind Energy Association, 2016). With more turbines and no reductions in fatality rates at wind energy facilities, we expect fatalities and species-level impacts to migratory bats to increase (i.e., greater declines in N). Future modeling efforts should explore the impact of increased turbine development and assessment of how mitigation efforts can be applied to reduce population-level impacts.

The only method documented to reduce fatalities at wind turbines is limiting operation during high risk periods, such as nocturnal periods of low wind speeds during autumn migration (Arnett et al., 2011; Baerwald et al., 2009). Such operational curtailment can reduce bat fatalities by 44–93% with minimal impact on power generation (Arnett et al., 2011). The American Wind Energy Association recently adopted policies to limit blade movement in low wind speeds as a voluntary operating protocol to reduce fatalities (American Wind Energy Association, 2015). Industry-wide implementation of operational mitigation or emerging technologies (e.g. acoustic deterrents; Arnett et al., 2013) may be necessary to successfully manage migratory bat populations and ensure stable and viable populations in North America. Siting wind energy facilities in places perceived as lower risk for causing bat fatalities could also help reduce impacts, although further research is needed to determine the efficacy of predicting risk from pre-siting assessments (Baerwald and Barclay, 2009; Hein et al., 2013; Lintott et al., 2016).

Conservation decisions must often be made with imperfect knowledge and data gaps. We lack empirical data on population sizes and trends for hoary bats and other migratory bat species, and given the ecology of these species and technologies available, we are unlikely to collect empirical population data in the near future. Our analyses suggest there is a range of realistic possibilities for the impact of fatalities from wind turbines that includes substantial population declines and increased risk of extinction. The magnitude of these predicted impacts may warrant re-evaluation of the status of hoary bats from least concern to a threatened category on the IUCN Red List (IUCN, 2012). Given the possibility for near or total extinction from wind-energy-related fatalities, our results suggest that conservation planning to manage migratory bat populations should include actions to reduce bat fatalities at wind energy facilities in North America.

Acknowledgements

We thank Todd Katzner and two anonymous reviewers for comments on the manuscript. Robyn Niver, Lori Pruitt, and Dan Nolfi helped with designing and conducting the elicitation workshop and provided comments on earlier drafts. David Nelson and Stephen Keller provided information to experts during the introductory phase of the elicitation workshop. Taal Levi, Ed Arnett, Paul Cryan, and Maarten Vonhof contributed to earlier versions of the modeling effort. The findings and conclusions in this article are those of the authors and do not necessarily represent the views of the U.S. Fish and Wildlife Service. USFWS, Region 3, provided travel to the elicitation workshop. WFF was supported on NSF DEB-1115895/1336390. RMRB is supported by Natural Sciences and Engineering Research Council of Canada.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.biocon.2017.02.023.

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ATTACHMENT 9

Martin and Geupel
NEST-MONITORING PLOTS: METHODS FOR LOCATING NESTS AND MONITORING SUCCESS

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NEST-MONITORING PLOTS: METHODS FOR LOCATING NESTS AND MONITORING SUCCESS

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Abstract.—Attention to long-term declines in populations of Neotropical migratory birds has generated increased interest in how to monitor and manage them. Measurement of nesting success provides information on trends in recruitment, and measurement of vegetation associated with nests may identify habitat influences on breeding productivity. Examination of nests also allows collection of life history data (e.g., clutch size, numbers of broods, numbers of nesting attempts, nesting success), which provide important insight into vulnerability of species to decimation or perturbations. Comparisons of nesting success and habitat use across the geographic range of a species can determine local habitat effects on population recruitment and historical constraints on habitat use and species distributions. In this paper, standardized methods and cues are described that aid in locating and monitoring nests to allow comparisons across studies in space and time.

MÉTODOS PARA LOCALIZAR NIDOS Y MONITOREAR EL ÉXITO DE ESTOS

Sinopsis.—El decrecimiento progresivo de las poblaciones de aves que migran al neotrópico ha generado gran interés en cómo monitorear y manejar a éstos. El medir el éxito de anidamiento provee información en relación a las tendencias en el reclutamiento poblacional y las medidas de la vegetación asociada a nidos puede ser importante en identificar aspectos de ésta que influyan en la productividad. El examen de nidos también permite recopilar datos sobre ciclos de vida (ej. tamaño de la camada, número de camadas por año, número de intentos de anidamiento, y éxito de anidamiento) el cual provee información importate en referencia a la vulnerabilidad de la especie a perturbaciones. La comparación del éxito de anidamiento de una especie en diferentes habitats a lo largo de extensiones geográficas puede determinar el efecto de habitats locales en el reclutamiento poblacional y restricciones históricas en el uso de habitat y la distribución de la especie. En este trabajo, se describen métodos estandarizados y pistas que pueden ayudar a localizar y monitorear nidos de tal manera que se puedan hacer comparaciones entre estudios y lapsos de espacio y/o tiempo.

Habitat features that influence breeding productivity of birds are poorly known (Martin 1992). Measurement of nesting success and associated vegetation allows identification of such habitat features and also provides greater insight into evolution of habitat requirements and species coexistence than traditional metrics such as presence or abundance (Martin 1986, 1988a, 1992). Data on nest sites and mortality also improve understanding of ecological and evolutionary influences on life history traits

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(Lack 1968; Martin 1988b, 1993a, b; Martin and Li 1992), which can give insight into the abundance and vulnerability of species to population decimation (Martin 1993a, Pimm et al. 1988). Knowledge of life history traits taken together with data on breeding productivity can also provide information on demographic trends and warn of population problems before declines in density actually occur (Martin 1992, 1993a; Pienkowski 1991; Temple and Wiens 1989). Many life history traits, however, are unknown or poorly known for many species in North America; breeding biology studies are poorly represented among species and geographic locations (Martin 1992, 1993a; Ricklefs 1969). The paucity of studies exists in part from a misconception that nests are too difficult to find. Yet, cues and techniques for finding nests can be learned, as we describe here, thereby providing the vital information needed to curb long-term population declines of many species (see Robbins et al. 1989).

Nest record programs, where volunteers turn in records of nest attempts, have been in existence for years in both the United Kingdom (Ballie 1990) and United States (Bart 1977). These programs obtain data for broad geographic regions from volunteers who often locate nests incidental to other activities. Sample sizes for many geographic regions and habitat types are minimal and consistency in monitoring nests once they are found is poor. Thus, these programs suffer from several potential biases and require careful interpretation (Ballie 1990). In contrast, studies that focus on nest monitoring on long-term plots can provide data on breeding productivity for entire collections of species to allow comparisons within and among species in space and time (e.g., Martin 1992, 1993a; Martin and Li 1992; Sherry and Holmes 1992). Moreover, broad-scale deterioration of environmental conditions from habitat degradation or global warming can be detected if such studies are distributed across local microclimatic gradients and broad geographic regions (Martin 1992, Temple and Wiens 1989). Additionally, if vegetation is measured, habitat features that influence nesting success can be compared across the geographic ranges of species to provide insight into habitat requirements and distribution of species (see James et al. 1984, Knopf et al. 1990). Effective comparisons among species and locations, however, depend on standardization of sampling protocols.

In this paper we describe aids and standardized techniques for locating and monitoring success of nests. These methods are provided to standardize data collection to allow comparisons across investigators and in the hope of increasing both sample sizes and numbers of studies of breeding biology.

NEST LOCATION

Nest finding is labor intensive (DeSante and Geupel 1987), but most observers can improve their ability to locate nests in a matter of days with training and practice. The behavioral observations and clues described below work effectively for a variety of species. Our experience includes only a small subset of species and habitats available in North America, however, and is largely restricted to wooded (scrub and forest) habitats. Other methods may be more effective in other habitats. For example, cable-dragging (Higgins et al. 1969) and rope-dragging (Labisky 1957) may be more effective methods for many grassland species. The patience and alertness of observers and their familiarity with the habitat and behavior of species are the most important influences on effectively locating nests.

We have successfully used these techniques to train individuals who even lack experience at bird identification. For example, a crew of four assistants initiated a study in Arkansas in 1991 where nesting behaviors of species were unstudied; this crew was provided only the general nest-finding guidelines given below. The crew included one experienced nest-finder, one person experienced at identifying birds and two people without experience at either. These workers found over 300 nests of open-nesting birds (Table 1). A crew of seven assistants that included two experienced nest-finders found more than 800 open-cup and cavity nests on Arizona sites in the same year (Table 1). In general, about 20 nests are needed for an adequate estimate of nesting success (Hensler and Nichols 1981), and such sample sizes were obtained for most species (Table 1). Moreover, species with small sample sizes can be compiled across years.

We recommend that two study plots be established for each person searching for nests and he or she should work on these two plots for the entire nesting season. Nest-searching should be alternated between plots between days. This schedule allows consistent monitoring and allows the person to become familiar with the plot and identify "hot spots." In general, eight plots, each 40 ha in size, should be established in forest habitat to find adequate numbers of nests for most species coexisting in any given forest, but smaller plots can be established if studying habitats with higher densities. This design fits in the national Breeding Biology Research and monitoring Database (BBIRD) administered by Martin.

Nest finding should begin early, as soon as territories are established. Non-migratory species generally are more variable than migrants and may initiate breeding considerably earlier in some years (e.g., Geupel and DeSante 1990). Visits prior to nesting are recommended to ensure early nests are not missed in 'unusual' years. Once general chronology of nest initiation is known (after the first year), a general description of this chronology helps assistants to know species on which to focus early in the season.

Nest location during nest construction.—Nests located during construction provide the best estimates of nest success. Permanent residents and many ground-nesting species often begin the earliest. Only the female constructs the nest and incubates for most small terrestrial bird species in North America (Kendeigh 1952, Silver et al. 1985). Exceptions include woodpeckers (Picidae), vireos (Vireonidae), and wrens (Troglodytidae). Thus, the most effective way of finding nests is by locating and following females, although males may provide some cues (see later), and some nests in the shrub layer can be found by random search. Ground nests

Table 1. List of species and numbers of nests found in a single field season in Arkansas and Arizona using teams of four and seven field assistants, respectively.

Arkansas		
Yellow-billed Cuckoo	*Coccyzus americanus*	13
Acadian Flycatcher	*Empidonax virescens*	51
Wood Thrush	*Hylocichla mustelina*	40
Red-eyed Vireo	*Vireo olivaceus*	51
Black-and-white Warbler	*Mniotilta varia*	19
Ovenbird	*Seiurus aurocapillus*	14
Worm-eating Warbler	*Helmitheros vermivorus*	16
Hooded Warbler	*Wilsonia citrina*	67
Indigo Bunting	*Passerina cyanea*	30
Arizona		
Acorn Woodpecker	*Melanerpes formicivorus*	8
Red-naped Sapsucker	*Sphyrapicus varius*	30
Williamson's Sapsucker	*Sphyrapicus thyroideus*	32
Hairy Woodpecker	*Dendrocopus villosus*	10
Downy Woodpecker	*Dendrocopos pubescens*	8
Northern Flicker	*Colaptes auratus*	26
Cordilleran Flycatcher	*Empidonax difficilis*	36
Mountain Chickadee	*Parus gambeli*	45
Pygmy Nuthatch	*Sitta pygmaea*	24
Red-breasted Nuthatch	*Sitta canadensis*	26
White-breasted Nuthatch	*Sitta carolinensis*	14
Brown Creeper	*Certhia familiaris*	22
House Wren	*Troglodytes aedon*	83
Hermit Thrush	*Catharus guttatus*	74
American Robin	*Turdus migratorius*	24
Ruby-crowned Kinglet	*Regulus calendula*	14
Warbling Vireo	*Vireo gilvus*	58
Orange-crowned Warbler	*Vermivora celata*	71
Virginia's Warbler	*Vermivora virginiae*	34
Yellow-rumped Warbler	*Dendroica coronata*	45
MacGillivray's Warbler	*Oporornis tolmiei*	9
Red-faced Warbler	*Cardellina rubrifrons*	21
Western Tanager	*Piranga ludoviciana*	39
Black-headed Grosbeak	*Pheucticus melanocephalus*	7
Green-tailed Towhee	*Pipilo chlorurus*	24
Dark-eyed Junco	*Junco hyemalis*	46

in forests are usually the most difficult to find and ground-nesting species are poorly studied (Martin 1992, 1993a). Yet, this group is thought to be particularly area-sensitive and good indicators of habitat disturbance (Martin 1993a, Whitcomb et al. 1981). Thus, special efforts should be made at locating and monitoring ground-nesting species.

Females tend to be extremely furtive during nest building. Mated females may be recognized by copulation events during latter stages of building or by observing that they move about the territory unharassed by the male. Any non-mated bird, especially an intruding male, is normally attacked immediately. Any female observed should be checked with binoculars, especially after long flights across the territory, to determine whether nesting material is being carried. Nest material may not be obvious. For example, species such as Yellow-rumped Warblers (*Dendroica coronata*) and Wrentits (*Chamaea fasciata*) collect spider webbing, which is only observable as a small white spot after careful examination of the bill (Martin and Geupel, pers. obs.). Similarly, many birds carry fine materials for lining nests, and these materials are not obvious upon casual inspection.

Sitting near sources of nesting material (i.e., failed nests, thistles) or open areas with a good view of the territory can help detection of nest-building females. Different paths across plots should be used on each visit to increase the probability of randomly encountering females near undiscovered nests. Follow a bird carrying nesting material from a distance to avoid disturbance. Do not interrupt a long flight. If the bird disappears, begin to scan for potential nest sites. Be patient and wait for another visit, being careful not to interfere with her behavior. If the female disappeared near the nest, she will spend time in the area. Remain aware, however, that she may also move out of the back side of the patch to a different patch that contains the nest.

Some birds tolerate nearby observers and behave normally, but most are very wary of observers. If the observer is too close to the nest, the bird often will sit on a perch and eventually drop the nesting material if the observer does not move away. The observer should move quickly and quietly in the opposite direction from which the bird came. Obtain a new hiding position at least 15 m away and watch the female take nesting material several times and leave without it. Stay alert to the possibility that the female may enter one patch and then surreptitiously move among patches only to return the same way to give the appearance of nesting in the first patch. Some species such as MacGillivray's Warblers (*Oporornis tolmiei*), Hooded Warblers (*Wilsonia citrina*) and Sage Sparrows (*Amphispiza belli*) will walk on the ground for several meters to approach the nest secretly. Species that nest off the ground can often be detected as they move through a thick patch of vegetation by watching the vegetation move. Verify the nest status and location a few hours later, being careful to make sure the female is not present. Later visitation is recommended because usually the female has become aware of observers during their nest-finding activities.

Nest location during egg-laying.—The most difficult stage for finding nests is during egg-laying because the female may visit the nest only when she lays an egg and most songbirds lay one egg per day. In cold climates, the female will sometimes sit on the nest during egg-laying when weather is particularly harsh. Also, nest visitation becomes more frequent with increases in numbers of eggs laid (Kendeigh 1952, Zerba and Morton 1983). One means of finding nests during egg-laying is by carefully observing female and male behavior. When either parent gets near the nest, it will look at the nest. If an egg-laying female detects a predator in the area, such as an observer following her, she will sometimes check the nest by looking down at it repeatedly. A good cue is a female staying in an area without actively feeding.

Finally, copulatory behavior can be used to detect nests during both nest-building and egg-laying. Copulation often occurs in the same tree above a nest, on the same branch, or in the next tree. Carefully examine the area immediately adjacent to any copulatory activity observed.

Nest location during incubation.—When females suddenly "vanish" and males increase the frequency of singing, females have probably initiated incubation. An increase in female foraging speed also indicates the onset of incubation. Females forage at slower speeds prior to incubation (during pre-construction, nest construction, and egg-laying) than during incubation and nestling stages. Females that are moving obviously fast (e.g., rapid hops, quick short flights, rapid wing flicks) should be carefully followed because they will return to the nest soon; on average, female passerines stay off the nest for 6–10 min and on for 20–30 min at a time across species (e.g., Nice 1937, Southern 1958, Zerba and Morton 1983).

Detection of incubating females can be accomplished in two ways. First, females can be encountered by constantly moving through the study plot, but constant alertness is imperative. Sometimes, sitting down in a spot for 20–30 min is useful because incubating females will leave the nest in that period. Second, females can be detected by call notes. Females of many taxa (e.g., Silviidae, Parulinae, Emberizinae) chip or call when they are off the nest. The female begins chipping just prior to leaving the nest or as soon as she is off it. Some taxa such as emberizid finches and icterines give a unique nest departure call when leaving the nest (McDonald and Greenberg 1991). If a vocalizing female is detected and then lost during the course of following her, immediately return to the point of original detection because it is often near the nest and the female can often be relocated before getting back on the nest.

Males can also be of some help. First, males often will respond to females when they leave the nest and either quietly guard the nest (e.g., Gray Catbird, *Dumetella carolinensis*; Slack 1976), or the female. Detection of a quiet male may indicate presence of a foraging female or a nest somewhere near him. Second, males will feed incubating females for a great array of species, particularly cavity-nesting birds, but for many open-nesting birds as well (Lyon and Montgomerie 1987, Silver et al. 1985, Martin and Geupel, unpubl. data). Any birds (male or female) observed should be checked for material in their bills because they potentially could be building nests, feeding females or feeding young. Finally, males of some species (e.g., Chestnut-sided Warbler, *Dendroica pensylvanica*) use favorite singing perches that are in direct view of the nest (Martin, pers. obs.). The nest can be located by following his line of sight.

Females are fairly tolerant of people following while they forage. The female is more cautious as she returns to the nest. A relatively long flight after foraging is probably a return to the nest and is often along the same route. Quickly running in her direction for about 25 m may often allow resighting because the disturbance will keep her from returning to the nest. If she is near the nest, but cautious about approaching, she will display nervous displacement behavior. This "nest dance" involves bouncing back and forth between a few trees or substrates, and in some cases also includes very rapid foraging. Eventually, she will start to move down toward the nest and then suddenly fly back up. This behavior will be repeated several times in the course of a few minutes. If the observer is too close to the nest, the bird will continue to bounce back and forth between substrates and will sometimes fly off for a short time, only to return within a few minutes. The observer should back off and watch her with binoculars and she will then return to the nest. If the work is being conducted in cold conditions, do not keep her off the nest for more than 15 min because the eggs can chill to lethal levels. If the female has been followed for more than 30 min and has not disappeared or exhibited displacement behavior, then she probably does not have a nest. Of course this "30-min rule" does not apply to species where both sexes incubate.

If a female disappears into a tree or shrub, memorize the area where the female disappeared and choose potential nesting sites before approaching. Moving quietly, begin tapping potential nest shrubs in this area with a stick. Listen for the flush of the female off the nest. Watch for the female or the "nest dance." Note that spotting the female will confirm that the nest is nearby. If the nest is not found and the female is not observed leaving, then there is no confirmation that a nest is in the area. Because the nest is in a fixed location, the site can be revisited for careful searches in the future.

In many species, nest site preference seems to be an evolutionarily conservative trait (Martin 1988a, 1992, 1993c). Many birds prefer to nest in or under certain plant species or patch types that differ among bird species (Geupel 1993, Martin 1993c, Martin and Roper 1988). Familiarity with nest substrate and patch preferences can help in finding nests. Describe and visit nest locations from previous years to aid new observers in finding nests.

Nest location during the nestling stage.—Finding nests during the nestling period is easiest because both males and females commonly bring food to the nestlings and remove fecal sacs. Males are normally the easiest to follow because they are generally less cautious than females in approaching nests. Nests can usually be found from a greater distance using binoculars because of the constant activity of the parents.

Knowledge of the nesting cycle allows an observer to anticipate when to start looking for a new nest. Most species will renest following a nesting failure, although the number of nesting attempts or renesting intensity varies within and among species (Geupel and Desante 1990, Martin and Li 1992). Reconstruction begins almost always at a new site within 10 d and the new nest is likely to be farther away from the previous nest the earlier in the nesting cycle that failure occurred (citations in Martin 1992). Multi-brooded species may begin another nest in as little as 8 d after fledging a prior nest. Sometimes the female will begin nesting while the male is still tending the fledglings of the previous brood (Burley 1980, Smith and Roff 1980).

Nest finding can be a difficult and frustrating task; patience is the most important asset. An observer should set a goal of trying to find at least one nest every day. More than one nest will be found on many days, but if at least one nest can be found each day the numbers of nests obtained over the season will accumulate and frustration will be minimized.

NEST MONITORING

Each nest found should be checked every 3–4 d to determine if it is still active (with eggs or young) or has failed. Except just after egg-laying and near hatching and fledging events, it is not necessary to check the nest contents. Instead, check the nest from a distance; if an adult is on the nest, do not flush it. Careful and highly conscientious attention to checking nests is critical for data quality because the number of days that nests are observed with eggs or young is used to calculate daily mortality rates, the most effective measure of nest success (Hensler and Nichols 1981; Mayfield 1961, 1975). Moreover, nesting outcome is difficult to determine with increasing length of time between nest checks and variation at this stage can bias estimates of nest success. The fledging date should be identified as the date of the last visit on which nestlings were observed in the nest. Do not extrapolate past the last date that young were observed except when the average nesting cycle duration is used to determine the fledging date from the known initiation date. Otherwise, an upward bias on Mayfield estimates occurs. Prior to the field season, a sheet of information that summarizes the general clutch size, length of the incubation period, and length of the nestling period for every species that occurs on the study sites should be prepared. This information aids anticipation of hatching and fledging events.

Flagging or other visible markers can increase risk of predation (Picozzi 1975) and, hence, should be used with caution. When possible, memorize the area and write a description of how to find the nest using compass bearings and distance estimates (paces) from obvious landmarks or flagging placed greater than 10 m from the nest. Another solution is to grid permanently all study plots with numbered stakes at 25 or 50 m intervals depending on the density of the vegetation; 25 m intervals are usually best (see Ralph et al. 1993 for information on establishing permanently marked plots). Nest location can be described from these permanent markers.

Nest cards are used to record data about the nest site and nest activity. The Cornell Laboratory of Ornithology (159 Sapsucker Woods Rd., Ithaca, New York 14850) maintains a national nest card database and, thus, their card or some similar variant should be used. All observations of nests should be recorded on the nest card, including visits when no activity was noted. Noting lack of adult activity is particularly critical for canopy or cavity-nests where nest contents cannot be checked. All this information is needed for calculating nesting success (see also Bart and Robson 1982). Recorded information should include date, time, presence of adults and activity of adults (e.g., incubating, feeding young, flushed from nest). Also, any time the nest is approached close enough to see the contents, they should be noted on the nest cards (number of eggs, or number and age of nestlings). Age of the nestlings helps determination of nest fate in some cases by providing information on length of time that nests were active. Also, data should be summarized by success at each nesting stage (egg-laying, incubation and nestling) and, thus, accurate records of these stages are needed. When possible, data should include date of first egg, clutch completion date, hatching date, day of banding (if banded) and fledging date. Careful and detailed observations should be recorded if a nest predation event is observed in action. If the nest appears inactive based on observations from a distance, it should be approached to verify mortality. In the case of canopy nests, mirrors attached to telescoping poles (we use window-washing poles) can be used to check nest contents of nests up to 10 m off ground. If the nest appears depredated (eggs or young removed) then check the nest structure and immediate area around and under the nest for evidence of predation. Look for holes in the bottom of the nest cup. Any evidence (e.g., shell fragments, hole in nest, nest torn up) should be fastidiously noted on the card. When the young fledge, they commonly perch on the side of the nest thereby flattening the nest and they leave fecal droppings in the nest or on the edge or ground and such should be noted as possible evidence of successful fledging. When a nest is thought to have fledged, however, observers should try to verify by watching for fledglings or parents feeding fledglings or by hearing parents giving alarm or distress calls or young begging. This activity usually occurs near the nest site because fledglings often do not move very far in the first couple of days. Some species such as Rufous-sided Towhees (*Pipilo erythrophthalmus*), however, may move as far as 100 m in less than a few hours. Care must be exercised in classifying nest fate because some species or individuals may carry food up to 24 h or longer after predation of their nest. This behavior may be exacerbated by unrelated fledgings from neighboring territories. Descriptive confirmatory evidence of fledging should be noted on the nest cards.

PRECAUTIONS FOR MINIMIZING HUMAN-INDUCED MORTALITY

Locating and monitoring nests have the potential to reduce nest success (Gotmark 1992) but with proper precautions such biases can be eliminated or minimized (Martin and Roper 1988, Nichols et al. 1984, Willis 1973). Some investigators use camouflage netting over their heads or attached to camouflaged hats to reduce disturbance to birds. Initial location of the nest normally creates the most distress to adult birds and disturbance to the nest site because subsequent visits are brief. Some evidence suggests that predation rates are higher on the first or early visits than subsequent visits (Bart 1977, Nolan 1978, but see Bart and Robson 1982), perhaps caused by the disturbance during locating the nest. Therefore the following guidelines are suggested when attempting to locate nests. (1) Distress calls by adults should be minimized and never allowed to continue for over 5 min. (2) Do not approach a nest when any potential nest predator, particularly a visually-oriented predator (e.g., corvid) is present. (3) Minimize disturbance to the area around the nest. (4) Do not get close to nests during nest building; birds will abandon if disturbed prior to egg-laying, particularly during the early part of a season.

To lower the probability of predation or brood parasitism during checks, we recommend the following precautions. (1) Check the nest from as great a distance as possible. Use binoculars to see the female or contents of the nest or get on logs and look from above into the nest when possible to minimize proximity and disturbance near the nest. (2) Disturb the birds and area as little as possible. Move to nests in different paths on subsequent visits and use a path that is quick, quiet and that minimizes disturbance to the vegetation; paths in the vegetation from broken stems or smashed grass/forbs can cue possible predators. Never leave a dead end trail to the nest. Do not return on the same path but continue walking in a different direction away from the nest. If avian predators are common, check other bushes without nests. Always assume a predator is watching. (3) Be quick and accurate during nest checks and nestling banding. If the nest must be approached, minimize the amount of time spent near the nest examining the contents because the more time spent at nest the more scent that is left for olfactory predators. (4) Minimize the number of observers visiting the nest (no photographers). (5) Use a pen or stick to check nests to prevent human scent from being left on or near a nest.

VEGETATION MEASUREMENT

As soon as a nesting attempt terminates (successful or unsuccessful), complete the nest card and then measure the vegetation associated with the nest. Be careful at the beginning of the season (May to early June), as an empty nest may not have had eggs laid yet; some species or individuals will delay as long as 8 d between completing nests and laying eggs. Do not bother nests at this stage, unless it is certain a nesting attempt was made and failed.

Vegetation should be measured for the nest substrate and surrounding patch. Vegetation in the patch surrounding the nest can provide information on microhabitat choices. Species that choose the same plant species as a nest substrate may choose different microhabitat types (Martin 1993c, unpubl. data). Moreover, vegetation in the habitat patch surrounding a nest may exert a strong influence on probability of mortality. For example, numbers of potential nest sites (stems of the same size and plant species as used for the nest) in the patch surrounding the nest may affect predation risk (Martin 1988c, 1992, 1993c; Martin and Roper 1988). Hence, determination of habitat patch preferences is important for developing land management guidelines and testing habitat selection theories. Comparisons of nest patch characteristics to unused patches or to patches used across the range of species may provide important insight into habitat preferences (e.g., see James et al. 1984; Knopf et al. 1990; Martin 1988c, 1992, 1993c; Martin and Roper 1988). Standardized vegetation sampling methods should be used to allow comparisons among locations and investigators. Details of the vegetation sampling protocols used by the national BBIRD program are available from Martin upon request.

In conclusion, nest-monitoring plots can provide valuable data on the habitat influences on nesting productivity and possible causes underlying population trends. Constant-effort mist-netting schemes can provide an index of annual productivity (Ballie et al. 1986, DeSante and Geupel 1987) and also some information on adult and juvenile survivorship. These methods, however, do not necessarily provide information on the types of habitat conditions that facilitate increased nesting productivity. Nest-monitoring is more labor-intensive but provides direct information on both productivity and habitat conditions that facilitate maintenance of viable populations, thereby providing direct land management information. Moreover, nest-monitoring is the only way to ascertain the rate and consequences of cowbird parasitism. Finally, nest-monitoring provides badly needed data on life history traits of species, which allows identification of bottlenecks in the demography of species and, also, when taken together with nesting success may provide important insight into vulnerability of populations to disturbance (see Martin 1993a).

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Channel Law Group, LLP

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 10

Lower Colorado River Multi-Species Conservation Program
Western Yellow Bat (*Lasiurus xanthinus*) (WYBA)
Basic Conceptual Ecological Model for the
Lower Colorado River

Lower Colorado River Multi-Species Conservation Program

Balancing Resource Use and Conservation

Western Yellow Bat (*Lasiurus xanthinus*) (WYBA) Basic Conceptual Ecological Model for the Lower Colorado River

Photo courtesy of the Bureau of Reclamation

U.S. Department of the Interior
Bureau of Reclamation

September 2015

Lower Colorado River Multi-Species Conservation Program Steering Committee Members

Federal Participant Group

Bureau of Reclamation
U.S. Fish and Wildlife Service
National Park Service
Bureau of Land Management
Bureau of Indian Affairs
Western Area Power Administration

Arizona Participant Group

Arizona Department of Water Resources
Arizona Electric Power Cooperative, Inc.
Arizona Game and Fish Department
Arizona Power Authority
Central Arizona Water Conservation District
Cibola Valley Irrigation and Drainage District
City of Bullhead City
City of Lake Havasu City
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City of Yuma
Electrical District No. 3, Pinal County, Arizona
Golden Shores Water Conservation District
Mohave County Water Authority
Mohave Valley Irrigation and Drainage District
Mohave Water Conservation District
North Gila Valley Irrigation and Drainage District
Town of Fredonia
Town of Thatcher
Town of Wickenburg
Salt River Project Agricultural Improvement and Power District
Unit “B” Irrigation and Drainage District
Wellton-Mohawk Irrigation and Drainage District
Yuma County Water Users’ Association
Yuma Irrigation District
Yuma Mesa Irrigation and Drainage District

Other Interested Parties Participant Group

QuadState Local Governments Authority
Desert Wildlife Unlimited

California Participant Group

California Department of Fish and Wildlife
City of Needles
Coachella Valley Water District
Colorado River Board of California
Bard Water District
Imperial Irrigation District
Los Angeles Department of Water and Power
Palo Verde Irrigation District
San Diego County Water Authority
Southern California Edison Company
Southern California Public Power Authority
The Metropolitan Water District of Southern California

Nevada Participant Group

Colorado River Commission of Nevada
Nevada Department of Wildlife
Southern Nevada Water Authority
Colorado River Commission Power Users
Basic Water Company

Native American Participant Group

Hualapai Tribe
Colorado River Indian Tribes
Chemehuevi Indian Tribe

Conservation Participant Group

Ducks Unlimited
Lower Colorado River RC&D Area, Inc.
The Nature Conservancy

Lower Colorado River
Multi-Species Conservation Program

Western Yellow Bat
(*Lasiurus xanthinus*) (WYBA)
Basic Conceptual Ecological Model for the Lower Colorado River

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Sound Science, LLC

Lower Colorado River
Multi-Species Conservation Program
Bureau of Reclamation
Lower Colorado Region
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http://www.lcrmscp.gov

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ACRONYMS AND ABBREVIATIONS

CEM	conceptual ecological model
LCR	lower Colorado River
LCR MSCP	Lower Colorado River Multi-Species Conservation Program
Reclamation	Bureau of Reclamation
WYBA	western yellow bat (*Lasiurus xanthinus*)

Symbols

<	less than

Definitions

For the purposes of this document, vegetation layers are defined as follows:

Canopy – The canopy is the uppermost strata within a plant community. The canopy is exposed to the sun and captures the majority of its radiant energy.

Understory – The understory comprises plant life growing beneath the canopy without penetrating it to any extent. The understory exists in the shade of the canopy and usually has lower light and higher humidity levels. The understory includes subcanopy trees and the shrub and herbaceous layers.

Shrub layer – The shrub layer is comprised of woody plants between 0.5 and 2.0 meters in height.

Herbaceous layer – The herbaceous layer is most commonly defined as the forest stratum composed of all vascular species that are 0.5 meter or less in height.

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1	Species Conceptual Ecological Model Methodology for the Lower Colorado River Multi-Species Conservation Program
2	Western Yellow Bat Habitat Data

Foreword

The Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Habitat Conservation Plan requires the creation, and long-term stewardship, of habitat for 20 covered species. This is both an exciting and daunting challenge – exciting, in that success would mean a major conservation achievement in the lower Colorado River landscape, and daunting, in that we need to simultaneously manage our lands for the benefit of 20 species in a mosaic of land cover types. To do so, we need to develop a common understanding of the habitat requirements of each species and the stewardship required to meet those needs.

To provide a framework to capture and share the information that forms the foundation of this understanding, conceptual ecological models (CEMs) for each covered species have been created under the LCR MSCP's Adaptive Management Program. The LCR MSCP's conceptual ecological models are descriptions of the functional relationships among essential components of a species' life history, including its habitat, threats, and drivers. They tell the story of "what's important to the animal" and how our stewardship and restoration actions can change those processes or attributes for the betterment of their habitat. As such, CEMs can provide:

- A synthesis of the current understanding of how a species' habitat works. This synthesis can be based on the published literature, technical reports, or professional experience.

- Help in understanding and diagnosing underlying issues and identifying land management opportunities.

- A basis for isolating cause and effect and simplifying complex systems. These models also document the interaction among system drivers.

- A common (shared) framework or "mental picture" from which to develop management alternatives.

- A tool for making qualitative predictions of ecosystem responses to stewardship actions.

- A way to flag potential thresholds from which system responses may accelerate or follow potentially unexpected or divergent paths.

- A means by which to outline further restoration, research, and development and to assess different restoration scenarios.

- A means of identifying appropriate monitoring indicators and metrics.
- A basis for implementing adaptive management strategies.

Most natural resource managers rely heavily upon CEMs to guide their work, but few explicitly formulate and express the models so they can be shared, assessed, and improved. When this is done, these models provide broad utility for ecosystem restoration and adaptive management.

Model building consists of determining system parts, identifying the relationships that link these parts, specifying the mechanisms by which the parts interact, identifying missing information, and exploring the model's behavior (Heemskerk et al. 2003[1]). The model building process can be as informative as the model itself, as it reveals what is known and what is unknown about the connections and causalities in the systems under management.

It is important to note that CEMs are not meant to be used as prescriptive management tools but rather to give managers the information needed to help inform decisions. These models are conceptual and qualitative. They are not intended to provide precise, quantitative predictions. Rather, they allow us to virtually "tweak the system" free of the constraints of time and cost to develop a prediction of how a system might respond over time to a variety of management options; for a single species, a documented model is a valuable tool, but for 20 species, they are imperative. The successful management of multiple species in a world of competing interests (species versus species), potentially conflicting needs, goals, and objectives, long response times, and limited resources, these models can help land managers experiment from the safety of the desktop. Because quantitative data can be informative, habitat parameters that have been quantified in the literature are presented (in attachment 2) in this document for reference purposes.

These models are intended to be "living" documents that should be updated and improved over time. The model presented here should not be viewed as a definitive monograph of a species' life history but rather as a framework for capturing the knowledge and experience of the LCR MSCP's scientists and land stewards. While ideally the most helpful land management tool would be a definitive list of do's and don'ts, with exact specifications regarding habitat requirements that would allow us to engineer exactly what the species we care about need to survive and thrive, this is clearly not possible. The fact is, that despite years of active management, observation, and academic research on many of the LCR MSCP species of concern, there may not be enough data to support developing such detailed, prescriptive land management.

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[1] Heemskerk, M., K. Wilson, and M. Pavao-Zuckerman. 2003. Conceptual models as tools for communication across disciplines. Conservation Ecology 7(3):8. http://www.consecol.org/vol7/iss3/art8/

The CEMs for species covered under the LCR MSCP are based on, and expand upon, methods developed by the Sacramento-San Joaquin Delta Ecosystem Restoration Program (ERP): https://www.dfg.ca.gov/ERP/conceptual_models.asp. The ERP is jointly implemented by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and National Marine Fisheries Service. The Bureau of Reclamation (Reclamation) participates in this program. (See attachment 1 for an introduction to the CEM process.)

Many of the LCR MSCP covered species are migratory. These models only address the species' life history as it relates to the lower Colorado River and specifically those areas that are potentially influenced by LCR MSCP land management. The models DO NOT take into account ecological factors that influence the species at their other migratory locations.

Finally, in determining the spatial extent of the literature used in these models, the goals and objectives of the LCR MSCP were taken into consideration. For species whose range is limited to the Southwest, the models are based on literature from throughout the species' range. In contrast, for those species whose breeding range is continental (e.g., yellow-billed cuckoo) or west-wide, the models primarily utilize studies from the Southwest.

How to Use the Models

There are three important elements to each CEM:

(1) The narrative description of the species' various life stages, critical biological activities and processes, and associated habitat elements.

(2) The figures that provide a visual snapshot of all the critical factors and causal links for a given life stage.

(3) The associated workbooks. Each CEM has a workbook that includes a worksheet for each life stage.

This narrative document is a basic guide, meant to summarize information on the species' most basic habitat needs, the figures are a graphic representation of how these needs are connected, and the accompanying workbook is a tool for land managers to see how on-the-ground changes might potentially change outcomes for the species in question. Reading, evaluating, and using these CEMs requires that the reader understand all three elements; no single element provides all the pertinent information in the model. While it seems convenient to simply read the narrative, we strongly recommend the reader have the figures and workbook open and refer to them while reviewing this document.

It is also tempting to see these products, once delivered, as “final.” However, it is more accurate to view them as “living” documents, serving as the foundation for future work. Reclamation will update these products as new information is available, helping to inform land managers as they address the on-the-ground challenges inherent in natural resource management.

The knowledge gaps identified by these models are meant to serve only as an example of the work that could be done to further complete our understanding of the life history of the LCR MSCP covered species. However, this list can in no way be considered an exhaustive list of research needs. Additionally, while identifying knowledge gaps was an objective of this effort, evaluating the feasibility of addressing those gaps was not. Finally, while these models were developed for the LCR MSCP, the identified research needs and knowledge gaps reflect a current lack of understanding within the wider scientific community. As such, they may not reflect the current or future goals of the LCR MSCP. They are for the purpose of informing LCR MSCP decisionmaking but are in no way meant as a call for Reclamation to undertake research to fill the identified knowledge gaps.

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Bureau of Reclamation
September 2015

Executive Summary

This document presents a conceptual ecological model (CEM) for the western yellow bat (*Lasiurus xanthinus*) (WYBA). The purpose of this model is to help the Bureau of Reclamation (Reclamation), Lower Colorado River Multi-Species Conservation Program (LCR MSCP), identify areas of scientific uncertainty concerning WYBA ecology, the effects of specific stressors, the effects of specific management actions aimed at species habitat restoration, and the methods used to measure WYBA habitat and population conditions. (Note: Attachment 1 provides an introduction to the CEM process. We recommend that those unfamiliar with this process read the attachment before continuing with this document.)

The identified research questions and gaps in scientific knowledge that are the result of this modeling effort serve as examples of topics the larger scientific community could explore to improve the overall understanding of the ecology of this species. These questions may or may not be relevant to the goals of the LCR MSCP. As such, they are not to be considered guidance for Reclamation or the LCR MSCP, nor are these knowledge gaps expected to be addressed under the program.

CONCEPTUAL ECOLOGICAL MODELS

CEMs integrate and organize existing knowledge concerning: (1) what is known about an ecological resource, with what certainty, and the sources of this information, (2) critical areas of uncertain or conflicting science that demand resolution to better guide management planning and action, (3) crucial attributes to use while monitoring system conditions and predicting the effects of experiments, management actions, and other potential agents of change, and (4) how we expect the characteristics of the resource to change as a result of altering its shaping/controlling factors, including those resulting from management actions.

The CEM applied to the WYBA expands on the methodology developed for the Sacramento-San Joaquin River Delta Regional Ecosystem Restoration Implementation Plan (DiGennaro et al. 2012). The model distinguishes the major life stages or events through which the individuals of a species must pass to complete a full life cycle. It then identifies the factors that shape the likelihood that individuals in each life stage will survive to the next stage in the study area and thereby shapes the abundance, distribution, and persistence of the species in that area.

Specifically, the WYBA conceptual ecological model has five core components:

- **Life stages** – These consist of the major growth stages and critical events through which an individual WYBA must pass in order to complete a full reproductive cycle.
- **Life-stage outcomes** – These consist of the biologically crucial outcomes of each life stage, including the number of individuals recruited to the next life stage or age class within a single life stage (recruitment rate), or the number of fertilized offspring produced (fertility rate).
- **Critical biological activities and processes** – These consist of activities in which the species engages and the biological processes that take place during each life stage that significantly beneficially or detrimentally shape the life-stage outcome rates for that life stage.
- **Habitat elements** – These consist of the specific habitat conditions, the abundance, spatial and temporal distributions, and other qualities of which significantly beneficially or detrimentally affect the rates of the critical biological activities and processes for each life stage.
- **Controlling factors** – These consist of environmental conditions and dynamics – including human actions – that determine the abundance, spatial and temporal distributions, and other qualities of the habitat elements for each life stage. Controlling factors are also called "drivers."

The CEM identifies the causal relationships among these components for each life stage. A causal relationship exists when a change in one condition or property of a system results in a change in some other condition or property. A change in the first condition is said to cause a change in the second condition. The CEM method applied here assesses four variables for each causal relationship: (1) the character and direction of the effect, (2) the magnitude of the effect, (3) the predictability (consistency) of the effect, and (4) the certainty of a present scientific understanding of the effect. CEM diagrams and a linked spreadsheet tool document all information on the model components and their causal relationships.

CONCEPTUAL ECOLOGICAL MODEL STRUCTURE

The WYBA conceptual ecological model addresses the WYBA population along the river and lakes of the lower Colorado River (LCR) and other protected areas. The basic sources of information for the WYBA conceptual ecological model are

Kurta and Lehr (1995), Miner and Stokes (2005), Kunz and Fenton (2003), Lacki et al. (2007), and Cryan and Veilleux (2007). These publications summarize and cite large bodies of earlier studies. Where appropriate and accessible, those earlier studies are directly cited. The CEM also integrates numerous additional sources, particularly reports and articles completed since these publications; information on current research projects; and the expert knowledge of LCR MSCP biologists. The purpose of the CEM is not to provide an updated literature review but to integrate the available information and knowledge into a CEM so it can be used for adaptive management.

The WYBA conceptual ecological model distinguishes and assesses three life stages and their associated outcomes as follows (table ES-1):

Table ES-1.—Outcomes of each of the three life stages of WYBA

Life stage	Life-stage outcome(s)
1. Pup	• Survival
2. Juvenile	• Survival
3. Breeding adult	• Survival • Reproduction

The model distinguishes 9 critical biological activities or processes relevant to 1 or more of these 3 life stages and their outcomes, 12 habitat elements relevant to 1 or more of these 9 critical biological activities or processes for 1 or more life stages, and 9 controlling factors that affect 1 or more of these 12 habitat elements. Because the LCR is a highly regulated system, the controlling factors almost exclusively concern human activities.

The nine critical biological activities and processes identified across all life stages are: chemical stress, disease, eating, foraging, mechanical stress, predation, roost attendance, roost site selection, and thermal stress. The 12 habitat elements identified across all life stages are: anthropogenic disturbance, canopy closure, food availability, genetic diversity and infectious agents, matrix community, number of pups, parent roost attendance, patch size, predator density, temperature, tree species composition, and water availability. The nine controlling factors identified across all habitat elements are: fire management, grazing, habitat restoration, nuisance species introduction and management, pesticide/herbicide application, tree pruning, tree thinning, water storage-delivery system design and operation, and wind energy development.

RESULTS

The analysis of the causal relationships shows which critical biological activities and processes most strongly support or limit each life-stage outcome in the present system, which habitat elements most strongly affect the rates of these critical biological activities and processes, and which controlling factors most strongly affect the abundance, distribution, or condition of these habitat elements.

The analysis identifies several critical biological activities and processes, habitat elements, and controlling factors that significantly affect survivorship across one or more life stages. Highlights of the results include the following:

- Tree pruning of the dead fronds from native and non-native palm (*Washingtonia* sp.) trees has a moderate effect on canopy closure and parent roost attendance.
- Tree species composition strongly affects roost site selection.
- Roost site selection has a moderate effect on reproduction in breeding adults and is strongly affected by tree species composition.
- Tree species composition is strongly affected by the presence of nuisance species; management activities, such as fire management; grazing, and water storage-delivery system design and operation. It is moderately affected by restoration activities and tree thinning.
- Roost sites located close to or within agricultural areas where pesticides/ herbicides are being applied may increase chemical stress in WYBA and affect survival rates during all life stages as well as prey abundance.
- The rate of foraging success strongly affects the success rate of WYBA in the juvenile and breeding adult life stages.
- Roost attendance and roost site selection have a moderate impact on breeding adult reproduction.
- If wind energy development is present in areas with significant WYBA activity, mechanical stress may negatively affect WYBA juvenile and breeding adult survival.

Finally, the analysis highlights several potentially important causal relationships about which scientific understanding remains low. These may warrant attention to determine if improved understanding might provide additional management options for improving WYBA survivorship and recruitment along the LCR. Specifically, the findings suggest a need to improve the understanding of:

- The distribution of WYBA roost sites within the LCR MSCP area, with special emphasis on potential impacts of land use and associated activities within the habitat and the surrounding matrix community.

- The distribution of suitable WYBA roost habitat along the LCR and habitat use within those sites.

- The ecology of predation on WYBA and its significance on survival across all life stages, how this may vary among predator species and across different habitat settings, and whether it may be possible to manipulate these habitat conditions to improve WYBA survival even in the presence of predators.

- The presence of disease in the WYBA population and its significance in affecting survival across all life stages within the LCR.

- The impacts of pesticide/herbicide use within the LCR on the survival of WYBA across all life stages.

- WYBA movement patterns within the LCR, including any seasonal migratory movement.

The research questions and gaps in scientific knowledge identified in this modeling effort serve as examples of topics the larger scientific community could explore to improve the overall understanding of the ecology of WYBA. These questions may or may not be relevant to the goals of the LCR MSCP. As such, they are not to be considered guidance for Reclamation or the LCR MSCP, nor are these knowledge gaps expected to be addressed under the program.

Chapter 1 – Introduction

This document presents a conceptual ecological model (CEM) for the western yellow bat (*Lasiurus xanthinus*) (WYBA). The purpose of this model is to help the Bureau of Reclamation (Reclamation), Lower Colorado River Multi-Species Conservation Program (LCR MSCP), identify areas of scientific uncertainty concerning WYBA ecology, the effects of specific stressors, the effects of specific management actions aimed at species habitat restoration, and the methods used to measure WYBA habitat and population conditions. The CEM methodology follows that developed for the Sacramento-San Joaquin River Delta Regional Ecosystem Restoration Implementation Plan (DiGennaro et al. 2012), with modifications. (Note: Attachment 1 provides an introduction to the CEM process. We recommend that those unfamiliar with this process read the attachment before continuing with this document.)

The CEM addresses the WYBA population along the river and lakes of the lower Colorado River (LCR) and other protected areas. The model thus addresses the landscape as a whole rather than any single reach or managed area.

Due to a lack of species-specific information on several key areas of WYBA life history and ecology, some of the information provided in this report is for the southern yellow bat (*Lasiurus ega*) prior to its split into two species and mostly reflects data for eastern populations. It is assumed for the purposes of the model and this report that the information is generally applicable to WYBA. One such reference is Kurta and Lehr (1995). Other basic sources of information used for the WYBA conceptual ecological model are Miner and Stokes (2005), Williams et al. (2006), Kunz and Fenton (2003), Lacki et al. (2007), and Cryan and Veilleux (2007). These publications summarize and cite large bodies of earlier studies. The CEM also integrates numerous additional sources, particularly reports and articles completed since the aforementioned publications; information on current research projects; and the expert knowledge of LCR MSCP bat biologists. The purpose of the conceptual ecological model is not to provide an updated literature review but to integrate the available information and knowledge into a CEM so it can be used for adaptive management.

This document is organized as follows: The remainder of chapter 1 provides an explanation of the purposes for using conceptual ecological models and introduces the underlying concepts and structure of the CEM. Succeeding chapters present and explain the model for the WYBA within the LCR and evaluate the implications of this information for management, monitoring, and research needs.

WESTERN YELLOW BAT REPRODUCTIVE ECOLOGY

There is not much known about the specific reproductive biology of the WYBA. It was taxonomically split from the southern yellow bat by Baker et al. in 1988. However, the reproductive biology of the southern yellow bat is likely very similar to the WYBA, and this description is based on that information.

WYBA copulation occurs in late summer, likely between late August and late October. Female WYBA likely store sperm until fertilization occurs in late winter. Gestation takes 60–70 days. WYBA have one to two pups, with litter sizes typically two (NatureServe 2015). Young are born in June and July, likely peaking around the second week of June (Hoffmeister 1986), and lactation takes place in June and July. There is no parental care after the female ceases lactation.

CONCEPTUAL ECOLOGICAL MODEL PURPOSES

Adaptive management of natural resources requires a framework to help managers understand the state of knowledge about how a resource “works,” what elements of the resource they can affect through management, and how the resource will likely respond to management actions. The “resource” may be a population, species, habitat, or ecological complex. The best such frameworks incorporate the combined knowledge of many professionals accumulated over years of investigations and management actions. CEMs capture and synthesize this knowledge (Fischenich 2008; DiGennaro et al. 2012).

CEMs explicitly identify: (1) the variables or attributes that best characterize resource conditions, (2) the factors that most strongly shape or control these variables under both natural and altered (including managed) conditions, (3) the character, strength, and predictability of the ways in which these factors do this shaping/controlling, and (4) how the characteristics of the resource vary as a result of the interplay of its shaping/controlling factors.

By integrating and explicitly organizing existing knowledge in this way, a CEM summarizes and documents: (1) what is known, with what certainty, and the sources of this information, (2) critical areas of uncertain or conflicting science that demand resolution to better guide management planning and action, (3) crucial attributes to use while monitoring system conditions and predicting the effects of experiments, management actions, and other potential agents of change, and (4) how the characteristics of the resource would likely change as a result of altering its shaping/controlling factors, including those resulting from management actions.

A CEM thus translates existing knowledge into a set of explicit hypotheses. The scientific community may consider some of these hypotheses well tested, but others less so. Through the model, scientists and managers can identify which hypotheses, and the assumptions they express, most strongly influence management actions. The CEM thus helps guide management actions based on the results of monitoring and experimentation. These results indicate whether expectations about the results of management actions – as clearly stated in the CEM – have been met or not. Both expected and unexpected results allow managers to update the model, improving certainty about some aspects of the model while requiring changes to other aspects, to guide the next cycle of management actions and research. The CEM, through its successive iterations, becomes the record of improving knowledge and the ability to manage the system.

CONCEPTUAL ECOLOGICAL MODEL STRUCTURE FOR THE WYBA

The CEM methodology used here expands on that developed for the Sacramento-San Joaquin River Delta Regional Ecosystem Restoration Implementation Plan (DiGennaro et al. 2012). The expansion incorporates recommendations of Wildhaber et al. (2007), Wildhaber (2011), Kondolf et al. (2008), and Burke et al. (2009) to provide greater detail on causal linkages and outcomes as well as explicit demographic notation in the characterization of life-stage outcomes (McDonald and Caswell 1993). Attachment 1 provides a detailed description of the methodology. The resulting model is a "life history" model, as is common for CEMs focused on individual species (Wildhaber et al. 2007; Wildhaber 2011). That is, it distinguishes the major life stages or events through which the individuals of a species must pass to complete a full life cycle, including reproducing, and the biologically crucial outcomes of each life stage. These outcomes typically include the number of individuals recruited to the next life stage (e.g., juvenile to adult) or next age class within a single life stage (recruitment rate), or the number of viable offspring produced (fertility rate). It then identifies the factors that shape the rates of these outcomes in the study area and thereby shapes the abundance, distribution, and persistence of a species in that area.

The WYBA conceptual ecological model has five core components as explained further in attachment 1:

- **Life stages** – These consist of the major growth stages and critical events through which an individual of a species must pass in order to complete a full life cycle.

- **Life-stage outcomes** – These consist of the biologically crucial outcomes of each life stage, including the number of individuals recruited to the next life stage (e.g., juvenile to adult), or the number of viable offspring produced (fertility rate). The rates of the outcomes for an individual life stage depend on the rates of the critical biological activities and processes for that life stage.

- **Critical biological activities and processes** – These consist of the activities in which the species engages and the biological processes that take place during each life stage that significantly affect its life-stage outcomes rates. Examples of activities and processes for a small mammal species may include dispersal, foraging, maternal care, and avoiding predators. Critical biological activities and processes typically are "rate" variables.

- **Habitat elements** – These consist of the specific habitat conditions, the quality, abundance, and spatial and temporal distributions of which significantly affect the rates of the critical biological activities and processes for each life stage. These effects on critical biological activities and processes may be either beneficial or detrimental. Taken together, the suite of natural habitat elements for a life stage is called the "habitat template" for that life stage. Defining the natural habitat template may involve estimating specific thresholds or ranges of suitable values for particular habitat elements, outside of which one or more critical biological activities or processes no longer fully support desired life-stage outcome rates – if the state of the science supports such estimates.

- **Controlling factors** – These consist of environmental conditions and dynamics – including human actions – that determine the quality, abundance, and spatial and temporal distributions of important habitat elements. Controlling factors are also called "drivers." There may be a hierarchy of such factors affecting the system at different scales of time and space (Burke et al. 2009). For example, the availability of adequate food, cover, and roost sites depends on the presence of suitable herbaceous vegetation, which in turn may depend in part on factors such as local hydrology, which is affected by water storage-delivery system design and operation coupled with habitat restoration or other management activities.

The CEM identifies these five components and the causal relationships among them that affect life-stage outcome rates. Further, the CEM assesses each causal linkage based on four variables to the extent possible with the available information: (1) the character and direction of the effect, (2) the magnitude of the effect, (3) the predictability (consistency) of the effect, and (4) the status (certainty) of a present scientific understanding of the effect.

The CEM for each life stage thus identifies the causal relationships that most strongly support or limit the rates of its life-stage outcomes, support or limit the rate of each critical biological activity or process, and support or limit the quality, abundance, and distribution of each habitat element (as these affect other habitat elements or affect critical biological activities or processes). In addition, the model for each life stage highlights areas of scientific uncertainty concerning these causal relationships, the effects of specific management actions aimed at these relationships, and the suitability of the methods used to measure habitat and population conditions. Attachment 1 provides further details on the assessment of causal relationships, including the use of diagrams and a spreadsheet tool to record the details of the CEM and summarize the findings.

Chapter 2 – WYBA Life Stage Model

A life stage consists of a biologically distinct portion of the life cycle of a species during which individuals undergo distinct developments in body form and function, engage in distinct behaviors, use distinct sets of habitats, and/or interact with their larger ecosystems in ways that differ from those associated with other life stages. This chapter proposes a life stage model for WYBA within the LCR on which to build the CEM.

INTRODUCTION TO THE WYBA LIFE CYCLE

The WYBA was formerly considered a subspecies of the southern yellow bat. It was recognized as a distinct species based on genetic work by Baker et al. (1988). Little is known about the breeding biology of WYBA. Much of the information available is for the southern yellow bat and may be somewhat different from WYBA given their different ecological setting and potentially different seasonal activity patterns.

WYBA LIFE STAGE 1 – PUP

We consider the pup stage to be the first stage in the life cycle of the WYBA. It begins when a pup is born and ends when it has fledged (becomes volant) and becomes independent of the mother. Lasiurines are thought to develop more slowly than the young of crevice-roosting bat species because their foliage roosts do not offer as much thermal protection as bark or tree hollows, leading to a greater use of torpor (Carter and Menzel 2007). The estimated time of young to fly and become fully independent is approximately 2 months (Adams 2003).

WYBA LIFE STAGE 2 – JUVENILE

This life stage begins when a pup has fledged and becomes independent from the mother and ends when the individual reaches sexual maturity. The precise timing of this life stage for WYBA is unknown. For the southern yellow bat, Kurta and Lehr (1995) speculate that both males and females breed in their first year. While there is a tremendous amount of overlap in the biological activities and processes, habitat elements, and controlling factors affecting both WYBA in the juvenile and breeding adult life stages, we felt that the differences in behavior and the way in which WYBA in these life stages interact with the environment were potentially significantly different enough to warrant the split.

WYBA LIFE STAGE 3 – BREEDING ADULT

This life stage begins when a bat reaches sexual maturity and ends when it stops reproducing. It is estimated that adult WYBA reach sexual maturity within their first year. Mating probably occurs in late summer to autumn. Sperm storage is assumed to be similar to that utilized by the closely related southern yellow bat (Adams 2003). Only scattered records of pregnant and lactating females exist, but these indicate that females give birth during spring or early summer. In the United States, pregnant southern yellow bats are known to exist from April through June (Kurta and Lehr 1995). The number of embryos carried by pregnant females varies from one to four. The lactation period is at least 60 days (Kurta and Lehr 1995).

LIFE STAGE MODEL SUMMARY

Based on this information, the WYBA conceptual ecological model distinguishes three life stages and their associated life-stage outcomes as shown in table 1 and figure 1. The life stages are numbered sequentially beginning with the pup life stage.

Table 1.—WYBA life stages and outcomes in the LCR ecosystem

Life stage	Life-stage outcome(s)
1. Pup	• Survival
2. Juvenile	• Survival
3. Breeding adult	• Survival • Reproduction

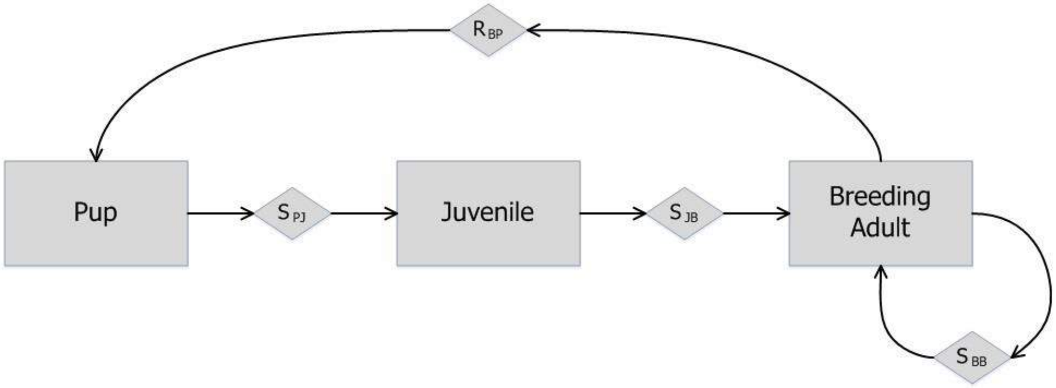

Figure 1.—Proposed WYBA life history model.
Squares indicate the life stage, and diamonds indicate the life-stage outcomes. SP_{PJ} = survivorship rate, pup; S_{JB} = survivorship rate, juveniles; S_{BB} = survivorship rate, breeding adults; and R_{PB} = reproduction rate, breeding adults.

Chapter 3 – Critical Biological Activities and Processes

Critical biological activities and processes consist of activities in which the species engages and biological processes that take place during each life stage that significantly shape the rate(s) of the outcome(s) for that life stage. Critical biological activities and processes are "rate" variables (i.e., the rate [intensity] of these activities and processes, taken together, determine the rate of recruitment of individuals from one life stage to the next).

The CEM identifies nine critical biological activities and processes that affect one or more WYBA life stages. Some of these activities or processes differ in their details among life stages. However, grouping activities or processes across all life stages into broad types makes it easier to compare the individual life stages to each other across the entire life cycle. Table 2 lists the nine critical biological activities and processes and their distribution across life stages.

Table 2.—Distribution of WYBA critical biological activities and processes among life stages
(Xs indicate that the critical biological activity or process is applicable to that life stage.)

Life stage ➔ **Critical biological activity or process 🡻**	**Pup**	**Juvenile**	**Breeding adult**
Chemical stress	**X**	**X**	**X**
Disease	**X**	**X**	**X**
Eating	**X**		
Foraging		**X**	**X**
Mechanical stress		**X**	**X**
Predation	**X**	**X**	**X**
Roost attendance			**X**
Roost site selection			**X**
Thermal stress	**X**	**X**	**X**

The basic sources of information used to identify the critical biological activities and processes are Kurta and Lehr (1995), Miner and Stokes (2005), Williams et al. (2006), Kunz and Fenton (2003), Lacki et al. (2007), and Cryan and Veilleux (2007). The identification also integrates information from both older and more recent works as well as the expert knowledge of LCR MSCP bat biologists. The following paragraphs discuss the nine critical biological activities and processes in alphabetical order.

CHEMICAL STRESS

WYBA in every life stage are vulnerable to stress and mortality due to exposure to harmful chemicals, including pesticides/herbicides used in agriculture. Environmental contaminants are known to have negative impacts on bat populations due to the bioaccumulation of these chemicals (O'Shea and Clark, Jr. 2002). WYBA in the juvenile and breeding life stages are especially at risk of poisoning from insecticides because of their diet, high metabolic rates, high food intake, and high rates of fat mobilization during migration, hibernation, and lactation (Clark et al. 1988). Pups may suffer mortality by direct exposure to chemicals such as pesticides/herbicides if maternal roosts are located within an agricultural matrix. Additionally, pesticides/herbicides ingested by the mother are mobilized during lactation and transferred into the milk, and the pups can die as a result (Geluso et al. 1981). Pesticide/herbicide use in foraging areas may affect WYBA due to a loss or change in the insect prey base, but these effects are unknown. The effects of pesticides/herbicides would be most prominent in roost sites close to agricultural lands and areas where pesticide/herbicide use is common (Pierson et al. 2006).

DISEASE

The prevalence of disease as a source of bat mortality is poorly known for most species and is difficult to separate from other causes of mortality (Messenger et al. 2003). However, rabies has been suspected as a cause of high mortality in some bat species (Constantine 1967). In addition to concerns of direct mortality from disease, the fact that bats harbor strains of rabies and possibly other viruses affecting humans makes them a human health hazard and thus a potential target for extermination efforts (Fenton 1997).

EATING

This process only applies to the pup life stage because pups must eat to stay alive and develop but do not actively forage within their environment in the same way as the juveniles and adults. A pup's ability to eat is determined by the foraging and provisioning rate of its mother. Some elements, such as siblings, number of pups in the roost, and genetic diversity, are not traditionally considered aspects of habitat but are included in this section because of their effects on critical biological activities and processes.

FORAGING

WYBA are insectivores and appear to select prey by size rather than taxonomic group (e.g., in contrast to bats that are moth specialists). A fecal analysis performed by O'Farell et al. (2004) identified the following insect orders as WYBA prey: Coleoptera (beetles), Diptera (flies), Hemiptera (cicadas and leaf hoppers), Lepidoptera (moths), and Orthoptera (crickets and grasshoppers). Foraging is done by juveniles and breeding adults, but it is important to note that foraging by the parents affects the provisioning rate to pups and roost attendance by adults.

In a study of riparian habitat use by bats in southern Nevada, Williams et al. (2006) found that WYBA were most active (foraging) in riparian woodland habitat compared to other habitat types (riparian marsh, mesquite bosque, and riparian shrubland). This riparian habitat was dominated by palm (*Washingtonia* sp.) trees. In a study conducted along a stretch of the LCR from southwestern Arizona to southeastern California, Vizcarra et al. (2010) found a high probability of WYBA use in cottonwood-willow (*Populus fremontii*, *Salix* sp.) habitat.

MECHANICAL STRESS

The primary source of mechanical stress on WYBA juveniles and breeding adults considered here is collisions with wind energy facilities. Bat fatalities related to wind energy facilities have been on the rise for the past 30 years (Hayes 2013). While wind energy facilities are not currently located along the LCR, mortality from wind energy facilities in areas where WYBA may migrate to and from have been recorded (Kunz et al. 2007).

PREDATION

Little specific information is available on WYBA predators. The WYBA's preference for palm trees as roost habitat puts them in closer proximity to humans; therefore, domestic dogs (*Canis lupis*) and cats (*Felis catus)* are major predators of this species (Kurta and Lehr 1995). Woodpeckers (Picidae) and raccoons (*Procyon lotor*) have been observed disturbing other tree-roosting bat species at their roosting sites (Sparks et al. 2003). Since jays (Corvidae), raccoons, and opossums (*Didelphis virginianus*) also thrive in human-dominated settings, it is likely that predation from these species is higher when roost sites are close to these areas.

Predation risk may impact a number of aspects of bat behavior, including roost site selection, the nature of sleep and torpor, evening roost departures, and landscape-related movement patterns (Lima and O'Keefe 2013).

ROOST ATTENDANCE

Adequate maternal roost attendance is important for successful reproduction. Female WYBA are solely responsible for feeding of the young. Lactating females attend the roost, and this affects the survival of pups.

ROOST SITE SELECTION

WYBA preferentially roost in the skirt of dead fronds of native and non-native palm trees (Kurta and Lehr 1995; Mirowsky 1997). In a study of bat roost site habitat conducted at the LCR, WYBA were documented to use Mexican fan palms (*Washingtonia robusta*) almost exclusively and did not exhibit roost-switching behavior. Roost locations were consistently found to be in dead frond skirts below the live crowns of trees (Diamond 2012). Higginbotham et al. (1999) cite examples of studies in which WYBA are found roosting in cottonwood forests.

Roost site selection by breeding females is important for reproductive success. Roost success varies spatially as a result of food availability, hydrology, predator types and densities, vegetation characteristics, and other factors (Kunz and Lumsden 2003).

THERMAL STRESS

The costs associated with thermoregulation influence the energy available for growth and reproduction of WYBA in all life stages (Barclay and Harder 2003). While not documented in WYBA, extremes in cold and heat are known to be causes of mortality in other bat species and should be considered a threat. Although lasiurines are capable of withstanding freezing temperatures for short periods (< 1 month) (Cryan and Veilleux 2007), WYBA may be especially vulnerable, as they are relatively exposed in their forest roosts. Pups may be particularly susceptible to temperature extremes. Jones et al. (2009) provide evidence of the effects of extreme cold and heat on various bat species, including a massive die off of bat pups documented in Australia in 2006. Similarly, extreme heat was responsible for a massive die off of over 3,500 individuals of a mixed-species colony in New South Wales in 2002. Thermal stress may affect WYBA in different life stages and reproductive statuses differentially.

Chapter 4 – Habitat Elements

Habitat elements consist of specific habitat conditions that ensure, allow, or interfere with critical biological activities and processes. These elements consist of anything in the environment from the perspective of the individual and thus should not be restricted to a traditional definition. For example, number of pups is a habitat element that may affect an individual pup.

This chapter identifies 12 habitat elements that affect 1 or more critical biological activities or processes across the 3 WYBA life stages. Some of these habitat elements differ in their details among life stages. Table 3 lists the 12 habitat elements and the 9 critical biological activities and processes that they *directly* affect across all WYBA life stages.

Table 3.—Distribution of WYBA habitat elements and the critical biological activities and processes they directly affect across all life stages
(Xs indicate that the habitat element is applicable to that critical activity or process.)

Critical activity or process ➔ **Habitat element 🡻**	**Chemical stress**	**Disease**	**Eating**	**Foraging**	**Mechanical stress**	**Predation**	**Roost attendance**	**Roost site selection**	**Thermal stress**
Anthropogenic disturbance				X			X		
Canopy closure							X	X	X
Food availability				X				X	
Genetic diversity and infectious agents		X							
Matrix community	X			X	X			X	
Number of pups				X			X		
Parent roost attendance			X						
Patch size				X		X		X	
Predator density				X		X		X	
Temperature								X	X
Tree species composition				X				X	
Water availability								X	

The diagrams and other references to habitat elements elsewhere in this document identify the habitat elements by a one-to-three-word short name. However, each short name in fact refers to a longer, complete name. For example, the habitat element "patch size" is the short name for "the size of riparian habitat patches." The following paragraphs provide the full name for each habitat element and a detailed definition, addressing the elements in alphabetical order. As with all tabulations of habitat associations, inferences that particular habitat characteristics are critical to a species or life stage require evidence and CEMs for why each association matters to species' viability (Rosenfeld 2003; Rosenfeld and Hatfield 2006.)

ANTHROPOGENIC DISTURBANCE

Full name: **Human activity within or surrounding a given habitat patch, including noise, pollution, and other disturbances associated with human activity**. This element refers to the existence and level of human disturbance near WYBA roosting habitat. The disturbance of roost sites may be a cause for bat decline along the LCR in areas that are near development and/or areas that receive varying levels of human use. The cosmetic pruning of palm trees in particular is a major threat to roosting WYBA (Miner and Stokes 2005; Reclamation 2008). Human talking and walking around roost sites does not appear to substantially disturb bats, but any attempt to handle them may (Constantine 1959).

CANOPY CLOSURE

Full name: **The density of foliage in the overstory**. This element refers to the percent cover of canopy vegetation in the vicinity of a WYBA roost site. Since few observations have been made of WYBA roosting in native riparian habitat, it is difficult to assess the exact requirements of canopy closure for roosting WYBA in this habitat type. WYBA are more commonly found roosting in native and non-native palm trees where an extensive cover of dead palm fronds exists below the live foliage of the tree (Kurta and Lehr 1995; Mirowsky 1997; Diamond 2012). In a study of WYBA roost habitat along the LCR, Diamond (2012) estimates the percent of dead crown cover in WYBA roosting trees (Mexican fan palms) at approximately 40 percent. Reduced canopy closure may affect the availability of appropriate roosts, which could increase energetic demands or displace bats to areas with increased competition for food and roosts (Ormsbee et al. 2007).

FOOD AVAILABILITY

Full name: **The abundance of food available for adults and their young**. This element refers to the taxonomic and size composition of the invertebrates that an individual WYBA will encounter during the juvenile and adult stages as well as the density and spatial distribution of the food supply near the roost location. The abundance and condition of the food supply affects adult health as well as the growth and development of the young during the pup and juvenile stages. Although pups rely on the mother for nutrition, food availability still affects the foraging behavior and success of the mother and therefore indirectly affects the survival of the pup.

GENETIC DIVERSITY AND INFECTIOUS AGENTS

Full name: **The genetic diversity of WYBA individuals and the types, abundance, and distribution of infectious agents and their vectors**. The genetic diversity component of this element refers to the genetic homogeneity versus heterogeneity of a population during each life stage. The greater the heterogeneity, the greater the possibility that individuals of a given life stage will have genetically encoded abilities to survive their encounters with the diverse stresses presented by their environment and/or take advantage of the opportunities presented. The infectious agent component of this element refers to the spectrum of viruses, bacteria, fungi, and parasites that individual WYBA are likely to encounter during each life stage.

MATRIX COMMUNITY

Full name: **The type of habitat surrounding habitat patches used by WYBA**. This element refers to the types of plant communities and land use activities surrounding the habitat patches used by WYBA. For example, adjacent agricultural landscapes may have elevated pesticide/herbicide loads, which may affect foraging and survival of adult and juvenile WYBA. Williams (2005) notes that WYBA are known to roost in date palm (*Phoenix dactylifera*) and other orchards. Orchards, in particular, can be a significant source of pesticide/herbicide contamination of prey consumed by WYBA. The proximity to development and the planting of non-native palm trees has likely aided in the northern expansion of WYBA populations and provides important roost habitat for the species (Williams et al. 2006).

NUMBER OF PUPS

Full name: **The number of pups in a roost**. This element refers to the number of pups that a mother must rear. Lasiurine bats are unusual in that they typically produce more than 1 pup (average 2.3) per year (LaVal and LaVal 1979). WYBA are known to have from one to four pups per year (Kurta and Lehr 1995). The number of pups in a roost is related to maternal health, and the well-being of the mother depends in part on the availability of sufficient food resources in close proximity to the roost as well as other factors such as predator density.

PARENT ROOST ATTENDANCE

Full name: **The ability of a mother to care for young during the pup stage**. This element refers to the capacity of a mother to tend to the young. It is affected by the presence of predators, food availability, and the ability to thermoregulate.

PATCH SIZE

Full name: **The size of riparian habitat patches**. This element refers to the areal extent of a given patch of riparian vegetation. Native riparian vegetation along the LCR has been reduced by 94 percent, and prior to the LCR MSCP, the remaining riparian habitat was scattered in patches less than 4 hectares in size (Calvert and Neiswenter 2012). No studies are available that address the effect of patch size on WYBA activity or survival; however, it is assumed to be an important factor, as it is for the western red bat (*L. blossevillii)*.

PREDATOR DENSITY

Full name: **The abundance and distribution of predators that affect WYBA during the pup, juvenile, and breeding adult stages**. This element refers to a set of closely related variables that affect the likelihood that different kinds of predators will encounter and successfully prey on WYBA during all life stages. The variables of this element include the species and size of the fauna that prey on WYBA during different life stages, the density and spatial distribution of these fauna in the habitat used by WYBA, and whether predator activity may vary in relation to other factors (e.g., time of day, patch size and width, matrix community type, etc.).

TEMPERATURE

Full name: **The mean temperature in a habitat patch or roost site**. This element refers to the average temperature in the roosting habitat. Thermal regulation is necessary for survival of WYBA in all life stages. Tree-roosting bats, in general, are more exposed to temperature fluctuations than cave- and mine- dwelling bats. They may hibernate or migrate to the southern part of their range in winter (O'Farell et al. 2004). Extreme temperatures in the LCR region in the summer may kill pups or roosting adult WYBA.

TREE SPECIES COMPOSITION

Full name: **The composition of tree species in a plant community**. This element refers to the tree composition of a plant community where WYBA are active. WYBA have been found to be more active (foraging) in riparian habitat compared to other natural habitat types (Williams et al. 2006), but they tend to preferentially roost in native and non-native palm trees (Kurta and Lehr 1995; Mirowsky 1997). Williams (2005) notes that WYBA are known to roost in date palm and other orchards. Pierson et al. (2006) list concerns over orchards being a population sink for tree-roosting bat species. In a study of bat roost site habitat conducted along the LCR, WYBA were documented to roost in Mexican fan palms almost exclusively (Diamond 2012). Higginbotham et al. (1999) cite examples of studies in which WYBA are found roosting in cottonwood forests.

WATER AVAILABILITY

Full name: **The availability of water, including groundwater and the distance to standing water, or the presence of adjacent water bodies**. This element refers to the presence of water near roost sites, particularly in the summer breeding season. The proximity of open water and wetlands to appropriate roost habitat may be an important landscape-scale factor for WYBA roost site selection. This element affects WYBA indirectly by affecting the availability of prey as well as the availability of roosting habitat (Hagen and Sabo 2012). Groundwater declines have been linked to changes in the riparian vegetation community, with declines in cottonwood and willow species and increases in non-native tamarisk (*Tamarix* spp.) (Stromberg 1998).

Chapter 5 – Controlling Factors

Controlling factors consist of environmental conditions and dynamics, both natural and anthropogenic, which significantly affect the abundance, spatial and temporal distributions, and quality of critical habitat elements. They may also significantly directly affect some critical biological activities and processes. A hierarchy of such factors exists, with long-term dynamics of climate and geology at the top. However, this CEM focuses on nine immediate controlling factors that are within the scope of potential human manipulation. The nine controlling factors identified in this CEM do not constitute individual variables; rather, each identifies a category of variables (including human activities) that share specific features that make it useful to treat them together. Table 4 lists the nine controlling factors and the habitat elements they directly affect.

Table 4.—Habitat elements directly affected by controlling factors

Controlling factor ➔ **Habitat element ⬇**	**Fire management**	**Grazing**	**Habitat restoration**	**Nuisance species introduction and management**	**Pesticide/herbicide application**	**Tree pruning**	**Tree thinning**	**Water storage-delivery system design and operation**	**Wind energy development**
Anthropogenic disturbance	N/A*								
Canopy closure	X		X			X	X		
Food availability					X				
Genetic diversity and infectious agents	N/A*								
Matrix community			X						X
Number of pups	N/A*								
Parent roost attendance						X			
Patch size	X	X	X						
Predator density	N/A*								
Temperature	N/A*								
Tree species composition	X	X	X	X			X		
Water availability								X	

* N/A values suggest that none of the identified controlling factors *directly* affect the habitat element.

FIRE MANAGEMENT

This factor addresses any fire management (whether prescribed fire or fire suppression) that may occur along the LCR that could affect WYBA or their habitat. Effects may include the creation of habitat that supports or excludes WYBA, a reduction in the food supply of invertebrates, or support of species that pose threats to WYBA such as predators, competitors, or carriers of infectious agents. Although typically not a major threat in most riparian habitats, fire has been shown to affect WYBA roosting habitat along the LCR by facilitating the replacement of large cottonwood trees by non-native species such as tamarisk (*Tamarix ramosissima*) and arrowweed (*Tessaria sericea*) (Busch 1995). Fire could affect WYBA roosting sites if it carries into the dead frond skirts preferred as roosting habitat.

Climate change is also projected to affect fire frequency along the LCR (U.S. Fish and Wildlife Service 2013).

GRAZING

This factor addresses the grazing activity on habitats along the LCR and in surrounding areas that could affect WYBA or their habitat. Grazing may thin the understory or even prevent the establishment of cottonwood and willow seedlings (Kauffman et al. 1997). This factor includes grazing by wild, domesticated, and feral animals. Currently, grazing is minimal in LCR MSCP restoration sites. (Note: Reclamation staff and researchers have observed mule deer (*Odocoileus hemionus)* browsing on LCR sites, which may become an issue if populations are not managed).

HABITAT RESTORATION

This factor addresses the active program to restore cottonwood-willow riparian habitat along the LCR and includes both the community planted as well as the manner in which it is planted within restoration areas (e.g., density, age, and patch size). It also includes avoiding the removal of native palm trees to maintain roost habitat for WYBA.

NUISANCE SPECIES INTRODUCTION AND MANAGEMENT

This factor addresses the intentional or unintentional introduction of nuisance species (animals and plants) and their control that affects WYBA survival and reproduction. A nuisance species may infect, prey on, compete with, or present alternative food resources for WYBA during one or more life stages, cause other alterations to the riparian food web that affect WYBA, or affect physical habitat features such as canopy or shrub cover.

PESTICIDE/HERBICIDE APPLICATION

This factor addresses biocide applications that may occur on or adjacent to WYBA habitat in the LCR region. Environmental contaminants are known to have negative impacts on bat populations due to the bioaccumulation of these chemicals (O'Shea and Clark, Jr. 2002). WYBA in the juvenile and breeding life stages are especially at risk of poisoning from insecticides because of their diet, high metabolic rates, high food intake, and high rates of fat mobilization during migration, hibernation, and lactation (Clark et al. 1988). Pierson et al. (2006) suggest that if there are negative impacts of agricultural pesticides/herbicides on tree-roosting bats either directly (mortality or reduced fecundity) or indirectly (through reduction in prey base), then orchards may be a population sink.

TREE PRUNING

This factor addresses the removal of vegetation (live and dead), mostly for cosmetic purposes, from individual native and non-native palm trees within the LCR region by mechanical means. WYBA only roost in the ring of dead fronds that encircle the live foliage on palm trees (Mirowsky 1997). Effects may include destruction of WYBA roosting habitat and/or direct mortality of adult and immature WYBA during pruning activities.

TREE THINNING

This factor addresses the removal of trees from areas within the LCR region by either mechanical or natural means. Effects may include the creation of habitat that supports or excludes WYBA or support of species that pose threats to WYBA such as predators, competitors, or carriers of infectious agents. This factor includes the thinning of vegetation within both riparian and matrix communities.

WATER STORAGE-DELIVERY SYSTEM DESIGN AND OPERATION

This factor addresses the volume and spatial and temporal variation of flow in the LCR. The LCR consists of a chain of reservoirs separated by flowing reaches. The water moving through this system is highly regulated for storage and delivery (diversion) to numerous international, Federal, State, Tribal, and municipal users and for hydropower generation. The dynamic nature of a free-flowing river creates a mosaic of riparian habitats, and thus, a natural flow regime may be beneficial to WYBA.

WIND ENERGY DEVELOPMENT

This factor addresses the development of wind energy facilities near foraging areas and migratory routes of WYBA. While there are currently no wind turbines located along the LCR, it is likely that bats foraging near active wind turbines, including WYBA migrating to and from the LCR, could be killed. Lasiurines tend to be disproportionately affected by these facilities (Arnett 2005; Kunz et al. 2007; Hayes 2013).

Chapter 6 – Conceptual Ecological Model by Life Stage

This chapter contains three sections, each presenting the CEM for a single WYBA life stage. The text and diagrams identify the critical biological activities and processes for each life stage, the habitat elements that support or limit the success of these critical biological activities and processes, the controlling factors that determine the abundance and quality of these habitat elements, and the causal links among them. The CEM sections specifically refer to the river and lakes of the LCR and other protected areas managed as WYBA habitat and thus address this landscape as a whole rather than any single reach or managed area.

The CEM for each life stage assesses the character and direction, magnitude, predictability, and scientific understanding of each causal link based on the following definitions (see attachment 1 for further details):

- **Character and direction** categorizes a causal relationship as positive, negative, or complex. "Positive" means that an increase in the causal node results in an increase in the affected node, while a decrease in the causal node results in a decrease in the affected node. "Negative" means that an increase in the causal node results in a decrease in the affected element, while a decrease in the causal node results in an increase in the affected node. Thus, "positive" or "negative" here do ***not*** mean that a relationship is beneficial or detrimental. The terms instead provide information analogous to the sign of a correlation coefficient. "Complex" means that there is more going on than a simple positive or negative relationship. Positive and negative relationships are further categorized based on whether they involve any response threshold in which the causal agent must cross some value before producing an effect. In addition, the "character and direction" attribute categorizes a causal relationship as uni- or bi-directional. Bi-directional relationships involve a reciprocal relationship in which each node affects the other.

- **Magnitude** refers to "…the degree to which a linkage controls the outcome *relative to other drivers*" (DiGennaro et al. 2012). Magnitude takes into account the spatial and temporal scale of the causal relationship as well as the strength (intensity) of the relationship at any single place and time. The present methodology separately rates the intensity, spatial scale, and temporal scale of each link on a three-part scale from "Low" to "High" and assesses overall link magnitude by averaging the ratings for these three. If it is not possible to estimate the intensity, spatial scale, or temporal scale of a link, the subattribute is rated as "Unknown" and ignored in the averaging. If all three subattributes are "Unknown," however, the overall link magnitude is rated as "Unknown." Just as the terms for link character provide information analogous to the sign of a correlation coefficient, the terms for link magnitude provide information analogous to the size of a correlation coefficient.

- **Predictability** refers to "…the degree to which current understanding of the system can be used to predict the role of the driver in influencing the outcome. Predictability … captures variability… [and recognizes that] effects may vary so much that properly measuring and statistically characterizing inputs to the model are difficult" (DiGennaro et al. 2012). A causal relationship may be unpredictable because of natural variability in the system or because its effects depend on the interaction of other factors with independent sources for their own variability. Just as the terms for link character provide information analogous to the sign of a correlation coefficient, the terms for link predictability provide information analogous to the size of the range of error for a correlation coefficient. The present methodology rates the predictability of each link on a three-part scale from "Low" to "High." If it is not possible to rate predictability due to a lack of information, then the link is given a rating of "Unknown" for predictability.

- **Scientific understanding** refers to the degree of agreement represented in the scientific literature and among experts in understanding how each causal relationship works—its character, magnitude, and predictability. Link predictability and understanding are independent attributes. A link may be highly predictable but poorly understood or poorly predictable but well understood. The present methodology rates the state of scientific understanding of each link on a three-part scale from "Low" to "High."

The CEM for each life stage thus identifies the causal relationships that most strongly support or limit life-stage outcomes, support or limit the rate of each critical biological activity or process, and support or limit the quality of each habitat element, as that element affects other habitat elements or affects critical biological activities or processes.

A separate spreadsheet is used to record the assessment of the character and direction, magnitude, predictability, and scientific understanding for each causal link along with the underlying rationale and citations for each life stage. The CEM for each life stage, as cataloged in its spreadsheet, is illustrated with diagrams showing the controlling factors, habitat elements, critical biological activities and processes, and causal links identified for that life stage. A diagram may also visually display information on the character and direction, magnitude, predictability, and/or scientific understanding of every link. The diagrams use a common set of conventions for identifying the controlling factors, habitat elements, critical biological activities and processes, and life-stage outcomes as well as for displaying information about the causal links. Figure 2 illustrates these conventions.

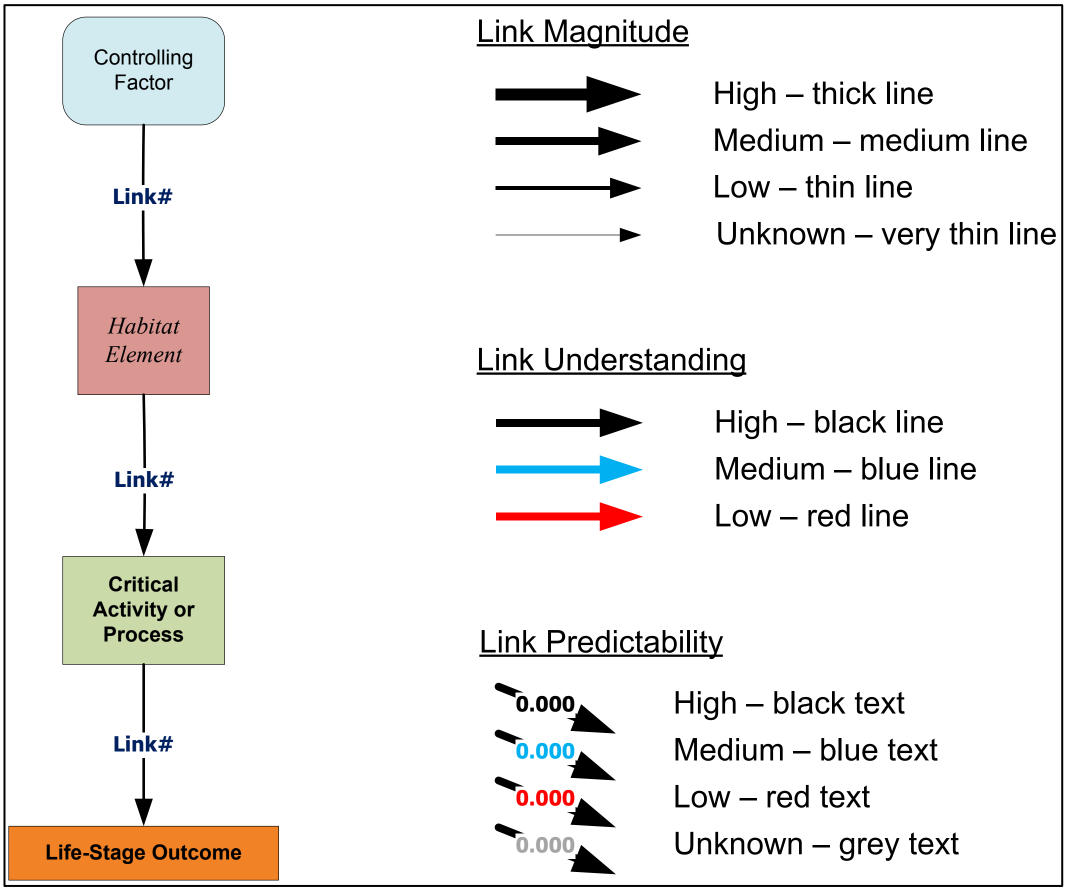

Figure 2.—Diagram conventions for LCR MSCP conceptual ecological models.

The discussion of each life stage includes an analysis of the information contained in the spreadsheet. The analyses highlight causal chains that strongly affect survivorship, identify important causal relationships with different levels of predictability, and identify important causal relationships with high scientific uncertainty. The latter constitutes topics of potential importance for adaptive management investigation.

The causal relationships between controlling factors and habitat elements are essentially identical across all three life stages. For this reason, the discussion of controlling factor-habitat element linkages across all three life stages appears in a subsequent chapter.

WYBA LIFE STAGE 1 – PUP

We consider the pup stage to be the first stage in the life cycle of WYBA. It begins when a pup is born and ends when it has fledged and becomes independent from the mother. Success during this life stage – successful transition to the next stage – involves pup survival, maturation, and flight.

The CEM (figures 3 and 4) recognizes five (of nine) critical biological activities and processes for this life stage, ordered as they appear on the following figures:

1. **Chemical Stress** – Pups may suffer mortality by direct exposure to chemicals such as pesticides/herbicides if maternal roosts are located within an agricultural matrix. Additionally, pesticides/herbicides ingested by the mother are mobilized during lactation and transferred into the milk, and the pups can die as a result (Geluso et al. 1981). There is no literature on the effects of chemical stress on WYBA in LCR open environments, although the impacts have been identified as a topic of concern.

   The CEM identifies the matrix community surrounding a roost site as a secondary habitat element affecting chemical stress.

2. **Disease** – Although the literature does not emphasize disease as affecting population levels of WYBA, we believe that disease bears mentioning. It has been recommended as an area for further research for bat species in general (Messenger et al. 2003).

   The CEM recognizes genetic diversity and infectious agents as a secondary habitat element affecting disease.

3. **Eating** – The pup must eat in order to maintain metabolic processes.

   The CEM recognizes the number of pups and parent roost attendance as secondary habitat elements affecting disease.

4. **Predation** – Predation may affect the survival of pups. Tree-roosting bat species are particularly susceptible to roost predation, although nothing is known about how great a threat predation poses to WYBA along the LCR.

   The CEM recognizes patch size and predator density as secondary habitat elements affecting predation.

5. **Thermal Stres***s* – Pup growth and survival depends on maintaining an optimum temperature.

   The CEM recognizes canopy closure, parent roost attendance, and temperature as secondary habitat elements affecting thermal stress.

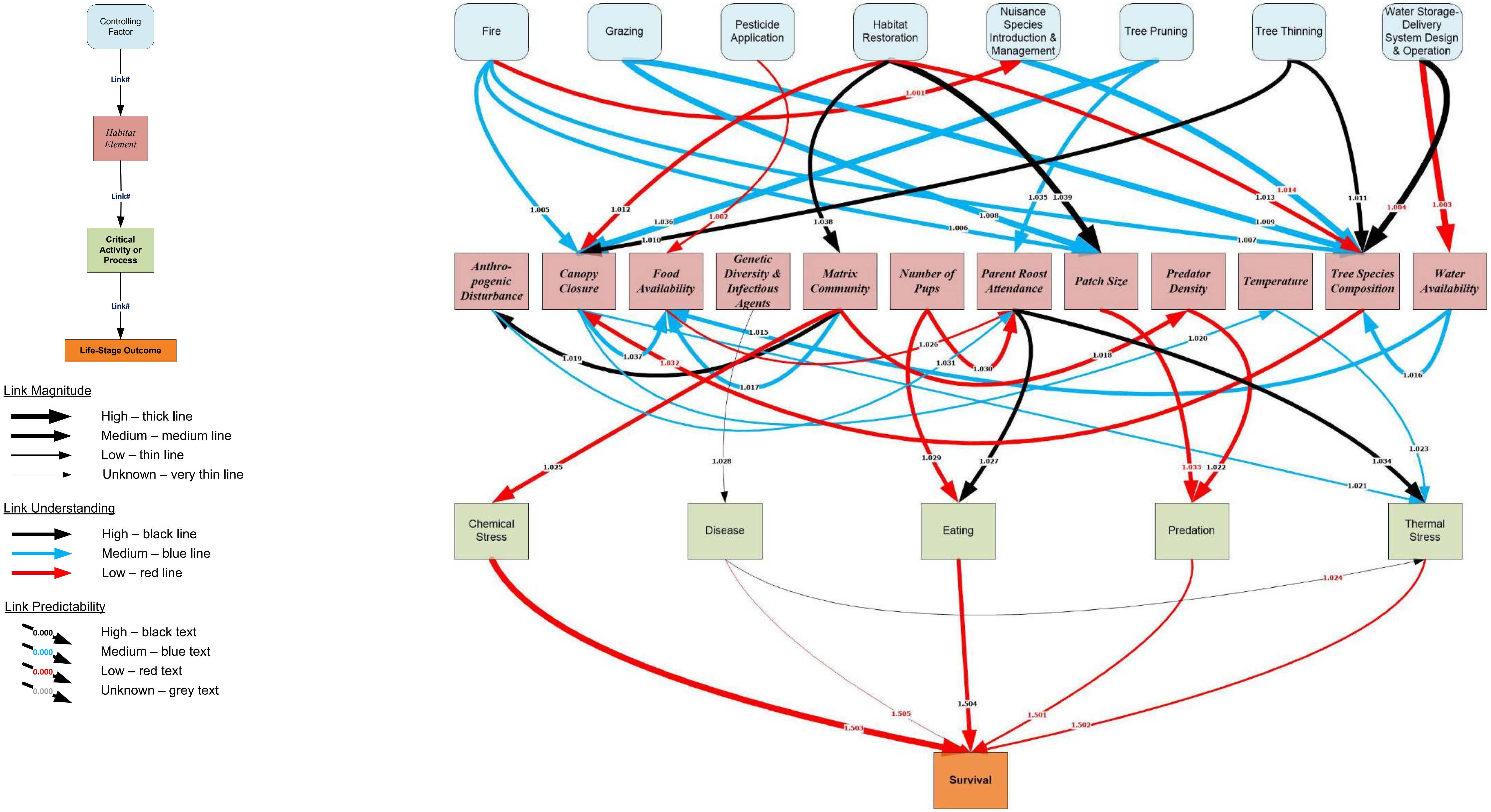

Figure 3.—WYBA life stage 1 – pup, basic CEM diagram showing the relevant controlling factors, habitat elements, and critical biological activities and processes at this life stage.

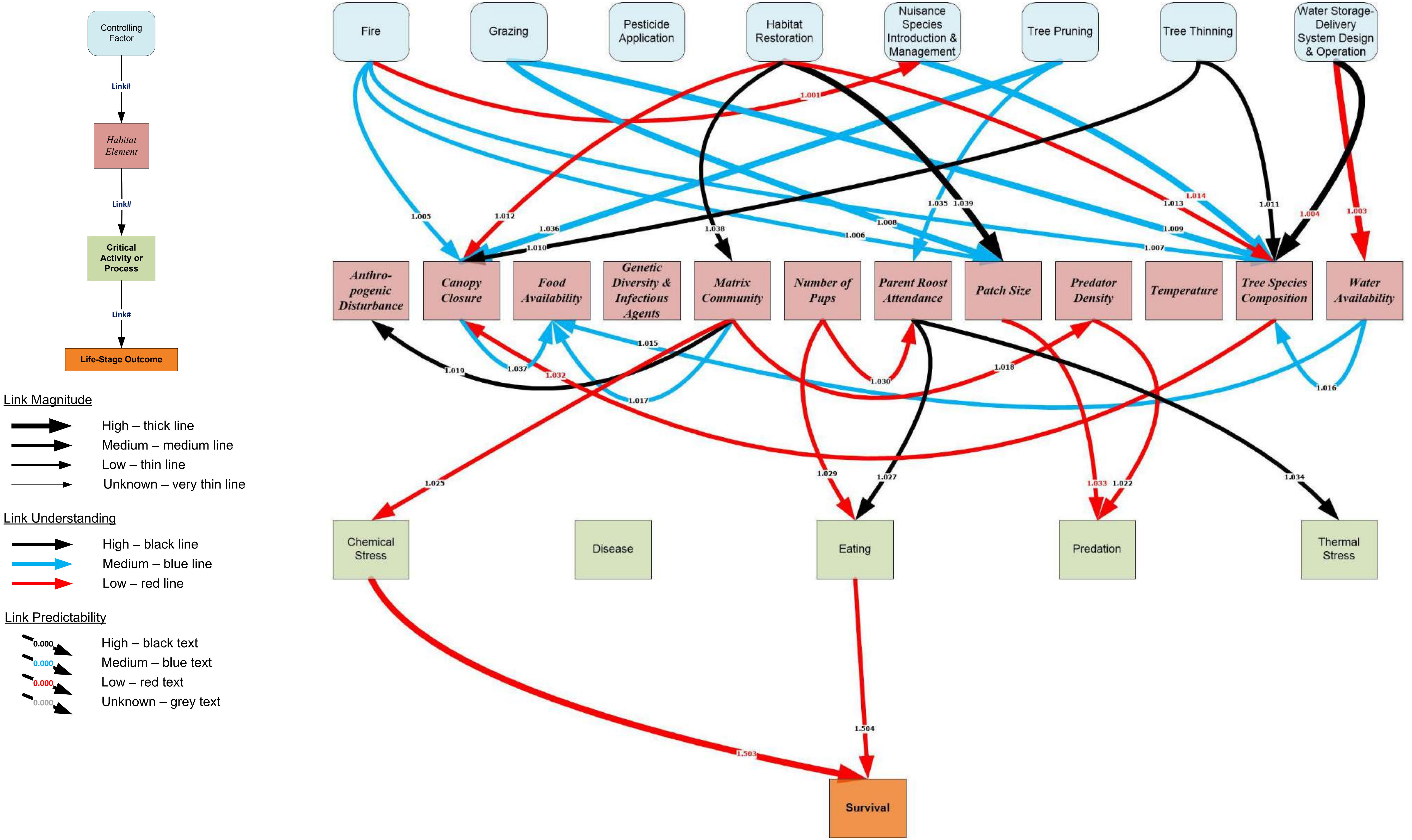

Figure 4.—WYBA life stage 1 – pup, high- and medium-magnitude relationships, showing the relevant controlling factors, habitat elements, and critical biological activities and processes at this life stage.

WYBA LIFE STAGE 2 – JUVENILE

The juvenile life stage begins when a pup has fledged and becomes independent from the mother and ends when the individual reaches sexual maturity. Success during this life stage – successful transition to the next stage – involves organism survival and maturation.

The CEM (figures 5 and 6) recognizes six (of nine) critical biological activities and processes for this life stage, ordered as they appear on the following figures:

1. **Chemical Stress** – Environmental contaminants are known to have negative impacts on bat populations due to the bioaccumulation of these chemicals (O'Shea and Clark, Jr. 2002). WYBA in the juvenile and breeding life stages are especially at risk of poisoning from insecticides because of their diet, high metabolic rates, high food intake, and high rates of fat mobilization during migration, hibernation, and lactation (Clark et al. 1988). There is no literature on the effects of chemical stress on WYBA in LCR open environments, although the impacts have been identified as a topic of concern.

   Additionally, pesticide/herbicide use in foraging areas may affect WYBA due to a loss or change in the insect prey base, but these effects are unknown. The effects of pesticides/herbicides would be most prominent in roost sites close to orchards and other agricultural lands (Pierson et al. 2006).

   The CEM identifies the matrix community surrounding a roost site as a secondary habitat element affecting chemical stress.

2. **Disease** – Although the literature does not emphasize disease as affecting population levels of WYBA, we believe that disease bears mentioning. It has been recommended as an area for further research for bat species in general (Messenger et al. 2003).

   The CEM recognizes genetic diversity and infectious agents as a secondary habitat element affecting disease.

3. **Foraging** – Juvenile WYBA must forage effectively to feed themselves and maintain metabolic processes.

   The CEM recognizes anthropogenic disturbance, food availability, the matrix community, patch size, predator density, and tree species composition as secondary habitat elements affecting foraging.

4. **Mechanical Stress** – The primary source of mechanical stress on WYBA juveniles considered here is collisions with wind energy facilities. While there are currently no wind turbines located along the LCR, it is likely that bats foraging near active wind turbines, including WYBA migrating to and from the LCR, could be killed. Lasiurines tend to be disproportionately affected by these facilities (Arnett 2005; Kunz et al. 2007; Hayes 2013).

   The CEM recognizes the matrix community as a secondary habitat element affecting mechanical stress.

5. **Predation** – Predation may affect the survival of juvenile WYBA. Tree-roosting bat species are particularly susceptible to predation because of their exposed roosts, although little is known about how great a threat predation poses to WYBA along the LCR.

   The CEM recognizes patch size and predator density as secondary habitat elements affecting predation.

6. **Thermal Stress** – Juvenile growth and survival depend on maintaining an optimum temperature.

   The CEM recognizes canopy closure and temperature as secondary habitat elements affecting thermal stress.

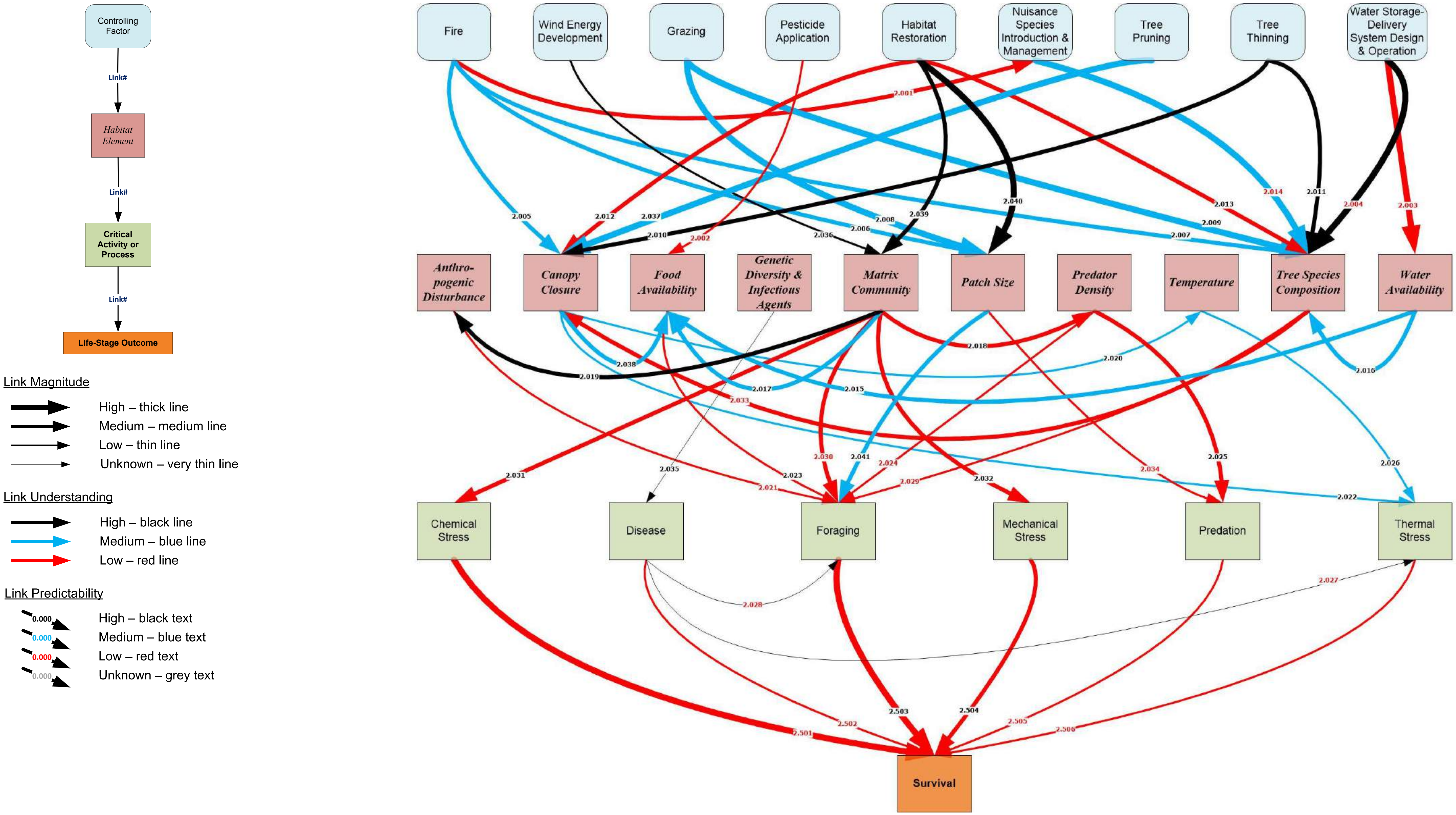

Figure 5.—WYBA life stage 2 – juvenile, basic CEM diagram showing the relevant controlling factors, habitat elements and critical biological activities and processes at this life stage.

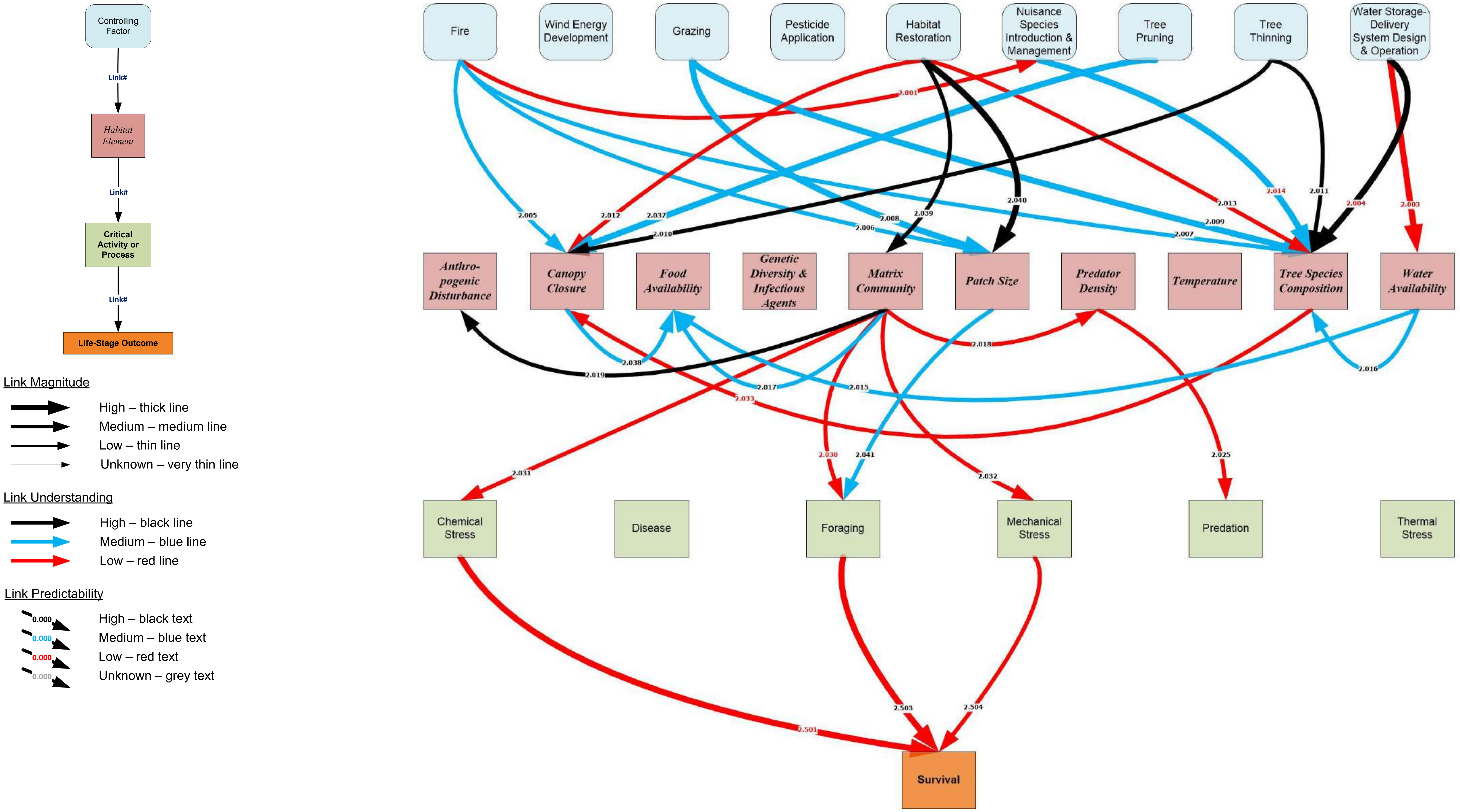

Figure 6.—WYBA life stage 2 – juvenile, high- and medium-magnitude relationships showing the relevant controlling factors, habitat elements, and critical biological processes at this life stage.

WYBA STAGE 3 – BREEDING ADULT

The breeding adult life stage begins when a bat reaches sexual maturity and ends when it stops reproducing. Success during this life stage involves organism survival and breeding.

The CEM (figures 7 and 8) recognizes eight (of nine) critical biological activities and processes for this life stage, ordered as they appear on the following figures:

1. **Chemical Stress** – Environmental contaminants are known to have negative impacts on bat populations due to the bioaccumulation of these chemicals (O'Shea and Clark, Jr. 2002). WYBA in the juvenile and breeding life stages are especially at risk of poisoning from insecticides because of their diet, high metabolic rates, high food intake, and high rates of fat mobilization during migration, hibernation, and lactation (Clark et al. 1988). There is no literature on the effects of chemical stress on WYBA in LCR open environments, although the impacts have been identified as a topic of concern.

   Additionally, pesticide/herbicide use in foraging areas may affect WYBA due to a loss or change in the insect prey base, but these effects are unknown. The effects of pesticides/herbicides would be most prominent in roost sites close to orchards and other agricultural lands (Pierson et al. 2006).

   The CEM identifies the matrix community surrounding a roost site as a secondary habitat element affecting chemical stress.

2. **Disease** – Although the literature does not emphasize disease as affecting population levels of WYBA, we believe that disease bears mentioning. It has been recommended as an area for further research for bat species in general (Messenger et al. 2003).

   The CEM recognizes genetic diversity and infectious agents as a secondary habitat element affecting disease.

3. **Foraging** – Adult WYBA must forage effectively to feed themselves and their young.

   The CEM recognizes anthropogenic disturbance, food availability, the number of pups, the matrix community, patch size, predator density, and tree species composition as secondary habitat elements affecting foraging.

4. **Mechanical Stress** – The primary source of mechanical stress on WYBA adults considered here is that of collisions with wind energy facilities. While there are currently no wind turbines located along the LCR, it is likely that bats foraging near active wind turbines, including WYBA migrating to and from the LCR, could be killed. Lasiurines tend to be disproportionately affected by these facilities (Arnett 2005; Kunz et al. 2007; Hayes 2013).

   The CEM recognizes the matrix community as a secondary habitat element affecting mechanical stress.

5. **Roost Site Selection** – This process involves roost site selection by breeding females and is important for reproductive success.

   The CEM recognizes anthropogenic disturbance, canopy closure, the matrix community, patch size, temperature, tree species composition, and water availability as secondary habitat elements affecting roost site selection.

6. **Predation** – Predation may affect the survival of adult WYBA. Tree-roosting bat species are particularly susceptible to predation because of their exposed roosts, although nothing is known about how great a threat predation poses to WYBA along the LCR.

   The CEM recognizes patch size and predator density as secondary habitat elements affecting predation.

7. **Thermal Stress** – Breeding adult survival depends on maintaining an optimum temperature.

   The CEM recognizes canopy closure and temperature as secondary habitat elements affecting thermal stress.

8. **Roost Attendance** – Breeding adults must attend to the roost to protect and feed the young.

   The CEM recognizes the number of pups in the roost as a secondary habitat element affecting roost attendance.

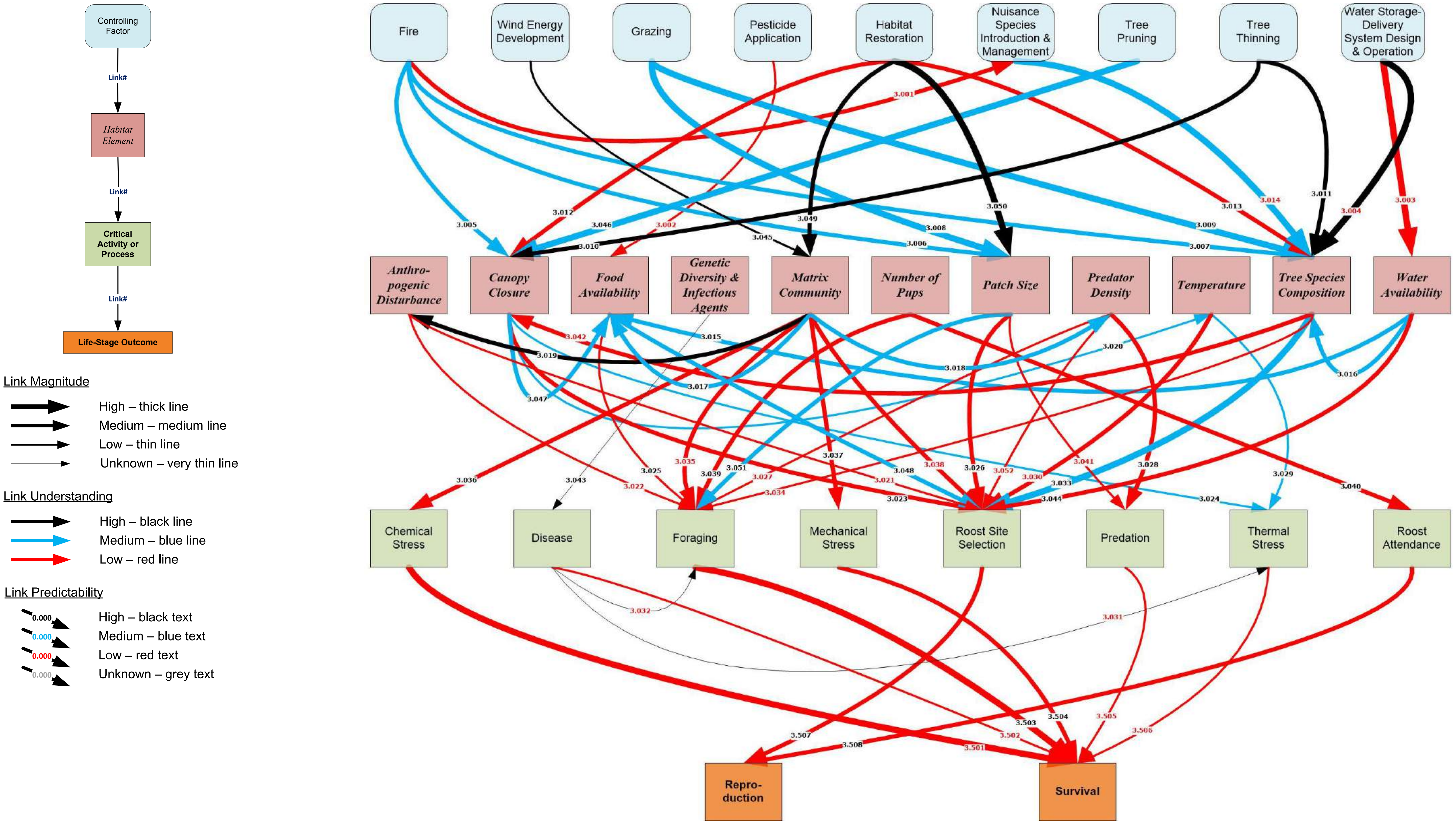

Figure 7.—WYBA life stage 3 – breeding adult, basic CEM diagram showing the relevant controlling factors, habitat elements, and critical biological activities processes at this life stage.

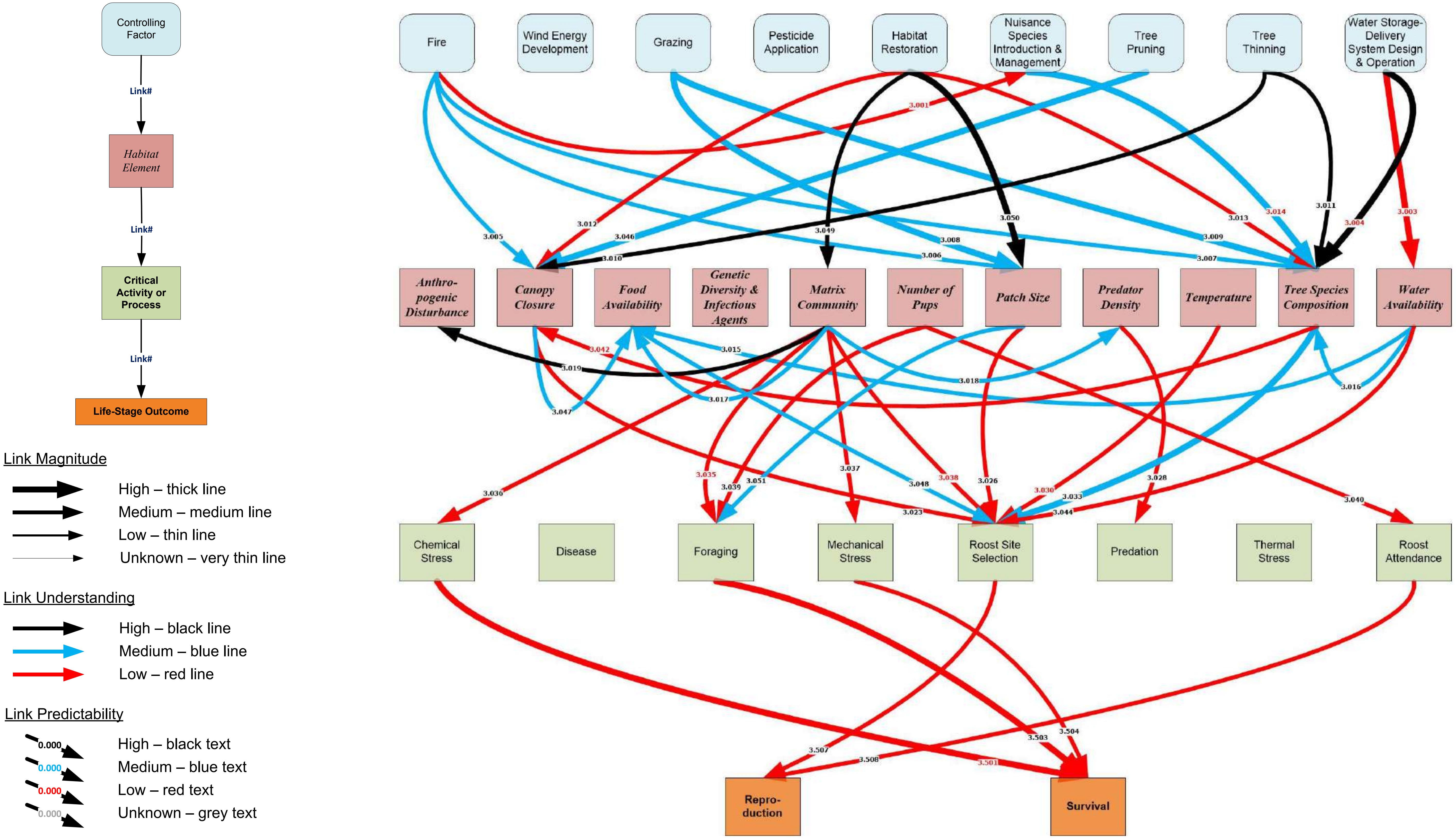

Figure 8.—WYBA life stage 3 – breeding adult, high- and medium-magnitude relationships showing the relevant controlling factors, habitat elements, and critical biological processes at this life stage.

Chapter 7 – Causal Relationships Across All Life Stages

The nine controlling factors discussed in chapter 5 have the same influence on the same habitat elements for all life stages for which those habitat elements matter. Table 5 shows the magnitudes of *direct* influence of the nine controlling factors on 7 of the 12 habitat elements. The structure of table 5 is the same as for table 4, but table 5 shows the magnitudes of the relationships instead of just their presence/absence. The paragraphs following the table discuss the relative effects of the different controlling factors on each habitat element.

Table 5.—Magnitude of influence of controlling factors on habitat elements

Controlling factor ➔ **Habitat element 🡻**	**Fire management**	**Grazing**	**Habitat restoration**	**Nuisance species introduction and management**	**Pesticide/herbicide application**	**Tree pruning**	**Tree thinning**	**Water storage-delivery system design and operation**	**Wind energy development**
Anthropogenic disturbance	N/A*								
Canopy closure	**Med**		**Med**			**Med**	**Med**		
Food availability					**Low**				
Genetic diversity and infectious agents	N/A*								
Matrix community			**Med**						**Low**
Number of pups	N/A*								
Parent roost attendance						**Med**			
Patch size	**Med**	**High**	**High**						
Predator density	N/A*								
Temperature	N/A*								
Tree species composition	**Med**	**High**	**Med**	**High**			**Med**	**High**	
Water availability								**High**	

* N/A values suggest that none of the identified controlling factors *directly* affect the habitat element.

CANOPY CLOSURE

The controlling factors that directly affect canopy closure include fire management, habitat restoration, tree pruning, and tree thinning.

Fire affects many aspects of vegetation structure and composition, including canopy closure. Little evidence exists that burning was extensive in flood plain environments historically in the Southwest. Native riparian vegetation is not well adapted to fire, so lightning and human-induced fires can severely alter riparian and, thus, WYBA habitat (Busch 1995).

Habitat restoration increases canopy closure, and tree thinning, either mechanical or natural, may either reduce or increase it. The extent of closure increase from restoration efforts depends on the types and ages of plants and the configuration in which they are planted.

The pruning of dead fronds from native and non-native palm trees reduces the cover of preferred roosting habitat for WYBA (Mirowsky 1997).

Tree thinning alters the species composition in riparian and urban habitats used by WYBA when thinning operations target certain species.

FOOD AVAILABILITY

The primary controlling factor affecting food availability is pesticide/herbicide application. Pesticides/herbicides, by design, reduce insect abundance and therefore prey for bats (Pierson et al. 2006).

MATRIX COMMUNITY

A controlling factor affecting the matrix community and mechanical stress on WYBA is wind energy development. This factor addresses the development of wind energy facilities near foraging areas and migratory routes of WYBA. While there are currently no wind turbines along the LCR, it is highly likely that migrating bats foraging near active wind turbines could be killed. Lasiurines tend to be disproportionately affected by these facilities (Arnett 2005; Kunz et al. 2007; Hayes 2013). Restoration may also change the matrix community if type conversion occurs (e.g., from farmed fields to riparian forests).

PARENT ROOST ATTENDANCE

The controlling factor that directly affects parent roost attendance is tree pruning. Cosmetic tree pruning may be one of the main threats to WYBA along the LCR (Williams 2005; Reclamation 2008). WYBA only roost in palm trees that have a ring of dead fronds that encircle the area below the live foliage (Mirowsky 1997). Parent roost attendance will be negatively affected by tree pruning that occurs when pups are in the roost.

PATCH SIZE

The controlling factors that directly affect patch size include fire management and grazing.

Fire affects many aspects of vegetation structure and composition, and severe fire may reduce overall patch size (Busch 1995).

Grazing may affect patch size as well if an overgrazed condition exists and inhibits the growth of tree species (Kauffman et al. 1997). Restoration would increase overall patch size.

TREE SPECIES COMPOSITION

The controlling factors that directly affect tree species composition include fire management, grazing, habitat restoration, nuisance species introduction and management, tree thinning, and water storage-delivery system design and operation.

Fire affects many aspects of vegetation structure and composition. Little evidence exists that burning was extensive in flood plain environments historically in the Southwest. Native riparian vegetation is not well adapted to fire, so lightning and human-induced fires can severely alter riparian species composition and, thus, WYBA habitat (Busch 1995). Some evidence exists that fire in riparian habitats can increase the cover of some nuisance species like tamarisk (Di Tomaso 1998).

Grazing effects on riparian tree species composition depends on the species of the grazer and grazing intensity among other factors. Grazing thins the understory and may even prevent the establishment of cottonwood and willow seedlings (Kauffman et al. 1997).

Habitat restoration along the LCR may improve habitat conditions for WYBA by altering riparian tree species composition and increasing patch size. WYBA have been found to be more active (foraging) in riparian habitat compared to other natural habitat types (Williams et al. 2006; Vizcarra et al. 2010), but they tend to preferentially roost in native and non-native palm trees (Kurta and Lehr 1995; Mirowsky 1997). In a study of bat roost site habitat conducted along the LCR, WYBA were documented to use Mexican fan palms almost exclusively (Diamond 2012), though Higginbotham et al. (1999) cite examples of studies in which WYBA are found roosting in cottonwood forests.

Nuisance species can change the structure of entire communities, with lasting effects. Although the effects are experienced at a patch level, invasive species can spread across entire regions, and their effects can last decades unless a complete transformation of the community type occurs.

Tree thinning alters the species composition in riparian and urban habitats used by WYBA when thinning operations target certain species.

Water movement in the LCR is highly regulated, and this has disrupted the natural flows that shape riparian habitat in the system. Water storage-delivery system design and operation affects water availability in riparian habitat and determines where various tree species can grow.

WATER AVAILABILITY

A controlling factor affecting water availability in the LCR is water storage-delivery system design and operation. The amount of water released or stored affects water levels and, therefore, distance to water, soil moisture, and other hydrological conditions within WYBA habitat.

Chapter 8 – Discussion and Conclusions

This chapter summarizes the findings of this assessment in three ways by posing three questions: (1) which critical biological activities and processes most strongly affect the individual across all life stages, (2) which habitat elements, in terms of their abundance, distribution, and quality, most strongly affect the most influential activities and processes, and (3) which of these causal relationships appear to be the least understood in ways that could affect their management?

MOST INFLUENTIAL ACTIVITIES AND PROCESSES ACROSS ALL LIFE STAGES

Figure 9 identifies the critical biological activities and processes that the assessment found most strongly directly affect the success of each life stage (high or medium magnitude). The findings presented in this diagram may be summarized as follows:

- Tree pruning (removal of the dead fronds from native and non-native palm trees) has a high effect on canopy closure, parent roost attendance, and thermal stress among all life stages.
- Roost site selection has a moderate effect on reproduction of breeding adults and is strongly affected by tree thinning.
- At roost sites located close to or within agricultural areas where biocides are being applied, bats may experience increased chemical stress, which can reduce WYBA survival rates in all life stages as well as prey abundance.
- Relative foraging success strongly affects the success rate of juvenile and breeding adult WYBA in all life stages.
- Roost attendance and roost site selection have a moderate effect on breeding adult reproduction.
- If wind energy development is present in areas with significant WYBA activity, mechanical stress may negatively affect WYBA juvenile and breeding adult survival.

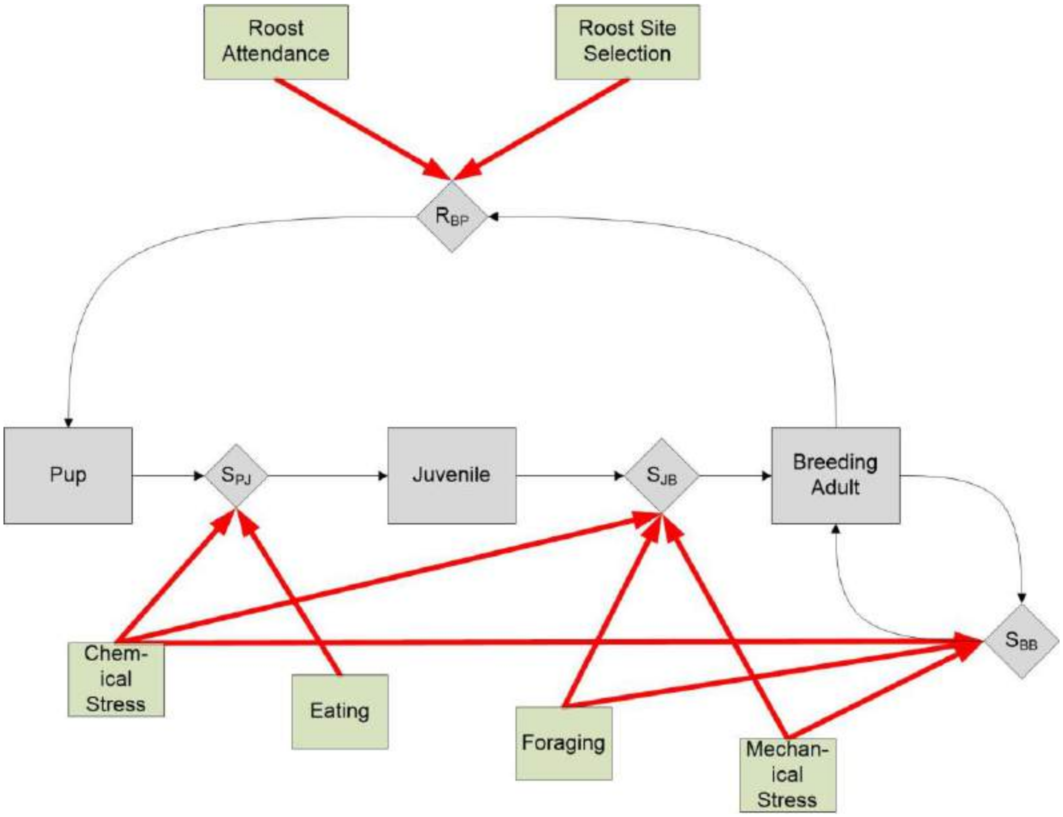

Figure 9.—Most influential biological activities and processes affecting each life stage of WYBA. Only elements with high- or medium-magnitude connections are presented. The legend is provided on figure 2.

POTENTIALLY PIVOTAL ALTERATIONS TO HABITAT ELEMENTS

Figure 10 identifies the habitat elements that this assessment indicates most strongly directly affect the critical biological activities and processes identified on figure 9 across all life stages (high or medium magnitude). The findings presented in this diagram may be summarized as follows:

- The habitat elements that most influenced critical biological processes and activities and WYBA breeding success include the matrix community, patch size, and tree species composition. All these elements affect the foraging success of adults and juveniles and provisioning (aka eating) of pups. WYBA preferentially forage over riparian forests, and maintaining these forests in a healthy state will maximize prey density.

- The matrix community can play a significant role in the survival and reproductive success of WYBA. While WYBA preferentially forage over riparian forest communities, they will forage over agricultural lands as well. Because the bats preferentially roost in palm trees, which along the LCR are found within an matrix of agricultural lands, they are likely to be exposed to a variety of biocides. This exposure can result in chemical stress to WYBA in all life stages.

In addition, the following controlling factors were important habitat element determinants:

- Water storage-delivery system design and operation is a significant driver of canopy closure, tree species composition, and thus food availability. Prey abundance during lactation and juvenile stages plays an important role in both adult reproductive success and survival of WYBA in all life stages. Thus, Reclamation's water management at its restoration sites can play a significant role in the persistence of WYBA.

- Habitat restoration, especially increasing the size of riparian forest habitat, plays a significant role in providing foraging patches for WYBA. As these habitat patches become larger, the likelihood of WYBA foraging over agricultural lands is lessened, reducing exposure to biocides that can reduce both reproductive success and survival.

GAPS IN UNDERSTANDING

Figures 9 and 10 use the conventional color coding of individual causal relationships to identify relationships that a CEM identifies as having high, intermediate, or low levels of scientific confirmation. As noted in attachment 1, "low" scientific understanding of a relationship means that it is "… subject to wide disagreement or uncertainty in peer-reviewed studies from within the ecosystem of concern and in scientific reasoning among experts familiar with the ecosystem." In many cases, the scientific principles are well understood, but the factual details are insufficiently understood within the LCR conservation areas. The figures highlight that the level of understanding of how the various controlling factors affect the habitat elements is fairly well understood. However, the large numbers of red arrows for relationships between habitat elements and biological activities and processes indicate that these relationships have a low level of scientific understanding. Each of these red arrows identifies a causal relationship that may warrant further field, laboratory, or literature investigation. The following paragraphs highlight some potentially important areas of low understanding; however, these are not meant to represent

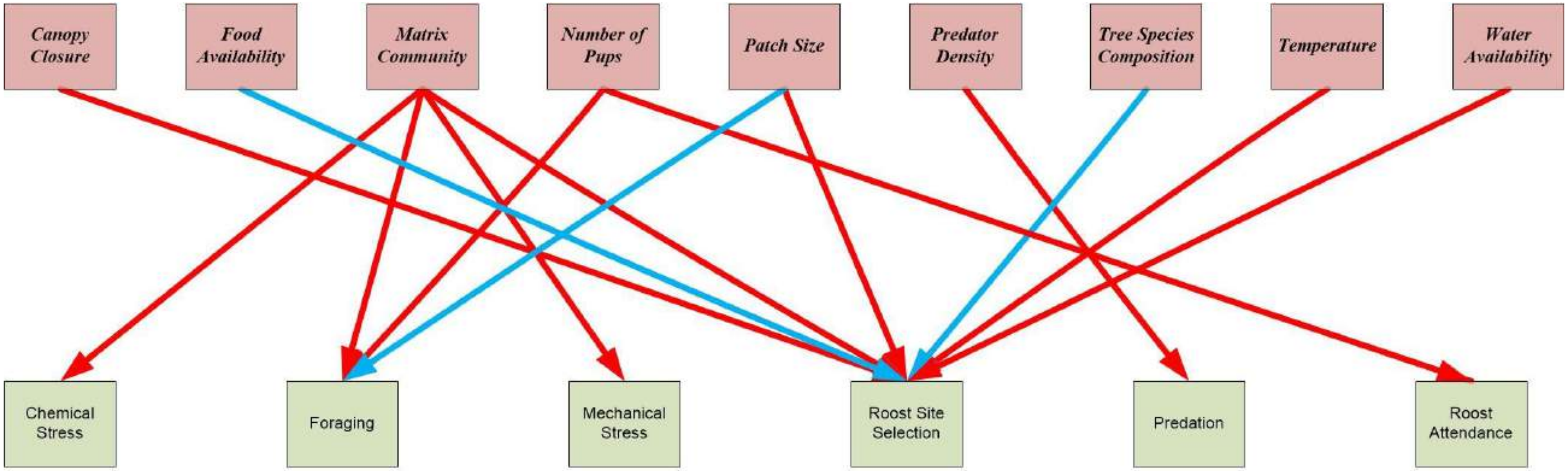

Figure 10.—Habitat elements that directly affect the most influential biological activities and processes across all life stages of WYBA. Only elements with high- or medium-magnitude connections within this life stage are presented. The legend is provided on figure 2.

a list of required or even feasible areas for research. Decisions about which research issues to pursue will be determined by LCR MSCP staff based on a variety of factors.

Specifically, the findings suggest a need to improve the understanding of:

- The distribution of WYBA roost sites within the LCR MSCP area, with special emphasis on potential impacts of land use and associated activities within the habitat and the surrounding matrix community

- The distribution of suitable WYBA roost habitat along the LCR and habitat use within those sites

- The ecology of predation on WYBA and its significance on survival across all life stages, how this may vary among predator species and across different habitat settings, and whether it may be possible to manipulate these habitat conditions to improve WYBA survival even in the presence of predators

- The presence of disease in the WYBA population and its significance in affecting survival of WYBA across all life stages within the LCR

- The impacts of biocide use within the LCR and its impact on the survival of WYBA across all life stages

- WYBA movement patterns within the LCR, including any seasonal migratory movement

This list of uncertainties is not meant to be exhaustive but only to highlight topics the literature identifies as potentially pivotal to WYBA recruitment along the LCR and to identify important knowledge gaps in these publications. They are not in any way to be considered guidance for Reclamation or the LCR MSCP, nor are these knowledge gaps expected to be addressed under the program.

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ATTACHMENT 1

Species Conceptual Ecological Model Methodology for the Lower Colorado River Multi-Species Conservation Program

OVERVIEW OF METHODOLOGY

The conceptual ecological models (CEMs) for species covered by the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) Habitat Conservation Plan expand on a methodology developed by the Sacramento-San Joaquin Delta Ecosystem Restoration Program (ERP): https://www.dfg.ca.gov/ERP/conceptual_models.asp. The ERP is jointly implemented by the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and National Marine Fisheries Service. The Bureau of Reclamation participates in this program.

The ERP methodology incorporates common best practices for constructing CEMs for individual species (Wildhaber et al. 2007; Fischenich 2008; DiGennaro et al. 2012). It has the following key features:

- It focuses on the *major life stages or events* through which each species passes and the *output(s)* of each life stage or event. Outputs typically consist of survivorship or the production of offspring.

- It identifies the *major drivers* that affect the likelihood (rate) of each output. Drivers are physical, chemical, or biological factors – both natural and anthropogenic – that affect output rates and therefore control the viability of the species in a given ecosystem.

- It characterizes these interrelationships using a "*driver-linkage-outcomes*" approach. Outcomes are the output rates. Linkages are cause-effect relationships between drivers and outcomes.

- It *characterizes each causal linkage* along four dimensions: (1) the character and direction of the effect, (2) the magnitude of the effect, (3) the predictability (consistency) of the effect, and (4) the certainty of present scientific understanding of the effect (DiGennaro et al. 2012).

The CEM methodology used for species covered by the LCR MSCP Habitat Conservation Plan species expands this ERP methodology. Specifically, the present methodology incorporates the recommendations and examples of Wildhaber et al. (2007), Wildhaber (2011), Kondolf et al. (2008), and Burke et al. (2009) for a more hierarchical approach and adds explicit demographic notation for the characterization of life-stage outcomes (McDonald and Caswell 1993). This expanded approach provides greater detail on causal linkages and outcomes. The expansion specifically calls for identifying **four** types of model components for each life stage, and the causal linkages among them, as follows:

- **Life-stage outcomes** are outcomes of an individual life stage, including the recruitment of individuals to the next succeeding life stage (e.g., juvenile to adult). For some life stages, the outcomes, alternatively or additionally, may include the survival of individuals to an older age class within the same life stage or the production of offspring. The rates of life-stage outcomes depend on the rates of the critical biological activities and processes for that life stage.

- **Critical biological activities and processes** are activities in which a species engages and the biological processes that must take place during each life stage that significantly affect life-stage outcomes. They include activities and processes that may benefit or degrade life-stage outcomes. Examples of critical activities and processes include mating, foraging, avoiding predators, avoiding other specific hazards, gamete production, egg maturation, leaf production, and seed germination. Critical activities and processes are "rate" variables. Taken together, the rate (intensity) of these activities and processes determine the rates of different life-stage outcomes.

- **Habitat elements** are specific habitat conditions that significantly ensure, allow, or interfere with critical biological activities and processes. The full suite of natural habitat elements constitutes the natural habitat template for a given life stage. Human activities may introduce habitat elements not present in the natural habitat template. Defining a habitat element may involve estimating the specific ranges of quantifiable properties of that element *whenever the state of knowledge supports such estimates*. These properties concern the abundance, spatial and temporal distributions, and other qualities of the habitat element that significantly affect the ways in which it ensures, allows, or interferes with critical activities and processes.

- **Controlling factors** are environmental conditions and dynamics – both natural and anthropogenic – that determine the quality, abundance, and spatial and temporal distributions of one or more habitat elements. In some instances, a controlling factor alternatively or additionally may directly affect a critical biological activity or process. Controlling factors are also called "drivers." A hierarchy of controlling factors will exist, affecting the system at different temporal and spatial scales. Long-term dynamics of climate and geology define the domain of this hierarchy (Burke et al. 2009). For example, the availability of suitable nest sites for a riparian nesting bird may depend on factors such as canopy closure, community type, humidity, and intermediate structure which, in turn, may depend on factors such as water storage-delivery system design and operation (dam design, reservoir morphology, and dam operations) which, in turn, is shaped by watershed geology, vegetation, climate, land use, and water demand. *The LCR MSCP conceptual ecological models focus*

> *on controlling factors that are within the scope of potential human manipulation, including management actions directed toward the species of interest.*

The present CEM methodology also explicitly defines a "life stage" as a biologically distinct portion of the life cycle of a species. The individuals in each life stage undergo distinct developments in body form and function; engage in distinct types behaviors, including reproduction; use different sets of habitats or the same habitats in different ways; interact differently with their larger ecosystems; and/or experience different types and sources of stress. A single life stage may include multiple age classes. A CEM focused on life stages is not a demographic model per se (McDonald and Caswell 1993). Instead, it is a complementary model focused on the ecological factors (drivers) that shape population dynamics.

This expanded approach permits the consideration of **six** possible types of causal relationships, on which management actions may focus, for each life stage of a species:

(1) The effect of one controlling factor on another

(2) The effect of a controlling factor on the abundance, spatial and temporal distributions, and other qualities of a habitat element

(3) The effect of the abundance, spatial and temporal distributions, and other qualities of one habitat element on those of another

(4) The effect of the abundance, spatial and temporal distributions, and other qualities of a habitat element on a critical biological activity or process

(5) The effect of one critical biological activity or process on another

(6) The effect of a critical biological activity or process on a specific life-stage outcome

Each controlling factor may affect the abundance, spatial and temporal distributions, and other qualities of more than one habitat element and several controlling factors may affect the abundance, spatial or temporal distributions, or other qualities of each habitat element. Similarly, the abundance, spatial and temporal distributions, and other qualities of each habitat element may affect more than one biological activity or process, and the abundances, spatial or temporal distributions, or other qualities of several habitat elements may affect each biological activity or process. Finally, the rate of each critical biological activity or process may contribute to the rates of more than one life-stage outcome.

Integrating this information across all life stages for a species provides a detailed picture of: (1) what is known, with what certainty, and the sources of this information; (2) critical areas of uncertain or conflicting science that demand resolution to better guide LCR MSCP management planning and action; (3) crucial attributes to use to monitor system conditions and predict the effects of experiments, management actions, and other potential agents of change; and (4) how managers may expect the characteristics of a resource to change as a result of changes to controlling factors, including changes in management actions.

Conceptual Ecological Models as Hypotheses

The CEM for each species produced with this methodology constitutes a collection of hypotheses for that species. These hypotheses concern: (1) the species' life history; (2) the species' habitat requirements and constraints; (3) the factors that control the quality, abundance, and spatial and temporal distributions of these habitat conditions; and (4) the causal relationships among these. Knowledge about these model components and relationships may vary, ranging from well settled to very tentative. Such variation in the certainty of current knowledge always arises as a consequence of variation in the types and amount of evidence available and in the ecological assumptions applied by different experts.

Wherever possible, the information assembled for the LCR MSCP species CEMs documents the degree of certainty of current knowledge concerning each component and linkage in the model. This certainty is indicated by the quality, abundance, and consistency of the available evidence and by the degree of agreement/disagreement among the experts. Differences in the interpretations or arguments offered by different experts may be represented as alternative hypotheses. Categorizing the degree of agreement/disagreement concerning the components and linkages in a CEM makes it easier to identify topics of greater uncertainty or controversy.

Characterizing Causal Relationships

A causal relationship exists when a change in one condition or property of a system results in a change in some other condition or property. A change in the first condition is said to cause a change in the second condition. The present CEM methodology includes methods for assessing causal relationships (links) along four dimensions (attributes) adapted from the ERP methodology (DiGennaro et al. 2012):

(1) The character and direction of the effect

(2) The magnitude of the effect

(3) The predictability (consistency) of the effect

(4) The certainty of present scientific understanding of the effect

The present and ERP methodologies for assessing causal linkages differ in three ways. First, the ERP methodology assesses these four attributes for the *cumulative* effect of the entire causal chain leading up to each outcome. However, the LCR MSCP methodology recognizes six different types of causal linkages as described above. This added level of detail and complexity makes it difficult in a single step to assess the cumulative effects of all causal relationships that lead up to any one individual causal link. For example, in the present methodology, the effect of a given critical biological activity or process on a particular life-stage outcome may depend on the effects of several habitat elements on that critical biological activity or process which, in turn, may depend on the effects of several controlling factors. For this reason, the present methodology assesses the four attributes separately for each causal link *by itself* rather than attempting to assess cumulative effects of all causal linkages leading to the linkage of interest. The present methodology assesses cumulative effects instead through analyses of the data assembled on all individual linkages. The analyses are made possible by assembling the data on all individual linkages in a spreadsheet as described below.

Second, the present CEM methodology explicitly divides link magnitude into three separate subattributes and provides a specific methodology for integrating their rankings into an overall ranking for link magnitude: (1) link intensity, (2) link spatial scale, and (3) link temporal scale. In contrast, the ERP methodology treats spatial and temporal scale together and does not separately evaluate link intensity. The present methodology defines link intensity as the relative strength of the effect of the causal node on the affected node *at the places and times where the effect occurs*. Link spatial scale is the relative spatial extent of the effect of the causal node on the affected node. Link temporal scale is the relative temporal extent of the effect of the causal node on the affected node. The present methodology defines link magnitude as the average of the separate rankings of link intensity, spatial scale, and temporal scale as described below.

Third, the ERP methodology addresses a single, large landscape, while the present methodology needed the flexibility to generate models applicable to a variety of spatial scopes. For example, the present methodology needed to support modeling of a single restoration site, the LCR main stem and flood plain, or the entire Lower Colorado River Basin. Consequently, the present methodology assesses the spatial scale of cause-effect relationships only relative to the spatial scope of the model.

The LCR MSCP conceptual ecological model methodology thus defines the four attributes for a causal link as follows:

- **Link character** – This attribute categorizes a causal relationship as positive, negative, involving a threshold response, or "complex." "Positive" means that an increase in the causal node results in an increase in the affected node, while a decrease in the causal node results in a decrease in the affected node. "Negative" means that an increase in the causal node results in a decrease in the affected element, while a decrease in the causal node results in an increase in the affected node. Thus, "positive" or "negative" here do ***not*** mean that a relationship is beneficial or detrimental. The terms instead provide information analogous to the sign of a correlation coefficient. "Threshold" means that a change in the causal agent must cross some value before producing an effect. "Complex" means that there is more going on than a simple positive, negative, or threshold effect. In addition, this attribute categorizes a causal relationship as uni- or bi-directional. Bi-directional relationships involve a reciprocal relationship in which each node affects the other.

- **Link magnitude** – This attribute refers to "… the degree to which a linkage controls the outcome *relative to other drivers*" (DiGennaro et al. 2012). Magnitude takes into account the spatial and temporal scale of the causal relationship as well as the strength (intensity) of the relationship in individual locations. The present methodology provides separate ratings for the intensity, spatial scale, and temporal scale of each link, as defined above, and assesses overall link magnitude by averaging these three elements. Just as the terms for link character provide information analogous to the sign of a correlation coefficient, the terms for link magnitude provide information analogous to the size of a correlation coefficient. Tables 1-1 through 1-4 present the rating framework for link magnitude.

- **Link predictability** – This attribute refers to "… the degree to which the current understanding of the system can be used to predict the role of the driver in influencing the outcome. Predictability … captures variability … [and recognizes that] effects may vary so much that properly measuring and statistically characterizing inputs to the model are difficult" (DiGennaro et al. 2012). A causal relationship may be unpredictable because of natural variability in the system or because its effects depend on the interaction of other factors with independent sources for their own variability. Just as the terms for link character provide information analogous to the sign of a correlation coefficient, the terms for link predictability provide information analogous to the size of the range of error for a correlation coefficient. Table 1-5 presents the scoring framework for link predictability.

- **Link understanding** refers to the degree of agreement represented in the scientific literature and among experts in understanding how each driver is linked to each outcome. Table 1-6 presents the scoring framework for understanding. Link predictability and understanding are independent attributes. A link may be considered highly predictable but poorly understood or poorly predictable but well understood.

Conceptual Ecological Model Documentation

The documentation for each CEM provides information in three forms: (1) a narrative report, (2) causal diagrams showing the model components and their causal linkages for each life stage, and (3) a spreadsheet that is used to record the detailed information (e.g., linkage attribute ratings) for each causal linkage. The spreadsheet and diagrams, built using Microsoft Excel™ and Microsoft Visio™, respectively, are linked so that the diagrams provide a fully synchronized summary of the information in the spreadsheet.

The narrative report for each species presents the definitions and rationales for the life stages/events and their outcomes identified for the species' life history; the critical biological activities and processes identified for each life stage; the habitat elements identified as supporting or impeding each critical biological activity or process for each life stage; the controlling factors identified as affecting the abundance, spatial and temporal distributions, and other qualities of the habitat elements for each life stage; and the causal linkages among these model components.

The narrative report includes causal diagrams (*aka* "influence diagrams") for each life stage. These diagrams show the individual components or nodes of the model for that stage (life-stage outcomes, critical biological activities and processes, habitat elements, and controlling factors) and their causal relationships. The causal relationships (causal links) are represented by arrows indicating which nodes are linked and the directions of the causal relationships. The attributes of each causal link are represented by varying line thickness, line color, and other visual properties as shown on figure 1-1. The diagram conventions mostly follow those in the ERP methodology (DiGennaro et al. 2012).

The spreadsheet for each CEM contains a separate worksheet for each life stage. Each row in the worksheet for a life stage represents a single causal link. Table 1-7 lists the fields (columns) recorded for each causal link.

Link Attribute Ratings, Spreadsheet Fields, and Diagram Conventions

Table 1-1.—Criteria for rating the relative intensity of a causal relationship – one of three variables in the rating of link magnitude (after DiGennaro et al. 2012, Table 2)

Link intensity – the relative strength of the effect of the causal node on the affected node *at the places and times where the effect occurs*.	
High	Even a relatively small change in the causal node will result in a relatively large change in the affected node *at the places and times where the effect occurs*.
Medium	A relatively large change in the causal node will result in a relatively large change in the affected node; a relatively moderate change in the causal node will result in no more than a relatively moderate change in the affected node; and a relatively small change in the causal node will result in no more than a relatively small change in the affected node *at the places and times where the effect occurs*.
Low	Even a relatively large change in the causal node will result in only a relatively small change in the affected node *at the places and times where the effect occurs*.
Unknown	Insufficient information exists to rate link intensity.

Table 1-2.—Criteria for rating the relative spatial scale of a cause-effect relationship – one of three variables in the rating of link magnitude (after DiGennaro et al. 2012, Table 1)

Link spatial scale – the relative spatial extent of the effect of the causal node on the affected node. The rating takes into account the spatial scale of the cause and its effect.	
Large	Even a relatively small change in the causal node will result in a change in the affected node across a large fraction of the spatial scope of the model.
Medium	A relatively large change in the causal node will result in a change in the affected node across a large fraction of the spatial scope of the model; a relatively moderate change in the causal node will result in a change in the affected node across no more than a moderate fraction of the spatial scope of the model; and a relatively small change in the causal node will result in a change in the affected node across no more than a small fraction of the spatial scope of the model.
Small	Even a relatively large change in the causal node will result in a change in the affected node across only a small fraction of the spatial scope of the model.
Unknown	Insufficient information exists to rate link spatial scale.

Table 1-3.—Criteria for rating the relative temporal scale of a cause-effect relationship – one of three variables in the rating of link magnitude (after DiGennaro et al. 2012, Table 1)

Link temporal scale – the relative temporal extent of the effect of the causal node on the affected node. The rating takes into account the temporal scale of the cause and its effect.	
Large	Even a relatively small change in the causal node will result in a change in the affected node that persists or recurs over a relatively large span of time – decades or longer – even without specific intervention to sustain the effect.
Medium	A relatively large change in the causal node will result in a change in the affected node that persists or recurs over a relatively large span of time – decades or longer – even without specific intervention to sustain the effect; a relatively moderate change in the causal node will result in a change in the affected node that persists or recurs over only a relatively moderate span of time – one or two decades – without specific intervention to sustain the effect; a relatively small change in the causal node will result in a change in the affected node that persists or recurs over only a relatively short span of time – less than a decade – without specific intervention to sustain the effect.
Small	Even a relatively large change in the causal node will result in a change in the affected node that persists or recurs over only a relatively short span of time – less than a decade – without specific intervention to sustain the effect.
Unknown	Insufficient information exists to rate link temporal scale.

Table 1-4.—Criteria for rating the overall relative link magnitude of a cause-effect relationship based on link intensity, spatial scale, and temporal scale

Link magnitude – the overall relative magnitude of the effect of the causal node on the affected node based on the numerical average for link intensity, spatial scale, and temporal scale. (Calculated by assigning a numerical value of 3 to "High" or "Large," 2 to "Medium," 1 to "Low" or "Small," and not counting missing or "Unknown" ratings.)	
High	Numerical average ≥ 2.67
Medium	Numerical average ≥ 1.67 but < 2.67
Low	Numerical average < 1.67
Unknown	No subattribute is rated High/Large, Medium, or Low/Small, but at least one subattribute is rated Unknown.

Table 1-5.—Criteria for rating the relative predictability of a cause-effect relationship (after DiGennaro et al. 2012, Table 3)

Link predictability – the statistical likelihood that a given causal agent will produce the effect of interest.	
High	Magnitude of effect is largely unaffected by random variation or by variability in other ecosystem dynamics or external factors.
Medium	Magnitude of effect is moderately affected by random variation or by variability in other ecosystem processes or external factors.
Low	Magnitude of effect is strongly affected by random variation or by variability in other ecosystem processes or external factors.
Unknown	Insufficient information exists to rate link predictability.

Table 1-6.—Criteria for rating the relative understanding of a cause-effect relationship (after DiGennaro et al. 2012, Table 3)

Understanding – the degree of agreement in the literature and among experts on the magnitude and predictability of the cause-effect relationship of interest.	
High	Understanding of the relationship is subject to little or no disagreement or uncertainty in peer-reviewed studies from within the ecosystem of concern or in scientific reasoning among experts familiar with the ecosystem. Understanding may also rest on well-accepted scientific principles and/or studies in highly analogous systems.
Medium	Understanding of the relationship is subject to moderate disagreement or uncertainty in peer-reviewed studies from within the ecosystem of concern and in scientific reasoning among experts familiar with the ecosystem.
Low	Understanding of the relationship is subject to wide disagreement, uncertainty, or lack of evidence in peer-reviewed studies from within the ecosystem of concern and in scientific reasoning among experts familiar with the ecosystem.
Unknown	(*The "Low" rank includes this condition*).

Table 1-7.—Organization of the worksheet for each life stage

Col.	Label	Content
A	Species	Identifies the species being modeled by four-letter code.
B	Link#	Contains a unique identification number for each causal link.
C	Life Stage	Identifies the life stage affected by the link.
D	Causal Node Type	Identifies whether the causal node for the link is a controlling factor, habitat element, critical biological activity or process, or life-stage outcome.
E	Causal Node	Identifies the causal node in the link.
F	Effect Node Type	Identifies whether the effect node for the link is a controlling factor, habitat element, critical biological activity or process, or life-stage outcome.
G	Effect Node	Identifies the effect node in the link.
H	Link Reason	States the rationale for including the link in the conceptual ecological model, including citations as appropriate.
I	Link Character Type	Identifies the character of the link based on standard definitions.
J	Link Character Direction	Identifies whether the link is uni- or bi-directional.
K	Link Character Reason	States the rationale for the entries for Link Character Type and Link Character Direction, including citations as appropriate.
L	Link Intensity	Shows the rating of link intensity based on the definitions in table 1-1.
M	Link Spatial Scale	Shows the rating of link spatial scale based on the definitions in table 1-2.
N	Link Temporal Scale	Shows the rating of link temporal scale based on the definitions in table 1-3.
O	Link Average Magnitude	Shows the numerical average rating of link intensity, spatial scale, and temporal scale based on the definitions in table 1-4.
P	Link Magnitude Rank	Shows the overall rating of link magnitude based on the Link Average Magnitude, grouped following the criteria in table 1-4.
Q	Link Magnitude Reason	States the rationale for the ratings for link intensity, spatial scale, and temporal scale, with citations as appropriate.
R	Link Predictability Rank	Shows the rating of link predictability based on the definitions in table 1-5.
S	Link Predictability Reason	States the rationale for the rating of link predictability, with citations as appropriate.
T	Link Understanding Rank	Shows the rating of link understanding based on the definitions in table 1-6.
U	Link Understanding Reason	States the rationale for the rating of link predictability, including comments on alternative interpretations and publications/experts associated with different interpretations when feasible, with citations as appropriate.
V	Management Questions	Briefly notes questions that appear to arise from the preceding entries for the link, focused on critical gaps or uncertainties in knowledge concerning *management actions and options*, with reasoning, including the estimate of relative importance when possible.
W	Research Questions	Brief notes that appear to arise from the preceding entries for the link, focused on critical gaps or uncertainties in *basic scientific knowledge*, with reasoning, including the estimate of relative importance when possible.
X	Other Comments	Provides additional notes on investigator concerns, uncertainties, and questions.
Y	Update Status	Provides information on the history of editing the information on this link for updates carried out after completion of an initial version.

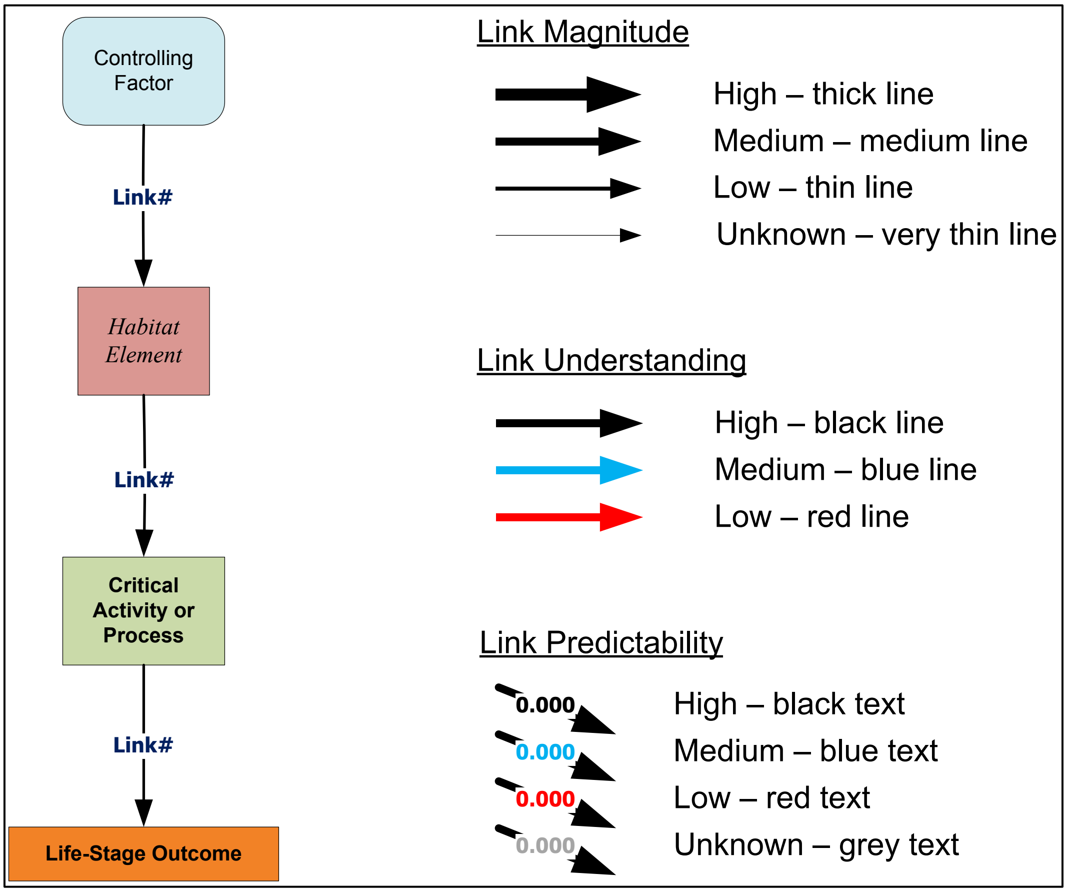

Figure 1-1.—Conventions for displaying cause and effect nodes, linkages, link magnitude, link understanding, and link predictability.

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ATTACHMENT 2

Western Yellow Bat Habitat Data

Table 2-1.—Western yellow bat habitat data

Habitat element	Value or range	Location	Reference
Canopy closure	Crown width for roost trees: mean = 2.5 meters (range = 1–4 meters); percent dead crown cover mean = 43 percent; range = 35–75 percent	Lower Colorado River	Diamond 2012
	Crown width for roost trees: mean = 2.9 meters (range = 0.5–4.6 meters); percent dead crown cover mean = 51 percent; range = 50–55 percent	Lower Colorado River	Diamond et al. 2013
Patch size	High probability of occupancy with as little as 10 percent coverage of cottonwood-willow (*Populus fremontii*, *Salix* sp.) within 10 meters, or 0.3 hectare	Lower Colorado River	Vizcarra et al. 2010
Tree species composition	Roost in Mexican fan palms (*Washingtonia robusta*) almost exclusively	Lower Colorado River	Diamond 2012
	Roost in cottonwoods	Arizona	Higginbotham et al. 1999
	Forage in riparian woodland preferentially	Nevada	Williams et al. 2006
	Occupancy strongly associated with cottonwood-willow habitat; weak negative association with saltcedar	Lower Colorado River	Vizcarra et al. 2010

Note: The data presented in this table reflect those available in the literature at the time this model was developed. These data have not been validated.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 11

Nooten, Schultheiss, Wright, Macdonald, Singh, Cook, and Power
What shapes plant and animal diversity on urban golf courses?

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What shapes plant and animal diversity on urban golf courses?

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Abstract

Recent concern over increasing loss of biodiversity has prompted considerable interest in the role of urban green spaces as reservoirs of local biodiversity. This study assessed the diversity of three indicator taxa - plants, ants and birds - on golf courses spanning a wide range of environmental variation in terms of climate, elevation, course age, size and connectivity to native woodland. Species richness and community composition was further compared between contrasting on-course habitat types that reflect different management intensities. We identified a set of taxon-specific environmental correlates indicating an intricate interplay of landscape- and local-scale variables that affect local species diversity. Our results show that floristic diversity is positively associated with the amount of rainfall, whereas ant and bird diversity are related to local-scale factors, particularly the number of trees and the size of water features on a site. The amount of on-course native habitat was a strong predictor of plant and ant diversity and was also associated with the number of unique species at the site level; this reinforces the value of remnant habitat patches as local biodiversity reservoirs that represent mini hot-spots in an otherwise species-poor urban landscape. Community composition for all three taxa differed markedly between non-playing and playing areas, with boundary and remnant habitats generally having more diverse, species-rich communities. Our results suggest that local floral and faunal biodiversity on urban golf courses can be enhanced by creating woody non-playing areas and, especially, by preserving, restoring or expanding remnant habitats.

Keywords Biodiversity · Community composition · Climate · Environmental factors · Urban environment · Golf courses · Plants · Ants · Birds

Introduction

Human modification of the global environment has led to the rapid decline of biological diversity, driven mainly by land use changes, with climate change, nitrogen deposition and elevated atmospheric CO_2 concentrations also playing major roles (Sala et al. 2000; Chapin et al. 2000). High levels of biodiversity are considered important for a number of reasons, including the provision of ecosystem services such as primary production and local climate regulation, for its intrinsic and aesthetic value and, in particular, for providing ecosystem resistance and resilience in the face of disturbance (Chapin et al. 2000). A complex interplay of environmental and biotic factors governs biodiversity at different spatial scales. At the landscape scale, the main drivers of biodiversity variation are environmental factors such as temperature, precipitation and soil type (Sala et al. 2000). At the more local scale, biodiversity can be strongly influenced by air quality and adjacent land use (Bailey 2007; Gadsdon et al. 2010; Lee and Power 2013) as well as the type, relative size and connectivity of native habitat fragments (Bailey 2007; Pardini et al. 2010; Hagen et al. 2012; Beninde et al. 2015). Biotic factors such as vegetation structure and complexity also play an important role in mediating species interactions and movement through the landscape (e.g. Beninde et al. 2015). Concern over the impact of land use

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change, particularly rapid urbanisation (e.g. Grimm et al. 2008), has led to recent interest in assessing the contribution of large recreational green spaces - i.e. parks, gardens and golf courses - to urban and peri-urban biodiversity (Lin and Fuller 2013; Aronson et al. 2014). Whilst golf courses typically have relatively low biodiversity when compared to native bush or forest areas (Terman 1997), they can compare well to other urban habitats (Colding and Folke 2009; Mata et al. 2017; Threlfall et al. 2016; Threlfall et al. 2017).

The benefits of green space in urban landscapes are increasingly being recognized, in terms of its importance for recreation and human health, including local climate regulation (Grimm et al. 2008; Vidrih and Medved 2013; Doick et al. 2014) and improved local air quality (Hartig et al. 2014; Hartig and Kahn 2016). Urban green spaces enhance human well-being by, for example, providing daily access to nature and reducing noise (Andersson et al. 2014; Hartig and Kahn 2016), factors that have tangible value, as evidenced by the frequently higher house prices where properties are close to green areas (Andersson et al. 2014). Larger vegetated areas typically support greater levels of biodiversity than smaller pockets of urban green space. Indeed, a recent study by Beninde et al. (2015) revealed positive relationships between the amount of green space and the diversity of a variety of taxonomic groups across 75 cities worldwide, while, at the more regional scale, Turrini and Knop (2015) found a positive association between the diversity of arthropods and the amount of vegetated area in several cities in Switzerland. Habitat connectivity also has an important influence on species movement and thus diversity in urban environments, as exemplified by Shanahan et al. (2011) for bird species richness in Brisbane. The value of golf courses as important reservoirs of biodiversity is often underestimated (Gange et al. 2003), despite the fact that they typically represent a considerable proportion of green space within the urban landscape, providing varied habitats that support a diverse range of flora and fauna (Colding and Folke 2009; Gange et al. 2003; Threlfall et al. 2016; Threlfall et al. 2017). Indeed, suburban golf courses have been shown to enhance local biodiversity for a range of taxa, including bird, beetle and bumblebee species in the UK (Tanner and Gange 2005), and plants, vertebrates and invertebrates in Japan (Yasuda and Koike 2006). Within Australia, golf courses have been identified as valuable refugia for threatened vertebrate species, including birds and mammals in suburban southeast Queensland (Hodgkison et al. 2007a, b), as well as a diverse fauna of birds and bats (Threlfall et al. 2016, 2017), ants (Ossola et al. 2015), bugs (Mata et al. 2017) and native bee communities (Threlfall et al. 2015) in Melbourne (southeast Victoria). Golf courses typically comprise both playing areas (intensively managed fairways, greens and tees) and non-playing areas (generally including boundary and between-fairway vegetation, water features such as lakes and ponds and areas of remnant native woodland). Non-playing areas are generally more structurally diverse and have been show to support as many species of plants, birds and vertebrates as areas of adjacent remnant native habitat outside of course boundaries (e.g. Yasuda et al. 2008; Hudson and Bird 2009; Hodgkison et al. 2007b).

Different habitat types within golf courses can harbour distinctly different floral and faunal communities, with marked turnover in species composition and abundance (e.g. Yasuda and Koike 2006). In Australia, communities have generally been investigated by comparing golf courses to other land use types, such as patches of remnant forests (Hodgkison et al. 2007b) or urban parks and gardens (Ossola et al. 2015; Threlfall et al. 2015; Threlfall et al. 2016), but there has so far been very little attention paid to differences in community assemblages between habitats within golf courses.

To date, the separate effects of local-scale factors such as habitat diversity and complexity, and landscape-scale factors such as climate on the biodiversity of urban golf courses have been studied in different parts of the world. However, it remains less clear how these affect biodiversity when acting together. Our study addresses this knowledge gap by asking: Are local-scale factors more important for local biodiversity than landscape-scale factors, or vice-versa? And, are the patterns similar for different groups of organisms? Answers to these questions are of direct relevance for biodiversity management and conservation efforts in urban green spaces since they can highlight the possibilities and limitations of such efforts and help inform golf course managers in their choice of management strategies.

In the present study, we focused on biodiversity surveys of three key taxa: plants, ants and birds. Plants, as structurally diverse primary producers, are of key importance in terrestrial habitats. Ants are being increasingly used in biodiversity surveys, as they are abundant in the environment, contribute significantly to ecological functioning within the landscape and are sensitive to disturbance (Underwood and Fisher 2006; Andersen et al. 2002; Andersen and Majer 2004). Birds are a charismatic taxon and are commonly used as a vertebrate indicator group for biodiversity studies in urban environments (e.g. Rottenborn 1999; Blair 1999; Shanahan et al. 2011) including on golf courses (Sorace and Visentin 2007; Hodgkison et al. 2007a, b).

The present study seeks to address the following key research questions: (1) Which landscape and local scale environmental factors are associated with high levels of biodiversity on golf courses? (2) Which on-course habitat types harbour more species? (3) Does the community composition of plant and animal taxa differ between habitat types? Based on previous studies investigating plant diversity across environmental gradients (e.g. Kreft and Jetz 2007; Beninde et al. 2015), we predict that plant diversity is closely associated with both landscape-scale variables (e.g. climate) and local scale variables (e.g. connectivity to native vegetation; Shanahan et al. 2011; Beninde et al. 2015). We further predict that bird and ant diversity are more closely related to local scale variables that influence nesting and foraging space, as has been previously found for both taxa (Hodgkison et al. 2007a, b; Ossola et al. 2015). Finally, we predict that there will be large differences in the composition of species assemblages associated with different golf course habitats, with the greatest contrasts being between remnant vegetation and highly managed playing areas, for all three taxa.

Methods

Study area

The Greater Sydney Region is Australia's most densely populated metropolitan area, supporting approximately five million people in an area spanning ~12 thousand square kilometres (www.cityofsydney.nsw.gov.au). We selected 15 golf courses covering a range of temperatures, precipitation and course characteristics, such as age, size and degree of connectivity to surrounding native habitat. Selected courses spanned an area of ~88 km east-west and ~50 km north-south. Sites ranged longitudinally from coastal Dee Why (33° 44′ 20.75″S, 151° 18′ 22.06″E) to Wentworth Falls (33° 41′ 48.18″S, 150° 21′ 45.98″E) in the Blue Mountains, and latitudinally from Terrey Hills (33° 41′ 19.56″S, 151° 15′ 38.52″E) in the north, to Camden (34° 3′ 1.19″S, 150° 43′ 51.29″E) in the south (Fig. 1).

Landscape and local-scale environmental variables

The diversity of three focal taxa (plants, ants and birds) was assessed in relation to four landscape-scale and six local-scale (site-level) environmental variables: Landscape-scale factors include (1) elevation (range 2–947 m above sea level); (2) mean max. Summer temperatures (16–25 °C); (3) annual precipitation amount (854–1510 mm), obtained from the nearest weather station for each golf course and calculated over the last 30 years, (http://www.bom.gov.au/); (4) connectivity to surrounding woodland, calculated as the percentage adjacent to the golf course perimeter (10–85%). Local-scale factors were course age (42–111 years), course size (32–92 ha), size of on-course remnant vegetation (0–31 ha), size of water features (0–33 ha), average tree density (110–456 trees ha^{-1}) and tree biomass (13–199 t ha^{-1}). All site-level data are included in Table S1.

Survey design

To capture as much within-course variation as possible, species richness and community composition were assessed on each golf course in different habitat types: three woody habitat types were selected for plants, ants and birds, and an additional two non-woody habitats for ants and birds only (Fig. 1): woody: on-course remnant or restored native habitat, between-fairway habitat and course boundary habitat; non-woody: fairway habitat and water feature habitat. On each course, four replicates per habitat type were selected using a stratified randomised approach: a grid with 50 × 50 m cells was placed on the golf course and four survey locations per habitat type were randomly drawn from available grid cells at each site.

Plant survey

Within each replicate area, plant species identity was recorded in rectangular plots of 10 × 40 m and abundance was estimated by assigning scores of 0–5, following a modified Braun-Blanquet scale (DECCW 2009; Tozer 2003). Vegetation surveys were carried out once on each course between January and April 2014.

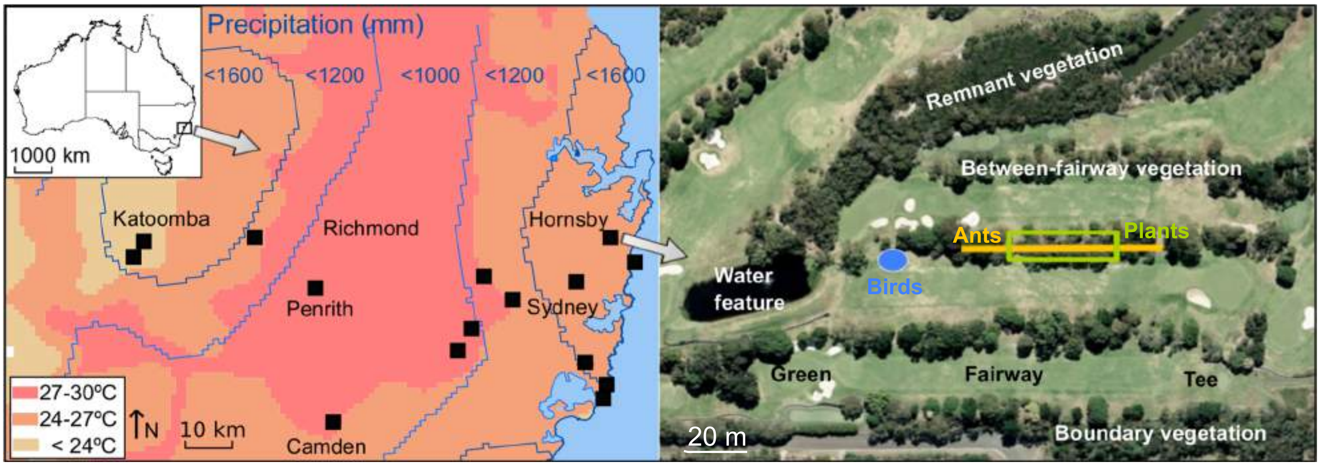

Fig. 1 Location of surveyed golf courses within the Greater Sydney area Left panel shows the study area, where filled squares show golf courses, ragged lines show annual precipitation isolines, shading indicates mean maximum summer temperature, averages based on available data from the last 30 years (http://www.bom.gov.au/). Inset shows location of study area within Australia. Right panel shows habitat types within golf courses and exemplary survey setup for plants (rectangle), ants (transect) and birds (survey point)

Ant survey

Ants were collected between January and April 2014 using minced meat baits in five habitat types; these included the three woody habitats used for vegetation surveys (see above), and additionally around water features and on fairways. Four replicate areas were surveyed once per habitat type for each course. Following preliminary trials of different methods, five baits were deployed in 1.5 ml Eppendorf tubes along one 100 m transect per replicate and left out for three hours, during the morning (09.00–12.00 h). A total of 100 tubes per course (five habitats x four replicates x five tubes) were collected and samples preserved with 70% ethanol and stored in the freezer at −20 °C. Ants were first sorted to genus and then to species level, using morphospecies, i.e. recognisable taxonomic units based on morphology, following procedures described in Oliver et al. (2012). Identification to subfamily/genus level was carried out using taxonomic keys (Shattuck 1999; Andersen 1991) and online identification resources (http://www.antwiki.org/wiki/). Final species identification was carried out in Darwin, Australia, under the expert guidance of Prof. Alan Andersen and the use of the CSIRO ant reference collection. Voucher specimens have been lodged there as a reference.

Bird survey

Bird surveys were carried out in the morning (06.00–10.30 h), using a modified point survey method (Gregory et al. 2002). Two sets of bird surveys were conducted, the first between September and December 2014 and the second in February–March 2015. For each golf course, 16 locations - in the vicinity of the vegetation/ant surveys - were selected. After approaching the survey point, a settling time of one minute was allowed before observations started. An observation consisted of a 5-min period during which all visible bird species were identified, individuals counted and the habitat noted. Only birds using the site, i.e. perching, resting or feeding were counted. Birds flying overhead or those that were heard, but not seen, were not included in the site counts.

Data analyses

Data were used to calculate plant, ant and bird species richness, diversity and community composition. Diversity was calculated as the Shannon-Wiener diversity index (H), which accounts for species richness and the proportional abundance of each species in the sample (Shannon 1948; Magurran 2004), using the program EstimateS v9.1 (Colwell 2013). In addition, for two taxa, the diversity of a subset of species, i.e. native plants and non-water birds, was analysed in the same fashion as described above.

Multiple regression analysis was used to assess relationships between taxon-level diversity (H) and the four landscape-scale and six local-scale environmental variables. Analyses were carried out with untransformed variables, except for elevation, which was logged. Linear regression models (*lm*) were fitted using the least squares approach to calculate R^2 in the package *MASS* (Venables and Ripley 2002). A two-step process was used to select the best explanatory model. Firstly, co-linearity amongst environmental factors was assessed by calculating the variance inflation values (VIF) and factors with values >4 were omitted (O'Brien 2007). Secondly, the most parsimonious model was selected based on the lowest Bayesian Information Criterion (BIC) value in a combined step-down and step-up model selection process (MacNally 2000). A canonical correspondence analyses (CCA) ordination was used to visualise the community composition for each of the three taxa, in relation to the tested environmental factors (Fig. S1). All statistical analyses were conducted in R version 3.2.0 (R Development CoreTeam 2015). Initially, the effect of environmental variables on species richness was explored, revealing highly similar trends as for species diversity. Given this similarity we have focused our study on relationships between environmental drivers (landscape and local-scale) and biodiversity of the three taxa assessed on Sydney's urban golf courses.

Species richness was compared between habitat types using linear mixed effects models (LMEs) in the package *lme4* (Bates et al. 2015) to account for the nested design of the study (habitats nested within golf courses) (Zuur et al. 2009). An appropriate function based on the distribution of the untransformed count data was selected: the full and native plant species data sets were analysed using the function "glmer.nb" based on a negative binomial distribution to account for overdispersion; birds were analysed using "glmer" based on a Poisson distribution; and ants and exotic plants were analysed using "lme" based on a Gaussian distribution (Zuur et al. 2009).

The community compositions of the three surveyed taxa were analysed using "manyGLM" in the package *mvabund* (Wang et al. 2015). The multivariate test statistic Wald-X^2 was used to evaluate compositional differences between habitats within individual golf courses. The "block" function was used to account for nesting of habitats within courses. Data were visualised using a model-based approach to unconstrained ordination based on latent variable models (LVMs) (Hui et al. 2015) in *boral* (Hui 2016).

Results

Comparisons between golf courses – species numbers & diversity

Overall, we identified 603 species across three taxa; of these 438 were plant species with an average of 62 ± 25 (AV ± SE) species per site (equivalent to 75–230 species per ha) (Table S2). Across all sites, 62% ($n = 270$) of recorded plant species were native and 38% exotic ($n = 168$). Plant diversity was positively associated with site elevation and precipitation (Table 1, Fig. 2a, b), but there was no significant relationship with other environmental factors, such as course size or connectivity. In addition, the diversity of native plant species was higher on courses with larger areas of remnant habitats (Table 1, Fig. 2c).

Ant surveys involved the collection and identification of 13,149 individual ants, belonging to 68 species, with an average of 18 ± 0.80 (range 12–22) species per course (Table S2). At the overall course level, ant diversity was significantly ($P = 0.03$) positively related to tree biomass (Table 1, Fig. 2d) although relationships with other environmental factors were not significant.

A total of 8660 individual birds, representing 97 species, were recorded during morning surveys. Site level species counts ranged from 26 to 52, with an average of 34 ± 4.5 species identified per golf course (S1 Table). Bird species diversity was positively related ($P < 0.01$) to the area of water features on a site (Table 1, Fig. 2e). However, the diversity of non-water birds (77% of all bird species) was significantly higher ($P = 0.02$) on older courses (Table 1, Fig. 2f). Relationships with other environmental factors were not significant.

Comparisons between habitat types – numbers of species

We identified 350 species across three taxa in on-course remnant habitats, 393 in boundary and 280 in between-fairway habitats. At water features and fairways, where only ants and birds were recorded, we found a total of 86 and 55 species, respectively. On average, there was greater native plant richness in remnant (14 ± 1.13) compared to boundary habitats (8 ± 0.79), whereas species richness of exotic plants was greatest in boundary habitats (4 ± 0.41) (Fig. 3a, c). Fairways were associated with particularly low species richness for ants (1

Table 1 Summary of final (minimal) multiple regression models for Shannon-Wiener diversity index (H) and associated environmental variables including the model coefficient (Estimate), standard error (SE), *p*-value, F- statistic (degrees of freedom) and R^2-values

Taxon group	Environmental variable	Estimate	*SE*	*P-value*	F [a]	R^2-values [b]
Plants			0.296	0.0061	7.17 (3,11)	0.57
	Intercept	1.492	0.519	0.0152		
	Precipitation	0.001	0.001	0.0250		*0.39*
	Elevation (log)	0.289	0.105	0.0185		*0.38*
	Size	0.007	0.005	0.1626		
Native plants			0.261	0.0002	16.34 (3,11)	0.77
	Intercept	0.977	0.397	0.0318		
	Precipitation	0.001	0.001	0.0066		*0.48*
	Elevation (log)	0.332	0.091	0.0038		*0.44*
	Size of remnant habitat	0.019	0.007	0.0158		*0.40*
Ants			0.129	0.0171	7.645 (1,13)	0.34
	Intercept	2.177	0.079	0.0001		
	Tree biomass	0.002	0.001	0.0171		*0.34*
Birds			0.141	0.0028	9.545 (3,10)	0.66
	Intercept	2.607	0.147	0.0001		
	Size water features	0.331	0.101	0.0080		*0.66*
	Elevation (log)	−0.097	0.056	0.1168		
	Connectivity	0.0027	0.001	0.0683		
Non-water birds			0.196	0.0176	5.764 (2,12)	0.41
	Intercept	1.818	0.214	0.0001		
	Course age	0.007	0.003	0.0153		*0.41*
	Connectivity	0.003	0.002	0.1343		

[a] Numbers in parentheses show degrees of freedom

[b] Adjusted R^2-values shown for the final model, partial R^2-values for associated environmental variables are shown in *italics*

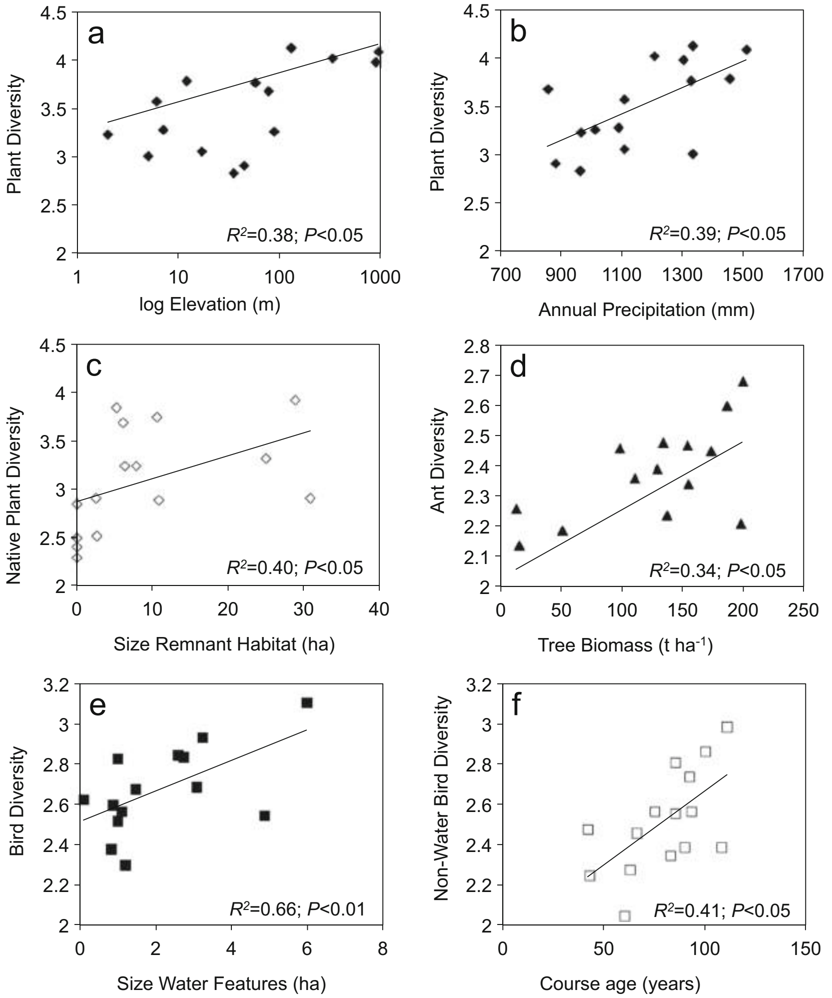

Fig. 2 **Relationships between Shannon-Wiener diversity index (H) and environmental factors for** (**a**) Plant diversity and course elevation (log), (**b**) plant diversity and annual precipitation amount, (**c**) native plant diversity and area of remnant habitat, (**d**) ant diversity and tree biomass, (**e**) bird diversity and the area of water features and (**f**) diversity of non-water birds and course age. Only significant relationships are shown

± 0.49) (Fig. 3b) and birds (12 ± 0.82), the latter otherwise having very similar species richness between the remaining habitat types (Fig. 3d). Overall, significant differences were found between habitat types for the species richness, for all plants, native plants, ants and birds, but not for exotic plant species (Table 2; Fig. 3). These differences were mainly

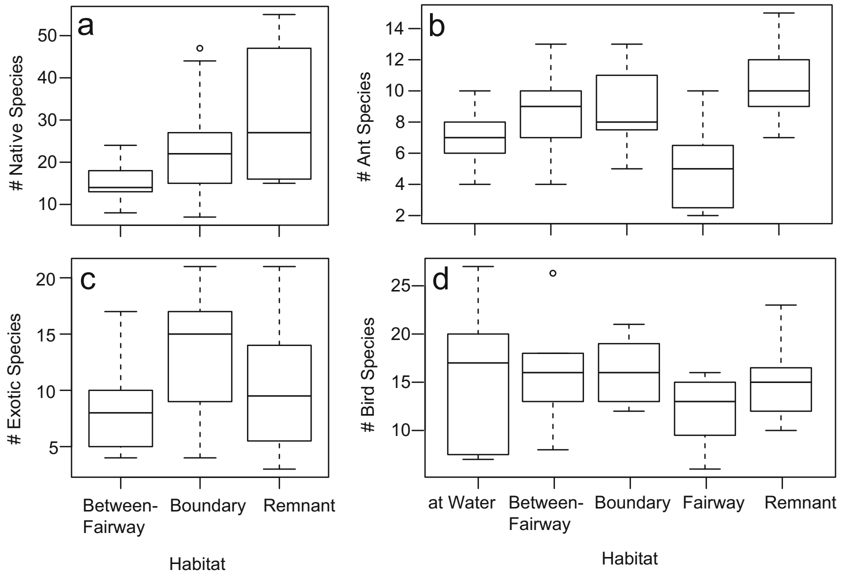

Fig. 3 **Number of species, by habitat type, across 15 golf courses** (**a**) Native plants, (**b**) ants, (**c**) exotic plants and (**d**) birds. Boxes show median and upper and lower quartile, whiskers extend to 10th and 90th percentile

Table 2 Summary LMEs for species richness by habitat type including the model coefficient (Estimate), standard error (SE) and *p*-value

Taxon [a]	Habitat type	Estimate	*SE*	*P-value*
Plants	Intercept	2.135	0.094	0.0001
	Between-Fairway	−0.350	0.100	0.0004
	Boundary	0.350	0.099	0.0004
	Remnant	0.612	0.110	0.0001
Native plants	Intercept	1.667	0.119	0.0001
	Between-Fairway	−0.337	0.146	0.0207
	Boundary	0.337	0.146	0.0207
	Remnant	0.818	0.154	0.0001
Exotic plants	Intercept	3.217	0.600	0.0001
Ants	Intercept	2.417	0.213	0.0001
	Between-Fairway	0.533	0.275	0.0581
	Boundary	0.617	0.275	0.0294
	Fairway	−0.917	0.275	0.0016
	Remnant	0.922	0.294	0.0028
Birds	Intercept	3.903	0.155	0.0585

[a] Plants & native plants: Number of observations ($n = 168$); Habitat:Course ($n = 42$); Course ($n = 15$). Birds & ants: Number of observations ($n = 288$); Habitat:Course ($n = 72$); Course ($n = 15$)

driven by significantly more plant species (all and native; $P < 0.01$) in remnant habitats and significantly less ant ($P < 0.001$) and bird ($P < 0.05$) species on fairways.

Comparisons between habitat types – community composition

Plant species composition varied by habitat type with remnant habitats having the highest proportion of native (compared to exotic) plant species (75%; average of 30.7 ± 4.4 species), followed by between-fairway (65%; 15.7 ± 1.2) and then boundary (61%; 22.5 ± 3.1) habitats. Species composition for the three surveyed taxa combined differed significantly between habitat types (Wald-X^2 = 18.09; $P < 0.05$; *df* 2,33) (Fig. 4a). Pairwise comparisons showed that the combined community composition in remnant habitats was distinctly different to that in between-fairway habitats ($P < 0.01$), and also when compared with boundary and between-fairway habitats ($P < 0.05$). On its own, plant community composition was not significantly different between habitats (Wald-X^2 = 13.64; $P = 0.102$; *df* 2,33), but pairwise comparisons showed that it did differ between remnant and between-fairway areas ($P < 0.05$), as well as between

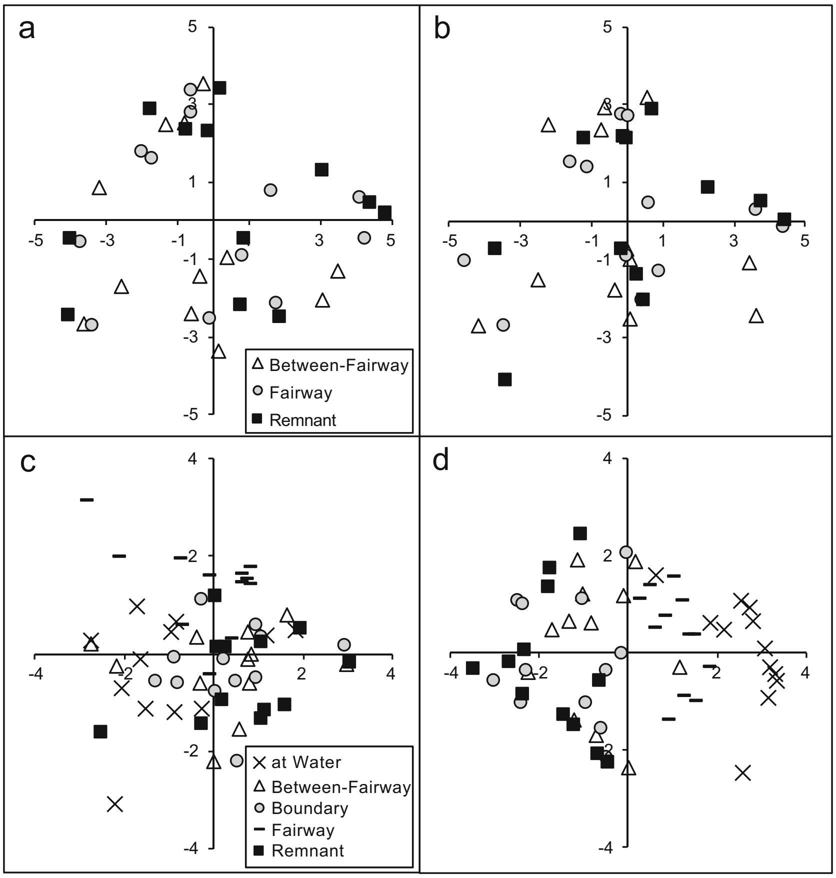

Fig. 4 **Unconstrained ordination based on latent variable models (LVMs) showing community composition by habitat type across 15 golf courses** (**a**) All three taxa combined, (**b**) native plants, (**c**) ants and (**d**) birds

boundary and between-fairway habitats ($P < 0.05$). These differences were largely driven by a greater abundance of native species such as old man Banksia (*Banksia serrata*), coastal wattle (*Acacia longifolia ssp. sophorae*), spiny-head mat-rush (*Lomandra longifolia*) and sweet Pittosporum (*Pittosporum undulatum*) in remnant habitats, and by high abundances of tallowwood (*Eucalyptus microcorys*), Queensland Brush Box (*Lophostemon confertus*) and the non-native Kikuyu grass (*Pennisetum clandestinum*) in between-fairway habitats. The overall composition of native plant species was similarly unaffected by habitat type (Wald-$X^2 = 11.50$; $P = 0.164$; *df* 2,33) (Fig. 4b), although pairwise comparisons revealed significant differences between remnant and between-fairway habitats ($P < 0.01$), with the same species mentioned above driving observed pair-wise differences.

Unlike the plant community, ant community composition did differ significantly between habitat types (Wald-$X^2 = 9.833$; $P < 0.05$; *df* 4,55) (Fig. 4c). Pairwise comparisons showed that fairways harboured a distinctly different ant community ($P < 0.05$) compared to all other habitat types. Of particular note were higher abundances of *Nylanderia nana* and *Pheidole* spp., and lower abundances of *Rhytidoponera* spp. and *Iridomyrmex* spp. on fairways. Habitats around water features were significantly different to remnant habitats ($P < 0.001$) with differences mainly driven by the particularly high occurrence of *Iridomyrmex* nr. *septentrionalis* around water features and the occurrence of species from the genera *Anonychomyrma, Camponotus* and *Monomorium*, and *Crematogaster laeviceps* in remnant habitats.

The complement of bird species recorded during site surveys also differed between habitat types (Wald-$X^2 = 21.10$; $P < 0.001$; *df* 4,55) (Fig. 4d). Pairwise comparisons revealed that remnant habitats had a distinctly different bird assemblage compared to fairway and water features ($P < 0.001$), and also between-fairway areas ($P < 0.01$), but not compared to boundary habitats ($P = 0.962$). Differences were chiefly driven by greater numbers of noisy miners (*Manorina melanocephala*), Australian magpies (*Gymnorhina tibicen*) and red wattlebirds (*Anthochaera carunculata*) on fairways, and more Eurasian coots (*Fulica atra*) and little black cormorants (*Phalacrocorax sulcirostris*) at water features.

Species restricted to a single habitat type

Each habitat type added a suite of unique species to the total species count, most of which were singletons, occurring only once across all surveyed sites (for a complete list of these unique species, refer to Tables S3-S5). Of the five habitat types surveyed, remnant habitats harboured more unique species of native plants and ants than any other habitat type (Table 3). Water features had the most unique bird species ($n = 15$), and fairways the least ($n = 1$) at the site level.

Discussion

This study surveyed biodiversity on urban golf courses at two spatial scales, assessing the influence of habitat type within courses, and the role of environmental drivers between courses. Like many studies of its kind, the lack of repeat surveys over time may limit the generalisability of our findings. As hypothesised, we have clear evidence that floristic diversity was particularly associated with landscape-scale environmental variables including climate and elevation, whereas faunal diversity was more closely associated with local-scale variables such as the area of water features or overall biomass of trees. At the community level, the composition of all three taxa differed markedly between playing and non-playing (woody) areas, indicating that the presence of a heterogeneous mix of habitat types can enhance levels of biodiversity within the wider metropolitan landscape.

Environmental drivers of biodiversity differ between taxa

Environmental correlates of biodiversity differed for plants, birds and ants. Floristic and faunal diversity has been related to a wide range of environmental variables in previous studies with, for example, plant diversity positively related to precipitation and temperature, and negatively related to altitude (Gaston and Blackburn 2000). Similar trends have been reported for both ants (Dunn et al. 2009) and birds (Gaston and Blackburn 2000) in earlier studies.

The role of climate (in particular precipitation) and altitude as drivers of plant diversity is clear from our study, as evidenced by greater diversity on golf courses located in wetter locations and at higher elevations - principally in the area of the Blue Mountains to the west of the Sydney Basin. Although the average number of plant species in Blue Mountains golf courses (~220 spp. per hectare, see Table S2, supporting information) was lower than that in the surrounding native dry sclerophyll forests (360 spp. per hectare; Rice and Westoby 1983), these are particularly high values for on-course species richness compared to similar studies (e.g. Yasuda and Koike 2006). Other courses in the Sydney suburban area that had similar values for plant species richness and diversity to sites in the Blue Mountains were also located adjacent to large areas of native woodland, suggesting that the nature of the surrounding landscape plays an important role in course-level biodiversity. Indeed, golf courses can be considered important at the landscape-scale by providing connections between isolated areas of native habitats, and by adding structural diversity - such as water features and open spaces - to otherwise woodland-dominated areas (Hodgkison et al. 2007b; Gange et al. 2003). The importance of landscape-scale connectivity of remnant native habitats and corridors for species movement has previously been shown for semi-

Table 3 Unique species occurring within a single habitat type

Taxon	Remnant # (%)	Boundary # (%)	Between- fairway # (%)	Water feature # (%)	Fairway # (%)
All plants [a]	68 (16)	90 (21)	61 (23)	–	–
Native plants [a]	51 (19)	34 (13)	33 (12)	–	–
Exotic plants [a]	17 (10)	56 (33)	30 (18)	–	–
Ants	12 (17)	7 (10)	3 (4)	2 (3)	3 (4)
Birds	10 (10)	10 (9)	1 (1)	15 (16)	1 (1)

[a] Plants were surveyed in woody habitats only; # shows number of species, percentage shown in parentheses

natural grasslands (Lindborg and Eriksson 2004), longleaf pine savannahs (Brudvig et al. 2009) and also for urban green spaces (Kong et al. 2010).

Local-scale features correlate with faunal diversity

Our study revealed a positive relationship between ant diversity and site-level tree biomass, which is in line with findings elsewhere of the greatest abundance and diversity of ants being associated with wooded, rather than other habitat types, such as heath (Andersen 1986). However, this contrasts with the lower ant diversity reported for more complex habitats in urban green spaces in the Melbourne area (Ossola et al. 2015) and in Sydney sandstone ridge-top woodlands (Lassau and Hochuli 2004). Differences in findings between these geographically close studies are likely associated with the contrasting settings of these studies (native habitat in Lassau and Hochuli (2004) versus metropolitan landscape in our study).

Birds featured prominently on the courses surveyed. We found higher bird diversity on courses with a greater area of water features, reflecting the dominance of water birds (e.g. cormorant, Australasian grebe, white-faced heron, and many ducks such as chestnut teal and hardhead) in our study – species that are attracted to well-maintained water features within courses. The importance of the size of suitable habitat patches for both species richness and abundance is well known for many taxa (e.g. MacArthur and Wilson 1967; Collinge 1996), including birds. Other studies investigating bird fauna on golf courses have also found species richness to be positively associated with the area of native on-course vegetation (Hodgkison et al. 2007b) and forest habitat (Sorace and Visentin 2007), indicating that structural heterogeneity within sites may be particularly important for birds.

We did not find a significant relationship between the area of remnant vegetation and bird species richness, although the diversity of non-water birds was higher on older courses. Again, this relationship may be due to the fact that the oldest courses - with the highest bird diversity - are located in the Blue Mountains area, where the surrounding area has large tracts of continuous native woodland. Some of the woodland specialists were also associated with older courses, for example the brown treecreeper (*Climacteris picumnus*), the white-winged triller (*Lalage tricolor*) and the lyrebird (*Menura novaehollandiae*), supporting the notion that older habitats are particularly valuable for more specialist species (Southwood et al. 1983), which are generally less frequent in a community (Gaston 1996). A similar pattern of higher faunal diversity on older golf courses has also been identified in the Greater Helsinki area in Finland (Saarikivi et al. 2010).

Remnant habitats add biodiversity value

Species richness and community composition were compared between different habitat types, which represent different management intensities in terms of mowing frequency, clearing of dead plant matter and supplementary inputs of water or agrochemicals. We found that remnant habitats consistently harboured more species than other habitat types (Fig. 3), a large proportion of which were unique at the site level. Furthermore, up to 90% of the recorded plant species in these habitats were native, the diversity of which was positively associated with the size of remnant patches, thus highlighting the importance of good-sized native remnants for preserving local flora. Similarly, in Japan, plant species composition in non-playing forest areas within golf courses was found to differ distinctly from between-fairway habitats, the former more closely resembling communities of native remnant forests (Yasuda and Koike 2006). All wooded habitats were associated with significantly higher numbers of bird species compared to fairways, suggesting that the former play an important role in supporting landscape-scale bird diversity, perhaps by providing refuges for species that are displaced as surrounding areas become increasingly urbanised (Sorace and Visentin 2007; Hodgkison et al. 2007a, b).

Golf courses can offer a great variety of habitats for ants, which are valuable ecosystem engineers as they scavenge for dead insects, predate on potential insect pests, pollinate plants and aerate the soil. Overall, significantly fewer ant species were found on fairway habitats compared to the more structurally complex wooded habitat types that are known to provide suitable habitat for foraging and nesting (Andersen 1986).

Community composition markedly different between playing and non-playing areas

The overall community composition for all three taxa differed between playing and non-playing areas (Fig. 4). For example, between-fairway habitats had simplified plant communities compared to boundary and remnant habitats; this trend was most likely driven by the more frequent occurrence of native shrubby understorey plants, including members of the *Banksia*, *Acacia* and *Leptospermum* genera in the latter habitats. Similar differences in plant species composition between habitats have been found on golf courses in Japan, with non-playing forest areas within courses more closely resembling communities of native remnant forests than, for example, between-fairway habitat (Yasuda and Koike 2006). The presence of multi-layered, remnant native vegetation has been found to be beneficial for local floral and faunal biodiversity in other urban studies (McKinnley 2002; Garden et al. 2007).

Between-habitat differences in bird community composition were driven by the occurrence of habitat specialists, particularly woodland birds in remnant and boundary habitats and wetland birds around water features. Similar distinctions between woodland versus wetland bird communities have also been reported for golf courses in suburban areas in southern Queensland (Hodgkison et al. 2007a). Of note here is that we frequently found that fairways were predominantly associated with typical grassland birds, including the masked lapwing (*Vanellus miles*) and the crested pigeon (*Ocyphaps lophotes*), as well as urban-adapted habitat generalists, such as the welcome swallow (*Hirundo neoxena*), magpie lark (*Grallina cyanoleuca*) and the noisy miner (*Manorina melanocephala*). There were fewer bird species recorded on fairways than in other on-course habitats despite the more open nature of fairways making it easier to record a sighting. The noisy miners, in particular, drive other birds away and are particularly associated with eucalypt trees with little understorey i.e. fairway and between-fairway areas (Maron et al. 2013).

The unique ant composition in fairway habitats was largely driven by small yellow or brown ants of the genus *Pheidole*, which nest and live in the soil. This type of nesting behaviour can enhance topsoil condition and nutrient cycling by creating tunnels, mixing plant and animal litter and reducing soil compaction (Lopez and Potter 2003). Underground foraging behaviour can also provide great on-course benefits by removal of dead insects and predation on potential pest species (Lopez and Potter 2003). Urban generalist species, such as *Iridomyrmex* meat ants were the most abundant group of ants collected in this study. These ants are the most frequently encountered group in Australia, and can occur in such large numbers that they often outcompete other ants in the area (Andersen 1995). The second most common group of ants recorded was the green-headed ants (genus *Rhytidoponera*). These large green metallic ants are common in urban parks and gardens; they prefer open habitats and are usually seen on the ground or on low vegetation (Shattuck 1999). This opportunistic genus is associated with disturbed habitats (Yates and Andrew 2011) and has also been reported to be abundant in urban woodland remnants and parks in southeast Melbourne (Ossola et al. 2015).

Conclusions

The key relationships between species diversity and environmental variables differed between taxonomic groups; plant diversity was closely associated with landscape-scale factors (precipitation), whereas ants and birds were more closely related to local (site-level) factors, notably tree biomass (ants) and the size of water features (birds). Overall, our results indicate that large areas of open, park-like fairways, water features and patches of remnant woodland on golf courses provide a habitat matrix that can support a wide range of plant and animal species. On-course remnant habitats in particular harboured a greater diversity of the less mobile species (i.e. plants and ants), highlighting their role as refugia for local flora and fauna and thus representing mini hot spots of diversity in an otherwise species-poor urban landscape. Our results suggest that the floristic and faunal diversity of urban golf courses can be enhanced by management practices aimed at increasing the extent of woody non-playing areas, especially by preserving and/or enhancing remnant native habitats.

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Channel Law Group, LLP

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 12

Remington
BAT SURVEYS OF THE
PROPOSED WHITTIER MATRIX OIL PROJECT

BAT SURVEYS OF THE PROPOSED WHITTIER MATRIX OIL PROJECT

Whittier, California

May-October 2011

Final Report

Prepared for

THE PUENTE HILLS HABITAT PRESERVATION AUTHORITY

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28 December 2011

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EXECUTIVE SUMMARY

All ten bat species previously documented on the Puente Hills Preserve (PHP) were detected during the 2011 survey period within the Whittier Matrix Oil Survey Area. An eleventh species (pallid bat (*Antrozous pallidus*), detected in the eastern Puente Hills in 2004 was not recorded during this survey. A twelfth species (big free-tailed bat, *Nyctinomops macrotis*) possibly occurs onsite, but was not confirmed.

Five species, including two sensitive (MSSC), foliage-roosting species, appeared to be day-roosting in the immediate vicinity of the survey area. A sixth species roosted nearby, but possibly off site. No roost structures were located. There was no evidence of the existence of a large maternity colony in the project area during this survey period.

Most bats appeared to be using the Whittier Matrix Oil Survey Area primarily for foraging, although the timing of the activity – later at night – does not preclude their use of night roosts onsite.

At least two migratory species used the survey area for roosting and foraging. One of the migratory species (the hoary bat, *Lasiurus cinereus*) was present on site throughout the summer, which is unusual for this species in this region.

A progress report was issued on October 5, 2011, documenting the initial survey results from May through August 2011. The primary additions to the final report from the progress report are:

1) The addition of a new species to the list (western mastiff bat, *Eumops perotis*)(MSSC);
2) Potential evidence of another molossid (*N. macrotis*) – a migratory species – foraging on site;
3) Evidence of increased foraging and roosting of lasiurines, particularly *L. cinereus* and western yellow bat, *L. xanthinus*) during the fall months;
4) The absence of confirmed activity in the fall of the second-most commonly recorded species (big brown bat, *Eptesicus fuscus*) in the spring and summer, indicating that this species may be hibernating and/or migrating.

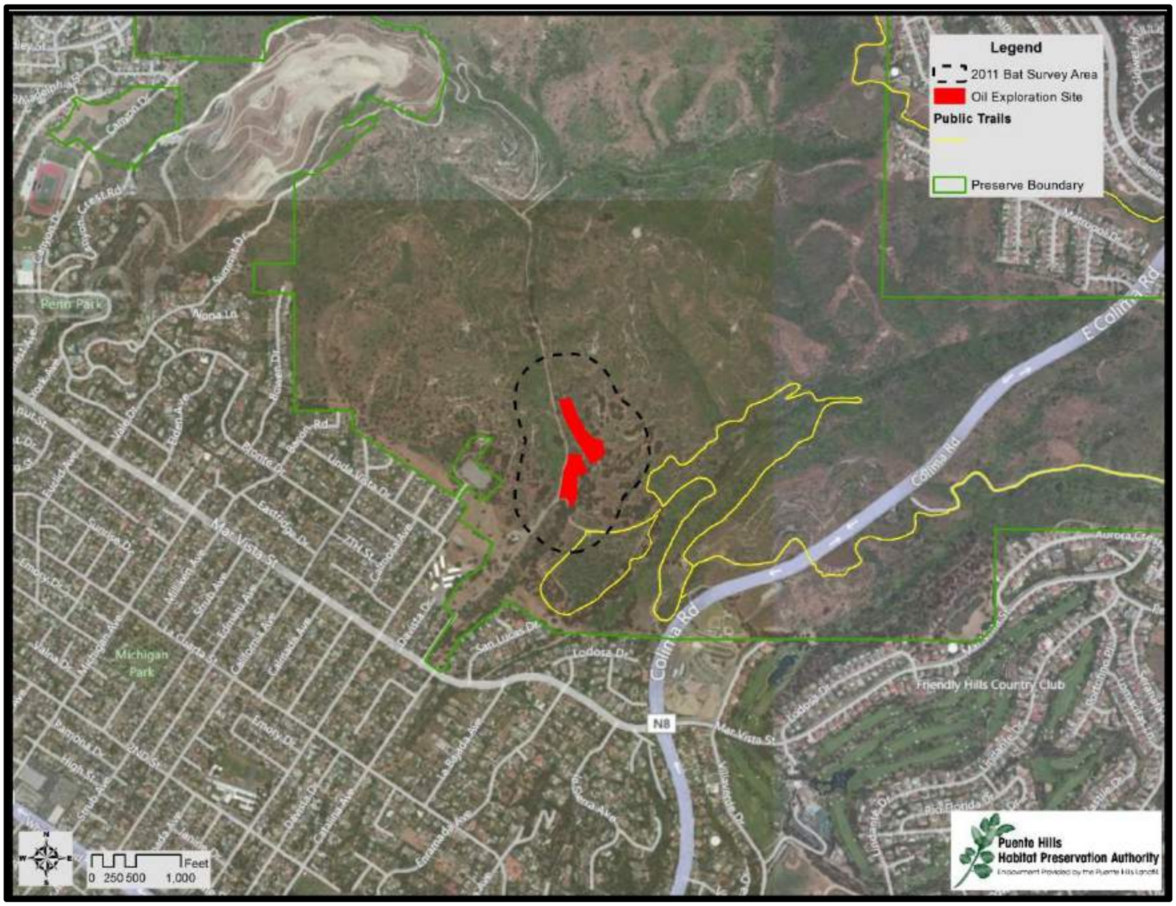
Strategies for mitigating impacts to bats are included at the end of this report.

INTRODUCTION/BACKGROUND

The Puente Hills Preserve consists of over 3,800 acres of varied habitat types and topography surrounded by urbanization to the north, west, and south. The Preserve, containing native and introduced vegetation and numerous vertebrate species, is fragmented by urban developments and several major roads.

In November 2011, the City of Whittier has approved conducting oil exploration on a 7-acre portion of the Preserve (Figure 1). Bat surveys of the site were requested by the City to assess potential impacts to bat species by the project, and were conducted within a 60-acre study area around the project oil exploration site [Whittier Matrix Oil Survey Area (WMOSA)].

Figure 1. The Whittier Matrix Oil Survey Area.



State and federal land management agencies officially recognize over two-thirds of the south coast ecoregion's 24 bat species as sensitive, and three additional species have been proposed to become California Species of Special Concern in the latest draft of the California Department of Fish and Game's (CDFG) "Mammal Species of Special Concern in California (MSSC)." Eleven of the 16 species most likely to occur in the area have been detected in the Puente Hills (Table 1) during previous surveys conducted by Brown, Berry, and Remington (2004) and Remington (2005-06).

Table 1. Bat Species Documented in the Puente Hills from 2004-2006.

Family Phyllostomidae	**Leaf-nosed bats**	**2004**	**2005-06**
Choeronycteris mexicana [1,2]	Mexican long-tongued bat		
Family Molossidae	**Free-tailed bats**		
Eumops perotis [1,2]	Western mastiff bat		X
Nyctinomops femorosaccus [1]	Pocketed free-tailed bat		X
Nyctinomops macrotis [1,2]	Big free-tailed bat	X	
Tadarida brasiliensis	Mexican free-tailed bat		X
Family Vespertilionidae	**Mouse-eared bats**		
Antrozous pallidus [1]	Pallid bat	X	
Corynorhinus townsendii [1,2]	Townsend's big-eared bat		
Eptesicus fuscus pallidus	Big brown bat	X	X
Lasiurus blossevillii [1]	Western red bat		X
Lasiurus cinereus	Hoary bat		X
Lasiurus xanthinus [3]	Southern yellow bat		X
Myotis californicus	California myotis	X	X
Myotis ciliolabrum [2]	Small-footed myotis		
Myotis evotis [2]	Long-eared myotis		
Myotis yumanensis [2]	Yuma myotis	X	X
Parastrellus hesperus	Western pipistrelle		X

[1] California Department of Fish and Game, Mammal of Special Concern or Sensitive Species

[2] Former Candidate (Category 2) for listing under U.S. Endangered Species Act; Species of Concern

[3] Proposed for addition to CDFG, MSSC list

The 2004 surveys included the Puente Hills, east of the Puente Hills Preserve. The 2005-06 surveys involved monthly surveys at five major sites within the Puente Hills Preserve, including the Whittier Hills, Hacienda Heights, and La Habra Heights. The combination of riparian habitat, woodland, scrub, cliff and rock features, and seasonal water sources in these areas are important – especially in combination – to bats.

Habitat loss, roost disturbance, and vegetation modification and removal pose major threats to bat populations in the south coast ecoregion. Fire suppression practices, pest control operations, and recreational activities can also negatively impact bats. Bats are exposed to all of these impacts in and near urban areas, and the cumulative effects on local populations can be substantial, but difficult or impossible to measure.

The objectives of the Bat Monitoring program are the following:

1) Update the species list from the 2004 and 2005-06 surveys;
2) Locate roosting and foraging areas;
3) Recommend mitigation strategies for potential impacts to bats.

This report reviews the data from the entire survey, from May through October, 2011.

METHODS

Acoustic monitoring was the primary survey method used to monitor bats at this site. Two acoustic sampling methods and three types of detectors were used to record bat calls. Bat activity was monitored actively by three observers, two with Anabat detectors and one with a Pettersson D240 detector for three hours, once a month, beginning at sunset. Active monitoring involved walking transects, primarily on current and old roads, but also off road. Passive monitoring involved the deployment of 1-2 Anabats and one SM2 detector for extended periods at five locations (Figure 2, Table 2, Table 2a).

The microphone of the Anabat detects sounds in both the upper range of human hearing and the ultrasonic range (4-200 kHz). A Zero-Crossing Meter paired with the Anabat stores detected bat calls on a compact flash card for later retrieval and download onto a laptop computer, where they can be viewed and analyzed as sonograms. The SM2 detector picks up calls up to 100 kHz. All local bat species can be detected within the frequency range of both detectors. The detection range of the detectors depends on a variety of factors, including the frequency range and intensity of the bat call, air temperature, habitat, relative humidity, and altitude. The SM2 is more sensitive than the Anabat.

The detectors were programmed to begin monitoring ½ hour before sunset and end monitoring ½ hour after sunrise. In both survey methods, bat calls were stored on flash cards in the detectors and downloaded onto laptop computers for later analysis.

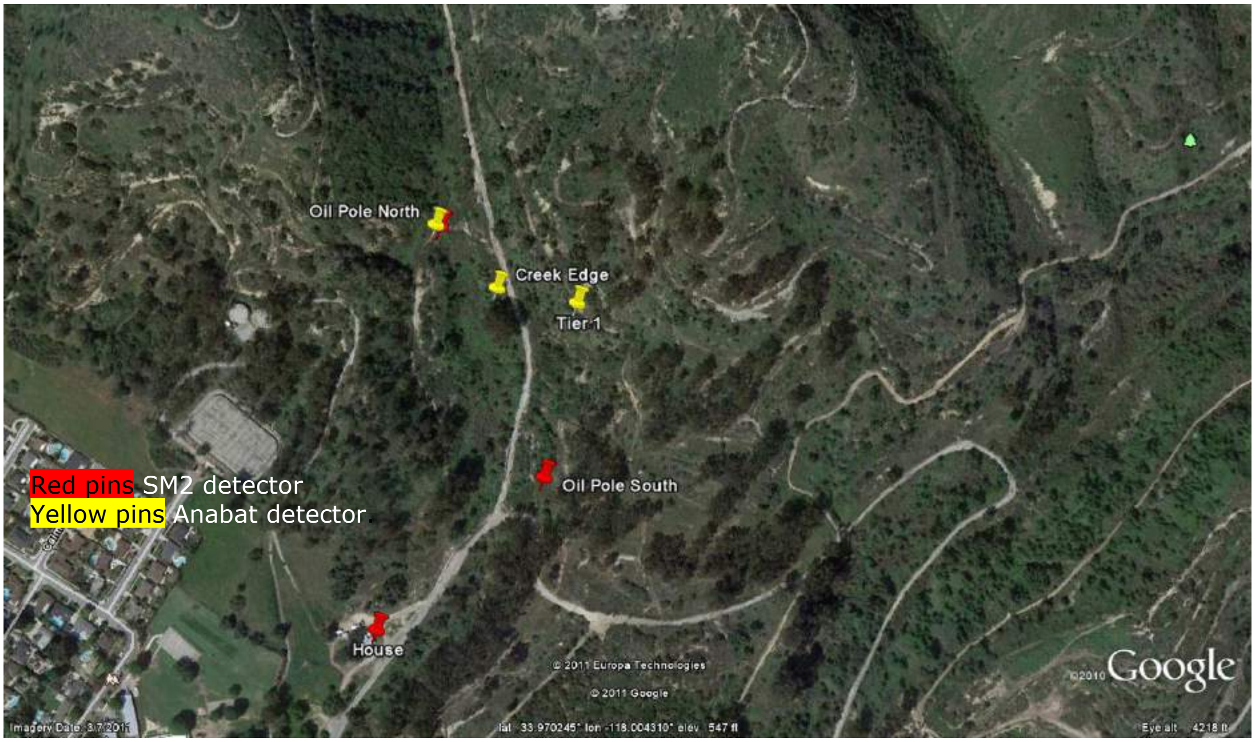
Table 2. Active survey dates at the WMOSA in 2011.

22 May	21 June	20 July	22 August	19 September	19 October

Table 2a. Number of nights of passive acoustic monitoring at each site.

Site	May	June	July	August	Sept	Oct	TOTAL
House	7	10	▨	▨	▨	▨	17
Creek Edge	9	10	▨	▨	▨	▨	19
Oil Post South	▨	7	27	▨	▨	▨	34
Oil Post North	▨	▨	7	22	10	9	48
Tier 1	3	9	6	▨	▨	▨	18
TOTAL	**19**	**36**	**40**	**22**	**10**	**9**	136

Figure 2. Passive acoustic monitoring stations in the Whittier Matrix Oil Survey Area



Differences in survey effort reflect variations in equipment functioning and availability, as well as human interference with deployed equipment.

Active monitoring also involved the search, by each of the three observers, for bats emerging early in the evening (within one-half hour of sunrise). The end of civil twilight – the limit at which twilight illumination is sufficient, under clear weather conditions, for terrestrial objects to be clearly distinguished – occurs at approximately 30 minutes after sunset), meaning that there is still ambient light from the sun during this period. Therefore, bats detected during this period are assumed to have emerged very recently from their day roosts, which would indicate that these structures are located in the very near vicinity. If bats were observed flying low during the period within one-half hour of sunset, the approximate location of the inferred roosting location would be mapped; if possible, a search for the roost would be conducted to confirm the location. Roost proximity was also inferred from the timing of calls recorded on passive detectors (within one-half hour of sunrise or sunset), with the early calls indicating nearby roosts.

Calls recorded within an hour of sunset indicate that the bats producing them likely emerged relatively recently, but have probably been foraging for some period of time. The roosts of bats recorded during this period may be onsite, but since the survey area is relatively small, they may also be nearby, but out of the survey area.

SUMMARY OF RESULTS

Species List

From May through October, all 10 bat species detected during the 2005-06 surveys were recorded in the Whittier Matrix Oil Project area (Table 3). A total of 2,007 call files were recorded over 100 nights at the five passive acoustic survey sites. The four active surveys generated 53 additional call files.

- The acoustically dominant species recorded was *Tadarida brasiliensis* (Mexican free-tailed bat) at all monitoring sites, followed by *Eptesicus fuscus* (big brown bat). These two species comprised 83% of identified detections (Figures 3a-b, Table 4).
- The foliage-roosting bats – *Lasiurus blossevillii* (Western red bat), *L. cinereus* (hoary bat)*, L. xanthinus* (western yellow bat) – comprised 9% of detections.
- Four California Mammal Species of Special Concern (MSSC) were detected: *L. blossevillii* (western red bat), *L. xanthinus* (western yellow bat), *Eumops perotis* (western mastiff bat) and *Nyctinomops femorosaccus* (pocketed free-tailed bat).
- Activity of lasiurines was greatest in spring and fall; activity of big brown bats was recorded exclusively in spring and summer.

Table 3. Species composition at passive monitoring sites in the WMOSA.

Family Phyllostomidae	**Leaf-nosed bats**	**Acronym**	**2004**	**2005-06**	**2011**
Choeronycteris mexicana [1,2]	Mexican long-tongued bat	CHME			
Family Molossidae	**Free-tailed bats**				
Eumops perotis [1,2]	Western mastiff bat	EUPE		X	X
Nyctinomops femorosaccus [1]	Pocketed free-tailed bat	NYFE		X	X
Nyctinomops macrotis [1,2]	Big free-tailed bat	NYMA			?
Tadarida brasiliensis	Mexican free-tailed bat	TABR	X	X	X
Family Vespertilionidae	**Mouse-eared bats**				
Antrozous pallidus [1]	Pallid bat	ANPA	X		
Corynorhinus townsendii [1,2]	Townsend's big-eared bat	COTO			
Eptesicus fuscus pallidus	Big brown bat	EPFU	X	X	X
Lasiurus blossevillii [1]	Western red bat	LABL		X	X
Lasiurus cinereus	Hoary bat	LACI		X	X
Lasiurus xanthinus [3]	Southern yellow bat	LAXA		X	X
Myotis californicus	California myotis	MYCA	X	X	X
Myotis ciliolabrum [2]	Small-footed myotis	MYCI			
Myotis evotis [2]	Long-eared myotis	MYEV			
Myotis yumanensis [2]	Yuma myotis	MYYU	X	X	X
Parastrellus hesperus	Western pipistrelle	PAHE		X	X

[1] California Department of Fish and Game, Mammal of Special Concern or Sensitive Species (MSSC)

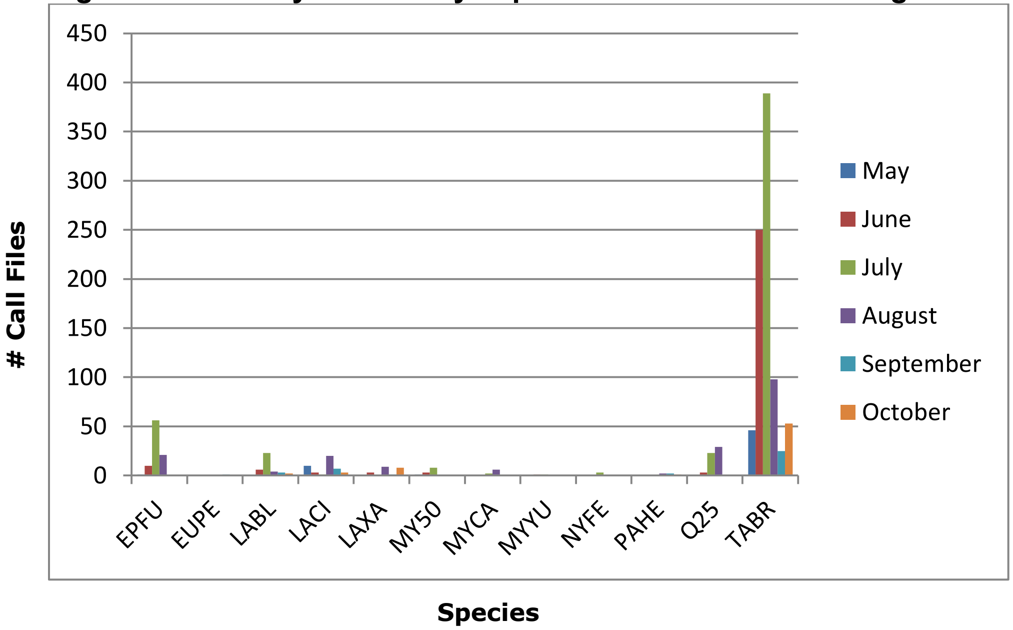
[2] Former Candidate (Category 2) for listing under U.S. Endangered Species Act; Species of Concern

[3] Proposed for addition to CDFG, MSSC list

Mexican free-tailed bats (TABR) were, by far, the most commonly detected species at all sites and during each month, comprising 76% of total calls that were identified (Table 4). When Mexican free-tailed bat activity is removed from the chart (Figure 3b), the relative dominance of the other species is apparent. Big brown bats (EPFU) were the second most dominant species recorded, comprising 8% of total call files, although this species was not recorded during the fall. This indicates that they may be hibernating onsite or nearby, migrating, or both. Big brown bats activity is typically low or absent from recordings in southern California. This species has been observed hibernating in the same structure used for roosting in the summertime in southern California. Western red bats (LABL)(MSSC listed), hoary bats (LACI)(in consideration for MSSC listing), and western yellow bats (LAXA)(MSSC listed) comprised 3, 4, and 2%, respectively, of the total. The 50-kHz myotis (MY50, MYCA, and MYYU) (Figure 3b) comprised 2%. Pocketed free-tailed bats (NYFE)(MSSC listed) and canyon bats (PAHE) each comprised less than 1% of total calls. Western mastiff bats (EUPE)(MSSC listed) were confirmed only once during the survey period, in September.

Big free-tailed bats (NYMA)(MSSC listed) were not confirmed during this survey period, but are listed as possibly occurring on-site ("?" in Table 3) because calls recorded in September containing characteristics of this species contained too much ambient noise to be positively identified. Big free-tailed bats are migratory and are recorded sporadically in southern California.

Figure 3a. Monthly bat activity at passive acoustic monitoring stations in the WMOSA.



MY50	50 kHz calls that could be either MYCA or MYYU
Q25	25 kHz calls that could be either EPFU OR TABR

Variation in detection rates from month to month is influenced by a variety of factors, including seasonal activity patterns, natural history, acoustic factors – both natural and equipment-related – and sampling effort.

Bat pups are born in late spring or early summer and are volant (able to fly) within several weeks. The higher rates of detections in June and July in many species reflect the increased numbers of newly-volant bats joining the adults in foraging. Mexican free-tailed bats are also among the most detectable bats, acoustically, of any species, because they produce high-intensity, relatively low-frequency echolocation calls (~20-30 kHz). The higher the frequency of calls, the more quickly they attenuate. Below that frequency range, particularly in the range of the western mastiff bat, calls are more difficult to detect because of the detectors' low frequency filter (designed to prevent insect-produced sounds from dominating the recordings.

Figure 3b. Monthly bat activity at passive acoustic monitoring stations excluding TABR

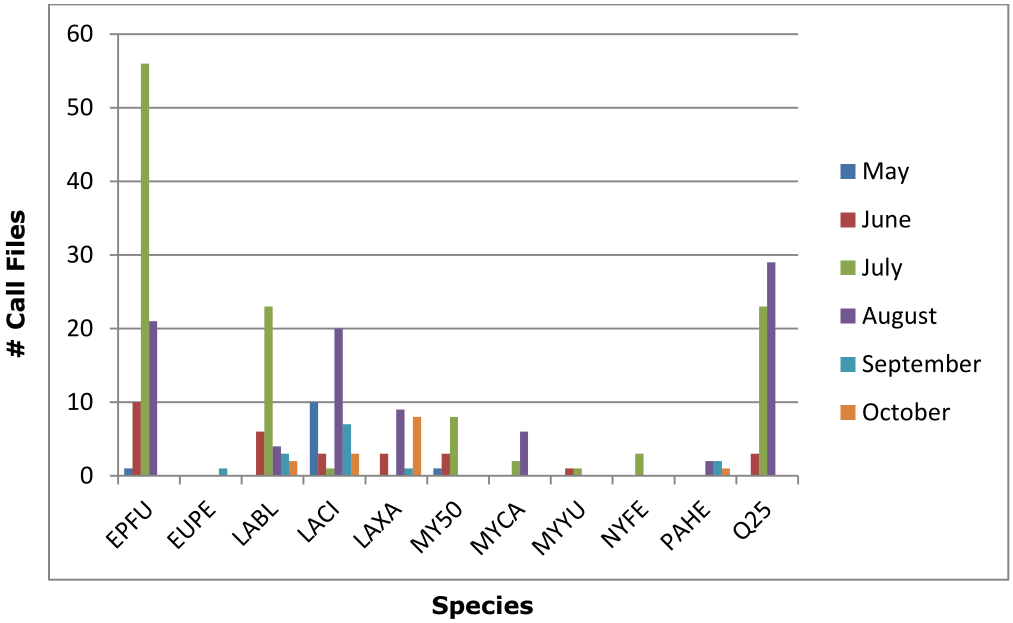


Table 4. Bat species activity expressed as a percentage of total identifiable calls.

Species	Acronym	# Call Files	%
Big brown bat	EPFU	88	9
Western mastiff bat	EUPE	1	< 1
Western red bat	LABL	38	3
Hoary bat	LACI	44	3
Western yellow bat	LAXA	21	1
50 kHz Myotis (California & Yuma Myotis)	MY50	22	2
Pocketed free-tailed bat	NYFE	3	< 1
Canyon bat	PAHE	5	< 1
25 kHz bats (mostly EPFU & TABR)	Q25	55	5
Mexican free-tailed bat	TABR	861	77
	Grand Total	**1138**	**100**

The drop-off in detection rates from July to August most likely represents, at least in part, mortality of first-year bats.

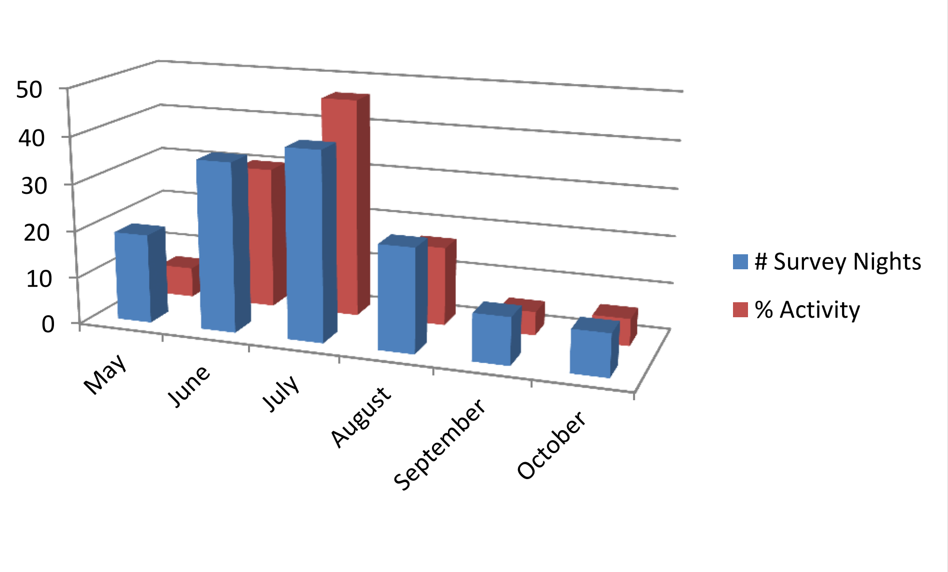
The different monthly pattern exhibited by hoary bats (LACI) and western yellow bats (LAXA) are related to their migratory habits. Hoary bats typically begin arriving in coastal southern California in the fall and are present (as a species, although possibly not the same individuals) throughout winter and spring, and are gone from the region by summer.

The August peak in numbers of this species is atypical for the region, which usually has the highest detection rates in fall or spring. The higher rates in August could represent an earlier-than-typical migratory wave, but the lower detection numbers in September and October are likely more strongly related sampling effort and equipment.

July had the greatest number of monitoring nights (40). June had 36, August had 22, and May had 19). The lowest levels, recorded in September and October, are due to equipment failures. This resulted in the lowest sampling effort, with 10 and 9 days sampled, respectively, with Anabat only, which is less sensitive than the SM2. Recorded activity levels roughly corresponded with survey effort (Figure 4).

Species diversity varied from four to seven species recorded each month, with the fewest species recorded in May and October (four and five, respectively). Both sampling effort and natural history influence the total. In the fall, detections were almost exclusively lasiurines (including migratory foliage-roosting bats) and molossids (free-tailed bats), which are long-distance flyers, including migratory species. The species recorded in fall are those expected for this site and season. All molossids except Mexican free-tailed bats are MSSC, and two of the three lasiurines are MSSC (western red bats and western yellow bats). A proposal to include hoary bats on the MSSC list is currently under consideration.

Figure 4. Monthly bat activity and survey effort at passive acoustic monitoring sites.



Comparing species activity by site, nearly 50% of activity was recorded at Oil Post South, at least partly due to the greatest survey effort occurring there in July (Figure 5a, Figure 6). Mexican free-tailed bats were the dominant species recorded at all sites. Figure 5b shows the distribution of recordings of the other species, by site. Big brown bats comprised nearly 9% of total calls and were the second most dominant species recorded at Oil Post North and South and at Tier 1. Hoary bats were the second most dominant species at the House and Creek Edge. Half of total hoary bat and western yellow bat activity was recorded in September and October, indicating a migratory wave of these two species. Hoary bats were recorded during all months of this study, but more frequently recorded in spring and fall. They are known migrants, typically absent during the summer in coastal southern California.

Figure 5a. Bat activity by site at passive acoustic monitoring stations in the WMOSA.

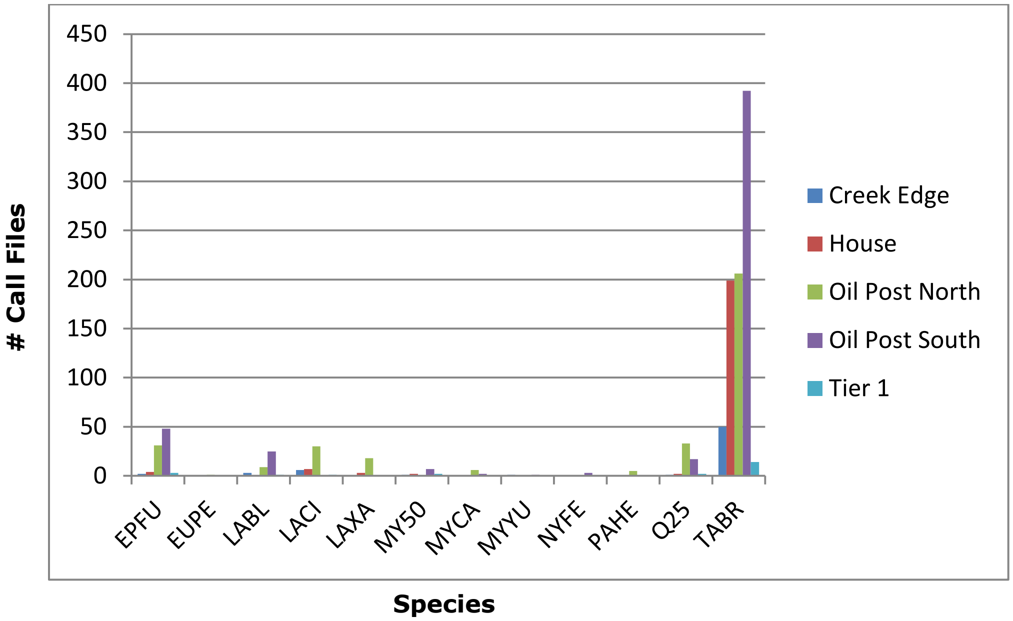


Figure 5b. Site bat activity at passive acoustic monitoring stations, excluding TABR.

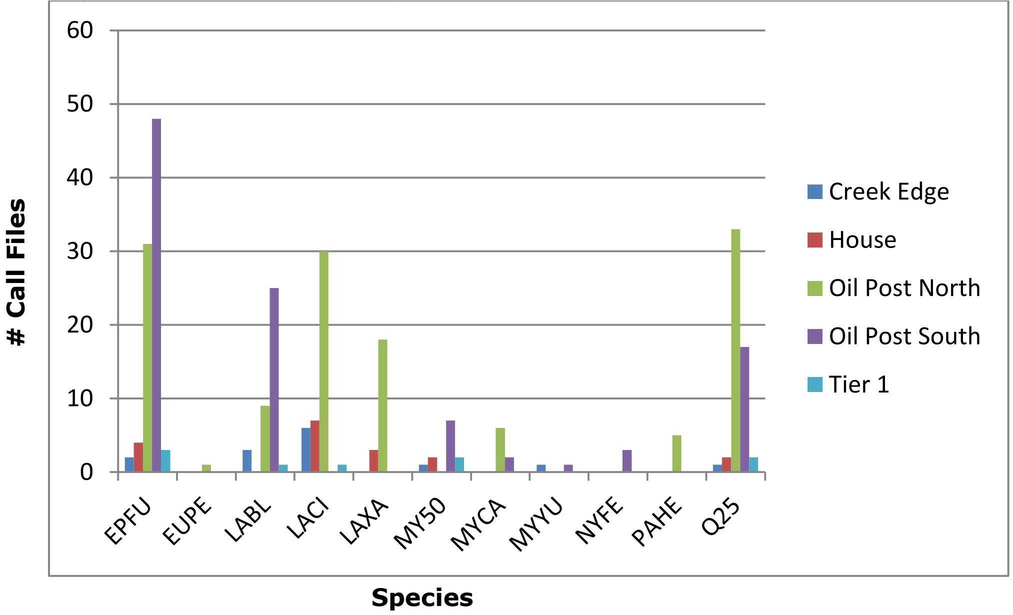
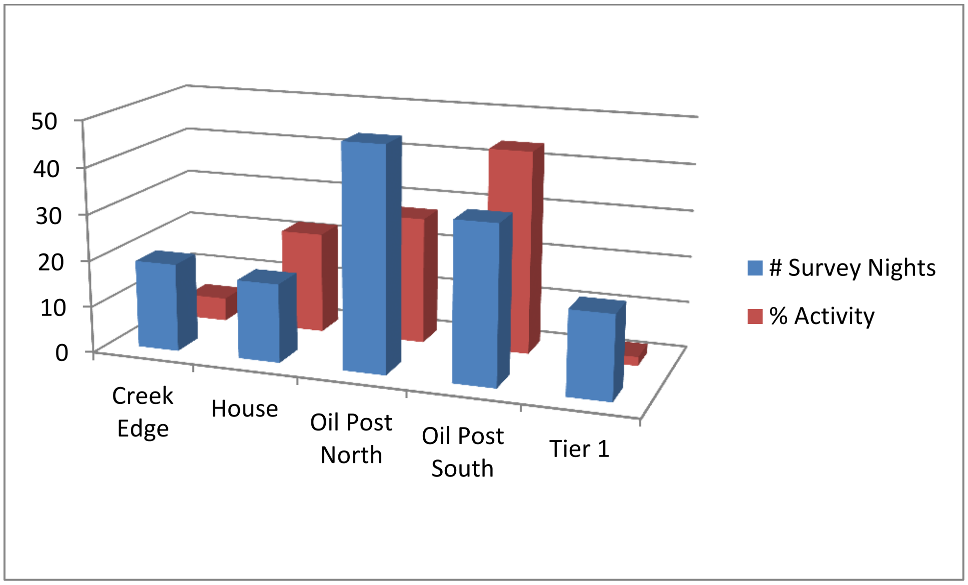


Table 5. Bat activity by site expressed as a percentage of total call files.

Site	# Call Files	%
Creek Edge	102	5
House	440	22
Oil Post North	551	27
Oil Post South	875	44
Tier 1	39	2
Grand Total	**2007**	**100**

Figure 6. Monthly bat activity by site and survey effort at passive acoustic monitoring sites.



Survey effort does not explain all variation in measured activity levels. The Creek Edge, House, and Tier 1 sites had nearly identical survey effort (19, 17, and 18 nights, respectively), but the house had higher recorded activity. This is probably due, at least in part, to the greater sensitivity of the SM2 detector at the House. The Creek Edge and Tier 1 were monitored by Anabat detectors. The differences in recorded activity between Oil Post North and South were probably due to the primary type of detector deployed at the site. Oil Post North was monitored for two weeks longer than Oil Post South, but had lower recorded activity. Oil Post South was monitored exclusively with the SM2. Oil Post North was monitored, alternately, with the Anabat and SM2 – exclusively with the Anabat in September and October.

Overall bat activity during the survey period was relatively low at all sites and seasons probably because insect activity was uniformly low across habitats at ground level in the survey area.

Foraging and Roosting

Bat activity at passive acoustic monitoring stations in the Matrix Oil Survey Area varied substantially, both nightly and by site. Activity early in the evening tended to be low, with the occasional exception of Mexican free-tailed bats (TABR), indicating that most of the bats foraging later in the evening had day-roosts elsewhere.

Bat nightly foraging distances vary by species, gender, individual bat, forage quality and distribution, and season. Mexican free-tailed bats may travel 25 miles or more, round trip, in a night. Nursing females may forage within a few hundred meters of a roost. They may travel farther when it is not maternity season. Low forage quality requires greater travel distances, but if the distance required exceeds the energy gained from foraging, a bat may not be able to reproduce, migrate, or survive the winter. If high quality foraging habitat exists a few miles from a high quality roost, an individual bat may choose to fly the distance.

There is no evidence of exceptional quality foraging opportunities at the acoustic monitoring stations used in this study. The survey area likely represents a regular portion of the foraging rounds for at least five species detected this season, and at least two others seasonally.

Four bat species [Mexican free-tailed bat (TABR), big brown bat (EPFU), hoary bat (LACI), and western yellow bat (LAXA)] were detected within a half-hour of sunset on at least one night during the survey period, indicating that they roosted nearby at that time; the canyon bat was detected within one hour of sunset and western red bat, (LABL), was detected within one hour of sunrise, also indicating roosting within the general vicinity (Table 6).

Table 6. Bat species inferred to be day-roosting onsite from the timing of recorded calls.

FAMILY/SPECIES	COMMON NAME	Day-roosting on site
Family Molossidae	**Free-tailed bats**	
Eumops perotis [1,2]	Western mastiff bat	
Nyctinomops femorosaccus [1]	Pocketed free-tailed bat	
Nyctinomops macrotis [1,2]	Big free-tailed bat	
Tadarida brasiliensis	Mexican free-tailed bat	Y
Family Vespertilionidae	**Mouse-eared bats**	
Eptesicus fuscus pallidus	Big brown bat	Y
Lasiurus blossevillii [1]	Western red bat	*
Lasiurus cinereus	Hoary bat	Y
Lasiurus xanthinus [3]	Southern yellow bat	Y
Myotis californicus	California myotis	
Myotis yumanensis [2]	Yuma myotis	
Parastrellus hesperus	Canyon bat	*

[1] California Department of Fish and Game, Mammal of Special Concern or Sensitive Species

[2] Former Candidate (Category 2) for listing under U.S. Endangered Species Act; Species of Concern

[3] Proposed for addition to CDFG, MSSC list

Y Detected within one half hour of sunset or sunrise

* Detected within one hour of sunset or sunrise

On four occasions, early-recorded bats of two species (Mexican free-tailed bat and hoary bat) were simultaneously observed flying. When bats are observed flying around sunset, it is possible to locate the roost by examining appropriate roosting structures in the direction from which the bat(s) came.

This technique is most productive when multiple bats are observed at a relatively low altitude. The observations in this survey period were of individual bats flying at a high altitude. May and August had the highest numbers of early recorded bat calls. No roosts were located in the survey period.

Mexican free-tailed bats appeared to roost in the vicinity of all sites, except Tier 1, where they were recorded within an hour of sunset. Mexican free-tailed bats were recorded multiple times early in the evening at all other sites. Big brown bats, hoary bats, and western yellow bats were detected within a half-hour of sunset at Oil Post North; hoary bats were also detected within the same time frame at Oil Post South. Three of these four species (all but western yellow bats, which were only detected at two sites) were detected at multiple sites within one hour of sunset. Canyon bats (PAHE) were detected once within an hour of sunset near Oil Post South.

This indicates that although at least half the species known to occur in the area appear to roost in the vicinity of the survey area, at least occasionally, the majority of individuals of these species recorded foraging onsite may roost outside the survey area.

Appropriate roosting habitat varies by species. Table 6a indicates the primary roosting habitat associated with the species in the Puente Hills.

Table 6a. Primary roosting habitat of bats occurring* in the Puente Hills.

FAMILY/SPECIES	**COMMON NAME**	**PRIMARY ROOSTING HABITAT**			
		Tree	**Cliff**	**Cave**	**MH**
Family Phyllostomidae	**Leaf-nosed bats**				
Choeronycteris mexicana [1,2]	Mexican long-tongued bat			X	
Family Molossidae	**Free-tailed bats**				
Eumops perotis [1,2]	Western mastiff bat		X		
Nyctinomops femorosaccus [1]	Pocketed free-tailed bat		X		
Nyctinomops macrotis [1,2]	Big free-tailed bat		X		
Tadarida brasiliensis	Mexican free-tailed bat				X
Family Vespertilionidae	**Mouse-eared bats**				
Antrozous pallidus [1]	Pallid bat				X
Corynorhinus townsendii [1,2]	Townsend's big-eared bat			X	
Eptesicus fuscus pallidus	Big brown bat				X
Lasiurus blossevillii [1]	Western red bat	X			
Lasiurus cinereus	Hoary bat	X			
Lasiurus xanthinus [3]	Southern yellow bat	X			
Myotis californicus	California myotis				X
Myotis ciliolabrum [2]	Small-footed myotis				X
Myotis evotis [2]	Long-eared myotis				X
Myotis yumanensis [2]	Yuma myotis				X
Parastrellus hesperus	Canyon bat		X		

[*] Confirmed or potentially occurring in the Puente Hills

[1] California Department of Fish and Game, Mammal of Special Concern or Sensitive Species

[2] Former Candidate (Category 2) for listing under U.S. Endangered Species Act; Species of Concern

[3] Proposed for addition to CDFG, MSSC list

MH = Multiple Habitats

There are significant variations in these trends. For example, western mastiff bats – known to predominantly roost in cliffs – have been found roosting in buildings (and, recently, in a palm tree). Townsend's big-eared bat, often categorized as a cave-roosting species, also roosts in mines and other structures (including buildings) that mimic the internal shape of a cave. Canyon bats typically roost in rocky outcrop habitat, both natural and of human construction (e.g. rip rap), as well as cliffs.

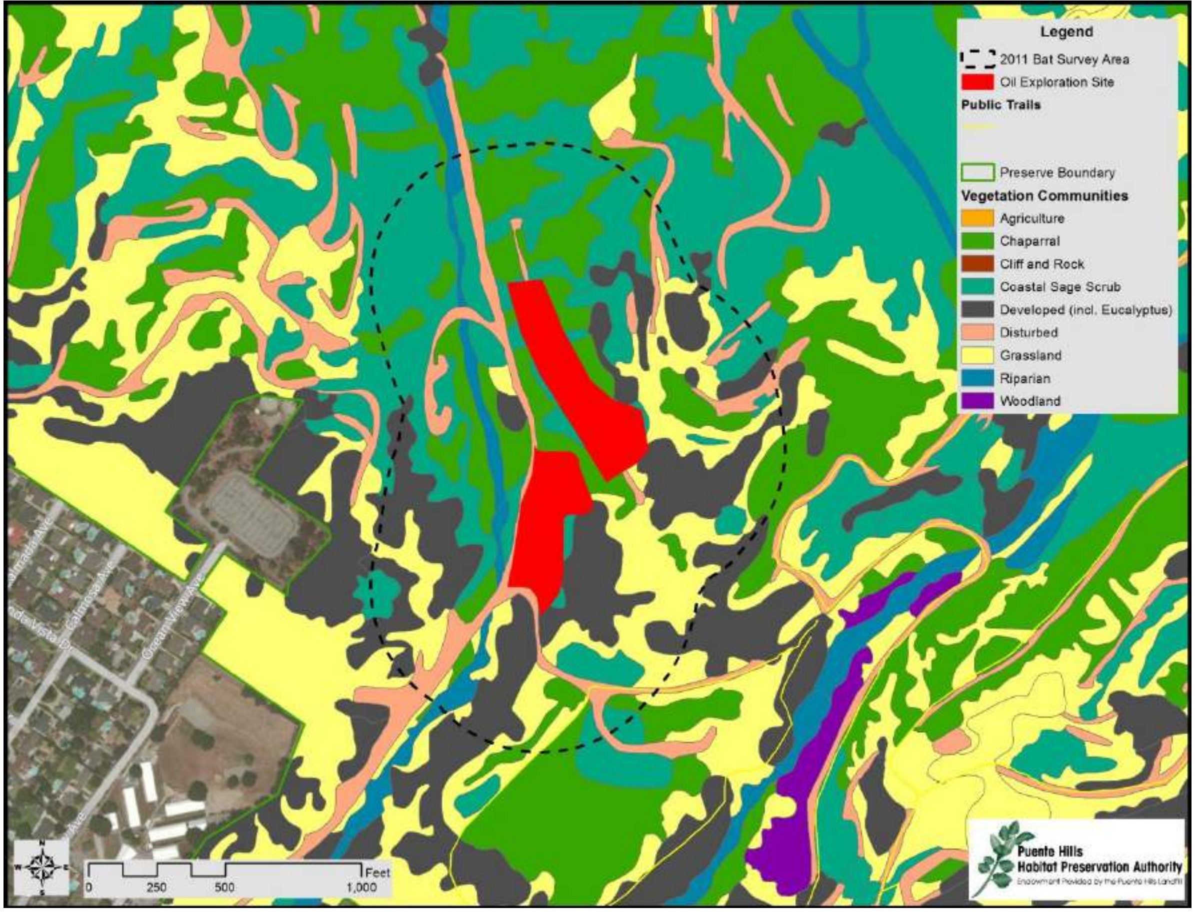
The lasiurines (western red bats, hoary bats, and western yellow bats) are obligate foliage-roosting species and are known to switch roosts often, even nightly. This is likely to reduce mortality from predation, because bats roosting in foliage are highly exposed and completely unable to defend themselves against predators when in torpor.

Big brown bats and Mexican free-tailed bats are more flexible in their roosting requirements, and are known to use a variety of natural and human-made structures, such as cliffs, rock crevices, buildings, and bridges. In southern

California, big brown bats also commonly use trees for roosting. They also may switch roosts from season to season, or even multiple times within a season, but are not known to switch nightly.

Although most habitats are used to some degree by foraging bats, the vegetation map in Figure 7 can indicate which sites may have greater foraging potential for bats.

Figure 7. Vegetation map of the WMOSA and surrounding habitat.



The woodland and riparian areas often have high insect diversity and abundance and tend, especially in dry years, to concentrate insect – and therefore – bat activity. Many species use these habitats extensively for both roosting and foraging, and western red bats (MSSC listed) require riparian habitats, particularly mature riparian, for both uses.

Scrub habitats are also used extensively for foraging by some bat species, such as the molossid family (free-tailed bats – including three MSSC). Some bat species also roost in scrub habitat. Pallid bats (MSSC listed) are known to forage in grassland, as well as oak woodland.

Several species use agricultural areas for foraging, at least occasionally.

Cliff and rock habitat is a major bat roosting habitat type. Any bridges, buildings, rip-rap, or other human constructions located in "Disturbed Areas" may be used by bats for roosting. The Eucalyptus included in the "Developed" habitat on the vegetation map (Figure 7) are known to provide roosting habitat for lasiurines and, when exfoliating bark is present, may house individuals and maternity colonies of other species.

There are three main types of roosts used by bats:

1) Day roosts (where bats spend the daylight hours – this includes maternity roosts);
2) Night roosts (where bats may stop periodically in between foraging rounds;
3) Hibernacula (where bats that hibernate spend the winter in torpor).

A type of day roost that is crucial for the reproductive success of bats is the maternity roost. The females of certain bat species gather in the spring to give birth and raise young. The structure used by these female bats and their young are called maternity roosts, and – in this area – may house anywhere from a few individuals to a few thousand. They disband in the fall. Most species recorded in this survey period (except the lasiurines and canyon bats) form maternity colonies.

Loss of any one of these types of roosts involves a cost to the bats using them. The cost may be longer foraging distances or survival, depending on the nature of the roost and the availability of other potential good-quality sites in the vicinity.

Bats appeared to be using the Whittier Matrix Oil Survey Area primarily for foraging, although the timing of the activity – later at night – does not preclude their use of night roosts onsite.

In summary, a few individuals of five species, including two* sensitive species (the western red bat and western yellow bat), appeared to be roosting in the immediate vicinity during the survey period. Most bats appeared to be using the Whittier Matrix Oil Survey Area primarily for foraging, although the timing of the activity – later at night – does not preclude their use of night roosts onsite. There was no evidence of the existence of a large maternity colony in the project area during this survey period. The study area is used by migratory species for both roosting and foraging.

The data described in this report represent conditions present during the survey period. The results cannot be used to predict bat activity or distribution during other times of year or in future seasons. Long-term (multi-year) datasets provide better grounds for prediction and extrapolation.

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* Recently, hoary bats have been proposed for listing as a sensitive species due to the high mortality observed at wind farms of this species.

Potential Mitigation Measures

The following measures will minimize negative impacts to bats and/or enhance existing bat habitat:

1) Avoid impacts to trees and riparian areas (to minimize damage to potential roosting habitat – particularly of lasiurines).
2) Conduct additional surveys of specific trees, structures, and other potential roosting habitat features* that cannot be avoided and will be altered, removed, or impacted by construction activities. Bats may switch tree roosts frequently.
3) Use a two-step process for tree removal that cannot be avoided (to avoid direct mortality of roosting bats). This involves removing all branches less than two inches in diameter from trees that will be removed (to create a disturbance that will encourage bats to choose another roosting site after foraging that night). The following day the tree is completely removed. If the tree is small enough so that zero occupancy can be verified by a bat biologist, then the tree may be removed in one step.
4) Create artificial roosting habitat (to minimize the travel distance – energy expense – from roost to foraging grounds that may be decreased in quality due to habitat loss). Bat boxes are one type of artificial roost. If this option is chosen, a bat biologist should recommend type and placement.
5) Consider enhancing foraging habitat by placing and maintaining water sources for drinking (which can be critical during maternity season) and attracting insects. This could be a water trough or an artificial pond. If a water trough is chosen, it should be kept full and include an escape ramp to avoid trapping wildlife.
6) Restrict construction activities involving impacts to bat habitat to the fall, if possible (to avoid direct impacts to maternity colonies or hibernating bats). Fall was the period of greatest activity for the lasiurines (foliage-roosting bats, 2 of 3 are MSSC), but impacts to roosting individuals of these species can be minimized by adhering to the first three recommendations.
7) If it is not possible to avoid maternity season (approximately March through August), conduct additional surveys of the impact area immediately before construction begins. Discovery of a maternity colony would necessitate an exclusion (creating a one-way door that allows bats to leave, but not re-enter). The exclusion could be performed properly in September. Conducting exclusions earlier than September may trap flightless young inside.
8) Have a biological monitor present during construction-related activities.

Channel Law Group, LLP

January 5, 2024

References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 13

Rodewald
Nest-searching cues and studies of nest-site selection
and nesting success

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Nest-searching cues and studies of nest-site selection and nesting success

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ABSTRACT. Locating and monitoring nests are among the most widely used approaches in studies of avian ecology, evolution, and conservation. While several papers outline "best practices" for nest studies, nest-searching techniques are seldom standardized in field investigations because observers generally use strategies that work best for them. In this study, I examined if field observers differed in the cues they used to locate nests, the species they found, and the fate of their nests (i.e., successful or failed), and the extent to which nest-searching cues were associated with either nest fate or vegetation characteristics surrounding the nest. My field assistants and I monitored 355 songbird nests on 10 forested sites in central Pennsylvania in 1998–99. Parental behavior was the most frequently used cue for locating nests (41%), followed by systematic searching of nesting substrate (37%). Accidental flushing of the parent (5%) and luck (17%) were involved in fewer located nests. Field observers differed in the cues they used to find nests, and these nest-searching cues were associated with finding certain species. In addition, estimates of nesting success (percentage of nests fledging young) differed among field observers by up to 2.35×. Nest-searching cues were related to nest-placement (e.g., nest height) and vegetation characteristics (e.g., leaf litter) within nest-patches for Ovenbirds (*Seiurus aurocapillus*), Red-eyed Vireos (*Vireo olivaceus*), and Scarlet Tanagers (*Piranga olivacea*), although cues were not significantly related to the fate of nests. Overall, nest-searching cues were associated with nest placement, nest-patch habitat, and species composition of nest samples, all of which can ultimately influence findings from nesting studies. Consequently, investigators should exercise caution when allocating individual effort across experimental units and consider assigning each observer to ≥1 treatment, multiple observers to each site, and addressing nest-patch and nest-placement differences among cues through training and data analysis.

SINOPSIS. **Pistas para la búsqueda de nidos en estudios de selección del lugar de anidamiento y de éxito de anidamiento**

La localización y el monitoreo de nidos es una de las prácticas más ampliamente utilizadas en estudios de ecología de aves, evolución y conservación. Mientras algunos trabajos indican "las mejores prácticas" para el estudios de anidamiento, las técnicas para buscar nidos pocas veces son estandarizadas en el campo porque los investigadores utilizan las estrategias que mejor trabajen para éstos. En este estudio, examino, si los observadores en el campo difieren en las pistas que utilizan para localizar nidos, las especies que buscan y el destino final del nido (ej. si fue exitoso o fracasó) y hasta que punto las pistas (para buscar nidos) estuvieron asociadas ya sea con el destino final del nido o con la vegetación característica en los alrededores del nido. Entre 1998–99 monitoreamos 355 nidos de aves canoras en 10 lugares boscosos en la parte central de Pennsylvania. La conducta de los adultos fue la pista más frecuentemente utilizada para localizar los nidos (41%), seguido de la busqueda sistemática del sustrato de anidamiento (37%). El sacar del nido accidentalmente a un adulto (5%) y la casualidad o suerte (17%) fueron formas menos frecuentes de encontrarlos. Los observadores de campo difieren en las pistas que utilizan para encontrar nidos, y estas pistas están asociadas a la busqueda de ciertas especies particulares. Además los estimados de éxito de anidamiento (el porcentaje de pichones que dejan el nido) se diferenció hasta en un múltiplo de 2.35 veces entre los distintos investigadores. Las pistas para localizar nidos estuvieron relacionadas con la localización de los nidos (ej. altura del nido) y características de la vegetación (ej. hojarasca) entre parches de anidamiento para especies como *Seiurus aurocapillus*, *Vireo olivaceus* y *Piranga olivacea*. No obstante, dichas pistas no estuvieron relacionadas al destino final del nido.

Key words: bias, cues, nest-searching, nest-site selection, nest success, observers

Ecologists frequently use information on avian nest-site selection, nest placement, and nesting success both to understand the ecology and evolution of species and to develop conservation strategies (e.g., fragmentation studies). The most commonly used approach in nest studies is to compare nests in different habitats, landscapes, or regions. To do this, researchers spend considerable effort standardizing their monitor-

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ing and analysis protocols (Martin and Geupel 1993; Martin et al. 1996). Although recent papers have discussed how the timing or frequency of nest visits may affect nest fate (Götmark 1992; Lloyd et al. 2000), variation in the nest-searching techniques used by field observers has received little attention as a potential source of bias. This is a particularly important issue because multiple field observers are generally needed to perform the extensive fieldwork that is necessary to accurately estimate nesting success.

Few investigators will deny that locating nests is difficult, and individuals vary in their abilities both to use different strategies and to locate nests. Individuals use those techniques that maximize their ability to find nests, and consequently, nest-searching techniques are difficult to standardize. For example, if an observer locates several nests along an old logging road, she may be especially diligent in nest-searching whenever a similar road is encountered, a tendency that can bias the sample of nests. Similarly, searching "potential substrates" as defined by an observer may produce quite different results than searching all possible substrates within a known territory. Biases also can result from favoring particular cues. Some of the most frequently used cues for locating nests are luck (finding a nest without actively looking), flushing an adult from the nest, watching parental behavior (e.g., carrying nest material or food), or systematically searching nesting substrates (Martin et al. 1996). These cues may, in turn, be associated with a tendency to locate certain species or with other factors, such as vegetation characteristics around the nest. For instance, observers that favor systematic-searching of substrates are more likely to locate nests low in height (e.g., in the understory vegetation) or those that are not well concealed. Ultimately, field observers using certain cues may find nests that differ in nest-patch characteristics or that are more vulnerable to predation than others. Some have suggested that nests found using parental behavior may be biased towards those with conspicuous adults who also are likely to attract the attention of predators (Cresswell 1997). Nests found by systematically searching nesting substrates may be more or less concealed by vegetation than nests found by luck. Nests found by flushing the incubating or brooding adult may be more conspicuous to predators because of parental behavior (e.g., showing more distress; Hammond and Forward 1956), disturbance to the vegetation immediately surrounding the nest (Bowen et al. 1976), or proximity of the nest to trails.

As part of a larger study of forest-nesting birds (Rodewald 2000; Rodewald and Yahner 2001a,b), I investigated whether cues used by field observers to locate nests were associated with nesting success estimates, nest placement, or nest-patch characteristics. Specifically, I examined if field observers differed in the cues they used to locate nests, the species they found, and the fate of their nests (i.e., successful or failed), and the extent to which nest-searching cues were associated with either nest fate, nest placement, or vegetation characteristics surrounding the nest.

METHODS

Ten 25-ha sites within contiguous mature forest were selected in the Ridge and Valley province of central Pennsylvania. Sites were similar in vegetative structure and plant species composition, occurred between 250–500 m in elevation, and were separated by ≥3 km. Common tree species in the study area included white oak (*Quercus alba*), northern red oak (*Q. rubra*), chestnut oak (*Q. prinus*), red maple (*Acer rubrum*), sugar maple (*A. saccharum*), black gum (*Nyssa sylvatica*), black cherry (*Prunus serotina*), and hickory (*Carya* spp.). Common understory species were vaccinium (*Vaccinium* spp.), mountain-laurel (*Kalmia latifolia*), witch-hazel (*Hamamelis virginiana*), and the saplings of dominant tree species, especially red maple.

My field assistants and I monitored active songbird nests (with at least one egg or nestling), emphasizing common forest species, such as Ovenbirds (*Seiurus aurocapillus*), Red-eyed Vireos (*Vireo olivaceus*), Scarlet Tanagers (*Piranga olivacea*), and Wood Thrushes (*Hylocichla mustelina*). Field observers received four days of training that focused on techniques to locate nests and ways to minimize conspicuousness of observers and nests to predators during searching and monitoring (Martin and Geupel 1993). From mid-May until late July 1998 and 1999, each site was visited every 3–5 d. Nest-searching efforts were concentrated primarily in areas at least 100 m from habitat edges, but some nests were found closer to edges. Located nests were marked with a small piece of orange flagging placed at least 10 m from the nest. Field observers classified the cues that they used to find nests into one of four categories described by Martin et al. (1996): parental behavior (parent bird followed to the nest or within 0.5 m of the nest), parent flushed from nest (bird flushed from nest while observer walked past), systematic search (nest found during systematic searches of possible nest sites), luck (nest found without active searching, but does not include flushing). However, two definitions of cue were modified for this study: the cue of "systematic searching" included only cases where a parent was not followed to the nest area at all (i.e., suitable substrates within known territories were searched) and the cue of "parental behavior" was expanded to include cases where parents were followed to within approximately 5 m of the nest.

Nests were checked every 3–5 d, except near fledging time when nests were checked at 1–2 d intervals. During a nest check, presence of eggs or nestlings, activity of parent (if seen), and any disturbance to the nest were noted. The nest was approached via different routes upon every nest check to prevent leaving a scent trail directly to the nest. If a potential nest predator was seen within approximately 50 m of the nest, the nest was checked at a later time. A successful nest was defined as one with ≥1 young fledged, parental activity or nestlings visible for longer than the known length of the nesting period (combined incubation and brooding time; Ehrlich et al. 1988), or fledglings were detected in the vicinity of the nest. Nest failures were identified as nests that were destroyed, contained eggshells or nestling remains, or found empty before the minimum nesting period had passed (e.g., 15 d of activity after onset of incubation in a species reported to have a nesting cycle of 23–25 d incubation to fledging). Abandoned nests (i.e., contained intact eggs but had no parental activity) represented <4% of all nests found and were dropped from nest-fate analyses. Differences among field observers in use of nest-searching cues, fate of nests, and species found were tested using chi-square approximation (SAS Institute Inc. 1990). Associations between nest-searching cues and nest fate, and species and nest fate, were also tested using chi-square approximation (SAS Institute Inc. 1990).

Nest-patch microhabitat characteristics were measured only for the Ovenbird, Red-eyed Vireo, Scarlet Tanager, and Wood Thrush, the four most common species. In July 1998 and 1999, the following nest characteristics were recorded (Martin et al. 1996): nest height (m), distance to forest edge (m), dbh of nesting substrate (diameter breast height [cm] at 1.4 m above the ground), number of branches supporting the nest, mean diameter of support branches (cm), distance from central axis of the nesting substrate (m), and percent of nest concealed by vegetation from above the nest and from four cardinal directions (for Ovenbirds only). Within an 0.04-ha plot around the nest (i.e., the "nest-patch"), the following habitat characteristics were recorded: mean canopy height, numbers of trees and snags by species and size class (8–23 cm, 23–38 cm, and >38 cm dbh), and numbers of fallen logs (≥7.5 cm in diameter, ≥1.0 m long) and stumps (≥7.5 cm diameter, ≥0.25 m tall; hereafter referred to as woody debris). At 20 locations along two perpendicular transects running north/south and east/west through the nest-patch plot, percent canopy (>5 m) and ground cover (<0.5 m) were estimated using an ocular tube. Ground cover was categorized as live vegetation, moss, bare soil, leaf litter, log, or rock. At these same points, litter depth (cm) was measured with a ruler, and woody stems were counted in 0.5-m height interval classes ranging from 0.5–3.0 m using a 3-m tall PVC pole.

Several highly correlated ($P \leq 0.001$) or collinear habitat variables were either dropped or combined into the following new variables: total number of trees (≥8.0 cm dbh), total number of understory stems (0.5–3.0 m in height, <8 cm dbh), and concealment (mean percent lateral concealment of nest from the four cardinal directions), percent unvegetated ground cover (cover by litter, rock, and bare soil). Percent overhead concealment, numbers of snags, canopy height, ground cover (<0.5 m tall) by vegetation, moss, and log were dropped from analysis because of strong correlations with other variables. Total number of trees and understory stems, amount of woody debris, leaf litter depth, nest height, nest plant dbh, diameter of support branches, and distance from central axis were log-transformed to meet assumptions

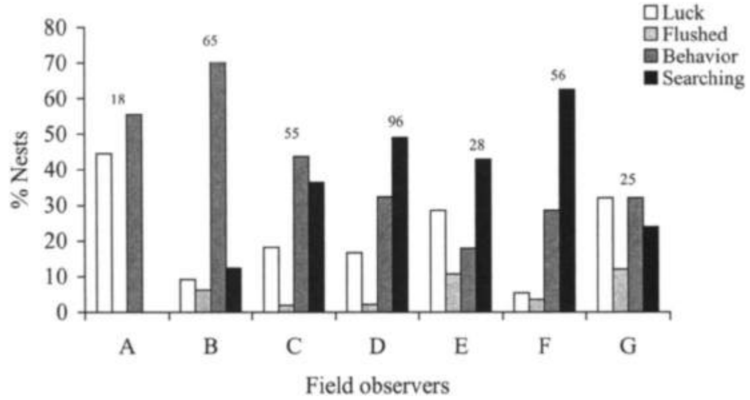

Fig. 1. Percentage of forest songbird nests found by seven different observers in central Pennsylvania, 1998–1999. Number of nests found by each observer are indicated above vertical bars.

of normality. The following seven variables were included in the model for the Ovenbird: nest concealment, distance to habitat edge, mean canopy cover, woody debris, number of understory stems, number of trees, and litter depth. The following ten variables were included in separate models for the Red-eyed Vireo, the Wood Thrush, and the Scarlet Tanager: nest height, number of support branches, diameter of support branches, distance from nest to center of the nesting substrate, distance to habitat edge, mean canopy cover, woody debris, number of understory stems, number of trees, and litter depth. Differences in nest-patch vegetation among nests found using different cues were tested separately for each species with multiple analysis-of-variance (MANOVA) with a posteriori univariate tests of vegetation variables. To reduce the probability of making a Type 2 error, I used a critical value of $P = 0.10$.

RESULTS

Of the 355 nests monitored over the two-year period, most were those of the Ovenbird ($N = 91$), Red-eyed Vireo ($N = 71$), Wood Thrush ($N = 67$), and Scarlet Tanager ($N = 35$). Most of these nests (343) were found by the seven primary observers, who each located from 18–96 nests (mean, 49 ± 10.4 SE). Parental behavior was the most frequently used cue for finding nests (41%), followed by systematic searching of nesting substrates (37%). Accidental flushing of the parent (5%) and luck (17%) were involved in fewer located nests. Field observers differed in the cues they used to find nests ($\chi^2 = 92.0$, $P < 0.0001$; Fig. 1), and their estimates of nesting success (percentage of nests successful) differed by up to 235% ($\chi^2 = 21.1$, $P = 0.10$; Fig. 2). However, cues used to locate nests were not significantly related to the fate of nests ($\chi^2 = 5.9$, $P = 0.43$; Fig. 3).

Most observers fell into one of two types of nest-searchers: behavioral searchers or substrate searchers. Not surprisingly, these nest-searching strategies were associated with finding nests of certain species ($\chi^2 = 40.7$, $P < 0.0001$; Fig. 4). Searchers using behavioral cues tended to find more Scarlet Tanagers and Red-eyed Vireos, whereas searchers focusing on substrates located more Ovenbird and Wood Thrush nests ($\chi^2 = 99.7$, $P < 0.0001$; Fig. 5).

Within the nest-patch, vegetation characteristics differed significantly among nests located using different cues for Ovenbirds (Wilks' $F_{21,173} = 1.57$, $P = 0.06$), Red-eyed Vireos (Wilks' $F_{30,139} = 1.76$, $P = 0.01$), and Scarlet Tanagers (Wilks' $F_{20,36} = 2.68$, $P = 0.005$), but not for Wood Thrushes (Wilks' $F_{20,84} = 0.92$, $P = 0.57$). For Ovenbirds, percent concealment of nests ($F_{3,66} = 2.41$, $P = 0.07$), amount of woody debris ($F_{3,66} = 2.46$, $P = 0.07$), number of trees ($F_{3,66} = 2.35$, $P = 0.08$), and litter depth ($F_{3,66} = 3.39$, $P = 0.02$) within nest-patches were associated with the cues used (Table 1). For Red-eyed Vireos, nest height ($F_{3,56} = 4.66$, $P = 0.006$), diameter of support branches ($F_{3,56} = 2.81$, $P = 0.05$), number of understory stems ($F_{3,56} = 2.43$, $P = 0.07$), number of trees ($F_{3,56} = 2.73$, $P = 0.05$), and litter depth ($F_{3,56} = 2.50$, $P = 0.07$) within nest

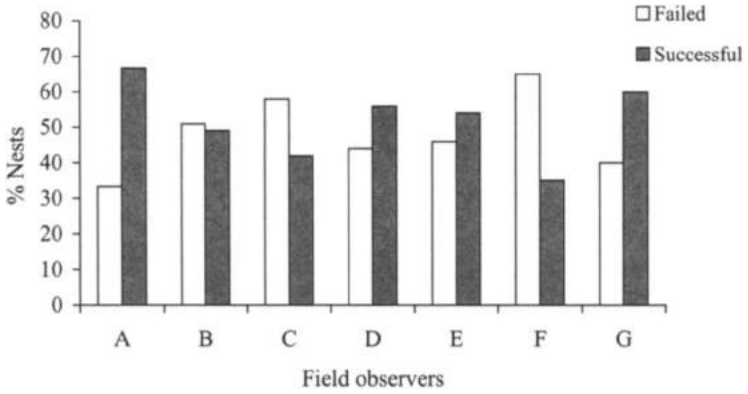

Fig. 2. Variation in forest songbird nesting success estimates as measured by the percentage of nests failed vs. successful among seven different observers in central Pennsylvania, 1998–1999.

patches differed among nest-searching cues (Table 1). For Scarlet Tanagers, nest height ($F_{2,27}$ = 2.67, $P = 0.09$), number of support branches ($F_{2,27}$ = 7.04, $P = 0.004$), diameter of support branches ($F_{2,27}$ = 2.82, $P = 0.08$), and number of understory stems ($F_{2,27}$ = 4.16, $P = 0.03$) within nest patches differed among nest-searching cues (Table 1).

DISCUSSION

Field observers differed in cues used to find nests, species composition of the nests they found, and in estimates of nesting success. These differences in nesting-success estimates were, in some cases, quite large (by up to 2.35×) and ranged from 30–70% failure rates. There appeared to be two qualitatively different types of observers: behavioral searchers who relied most on parental behavior (e.g., observers 1 and 2 in Fig. 1) and substrate searchers who primarily used systematic searching (e.g., observers 4, 5, 6 in Fig. 1). Nest-searching cues were not directly associated with nest fate, although there was a greater tendency for nests found by flushing to fail. Instead, nest-searching cues were related to species composition of each observer's nest samples. For example, field observers that heavily used parental behavior tended to find more Red-eyed Vireo and Scarlet Tanager nests than other observers. Where species differ widely in nesting success, such associations can affect nesting success estimates and bias results. However, species composition did not explain differences in nesting success among observers in this study.

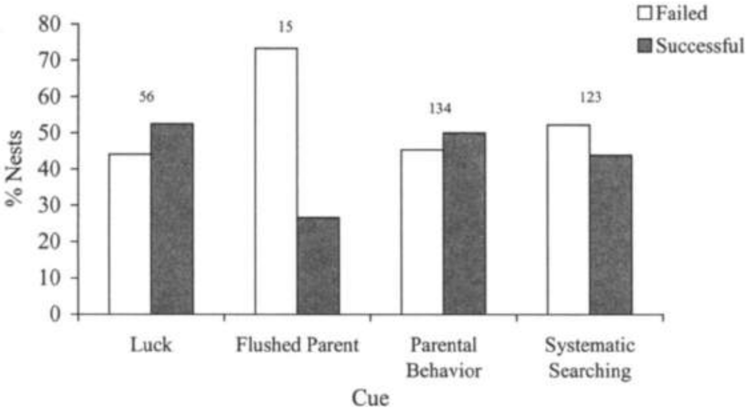

Fig. 3. Relationship between nest-searching cue and nest fate for forest songbird nests in central Pennsylvania, 1998–1999. Abandoned nests are not included.

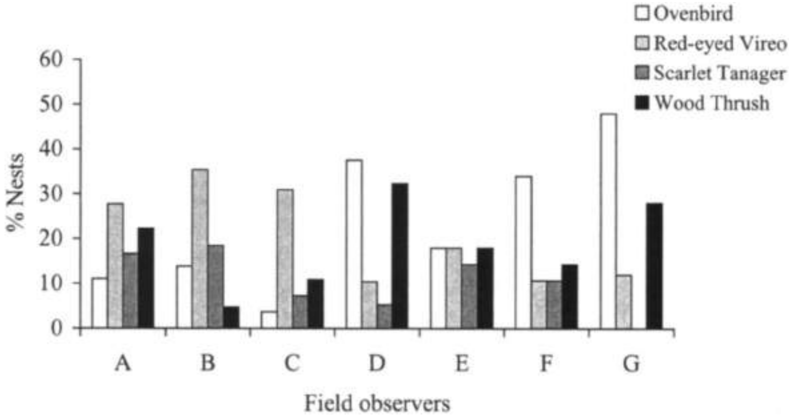

Fig. 4. Percentage of forest songbird nests of different species found by seven different observers who varied in nest-searching cues used in central Pennsylvania, 1998–1999.

Vegetation characteristics in the nest-patches varied among nest-searching cues for Ovenbirds, Red-eyed Vireos, and Scarlet Tanagers. For example, Ovenbird nests found by systematic searching were less concealed and in patches with fewer trees, less woody debris, and more shallow leaf litter than nests found by other cues. Nests of Scarlet Tanagers located by luck had fewer and thicker support branches and were lower in height than those found by systematically searching substrates. Nests of Red-eyed Vireos found by flushing or luck were nearly 3× lower in nest height, had fewer support branches, more understory stems, and deeper leaf litter than nests found using parental behavior.

Associations between nest-searching cues and nest-patch vegetation may either create or obscure patterns in studies of nest-site selection and nest placement. An excellent example of how bias can occur is demonstrated with nest height. If data were collected by observers that relied heavily on luck or flushing adults from nests, then results would indicate that Red-eyed Vireos nests averaged 3.5–4.2 m in height. On the other hand, if data were collected by observers who primarily searched nesting substrates without using behavioral cues, then average nest height would be 7.5 m. However, if one principally followed birds and used parental behavior to locate nests, then average nest height would be 10.1 m. These descriptions of nest placement differ by up to 2.9× and could lead to substantially different conclusions. Similar distortions with studies of nest-site selection also are possible. For instance, if most observers systematically searched for nests rather than used parental behavior, Ovenbirds may appear

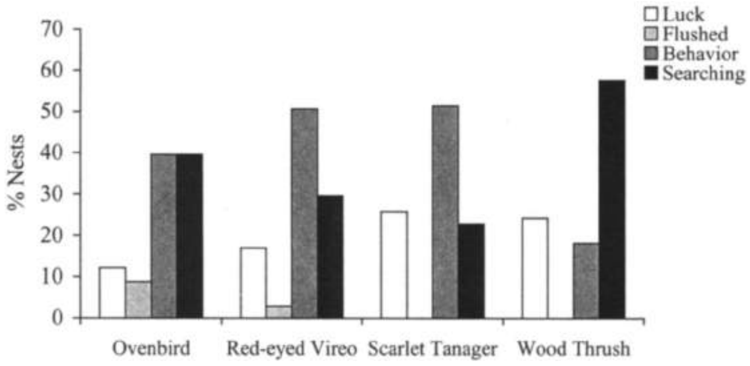

Fig. 5. Percentage of forest songbird nests found by different nest-searching cues by species in central Pennsylvania, 1998–1999.

Table 1. Mean (± SE) nest placement and vegetation characteristics within 0.04-ha circular nest-patches found using different nest-searching cues in Pennsylvania, 1998–99.

Characteristic	Flushed	Luck	Parental behavior	Systematic searching	*P*
Ovenbird					
Concealment (%)	47.5 (10.8)	62.1 (6.6)	60.1 (4.5)	44.8 (4.5)	0.07
Distance to edge (m)	109.4 (25.9)	152.3 (19.2)	126.3 (11.4)	152.1 (10.7)	0.33
Canopy cover (%)	58.1 (9.4)	73.2 (3.2)	68.9 (3.0)	71.1 (2.8)	0.48
Woody debris	12.0 (2.9)	10.6 (1.8)	10.3 (0.9)	8.0 (0.8)	0.07
Number of understory stems	13.1 (3.3)	12.3 (2.4)	13.9 (2.0)	10.9 (1.6)	0.69
Number of trees	24.1 (4.1)	25.8 (1.6)	19.9 (1.0)	19.0 (1.4)	0.08
Litter depth (cm)	2.0 (0.7)	2.1 (0.5)	2.1 (0.3)	1.2 (0.1)	0.02
Red-eyed Vireo					
Nest height (m)	4.2 (2.8)	3.5 (0.6)	10.1 (1.1)	7.5 (1.4)	0.006
Support branches	2.0 (0)	2.6 (0.2)	2.2 (0.1)	2.3 (0.1)	0.45
Diameter of branches (cm)	0.4 (0.1)	0.7 (0.1)	0.9 (0.1)	1.1 (0.1)	0.05
Distance from center (m)	0.8 (0)	1.4 (0.4)	2.5 (0.4)	2.1 (0.4)	0.26
Distance to edge (m)	150.0 (50.0)	107.5 (19.1)	108.8 (11.0)	130.7 (14.5)	0.31
Canopy cover (%)	80.0 (10.0)	74.6 (3.1)	73.6 (0.8)	71.0 (4.9)	0.92
Woody debris	9.0 (1.0)	13.2 (1.1)	10.8 (0.8)	9.7 (1.1)	0.20
Number of understory stems	26.0 (2.0)	15.0 (4.4)	13.0 (1.8)	9.0 (1.8)	0.07
Number of trees	26.0 (7.0)	19.2 (2.1)	18.9 (1.0)	24.9 (2.3)	0.05
Litter depth (cm)	3.9 (1.4)	2.1 (0.3)	1.8 (0.2)	1.5 (0.1)	0.07
Scarlet Tanager					
Nest height (m)		9.2 (1.3)	13.7 (1.1)	11.6 (2.3)	0.09
Support branches		2.8 (0.3)	3.0 (0.2)	4.4 (0.6)	0.004
Diameter of branches (cm)		4.8 (1.6)	2.6 (0.4)	1.9 (0.3)	0.08
Distance from center (m)		3.0 (0.3)	3.0 (0.4)	4.4 (0.8)	0.14
Distance to edge (m)		121.7 (25.1)	116.7 (14.7)	165.0 (18.0)	0.17
Canopy cover (%)		72.2 (4.0)	69.2 (4.2)	80.0 (5.8)	0.15
Woody debris		11.9 (1.2)	11.6 (1.1)	9.4 (1.7)	0.58
Number of understory stems		12.7 (3.1)	8.1 (1.6)	13.4 (2.8)	0.03
Number of trees		23.7 (2.8)	20.1 (1.4)	17.8 (1.5)	0.15
Litter depth (cm)		2.0 (0.5)	2.0 (0.3)	1.4 (0.2)	0.77
Wood Thrush					
Nest height (m)		3.4 (0.5)	4.0 (1.0)	3.8 (0.5)	0.96
Support branches		3.9 (0.4)	3.7 (0.4)	4.3 (0.2)	0.31
Diameter of branches (cm)		1.8 (0.4)	1.5 (0.3)	1.9 (0.1)	0.78
Distance from center (m)		1.8 (0.4)	1.0 (0.4)	1.5 (0.3)	0.38
Distance to edge (m)		118.8 (15.0)	79.2 (16.3)	106.7 (12.2)	0.33
Canopy cover (%)		71.6 (4.2)	68.8 (4.5)	71.8 (2.7)	0.63
Woody debris		11.1 (1.5)	13.2 (2.6)	10.4 (1.2)	0.38
Number of understory stems		32.9 (4.7)	19.6 (5.4)	27.5 (2.7)	0.25
Number of trees		19.9 (2.8)	23.5 (2.4)	17.1 (1.1)	0.17
Litter depth (cm)		1.9 (0.4)	1.7 (0.3)	1.6 (0.2)	0.80

to select relatively open (i.e., few trees and woody debris) areas with shallow leaf litter. Investigators would not reach this conclusion if their assistants used other nest-searching techniques.

Associations between cues and nest-patch habitat may affect nest fate as well. Studies have shown that the amount of foliage or complexity of habitat surrounding the nest may influence vulnerability to brood parasitism (Brittingham and Temple 1996; Burhans 1997) or nest predation by affecting predator movement or search efficiency (Bowman and Harris 1980; Martin and Roper 1988; Holway 1991; Martin

1992; Johnson 1997) and concealment of parental activity (Holway 1991; Kelly 1993). However, in this study associations between nest-searching cues and nest-patch vegetation did not result in detectable differences in nest fate. In fact, characteristics within the nest-patch were not related to nest fate at my sites in general, which may reflect the nest-predator community at my study sites (Rodewald and Yahner 2001b). Vegetation characteristics within the nest-patch should be most important when predation is caused by visually oriented birds rather than by mammals or other predators (Clark and Nudds 1991; Colwell 1992; Yahner and Scott 1988). Areas with diverse predator communities, as were present on my sites (Rodewald 2000), are not expected to have predictably safe nest-patch features (Filliater et al. 1994).

I can offer no satisfactory explanation for why observers differed so widely in estimates of nesting success. Monitoring (or visitation) frequency can contribute to observer-related effects on nest fate because nest visits may provide predators and/or brood parasites with cues for finding nests (Nichols et al. 1984; Westmoreland and Best 1985; Götmark 1992; but see Lloyd et al. 2000; Gutzwiller et al. 2002) or, alternatively, may discourage predators from visiting nests (Götmark 1992; MacIvor et al. 1999). However, field observers in my study used the same monitoring protocol, and thus I do not expect this to contribute to the patterns detected.

Nest-searching cues were associated with nest placement and nest-patch habitat characteristics as well as species composition of nesting samples. These data suggest that results from studies of nest-site selection and nest placement may be affected if observers rely heavily on particular cues. Thus, investigators should exercise caution when allocating observer effort across experimental units. To avoid bias, field observers should be distributed among treatments such that each observer spends equal effort searching for nests in each of the experimental treatments. In addition, assigning multiple observers to each site better ensures that a variety of nest-searching cues will be used and that no species or nesting guild or nest-patch habitat will be favored in searching efforts on some sites but not on others. In studies of nest-placement or nest-patch habitat, investigators should include information on nest-searching cues and how they may bias results. In some circumstances, standardizing searching protocol might be necessary. Investigators also can conduct a posteriori analyses to determine if cues contributed bias to their findings. Despite difficulties and limitations, studies of nesting success have provided biologists with critical information on habitat quality, population viability, and conservation status of birds. The ultimate effectiveness of our efforts will depend, in part, on minimizing the bias associated with different field observers.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 14

Rosenberg, Dokter, Blancher, Sauer, A. Smith, P. Smith, Stanton, Panjabi, Helft, Parr, and Marra
Decline of the North American avifauna

BIODIVERSITY LOSS

Decline of the North American avifauna

Kenneth V. Rosenberg[1,2]*, Adriaan M. Dokter[1], Peter J. Blancher[3], John R. Sauer[4], Adam C. Smith[5], Paul A. Smith[3], Jessica C. Stanton[6], Arvind Panjabi[7], Laura Helft[1], Michael Parr[2], Peter P. Marra[8]†

Species extinctions have defined the global biodiversity crisis, but extinction begins with loss in abundance of individuals that can result in compositional and functional changes of ecosystems. Using multiple and independent monitoring networks, we report population losses across much of the North American avifauna over 48 years, including once-common species and from most biomes. Integration of range-wide population trajectories and size estimates indicates a net loss approaching 3 billion birds, or 29% of 1970 abundance. A continent-wide weather radar network also reveals a similarly steep decline in biomass passage of migrating birds over a recent 10-year period. This loss of bird abundance signals an urgent need to address threats to avert future avifaunal collapse and associated loss of ecosystem integrity, function, and services.

Slowing the loss of biodiversity is one of the defining environmental challenges of the 21st century (*1*–*5*). Habitat loss, climate change, unregulated harvest, and other forms of human-caused mortality (*6*, *7*) have contributed to a thousandfold increase in global extinctions in the Anthropocene compared to the presumed prehuman background rate, with profound effects on ecosystem functioning and services (*8*). The overwhelming focus on species extinctions, however, has underestimated the extent and consequences of biotic change, by ignoring the loss of abundance within still-common species and in aggregate across large species assemblages (*2*, *9*). Declines in abundance can degrade ecosystem integrity, reducing vital ecological, evolutionary, economic, and social services that organisms provide to their environment (*8*, *10*–*15*). Given the current pace of global environmental change, quantifying change in species abundances is essential to assess ecosystem impacts. Evaluating the magnitude of declines requires effective long-term monitoring of population sizes and trends, data that are rarely available for most taxa.

Birds are excellent indicators of environmental health and ecosystem integrity (*16*, *17*), and our ability to monitor many species over vast spatial scales far exceeds that of any other animal group. We evaluated population change for 529 species of birds in the continental United States and Canada (76% of breeding species), drawing from multiple standardized bird-monitoring datasets, some of which provide close to 50 years of population data. We integrated range-wide estimates of population size and 48-year population trajectories, along with their associated uncertainty, to quantify net change in numbers of birds across the avifauna over recent decades (*18*). We also used a network of 143 weather radars (NEXRAD) across the contiguous United States to estimate long-term changes in nocturnal migratory passage of avian biomass through the airspace in spring from 2007 to 2017. The continuous operation and broad coverage of NEXRAD provide an automated and standardized monitoring tool with unrivaled temporal and spatial extent (*19*). Radar measures cumulative passage across all nocturnally migrating species, many of which breed in areas north of the contiguous United States that are poorly monitored by avian surveys. Radar thus expands the area and the proportion of the migratory avifauna that is sampled relative to ground surveys.

Results from long-term surveys, accounting for both increasing and declining species, reveal a net loss in total abundance of 2.9 billion [95% credible interval (CI) = 2.7–3.1 billion] birds across almost all biomes, a reduction of 29% (95% CIs = 27–30%) since 1970 (Fig. 1 and Table 1). Analysis of NEXRAD data indicates a similarly steep decline in nocturnal passage of migratory biomass, a reduction of 13.6 ± 9.1% since 2007 (Fig. 2A). Reduction in biomass passage occurred across the eastern United States (Fig. 2, C and D), where migration is dominated by large numbers of temperate- and boreal-breeding songbirds; we observed no consistent trend in the Central or Pacific flyway regions (Fig. 2, B to D, and table S5). Two completely different and independent monitoring techniques thus signal major population loss across the continental avifauna.

Species exhibiting declines (57%, 303 out of 529 species) on the basis of long-term survey data span diverse ecological and taxonomic groups. Across breeding biomes, grassland birds showed the largest magnitude of total population loss since 1970—more than 700 million breeding individuals across 31 species—and the largest proportional loss (53%); 74% of grassland species are declining. (Fig. 1 and Table 1). All forest biomes experienced large avian loss, with a cumulative reduction of more than 1 billion birds. Wetland birds represent the only biome to show an overall net gain in numbers (13%), led by a 56% increase in waterfowl populations (Fig. 3 and Table 1). Unexpectedly, we also found a large net loss (63%) across 10 introduced species (Fig. 3, D and E, and Table 1).

A total of 419 native migratory species experienced a net loss of 2.5 billion individuals, whereas 100 native resident species showed a small net increase (26 million). Species overwintering in temperate regions experienced the largest net reduction in abundance (1.4 billion), but proportional loss was greatest among species overwintering in coastal regions (42%), southwestern aridlands (42%), and South America (40%) (Table 1 and fig. S1). Shorebirds, most of which migrate long distances to winter along coasts throughout the hemisphere, are experiencing consistent, steep population loss (37%).

More than 90% of the total cumulative loss can be attributed to 12 bird families (Fig. 3A), including sparrows, warblers, blackbirds, and finches. Of 67 bird families surveyed, 38 showed a net loss in total abundance, whereas 29 showed gains (Fig. 3B), indicating recent changes in avifaunal composition (table S2). Although not optimized for species-level analysis, our model indicates that 19 widespread and abundant landbirds (including two introduced species) each experienced population reductions of >50 million birds (data S1). Abundant species also contribute strongly to the migratory passage detected by radar (*19*), and radar-derived trends provide a fully independent estimate of widespread declines of migratory birds.

Our study documents a long-developing but overlooked biodiversity crisis in North America—the cumulative loss of nearly 3 billion birds across the avifauna. Population loss is not restricted to rare and threatened species, but includes many widespread and common species that may be disproportionately influential components of food webs and ecosystem function. Furthermore, losses among habitat generalists and even introduced species indicate that declining species are not replaced by species that fare well in human-altered landscapes. Increases among waterfowl and a few other groups (e.g., raptors recovering after the banning of DDT) are insufficient to offset large losses among abundant species (Fig. 3). Notably, our population loss estimates are conservative because we estimated loss only in breeding populations. The total loss and

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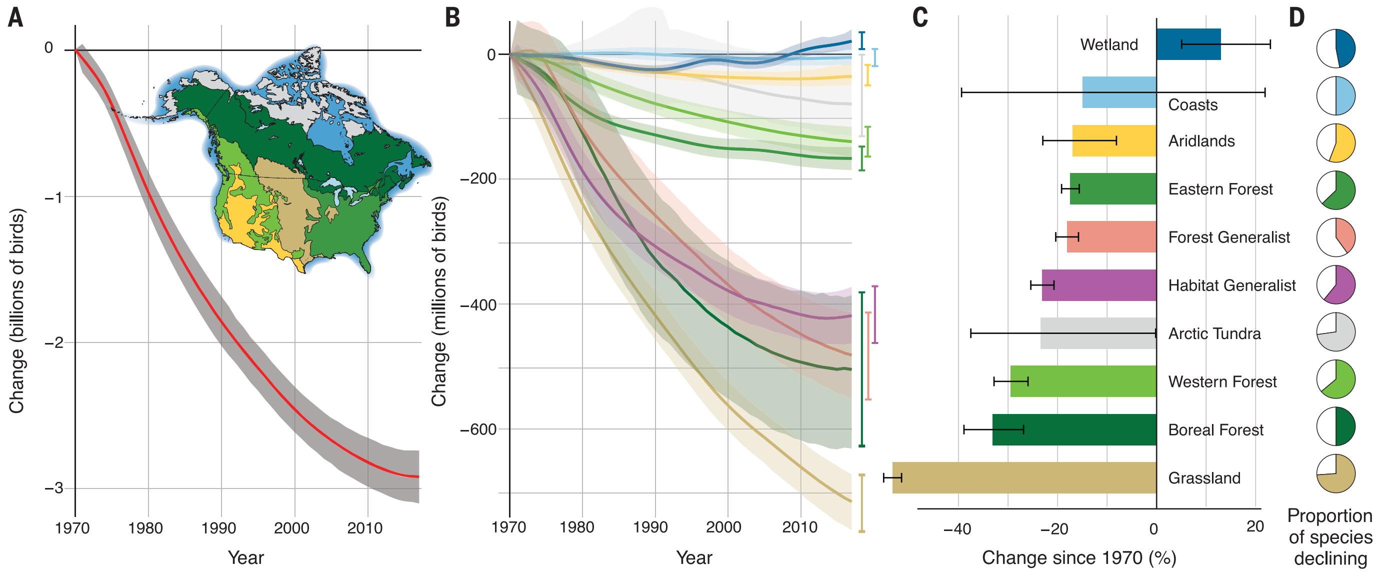

Fig. 1. Net population change in North American birds. (**A**) By integrating population size estimates and trajectories for 529 species (*18*), we show a net loss of 2.9 billion breeding birds across the continental avifauna since 1970. Gray shading represents the 95% credible interval (CI) around total estimated loss. Map shows color-coded breeding biomes based on Bird Conservation Regions and land cover classification (*18*). (**B**) Net loss of abundance occurred across all major breeding biomes except wetlands (see Table 1). (**C**) Proportional net population change relative to 1970, ±95% CI. (**D**) Proportion of species declining in each biome.

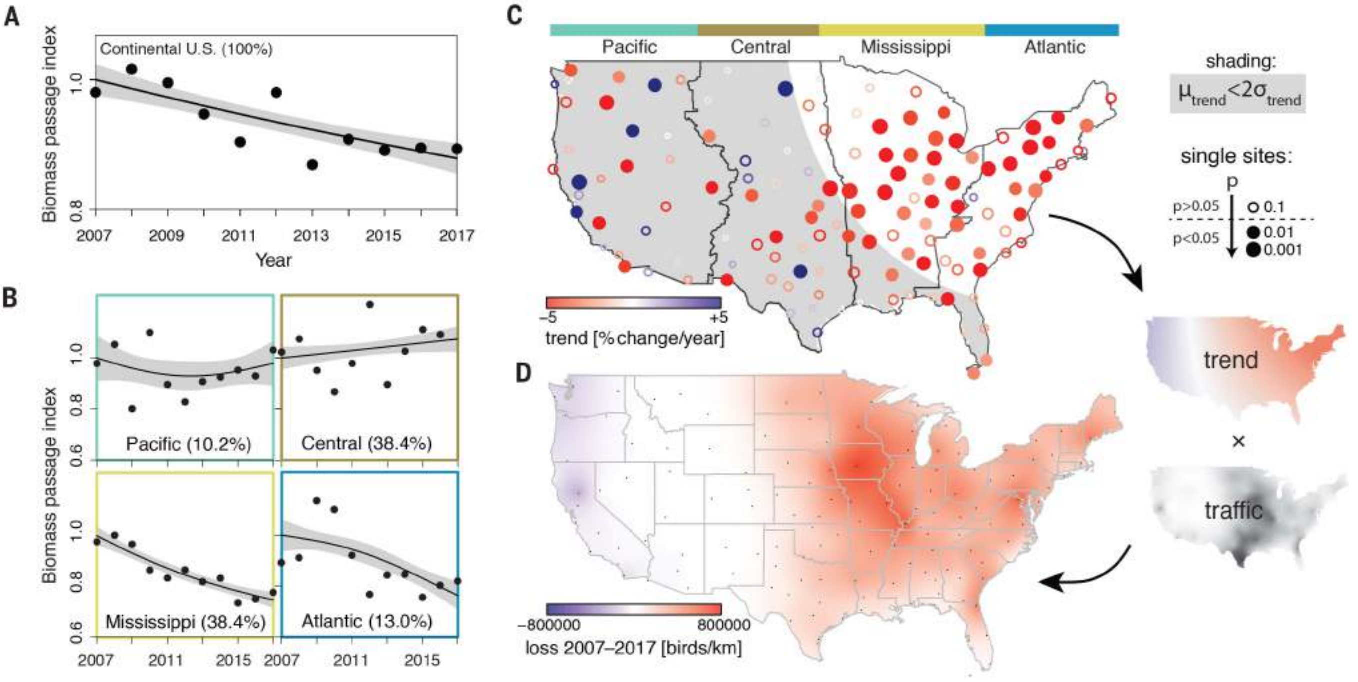

Fig. 2. NEXRAD radar monitoring of nocturnal bird migration across the contiguous United States. (**A**) Annual change in biomass passage for the full continental United States (black) and (**B**) the Pacific (green), Central (brown), Mississippi (yellow), and Atlantic (blue) flyways [borders indicated in (C)], with percentage of total biomass passage (migration traffic) for each flyway indicated; declines are significant only for the full United States and the Mississippi and Atlantic flyways (tables S3 to S5). (**C**) Single-site trends in seasonal biomass passage at 143 NEXRAD stations in spring (1 March to 1 July), estimated for the period 2007–2017. Darker red colors indicate higher declines and loss of biomass passage, whereas blue colors indicate biomass increase. Circle size indicates trend significance, with closed circles being significant at a 95% confidence level. Only areas outside gray shading have a spatially consistent trend signal separated from background variability. (**D**) Ten-year cumulative loss in biomass passage, estimated as the product of a spatially explicit (generalized additive model) trend, times the surface of average cumulative spring biomass passage.

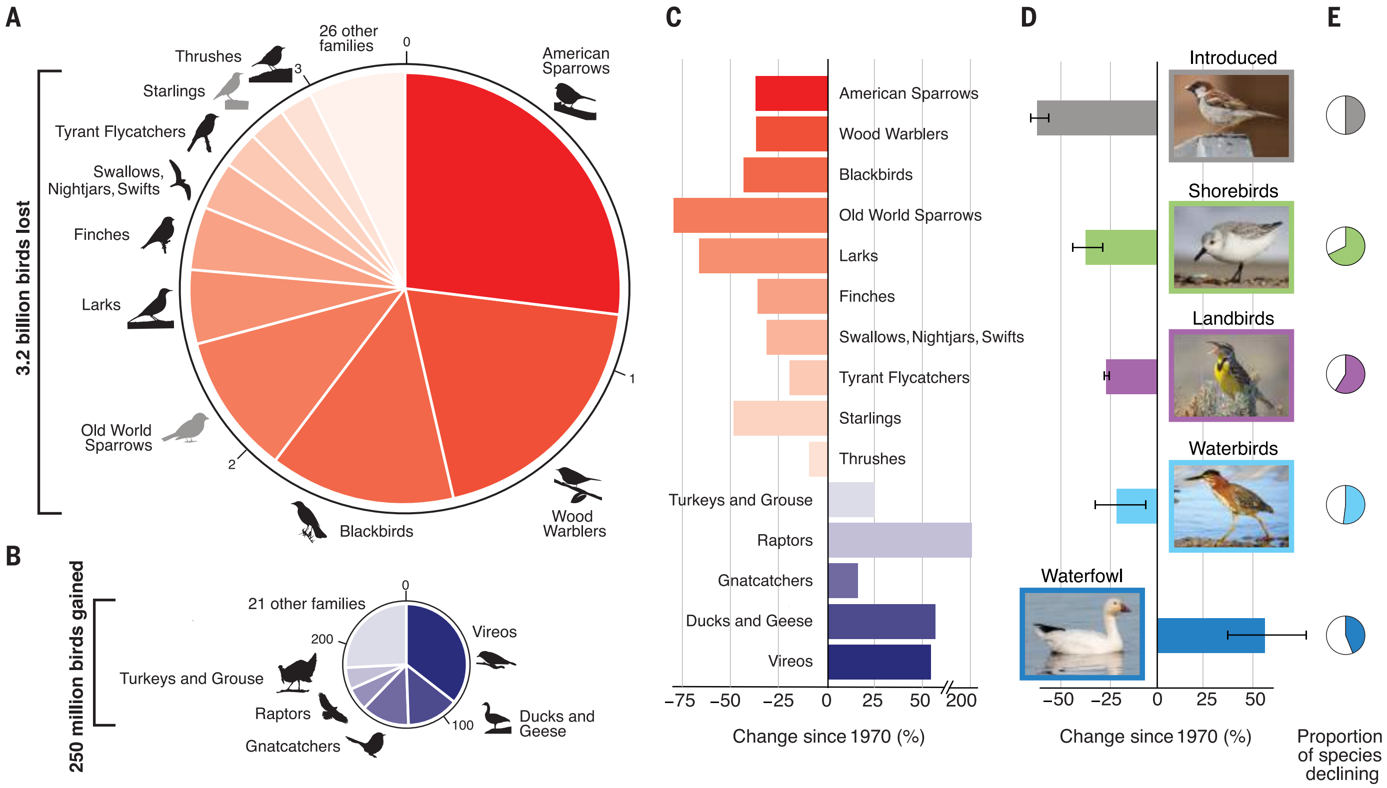

Fig. 3. Gains and losses across the North American avifauna over the past half-century. (**A**) Bird families were categorized as having a net loss (red) or gain (blue). Total loss of 3.2 billion birds occurred across 38 families; each family with losses greater than 50 million individuals is shown as a proportion of total loss, including two introduced families (gray). Swallows, nightjars, and swifts together show loss within the aerial insectivore guild. (**B**) Twenty-nine families show a total gain of 250 million individual birds; the five families with gains greater than 15 million individuals are shown as a proportion of total gain. Four families of raptors are shown as a single group. Note that combining total gain and total loss yields a net loss of 2.9 billion birds across the entire avifauna. (**C**) For each individually represented family in (B) and (C), proportional population change within that family is shown. See table S2 for statistics on each individual family. (**D**) Percentage population change among introduced and each of four management groups (*18*). A representative species from each group is shown (top to bottom, house sparrow, *Passer domesticus*; sanderling, *Calidris alba*; western meadowlark, *Sturnella neglecta*; green heron, *Butorides virescens*; and snow goose, *Anser caerulescens*). (**E**) Proportion of species with declining trends.

impact on communities and ecosystems could be even higher outside the breeding season if we consider the amplifying effect of "missing" reproductive output from these lost breeders.

Extinction of the passenger pigeon (*Ectopistes migratorius*), once likely the most numerous bird on the planet, provides a poignant reminder that even abundant species can go extinct rapidly. Systematic monitoring and attention paid to population declines could have alerted society to its pending extinction (*20*). Today, monitoring data suggest that avian declines will likely continue without targeted conservation action, triggering additional endangered species listings at tremendous financial and social cost. Moreover, because birds provide numerous benefits to ecosystems (e.g., seed dispersal, pollination, pest control) and economies [47 million people spend U.S.$9.3 billion per year through bird-related activities in the United States (*21*)], their population reductions and possible extinctions will have severe direct and indirect consequences (*10*, *22*). Population declines can be reversed, as evidenced by the exceptional recovery of waterfowl populations under adaptive harvest management (*23*) and the associated allocation of billions of dollars devoted to wetland protection and restoration, providing a model for proactive conservation in other widespread native habitats such as grasslands.

Steep declines in North American bird populations parallel patterns of avian declines emerging globally (*14*, *15*, *22*, *24*). In particular, depletion of native grassland bird populations in North America, driven by habitat loss and more toxic pesticide use in both breeding and wintering areas (*25*), mirrors loss of farmland birds throughout Europe and elsewhere (*15*). Even declines among introduced species match similar declines within these same species' native ranges (*26*). Agricultural intensification and urbanization have been similarly linked to declines in insect diversity and biomass (*27*), with cascading impacts on birds and other consumers (*24*, *28*, *29*). Given that birds are one of the best monitored animal groups, birds may also foreshadow a much larger problem, indicating similar or greater losses in other taxonomic groups (*28*, *30*).

Pervasiveness of avian loss across biomes and bird families suggests multiple and interacting threats. Isolating spatiotemporal limiting factors for individual species and populations will require additional study, however, because migratory species with complex life histories are in contact with many threats throughout their annual cycles. A focus on breeding season biology hampers our ability to understand how seasonal interactions drive population change (*31*), although recent continent-wide analyses affirm the importance of events during the nonbreeding season (*19*, *32*). Targeted research to identify limiting factors must be coupled with effective policies and societal change that emphasize reducing threats to breeding and nonbreeding habitats and minimizing avoidable anthropogenic mortality year-round. Endangered species legislation and international treaties, such as the 1916 Migratory Bird Treaty between Canada and the United States, have prevented extinctions

Table 1. Net change in abundance across the North American avifauna, 1970–2017. Species are grouped into native and introduced species, management groups (landbirds, shorebirds, waterbirds, waterfowl), major breeding biomes, and nonbreeding biomes [see data S1 in (*18*) for assignments and definitions of groups and biomes]. Net change in abundance is expressed in millions of breeding individuals, with upper and lower bounds of each 95% credible interval (CI) shown. Percentage of species in each group with negative trend trajectories is also noted. Values in bold indicate declines and loss; those in italics indicate gains.

Species group	No. of species	Net abundance change (millions) and 95% CIs			Percent change and 95% CIs			Proportion species in decline
		Change	LC95	UC95	Change	LC95	UC95	
Species summary								
All N. Am. species	529	**–2,911.9**	–3,097.5	–2,732.9	**–28.8%**	–30.2%	–27.3%	57.3%
All native species	519	**–2,521.0**	–2,698.5	–2,347.6	**–26.5%**	–28.0%	–24.9%	57.4%
Introduced species	10	**–391.6**	–442.3	–336.6	**–62.9%**	–66.5%	–56.4%	50.0%
Native migratory species	419	**–2,547.7**	–2,723.7	–2,374.5	**–28.3%**	–29.8%	–26.7%	58.2%
Native resident species	100	*26.3*	7.3	46.9	*5.3%*	1.4%	9.6%	54.0%
Landbirds	357	**–2,516.5**	–2,692.2	–2,346.0	**–27.1%**	–28.6%	–25.5%	58.8%
Shorebirds	44	**–17.1**	–21.8	–12.6	**–37.4%**	–45.0%	–28.8%	68.2%
Waterbirds	77	**–22.5**	–37.8	–6.3	**–21.5%**	–33.1%	–6.2%	51.9%
Waterfowl	41	*34.8*	24.5	48.3	*56.0%*	37.9%	79.4%	43.9%
Aerial insectivores	26	**–156.8**	–183.8	–127.0	**–31.8%**	–36.4%	–26.1%	73.1%
Breeding biome								
Grassland	31	**–717.5**	–763.9	–673.3	**–53.3%**	–55.1%	–51.5%	74.2%
Boreal forest	34	**–500.7**	–627.1	–381.0	**–33.1%**	–38.9%	–26.9%	50.0%
Forest generalist	40	**–482.2**	–552.5	–413.4	**–18.1%**	–20.4%	–15.8%	40.0%
Habitat generalist	38	**–417.3**	–462.1	–371.3	**–23.1%**	–25.4%	–20.7%	60.5%
Eastern forest	63	**–166.7**	–185.8	–147.7	**–17.4%**	–19.2%	–15.6%	63.5%
Western forest	67	**–139.7**	–163.8	–116.1	**–29.5%**	–32.8%	–26.0%	64.2%
Arctic tundra	51	**–79.9**	–131.2	–0.7	**–23.4%**	–37.5%	–0.2%	56.5%
Aridlands	62	**–35.6**	–49.7	–17.0	**–17.0%**	–23.0%	–8.1%	56.5%
Coasts	38	–6.1	–18.9	8.5	–15.0%	–39.4%	21.9%	50.0%
Wetlands	95	*20.6*	8.3	35.3	*13.0%*	5.1%	23.0%	47.4%
Nonbreeding biome								
Temperate N. America	192	**–1,413.0**	–1,521.5	–1,292.3	**–27.4%**	–29.3%	–25.3%	55.2%
South America	41	**–537.4**	–651.1	–432.6	**–40.1%**	–45.2%	–34.6%	75.6%
Southwestern aridlands	50	**–238.1**	–261.2	–215.6	**–41.9%**	–44.5%	–39.2%	74.0%
Mexico–Central America	76	**–155.3**	–187.8	–122.0	**–15.5%**	–18.3%	–12.6%	52.6%
Widespread neotropical	22	**–126.0**	–171.2	–86.1	**–26.8%**	–33.4%	–19.3%	45.5%
Widespread	60	–31.6	–63.1	1.6	–3.7%	–7.4%	0.2%	43.3%
Marine	26	**–16.3**	–29.7	–1.2	**–30.8%**	–49.1%	–2.5%	61.5%
Coastal	44	**–11.0**	–14.9	–6.7	**–42.0%**	–51.8%	–26.7%	68.2%
Caribbean	8	–6.0	1.4	–15.7	12.1%	–2.8%	31.7%	25.0%

and promoted recovery of once-depleted bird species. History shows that conservation action and legislation work. Our results signal an urgent need to address the ongoing threats of habitat loss, agricultural intensification, coastal disturbance, and direct anthropogenic mortality, all exacerbated by climate change, to avert continued biodiversity loss and potential collapse of the continental avifauna.

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SUPPLEMENTARY MATERIALS

science.sciencemag.org/content/366/6461/120/suppl/DC1
Materials and Methods
Figs. S1 to S7
Tables S1 to S5
Databases S1 and S2
References (*36*–*101*)

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Decline of the North American avifauna

Kenneth V. Rosenberg, Adriaan M. Dokter, Peter J. Blancher, John R. Sauer, Adam C. Smith, Paul A. Smith, Jessica C. Stanton, Arvind Panjabi, Laura Helft, Michael Parr and Peter P. Marra

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Staggering decline of bird populations
Because birds are conspicuous and easy to identify and count, reliable records of their occurrence have been gathered over many decades in many parts of the world. Drawing on such data for North America, Rosenberg *et al.* report wide-spread population declines of birds over the past half-century, resulting in the cumulative loss of billions of breeding individuals across a wide range of species and habitats. They show that declines are not restricted to rare and threatened species—those once considered common and wide-spread are also diminished. These results have major implications for ecosystem integrity, the conservation of wildlife more broadly, and policies associated with the protection of birds and native ecosystems on which they depend.
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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 15

State Water Resources Control Board
Staff Report
State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

Staff Report

Including the Substitute Environmental Documentation

State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State

[Proposed for Inclusion in the Water Quality Control Plans for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California]

Final: Adopted April 2, 2019

Staff Report

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Final: Adopted April 2, 2019

Cover page photo credit: State Water Board Staff, Mather Field vernal pool, April 2009

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1. ACRONYMS AND ABBREVIATIONS

APA	Administrative Procedure Act
BU	Beneficial Use
CALFED	California Bay-Delta Program
CBC	California Biodiversity Council
CCC	California Coastal Commission
CCR	California Code of Regulations
CDF	California Department of Forestry and Fire Protection
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CERES	California Environmental Resources Evaluation System
CIWQS	California Integrated Water Quality System
CNDDB	California Natural Diversity Database
Corps	United States Army Corps of Engineers
CRAM	California Rapid Assessment Method
CWA	Clean Water Act
CWMW	California Wetland Monitoring Workgroup
DPW	Department of Public Works
DWR	Department of Water Resources
EIR	Environmental Impact Report
ELI	Environmental Law Institute
ESA	Endangered Species Act
FAA	Federal Aviation Administration
FY	Fiscal Year
GHG	Greenhouse Gas
HCP	Habitat Conservation Plan
Hydromod TAC	Hydromodification Technical Advisory Committee
ICC	Interagency Coordinating Committee

IPCC	Intergovernmental Panel on Climate Change
LCP	Local Coastal Program
LEDPA	least environmentally damaging practicable alternative
LTS	Less Than Significant
MOU	Memorandum of Understanding
NCCP	Natural Community Conservation Plan
NI	No Impact
NOD	Notice of Determination
NOP	Notice of Preparation
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resource Conservation Service
NWP	Corps Nationwide Permit
OAL	Office of Administrative Law
SCH	State Clearinghouse
SCWRP	Southern California Wetlands Recovery Project
SED	Substitute Environmental Documentation
SEZs	Stream Environment Zones
SFEI	San Francisco Estuary Institute
SWANCC	Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers
SWRCB	California State Water Resources Control Board
T&E	Threatened and Endangered
TAT	Technical Advisory Team
U.S. EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDR	Waste Discharge Requirements
WEF	Water Education Fund

2. EXECUTIVE SUMMARY

The State Water Resources Control Board (State Water Board) prepared this Staff Report, including Substitute Environmental Documentation (SED) (Staff Report) to evaluate the potential environmental effects of adopting the *State Wetland Definition and Procedures for Dredged or Fill Material to Waters of the State* (Procedures) and comply with other requirements related to the development and adoption of water quality control plans and policies for water quality control. Previous drafts of the Procedures have been referred to by the State Water Board as the *Water Quality Control Policy for Wetland Area Protection and Dredged or Fill Permitting*. However, the decision was made to convert the policy into a plan amendment to both the existing Water Quality Control Plan for Ocean Waters and forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries of California. The title was shortened to better communicate the dredge or fill procedures apply to all waters of the state, including both waters of the United States (used interchangeably with "waters of the U.S.") and waters of the state outside of federal jurisdiction, regardless of whether they meet the definition of a "wetland." In addition, by adopting the Procedures as amendments to water quality control plans, they will automatically supersede any conflicting provisions in the Regional Water Quality Control Boards' (Regional Water Boards) water quality control plans and will apply to the State and Regional Water Boards (collectively, Water Boards).[1,2]

The Procedures consist of the following components: (1) a wetland definition (2) a framework for determining if a feature that meets the wetland definition is a water of the state, (3) wetland delineation procedures, and (4) procedures for application submittal, and the review and approval of water quality certifications, waste discharge requirements, and waivers of waste discharge requirements for dredge or fill activities (henceforth collectively referred to as Orders). The State Water Board has developed the Procedures and this report in compliance with existing regulatory requirements.

The State Water Board developed the Procedures to address several important issues. First, there is need to strengthen protections for waters of the state that are no longer protected under the Clean Water Act (CWA) due to U.S. Supreme Court decisions, since the Water Boards have historically relied on CWA protections in dredge or fill discharge permitting practices. Second, there is inconsistency

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[1] Water Code section 13170.

[2] The Procedures will be incorporated into the water quality control plans for (1) Inland Surface Waters Enclosed Bays and Estuaries and (2) Ocean Waters of California. Because the Procedures will already have been adopted, future incorporation of the Procedures, as adopted, into the water quality control plans will be considered non-substantive amendments. At that time, formatting and other organizational edits necessary for incorporation into the water quality control plans will be addressed.

across the Water Boards in requirements for discharges of dredged or fill material into waters of the state, including wetlands. There is no single accepted definition of wetlands at the state level, and the Water Boards may have different requirements and levels of analysis with regard to the issuance of dredge or fill Orders. Third, current regulations have not been adequate to prevent losses in the quantity and quality of wetlands in California, where there have been especially profound historical losses of wetlands.

2.1 Program Background

The State Water Board has developed the Procedures in the context of existing regulatory framework for the discharge of dredged or fill material to waters of the state. At the federal level, the CWA is the primary mechanism by which agencies regulate discharges to waters of the United States. The primary framework for protecting water quality at the state level is the Porter-Cologne Water Quality Control Act at Water Code section 13000 et seq. (Porter-Cologne Act), which requires waste discharge requirements (WDRs) for any discharge of waste, which includes discharges of dredged or fill material, that could affect the quality of waters of the state.[3]

Under the CWA, in order to discharge dredged or fill material into waters of the United States, applicants must obtain a CWA section 404 permit from the U.S. Army Corps of Engineers (Corps) and a section 401 water quality certification (401 certification) from the State Water Board or one of nine Regional Water Quality Control Boards (collectively, Water Boards) verifying that the project will comply with state water quality standards. In California, the Porter-Cologne Act requires that any discharge that could affect the quality of waters of the state, including waters that are not under federal jurisdiction, be permitted through WDRs. 401 certifications issued by the Water Boards also serve as WDRs under State Water Board Water Quality Order 2003-0017-DWQ.

When the Corps issues individual section 404 permits, applicants are subject to comprehensive review under the U.S. EPA's 404(b)(1) (40 CFR part 230) "Guidelines for Specification of Disposal Sites for Dredge or Fill Material (federal Guidelines)." Under these regulations, the applicant must demonstrate that the following three sequential steps have been taken to reduce impacts to federal waters: 1) all practicable measures to avoid impacts must be exhausted; 2) minimization measures must be incorporated into the project design to further reduce any remaining impacts; and 3) if after all practicable avoidance and minimization measures have been applied, the applicant must provide compensatory mitigation for any unavoidable impacts. One of the requirements set forth by the federal Guidelines is that the applicant is required to provide an alternative analysis which is used by the Corps to select the least environmentally damaging practicable alternative (LEDPA) for the project. General

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[3] Water Code §§ 13260, 13263.

permits issued by the Corps address specific classes of dredge or fill discharge activities that are similar in nature and/or involve the same or similar types of possible adverse effects which would cause only minimal environmental effects. The Corps issues a variety of general permits, including regional general permits (which cover a specific geographic area), programmatic general permits (for existing local, state or other federal programs) that protect waters of the United States to the standards of the CWA section 404 program, and nationwide general permits which cover types of activities such as linear transportation crossings, bank stabilization activities, and aquatic habitat restoration, establishment, and enhancement projects.

For Corps-issued general permits, an applicant need only qualify for the permit since the permit is already issued. For some general permits, the applicant notifies the Corps before initiating dredge or fill activities to waters of the U.S. (notification is not required for select permits), and for others, the applicant can notify the Corps after initiating activities. When the Corps issues a general permit, all project review requirements of the federal Guidelines, including the alternatives analysis requirement, are satisfied for the applicant at a programmatic level.

The Water Boards have issued 401 certifications for some general permits issued by the Corps. These include, but are not limited to, regional general permits for emergency projects and some classes of nationwide permits that are exempt for review under California’s Environmental Quality Act (CEQA). If an applicant believes a project qualifies to enroll under a 401 certification for a Corps general permit, the applicant need only file a Notice of Intent (NOI) for review by the Water Boards. Otherwise, the project proponent would submit an application for an individual 401 certification.

Description of Procedures

The Procedures consist of the following main components: (1) a statewide wetland definition; (2) a framework for determining if a feature that meets the wetland definition is a water of the state; (3) wetland delineation procedures; and (4) procedures for regulation of discharges of dredged or fill material that apply to all waters of the state (including wetlands).

Wetland Definition

The statewide wetland definition is intended to provide clear and consistent direction for determining whether an aquatic feature is a wetland. This definition does not affect the meaning of “waters of the state” as it pertains to the Water Boards’ jurisdiction pursuant to the Porter-Cologne Act, nor does it modify the current authorities of the Water Boards to protect water quality. Rather, a statewide wetland definition would provide consistent identification standards for certain types of aquatic features that are sometimes difficult to identify in the field, and for which current policy does not provide adequate guidance.

Jurisdictional Framework for Wetlands

The Water Code defines “waters of the state” broadly to include “any surface water or groundwater, including saline waters, within the boundaries of the state.” The Procedures include a jurisdictional framework for determining if a feature that meets the wetland definition is a water of the state. If an aquatic feature meets the wetland definition, the burden is on the applicant to demonstrate that the wetland is not a water of the state. The jurisdictional framework considers all natural wetlands, wetlands created by modification of waters of the state, and wetlands that meet current or historic definitions of "waters of the U.S.," to be waters of the state. In addition, the jurisdictional framework considers artificial wetlands that meet specific criteria to be waters of the state. An artificial wetland would be considered a water of the state if it was 1) created as mitigation for impacts to other waters of the state; 2) identified in a water quality control plan as a water of the state; 3) a result of historic human activity and has become a relatively permanent part of the natural landscape; or 4) greater than or equal to one acre in size with exceptions for artificial wetlands that were constructed for certain purposes.

Delineation Procedures for Wetlands

The Procedures provide wetland delineation procedures, by incorporating the established delineation procedures set forth by the Corps. The Corps' delineation procedures will be used to determine if an area meets the wetland definition in the Procedures.

The Procedures do not include definitions or delineation procedures for non-wetland aquatic features.

Dredge or Fill Procedures for All Waters of the State

The Procedures supplement existing application submittal and review requirements for the regulation of discharges of dredged or fill material into all waters of the state (regardless of whether the waters of the state in question also meet the definition of wetlands). It would establish procedures for the Water Boards' review and approval of individual 401 certifications and WDRs (collectively, Orders) for these discharges. The Water Boards may issue an Order if, in general, an applicant has shown that:

- ***A sequence of actions was taken to first avoid, then to minimize, and lastly mitigate for adverse impacts to waters of the state;***
- ***The potential impacts will not contribute to a net loss of the overall abundance, diversity, and condition of aquatic resources in a watershed;***
- ***The discharge of dredged or fill material will not violate water quality standards and will be consistent with all applicable water quality control plans and policies for water quality control; and***
- ***The discharge of dredged or fill material will not cause or contribute to significant degradation of the waters of the state.***

The Water Boards would require an applicant to comply with the "State Supplemental Dredge or Fill Guidelines" (State Guidelines), included in Appendix A of the Procedures. The State Guidelines include relevant portions of the federal Guidelines. Full integration of the federal Guidelines was not possible due to jurisdictional and procedural differences. Therefore, relevant sections of the federal Guidelines were retained, and non-applicable sections were excluded. Global changes and/or deletions were made to translate federal terms to the state equivalent, and account for existing state regulations.

Compliance under the Procedures

On average, 80 percent of dredge or fill Orders issued by the Water Boards are individual section 401 water quality certifications for Corps' section 404 permits. Since the Procedures largely incorporate the federal Guidelines, much of the avoidance, minimization and mitigation requirements of the Procedures are already applied under the federal Guidelines and the Corps' current practices.

Another 19 percent of projects are regulated by general orders issued by the Water Boards for discharges that impact waters of the state that are also under federal jurisdiction or discharges to waters of the state only. When developing general orders, the Water Boards conduct programmatic analyses and include requirements to ensure that discharges that qualify for coverage under the general orders have only minimal impacts on aquatic resources. The Water Boards also review individual projects to determine whether they qualify for enrollment under these general orders. The Procedures do not include any new requirements for general orders issued by the Water Boards.

The remaining one percent of Orders are WDRs for discharges to waters of the state that are not under federal jurisdiction. The Procedures include requirements that apply to individual WDRs for discharges of dredged or fill material to waters of the state that are outside of federal jurisdiction.

Finally, all of the Water Boards are currently applying all or some of the elements of the Procedures to individual Orders. However, it is not possible to determine the full extent of each of the Water Boards' requirements simply by reviewing Basin Plans and existing Orders. This inconsistency, which creates uncertainty for the regulated community, is one of the main reasons for these Procedures – to make regulation of dredged or fill material to waters of the state consistent across the Water Boards.

2.2 Environmental Impacts

The environmental impacts associated with the Procedures are evaluated in this Staff Report on a programmatic level. As such, this Staff Report is not as detailed as an environmental document that would be used to analyze an individual discharge of dredged or fill material project that would be regulated under the Procedures. The State Water Board expects future environmental reviews of projects that are subject to the Procedures to identify project-specific environmental effects. At that time, the lead agency must identify any project-specific significant environmental effects and adopt all feasible alternatives and mitigation for these effects. If no feasible mitigation or alternatives are available, the lead agency must adopt a statement of overriding considerations before approving the project, as required by CEQA.

Staff cannot predict the exact nature of environmental effects associated with future individual projects because such forecasting would require knowledge of future projects (e.g., scope, scale, location, and design) throughout the state.[4] However, the programmatic environmental impacts assessment may be representative of the types and magnitude of project-specific environmental effects. The State Water Board intends for the Procedures to provide consistent identification of wetlands, and to strengthen efforts to avoid and minimize impacts to all waters of the state, through consistent application submittal and review requirements. This consistency may result in a greater avoidance, minimization, and compensation for impacts to waters of the state and reduction of discharges of dredged or fill material, potentially resulting in the protection and retention of a greater proportion of aquatic resources relative to existing regulatory practice.

Further, given the relatively small number of projects that might be regulated significantly differently under the Procedures, compared to the existing regulatory framework, the State Water Board has determined that the programmatic environmental effect on all environmental impact categories will be less than significant, or there will be no impact. As such, the Procedures will not result in any cumulatively considerable impacts when combined with other past, present, or reasonably foreseeable related projects.

2.3 Analysis of Alternatives to the Procedures

Although the Procedures would not have any significant effects, the State Water Board considered a range of alternatives to the Procedures. These alternatives address applicability of the Procedures (no procedures, adoption of procedures for non-federal waters only, and administration of CWA section 404 program for all waters), the wetland definition (no statewide wetland definition, one two or three parameter definition), jurisdictional framework for determining whether a wetland is a water of the state (case-by-case determinations, all wetlands, all natural wetlands, categorical inclusions and exclusions), wetland delineation methods, procedures for the regulation of discharges of dredged or fill material (no uniform permitting procedures, uniform permitting procedures based on Corps procedures). Ultimately, however, the requirements of the Procedures represent the best option for meeting the objectives of the Water Boards while avoiding significant impacts.

2.4 Economic Considerations

This Staff Report analyzes and explains potential costs of implementing the Procedures. The Procedures provide flexibility as to the extent of the required environmental analysis associated with application submittal and review requirements. Under existing regulatory practice, applicants are likely to compile

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[4] According to 23 CCR § 3777(c), the "environmental analysis shall take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites, but the board shall not be required to conduct a site-specific project level analysis of the methods of compliance, which CEQA may otherwise require of those agencies who are responsible for complying with the plan or policy when they determine the manner in which they will comply."

extensive documentation of environmental impacts, site design, stormwater controls, mitigation strategies, and other relevant factors, especially if the project is subject to review under CEQA. As such, analysis to examine alternatives that would avoid or minimize impacts to waters of the state may represent a small portion of the costs of the existing analysis. Projects that are less complex may not be subject to CEQA review. As such, the level of effort that would be needed would likely be commensurate with the scope and potential for adverse environmental impacts on the aquatic environment.

An environmental analysis for an individual project may or may not result in identifying alternate project designs that avoid or minimize adverse environmental impacts, including cumulative impacts. Whether such analysis leads to project design alterations with implications for overall project costs is also unknown. Design changes associated with avoiding areas recurrently inundated with water could lead to costs (e.g., if permit applicants are required to move the project to a more expensive upland lot away from wetlands) or cost savings (e.g., if design or site alterations lead to less extensive alterations or construction).

Since impacts to waters of the state are currently subject to compensatory mitigation requirements, the Procedures are not likely to significantly change compensatory mitigation requirements on a statewide basis. However, there may be some minor increases or decreases in compensatory mitigation project requirements at the project level. For example, if the Procedures result in a decrease of impacts to waters of the state for an individual project, there may be a decrease in the quantity of compensatory mitigation that would be required for those impacts. As such, there may be some indirect cost savings to project developers due to avoided compensatory mitigation requirements. For some individual projects, the converse may be true.

3. ORGANIZATION OF DOCUMENT

This Staff Report identifies and evaluates potential adverse impacts to the environment from adoption of the Procedures and proposes necessary measures to reduce any potential adverse impacts to a less than significant level. This Staff Report includes the following sections:

- ***Section 4: Introduction – provides an overview of the purpose of the report and a discussion of the regulatory requirements fulfilled by this Staff Report.***
- ***Section 5: Project Background – provides background information for the Procedures, including the regulatory background, Water Board program information, wetland importance and trends, and existing wetland regulations and initiatives in California.***
- ***Section 6: Project Description – provides an overview of the project need, objectives, location, and methods of compliance with the Procedures.***
- ***Section 7: Environmental Setting – provides a description of California's bioregions, ecosystems, hydrology, and hydrologic regions.***
- ***Section 8: Environmental Impacts – describes the potential environmental impacts of the Procedures.***
- ***Section 9: Cumulative Impacts – describes the potentially cumulatively considerable impacts of the Procedures in combination with past, present, and reasonably foreseeable future projects.***
- ***Section 10: Alternatives – describes a reasonable range of potentially feasible alternatives that would attain the basic objectives of the Procedures.***
- ***Section 11: Economic Considerations – provides an analysis of compliance with the Procedures, methods for achieving compliance, and the cost of those methods.***

4. INTRODUCTION

This section provides an overview of the steps necessary for adoption of the Procedures. Section 4.1 provides the purpose of the Staff Report for the Procedures. Section 4.2 outlines the scoping process for the Procedures. Section 4.3 describes the State Water Board's compliance with the California Environmental Quality Act (CEQA) and public noticing requirements. Steps taken to obtain scientific peer review for specific elements of the Procedures are outlined in section 4.4. The rationale for providing an economic analysis as part of the Staff Report is described in section 4.5. Sections 4.6 - 4.8 describes the Procedures adoption process. Section 4.9 sets timing for implementation of the Procedures after adoption.

4.1 Purpose of Staff Report

The State Water Board must comply with CEQA[5] when adopting water quality control plans and policies. CEQA, adopted as state law in 1970, is meant to inform citizens and decision makers about all potential significant environmental impacts of a project (e.g., water and air quality, wildlife and habitats, public health and safety). The CEQA process also includes a thorough public review of the project and its potential impacts.

State Water Board staff prepared this Staff Report in compliance with the California Code of Regulations (CCR), title 23, §3775, et. seq. to identify, evaluate, and minimize potential adverse impacts to the environment from adoption of the Procedures. The Secretary for Natural Resources has certified the State Water Board's water quality planning process as an environmental regulatory program[6] meeting the requirements of CEQA and Public Resources Code section 21080.5. The CCR[7] requires the State Water Board to prepare a report that, at a minimum, contains:

(1) A brief description of the proposed project (Procedures);
(2) An identification of any significant or potentially significant adverse environmental impacts of the Procedures;
(3) An analysis of reasonable alternatives to the Procedures, and mitigation measures to avoid or reduce any significant or potentially significant adverse environmental impacts; and
(4) An environmental analysis of the reasonably foreseeable methods of compliance.

This Staff Report fulfills the State Water Board's requirements for preparation of an environmental document for public review and is part of the substitute environmental documentation required to support the

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[5] Pub. Res. Code, CWC §13147 et seq.
[6] Cal. Code Regs. tit. 14, §15251(g).
[7] 23 CCR §3775 et seq.

Procedures. Other relevant documents used in the development of the Procedures will be included in the administrative record, and will be made available on the State Water Board's website for the Procedures.[8]

4.2 CEQA Scoping

Public participation is an essential part of the CEQA process. Early consultation with the public and other agencies, also called scoping, provides the opportunity to identify the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in the environmental document.

The State Water Board held a public CEQA scoping meeting for the Procedures on April 5, 2007. That initial effort was subsequently abandoned, and a new approach was developed (initiated by Resolution 2008-0026 in April 2008). New scoping sessions were held on August 18 and 20, 2008.[9]

On January 5, 2011, the State Water Board released an initial study of potential environmental impacts (State Water Board, 2011), and posted notice of its intent to hold a second round of scoping meetings on January 31, 2011 and February 8, 2011. Scoping also included formal consultation with agency and academic wetland scientists who were convened as a Technical Advisory Team (TAT); consultation with representatives from other regulatory agencies with authorities related to surface water permitting; and various informational stakeholder outreach meetings. These scoping efforts are described in more detail below.

The State Water Board received comment letters from 66 individuals or agencies during the noticed comment period from January 5, 2011 through May 20, 2011 as follows:[10] sixteen from business and industry interest groups; sixteen from environmental advocacy groups; two from federal agencies; twenty-five from regulated California state and local agencies; and three from other California state regulatory agencies. The State Water Board staff has since regularly consulted with various groups of interested parties, and other state and federal agencies. In addition, 8,023 form letters were received in September 2011, from members or supporters of environmental advocacy groups. The alternatives to the Procedures that the State Water Board considered were largely based upon comments and alternative proposals received from various stakeholder groups and interested persons as an early part of the public process.

Technical Advisory Team

Water Board staff recognized very early in the Procedures development process that independent scientific analysis would be needed to support key policy elements, especially the consideration of a wetland definition for use in the Water Quality Certification program, statewide. In the summer of 2008, the San Francisco Estuary

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[8] The State Water Board's website can be accessed at: http://www.waterboards.ca.gov/

[9] Information about the scoping meetings are located on the State Water Board's web site at http://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.shtml#historical

[10] Notices, the initial study, presentations, public comments, and other Information about the 2011scoping meetings and public comments are posted on the State Water Board's web site at http://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.shtml#recent

Institute (SFEI) was contracted to convene a TAT whose purpose would be to recommend a wetland definition and wetland delineation methods to Water Board staff. This TAT was given the mission to:

> "…compare existing alternative wetland definitions, classification systems, and delineation methods in terms of their ability to protect the State's wetland resources, beneficial uses, and ecological services…[and] to (1) assemble existing definitions, classification systems, and delineation methods; (2) compare them in terms of comprehensive wetland protection; (3) recommend choices; and (4) illustrate our deliberations with case studies."

SFEI appointed Josh Collins, PhD, to lead this effort. Dr. Collins in turn recruited a team of respected scientists with extensive experience in wetland science and policy. Team members were drawn from research institutes, private consulting practice, and from state, federal and local agencies, including senior staff of the Corps. Water Board staff liaisons from the State Water Board and the San Francisco Bay Regional Water Quality Control Board were assigned to the TAT to participate in the deliberations and to provide a communication channel between the TAT and Water Board staff.

The TAT fulfilled its assigned duties through a well-documented process in which existing wetland definitions from around the U.S. and the world were compared. Special attention was given to definitions in use for wetland regulatory programs. The TAT found that creation of a new definition would better serve the purposes of the Procedures than existing definitions. After the TAT recommended a definition to Water Board staff, it turned its attention to wetland delineation methods, and ultimately recommended the Corps' wetland delineation method to the Water Board for application under the Procedures.

The TAT's methods and results are presented in a series of four technical memoranda to the Water Board. These memoranda were released and revised between June 2009 and September 2012. The final versions of these memoranda were published after consultation with Water Board staff and consideration of peer review comments. Water Board staff have used these memoranda in the development of the Procedures.

Interagency Coordinating Committee

Water Board staff conducted routine consultation with other regulatory agencies with authorities pertaining to wetlands in the development of the Procedures. This consultation was conducted through an Interagency Coordinating Committee (ICC) that was convened for this purpose. The ICC consisted of senior staff representatives from the agencies listed in Table 4-1 below, including the Assistant Deputy Director for the Division of Water Quality at the State Water Board and the Assistant Executive Officer of the San Francisco Bay Regional Water Quality Control Board, and senior scientists from SFEI. Six meetings of the ICC were convened, as shown in **Table 4-1**.

Table 4-1: Agencies Participating in the Interagency Coordination Committee

State Agencies	Federal Agencies
California Department of Fish and Wildlife (formerly Fish and Game)	U.S. Army Corps of Engineers, Sacramento, San Francisco and Los Angeles Districts

California Department of Forestry and Fire Protection	U.S. Environmental Protection Agency – Region 9
California Coastal Commission	U.S. Fish and Wildlife Service
	U.S. Department of Agriculture – Natural Resources Conservation Service

Table 4-1: Interagency Coordination Committee Meetings and Key Agenda Topics

Meeting Dates	Key Agenda Topics
November 21, 2008	Presentation of procedures development goals and ideas; Introduction of draft wetland definition
August 27, 2009	Discuss first draft definition
May 20, 2010	Summary of procedures; Presentation of delineation method
Nov. 18, 2011	Presentation of TAT Memo 4 – Delineation; Summary of Water Boards steering committee decisions on development of procedures
March 15, 2012	Presentation of wetland definition as revised in response to peer review; Summary of current proposals
August 16, 2012	Review key provisions; Comparison to Corps regulations; implementation strategy

The ICC members provided many helpful and informative recommendations to Water Board staff. Most comments were focused on how implementation of the Procedures might conflict with those agencies existing regulatory programs. These comments were carefully considered by Water Board staff in the drafting of the Procedures.

Informal Stakeholder Outreach

Opportunities for outreach occurred when various organizations invited State Water Board staff to make presentations on the Procedures and its development process. Individuals and representatives of interest groups also requested meetings with staff to present concerns, ideas, and opinions regarding the Procedures. These are listed in **Table 4-2**.

Table 4-2: Outreach Meetings and Presentations with Interested Groups

Date	Group/Event	Topics
May 20, 2008	Northern California Conservation Partners meeting with staff	Advocates for mitigation planning and banking businesses met with staff to describe concerns and ideas from the mitigation banking industry

July 23, 2008	Bay Planning Council regular meeting and workshop	Staff delivered a presentation on the Procedures as one agenda item
October 30, 2008	Urban Water Institute 7th Annual Clean Water Conference	Staff delivered a presentation on the Procedures as one program topic
February 26, 2009	Road Ecology Management Conference for Caltrans staff	Staff delivered a presentation on the Procedures as one program topic
February 7, 2010	San Francisco Bay Wetlands Monitoring Group – Volunteer Monitoring Workshop	Staff delivered a presentation on aspects of the Procedures pertaining to wetland monitoring
June-July 2010	Informal stakeholder meetings	Meetings to hear comments on potential procedure issues with stakeholders representing: (1) agriculture, timber and range; (2) business; (3) environmental; (4) federal and tribal; (5) public health; and (6) local agencies
Oct-Nov 2012	Informal stakeholder meetings	Meetings to hear comments on Procedures with stakeholders representing (1) Corps and (2) wetland restoration
April 2013	Informal stakeholder meetings	Meetings to hear comments on Procedures with stakeholders representing: (1) business; (2) utilities; (3) environmental; and (4) wetland restoration
April-May 2016	Informal stakeholder meetings	Meetings to discuss any outstanding issues prior to public release
June-July 2016	Staff Workshops	Meetings to discuss Procedures and answer any questions prior to submission of written comments
July 19, 2016	Board Hearing	Hearing held for the State Water Board to hear comments on the Procedures
August 2017	Staff Workshops	Meetings to discuss Procedures and answer any questions prior to submission of written comments
September 6, 2017	Board Hearing	Hearing held to for the State Water Board to hear comments on the Procedures
January 9, 2019	Staff Workshop	Staff delivered a presentation on the Procedures, and answered any questions
January 22, 2019	Board Workshop	Workshop held for the State Water Board to hear comments on the Procedures

February 6, 2019	Staff Workshop	Staff delivered a presentation on clarifying language in the Procedures, answered any questions, and identified stakeholders' remaining policy concerns
March 5, 2019	Board Workshop	Workshop held for the State Water Board to hear comments on the clarifying language in the Procedures, and stakeholders' remaining policy concerns

Next Steps in the Public Process

A revised version of the Procedures, draft Staff Report, and other relevant information was circulated for public comment on July 21, 2017. A revised version of the draft Procedures, draft Staff Report, response to comments received, and other relevant information was noticed on January 3, 2019. At the January 22 State Water Board Workshop, staff received direction to work with stakeholders and identify areas of the Procedures that could be clarified and remaining policy concerns. As a result of this additional stakeholder outreach, staff released two documents on February 22, 2019: 1) State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State – Clarifications made to the January 2019 Version; and 2) Stakeholder Requested Policy Changes. The State Water Board held a Board Workshop on March 5, 2019 to discuss the two documents and receive feedback from stakeholders. Revised documents, including the Procedures, the Staff Report, and Response to Comments received on the 2017 draft Procedures, were released to the public on March 22, 2019. The revised documents will be presented and considered for adoption by the State Water Board at a public meeting on April 2, 2019. If adopted, the regulatory provisions of the Procedures must be approved by the Office of Administrative Law (OAL), and a Notice of Decision and fees must be submitted to the California Resources Agency. The State Water Board would also submit the adopted Procedures and supporting documentation to the United States Environmental Protection Agency (U.S. EPA) for informational purposes.

4.3 State Clearinghouse

The State Clearinghouse was established in 1973, as a division of the Governor's Office of Planning and Research. The State Clearinghouse coordinates the distribution and State-level review of CEQA documents,[11] and provides information and assistance on the environmental review process. Public agencies that are responsible for preparing CEQA environmental documents for proposed projects must make those documents available for public review. All Notices of Preparations (NOPs), draft Environmental Impact Reports (EIRs), and draft Negative Declarations for projects that involve a California state agency or area of statewide,

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[11] The CEQA Guidelines, Cal. Code Regs. tit. 14, §15000 et seq., describes the State Clearinghouse's roles and responsibilities regarding environmental review.

regional, or area-wide significance must be submitted to the State Clearinghouse.[12] The State Clearinghouse distributes these documents to relevant California state agencies and coordinates the transmittal of California state comments back to the Lead Agency. The minimum review period for EIRs is 45 days. If a project requires discretionary approval from a State agency, a Notice of Determination (NOD) must also be filed with the State Clearinghouse.[13] The filing of the NOD begins a 30-calendar-day statute of limitations on court challenges to the project approval under CEQA. The State Clearinghouse maintains a searchable computerized information system ("CEQAnet") of all environmental documents it processes, which is available for use by other State agencies, local governments, and project applicants.[14]

Exempt regulatory programs, such as the Water Boards' water quality planning process, are not required to use the State Clearinghouse. The Water Boards are independently responsible for noticing, posting, and circulating environmental documents to the public and relevant state and federal agencies. However, exempt regulatory programs may submit documents to the State Clearinghouse in order to widen the circulation of the documents and ensure broader public participation. Accordingly, the State Clearinghouse was used for the posting and circulation of environmental documents for the Procedures, in addition to posting the documents on the State Water Board's program website[15] and emailing interested parties. The State Water Board has filed a NOP (1/7/2011) for an initial study checklist and a draft EIR[16] with the State Clearinghouse, and has posted notice of CEQA scoping meetings through the State Clearinghouse.

4.4 Peer Review

State law (Health and Safety Code §57004) requires that when departments in the California Environmental Protection Agency (including the State Water Board) adopt plans, policies, amendments or regulations that have a scientific basis, the scientific data and analysis which serve as the basis for the regulation must undergo peer review. The State Water Board provides strict guidelines for these peer reviews.[17] The peer reviewer's responsibility is to determine whether the scientific findings, conclusions, and assumptions are based upon sound scientific knowledge, methods, and practices. Peer reviewers must not have been involved in any way with the development of the state agency proposal. The number of reviewers and the specialties represented should be appropriate to the complexity of the issue.

The State Water Board has contracted with the University of California to provide independent scientific peer review services prior to adoption of any regulation. The results of the peer review, along with staff

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[12] Cal. Code Regs. tit. 14, §15205 and §15206.

[13] Cal. Code Regs. tit. 14, §15075.

[14] See http://www.ceqanet.ca.gov/.

[15] See http://www.waterboards.ca.gov/water_issues/programs/cwa401/wrapp.shtml.

[16] See SCH # 2011012009.

[17] See http://www.waterboards.ca.gov/water_issues/programs/peer_review/

analysis of the reviews, are made available to the public and become part of the administrative record of the regulatory action.

The Procedures largely includes dredge or fill permitting procedures that are based on policy considerations, not scientific considerations. However, the wetland definition and delineation methods are based on scientific findings, conclusions, or assumptions. The State Water Board submitted the wetland definition and delineation methods for external scientific peer review to verify that the scientific findings, conclusions, and assumptions are based upon sound scientific knowledge, methods, and practices. The peer review was successfully accomplished in 2011.

Peer review of the Water Board wetland definition and delineation methods[18] is focused on its application under the section 401 certification program in California and associated state regulatory efforts under The Porter-Cologne Act. The definition and delineation methods draw upon CWA rules and procedures, but add considerations for application under the Porter-Cologne Act and for California's unique ecological conditions.

Peer reviewers' comments provided many helpful recommendations that were used to revise and improve the definition and delineation methods.

4.5 Economic Considerations

As discussed in section 11, a formal economic analysis is not required for the Procedures. Nevertheless, this Staff Report contains an analysis of possible costs to implement the Procedures. This analysis is contained in section 11 of this document.

4.6 Approval by OAL

The Administrative Procedures Act (APA)[19] establishes rulemaking procedures and standards for state agencies in California. The requirements set forth in the APA are designed to provide the public with a meaningful opportunity to participate in the adoption of state regulations and to ensure that regulations are clear, necessary, and legally valid. A regulation is a rule or standard of general application that implements, interprets, or makes specific the law enforced or administered by the agency that adopted the regulation. Substantial portions of the Procedures meet the definition of a "regulation." Government Code section 11353 sets forth specific procedures for the adoption or revision of water quality control plans, and exempts the adoption or revision of such plans from the remainder of the APA.

State regulations must be adopted in compliance with regulations of OAL.[20] OAL reviews regulatory provisions of Water Quality Control Plans, Policies, and Guidelines for compliance with six standards set out in the APA.[21] These six standards are necessity, authority, reference, consistency, clarity, and non-duplication.[22]

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[18] http://www.waterboards.ca.gov/water_issues/programs/peer_review/wetl_def_del/index.shtml

[19] Govt. Code §11340 et seq.

[20] California Code of Regulations, tit. 1, §1-§280.

[21] Govt. Code §11353(b).

[22] Govt. Code §11349(a) through §11349(f).

To satisfy the “necessity” standard, the record for the Procedures must contain substantial evidence demonstrating the need for the regulatory provisions, including a description of the public problem or other condition that each provision of the regulatory action is intended to address and the data that supports proposing the action. “Authority” is the provision of law which permits or obligates an agency to adopt, amend, or repeal a regulation. “Reference” means the statute, court decision, or other provision of law which an agency implements, interprets, or makes specific by adopting, amending or repealing a regulation. “Consistency” means being in harmony with, and not in conflict with or contradictory to, existing statutes, court decisions, or other provisions of law. “Clarity” is defined as “written or displayed so that the meaning of regulations will be easily understood by those persons directly affected by them.” “Non-duplication” means a regulation does not serve the same purpose as a state or federal statute or another regulation. However, a regulation may duplicate or overlap a state or federal statute or regulation where necessary to satisfy the clarity standard, or where mandated or authorized by federal law.

OAL must decide within 30 calendar days of receiving a complete administrative record if the Procedures follow OAL regulations. OAL does not generally accept comments on proposed regulations during the review process. After OAL approves a proposed regulation adopted by a state agency, it files the regulation with the California Secretary of State and publishes it in the CCR.[23]

4.7 Submittal of Notice of Decision and Filing Fees

CEQA[24] requires state agencies and departments to submit a Notice of Decision to the Office of the Secretary for the California Natural Resources Agency for projects approved under a certified regulatory program. The CEQA Checklist with findings, adopted Resolution, final regulatory language, and proof of OAL approval are generally submitted with the Notice of Decision. The Notice of Decision is posted for public inspection for a period of not less than 30 days. Filing a Notice of Decision will result in a shorter statute of limitation for CEQA lawsuits.

The California Department of Fish and Wildlife (CDFW)[25] is a department within the California Natural Resources Agency that manages and protects the state's diverse fish, wildlife, plant resources, and native habitats. CDFW is responsible for consulting with agencies and providing the requisite biological expertise to review and comment on CEQA documents, and recommend mitigation measures. CDFW must be notified when a CEQA project involves fish and wildlife of the state, rare, and endangered native plants, wildlife areas, and ecological reserves. CDFW collects a filing fee[26] for Certified Regulatory Programs to offset the costs of reviewing environmental documents (e.g., the Procedures, Staff Report, and CEQA Checklist). The filing fee must be paid to the Secretary for Resources before the respective Notice of Decision is submitted to the California Natural Resources Agency.

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[23] The CCR is available online at http://ccr.oal.ca.gov/

[24] 23 CCR §3781; Public Resources Code §21080.5

[25] See http://www.dfg.ca.gov/

[26] Fish and Game Code §711.4

4.8 Submittal to U.S. EPA

Section 303(c) of the CWA requires U.S. EPA to review and approve or disapprove new or revised state-adopted water quality standards. For purposes of §303(c) of the CWA, water quality standards generally include designated beneficial uses, water quality criteria, and antidegradation policies. U.S. EPA has 60 days to approve or 90 days to disapprove water quality standards submitted by states. In certain cases, U.S. EPA may conditionally approve a state's standards.

U.S. EPA reviews a state submittal to ensure that new or revised state-adopted water quality standards meet the requirements of the CWA. Before approving any state-adopted water quality standards, U.S. EPA must first consult with the United States Fish and Wildlife Service (USFWS) to ensure that the action will not jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of critical habitat.[27]

Once adopted by the State Water Board and approved by OAL, the State Water Board will submit the Procedures to U.S. EPA with all required documentation in accordance with the federal CWA.[28] In the view of the State Water Board, however, there are no changes to surface water quality standards in the Procedures that would be subject to U.S. EPA approval.

Implementation of the Procedures through section 401 certification and WDRs permitting is part of the continuing planning process, but does not require U.S. EPA approval. To the extent that the Procedures address matters outside the scope of the CWA, the Procedures will be provided to U.S. EPA for its information only.

4.9 Effective Date of the Procedures

In the absence of explicit effective dates, adopted policies and plans go into effect on the date of approval by the final approving authority (if the CDFW filing fee has been paid). In most cases (surface water quality standards actions), the final approving authority is U.S. EPA. For regulatory actions that do not require U.S. EPA approval (e.g., groundwater standards), OAL's approval is final. Amendments that do not have a regulatory component (e.g., administrative changes) are in effect when approved by the State Water Board. The State Water Board recognizes that once the final Procedures are adopted, it would be reasonable to allow time for applicants to come into compliance and become familiar with the Procedures. As specified in the Procedures, the Procedures would apply to all applications for discharges of dredged or fill material to waters of the state submitted nine months after final approval by the OAL. The Procedures do not apply to applications that are submitted prior to [insert date that is nine months after approval by the Office of Administrative Law]." was added to the Procedures in an attempt to make it clear that, so long as a dredge or fill discharge application is submitted prior to the effective date of the Procedures, sections IV.A (project applications) and IV.B (Water Board review and approval) do not apply to that application. Instead, project application and Water Board review and approval will follow the policies and procedures in place at the permitting authority prior to the

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[27] As required by §7(a)(2) of the Endangered Species Act.

[28] 33 U.S.C. §1251, et seq.

effective date of the Procedures. This is true whether or not the application is ultimately deemed to be a "complete" application by the Water Board. If the application is so obviously deficient that it is clear that it was submitted prematurely to avoid having to comply with the Procedures, however, then the Water Boards' recourse would be to deny the application without prejudice. The applicant could then finish the application and re-submit it. That resubmission of the application would have to be in accordance with the Procedures if the Procedures have taken effect by the time that the application is re-submitted.

5. PROJECT BACKGROUND

Wetland protection has been a focus of California and State Water Board policy development activities since the 1970s. This section reviews the current regulatory programs in place to protect water quality and wetlands from dredge or fill impacts. Section 5.1 provides state and federal regulatory background for the Procedures. Section 5.2 provides an overview of the Waters Boards' Water Quality Certification program, with representative data on different types of projects, impacts and mitigation required for waters of the state. Section 5.3 provides an overview of the importance and status of wetlands both nationally and in California, with consideration to compensatory mitigation and environmental stressors. Section 5.4 provides Regional Board Basin Plan provisions regarding wetlands. Section 5.5 describes some of the main regulations and legal initiatives that have shaped wetland policy in California.

5.1 Regulatory Background

This section provides an overview of the relevant federal and state regulations governing discharges of dredged or fill material to waters of the state.

Clean Water Act

In 1972, Congress enacted the CWA to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.[29] The CWA[30] is the primary federal law controlling water pollution in the United States, which applies to all "waters of the United States," including many wetlands. Waters of the United States are defined[31] by U.S. EPA and the Corps in federal regulations and roughly comprise the nation's navigable waters, and tributaries to those waters, that have a connection to interstate commerce.

Under CWA section 303(c), the states are primarily responsible for the adoption and periodic review of water quality standards for all waters within their boundaries, with oversight by the U.S. EPA. Water quality standards consist of designated beneficial uses of waters, water quality objectives to protect beneficial uses, and an antidegradation policy.[32] The State Water Board is designated as the state water pollution control agency for all purposes under the CWA. [33]

Section 301 of the CWA prohibits the discharge of any pollutant except in accord with certain other provisions of the Act, including the permit program under CWA section 404 that authorizes the issuance of permits by the

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[29] 33 United States Code (U.S.C.) §1251 et seq.
[30] 33 U.S.C. §1251 et seq.
[31] 33 C.F.R. §328.3(a) and 40 C.F.R. §230.3(s).
[32] See 33 U.S.C. §1313(c); 40 C.F.R. §131.6.
[33] Wat. Code § 13160

Corps for the discharge of dredged or fill material. Section 502 of the CWA defines "pollutant" as "dredged spoil, solid waste, incinerator residue, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water." Dredged or fill material is thus considered a pollutant under the CWA.

Under section 404 of the CWA, the Corps and U.S. EPA regulate discharges of dredged or fill material to waters of the United States, pursuant to the federal Guidelines.[34] In addition, under section 401 of the CWA, applicants for section 404 permits must also receive a section 401 water quality certification from the state from which the discharge originates to ensure that the project will comply with all applicable provisions of the CWA and state water quality standards.

Definition of Terms

The CWA does not define either dredged or fill material; however, the U.S. EPA and the Corps have agreed on regulatory definitions for these terms. The U.S. EPA and the Corps defines "dredged material" to mean material that is excavated or dredged from waters of the United States. The term "discharge of dredged material" means any addition of dredged material into, including redeposit of dredged material (other than incidental fallback) within the waters of the United States. The term includes, but is not limited to, the following:

(i) The addition of dredged material to a specified discharge site located in waters of the United States;
(ii) The runoff or overflow, associated with a dredging operation, from a contained land or water disposal area; and
(iii) Any addition, including redeposit other than incidental fallback, of dredged material, including excavated material, into waters of the United States which is incidental to any activity, including mechanized land clearing, ditching, channelization, or other excavation.

The term "discharge of dredged material" does not include the following:

(1) Discharges of pollutants resulting from the onshore subsequent processing of dredged material that is extracted for any commercial use (other than fill);
(2) Activities that involve only the cutting or removing of vegetation above the ground (e.g., mowing, rotary cutting, and chain sawing) where the activity neither substantially disturbs the root system nor involves mechanized pushing, dragging, or other similar activities that redeposit excavated soil material; or
(3) Incidental fallback.

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[34] U.S. EPA issued interim final Guidelines in 1975 and the final Guidelines in 1980 following consultation with the Corps and public notice and comment (45 Fed. Reg. 85,336, Dec. 24, 1980). On March 31, 2008, U.S. EPA and the Corps amended the Guidelines (Subpart J) with revised regulations governing compensatory mitigation for authorized impacts to wetlands, streams, and other waters of the United States under section 404 of the Clean Water Act (73 Fed. Reg. 19687, Apr. 10, 2008).

Examples of dredging activities include stream widening or deepening, channel relocation, and mining. Note that suction dredge mining for mineral recovery is regulated primarily under CWA section 402, not section 404.

The U.S. EPA and the Corps defines “fill material” to mean material placed in waters of the United States where the material has the effect of replacing any portion of a water of the U.S. with dry land; or changing the bottom elevation of any portion of a water of the United States. For example, dirt, sand, gravel, rocks, shells, pilings, mulch and concrete are all considered fill if they are placed in a wetland or other surface water. Note that fill material does not include trash or garbage regardless of the purpose for their deposit.

The term “discharge of fill material” means the addition of fill material into waters of the United States. The term generally includes, without limitation, the following activities: placement of fill that is necessary for the construction of any structure or infrastructure in a water of the United States; the building of any structure, infrastructure, or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, or other uses; causeways or road fills; dams and dikes; artificial islands; property protection and/or reclamation devices such as riprap, groins, seawalls, breakwaters, and revetments; beach nourishment; levees; fill for structures such as sewage treatment facilities, intake and outfall pipes associated with power plants and subaqueous utility lines; placement of fill material for construction or maintenance of any liner, berm, or other infrastructure associated with solid waste landfills; placement of overburden, slurry, or tailings or similar mining-related materials; and artificial reefs. The term does not include plowing, cultivating, seeding and harvesting for the production of food, fiber, and forest products, but does include projects involving stream bank stabilization and stream crossings.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act provides a framework to protect water quality in California. The Porter-Cologne Act was enacted in 1969 as Division 7 of the Water Code,[35] and is the primary water quality law in California. The Porter-Cologne Act addresses two primary functions: water quality control planning and waste discharge regulation. The State Legislature, in adopting the Porter-Cologne Act, directed that California’s waters “shall be regulated to attain the highest water quality which is reasonable” and charges the Water Boards with protecting all waters of California, defined as “any surface water or groundwater, including saline waters, within the boundaries of the State.”[36] This encompasses all waters of the state, including those not under federal jurisdiction.

This statute identifies the nine major hydrologic basins in the state, establishes the Regional Water Boards with responsibility for each basin, and directs that each Regional Water Board adopt a water quality control plan (basin plan). [37] Each basin plan identifies the beneficial uses of all waters in the basin, specifies numeric and narrative water quality objectives needed to protect the uses, and presents an implementation strategy. The Porter-Cologne Act further requires that anyone who plans to discharge waste where it might affect waters of the state must first notify the Water Boards. The Water Boards identify the sources of pollutants that threaten

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[35] Wat. Code §13000 et seq.

[36] Wat. Code §13050, subd. (e).

[37] Basin Plans and state plans are available on the State Water Board’s website at: http://www.waterboards.ca.gov/plans_policies/#plans

the quality of the state's waters and regulate those sources by imposing requirements to control the discharge of pollutants in permits. The Porter-Cologne Act also provides a variety of civil and criminal enforcement tools.

Under the Porter-Cologne Act, the Water Boards regulate waste discharges that could affect water quality by issuing WDRs. Discharges of dredged or fill material have historically been treated as discharges of waste by the Water Boards. It is the longstanding interpretation of the State Water Board that the definition of "waste" set forth in Water Code section 13050(e) includes dredged or fill material. (Mem. from William R. Attwater, State Water Resources Control Board, to Danny Walsh, Board member (July 28, 1987).) In 1972, the California Legislature amended the Porter-Cologne Act to provide the state the necessary authority to implement CWA section 402, or the National Pollutant Discharge Elimination System (NPDES), in lieu of a U.S. EPA-administered program under the CWA. The Water Boards issue some WDRs that also serve as NPDES permits. Subsequent amendments have allowed the Water Boards to assume most of the responsibilities of the CWA, including the CWA section 404 permit program. To date, California has not applied for the 404 program.

The State Water Board oversees and guides the Regional Water Boards through several activities, including the adoption of regional water quality control plans and policies for water quality control. The State Water Board is also charged with adopting state plans and policies for water quality control, which may consist of principles or guidelines deemed essential by the State Water Board for water quality control. State policies[38] address water quality concerns for surface and groundwater that overlap regional board boundaries, are statewide in scope, or are otherwise considered significant.

The Water Boards require that discharges to high quality waters[39] comply with State Water Board Resolution No. 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," which generally requires that high quality waters be protected. The California antidegradation policy also incorporates the federal antidegradation policy which requires the maintenance and protection of existing uses and water quality conditions necessary to support such uses. In addition, the federal antidegradation policy maintains and protects water quality in outstanding national resource waters.

Key Regulatory Differences between the Clean Water Act and the Porter-Cologne Water Quality Control Act

The CWA regulates proposed discharges into waters of the U.S. The term "waters of the U.S." defines the extent of federal jurisdiction under the CWA. The definition uses explicit physical terms which include only surface waters, such as "navigable waters," the boundaries of which establish federal jurisdictional limits that apply to the Corps' section 404 permitting. Those limits include a requirement that each "water of the U.S." have a connection to interstate commerce. The Porter-Cologne Act, on the other hand, regulates discharges that could

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[38] Adopted State policies are available on the State Water Board's website at: http://www.waterboards.ca.gov/plans_policies/#policies

[39] "high quality waters" refers to waters that have quality higher than necessary to be protective of state-designated beneficial uses.

affect the quality of water of surface or ground waters, wherever those discharges may occur. Also, the Porter-Cologne Act defines "waters of the state" very broadly, with no physical descriptors, and no interstate commerce limitation. This means that the Water Boards' jurisdiction is over any proposed activity which could affect the quality of waters of the state regardless of the specific location of the proposed activity, while federal jurisdiction is generally limited to the discharge site, and within the defined boundaries of "waters of the U.S." In regulating discharges of dredged or fill material, therefore, the Water Boards' jurisdiction is more broad than federal jurisdiction.

Regulation of Discharges of Dredged or Fill Material in California

The regulation of dredged or fill material is accomplished through federal and state regulations. Applicants must comply with section 404 and section 401 of the CWA as well as the Porter-Cologne Act. In California, applicants must obtain a 401 certification for projects that receive a federal license or permit, such as a section 404 permit from the Corps, if waters that would be impacted fall under federal jurisdiction. If a project impacts waters of the state that do not fall under federal jurisdiction, the applicant need not obtain a section 404 permit or a 401 certification, but instead must receive approval from the Water Boards through the adoption of WDRs. Lastly, if a project would impact both waters inside and outside of federal jurisdiction an applicant would obtain a combination 401 certification/WDRs from the Water Boards and a section 404 permit from the Corps.

Federal and State Regulatory Framework for Dredge or Fill Discharges under Individual Orders

Discharges of dredged or fill material to waters of the state must comply with federal and state requirements (tables 5-1 and 5-2, respectively). The Corps has primary permitting authority for CWA section 404, subject to U.S. EPA approval, and issues individual and general permits. The Corps issues individual permits for specific discharges, and general permits for classes of activities on a regional, programmatic or nationwide basis. An applicant must obtain a section 404 permit from the Corps before discharging dredged or fill material into waters of the United States.

When applying for individual section 404 permits, applicants are subject to comprehensive review under the federal Guidelines. Under these regulations, the applicant must demonstrate that three steps, in the following sequence, have been taken to reduce impacts to federal waters: first, all practicable measures to avoid impacts to federal waters must be exhausted; second, minimization measures must be incorporated into the project design to further reduce any remaining impacts; and lastly, if after all practicable avoidance and minimization measures have been applied, the applicant must provide compensatory mitigation for any unavoidable impacts. The applicant is required to provide this information as an "alternatives analysis" when applying for an individual permit. Under the federal Guidelines, the Corps is required to select the least environmentally damaging practicable alternative (LEDPA) for the project.

For projects that impact waters of the state that are also under federal regulation, an applicant must obtain a section 404 permit from the Corps and a section 401 water quality certification from the Water Boards verifying that the project will comply with state water quality standards. For projects that would impact waters of the state that are outside federal jurisdiction, applicants must obtain WDRs from the Water Boards. In cases when a project may impact waters of the state that include waters both inside and outside of federal jurisdiction, an applicant must obtain a section 404 permit from the Corps, and a combination section 401 certification and WDRs from the Water Boards.

Table 5-1: Federal Regulatory Framework for Discharges of Dredged or Fill Material to Waters of the United States, Including Wetlands[40]

Authority	Provisions and Requirements
Clean Water Act (1972)	• ***Protects quality of waters of the United States, including wetlands;*** • ***Requires a permit for discharge of dredge or fill material to waters of the United States (section 404);*** • ***Requires state certification for section 404 permits (section 401)***
Federal Guidelines (40 CFR Part 230; 1980, 2008)	• ***Prohibits discharge of dredged or fill material if there is a practicable alternative that has less adverse impact on the aquatic environment and does not have other significant adverse environmental consequences;*** • ***Requires consideration of practicable alternatives, which include activities that do not involve discharge of dredged or fill material into waters of the United States, or activities that discharge at other locations in waters of the United States;*** • ***Defines alternative as practicable if it is available and capable of being done considering cost, existing technology, and logistics in light of overall project purposes;*** • ***Prohibits discharges that will cause or contribute to significant degradation of the waters of the United States;*** • ***Prohibits violation of state water quality standards, toxicity standards, endangered species protection, or requirements designed to protect federally designated marine sanctuaries;*** • ***Requires consideration of cumulative and secondary effects on aquatic ecosystem; and*** • ***Additional projection for "special aquatic sites" defined as including wetlands, mudflats, vegetated shallows, and riffle and pool complexes***
Corps/U.S. EPA Compensatory Mitigation Rule (April 10, 2008)	• ***Specifies requirements for mitigation when impacts are unavoidable; these requirements have been added to the federal Guidelines; and*** • ***Rule was adopted as Subpart J in the federal Guidelines***
MOU between Dept. of Army and U.S. EPA on	• ***Provides guidance for U.S. EPA and the Corps in use of discretion in implementing federal Guidelines in standard permits; and***

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[40] The table does not include all federal regulations that address or provide protection to wetlands.

the Determination of Mitigation under the federal Guidelines (1990)	• ***Sets policy of "avoid, minimize, compensate" sequence for impacts to wetlands***
Corps Standard Operating Procedures (2009)	• ***Guidance for the Corps in issuing permits***
Corps Regulatory Guidance Letters	• ***System for written guidance from the Corps to field agencies to clarify or interpret existing policy, judicial decisions or federal regulations***
Decision in *Solid Waste Agency of Northern Cook County v. Corps* (2001)	• ***Certain "isolated" waters, including wetland and riparian areas, do not fall under Corps jurisdiction***
Decisions in *Rapanos v. United States* and *Carabell v. United States* (2006)	• ***Two definitions for waters of the United States: (1) the CWA covers "relatively permanent, standing, or continuously flowing bodies of water" that are connected to traditional navigable waters, as well as wetlands with a continuous surface connection to such water bodies and (2) the CWA covers wetlands that "possess a 'significant nexus' to waters that are or were navigable in fact or that could reasonably be so made."***
Corps Wetlands Delineation Manual (1987)	• ***General methods for delineating wetlands***
Regional Wetland Delineation Supplements: Arid West Region (2008) and Western Mountains, Valleys, and Coast Region (2010)	• ***Identifies California-specific plants, hydric soils, and wetland hydrology indicators for the Arid West Region; and*** • ***Identifies California-specific plants, hydric soils, and wetland hydrology indicators for the Western Mountains, Valleys, and Coast Region***

Table 5-2: State Regulatory Framework for Permitting Discharges of Dredged or Fill Material to Waters of the State, Including Some Wetlands[41]

Authority	Provisions and Requirements
California Code of Regulations Title 23	• ***Requires any person discharging waste, or proposing to discharge waste, within any region that could affect the waters of the state to file a report of waste discharge (application for WDRs)***

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[41] The exhibit does not include all state regulations that address or provide protection to wetlands.

California Coastal Act (1976)	- ***Coastal permits from the California Coastal Commission (CCC) are required for all new development proposed on tide and submerged lands, and other public trust lands;*** - ***Requires coastal development permit from CCC for development within a wetland located in the coastal zone (defined as lands within the coastal zone that may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, or fens); and*** - ***The CCC reviews all section 404 permits for activities affecting the coastal zone to ensure consistency with the federally approved California Coastal Management Program***
California Wetlands Conservation Policy (1993)	***Establishes goal of ensuring no overall net loss of wetlands and achieving a long-term gain in the quantity, quality, and permanence of wetlands acreage and values***
State Water Board Water Quality Order No. 2004-004 DWQ (2004)	- ***Requires applicants to avoid, minimize, and then mitigate for adverse impacts to wetlands;*** - ***Requires mitigation for unavoidable impacts; monitoring and reporting; and*** - ***General WDRs for dredge or fill discharges of less than 0.2 acre, 400 linear feet, or 50 cubic yards to waters of the state that are not waters of the United States***
State Water Board 401 Certifications for other Corps General Permits	- ***Certifies other activities, such as small habitat restoration, invasive exotic plant removal, Corps regional general permits for emergency projects, and in the Lahontan Region, small construction projects outside the Lake Tahoe area.***
CDFW Lake and Streambed Alteration Program (section 1600 – 1616 of the Fish and Game Code)	- ***Requires notification for activities that substantially divert or obstruct the natural flow of any river, stream, or lake; change or use material from the bed, channel, or bank of, any river, stream, or lake; or deposit or disposal of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake; and*** - ***Requires a Lake and Streambed Alteration Agreement for activities that may affect fish and wildlife resources***
Local Coastal Plan (LCP) Certification and Amendments	- ***Directs each of the 73 cities and counties lying wholly or partly within the coastal zone to prepare an LCP; and*** - ***Requires local jurisdictions containing wetlands to include regulatory policies in their LCPs to ensure consistency with the Coastal Act***

State Water Board 401 Water Quality Certification for Corps NWPs (2017)	• ***Certifies NWPs 1, 4, 5, 6, 9, 10, 11, 12, 20, 22, 28, 32, 36, and 54 and finds that these activities are exempt from review under CEQA***

Federal and State Regulatory Framework for Dredge or Fill Discharges under General Orders

General permits issued by the Corps address specific classes of dredge or fill activities that are similar in nature and/or involve the same or similar types of adverse effects. The purpose of these general permits is to simplify the project review and approval process for both the Corps and the applicant, thereby streamlining the permitting process. Regional General Permits cover a specific geographic area, such as a watershed, city or district. The Corps also issues nationwide general permits every five years to cover dredge or fill activities that are similar and/or involve the same or similar types of discharges and possible adverse impacts to water quality, such as linear transportation crossings, bank stabilization activities, and aquatic habitat restoration, establishment, and enhancement projects.

To comply with Corps general permits, an applicant need only qualify for the permit since the general permit is already issued, and for most permits, notify the Corps either before or after initiating dredge or fill activities into water of the U.S. (notification is not required for select permits). In effect, the Corps satisfies all project review requirements under the federal Guidelines for the applicant, including the requirement to submit an alternatives analysis to identify the LEDPA.

The Water Boards have issued some 401 certifications for general permits issued by the Corps, while others have been denied certification, necessitating that those activities receive individual review at the state level. Examples of 401 certifications issued by the Water Boards are regional general permits for emergency projects and some classes of nationwide permits that are exempt from review under CEQA. If an applicant believes a project qualifies to enroll under a 401 certification already issued by the Water Boards, the applicant need only file a Notice of Intent (NOI) for review by the Water Boards. In all other instances, the project proponent would apply for an individual Order.

5.2 Overview of the Water Boards' Dredge or Fill Program

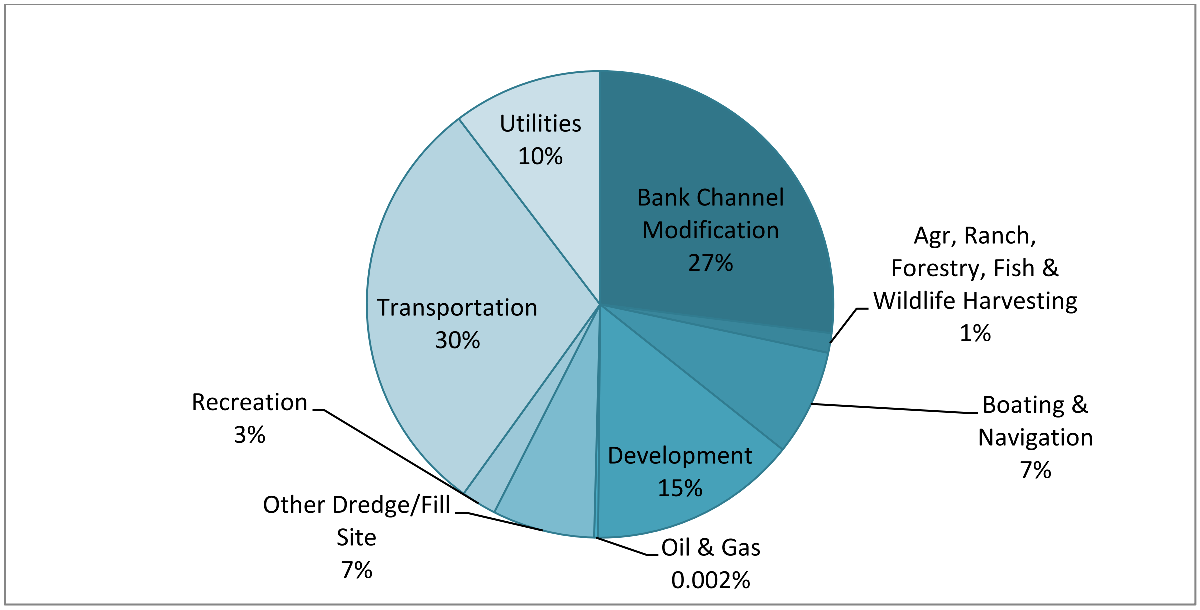
Through the Water Boards, a number of different classes of projects are regulated under the dredge or fill program. Types of projects and activities that are certified and regulated through the program include deep water dredging, flood control maintenance projects, sand and gravel extraction, fill and excavation for development projects, compensatory mitigation projects, and ecological restoration and enhancement projects. Below is a description and summary of different types of projects that includes data from the California Integrated Water Quality System (CIWQS) for fiscal year 14-15 (FY 14-15) (July 1, 2014, through June 30, 2015). Data and information displayed here is representative of a typical year of regulation for the program.

Fill & Excavation Projects

Fill and excavation projects represent the largest portion of projects that are regulated through the program. In FY 14-15, the Waters Boards issued 734 Orders for Fill & Excavation Projects, representing 82 percent of projects certified through the program. As described in section 5.1, fill material is material that can replace any portion of waters with dry land or changes the bottom elevation of waters. In contrast, excavation is the removal of sediment or soil in shallow waters. Figure 1 displays a comparison of different types of fill and excavation projects that have been certified through the program in FY 14-15. This data represents a typical year of the programs permitting for the following project types:

> ***Transportation Projects include roads, highways, airport facilities, bridges, overpasses, crossings, and railroads.***
>
> ***Bank and Channel Modification Projects include non-restoration bank stabilization, bio-engineered bank stabilization projects, beach nourishment, temporary diversion structures, dams, permanent diversion structures, channel construction and maintenance, outfall structures, and flood control and maintenance projects.***
>
> ***Boating and navigation projects include construction, maintenance, modification, and removal of marina facilities, boat slips, boat ramps, moorings, piles, piers, wharves, buoys, and other navigation aids.***
>
> ***Development projects include residential, commercial, mixed use, and industrial construction.***
>
> ***Utility projects include the construction, maintenance, modification and/or removal of overhead, underground utilities, including support facilities and large integrated power developments. Utility projects also include alternative energy such as solar, wind & hydroelectric facilities.***
>
> ***Agriculture, Ranch, Forestry, Fish and Wildlife Harvesting projects include agricultural conversations of use from undeveloped to agriculture, industrial ranching, irrigated lands, aquaculture projects, and silvicultural activities.***
>
> ***Recreation projects includes construction, maintenance, modification, and removal or recreation facilities including campgrounds, trails, golf courses, ski facilities, and event venues.***
>
> ***Oil and gas projects include projects with the purpose of installing drilling pads, exploration, hydraulic fracturing, and production wells.***
>
> ***Other Dredge or Fill sites include projects for the installation of data collection devices to measure and record scientific data or for survey activities. This category also includes projects with the purpose of cleanup of hazardous or toxic waste or projects that do not fit in any other category.***

Figure 1: Fill & Excavation Projects by Project Type



Impacts from Fill & Excavation Projects

Table 5-3 displays the total quantity of impacts for projects that have been certified by the Water Boards in FY 14-15 and is representative of a typical year. This table displays the impact quantity by water body type. Impact types are defined as follows:

> ***Temporary impacts are impacts that temporarily cause a physical loss or ecological degradation of an aquatic resource. The impact must be restored to pre-project condition through natural ecological processes or active restoration in order to be classified as temporary. If the impact is not restored to pre-project condition, it is classified as permanent.***
>
> ***Permanent impacts will permanently change an aquatic resource to a non-aquatic habitat type or permanently changes the bottom elevation of an aquatic resource. Permanent impacts can result in physical loss of area and ecological degradation.***

Table 5-3: Fill & Excavation Impacts in FY 14-15[42]

Aquatic Resource Type	Temporary Impacts (Acres)	Permanent Impacts (Acres)
Lake	7.90	2.35
Ocean/Bay/Estuary	15.57	17.48
Riparian	15.62	8.42

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[42] This data excludes impacts from flood control and maintenance projects.

Streambed	297.97	64.75
Vernal Pool	2.93	2.84
Non-Vernal Pool Wetlands	52.67	100.92
Total	392.67	196.76

Compensatory Mitigation Required for Fill & Excavation Impacts

Compensatory mitigation means the re-establishment, establishment (creation), rehabilitation, enhancement, and in some circumstances, preservation, of aquatic resources for the purpose of offsetting unavoidable temporary and permanent adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved. Compensatory mitigation required for certified impacts quantified in Table 5-3 (above) are displayed in Table 5-4. There are six different types of compensatory mitigation methods, including unknown, described as follows:

> ***Establishment (or creation) means the manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at a site. Establishment results in a gain of aquatic resource area and function (+/+)***
>
> ***Re-Establishment means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area and functions (+/+)***
>
> ***Rehabilitation means the manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area (0/+)***
>
> ***Enhancement means the manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource functions(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area (0/+)***
>
> ***Preservation means the removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in the gain of aquatic resource area or function(s) (0/0)***
>
> ***Unknown Compensatory Mitigation methods represent compensatory mitigation that is unknown at the time of certification. The compensatory mitigation method would be unknown at the time of***

certification when the approved mitigation is through an in-Lieu fee program that has not yet financed a project for that area.

Compensatory mitigation type is the manner in which the permittee will carry out the compensatory mitigation that is required for unavoidable adverse impacts associated with the project. Compensatory mitigation types are defined as follows:

Mitigation banks are aquatic resource areas that have been restored, established, enhanced, or in certain circumstances, preserved for the purpose of providing compensation for impacts to aquatic resources in the form of mitigation credits. Aquatic resources areas are restored, established or enhanced in advance of credits being made available for purchase.

In-Lieu Fee Programs are mitigation instruments which operate by making mitigation credits available for purchase to compensate for impacts to aquatic resources through an in-lieu-fee sponsor. Fees collected from the purchase of mitigation credits are used for the restoration, establishment, and/or enhancement of aquatic resource areas, in the same service area as the impacts once enough funds have been collected to finance a project in that area.

Permittee responsible is mitigation which is carried out by the discharger. Permittee responsible mitigation can be carried out at the same location as the impacts (on-site) or carried out at a different location (off-site).

Unknown Compensatory Mitigation types represent compensatory mitigation that is unknown at the time of certification.

Table 5-4: Compensatory mitigation required for certified impacts in FY 14-15

Aquatic Resource Type	Compensatory mitigation Type	Compensatory Mitigation Method					
		Established	Reestablished	Rehabilitated	Enhanced	Preserved	Unknown
Lake	Mitigation Bank	0.00	0.00	0.00	0.00	0.00	0.00
	In-Lieu	0.00	0.00	0.00	0.02	0.00	0.00
	Permittee Responsible	2.38	0.00	9.27	3.86	0.00	0.00
Ocean/Bay/ Estuary	In-Lieu	0.00	0.00	0.00	0.16	0.00	0.00
	Permittee Responsible	0.50	5.76	1.30	11.09	0.00	0.00
Riparian	Mitigation Bank	0.22	1.78	0.12	5.52	0.00	0.00
	In-Lieu	0.00	0.78	0.87	0.00	0.00	0.00

	Permittee Responsible	9.08	6.55	15.92	11.26	4.71	2.67
Streambed	Mitigation Bank	0.79	0.93	1.00	5.27	1.08	0.22
	In-Lieu	4.25	0.86	2.16	3.22	0.04	0.69
	Permittee Responsible	8.29	3.24	36.24	12.11	5.45	0.00
Unknown	In-Lieu	0.00	0.00	0.00	0.00	0.42	0.00
	Permittee Responsible	0.77	1.28	0.00	0.00	0.00	0.00
Vernal Pool	Mitigation Bank	5.47	0.00	0.11	0.13	13.98	0.00
	In-Lieu	0.00	0.00	0.03	0.00	0.00	0.00
	Permittee Responsible	0.41	0.00	2.90	0.00	0.00	0.00
Non-Vernal Pool Wetlands	Mitigation Bank	14.53	3.32	0.83	32.10	4.80	9.05
	In-Lieu	14.71	0.64	0.20	0.06	0.00	0.68
	Permittee Responsible	44.16	19.28	33.24	12.48	82.10	0.00

Dredging Projects

Dredging projects are carried out with the purpose of removing sediment in deeper water to increase depth. In FY 14-15, the Water Boards' program certified 50 dredging projects with the approximate cumulative total of 2,876,624 cubic yards of sediment reported to be removed from waters of the state. This is representative of a typical year of dredging activity. Examples of dredging projects certified through the Water Boards' program include maintenance dredging programs in which dischargers remove sediment regularly. These projects report to the Regional Boards on an annual basis the amount of sediment that is removed, as well as to the status of monitoring and mitigation conditions, if any.

Ecological Restoration and Enhancement Projects

Ecological restoration and enhancement projects (restoration projects) are projects that are voluntarily undertaken for the purpose of assisting or controlling the recovery of an aquatic ecosystem that has been degraded, damaged or destroyed to restore some measures of its natural condition and to enhance the beneficial uses of potential beneficial uses of waters of the state. Restoration projects are undertaken voluntarily in accordance with the terms and conditions of a binding stream or wetland enhancement or restoration agreement, or a wetland establishment agreement. In FY 14-15, the Water Board program certified

84 restoration projects across the state. These types of projects are carried out for a number of reasons, such as to improve or create habitat for threatened and/or endangered species, improve spawning habitat for salmonids, or facilitate passage for anadromous fish (to name a few). For example, each year the State Water Board certifies restoration projects for the Fisheries Restoration Grant Program.[43] This program is funded by the California Department of Fish and Wildlife to restore and enhance fish habitat in California.

Compensatory Mitigation Project Type

This project type includes projects that establish mitigation banks, in-lieu fee programs and permittee-responsible mitigation (located outside of the originally permitted discharge site). It includes projects that re-establish, establish (create), rehabilitate, enhance, and in some circumstances, preserve, aquatic resources for the purposes of providing compensatory mitigation. Mitigation credits are purchased by permittees from mitigation banks and in-lieu fee programs approved by the Corps to satisfy compensatory mitigation requirements for adverse impacts to aquatic resources. Whereas mitigation bank project activity is confined to one location, in-lieu fee programs sponsor restoration activities in designated service areas, carrying out individual projects once sufficient funds have been collected through the sale of credits. The compensatory mitigation project type also includes permittee responsible compensatory mitigation to satisfy the compensatory mitigation requirements for a project permitted separately in a different location. In FY 14-15, the Water Board program certified nine compensatory mitigation projects: four mitigation banks, four permittee-responsible projects, and one in-lieu fee project.

5.2.1 Wetland Importance and Current Status

Due to the numerous functions and services wetlands provide, these areas are among the world's most important ecosystems. These functions and services include the provision of habitat and conservation of biodiversity, recreational opportunities (such as hunting, fishing, wildlife viewing, and others), water supply, floodplain protection, water quality maintenance and purification, carbon sequestration, erosion control, oxygen provision, nutrient cycling, and many others. Of course, not all wetlands provide all of these functions; the set of functions provided by a particular wetland is highly site-and water body-specific.

The Water Education Fund (WEF, 2000) provides an overview of the major values of wetlands to California.[44] Wetlands are essential to maintaining water quality, as pollutants that would otherwise degrade groundwater and surface waters are routinely filtered by wetland vegetation. The wetland areas of the San Francisco Bay and San Joaquin Delta Estuary are key components of the waterway complex that provides two thirds of the drinking water for the state. Wetlands also provide flood control, mitigating potentially serious impacts on downstream resources by temporarily storing flood waters and detaining water flow. By stabilizing the banks of waterbodies

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[43] https://www.wildlife.ca.gov/Grants/FRGP

[44] This discussion is not a comprehensive evaluation of wetland functions and services. For more information on wetlands and their benefits, see U.S. EPA (2001a) and California Natural Resources Agency (1998; 2010).

and coastal areas they border, wetlands are also vital erosion control and shoreline stabilization mechanisms. In addition, these ecosystems are important for recharging aquifers.

As noted by California Natural Resource Agency (2010), wetlands are a blend of terrestrial and aquatic characteristics, which provide diverse habitats and serve as critical nursery areas for many birds, fish, and invertebrates. As such, habitat provision is another key function of wetlands. The 110 billion-dollar fishing industry in the state is heavily reliant on wetlands, which are the spawning and nursery habitats that sustain many freshwater and marine fisheries (WEF, 2000).

The Humboldt Bay tidal lands, for example, produce 90 percent of all oysters harvested in California. Beyond sustaining these and other economically valuable species, wetlands support 55 percent of endangered animal and 25 percent of endangered plant species in California. Taken together, wetlands in California support more species of plants and animals than any other habitat type in the state (California Natural Resource Agency, 2010). The Central Valley, home to a large share of the remaining wetlands in the state, is the most important waterfowl wintering area in the Pacific Flyway, supporting 60 percent of the total wintering population (WEF, 2000; California Natural Resource Agency, 2010).

Due to these and other functions, wetlands are fundamental to the economic health of the state. Although accurate economic valuations of these diverse ecosystems are difficult to produce, South Bay Restoration (n.d.) has estimated the annual recreational value of wetlands in California at between 6.3 and 22.9 billon dollars. However, recreational value is a significant underestimate of the total economic benefit, because it does not include the value of the myriad of other functions wetlands provide, such as water filtration, flood control, wildlife habitat, carbon sequestration, and others.

National Wetland Status

Despite the valuable functions and services provided by wetlands, the nation and the state of California have sustained substantial wetland losses over time, primarily due to conversion of wetland areas to other uses. U.S. EPA (2001b) estimates that over 220 million acres of wetlands originally existed in the conterminous United States. Today, over half of those original wetlands have been lost. The USFWS (2011) estimates that there are approximately 110.1 million acres of wetlands within the conterminous United States (as of 2009).

USFWS (2011) began systematically monitoring wetlands in the early 1970s, when wetland loss in the United States averaged approximately 458,000 acres annually. Since then, wetland losses have slowed; in the mid-1970s to the mid-1980s, losses were approximately 290,000 per year, and by 1998, they were about 59,000 per year. The period between 1998 and 2004 saw the first net wetlands gain of approximately 32,000 acres per year.

However, the most recent data documented by USFWS (2011) indicate a reversal of this gain. Approximately 13,800 acres of wetlands were lost in the conterminous United States between 2004 and 2009. Gains in some wetland types (via compensatory mitigation) were offset by losses in others. For example, over 489,000 acres of forested wetlands were lost during the 4.5-year period, while gains in freshwater ponds were considerable.

On May 11, 2016 the U.S. EPA released the *National Wetland Condition Assessment, 2011* (NWCA).[45] The NWCA is a collaborative survey the evaluation of the ecological condition of wetlands in the United States. The survey assessed vegetation, soil, hydrology, chemistry, algae, and buffer metrics at tidal and non-tidal wetlands. Survey results found that 48 percent of the country's wetlands are in good condition, while 20 percent are fair, and 32 percent are in poor condition. Of the national totals, 146 randomly selected sites were assessed in the Western United States which represents the condition or 3,647,060 acres of wetlands. Of this subset it was found that 21 percent of wetlands were in good condition, 18 percent fair, and 43 percent in poor condition. It was observed that major indicators of stress in the west are ditching, damming, nonnative vegetation, surface hardening, and vegetation removal (U.S. EPA, 2016).

California Wetland Status

Relative to the rest of the nation, especially profound historical wetland losses have occurred in California. Over 90 percent of the wetlands that existed at the time of European settlement are now gone (California Natural Resources Agency, 2010) – a higher rate of loss than any other state. Most wetland destruction has been the result of conversion of wetland areas to agriculture or urban uses. Central Valley wetlands are an example of this conversion (California Natural Resources Agency, 2010). The Central Valley originally contained over 4 million acres of wetlands, or over 30 percent of the total 13 million acres in the region. However, since the mid-1800s, over 95 percent of these wetlands have been destroyed. Today, just over 205,000 acres of wetlands remain in the region, and two-thirds of them are under private ownership. Figure 2 shows this historical loss (Dahl and Allord, 1997).

As with the rest of the nation, wetland loss in California has slowed in recent years. Primary causes of these recent wetland losses are land cover change, hydrological modification, biological invasion (i.e., invasive species), pollution, and climate change (California Natural Resources Agency, 2010). As noted in Table 5.3 above, approximately 104 acres of wetlands were lost by fill and excavation activities in FY 14-15.

Today, there are approximately 2.9 million acres of wetlands in California (California Natural Resources Agency, 2010). Of those, 38 percent are concentrated in the San Francisco Bay Delta and Central Valley regions, while another 36 percent are in the Sierra and Modoc regions, and 26 percent are in the North, Central, and South Coasts and the Colorado and Mojave Deserts. A majority of wetlands in the state (60 percent) are freshwater vernal pools, marshes, wet meadows, fens, playas, seeps and springs, bogs, swamps, and shallow ponds. Lakes are associated with 25 percent, and 15 percent are associated with river channels, intertidal beaches, rocky shorelines, and estuaries (California Natural Resources Agency, 2010).

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[45] https://www.epa.gov/national-aquatic-resource-surveys/national-wetland-condition-assessment-2011-results

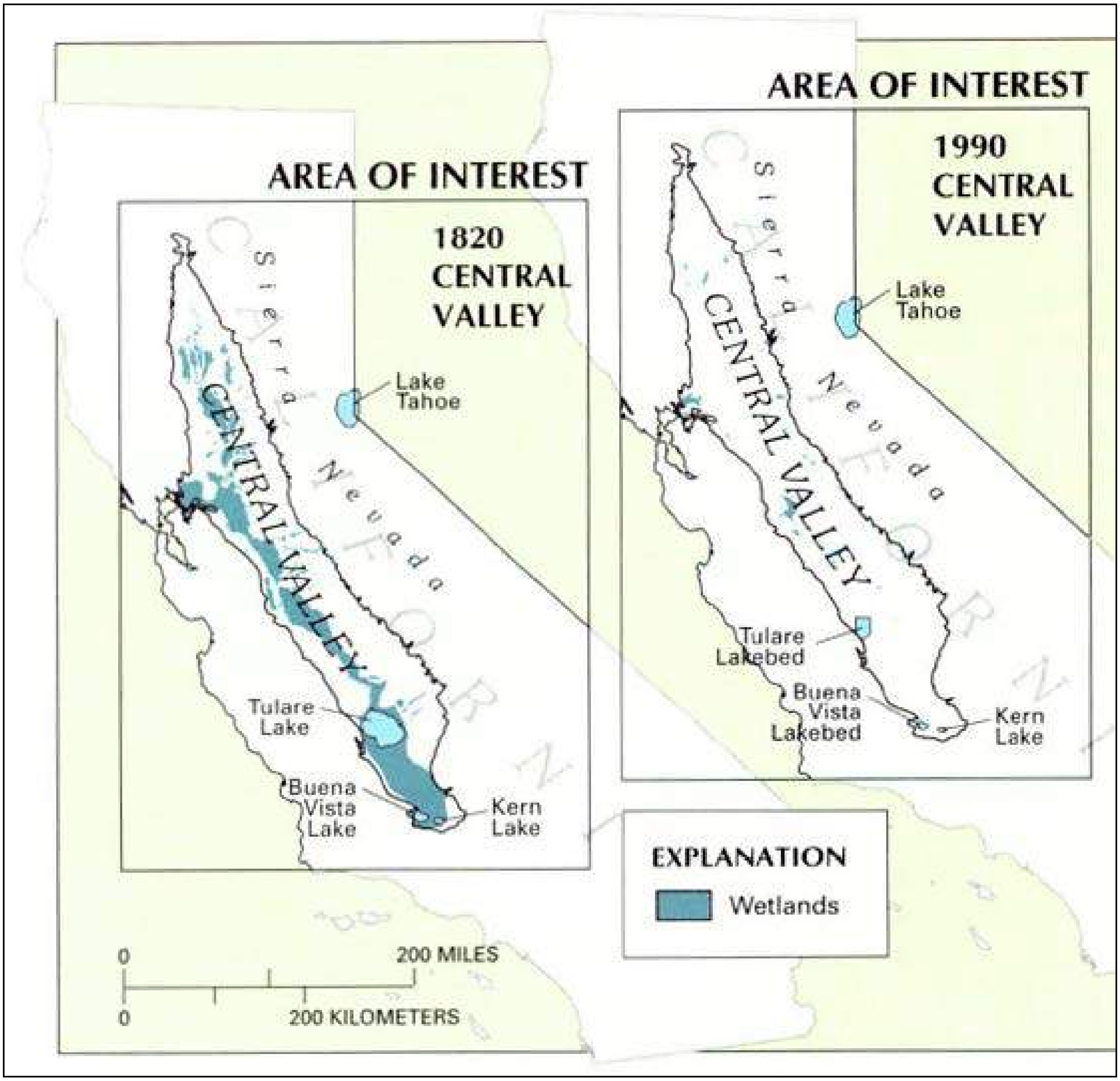

Figure 2. Wetlands of the Central Valley of California, circa 1820 (left) and 1990 (right) (Dahl and Allord, 1997)

Impact of Compensatory Mitigation

The regulatory requirement of compensatory mitigation[46] has significantly contributed to the reported decreasing rates of net wetland loss over recent decades. However, these estimates of decreasing net wetland losses may be overly optimistic when considering that mitigation wetlands in some cases are not ecologically equivalent to the natural wetlands they are intended to replace. For example, the USFWS (2011) points out that, although there have been net wetland gains in recent years, there is a "non-parity between wetland types that have been lost and subsequent wetland mitigation…the net effect has been the loss of wetland diversity, hydrologic function, biological communities, and a 'homogenization of wetland landscapes.'"

Wetlands such as freshwater emergent and open water ponds have been preferentially established as mitigation wetlands, with an area of deeper open water surrounded by shallow water and a band of emergent vegetation being the most common hydrologic pattern. Meanwhile, replacement of ecosystems such as forested wetlands has substantially lagged behind, despite sustaining significantly higher losses (Kihslinger, 2008; USFWS, 2011). As such, many compensatory mitigation wetlands may not sufficiently replace the functions of lost natural wetlands, and estimates of net acreage gains and losses are not fully reflective of the true losses and gains in the nation's wetlands.

This trend is also apparent in California. Ambrose et al. (2007) conducted a study of compensatory mitigation wetlands throughout the state, and found that, although they are largely meeting their permit requirements in terms of area and/or establishment of wetland vegetation, most sites do not achieve stated ecological performance goals. The authors visited 129 sites with compensatory mitigation permits, and assessed them according to the California Rapid Assessment Method (CRAM), which is a rapid assessment method for monitoring the conditions of wetlands in California. The method includes evaluations of 1) buffer and landscape context, 2) hydrology, 3) physical structure, and 4) biotic structure.

According to these criteria, the average mitigation site scored a 59 percent or "suboptimal" score (where a score of 70 to 100 percent represents an "optimal" wetland). Only 19 percent of the mitigation wetlands were ecologically successful, and 27 percent did not meet the federal definition of wetlands. Given these results, the authors conclude that "it seems likely that many mitigation projects did not replace the functions lost when wetlands were impacted, and hence the goal of 'no net loss' of wetland functions was not met," and that "this is partly due to regulatory agencies approving mitigation projects with conditions or criteria that are too heavily focused on the vegetation component of wetland function, with inadequate emphasis on hydrological and biogeochemical conditions and their associated functions and services." Table 5-5 below summarizes the extent of compensatory mitigation in California from 2004 to 2008.

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[46] Whereby project developers use wetland establishment, restoration, enhancement, or preservation to offset losses to wetlands, as required by §401 certifications and/or WDRs.

Table 5-5. Comparison of Permanent Fill and Compensatory Mitigation Acreage in California for Years 2004 – 2008 based on State Water Board permit data

Year	Permanent Fill (acres)	Compensatory Mitigation (acres)
2004	500	960
2005	600	1,426
2006	588	1,729
2007	479	1,873
2008	602	1,059
Sum	2,769	7,047

Source: CWA §401 Water Quality Certification Program, Division of Water Quality, Annual Reports, (http://www.waterboards.ca.gov/water_issues/programs/cwa401/#reports), for years 2004 - 2008. Information obtained from California Integrated Water Quality System (CIWQS) for year 2009.

Stressors to Existing Wetlands

In addition to historic and continued losses of natural wetlands, and compounded by the effects of suboptimal compensatory mitigation, many of the remaining wetlands in California are subject to a wide variety of potential stressors. These stressors can include habitat fragmentation, altered hydrology and flood control structures, reduced water supply, altered sediment transport and organic matter loading, physical barriers to movement of water, sediment, dredging, filling, diking, and ditching, shoreline hardening, engineered channels, beds, and banks, human land uses in wetland buffers, toxic contaminations, nutrient over-enrichment, pathogenic bacteria, invasive plants and animals, excessive human visitation, predation from feral animals and domestic pets, compaction and trampling by livestock, and removal of vegetation. According to the California Natural Resources Agency (2010), "a fundamental challenge facing entities entrusted with protecting wetlands in the state is the lack of an integrated, comprehensive wetland monitoring and assessment program and the associated data management infrastructure to support it."

5.3 Regional Board Basin Plan Provisions Regarding Wetlands

As shown in Table 5-6, a number of the Regional Water Boards, including the North Coast and San Francisco Bay Regions, reference the U.S. EPA and Corps wetland definition and/or the Corps 1987 Manual in their basin plans. Outside of the CWA section 401 program, however, basin plans generally acknowledge that more flexible wetland identification criteria may be needed to protect wetlands that qualify as waters of the state. For example, the San Francisco Bay Basin Water Quality Control Plan (Basin Plan) notes that:

> Identifying wetlands may be complicated by such factors as the seasonality of rainfall in the Region. Therefore, in identifying wetlands considered waters of the United States, the [Regional] Water Board will consider such indicators as hydrology, hydrophytic plants, *and/or* hydric soils for the purpose of mapping and inventorying wetlands. (Basin Plan section 2.2.3; emphasis added.)

Despite a somewhat broader recognition of wetlands shown in Table 5-6, and discussed in more detail below, the Regional Water Boards do not have specific wetland definitions or regional delineation standards for wetland identification.

Table 5-6: Wetland Definitions/Procedures and Wetland Beneficial Uses Contained in Regional Water Quality Control Board Basin Plans as of September 2012

Regional Water Board	Wetland Definition	Delineation Procedures	Beneficial Uses (BUs) and/or Water Quality Objectives for Wetlands
North Coast (Chapter 2.15-2.18)	Relies on the federal wetland definition to generally define wetlands. Identifies other wetlands based on judgment of the Regional Board.	Relies on Corps delineation manuals to identify wetland boundaries. If U.S. EPA disagrees with Corps' determination, will rely on U.S. EPA determination.	Establishes the following wetland BUs: Wetland Habitat; Flood Peak Attenuation/Flood Water Storage; Water Quality Enhancement; assigns other surface water BUs to wetlands.
San Francisco Bay (Chapters 2.2.3 & 4.23.2)	Relies on the federal wetland definition to generally define wetlands. Identifies other wetlands based on the presence of wetland hydrology, hydric soils, and/or hydrophytic vegetation. Provides a list of wetland types including mudflats.	Relies on U.S. EPA and Corps delineation procedures for CWA section 401. Relies on U.S. EPA or CDFW delineations when U.S. EPA disagrees with Corps' determination.	Assigns a number of BUs to wetlands including Wildlife Habitat.
Central Coast	None specified.	None specified.	None specified.
Los Angeles (Chapter 2.4 and 3.17)	Relies on Saint, et al. (1993) as an inventory and description of major regional wetlands. Freshwater, estuarine, and saltwater marshes, swamps, mudflats, and riparian areas are specifically identified as wetlands. Identifies other wetlands based on the presence of wetland hydrology, hydric soils,	None specified.	Establishes the following wetland BUs: Wetland Habitat; assigns other surface water BUs to wetlands. Establishes two water quality objectives for the protection of wetlands: Wetland Hydrology and Wetland Habitat.

	and/or hydrophytic vegetation.		
Central Valley (Chapter 2)	None specified.	None specified.	Identifies the following wetland BUs: Wildlife Habitat; assigns other surface water BUs to wetlands; BUs in the Delta assigned on a case by case basis.
Lahontan (Chapter 2.1, 2.5 and 4.9-8)	Relies on the federal wetland definition to generally define wetlands. Uses primary and secondary indicators of hydrology, vegetation, and soils to identify "Stream Environment Zones" (includes wetlands and riparian areas; Lake Tahoe Basin only).	Provides a wetlands protection and management implementation plan. Determines site-specific boundaries of wetland areas on an as-needed basis using methods in the current federal Wetlands Delineation Manual (Corps, 1987).	Establishes the following wetland BUs: Flood Peak Attenuation/Flood Water Storage and Water Quality Enhancement (applies to all surface waters, but only assigned to wetlands currently); assigns other surface water BUs to wetland waterbodies via the tributary rule. Establishes a narrative wetland water quality objective for non-degradation of Aquatic Communities and Populations; assigns other surface water quality objectives to wetlands but notes that a case by case determination may be needed where the water quality objective is naturally out of range.
Colorado River	None specified	None specified.	None specified.
Santa Ana (Chapter 3.4-3.5)	Identifies wetland types: swamps, marshes, bogs, sloughs, mangroves, wet meadows, savannas, wet tundra, playa lakes and vernal pools.	Uses the Corps' wetland definition as general reference only. Specific boundaries of each wetland area are determined on an as-needed basis using the federal Wetland	Assigns BUs to a partial listing of wetlands in the Basin Plan; not all wetlands in the Region have been identified by the Regional Board to date.

		Delineation Manual (Corps 1987) or other accepted techniques.	
San Diego	None specified.	None specified.	None specified.

North Coast Regional Water Quality Control Board

The North Coast Regional Water Quality Control Board Basin Plan (2011) (Basin Plan) refers to the definition of wetlands found in federal regulations, which is "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (40 CFR 116.3)."

The Basin Plan also acknowledges that state wetland requirements under the Water Code can differ from the CWA and federal regulations. The Basin Plan states that the "definition of Waters of the state is broader than the definition of Waters of the United States" and that under state law "wetlands are waters of the state and wetland water quality control is within the jurisdiction of the state and Regional Boards independent of federal law, and need not meet federal jurisdictional requirements under the CWA to trigger regulatory controls (Basin Plan 2011, p 2-16)." The North Coast Region recognizes wetlands as a broad category of waters of the state, in addition to other categories such as bays, estuaries, ocean waters, and groundwater. The North Coast Region protects three beneficial use categories for wetlands in its Basin Plan:

- ***Water Quality Enhancement: Uses of waters, including wetlands and other waterbodies, that support natural enhancement or improvement of water quality in or downstream of a waterbody including, but not limited to, erosion control, filtration and purification of naturally occurring water pollutants, streambank stabilization, maintenance of channel integrity, and siltation control;***
- ***Flood Peak Attenuation/Flood Water Storage: Uses of riparian wetlands in flood plain areas and other wetlands that receive natural surface; and***
- ***Wetland Habitat: Uses of water that support natural and man-made wetland ecosystems, including, but not limited to, preservation or enhancement of unique wetland functions, vegetation, fish, shellfish, invertebrates, insects, and wildlife habitat.***

The Basin Plan further states:

> ***The regional board recognizes that wetlands are frequently referred to under the following names (or classifications): saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, sandflats, un-vegetated seasonal ponded areas, vegetated shallows, sloughs, wet meadows, fens, playa lakes, natural ponds, vernal pools, diked baylands, seasonal wetlands, and riparian woodlands; and***

> ***In general, the Regional Water Board relies on the federal Wetlands Delineation Manual (Corps 1987) for determining wetland areas subject to the CWA. In the rare cases where the U.S. EPA and Corps Guidelines disagree, the Regional Water Board relies on the wetlands delineation made by U.S. EPA.***

The North Coast Region states in its Basin Plan that staff will "prepare and implement a plan to identify and delineate wetlands with the Region when funding becomes available." The Region admits that it may not be practical to delineate and specify beneficial uses for every wetland area because there are a large number of small and contiguous wetlands and those wetlands and their beneficial uses may continue to be determined on a site-specific basis, as necessary.

The North Coast Region describes Constructed Treatment Wetlands as wetlands built and managed to provide wastewater or stormwater treatment to achieve protection or improvement in receiving water quality, that can have additional benefits such as supporting waterfowl, and providing opportunities for education and recreation. The Region does not consider Constructed Treatment Wetlands mitigation for projects that impact naturally-occurring wetlands.

Finally, wetlands are addressed in several of the Region's implementation plans. In the "Action Plan for the Garcia River Watershed Sediment TMDL," wetlands are specifically mentioned in the land management measures that apply to floodplain gravel mining in the Garcia River watershed. It is noted that the maximum depth of floodplain gravel extraction should remain above the channel thalweg, and that shallow excavations (above the water table) would provide depressions that would fill with water part of the year and develop seasonal wetland habitat. In addition, it is noted that side slopes of floodplain excavations should range from 3:1 to 10:1, which would allow for a range of vegetation from wetland to upland. Also, it is noted that floodplain pits should be restored to wetland habitat or reclaimed to agriculture.

San Francisco Bay Regional Water Quality Control Board

The San Francisco Bay Regional Water Quality Control Board includes wetlands as one of the types of surface waters in the region and clearly recognizes its authority to regulate wetlands (Basin Plan, 2013). The Basin Plan states that wetland water quality control is "clearly within the jurisdiction of the State Water Board and Regional Water boards" because the Porter-Cologne Act defines waters of the state as "any water, surface or underground, including saline waters, within the boundaries of the State (Cal. Wat. Code§13050(e))." The Regional Board recognizes mudflats, which would fail the three-of-three wetland parameter test since they are unvegetated, as one of the most important wetland types in the San Francisco Bay Region. The Basin Plan also asserts the Regional Water Board's independent authority to regulate discharges of waste to wetlands in situations where there is a conflict with the Corps over a jurisdictional determination or in instances where the Corps may not have jurisdiction.

The San Francisco Regional Basin Plan lists many beneficial uses of wetlands: wildlife habitat; preservation of rare and endangered species; shellfish harvesting; water contact recreation; noncontact water recreation; ocean, commercial, and sport fishing; marine habitat; fish migration; fish spawning; estuarine habitat; and groundwater recharge. In addition to these beneficial uses, the Basin Plan recognizes that wetlands that provide groundwater recharge also provide flood control, pollution control, erosion control, and stream baseflow. The

Basin Plan identifies 34 significant wetland areas within the Region, although the Basin Plan states that the list is not comprehensive. Most of the identified wetlands in the Basin Plan are saltwater marshes.

The Basin Plan indicates that the San Francisco Bay Regional Water Quality Control Board has participated in several efforts to provide guidance on wetland restoration. The Region participated in the Baylands Ecosystem Habitat Goals Report (1999) and the Baylands Ecosystem Species and Community Profiles (2000). The Region has also assisted efforts to identify wetland sites, such as the SFEI's EcoAtlas Baylands Maps and Bay Area Wetlands Project Tracker.

The San Francisco Bay Basin Plan identifies "wetland protection and management" as one of the general categories of the watershed management framework for regulating water quality. In terms of identifying and delineating wetlands, the San Francisco Bay Regional Water Quality Control Board states in its Basin Plan that:

> The [Regional] Water Board will, in general, rely on the federal manual for wetland delineation in the Region when issuing Clean Water Act §401 water quality certifications (US Army Corps of Engineers (Corps) Wetlands Delineation Manual 1987). (Basin Plan for the San Francisco Bay Region section 2.2.3.)

The San Francisco Bay Basin Plan also notes that:

> Identifying wetlands may be complicated by such factors as the seasonality of rainfall in the Region. Therefore, in identifying wetlands considered waters of the United States, the [Regional] Water Board will consider such indicators as hydrology, hydrophytic plants, and/or hydric soils for the purpose of mapping and inventorying wetlands. (Basin Plan for the San Francisco Bay Region section 2.2.3.)

The San Francisco Regional Water Quality Control Board Basin Plan requires that the following be considered when permitting or otherwise acting on wetland issues:

- ***Governor's Executive Order W-59-93 (signed August 23, 1993; also known as the California Wetlands Conservation Policy, or the "No Net Loss" policy);***
- ***California State Senate Concurrent Resolution No. 28 that states, "It is the intent of the legislature to preserve, protect, restore, and enhance California's wetlands and the multiple resources which depend on them for the benefit of the people of the State";***
- ***Water Code §13142.5 (applies to coastal marine wetlands) that states: "Highest priority shall be given to improving or eliminating discharges that adversely affect … wetlands, estuaries, and other biologically sensitive sites";***
- ***Estuary Project's Comprehensive Conservation and Management Plan (June 1994) for recommendations on how to effectively participate in a Region-wide, multiple-agency wetlands management program;***
- ***Two planning documents for wetland restoration for the Estuary baylands: Baylands Ecosystem Habitat Goals (1999) and Baylands Ecosystem Species and Community Profiles (2000), together known***

as the Habitat Goals reports. The Habitat Goals reports identify and specify the beneficial uses and/or functions of existing wetlands and suggest wetland habitat goals for the baylands;

- ***CWA section 401 water quality certification requirements for dredge or fill impacts to waters of the state;***
- ***The federal Guidelines, which are incorporated by reference into the basin plan;***
- ***1987 Corps wetland delineation manual, and/or U.S. EPA or CDFW wetland delineation method;***
- ***Mapping and inventorying uses protocols and naming conventions in the NWI prepared by the USFWS;***
- ***Order 2004-0004-DWQ, General WDRs for dredge or fill discharges to waters deemed by the Corps to be outside of federal jurisdiction; and***
- ***The use of established wetland compliance and ecological assessment methods, such as the Wetland Ecological Assessment and CRAM, for mitigation projects.***

Central Coast Regional Water Board

This Regional Water Board states in the Water Quality Control Plan for the Central Coast Basin (Basin Plan), that it will be "developing management practices for marinas and recreational boating; hydromodification facilities; and wetlands, riparian areas, and vegetated treatment systems at a later date." In the Basin Plan, "constructed wetlands" are mentioned as a best management practice for removing pollutants from a discharge before it reaches surface or ground waters. As of 1988, the Region has about 59 wetlands and estuaries comprising about 8,387 acres (Basin Plan 2011). This Region does not identify beneficial uses that are specific to wetlands.

Los Angeles Regional Water Quality Control Board

The Water Quality Control Plan: Los Angeles Region Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties (1994) (Basin Plan) for this Region describes wetlands as "freshwater, estuarine, and saltwater marshes, swamps, mudflats, and riparian areas." The Regional Water Board identifies wetlands using indicators such as hydrology, presence of hydrophytic plants, and/or hydric soils (Basin Plan 1994). In 1993, the Regional Water Board contracted with Dr. Saint, et al., to inventory and describe major regional wetlands.

In terms of regulating wetlands, the Regional Water Board recognizes its right to regulate natural wetlands under the Water Code. The Basin Plan also acknowledges Executive Order W-59-03, or the "No Net Loss" Policy approved in 1993. The Regional Water Board identifies three regulatory tools for wetland protection:

1. ***Wetland beneficial use designation: The Basin Plan defines wetland beneficial use designations as "uses of water that support wetland ecosystems, including, but not limited to, preservation or enhancement of wetland habitats, vegetation, fish, shellfish, or wildlife, and other unique wetland functions which enhance water quality, such as providing flood and erosion control, stream bank stabilization, and filtration and purification of naturally occurring contaminants." However, the Basin Plan also lists other beneficial uses relevant to wetlands, including wildlife habitat; preservation of rare and endangered species; shellfish harvesting; water contact recreation; noncontact water recreation; ocean, commercial,***

and sport fishing; marine habitat; fish migration; fish spawning; estuarine habitat; groundwater recharge; preservation of biological habitats; warm freshwater habitat; and cold freshwater habitat.

2. ***Water Quality Objective: The Basin Plan has a narrative objective which addresses the protection of hydrologic conditions and physical habitats to sustain the functional values of wetlands.***
3. ***Water Quality Certification (section 401) Program: According to the Watershed Management Initiative Chapter, the Water Quality Certification (section 401) Program is one of the most effective tools available for regulating hydrologic modification projects, especially those which directly impact the region's diminishing acres of wetlands and riparian areas.***

Central Valley Regional Water Quality Control Board

The Central Valley Region has two Basin Plans, the Water Quality Control Plan for Tulare Lake Basin and the Water Quality Control Plan for the Sacramento and San Joaquin River Basins. The Basin Plans do not describe any specific wetland beneficial uses, but they do ascribe the beneficial use of wildlife habitat to wetlands, including uses of water that support terrestrial or wetland ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats or wetlands, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources. Both Basin Plans also state that the region provides critically important wetland habitat for wintering waterfowl of the Pacific Flyway.

The Basin Plans generally require that wetlands meet water quality objectives and also specifically require that activities related to wetland restoration or establishment not contribute additional levels of methylmercury and other pollutants to certain mercury impaired watersheds.

Lahontan Regional Water Quality Control Board

The Water Quality Control Plan for the Lahontan Region (Basin Plan) identifies two wetland beneficial uses – water quality enhancing and flood attenuation. The Basin Plan states that "All wetlands shall be free from substances attributable to wastewater or other discharges that produce adverse physiological responses in humans, animals, or plants; or which lead to the presence of undesirable or nuisance aquatic life" and that "All wetlands shall be free from activities that would substantially impair the biological community as it naturally occurs due to physical, chemical and hydrologic processes."

The Basin Plan uses some of the narrative objectives and numerical criteria developed for surface waters to measure water quality objectives for wetlands, but acknowledge that natural water quality characteristics of some wetlands may not be within the range for which the objectives and criteria were developed. The Regional Water Board notes that it will consider developing site-specific objectives for wetlands on a case-by-case basis.

The Basin Plan also includes considerations for protecting wetlands that are used to slow stormwater runoff into surface waters and act as a final treatment of pre-treated discharges are discussed. Additionally, the Plan has a section titled "Constructed Wetlands" that discusses the Regional Water Board's approach to constructed wetlands. Finally, the Plan includes a section titled "Wetland Protection and Management" which includes many specific measures for wetland protection.

Except for the Lake Tahoe Basin where broader wetland identification procedures apply (see discussion below), the Lahontan Regional Water Board relies on the U.S. EPA and Corps wetland definition and the 1987 Manual for wetland delineations. Delineations must be performed by certified wetland delineators (certification program established in accordance with section 307[e] of the Water Resources Development Act of 1990) or by other qualified professionals.

For the Lake Tahoe Basin only, the Lahontan Regional Water Board has adopted a specific wetland and riparian identification standard. For this designated area, wetland and riparian area identification is essentially a one-of-three parameter test, similar to the USFWS and CCC standards. The Lahontan Regional Water Board's standard here is used to identify "stream environment zones" (SEZs), which "are generally synonymous with 'wetlands' and 'riparian areas.'" (Basin Plan for the Lake Tahoe Region section 5.7.) These areas may be identified using either "key indicators" or "secondary indicators." Key indicators of SEZs include indicators of hydrology, soils, and vegetation and are:

- ***Evidence of surface water flow, including perennial, ephemeral, and intermittent streams, but not including rills or man-made channels; or***
- ***Primary riparian vegetation; or***
- ***Near surface groundwater; or***
- ***Lakes or ponds; or***
- ***Beach soils; or***
- ***One of the following alluvial soils: (i) Elmira loamy coarse sand, wet variant; (ii) Marsh. (Basin Plan for the Lake Tahoe Region, section 5.7.)***

In the Lake Tahoe Basin, the presence of any one key indicator in an area is sufficient to classify the area as an SEZ. Where key indicators of SEZs are absent, the Lahontan Regional Water Board also considers a number of secondary indicators, including:

- ***Designated floodplain;***
- ***Groundwater between 20-40 inches;***
- ***Secondary riparian vegetation; and***
- ***One of the following alluvial soils: (i) Loamy alluvial land; or (ii) Celio gravelly loamy coarse sand; or (iii) Gravelly alluvial land. (Basin Plan for the Lake Tahoe Region, section 5.7.)***

The presence of any three of these secondary indicators are sufficient to identify an area as a wetland or riparian area. While this standard sounds similar to the more restrictive three-of-three approach used by federal regulatory standards, it is important to note that the secondary indicators of hydrology, soils, and vegetation are substantially broader than those provided in the Corps' manual. Also of note is the secondary indicator of "designated floodplain." As noted above, many floodplains and other riparian areas do not satisfy the three-of-three indicator tests used by U.S. EPA and the Corps.

Colorado River Regional Water Board
The Water Quality Control Plan, Colorado River Basin Plan for this Region does not describe any specific wetland protection measures.

Santa Ana Regional Water Board
In the 1995 Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), the Regional Water Board recognizes wetlands as serving a number of important functions, such as absorption of floodwaters, shoreline erosion control, water quality improvement by the removal of pollutants, habitat for wetland species, aesthetics, recreation, research, and educational values. The Basin Plan also recognizes that the definitions of wetlands vary widely among federal agencies, but states that "wetlands are general agreed to have three characteristics: hydrophytic vegetation, hydric soils; and wetland hydrology."

The Basin Plan lists certain waters known to be wetlands and designates their beneficial uses. Although these specific wetlands are identified in the Region's Basin Plan, all wetlands in the Region are protected. It is noted that additional narrative objectives for wetlands will be developed in the future. The Basin Plan cites the U.S. EPA and Corps wetland definition "as general reference and not as guidance." The Basin Plan provides for constructed wetlands for wastewater treatment purposes. Finally, the Basin Plan cites the objectives of the 1993 California Wetlands Conservation Policy.

San Diego Regional Water Board
The Water Quality Control Plan for the San Diego Basin (Basin Plan) (1994) contains a section describing how the Regional Water Board meets the objectives of the No Net Loss Policy. The section describes statewide policy initiatives and regional strategies. Statewide policy initiatives include inventorying wetlands, supporting wetland planning and protection, improving and enhancing wetland regulatory programs, integrating wetland regulations with other programs. Regional Water Board strategies include the participation in a "Southern California Joint Venture" that would set goals and priorities for protecting wetlands. Also noted in the Basin Plan is the detrimental effect of marinas on wetlands, and how the restoration and enhancement of wetlands is likely to be more successful than creation of new wetland where none had existed previously. The Basin Plan does not list any beneficial uses that are specific to wetlands.

5.4 Statewide Initiatives for Wetland Protection

This section provides an overview of recent wetland initiatives and events, as summarized in Table 5-7.

Table 5-7: Timeline of Recent California Wetland Initiatives

Date	Initiative
1993	Executive Order W-59-93, commonly referred to as the State "No Net Loss Policy" for wetlands
1994	Recommendations from Hydromod TAC

2001	First US Supreme Court case to limit scope of federal jurisdiction of waters under the Clean Water Act (CWA; *SWANCC*)
2003	State Water Board report to California Legislature detailing steps needed to protect and conserve wetlands not subject to the CWA
2004	State Water Board workplan for addressing limited scope of federal jurisdiction over waters of the state General Order 2004-0004-DWQ adopted to cover dredge or fill discharges to waters deemed outside of federal jurisdiction by the Corps
2006	Second Supreme Court case to limit scope of federal jurisdiction of waters under the CWA (*Rapanos*)
2007	MOU between Secretaries of California EPA and California Natural Resources Agency to form California Water Quality Monitoring Council Scoping meetings for State Water Board Policy
2008	California Water Quality Monitoring Council's initial recommendations for water quality and ecosystem monitoring and assessment Resolution 2008-0026 by State Water Resources Control Board to direct the development of the Policy Public workshops held for phase 1 of Policy
2009	State Water Board Technical Advisory Team Memoranda 1, 2, and 3 released regarding research on the State Water Board wetland definition and a landscape framework
2010	California Water Quality Monitoring Council's recommendations for comprehensive monitoring in California California Water Quality Monitoring Council approval of CWMW WRAMP framework
2011	State Water Board Technical Advisory Team Memorandum 4 released regarding research on identifying and delineating wetlands

1993: Executive Order W-59-93

California Governor Pete Wilson adopted the California Wetlands Conservation Policy in 1993 as Executive Order W-59-93.[47] Commonly referred to as the "No Net Loss Policy" for wetlands, Executive Order W-59-93

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[47] The executive order can be accessed at http://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/wrapp2008/executive_order_w59_93.pdf

establishes the intent of the state to develop and adopt a policy framework and strategy to protect the state's wetland ecosystems. The goals of this policy are to:

- ***Ensure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship and respect for private property;***
- ***Reduce procedural complexity in the administration of state and federal wetlands conservation programs; and***
- ***Encourage partnerships to make landowner incentive programs and cooperative planning efforts the primary focus of wetlands conservation and restoration.***

To achieve these goals, the No Net Loss Policy establishes a number of tasks and criteria for state agencies in developing a state wetland program, including recognizing diverse wetlands, developing and adopting a consistent wetland definition for state regulatory purposes, improving permitting efficiency, and coordinating federal, state, and local wetland protection efforts. In its task to develop and adopt a consistent wetlands definition for state regulatory purposes, the No Net Loss Policy specifically establishes that:

> "Because of the lack of consistency in the existing definitions of wetlands definitions used by State agencies, the State will work toward the adoption of a single definition for regulatory purposes. The definition will, to the greatest extent possible, be consistent with the definition and wetlands delineation manual used by the Federal government."

1994: Hydromodification, Wetlands and Riparian Technical Advisory Committee

In 1994, the Hydromodification Technical Advisory Committee (Hydromod TAC, 1994) presented a report with recommendations for "identifying program changes to decrease the impacts of hydromodification and wetlands and riparian destruction on the beneficial uses of water." The Hydromod TAC was a multi-agency panel convened by the State Water Board and consisted of representatives from a variety of different agencies and organizations, including the U.S. EPA; US Department of Agriculture Soil Conservation Service; CDFW; and the Los Angeles, San Francisco, and Lahontan Regional Water Boards. In its 1994 recommendations, the Hydromod TAC noted the need for a state wetland definition and coordination with state and federal agencies to improve project planning and permitting. It also recommended that the State Water Board:

> "Focus its mitigation strategy to protect areas that are not addressed by other agencies, integrate mitigation with watershed planning, adhere to the federal Guidelines, work towards functional assessment for determining mitigation obligation, encourage mitigation banking with adequate environmental safeguards, and improve monitoring."

2003: State Water Board Report to Legislature

In 2003, in response to *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, 2011* (*SWANCC),*[48] the State Water Board submitted a report to the California Legislature titled "Regulatory Steps Needed to Protect and Conserve Wetlands Not Subject to the Clean Water Act (State Water Board 2003)." This report reviews the critical role that wetlands and riparian areas have in protecting the beneficial uses of waters of the state. It further recognizes that a watershed-level approach is most effective in protecting wetlands and riparian areas and their associated water quality functions. The regulatory steps identified in the report include:

<u>Steps Needed to Protect Waters Not Subject to the CWA:</u>

- ***Explicitly mandate wetland protection;***
- ***Focus on protecting wetland function rather than on discharges of pollutants;***
- ***Recognize and protect landscape-level wetland functions; and***
- ***Protect wetland functions from all types of activities.***

<u>Steps Needed to Establish a State Water Board Wetland Permitting Program:</u>

- ***Adopt a State Water Board wetlands policy;***
- ***Enhance interagency communication and coordination;***
- ***Adopt beneficial use designations for wetland functions;***
- ***Advise project proponents of their state responsibilities;***
- ***Encourage local land use/water quality linkage;***
- ***Mandate protection of wetland functions; and***
- ***Use best available science.***

<u>Steps Needed to Protect "Isolated" Wetlands:</u>

- ***Advise dischargers of need to report discharges;***
- ***Develop and implement endangered species coordination;***
- ***Adopt a state wetland definition;***

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[48] See section 6.2 for further discussion of the case and its implications for wetland protections.

- ***Adopt a state analog of the federal Guidelines; and***
- ***Implement permitting for "isolated" waters.***

2004: Workplan for Wetland Protection

In 2004, the State Water Board developed a document titled "Workplan: Filling the Gaps in Wetland Protection" (State Water Board, 2004a), in response to a California Environmental Protection Agency request that the State Water Board address waters of the state no longer protected under the CWA, as well as some of the policy needs outlined in the 2003 Report to the Legislature. Tasks 3 and 4 of the 2004 Workplan are "Develop Beneficial Use Definitions for Wetland-Related Functions" and "Adopt State Wetland Definition… [To] provide a standard metric to help determine compensatory mitigation requirements and compliance with [the] 'no net loss' policy" (State Water Board, 2004a). In addition, the 2004 Workplan included a task to develop a statewide policy/plan for wetland protection "at least as protective as the federal requirements."

2004: General Order for Discharge of Dredged or Fill Materials to Waters Outside of Federal Jurisdiction

In response to reduced federal authorities, the State Water Board adopted Water Quality Order 2004-0004-DWQ, "Statewide General Waste Discharge Requirements (WDRs) for Dredged or Fill Discharges to Waters Deemed by the Corps to Be Outside of Federal Jurisdiction."[49] These general WDRs reflect that streams and wetlands are waters of the state under the Porter-Cologne Act regardless of whether or not they are also waters of the United States under the CWA. The general WDRs provide a tool to regulate some impacts to non-federal state waters; however, the general WDRs applies only to minor discharges of dredged or fill material to these waters. Impacts larger than two-tenths (0.2) of an acre or 400 linear feet for fill and excavation discharges, or of more than 50 cubic yards for dredging discharges are not covered by the general WDRs, nor are any impacts that do not involve discharges of dredged or fill material (e.g., discharge of stormwater or wastewater; State Water Board, 2004b).

2007: Memorandum of Understanding for Water Quality Monitoring

In November 2007, the Secretaries of the California EPA and the California Natural Resources Agency signed a Memorandum of Understanding (MOU), mandated by California Senate Bill 1070 (Wat. Code section 13167 and section 13181), to establish the California Water Quality Monitoring Council (Monitoring Council).[50] The MOU requires the boards, departments, and offices within the California EPA and the California Natural Resources Agency to integrate and coordinate their water quality and related ecosystem monitoring, assessment, and reporting.

California Senate Bill 1070 and the MOU require that the Monitoring Council develop specific recommendations to improve the coordination and cost-effectiveness of water quality and ecosystem monitoring and assessment,

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[49] http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2004/wqo/wqo2004-0004.pdf

[50] http://www.mywaterquality.ca.gov/monitoring_council/index.shtml

enhance the integration of monitoring data across departments and agencies, and increase public accessibility to monitoring data and assessment information. While the Monitoring Council may recommend new monitoring or management initiatives, it builds on existing effort to the greatest extent possible. The Monitoring Council published its initial recommendations in December 2008, and its recommendations for a comprehensive monitoring in California in December 2010. The main products of the Monitoring Council are the "My Water Quality" internet portals, which are sources of information about various aspects of water quality, such as wetland health, safety of water for swimming, and bioaccumulation of contaminants in fish and shellfish. To date, the Monitoring Council has produced three internet portals.

The Monitoring Council has several workgroups, including the California Wetland Monitoring Workgroup (CWMW). The CWMW evolved from a statewide steering committee formed to coordinate agencies' wetland regulatory activities and to provide advice on development, implementation, and routine use of standardized wetland and riparian monitoring tools. The objectives of the CWMW include developing and guiding a comprehensive wetland monitoring program for the state of California, enhancing the California Wetlands Portal, compiling information on existing wetland monitoring programs and activities, and developing agreements among partner agencies on data sharing.[51]

2008: State Water Board's Wetlands Resolution

In 2008, the State Water Board adopted Resolution 2008-0026, which provides the course of development for the Procedures. The 2008 resolution directs State Water Board staff to address policy directives and recommendations of the State's No Net Loss Policy, Hydromod TAC, the State Water Board 2003 Report to the Legislature, and 2004 Workplan.

Resolution 2008-0026 directs work to be performed in three phases. The objectives of Phase 1 constitute the Procedures. Phase 2 requirements are to expand the scope of the Procedures to protect wetlands from all other activities impacting water quality (i.e. other than dredge or fill activities) by defining wetland beneficial uses and water quality objectives, along with a program of implementation to achieve the water quality objectives. Phase 3 requirements are to extend the Procedures to identifying and protecting water quality benefits provided by riparian areas. The State Water Board considers Phases 2 and 3 to be separate projects, and will address the environmental impacts of them in future environmental documents.

2008: Development of Technical Advisory Team-TAT

As noted in section 4.2 above, in 2008, through U.S. EPA grant funding, the State Water Board worked with the SFEI to form a TAT to "provide the breadth and depth of scientific understanding about wetlands and riparian areas needed to assure the scientific credibility of the policy [Wetland and Riparian Area Protection Policy]" (TAT Memo 1). In 2009, TAT released its second memo, *Wetland Definition*, and its third memo, *Landscape*

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[51] For more information, see the website:
http://www.waterboards.ca.gov/mywaterquality/monitoring_council/wetland_workgroup/http://www.waterboards.ca.gov/mywaterquality/monitoring_council/wetland_workgroup/

Framework for Wetlands and Other Aquatic Areas. In 2011, TAT released its fourth memo, *Wetland Identification and Delineation.*

The TAT studied existing wetland definitions and found that existing definitions do not fully reflect the variety of wetlands found in California (TAT, 2009). Some definitions are either too general to cover California wetlands without ambiguity, while others are too narrow and exclude some California wetlands. The State Water Board used existing definitions to develop the wetland definition in the Procedures, which is:

> An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

2010: Agency Endorsement of Statewide Wetland and Riparian Area Monitoring Program

In 2010, the Monitoring Council formally endorsed the *Tenets of a State Wetland and Riparian Area Monitoring Plan,* developed by the CWMW (Monitoring Council, 2010). The Monitoring Council has recommended that state agencies incorporate these goals into their activities related to wetlands.

6. PROJECT DESCRIPTION

This section provides a discussion of the project objectives, need and a brief description of the Procedures. For a complete description of the Procedures, please refer directly to the Procedures.

6.1 Project Objectives

The objectives of the Procedures are to:

1. ***Advance statewide efforts to ensure no overall net loss and a long-term net gain in the quantity, quality and sustainability of wetlands in California in a manner that fosters creativity, stewardship, and respect for private property (Executive Order W-59-93-Calfiornia's "No Net Loss" Policy).***
2. ***Support the Water Boards' environmental priorities for protecting and enhancing California's vital wetland areas through watershed-based regulatory and monitoring strategies.***
3. ***Establish a uniform regulatory approach consistent with the federal CWA section 404 program for the discharge of dredged or fill material into all waters of the state, including wetland areas that qualify as waters of the state.***
4. ***Enhance the Water Boards' capabilities to support efforts of other agencies and groups in the conservation planning of watersheds, wetlands, and other aquatic resources (e.g., watershed plans such as habitat conservation plans and national community conservation plans).***
5. ***Strengthen regulatory effectiveness and improve consistency across all Water Boards.***
6. ***Streamline the 401 certification process.***
7. ***Establish procedures for regulation of dredge or fill discharges to all waters of the state, including those outside of federal jurisdiction.***

6.2 Project Need

Resolution No. 2008-0026, adopted by the State Water Board on April 15, 2008, directed staff to develop the Procedures. The Resolution identifies the following elements to be included in the Procedures: "(a) a wetland definition that would reliably define the diverse array of California wetlands based on the United States Army Corps of Engineers' wetland delineation methods to the extent feasible, (b) a wetland regulatory mechanism based on the federal Guidelines (40 C.F.R. parts 230-233) that includes a watershed focus, and (c) an assessment method for collecting wetland data to monitor progress toward wetland protection and to evaluate program development." The Procedures establish a wetland definition and a state version of the federal Guidelines to protect all waters of the state, including wetlands, which are subject to potential dredge or fill impacts. Development of an assessment method will be addressed separately from the Procedures. The Procedures, as discussed in more detail below, will ensure the protection of wetlands that qualify as waters of the state but are not under federal jurisdiction. The Procedures also provide consistency for the Water Boards regulation of discharges of dredged or filled material to all waters of the state. Finally, the Procedures will ensure that compensatory mitigation is sufficient to offset impacts to the quantity and quality of wetlands that qualify as waters of the state.

Lack of Federal Protection for Some Waters

Certain waters of the state have lost protection under the CWA due to U.S. Supreme Court decisions regarding the definition of waters of the United States. In 2001 and 2006, two U.S. Supreme Court decisions, SWANCC and Rapanos, had important implications for the definition of "waters of the United States." The Supreme Court cases clarified this definition to include the following types of waters (U.S. EPA and Corps, 2007):

- ***Traditional navigable waters;***
- ***Wetlands adjacent to traditional navigable waters (including wetlands without a continuous surface connection to traditional navigable waters);***
- ***Relatively permanent non-navigable tributaries to traditional navigable waters;***
- ***Wetlands with a continuous surface connection to relatively permanent non-navigable tributaries of traditional navigable waters; and***
- ***Non-navigable, not relatively permanent tributaries and their adjacent wetlands where such tributaries and wetlands have a significant nexus to traditional navigable water.***

Some waterbodies in California do not conform to the types of waters listed above, such as waters that are non-navigable, are not "relatively permanent," and do not have a significant nexus to traditional navigable waters. Consequently, federal jurisdiction and CWA protection does not apply to these waters. In California, such waterbodies typically include ephemeral streams, headwaters, and wetlands such as vernal pools, playas, prairie potholes, and alpine wet meadows (National Research Council, 1995). A study by Comer et al. (2005) names more than 13 wetland ecological systems within California that occur in partial or total isolation from other waterbodies, including Northern California Claypan and Volcanic Vernal Pools, South Coastal California Vernal Pools, Central Valley Alkali Sinks, and the California Mediterranean Alkali Marshes.

Prior to the U.S. Supreme Court decisions in 2001 and 2006, the permits issued by the federal government under CWA section 404 had a wider jurisdictional reach over waters of the state. Following the decisions, the applicability of federal law to state waters has been reduced, and is now insufficient to protect the full extent of waters in the state. The Water Boards protect waters of the state that are not waters of the United States under the authority of the Porter-Cologne Act alone.

Inconsistent Wetland Definition and Dredge or Fill Regulation

There is no single accepted definition of wetlands at the state level. In other words, the determination of whether a water is a wetland is based on different standards by different agencies in California. The definition of wetlands even differs amongst the Water Boards (as shown in section 5.3). Some Water Boards have adopted the federal wetland definition and delineation methods, but others have not. The Procedures establish a wetland definition for the Water Boards.

In addition, the Water Boards do not have consistent dredge or fill application submittal and approval procedures. Prior to development of the Procedures, the Water Boards relied on the California Code of Regulations, title 23, section 3856 "Contents of a Complete Application" as well as requirements set forth in the federal 404(b)(1) guidelines on a case-by-case or regional basis. For example, based on the review of current practices, some Regional Boards may require an applicant to conduct an alternatives analysis and others may not require an alternatives analysis. The Procedures establish consistency in regulating discharges of dredged or fill material to waters of the state, including wetlands that qualify as waters of the state, by adopting wetland delineation methods and uniform dredge or fill application submittal and approval procedures for use by the Water Boards. In addition, establishing Procedures that are applicable to both federal and non-federal waters of the state will help ensure that Water Board actions are consistent regardless of whether the Orders are 401 certifications, waste discharge requirements, or a combination thereof.

Performance of Compensatory Mitigation

Finally, as discussed in Section 5.2, "Impact of Compensatory Mitigation," compensatory mitigation throughout the state has not been adequate to prevent loss in the quantity and quality of wetlands that qualify as waters of the state, and other waters of the state, in California. The second component of the Procedures, the requirements applicable to discharges of dredged or fill material based on the federal Guidelines, includes clarification of compensatory mitigation requirements with the intent of making compensatory mitigation more robust and successful in California.

6.3 Policy Changes since January 2019

As discussed in section 4.2 "Next Steps in the Public Process" State Water Board staff provided clarifications to the January 2019 Procedures, as well as a number of Stakeholder Requested Policy Options. The two documents were released for public review on February 22, 2019, and were discussed at a Board Workshop on March 5, 2019. This section responds to comments made at the Board workshop and during stakeholder discussions since January 2019, and describes the changes to the Procedures.

Fields Used for the Cultivation of Rice

During the Board and staff workshops held in 2019, staff received feedback concerning how rice fields would be regulated under the Procedures. Rice requires wetland conditions to grow. Accordingly, rice fields will often meet the Water Boards' wetland definition. In some cases, part or all of the rice field that is reliant on artificial irrigation may not meet the definition of wetland because the hydrology that is causing the wetland characteristics is not part of the normal circumstances. Where a rice field does exhibit wetland characteristics under normal circumstances, there was concern that the Procedures would regulate discharges to the rice field itself. In the past, the Water Boards have typically focused regulations on discharges from the rice field to surface or ground waters of the state, not on the water quality in the rice field itself. Specifically, there was a concern that rice fields would typically not qualify for a jurisdictional exclusion, and if considered a water of the state, State Water Board Order 88-63, Sources of Drinking Water, would extend certain beneficial uses, such as MUN, to the rice field water. In addition, through collaboration between farmers, conservation groups, and regulatory agencies, rice fields are sometimes used to provide valuable habitat for wildlife and other beneficial uses in between growing seasons. The Procedures were revised in response to these concerns to prevent beneficial uses from applying to the rice fields themselves and to ensure that the Procedures did not create additional regulatory burdens that would disincentivize rice cultivation and collaboration to provide wildlife habitat.

Two sections of the Procedures were revised to provide regulatory relief for rice fields: 1) the jurisdictional framework (section II, footnote 5), and 2) the areas and activities excluded from the application procedures (section IV.D.3). In the jurisdictional framework, an additional type of artificial wetland feature was excluded ("fields flooded for rice growing"), and a footnote was added to include provisions related to beneficial uses of rice fields and abandonment. In the procedural exclusions, an exclusion was added to exclude from the application procedures wetlands that meet criteria specific to rice cultivation. Staff did not identify any significant adverse impacts from these revisions. See section 6.10.

Review and Approval of Restoration Plans for Temporary Impacts

The timing of when the permitting authority may approve a restoration plan for temporary impacts was revised to allow for approval after an Order is issued, but prior to the initiation of temporary impacts (Procedures section IV.B.4). This revision is consistent with the process for the permitting authority's approval of compensatory mitigation plans, and staff has identified no significant adverse impacts from this revision.

Procedural Exclusion for the Routine and Emergency Operation and Maintenance Activities

An exclusion for routine and emergency operation and maintenance activities for certain projects was added as a result of negotiations between a workgroup of water and stormwater agencies and environmental advocacy groups. The language is limited to certain entities and types of facilities. The exclusion does not limit the permitting authority's current regulation of dredge or fill activities, nor does it relieve the permittees of their obligation to avoid and minimize adverse impacts from the activities. The exclusion gives the Regional Boards the discretion to determine the scope of the exclusion, including what constitutes existing, artificial waters. Staff did not identify any significant adverse impacts from these revisions. See section 6.10 below.

Instead of these Procedures, the specified operation and maintenance activities may be regulated using existing policies and procedures. For projects in waters of the U.S. that need a Clean Water Act section 404 permit or other federal permit, applicants must apply for a section 401 Water Quality certification, prepared in accordance with California Code of Regulations title 23, section 3830 et seq. Note that section 3836 allows the permitting authority to request further information in addition to what is required for a complete application under section 3856. In the case of projects that are exclusively in non-federal waters of the state, Orders would be developed in accordance with Porter-Cologne, section 13260 et seq., which requires a report of waste discharge. In either case, the information requested may be substantially equivalent, or even identical, to the information required under the Procedures.

Procedural Exclusion for Prior Converted Cropland (PCC)

The procedural exclusion for PCC was revised to state that the exclusion applies to wetland areas that qualify as PCC within the meaning of federal regulations because not all areas that qualify as PCC will have a PCC certification. There was a concern that applicants without a PCC certification would be unable to avail themselves of this exclusion. Under the revised language, an applicant may present a PCC certification as evidence that the area qualifies as PCC. The applicant may also present other documentary evidence that the area qualifies as PCC where a certification has not been obtained. The revised language also specifies that qualifying as PCC means that the area has not been abandoned through five consecutive years of non-use for agricultural purposes. Federal regulations have been interpreted as requiring that PCC is not abandoned. Although there are a number of different formulations of the abandonment principle, the preamble language to the 1993 regulations states that PCC that now meets the wetland criteria is considered abandoned unless "[f]or once in every five years, the area has been used for the production of an agricultural commodity, or the area has been used or will continue to be used for the production of an agricultural commodity in a commonly used rotation with aquaculture, grasses, legumes or pasture production." (58 Fed. Reg. 45034.) It is expected that the scope of PCC, including interpretations of abandonment, would be interpreted consistently with how the Corps and EPA are defining PCC. Staff did not identify any significant adverse impacts from these revisions. See section 6.10 below.

Procedural Exclusion for Features used for Agricultural Purposes

There was concern that there were certain areas used for agriculture that would not qualify for a jurisdictional exclusion or procedural exclusions under section 404(f) or PCC. The preamble to the 1986 waters of the U.S. regulations included a list of features that were generally not considered waters of the U.S., but that could be considered waters of the U.S. on a case-by-case basis. The 2015 Clean Water

Rule codified these general exclusions into regulatory language. The Procedures were revised to include procedural exclusions for certain features used for agricultural purposes consistent with exclusions under the 2015 Clean Water Rule. It is appropriate to exclude these types of features from the Procedures because these features are also not typically regulated by the federal section 404 program. In addition, some of these wetlands may already be excluded by the jurisdictional framework. Staff did not identify any significant adverse impacts from these revisions. See section 6.10 below.

Definition of a Watershed Plan

The definition of a watershed plan was revised to allow for more flexibility and to avoid duplicative planning efforts. Staff recognized that the requirements of a watershed plan may be satisfied by a set of documents, rather than a singular document, and added other examples of plans that might meet the specific requirements of a watershed plan. In an aim to avoid duplication with other planning efforts, the definition was also revised to allow permittees to use certain HCPs and NCCPs as watershed plans, unless the permitting authority determines that the plan does not substantially meet the requirements of a watershed plan as defined in the Procedures. Staff did not identify any significant adverse impacts from these revisions. See section 6.11 below.

Climate Change

There was concern that it was not clear how to conduct a climate change analysis required by the Procedures. The relevant factors to consider and the appropriate level of analysis is case-dependent. The Board Resolution adopting the Procedures directs staff to work with stakeholders, relevant state agencies, and scientific organizations to develop best practices for conducting a climate change analysis.

6.4 Wetland Definition

The first element of the Procedures is a wetland area definition. As discussed in section 5.4, many Regional Water Boards recognize a variety of wetland types, including some non-vegetated areas such as mudflats. However, not all Water Boards have definitions that clearly encompass all areas that would be identified as wetlands under the Procedures. The Procedures establish a standard wetland definition for use by the Water Boards. The definition recognizes the diversity of wetlands in this state created by the varied climate, geologic, and cultural influences. It can also be translated into a standard field-based set of delineation procedures to identify the extent of the wetland area.

The Water Board wetland definition is intended to provide clear and consistent direction for determining whether an aquatic feature is a wetland. The wetland definition would provide consistent identification standards for certain types of aquatic features that are sometimes difficult to identify in the field, and for which current policy does not provide adequate guidance. It is important to note, however, that regardless of whether an aquatic feature meets the wetland definition, it may not qualify as a water of the state under the jurisdiction of the Water Boards. Whether a wetland feature is also a water of the state under the jurisdiction of the Water Boards must be decided by applying a jurisdictional framework as discussed in section 6.5.

The Water Boards define an area as wetland as follows:

> ***An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.***

This definition reflects current scientific understanding[52] of the formation and functioning of wetlands. Hydrology is the dominant factor in wetland formation because it controls the development of anaerobic substrate conditions that create wetland soils. Wetland soils, in turn, influence the occurrence of wetland plants that tolerate anaerobic conditions. The Procedures wetland definition incorporates these three characteristics of hydrology, wetland soils, and wetland vegetation.

The Corps also defines wetlands using a "three parameter" definition.[53] The Water Board wetland definition in the Procedures differs slightly from the Clean Water Act definition in that, under the Water Board's definition, an area can also be classified as a wetland if it is devoid of any vegetation, but wetland hydrology and soils are present. Such areas provide the hydrological and ecological functions and beneficial uses that distinguish wetlands from other places. Wetlands can naturally lack vegetation for many reasons such as aridity and intolerable physiochemical or biotic conditions. Tidal flats, playas, some river bars, and shallow non-vegetated ponds are common kinds of non-vegetated wetlands that could meet the Procedures' definition of wetlands, but not the federal definition of wetlands.

However, it is important to note that the Corps regulates some non-vegetated areas as wetlands, or as special aquatic sites with the same protections. As to the latter, tidal flats, and some river bar areas that exhibit pools and riffles, qualify as special aquatic sites and are afforded the same protections as wetlands under the Corps' regulations. Also, the Corps delineation manuals provide methods for delineating areas that exhibit indicators of hydric soils and wetland hydrology, but lack wetland plants. These areas are referred to as "problematic hydrophytic situations" in the delineation manuals and require delineators to investigate whether the absence of vegetation is temporal due to such conditions as drought, shifts in vegetation, or ephemeral water sources. Areas devoid of vegetation, or patchy areas within a wetland, may still qualify as waters of the United States. Therefore, the scope of waters

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[52] See Water Board response to peer review of wetland definition and delineation procedure.

[53] Corps defines wetlands as "Those areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas." (33 CFR 328.3(b); 40 CFR 230.3(t)).

identified by the Water Boards definition of wetlands will not differ greatly from the federal definition of wetlands and special aquatic sites. The overall effect of having a different Water Board definition is minor. Further, because the Procedures adopts the Corps' delineation methods, and because the definitions are functionally similar based on the three parameters of wetland plants, soils and hydrology, the identification of the boundaries of these areas will generally be the same under both the federal and Water Boards' definitions.

The wetland definition, like the federal definition, also incorporates the concept of "normal circumstances." This provides that if the wetland hydrology or hydrophytic vegetation normally present is physically altered by a natural, inadvertent or purposeful event, the area should be evaluated as it existed before the event. This is important because determining whether normal circumstances are present is one of the first steps in and is essential for wetland identification and delineation for disturbed sites.[54] In these cases, an evaluation of normal circumstances is necessary to determine or reasonably infer whether the purpose of the physical alteration of hydrology or hydrophytic vegetation was to avoid regulation. If this is the case, the Water Boards may assert regulatory jurisdiction over the site if the wetland would also qualify as a water of the state. The Corps' 1987 wetland delineation manual provides specific procedures to be followed in delineating wetlands when disturbed conditions exist.

The wetland definition has been peer reviewed and is based on the recommendation from the Technical Advisory Team (TAT), which was comprised of distinguished wetland scientists and practitioners (see section 4.2). The TAT, in consultation with Water Board staff, developed the Water Board wetland definition and provided the scientific rationale. Upon comparison of existing wetland definitions, the TAT found that "a new wetland definition is needed because none of the existing, candidate definitions fully represent all the various forms or kinds of landscape areas in California that are very likely to provide wetland functions, beneficial uses, or ecological services."[55] The proposed wetland definition, by including substrates that may not be addressed by NRCS Hydric Soil standards and by allowing for naturally unvegetated wetlands, succeeds in fully addressing California wetlands. Analysis of alternative wetland definitions is presented in section 10.2.

6.5 Jurisdictional Framework for Wetlands

The Procedures include a jurisdictional framework that applies to aquatic features that meet the technical wetland definition. The jurisdictional framework is intended to exclude artificially-created, temporary features, such as tire ruts or other transient depressions caused by human activity from regulation, while still capturing smaller, naturally-occurring features, such as seasonal wetlands and

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[54] TAT Memorandum No. 4: Wetland identification and Delineation Version 14, Revised September 1, 2012.

[55] TAT Memorandum No. 2: Wetland Definition Revised September 1, 2012.

small vernal pools that may be outside of federal jurisdiction. Note that this jurisdictional framework applies only to features meeting the technical definition of a wetland. If an aquatic feature does not meet the definition of a wetland, it may nonetheless be a different type of aquatic feature that may still be regulated as a water of the state (e.g., lake, streams, and ocean waters). The Procedures do not include guidance for jurisdictional determinations for other waters of the state, but the State Water Board may consider such guidance as a future project. Applicants are encouraged to consult with the Water Boards about whether a feature is a water of the state.

The discussion below provides additional explanation for the language in the Procedures. The actual language used in the Procedures is provided in ***bold italics***. The non-italicized text below is explanation. In addition, Figure 3 below provides a flow chart to assist the reader in understanding the framework.

"The Water Code defines "waters of the state" broadly to include "any surface water or groundwater, including saline waters, within the boundaries of the state." "Waters of the state" includes all "waters of the U.S."

California Code of Regulations, title 23, section 3831(w) states that "[a]ll waters of the United States are also 'waters of the state.'" This regulation has remained in effect despite Supreme Court decisions such as *Rapanos* and *SWANCC* added limitations to what could be considered a water of the U.S. Therefore, the regulation reflects an intention by the Water Boards to include a broad interpretation of waters of the United States into the definition of waters of the state. Waters of the state includes features that have been determined by the U.S. EPA or the U.S. Army Corps of Engineers to be "waters of the U.S." in an approved jurisdictional determination; "waters of the U.S." identified in an aquatic resource report certified by the Corps upon which a permitting decision was based; and features that are consistent with any current or historic final judicial interpretation of "waters of the U.S." or any current or historic federal regulation defining "waters of the U.S."

Because the interpretation of waters of the U.S. in place at the time section 3831(w) was adopted was broader than any post-*Rapanos* or post-*SWANCC* regulatory definitions that incorporated more limitations into the scope of federal jurisdiction, it is consistent with the Water Boards' intent to include both historic and current definitions of waters of the United States into the Water Boards' wetland jurisdictional framework. Further, the people of California have a reasonable expectation that a wetland will continue to be protected when it has been regulated in the past as a water of the U. S. regardless of any subsequent changes in federal regulations. The inclusion of both current and historic definitions of "waters of the U. S." will help ensure some regulatory stability in an area that has otherwise been in flux. Like the other categories of the Water Boards' wetland jurisdictional framework, the definition of waters of the U. S. may only be used to establish that a wetland qualifies as a water of the state; it cannot be used to exclude a wetland from qualifying as a water of the state. In other words, wetlands that are categorically excluded from as a water of the U. S. may nevertheless qualify as waters of the state under another jurisdictional category. In cases of uncertainty regarding the interpretation of a "current or historic waters of the U.S.," such as when there is no applicable jurisdictional determination for that wetland, it is advisable to first analyze whether the wetland would fit within another jurisdictional category.

The following wetlands are waters of the state:

1. Natural wetlands,

Natural wetlands are wetlands that exist independent of anthropogenic assistance, in normal circumstances. This category includes small, vulnerable features, such as seasonal wetlands or vernal pools that are outside of federal jurisdiction.

2. Wetlands created by modification of a surface water of the state,

Wetlands can be created by modifying stream channels lakes and coastal areas or converting a wetland from one type to another. Modification means that the wetland that is being evaluated was created by modifying an area that was a surface water of the state at the time of such modification. It does not include a wetland that is created in a location where a water of the state had existed historically, but had already been completely eliminated at some time prior to the creation of the wetland. The wetland being evaluated does not become a water of the state due solely to a diversion of water form a different waters of the state. By way of example, if a water is converted to dry land, and subsequently wetland features develop on that dry land, those wetlands would not be considered "created by modification of a water of the state." To determine if a wetland was created by modification of a water of the state, an applicant should research historical site conditions to determine whether any portion of the wetland was created in a pre-existing water of the state. The following sources could be used to make this determination:

- ***Maps that show a channel flowing through, into or out of the wetland;***
- ***Historical aerial photos that show a waterbody or inundation;***
- ***National Wetland Inventory of California Aquatic Resource Inventory maps that show a wetland or other water of the state;***
- ***Hydric soil maps;***
- ***Evidence of springs, seeps or wetlands upslope of the site;***
- ***Evidence of a channel flowing into the site.***

3. Artificial wetlands that meet any of the following criteria:

a. Approved by an agency as compensatory mitigation for impacts to other waters of the state, except where the approving agency explicitly identifies the mitigation as being of limited duration;

Wetlands created to mitigate for an impact to waters of the state will always be a wetland water of the state unless the agency that approved the mitigation indicated that the site was not intended to function as permanent wetlands. This language includes impacts where the permitting agency determines that a temporal loss will occur and requires mitigation. This category also includes mitigation approved by any local, state, or federal agency, including but not limited to, the State or Regional Boards.

b. Specifically identified in a water quality control plan as a wetland or other water of the state;

The jurisdictional framework provides greater clarity and certainty about how to determine if a wetland is a water of the state. However, it is infeasible within a statewide water quality control plan to encompass every possible situation that could occur. Thus, some element of site-specific discretion is necessary and appropriate. Therefore, the Procedures provide that if a Water Board includes specific wetlands in its water quality control plan, those identified wetlands are waters of the state. For example, the Water Quality Control Plan for the San

Francisco Bay[56] expressly identifies 34 significant wetlands. These wetlands shall always be protected as waters of the state, even if the wetlands might otherwise qualify for one of the exclusions discussed below. This provides the Water Boards with the flexibility necessary to address site-specific conditions, while ensuring opportunities for stakeholder involvement through a public process.

c. Resulted from historic human activity, is not subject to ongoing operation and maintenance, and has become a relatively permanent part of the natural landscape; or

Human activity can cause changes to the surrounding landscape (e.g., grading activities, road construction, direct hydromodification) such that wetlands form where wetlands did not previously exist. Where such artificial wetlands are now a relatively permanent part of the natural landscape, and are not subject to ongoing operation and maintenance, they are waters of the state. By requiring that the wetlands are relatively permanent, the framework excludes wetlands that are temporary or transitory. That they are part of the natural landscape also indicates the relative permanence of the wetlands and suggests that the wetland is self-sustaining without ongoing operation and maintenance activities, and provides similar ecosystem services as natural wetlands. By way of example, this category of wetlands includes situations where water flow is permanently redirected as the result of human activity, such as grading in another area, such that new wetlands form in areas that were previously dry. These wetlands may not be natural wetlands because they result from human activity and they were not formed by modifying a water of the state (rather they were an indirect result), but nevertheless they take on the function of natural wetlands such that they should be considered waters of the state. This category would not include artificial wetlands constructed for specific purposes listed in section II.4.d because the construction of the artificial wetlands would be too recent to be deemed "historic" and the artificial wetland would likely require ongoing maintenance such that they would not be deemed "relatively permanent," and/or the artificial wetland is not part of the "natural landscape."

d. Greater than or equal to one acre in size, unless the artificial wetland was constructed and is currently used and maintained, primarily for one or more of the following purposes (i.e., the following artificial wetlands are not waters of the state unless they also satisfy the criteria set forth in 2, 3a, or 3b):

i. Industrial or municipal wastewater treatment or disposal,

ii. Settling of sediment,

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[56] Water Quality Control Plan for the San Francisco Bay Basin, Section 4.23.2: Determination of Applicable Beneficial Uses for Wetlands.

iii. ***Detention, retention, infiltration, or treatment of stormwater runoff and other pollutants or runoff subject to regulation under a municipal, construction, or industrial permitting program,***[57]

iv. ***Treatment of surface waters,***

v. ***Agricultural crop irrigation or stock watering,***

vi. ***Fire suppression,***

vii. ***Industrial processing or cooling water,***

viii. ***Active surface mining – even if the site is managed for interim wetlands functions and values,***

ix. ***Log storage,***

x. ***Treatment, storage, or distribution of recycled water,***

xi. ***Maximizing groundwater recharge (this does not include wetlands that have incidental groundwater recharge benefits), or***

xii. ***Fields flooded for rice growing.***

All artificial wetlands that are less than an acre in size and do not satisfy the criteria set forth in 2, 3.a, 3.b, or 3.c are not waters of the state. If an aquatic feature meets the wetland definition, the burden is on the applicant to demonstrate that the wetland is not a water of the state."

Some artificial wetlands are important to include as waters of the state because they provide beneficial functions and services for people and wildlife comparable to natural wetlands. The definition of artificial is very broad and if left without qualification could inappropriately exclude a number of wetlands that are of legitimate concern ecologically and to the people of the state of California. These artificial wetlands protect and improve water quality, provide fish and wildlife habitat, store floodwaters, maintain surface water flows in dry periods, and provide other valuable wetland beneficial functions and services. Thus, regulating some artificial wetlands supports one of the Procedures' objectives, as described in section 6.1, to "support the Water Boards' environmental priorities for protecting and enhancing California's vital wetland areas through watershed-based regulatory and monitoring strategies."

However, the Water Boards have generally not asserted jurisdiction over small temporary features or small permanent features like ornamental ponds, as long as they do not meet any of the other proposed

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[57] This includes retention basins that were designed to fit the Notice of Non-Applicability requirements set forth in the general permit for storm water discharges associated with industrial activities.

jurisdictional categories. Using a specific size limitation will help provide regulatory certainty about whether any given wetland is a water of the state under this category. The Procedures specify that artificial wetlands that are greater than or equal to one acre in size will be considered a water of the state unless the applicant can show that the wetland was created, and is currently used and maintained, for any of the purposes listed above. In considering the appropriate size threshold, the Water Boards considered the wetlands proportional effect on the overall health of the watershed. The larger the wetland, the more difficult it would be to replace lost functions and services. The Water Boards have an interest in protecting large artificially-created wetlands because the wetlands are more likely to confer environmental benefits that reach beyond the boundary of the wetland itself. The people of California are also likely to have a greater expectation of permanence for larger wetlands. Setting a smaller threshold would capture more features that potentially provide ecological benefit, but could also include features that the Water Boards have historically not regulated (e.g., tire ruts). Ultimately, the Procedures set the size threshold at greater than or equal to one acre as a reasonable balance of interests.

For any aquatic feature that meets the technical definition of a wetland, the applicant has the burden of demonstrating that the wetland does not meet any of the other listed criteria (e.g., created by modification of a water of the state, meets current or historic definitions of “waters of the U.S.,” created as mitigation, or identified in a water quality control plan). The burden of proof is placed on the applicant because the applicant is in a better position to provide accurate information to the Water Boards to demonstrate that the jurisdictional exclusion applies.

Note that even if a wetland is not a water of the state as per any of the framework outlined above, the Water Boards may still regulate discharges from the wetland where those discharges are to a water of the state. For example, while a municipal treatment wetland may not be a water of the state and may not require a dredge or fill permit for modifications to the wetland, discharges from that wetland may still require a Water Board Order. Specifically, discharges from a treatment wetland to a water of the state typically require a National Pollutant Discharge Elimination System permit from the Water Boards. Moreover, discharges from the treatment wetland that may affect other waters of the state, such as groundwater, may require a WDR.

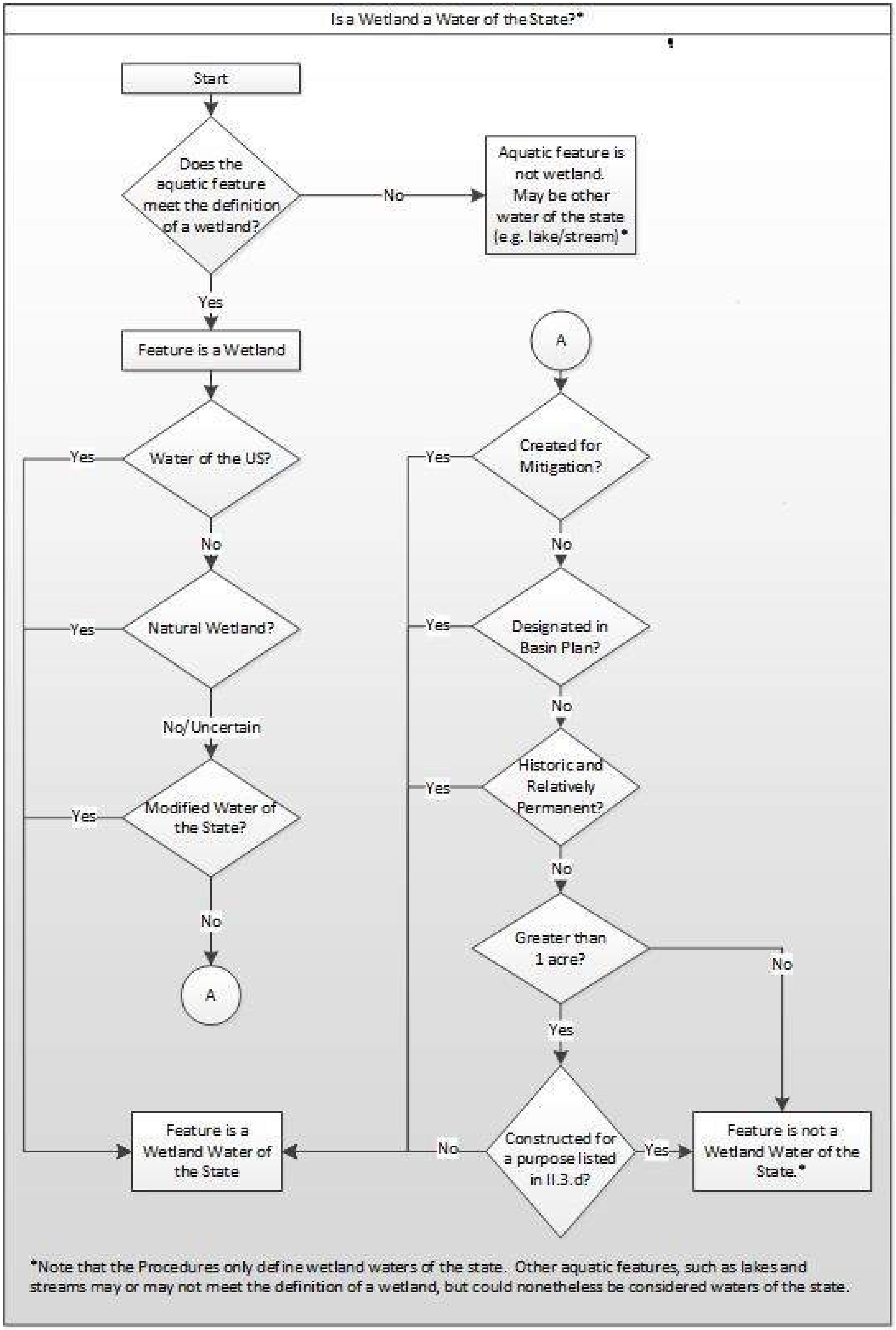

Figure 3: Informational Flowchart for Determining if a Wetland is a Water of the State.

6.6 Wetland Delineation Procedures

The third element of the Procedures is the wetland delineation procedures. The Procedures adopt the Corps' wetland delineation manual and regional supplements for use in determining the extent of a wetland area that meets the criteria of the wetland definition as follows:

The permitting authority shall rely on any wetland area delineation from a final aquatic resource report verified by the U.S. Army Corps of Engineers (Corps) for the purposes of determining the extent of wetland waters of the U.S. A delineation of any wetland areas potentially impacted by the project that are not delineated in a final aquatic resource report verified by the Corps shall be performed using the methods described in the three federal documents listed below (collectively referred to as "1987 Manual and Supplements") to determine whether the area meets the state definition of a wetland as defined above. As described in the 1987 Manual and Supplements, an area "lacks vegetation" if it has less than 5 percent areal coverage of plants at the peak of the growing season. The methods shall be modified only to allow for the fact that the lack of vegetation does not preclude the determination of such an area that meets the definition of wetland. Terms as defined in these Procedures shall be used if there is conflict with terms in the 1987 Manual and Supplements.

- ***Environmental Laboratory. 1987. U.S. Army Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.***
- ***U.S. Army Corps of Engineers. 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0). ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.***
- ***U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual Western Mountains, Valleys, and Coast Region (Version 2.0). ed. J.S. Wakeley, R.W. Lichvar, and C.V. Noble. ERDC/EL TR-10-3. Vicksburg, MS: U.S. Army Engineer Research and Development Center.***

Under the Procedures, the Water Boards rely on delineations from a final aquatic resource report verified by the Corps within the boundaries of waters of the U.S. Where federal jurisdiction does not extend to state waters (e.g., isolated waters and some non-vegetated wetlands) the Procedures direct applicants to use the methods described in the 1987 Manual and Supplements. In some cases, the Water Boards may require supplemental field data from the wet season to substantiate wetland delineations conducted in the dry season, equivalent to the requirements of the Arid West Supplements, for areas where wetland indicators are especially difficult to resolve, or where the delineations are potentially contentious. As noted by the TAT, there are no, or minor, effects on methodology when applying the Corps' delineation procedures to the Water Board wetland definition. See TAT Memo No. 2: Wetland Definition 25 June 2009 (revised September 1, 2012), and TAT Memo No. 4: Wetland Identification and Delineation Version 14, March 1, 2011.

6.7 Procedures for Regulation of Dredged or Fill Material to Waters of the State

In line with stated objectives, the Procedures establish application and review procedures for the discharge of dredged or fill material to waters of the state. These Procedures apply to all waters of the state, which includes both federal and non-federal waters of the state as well as wetlands and other aquatic resource types. These Procedures include Appendix A, which contains relevant portions of the U.S. EPA's Section 404(b)(1) "Guidelines for Specification of Disposal Sites for Dredge or Fill Material," 1980, with minor modifications that make them applicable to the state's dredge or fill program. Appendix A: State Supplemental Dredge or Fill Guidelines, is described in more detail in section 6.12.

Applicants must file an application for an individual order with the Water Boards for any activity that could result in the discharge of dredged or fill material to waters of the state in accordance with California Code of Regulations, title 23, section 3855 unless any of the following occurs:[58]

- ***The Water Boards have confirmed that the wetland is not a water of the state as per the wetland jurisdictional framework (section 6.5);***
- ***The area or activity is excluded by Procedures section IV.D (section 6.8); or***
- ***The project meets the terms and conditions of a Water Board general order (section 6.8).***

In some cases, it may be appropriate for the State Water Board to allow for alternative application submittal, review and approval procedures in instances where the applicant is another state agency and that state agency acts as lead agency under CEQA for one or more projects subject to the Procedures. These Procedures recognize such cases where there already exists a written agreement with the State Board that sets out alternative procedures and requirements for State Board review or approval of projects that will govern in lieu of Section IV of the Procedures. Further, these Procedures recognize potential future agreements that may be entered into by the State Water Board and other state agencies acting as CEQA lead agencies that will similarly act in lieu of Section IV after consideration at a public meeting. The Procedures provide that such agreements may be modified at any time by joint agreement and that those amendments will govern in lieu of Section IV.

Once there is an activity that results in the discharge of dredged or fill material to waters of the state, the Water Boards may also regulate activities that could affect the water quality of waters of the state. For example, section IV.A.1(f) of the Procedures requires applicants to describe potential direct and indirect impacts. An order may include conditions that help avoid or minimize potential indirect impacts. In contrast, where there is only a

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[58] Note that California Code of Regulations, title 23, section 3855 applies only to individual water quality certifications, but these Procedures extend the application of section 3855 to individual waste discharge requirements for discharges of dredged or fill material to waters of the state that are outside of federal jurisdiction, and waivers thereof.

discharge of waste to land that could affect the quality of waters of the state, such discharges are not subject to the Procedures, but may be regulated by other Water Board regulatory programs. For example, the disposal of dredged or fill material to land may be regulated by the issuance of waste discharge requirements if the disposal could affect the quality of waters of the state.

The following section describes the application submittal Procedures in more detail. Section 6.8 describes how the Water Boards' will use information submitted by applicants to review and approve applications.

Project Application Submittal for Individual Orders

Application requirements for water quality certifications are outlined in the California Code of Regulations, title 23, section 3856; however, the information required by section 3856 does not include all necessary information to make a regulatory decision, which has led to delays in processing applications. To address this, the Procedures outline the materials that are routinely requested by Water Board staff during the application process to fully analyze project impacts on water quality. By making these items procedural requirements, applicants may prepare materials ahead of their initial submittal, thereby reducing the number of information requests and reduce the amount of time to determine that an application is complete. Some items would be required for all applications; while other items could be required on a case-by-case basis depending on project characteristics. If an application for a license or permit to another state or federal agency includes any of the information required for a complete water quality certification application, the applicant may submit those materials to satisfy the corresponding Procedures application requirement. Applicants may also consult with the appropriate Water Board regarding case-by-case determinations before application submittal.

Items required for a complete application are outlined and explained in more detail below. The actual language used in the Procedures is provided in ***bold italics***. The non-italicized text is additional explanation. For the purposes of the description provided below, the Procedures define the permitting authority as the entity or person issuing the Order (i.e., the applicable Water Board, Executive Director or Executive Officer, or his or her designee). In addition, certain definitions are discussed in section 6.9 and may be useful for understanding the following sections. Lastly, the requirements for a complete application set forth in sections IV.A and IV.B of the Procedures apply only to individual Orders.

1. ***Items required for a complete application:***

   a. ***All items listed in California Code of Regulations, title 23, section 3856 "Contents of a Complete Application."***

California Code of Regulations section 3856 requires the following items:

- Name, address, and telephone number of applicant and applicant's agent (if applicable)
- A full, technically accurate description, including the purpose and final goal, of the entire activity
- Identification and copies of federal licenses/permits
- Copy of draft or final CEQA documents
- Fee deposit
- Location of activity in latitude and longitude

- Name of receiving water bodies
- Types of receiving water bodies, and total estimated quantity of waters of the U.S., by type, that may be adversely impacted temporarily or permanently by a discharge or by dredging
- Total estimated quantity (in acres and, where appropriate, linear feet) of waters of the United States, by type, proposed to be created, restored, enhanced, purchased from a mitigation or conservation bank, set aside for protection, or otherwise identified as compensatory mitigation for any anticipated adverse impacts
- Description of steps taken to avoid, minimize, and compensate for a loss of significant impacts to beneficial uses of waters of the state
- Cumulative impacts from projects within the last five years, or planned within the next five years, that are related to the proposed project

b. If the Corps requires an aquatic resource delineation report, a copy of the report verified by the Corps.

The Procedures indicate that the Water Boards will rely on aquatic resource delineation reports that are verified by the Corps. This requirement is in line with Corps practices and Corps RGL 16-01, which indicates that the Corps may not require a jurisdictional determination for all permits. As per the California Code of Regulations, title 23, section 3856, an applicant must identify, and provide copies of, any federal applications associated with the project. If the Corps does not require an aquatic resource delineation report, an applicant must submit a delineation of all waters, but the delineation need not be verified by the Corps.

c. A delineation of any waters that are not delineated in an aquatic resource delineation report verified by the Corps. If such waters include wetlands, the wetlands must be delineated as described in section III.

A delineation of potentially impacted wetland areas using the U.S. Army Corps of Engineers Wetland Delineation Manual and Supplements (1987, 2008, and 2010) is required. The delineation report must include any wetlands that are waters of the state, including wetlands that are also waters of the U.S. Any final wetland or aquatic resource delineation report submitted by the applicant to the Corps for the project site may suffice provided it includes all affected waters of the state. If applicants are unsure if wetlands are jurisdictional under state law (that is, whether they qualify as waters of the state), they should contact the Water Boards for a pre-application consultation.

d. The dates upon which the overall project activity will begin and end; and, if known, the date(s) upon which the discharge(s) will take place.

A timeline of the proposed project is required; including the estimated start and end dates for the project as a whole, and the estimated dates of the proposed dredge or fill discharge activities.

e. Map(s) with a scale of at least 1:24000 (1" = 2000') and of sufficient detail to accurately show (1) the boundaries of the lands owned or to be utilized by the applicant in carrying out the proposed activity, including the grading limits, proposed land uses, and the location,

dimensions and type of any structures erected (if known) or to be erected and (2) all aquatic resources that may qualify as waters of the state, within the boundaries of the project, and all aquatic resources that may qualify as waters of the state outside of the boundary of the project that could be impacted by the project. A map verified by the Corps may satisfy this requirement if it includes all potential waters of the state. The Permitting Authority may require that the map(s) be submitted in electronic format (e.g., GIS shapefiles).

Detailed maps will allow Water Board staff to analyze potential direct and indirect impacts to waters of the state and impacts to their beneficial uses. Applicants are encouraged to submit maps using the USACE South Pacific Division Map and Drawing Standards.[59] When applicants submit maps and drawings that are consistent with these standards, the application review and approval process will be simplified and improved because the quality and consistency of maps and drawings will also be improved.

f. A description of the waters proposed to be impacted by the dredge or fill activity. The description should include the beneficial uses as listed in the applicable water quality control plan; a description of the activity at each individual discharge or dredge location, quantity of impacts to waters proposed to receive a discharge of dredged or fill material at each location rounded to at least the nearest one-hundredth (0.01) of an acre, nearest linear foot, and quantity of impacts to waters proposed to be dredged at each dredging location to the nearest cubic yard (as applicable), assessment of potential direct and indirect impacts resulting from the discharge or dredging activity and potential mitigation measures for those potential impacts, identification of existing water quality impairment(s); the source of water quality impairment(s), if known; and the presence of rare, threatened or endangered species habitat.

A description of waters should include enough information on the waters that will be impacted by the dredge or fill activity sufficient to allow the permitting authority to make a determination of the potential impacts of the project to waters of the state. Applicants should refer to the appropriate water quality control basin plan for information about beneficial uses designated to receiving waters that may receive a discharge of dredge or fill material.

Impact measurements should be made and reported for every discharge or dredge impact location. This requirement allows applicants to round impacts to the nearest one-hundredth (0.01) of an acre or to a smaller quantity, one-thousandth (0.001) of an acre, to more precisely characterize impacts related to dredge or fill activities. This impact measurement is necessary for determining fees, analyzing the level of threat and complexity, and determining the amount of compensatory mitigation required, if applicable.

Once there is an activity proposed that would result in the discharge of dredged or fill material to waters of the state, it may be appropriate for the Water Boards to also regulate activities that could indirectly affect water quality; therefore, an assessment of the potential direct and indirect impacts is appropriate. If the project is

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[59] http://www.spd.usace.army.mil/Missions/Regulatory/Public-Notices-and-References/Article/651327/updated-map-and-drawing-standards/

approved, the Water Boards may require additional conditions that help avoid or minimize potential direct or indirect impacts. Indirect impacts are those that are reasonably foreseeable outside of the direct impact area, or that can occur later in time, that will have an adverse effect on water quality. Examples of indirect impacts could include fluctuating or disturbed water levels, climate change adaptation, and disturbed habitat connectivity corridors. Similarly, the identification of existing water quality impairment(s) and the source of those impairment(s), if known, will allow Water Board staff to make the appropriate assessment of potential threats to water quality.

Finally, applicants should disclose the presence of rare, threatened, or endangered species habitat, if known. This information requirement is will also help Water Board staff assess the potential for adverse impacts to beneficial uses that are designated to protect rare, threatened, or endangered species habitat. Please note, that information submitted to state or federal agencies that are consistent with this requirement may also be submitted to the Water Boards, thereby reducing duplicative application requirements.

Applicants are strongly encouraged to discuss impact assessments associated with their project with the appropriate Water Board before submittal of an application.

Alternatives Analysis Requirement

This section generally matches the organization of the Procedures and includes a discussion of information applicants should provide for an alternatives analysis. Portions of the Procedures that apply to Water Board review and approval of an alternatives analysis is discussed in section 6.8. To help understand the overall framework of an alternatives analysis, it is necessary to consider both the Procedures and the staff report, together.

Under the U.S. EPA’s 404(b)(1) Guidelines, the Corps is required analyze project alternatives and select the least environmentally damaging practicable alternative (LEDPA). An alternatives analysis conducted by the Corps generally will not consider impacts to non-federal waters of the state. In addition, for Corps’ Nationwide Permits, the Corps conducts a programmatic alternatives analysis, rather than a project-specific alternatives analysis.

In cases when the Corps requires an alternatives analysis, the Water Boards will defer to the Corps’ determination, where possible. Where there is no project-specific alternatives analysis or where the Corps’ alternatives analysis did not consider impacts to non-federal waters of the state, it is not feasible to defer to the Corps’ alternatives analysis. Instead, the applicant must prepare a project-specific alternatives analysis or a supplemental alternatives analysis to consider non-federal state waters. An alternatives analysis as required by the Procedures refers to the analysis required by section IV.A.1.h and is a means to comply with the State Supplemental Dredge or Fill Guidelines, section 230.10(a).

Where a separate alternatives analysis is required by the Water Boards, the Procedures provide applicants quantitative and qualitative guidance to determine the appropriate level of analysis. The tiered approach will allow a more in-depth analysis for projects with more impacts and allow for less analysis for minimally impacting projects. A more detailed discussion of the tiers and appropriate level of analysis is found below.

This alternatives analysis may be similar to, but is distinct from, an alternative analysis required to comply with other statutory or regulatory requirements, such as CEQA, the National Environmental Policy Act (NEPA), or a Regional Board water quality control plan discharge prohibition. The exemptions and requirements described below do not affect any alternatives analysis conducted pursuant to another statutory or regulatory requirement. In addition, to the extent that the Water Boards are acting as the lead agency under CEQA, it may be necessary for the Water Boards to conduct further analysis to comply with CEQA.

> ***g. An alternatives analysis, unless any of the following exemptions apply. The exemption from the alternatives analysis requirement does not preclude a permitting authority from requiring the applicant to demonstrate in its application that the project complies with section IV.B.1.a.***
>
> ***i. The project includes discharges to waters of the state outside of federal jurisdiction, but the entire project would meet the terms and conditions of one or more Water Board-certified Corps' General Permits, including any Corps District's regional terms and conditions, if all discharges were to waters of the U.S. The permitting authority will verify that the entire project would meet the terms and conditions of the Corps' General Permit(s) if all discharges, including discharges to waters of the state outside of federal jurisdiction, were to waters of the U.S. based on information supplied by the applicant.***

The alternatives analysis requirement does not apply to applications for general orders because the requirements set forth in section IV.A and IV.B of the Procedures apply only to individual Orders. Applicants applying for coverage under a State Water Board General Order, such as certain certified Nationwide Permits, are not subject to the alternatives analysis requirement. [60] In all cases, the Water Boards will verify that the entire project meets the terms and conditions of the general order, including any Corps District's regional terms and conditions, and those terms and conditions will be imposed.

In addition, the Procedures set forth a number of express exemptions from the alternatives analysis requirement (listed above). Projects that meet the terms and conditions for coverage under uncertified Corps' general Orders are also exempt from the alternatives analysis requirement, subject to several restrictions. Projects do not qualify for the exemption if the discharge of dredge or fill material will directly impact: more than two-tenths (0.2) of an acre or 300 linear feet of waters of the state, or directly impact rare, threatened, or endangered species habitat in waters of the state, wetlands, eel grass beds, Outstanding National Resource Waters (ONRWs), or Areas of Special Biological Significance (ASBS). These criteria allow the Water Boards to focus resources on large projects or projects that propose to impact difficult to replace resources, such as wetlands.

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[60] State Water Board Certification of the 2017 nationwide permits is the current State Water Board General Order certifying certain nationwide permits. This Order is publicly available on the State Water Board's website.

ii. The project includes only discharges to waters of the U.S. and meets the terms and conditions for coverage under an uncertified Corps' General Permit, including any Corps District's regional terms and conditions. This exemption does not apply if the discharge of dredge or fill material will directly impact:

- ***a) more than two-tenths (0.2) of an acre or 300 linear feet of waters of the state;***
- ***b) rare, threatened, or endangered species habitat in waters of the state;***
- ***c) wetlands or eel grass beds; or***
- ***d) Outstanding National Resource Waters or Areas of Special Biological Significance.***

In developing the criteria above, Water Board staff reviewed three years of impact data statewide to estimate how many projects would be required to prepare an alternatives analysis. The impact threshold of two-tenths (0.2) of an acre or 300 linear feet would potentially subject approximately 65 percent of projects seeking an individual order to an alternatives analysis. Increasing the threshold to five-tenths (0.5) of an acre would decrease the number of projects required to prepare an alternatives analysis by eight percent; however, it would nearly double the number of acres of project impacts that could be authorized without the benefit of an alternatives analysis.

Projects that propose to impact hard to replace resources, such as rare, threatened, or endangered species habitat in waters of the state, wetlands or eel grass beds, will also trigger the alternatives analysis requirement, unless an exemption applies. Applicants can determine whether their project impacts such resources by checking the applicable basin plan for their region. As discussed in section 5.1., the Porter-Cologne Act identifies the nine major hydrologic basins in the state, establishes the Regional Water Boards with the responsibility for each basin, and directs that each Regional Water Board adopt basin plan. [61] Each basin plan identifies the beneficial uses of all waters in the basin, which includes the protection of beneficial uses associated with rare, threatened, or endangered species habitat in waters of the state. Also, as discussed in section 5.2.1, wetlands are among the world's most important ecosystems due to the numerous functions and services they provide. Because wetlands have experienced historic and continued losses, it is appropriate that the Water Boards impose a requirement to ensure that proposed impacts to wetlands, and other hard to replace resources, are avoided and minimized to the extent practicable. Eel grass beds (aggregations of aquatic plants) are also designated as sensitive habitat in need of special protection.[62]

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[61] Basin Plans and state plans are available on the State Water Board's website at: http://www.waterboards.ca.gov/plans_policies/#plans

[62] The 2015 Water Quality Control Plan for Ocean Waters of California is available on the State Water Board's Website at: https://www.waterboards.ca.gov/water_issues/programs/ocean/docs/cop2015.pdf

The requirements for an alternatives analysis would also be triggered if a project proposed to impact ONRWs or ASBS. ONRWs are areas of exceptional water quality or recreational/ecological significance and are designated for special protection against degradation by the U.S. EPA.[63] In California, these areas include Lake Tahoe and Mono Lake. ASBS in California consist of thirty-four ocean areas that are monitored and maintained for water quality by the State Water Board.[64] ASBS cover much of the length of California's coastal waters, support an unusual variety of aquatic life, and are basic building blocks for a sustainable, resilient coastal environment and economy. Therefore, requiring that impacts to these areas are avoided and minimized to the extent practicable ensures that the Procedures are in line with other federal and state antidegradation goals.

In all cases, applicants are encouraged to contact the appropriate Water Board for a pre-application consultation to determine if an alternatives analysis is required; however, applicants should also perform their due diligence to assess whether their projects trigger any of the criteria described above.

iii. The project would be conducted in accordance with a watershed plan that has been approved for use by the permitting authority and analyzed in an environmental document that includes a sufficient alternatives analysis, monitoring provisions, and guidance on compensatory mitigation opportunities.

iv. The project is an Ecological Restoration and Enhancement Project.

A project may also be exempt from the alternatives analysis requirement if they are an EREP or planned in accordance with a watershed plan approved for use by the Water Boards. EREPs are those projects that are voluntarily undertaken for the purposes of assisting or controlling the recovery of an aquatic ecosystem that has been degraded, damaged, or destroyed to restore some measure of its natural condition and to enhance the beneficial uses. Similarly, watershed plans are prepared with the specific goal of aquatic resource restoration, establishment, enhancement, and preservation within a watershed and will prioritize sites for aquatic resource restoration and protection. EREPs and watershed plans typically undergo a separate screening process involving input from multiple agencies; therefore, it is appropriate to provide regulatory relief through an alternatives analysis exemption. Complete definitions for EREPs and watershed plans are included in Procedures section V.

v. The project has no permanent impacts to aquatic resources and no impacts to rare, threatened or endangered species habitat in waters of the state, wetlands or eel grass beds, Outstanding National Resource Waters or Areas of Special Biological Significance, and all implementation actions in the restoration plan can reasonably be concluded within one year.

The impact thresholds that trigger an alternatives analysis include the quantification of permanent and temporary impacts. However, if an applicant can demonstrate that the project would not result in permanent

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[63] "National Guidance Water Quality Standards for Wetlands." Appendix D to the Water Quality Standards Handbook. July 1990. U.S. Environmental Protection Agency. https://www.epa.gov/cwa-404/national-guidance-water-quality-standards-wetlands.
[64] More information about Areas of Special Biological Significance is available on the State Water Board's Website at: https://www.waterboards.ca.gov/water_issues/programs/ocean/asbs.html

impacts, and all actions needed to restore temporarily impacted areas to pre-project conditions can be implemented in one year, an alternatives analysis may not be required. Temporary impacts are commonly understood as those which eventually reverse, allowing the affected resource to return to its natural state through natural processes or active restoration. Actions needed to restore temporarily impacted areas include regrading, revegetation, and active management. Successful restoration of temporary impacts is dependent on on-site specific information including the type of aquatic resources, the severity and duration of the impact, type of equipment, and environmental conditions. In order to demonstrate that a project would qualify for this exemption, an applicant should submit a draft assessment plan consistent with the requirement set forth in section IV.2(d) of the Procedures.

Note that, even when an alternatives analysis is not required, all applicants are required to demonstrate that a sequence of actions has been taken to first avoid and then to minimize adverse impacts to waters of the state.

h. If none of the above exemptions apply, the applicant must submit an alternatives analysis consistent with the requirements of section 230.10 of the State Supplemental Dredge or Fill Guidelines that allows the permitting authority to determine whether the proposed project is the Least Environmentally Damaging Practicable Alternative (LEDPA). If the applicant submitted information to the Corps to support an alternatives analysis, the applicant shall provide that information to the permitting authority. Such information may satisfy some or all of the following requirements in accordance with section IV.B.3. Alternatives analyses shall be completed in accordance with the following tiers. The level of effort required for an alternatives analysis within each of the three tiers shall be commensurate with the significance of the impacts resulting from the discharge.

i. Tier 3 projects include any discharge of dredged or fill material that directly impacts more than two-tenths (0.2) of an acre or 300 linear feet of waters of the state, rare, threatened or endangered species habitat in waters of the state, wetlands or eel grass beds, or Outstanding National Resource Waters or Areas of Special Biological Significance, and is not a project that inherently cannot not be located at an alternate location. Tier 3 projects shall provide an analysis of off-site and on-site alternatives.

ii. Tier 2 projects include any discharge of dredged or fill material that directly impacts more than one tenth (0.1) and less than or equal to two tenths (0.2) of an acre or more than 100 and less than or equal to 300 linear feet of waters of the state unless it meets the criteria for a Tier 3 project, or any project that inherently cannot be located at an alternate location (unless it meets the size requirements set forth in Tier 1). Tier 2 projects shall provide an analysis of only on-site alternatives. For routine operation and maintenance of existing facilities, analysis of on-site alternatives is limited to operation and maintenance alternatives for the facility.

iii. Tier 1 projects include any discharge of dredged or fill material that directly impacts less than or equal to one tenth (0.1) of an acre or less than or equal to 100 linear feet of waters of the state, unless it meets the criteria for a Tier 3 project. Tier 1 projects shall provide a description

of any steps that have been or will be taken to avoid and minimize loss of, or significant adverse impacts to, beneficial uses of waters of the state.

If the Corps requires information in support of an alternatives analyses, the applicant is required to provide a copy of same information to the Water Boards in order for an application to be complete. An applicant may engage with the Corps much earlier than it applies for a 401 certification. In such cases, applicants are encouraged to contact the Water Boards for a pre-application consultation when it first engages the Corps, to maximize the agencies' ability to collaborate on the preparation of an alternatives analysis that would satisfy both agencies.

In cases when the Corps does not require an alternatives analysis, an applicant must prepare a project specific alternatives analysis. The alternatives analysis should be consistent with the requirements of section 230.10(a) of the State Guidelines that allows the Water Boards to determine whether the proposed project is the LEDPA. Consistent with federal guidelines, the State Guidelines prohibit discharge of dredged or fill material if there is a practicable alternative to the proposed discharge to waters of the state that would have a less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. An alternative is practicable if it is available and capable of being done after taking into consideration logistics, technology, other adverse environmental consequences, and cost, in consideration of the overall project purpose. In addition, the State Guidelines afford Special Aquatic Sites a higher level of analysis and protection. Special Aquatic Sites, defined in section 230.10 of the State Guidelines, include sanctuaries and refuges, wetlands, mudflats, vegetated shallows, and riffle and pool complexes. Special Aquatic Sites are considered to be rare, difficult to replace, or in need of additional protection; therefore, the State Guidelines require that applicants must rebut the presumption that a project does not need to be in a Special Aquatic Site to meet its basic purpose and that there is a practicable alternative located outside of the Special Aquatic Site.

The level of effort required in developing an alternatives analysis should be commensurate with the significance of the project's potential threats to water quality and beneficial uses (Procedures section IV.A.1(h)). Where an alternatives analysis is required, the Procedures provide applicants with quantitative and qualitative guidance to determine the appropriate level of analysis via a tiered approach. A tiered approach allows for a more in-depth analysis of projects with more impacts or risk of impacts, including consideration of indirect project impacts. For projects with minimal impacts, or risk of direct or indirect impacts, less analysis is required. To determine impact quantities, an applicant should first assess the impacts as per Procedures section IV.A.1(f).

Tier 3 projects may result in significant impacts or impacts to sensitive habitat types; therefore, analysis of Tier 3 projects shall include a comparison of on-site and off-site practicable alternatives. Tier 2 projects may result in moderate impacts or cannot inherently be in an alternate location; therefore, analysis of Tier 2 projects need only include a comparison of practicable on-site alternatives because off-site alternatives are not logistically feasible. Evaluation of Tier 1 projects requires a description of steps that have been or will be taken to avoid and minimize the loss of, or significant adverse impacts to, beneficial uses of waters of the state. Note that impacts, as used in the size criteria, include both permanent and temporary impacts.

2. Additional Information Required for a Complete Application

The Procedures identify additional information that may also be required by the permitting authority on a case-by-case basis before an application will be considered complete. This is information that is not listed in California Code of Regulations title 23, section 3856 "Contents of a Complete Application," but that Water Board experience has demonstrated is critical information, without which a final Order cannot be issued. The additional information is required on a case-by case basis because the information may not be applicable to all situations. For example, supplemental wet season delineation would not be required if the initial delineation was conducted during the wet season, or if the permitting agency determined that the dry season delineation was sufficient to preclude the need for supplemental information.

a. If required by the permitting authority on a case-by-case basis, supplemental field data from the wet season to substantiate dry season delineations, as is consistent with the 1987 Manual and Supplements.

For areas where wetland indicators are especially difficult to resolve, or where the delineations are potentially contentious, supplemental field data may be needed to confirm, or deny, dry season delineations. Note that this is also a recommended procedure for "difficult situations" as described in the Corps' delineation supplements for California (Corps 2008).

b. If compensatory mitigation is required by the permitting authority, on a case-by-case basis, a draft compensatory mitigation plan developed using a watershed approach containing the items listed below. Compensatory mitigation plans are not required for Ecological Restoration and Enhancement Projects. For permittees who intend to fulfill their compensatory mitigation obligations by securing credits from approved mitigation banks or in-lieu fee programs, their mitigation plans need include only items i, ii, and iii, as described below, as well as information required in the State Supplemental Dredge or Fill Guidelines, section 230.94 (c)(5) and (c)(6), and the name of the specific mitigation bank or in-lieu fee program to be used. Draft compensatory mitigation plans shall comport with the State Supplemental Dredge or Fill Guidelines, Subpart J, and include the items listed below.

Subpart J of the State Guidelines, Compensatory Mitigation for Loss of Aquatic Resources, defines compensatory mitigation as follows: the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources, for the purposes of off-setting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Compensatory mitigation projects that are certified separately from the project's discharge of dredged or fill material, and if they do not meet the terms and conditions of a General Order, are required to follow sections IV.A and IV.B of the Procedures. However, in most cases, it is expected that standalone compensatory mitigation projects would be able to demonstrate that the project satisfies the requirements in IV.B.1 without much difficulty. For example, avoidance and minimization requirements may focus primarily on wetland functions or beneficial uses, recognizing that complete avoidance may not be possible for water dependent mitigation projects.

Projects that qualify as EREPs are exempt from compensatory mitigation and alternatives analyses requirements. Because these projects are planned in accordance with wetland development grants with natural resource agencies or state/federal agencies that are statutorily tasked with resource protection, the Water Boards will defer to the agency's determination of what constitutes appropriate mitigation and alternatives analyses.

i. ***A watershed profile for the project evaluation area for both the proposed dredge or fill project and the proposed compensatory mitigation project.***

A complete definition of a watershed profile can be found in section V of the Procedures and section 6.9, below. The scope and the detail of a watershed profile should be commensurate magnitude of impact associated with the proposed project. Sources for information needed for a watershed profile could include online searches, maps, watershed plans, and field work. Much of this information could be obtained from a watershed plan, if one is available.

ii. ***An assessment of the overall condition of aquatic resources proposed to receive a discharge of dredged or fill material and their likely stressors, using an assessment method approved by the permitting authority.***

When a project includes unavoidable impacts to waters requiring mitigation, the permitting authority will require an assessment of the overall condition of those waters using an assessment method approved by the Water Boards. CRAM is one such assessment method that is likely appropriate for assessing overall condition because it has been peer reviewed and has been used to assess various wetland types common in California. CRAM has been proven to be cost effective and scientifically defensible when used for monitoring ecological conditions and assessing the performance of compensatory mitigation projects and is widely used in California for these purposes.

CRAM is a component of the Wetland and Riparian Area Monitoring Plan (WRAMP) [65] endorsed by the California Water Quality Monitoring Council. CRAM is a Level 2 assessment method within the U.S. EPA's 3 Level framework for wetland monitoring where Level 1 includes mapping information and Level 3 consists of intensive quantitative data collected to validate Level 1 and Level 2 assessments. In approving assessment methods, the Water Boards will cooperate in achieving goals of the California Water Quality Monitoring Council (Monitoring Council) in the collection and reporting of water quality data and information pursuant to Water Code section 13181. This includes implementing guidance, methods, and plans endorsed or directed by the Monitoring Council for monitoring and assessment of aquatic resources.

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[65] WRAMP is a plan for comprehensive monitoring and assessment of aquatic resources using a watershed or landscape context. WRAMP, like U.S.EPA's three-tier monitoring and assessment framework, includes three levels of assessment and analysis, and provides the framework for making these three levels of assessment work together in the analysis of the overall condition and viability of aquatic resources within a watershed. See http://www.mywaterquality.ca.gov/monitoring_council/wetland_workgroup/#frame for more information

iii. ***A description of how the project impacts and compensatory mitigation would not cause a net loss of the overall abundance, diversity, and condition of aquatic resources, based on the watershed profile. If the compensatory mitigation is located in the same watershed as the project, no net loss will be determined on a watershed basis. If the compensatory mitigation and project impacts are located in multiple watersheds, no net loss will be determined considering all affected watersheds collectively. The level of detail in the plan shall be sufficient to accurately evaluate whether compensatory mitigation offsets the adverse impacts attributed to a project.***

The purpose of this information is to provide sufficient information to evaluate direct, secondary, and cumulative impacts of a proposed project on aquatic resources in the project evaluation area and to determine if the compensatory mitigation alternatives adequately compensate for these impacts within the evaluation area. This analysis ensures that a watershed approach is being taken in developing a compensatory mitigation plan. A watershed approach is an analytical process for evaluating the environmental effects of a proposed project and promotes decisions that support the sustainability or improvement of aquatic resources in the watershed.

iv. ***Preliminary information about ecological performance standards, monitoring, and long-term protection and management, as described in the State Supplemental Dredge or Fill Guidelines.***

If proposed compensatory mitigation is permittee responsible, the draft compensatory mitigation plan should include information about how ecological-based performance standards will be used to determine when and how the proposed compensatory mitigation project will achieve its objectives. The plan should include parameters to be monitored throughout the monitoring period to determine if the compensatory mitigation project is on track to meet performance standards. Long-term protection and management strategies are needed to determine how the compensatory mitigation project will be managed after performance standards have been achieved and to ensure the long-term sustainability of the resource. More information on this item can be found in Appendix A: State Supplemental Dredge or Fill Guidelines, Subpart J- Compensatory Mitigation for Losses of Aquatic Resources, section 230.94: Planning and Documentation.

v. ***A timetable for implementing the compensatory mitigation plan.***

A timetable for implementation of permittee-responsible mitigation includes time frames for all planned project activities, including performance monitoring.

vi. ***If the compensatory mitigation plan includes buffers, design criteria and monitoring requirements for those buffers.***

Buffers to an aquatic resource could be required as part of compensatory mitigation. Buffers are important to ensure the long-term viability of aquatic resources, and provide habitat corridors necessary for the full ecological services of the aquatic resources. If buffers are an element of required compensatory mitigation, design criteria information, including boundaries and other pertinent ecological information, as well as monitoring to ensure the success of buffer areas will be needed.

vii. ***If the compensatory mitigation involves restoration or establishment as the form of mitigation, applicants shall notify, as applicable, state and federal land management agencies, airport land use commission, fire control districts, flood control districts, local mosquito-vector control district(s), and any other interested local entities prior to initial site selection. These entities should be notified as early as possible during the initial compensatory mitigation project design stage.***

Coordination with local, state, and federal agencies (e.g., airport land use commissions and local mosquito-vector control districts) will help ensure the consideration public health and safety issues when designing the mitigation project. Collaboration with these agencies early on in the planning process can be beneficial to both the applicant and the agencies by identifying potential compensatory mitigation locations early on.

viii. ***If required by the permitting authority, an assessment of reasonably foreseeable impacts to the compensatory mitigation associated with climate change, and any measures to avoid or minimize those potential impacts.***

Climate change should be taken into consideration when planning compensatory mitigation. Project proponents should take into consideration potential impacts on the project's viability and success. A climate change analysis should address how climate change may impact the hydrology of the site, e.g., changes in magnitude, duration and intensity of water movement through the site, and how those climate change effects are addressed to ensure the viability of the compensatory mitigation. For instance, a compensatory mitigation project that is subject to sea level rise should consider the need for transition zones that allow for successful succession of wetlands to ensure long term viability.

c. If required by the permitting authority on a case-by-case basis, if the project activities include in-water work or water diversions, a proposed water quality monitoring plan to monitor compliance with water quality objectives of the applicable water quality control plan. At a minimum, the plan should include type and frequency of sampling for each applicable parameter.

In-water work and water diversions could result in water quality impairments. An applicant may need to demonstrate that a plan to monitor water quality to ensure that objectives such as turbidity, oil and grease, pH, and dissolved oxygen are not exceeded during project activities.

d. In all cases where temporary impacts are proposed, a draft restoration plan that outlines design, implementation, assessment, and maintenance for restoring areas of temporary impact to pre-project conditions. The design components shall include the objectives of the restoration plan; grading plan of disturbed areas to pre-project contours; a planting palette with plant species native to the area; seed collection locations; and an invasive species management plan. The implementation component shall include all proposed actions to implement the plan (e.g., re-contouring, initial planting, site stabilization, removal of temporary structures) and a schedule for completing those actions. The maintenance and assessment components shall include a description of performance standards used to evaluate attainment of objectives; the timeframe for determining attainment of performance

> ***standards; and maintenance requirements (e.g., watering, weeding, replanting and invasive species control). If temporary impacts are proposed to be restored through passive restoration, the draft restoration plan shall include an explanation of how passive restoration will restore the area to pre-project conditions, assessment components, and an estimated date for expected restoration. The level of detail in the restoration plan shall be sufficient to accurately evaluate whether the restoration addresses the adverse temporary impacts attributed to a project. The applicant shall submit a final restoration plan that describes the restoration of all temporarily disturbed areas to pre-project conditions, consistent with section IV.B.4.***
>
> ***For Ecological Restoration and Enhancement Projects, a restoration plan for temporary impacts provided as part of the binding stream or wetland enhancement or restoration agreement or wetland establishment agreement may satisfy this requirement.***

Temporary impacts are impacts that can temporarily cause a physical loss and/or degradation of an aquatic resource. Temporary impacts can include areas such as temporary material staging areas, parking lots, or access roads. For an impact to be considered temporary, it needs to be restored to pre-project conditions. To ensure that these areas are successfully restored to pre-project condition a draft restoration plan is required in order to deem an application complete. Water Board staff will review the draft plan that is submitted and will require that a final plan is submitted before issuing an Order for the proposed project, or prior to initiation of temporary impacts, consistent with section IV.B.4 of the Procedures. The extent and level of detail in a draft restoration plan should be commensurate with the size and the scope of the proposed temporary impacts. If an applicant is unsure about the level of detail that will be sufficient for a restoration plan, they should contact the Water Boards for pre-application consultation. For Ecological Restoration and Enhancement Projects, note that “restoration plan” refers to the restoration of temporary impacts such as staging areas and access roads, not a plan covering all restoration activities.

> ***e. For all Ecological Restoration and Enhancement Projects, a draft assessment plan including the following: project objectives; description of performance standards used to evaluate attainment of objectives; protocols for condition assessment; the timeframe and responsible party for performing condition assessment; and assessment schedule. A draft assessment plan shall provide for at least one assessment of the overall condition of aquatic resources and their likely stressors, using an appropriate assessment method approved by the permitting authority, prior to restoration and/or enhancement and two years following restoration and/or enhancement to determine success of the restoration and/or enhancement. An assessment plan approved by a federal or state agency, or a local agency with the primary function of managing land or water for wetland habitat purposes in accordance with a binding stream or wetland enhancement agreement, restoration agreement, or establishment agreement, will satisfy these requirements. An assessment plan approved by a non-governmental conservation organization or a state or federal agency that is statutorily tasked with natural resource management may satisfy some or all of these requirements***

A draft assessment plan is required for Ecological Restoration and Enhancement Projects. Generally, binding agreements are prepared when project proponents are applying for grant funding for the project. To the extent possible, applicants are encouraged to use the information provided for grant application, or required by the binding agreement, to meet the requirements of these Procedures. However, plans approved by non-governmental conservation organizations, or state or federal agencies statutorily tasked with natural resource management, may need to be supplemented to ensure that the project would comply with state water quality standards. The extent and level of detail in the plan should be commensurate with the size and the scope of the proposed temporary impacts. If an applicant is unsure about the level of detail that will be sufficient for an assessment plan, they should contact the Water Boards for pre-application consultation.

In addition, a minimum of one condition assessment (using a condition assessment method subject to the approval of the Water Boards) before and one after restoration activities take place is needed to measure and document the success of the project. CRAM is an example of a method that the Water Boards would approve in such situations.

6.8 Water Boards' Review and Approval for Applications for Individual Orders

This section reviews the criteria and requirements under the Procedures associated with approving an application submitted to the Water Boards for the discharge of dredged or fill material to waters of the state, including wetlands.

Application Approval Criteria

The Procedures specify environmental criteria that would be used in evaluating applications. These criteria are consistent with State Water Board Resolution 68-16, "Statement of Policy with Respect to Maintaining High Quality of Waters in California," all discharges of waste would be regulated by the Water Boards to achieve the highest quality consistent with the maximum benefit to the people of the state.

The following four environmental criteria, which are set forth in section IV.B, are the prerequisites that the Water Boards consider under the Procedures when approving applications for individual Orders.

1. ***The permitting authority will evaluate the potential impacts on the aquatic environment from the proposed project and determine whether the proposed project complies with these Procedures. The permitting authority has discretion to approve a project only if the applicant has demonstrated the following:***

    a. ***A sequence of actions has been taken to first avoid, then to minimize, and lastly compensate for adverse impacts that cannot be practicably avoided or minimized to waters of the state;***

    b. ***The potential impacts will not contribute to a net loss of the overall abundance, diversity, and condition of aquatic resources in a watershed (or multiple watersheds when compensatory mitigation is permitted in another watershed as set forth in section IV.B.5(d));***

c. ***The discharge of dredged or fill material will not violate water quality standards and will be consistent with all applicable water quality control plans and policies for water quality control;***

d. ***The discharge of dredged or fill material will not cause or contribute to significant degradation of the waters of the state.***

Noncompliance with any of these four requirements would provide the Water Boards with sufficient basis to deny an application. The applicant may be required to submit an alternatives analysis to establish that a sequence of actions have been taken to first avoid, then to minimize adverse impacts to waters of the state, and to ensure that the proposed project is the LEDPA.

2. ***The permitting authority shall rely on any final aquatic resource report verified by the Corps to determine boundaries of waters of the U.S. For all other wetland area delineations, the permitting authority shall review and approve delineations that are performed using the methods described in section III.***

The Water Boards will rely on the Corps' final aquatic resource report to determine boundaries of waters of the U. S. The applicant should consult with the Water Board to determine if any wetland features on the project site would be regulated by the Water Boards as non-federal waters of the state. Water Board staff may request the applicant to delineate aquatic resources that were not delineated in an aquatic resource delineation report verified by the Corps. When wetland areas are present, an applicant must delineate the wetland area using wetland delineation procedures (see section 6.6).

3. ***Alternatives Analysis Review Requirements:***

   a. ***The purpose of the alternatives analysis is to identify the LEDPA. The permitting authority will be responsible for determining the sufficiency of an alternatives analysis except as described in 3(b) below. In all cases, the alternatives analysis must establish that the proposed project alternative is the LEDPA in light of all potential direct, secondary (indirect), and cumulative impacts on the physical, chemical, and biological elements of the aquatic ecosystem.***

   b. <u>***Discharges to Waters of the U.S.***</u>

   In reviewing and approving the alternatives analysis for discharges of dredged or fill material that impact waters of the U.S., the permitting authority shall defer to the Corps' determinations on the adequacy of the alternatives analysis, or rely on a draft alternatives analysis if no final determination has been made, unless the Executive Officer or Executive Director determines that (1) the permitting authority was not provided an adequate opportunity to collaborate in the development of the alternatives analysis, (2) the alternatives analysis does not adequately address aquatic resource issues identified in writing by the Executive Officer or Executive Director to the Corps during the development of the alternatives analysis, or (3) the proposed project and all of the identified alternatives would not comply with water quality standards.

> ***If the project also includes discharges to waters of the state outside of federal jurisdiction, the permitting authority shall require the applicant to supplement the alternatives analysis to include waters of the state outside of federal jurisdiction unless the applicant has consulted with the permitting authority and the alternatives analysis addresses all issues identified by the permitting authority during the consultation process. If an alternatives analysis is not required by the Corps for discharges of dredged or fill material to waters of the U.S., the permitting authority shall require an alternatives analysis for the entire project in accordance with the State Supplemental Dredge or Fill Guidelines, unless the project is exempt under section IV.A.1(g) above.***
>
> ***The permitting authority shall not apply the presumption set forth in the State Supplemental Dredge or Fill Guidelines, section 230.10(a)(3) to any non-vegetated waters of the U.S. that the Corps does not classify as a special aquatic site (as defined in subpart E of U.S. EPA's section 404(b)(1) Guidelines).***

In cases where the Water Boards requires an alternatives analysis, Water Board staff will review and approve an alternative analysis to ensure that practicable alternatives have been considered and adverse impacts have been avoided and minimized to the extent practicable.

In cases where the Corps requires an alternatives analysis, as discussed in Procedures section IV.B.3.b, the Water Boards will defer to the Corps as to the adequacy of the alternatives analysis for waters of the state that are also waters of the U.S., except under certain circumstances. These circumstances are necessary to ensure that both federal and non-federal state waters are adequately protected. Situations where it would be inappropriate to defer to the Corps include the following:

> ***The Project is covered under an individual Corps permit and includes impacts to both waters of the U.S. and non-federal waters of the state, but the Corps alternatives analysis only considers impacts to waters of the U.S. The following are two examples:***

- A project includes replacing two culverts. One culvert crosses a stream channel that is a water of the U.S. The other culvert crosses a headwater swale that is a non-federal water of the state. The Corps' alternatives analysis would only consider alternatives to the culvert located in the water of the U.S., and therefore the Water Boards will require that the alternatives analysis be supplemented to consider alternatives to the other culvert.
- A Corps' alternative analysis proposes relocating a project to avoid impacts to a stream channel that is a Water of the U.S. without considering that the alternative location is an isolated wetland that is a non-federal water of the state. In this case, the Water Boards may require the alternatives analysis be supplemented to consider a location that avoids or minimizes impacts to the isolated waters of the state.

The Executive Officer or Executive Director determines:

a. ***The Corps did not provide the permitting authority with an adequate opportunity to collaborate in the development of an alternatives analysis;***

b. ***The Corps' alternatives analysis does not adequately address issues identified in writing by the Executive Officer or Executive Director to the Corps during the development of the Corps' alternatives analysis; or***

c. ***The project, and all the identified alternatives, would not comply with water quality standards.***

In cases where the Corps requires an alternatives analysis for an individual 404 permit, an applicant must submit the same documentation to the Water Boards that is submitted to the Corps. However, applicants are encouraged to engage the Water Boards early in the alternatives analysis process to increase the likelihood that the Water Boards has an adequate opportunity to collaborate with the Corps on the development of the alternatives. Giving the Water Boards an opportunity to collaborate in the development of an alternatives analysis will help ensure that the LEDPA complies with state water quality standards, which will help avoid application approval delays.

In addition, there may be rare instances when an aquatic resource *does not* meet the definition of a wetland or special aquatic site under the federal Guidelines, but meets the Water Boards' definition of a wetland special aquatic site, creating the potential for conflicting outcomes when applying the rebuttable presumption set forth in State Supplemental Guidelines section 230.10(a)(3). In these rare instances, the Water Boards will not apply the presumption so that the Water Boards and the Corps will not identify different LEDPAs due to differences in wetland definitions.

4. ***Prior to or concurrent with issuance of the Order, the permitting authority will approve the final restoration plan for temporary impacts. Generally, the permitting authority will approve the final restoration plan when it issues the Order. The permitting authority may approve the final restoration plan after it issues the Order. In such cases the permitting authority shall include as a condition of the Order that the applicant receive approval of the final restoration plan prior to initiating the temporary impacts and shall specify a process for approving the final restoration plan.***

If an applicant has proposed to temporarily impact waters of the state, a restoration plan to return those waters to pre-project conditions is required as part of a complete application, and the Water Boards will incorporate the approved restoration plan as part of the final Order. Where the Water Board approves a final restoration plan after it issues an Order, consistent with section IV.B.4 of the Procedures, the approval must occur prior to the initiation of temporary impacts.

5. Compensatory Mitigation

The Procedures require that the Water Boards consider the following items when determining compensatory mitigation requirements and the sufficiency of a draft compensatory mitigation plan. In general, the Procedures adopt criteria used by the Corps in the federal Guidelines for making compensatory mitigation determinations.

a. ***Compensatory mitigation, in accordance with the State Supplemental Dredge or Fill Guidelines, Subpart J, may be required to ensure that an activity complies with these Procedures. Consistent with section 230.93(a)(2) of the State Supplemental Guidelines, subject to the permitting authority's approval, compensatory mitigation may be performed using methods of restoration, enhancement, establishment, and in certain circumstances preservation. Restoration should generally be the first option considered because the likelihood of success is greater and the impacts to potentially ecologically important uplands are reduced compared to establishment, and the potential gains in terms of aquatic resource functions are greater, compared to enhancement and preservation.***

Subpart J of the State Guidelines, Compensatory Mitigation for Losses of Aquatic Resources, defines Compensatory mitigation as follows: the restoration (re-establishment or rehabilitation), establishment (creation), enhancement, and/or in certain circumstances preservation of aquatic resources for the purposes of offsetting unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

b. ***Where feasible, the permitting authority will consult and coordinate with any other public agencies that have concurrent mitigation requirements in order to achieve multiple environmental benefits with a single mitigation project, thereby reducing the cost of compliance to the applicant.***

In some cases, an applicant may need to comply with compensatory mitigation requirements from a number of different agencies. Compensatory mitigation required by the Waters Boards and Corps compensate for impacts to waters of the state and/or waters of the U.S. Compensatory mitigation required by the California Department of Fish and Wildlife or the U.S. Fish and Wildlife Service compensate for potential impacts to threatened or endangered species and critical habitat for those species. In some cases, when threatened or endangered species are known to be present in aquatic resources, compensatory mitigation requirements could overlap. In these instances, the Water Boards would facilitate interagency collaboration to align compensatory mitigation requirements with other agencies, if possible.

c. ***<u>Amount:</u> The amount of compensatory mitigation will be determined on a project-by-project basis in accordance with the State Supplemental Dredge or Fill Guidelines, section 230.93(f). The permitting authority may take into account recent anthropogenic degradation to the aquatic resource and the potential and existing functions and conditions of the aquatic resource. The permitting authority may reduce the amount of compensatory mitigation if buffer areas adjacent to the compensatory mitigation are also required to be maintained as***

> ***part of the compensatory mitigation management plan. The amount of compensatory mitigation required by the permitting authority will vary depending on which of the following strategies the applicant uses to locate the mitigation site within a watershed.***

The amount of compensatory mitigation required by the Water Boards would be the amount necessary to compensate for aquatic resource losses that is sufficient in replacing the full range of aquatic resources and/or functions of the aquatic resource. Functions are the physical, chemical, and biological processes that occur in ecosystems. In general, compensatory mitigation projects that are fully established prior to the adverse impacts to aquatic resource(s) will require a lower amount of compensatory mitigation because there will be no temporal losses in aquatic functions and greater certainty in the success of the compensatory mitigation project. Similarly, compensatory mitigation projects that are implemented prior to or concurrent with the adverse impacts to aquatic resource(s) will generally require a lower amount of compensatory mitigation because temporal losses in aquatic functions will be lower and certainty in the success in the compensatory mitigation project will be greater. In addition, compensatory mitigation projects that take a relatively long time to develop a full range of functions will require a greater amount of compensatory mitigation to account for temporal losses in aquatic functions.

The ability to adjust the required mitigation ratio to account for recent anthropogenic degradation of an aquatic resource creates a disincentive for an applicant to intentionally degrade an aquatic resource in advance of a project so that less compensatory mitigation would be required. When recent anthropogenic degradation occurs that is wholly independent of the project applicant’s activity, a higher mitigation ratio would likely not be appropriate.

In-kind mitigation is preferred and will generally require a lower amount of compensatory mitigation because it provides greater assurance that the full range of lost aquatic resource(s) and/or functions will be replaced. Locational factors, such as proximity to the impact site, hydrological conditions, soil characteristics, adjacent land uses, and biological conditions, will affect the level of certainty that a compensatory mitigation project will replace lost acres, functions, and services (i.e., likelihood of success).

Compensatory mitigation projects with a high likelihood for success will generally require a lower amount of compensatory mitigation because a high likelihood of success will ensure no overall net loss and achieve a long-term net gain in the aquatic resource acres, functions and services. For instance, mitigation projects located in close proximity and within the same watershed as the impacted aquatic resources will generally require a lower amount of mitigation. Lastly, impacts to aquatic resources with potentially medium to high level of aquatic functions will require a greater amount of compensatory mitigation.

Compensatory mitigation projects that include buffers will generally require a lower amount of compensatory mitigation because risk and failure will be lower when buffers are provided. The Procedures allow for buffer areas to be included as a component of compensatory mitigation, to ensure the ecological sustainability of a compensatory mitigation site, when necessary. Buffers are important to ensuring the long-term viability of aquatic resources and may provide habitat and wildlife corridors that improve the ecological functioning of an aquatic resource. For buffer areas to be considered as a component of compensatory mitigation, buffer areas need to be maintained and protected in long-term management plans.

In addition to condition assessments and buffer area components, the Water Boards will take into consideration the application of the watershed approach. As a component of a draft compensatory mitigation plan, an applicant must submit a watershed profile which contains data on the abundance, diversity and condition of aquatic resources in a project evaluation area sufficient to provide information to evaluate direct, secondary (indirect), and cumulative impacts of a project and compensatory mitigation alternatives on sustaining and enhancing the aquatic resources in the watershed. The Water Boards will take into consideration the following two strategies when determining compensatory mitigation amounts based on the applicant submittal of a watershed profile.

> ***Strategy 1:*** ***Applicant locates compensatory mitigation using a watershed approach based on a watershed profile developed from a watershed plan that: (1) has been approved for use by the permitting authority and analyzed in an environmental document, (2) includes monitoring provisions, and (3) includes guidance on compensatory mitigation opportunities.***
>
> ***Strategy 2:*** ***Applicant locates compensatory mitigation using a watershed approach based on a watershed profile developed for a project evaluation area, and demonstrates that the mitigation project will contribute to the sustainability of watershed functions and the overall health of the watershed area's aquatic resources.***
>
> ***Generally, the amount of compensatory mitigation required under Strategy 1 will be less than the amount of compensatory mitigation required under Strategy 2 since the level of certainty that a compensatory mitigation project will meet its performance standards increases if the compensatory mitigation project complies with a watershed plan as described above. Certainty increases when there is a corresponding increase in understanding of watershed conditions, which is increased when using a watershed plan as described above to determine compensatory mitigation requirements. A minimum of one-to-one mitigation ratio, measured as area or length, is required to compensate for wetland or stream losses whenever compensatory mitigation is required. Subject to the permitting authority's approval, the ratio may be satisfied using any of the methods identified in section IV.V.5(a). A higher overall mitigation ratio shall be used where necessary to ensure replacement of lost aquatic resource functions, as described in the State Supplemental Dredge or Fill Guidelines, section 230.93(f). Where temporary impacts will be restored to pre-project conditions, the permitting authority may require compensatory mitigation for temporal loss from the temporary impacts.***

The Water Boards aim to sustain and enhance the quality and quantity of aquatic resources within watersheds by applying the watershed approach to strategically select compensatory mitigation sites. As stated above, by relying on a Water Board approved watershed plan, compensatory mitigation quantities for the applicant could be reduced due to a higher level of certainty that the compensatory mitigation project would improve the overall health of the watershed.

The minimum mitigation ratio of one-to-one for wetland or stream losses establishes the baseline ratio which can then be increased based on such factors mentioned above (e.g., risk, type, method, and location of compensatory mitigation). Given the uncertainties associated with mitigation (as described in section 5.2 Impact of Compensatory Mitigation), there is a relatively heavy burden on applicants to clearly demonstrate that a minimum mitigation of one-to-one would compensate for the proposed impacts. Examples of factors that individually, or in combination with other factors, may lead to consideration of a minimum of one-to-one mitigation ratio by the Water Boards, include:

- Where compensatory mitigation includes maintenance and long-term management of substantial buffers to protect the mitigation as part of the mitigation plan, because those buffers are not included in the calculation of the ratio.
- Where compensatory mitigation includes multiple benefits, such as addressing climate change, sea level rise, or similar issues, as long as those issues are not related to project impacts.
- Where compensatory mitigation is part of a watershed plan and is evaluated in conjunction with other nearby mitigation projects in the watershed plan, has additional cumulative watershed benefits.

The Water Boards intend to implement standardized procedures to determine compensatory mitigation ratios which are open and transparent to the applicant. It will be consistent with the procedures developed by the South Pacific Division of the Corps for determining and documenting mitigation ratios (Regulatory Program Standard Operating Procedures for Determination of Mitigation Ratios[66]), but will also include consideration of the additional factors discussed above. In the Corps procedures, the following factors are evaluated using a "checklist" approach to adjust the mitigation ratio:

- Quantitative or qualitative impact-mitigation comparison – The mitigation ratio is adjusted based on the degree of gain in aquatic resource function and condition. A comparison of the sites is made quantitatively based on field scores from an approved function/condition assessment method, or qualitatively by assessing the functional loss at the impact site verses expected functional gain at the mitigation site.
- Mitigation site location – Generally, a lower ratio is prescribed when mitigation is located within the same watershed as the impacted aquatic resource since to would replace the permanent loss of aquatic resource functions and beneficial uses. An increase in the mitigation ratio would be justified if the mitigation was located outside of the watershed to account for permanently removing the aquatic resource unless it is determined that the proposed mitigation is ecologically preferable.

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[66] Special Public Notice: "Standard Operating Procedure for Determination of Mitigation Ratios" U.S. Army Corps of Engineers, South Pacific Division, February 20, 2012

- Net loss of aquatic resource surface area – The mitigation ratio is adjusted based on the compensatory mitigation method since compensatory mitigation in the form of establishment (creation) or re-establishment results in a gain of area and a gain in function; compensatory mitigation in the form of rehabilitation or enhancement results in a gain of function only; mitigation in the form of preservation results in neither a gain of area or a gain in function. Thus, the latter method of compensatory mitigation would require the highest increase in the mitigation ratio, while the first method would result in the least increase.

- Type conversion – Out-of-kind mitigation is compensatory mitigation that replaces a resource that is structurally and functionally different from the impacted aquatic resource. For out-of-kind mitigation generally a higher mitigation ratio is prescribed unless the mitigation is ecologically preferable based on aquatic resource needs in the greater ecoregion.

- Risk and uncertainty – The ratio are adjusted to reflect the uncertainty mitigation success. Factors considered include, but are not limited to, whether the mitigation is permittee responsible, difficulty of replacement (e.g., vernal pools, streams) modified hydrology or artificial hydrology, supporting structures requiring long-term maintenance (e.g., bank stabilization, outfalls), planned vegetation maintenance, and absence of a long-term preservation mechanism.

- Temporal loss – Temporal loss describes the time lag between the loss of aquatic resource functions caused by permanent or temporary impacts and the timing of the replacement of aquatic resource functions at the compensatory mitigation site. If temporal loss is expected, a higher mitigation ratio is prescribed. If compensatory mitigation is established before a proposed impact, such as at a mitigation bank, temporal loss would not be considered.

Where temporary impacts will be restored to pre-project conditions, the permitting authority may require compensatory mitigation for temporal loss due to delayed restoration of temporarily impacted areas. In addition, the minimum one-to-one mitigation ratio for wetland or stream losses is not applicable to compensatory mitigation required for temporal loss. In other words, the permitting authority may approve compensatory mitigation to mitigate for temporal loss at a less than one-to-one ratio. Also see section 6.7 above.

d. ***Type and Location**: The permitting authority will evaluate the applicant's proposed mitigation type and location based on the applicant's use of a watershed approach based on a watershed profile. The permitting authority will determine the appropriate type and location of compensatory mitigation based on watershed conditions, impact size, location and spacing, aquatic resource values, relevant watershed plans and other considerations.*

In general, the required compensatory mitigation should be located within the same watershed as the impact site, but the permitting authority may approve compensatory mitigation in a different watershed. For example, if a proposed project may affect more than one watershed, then the permitting authority may determine that locating all required project

mitigation in one area is ecologically preferable to requiring mitigation within each watershed.

The Procedures would require that the Water Boards determine that the compensatory mitigation type and location is the most environmentally-preferable by applying the watershed approach to the extent appropriate and practicable. The Procedures provide that the Water Boards may approve all required compensatory mitigation in one area within the larger region if the proposed project impacts more than one watershed while taking into consideration watershed conditions, impact size, location and spacing, aquatic resource values, watershed plans and other considerations. Compensatory mitigation should be located where it is most likely to successfully replace the lost functions and services of the impact site, taking into account the watershed profile.

As described in the State Guidelines, the following compensatory mitigation types would be considered: 1) mitigation banks, 2) In-Lieu fee programs, and 3) permittee responsible. The State Guidelines further provide for a preference hierarchy, with the highest preference given to mitigation banks, and then in-lieu fee programs; permittee-responsible under a watershed approach; permittee-responsible through on-site and in-kind mitigation; and lastly, permittee-responsible off-site and/or out-of-kind. This is considered a “soft preference” because any mitigation type may override the preferred type if that mitigation type will result in greater benefits to the condition of aquatic resources in the watershed.

e. ***<u>Final Compensatory Mitigation Plan:</u> The permitting authority will review and approve the final compensatory mitigation plan submitted by the applicant to ensure mitigation comports with the State Supplemental Dredge or Fill Guidelines, Water Code requirements, applicable water quality standards, and other appropriate requirements of state law. The level of detail in the final plan shall be sufficient to accurately evaluate whether compensatory mitigation offsets the adverse impacts attributed to a project considering the overall size and scope of impact. The compensatory mitigation plan shall be sufficient to provide the permitting authority with a reasonable assurance that replacement of the full range of lost aquatic resource(s) and/or functions will be provided in perpetuity.***

Generally, the permitting authority will approve the final compensatory mitigation plan when it issues the Order. Where compliant with CEQA, the permitting authority may approve the final compensatory mitigation plan after it issues the Order. In such cases the permitting authority shall include as a condition of the Order that the applicant receive approval of the final mitigation plan prior to discharging dredged or fill material to waters of the state and shall specify a process for approving the final mitigation plan.

As part of a complete application, the applicant would have already submitted a draft compensatory mitigation plan. Water Board staff will review the draft mitigation plan to ensure all components have been addressed and finalized, including the amount, type, and location of compensatory mitigation. A final compensatory mitigation plan will be adopted as part of the final Order issued by the Water Boards.

Where compliant with CEQA, the permitting authority may approve the final compensatory mitigation plan after it issues the Order. In such cases, the permitting authority will include as a condition of the Order that the applicant receive approval of the final mitigation plan prior to discharging dredged or fill material to waters of the state and shall specify a process for approving the final mitigation plan.

f. ***Financial Security:*** ***Where deemed necessary by the permitting authority, provision of a financial security (e.g., letter of credit or performance bond) shall be a condition of the Order. In this case, the permitting authority will approve the financial security to ensure compliance with compensatory mitigation plan requirements. The financial security shall be in a form consistent with the California Constitution and state law.***

In some cases, the Water Boards may require the applicant provide financial security to ensure a high level of confidence that the compensatory mitigation project will be completed, successfully. Financial assurances could be provided in the form of a letter of credit, a performance bond, escrow accounts, or casualty insurance.

g. ***Term of Mitigation Obligation:*** ***The permitting authority may specify in the Order the conditions that must be met in order for the permitting authority to release the permittee from the mitigation obligation, including compensatory mitigation performance standards and long-term management funding obligations.***

The Water Boards may include conditions in an Order that would release the permittee from any further compensatory mitigation obligations. A release may be considered by the Water Boards after a real-estate instrument is in place to protect the site in perpetuity, all performance standards agreed to in the compensatory mitigation plan have been met, and an endowment fund has been provided to ensure the long-term management and protection of the aquatic resource site in perpetuity. If site-specific environmental factors are present that may jeopardize the condition of the mitigation site, then these concerns must be addressed in the compensatory mitigation plan prior to releasing the permittee from the mitigation obligation.

6. ***The permitting authority shall provide public notice in accordance with Water Code section 13167.5 for waste discharge requirements. The permitting authority shall provide public notice of an application for water quality certification in accordance with California Code of Regulations, title 23, section 3858. If the permitting authority receives comments on the application or there is substantial public interest in the project, the permitting authority shall also provide public notice of the draft Order, or draft amendment of the Order, unless circumstances warrant otherwise.***

Water Code section 13167.5 requires that a draft WDR is made available to the public for a 30-day comment and review period before the draft Order is taken in front of the Board for adoption. The California Code of Regulations, title 23, section 3858 requires that applications for 401 certifications are made available to the public for a 21-day public review and comment period.

7. ***The permitting authority will review and approve the final monitoring and reporting requirements for all projects. Monitoring and reporting may be required to demonstrate compliance with the terms of the Order.***

Monitoring and reporting requirements will be included in Orders to ensure that dischargers are complying with conditions set forth on an approved Order. In addition, monitoring and reporting allows the Water board to track the status of project requirements that could take a number of years to complete.

6.9 General Orders

General orders are designed to regulate activities that are similar in nature and have minimal impacts to aquatic resources. General orders serve to streamline application procedures for the applicant and to reduce staff workload for the Water Boards. For dredge or fill projects, the Water Boards have issued certifications for a number of Corps general permits. Examples include certifications for regional general permits, emergency projects, and a subset of Nationwide Permits that the State Water Board determined are exempt from review under CEQA.

Discharges of dredged or fill material to waters of the state that are regulated under a general order are not subject to the requirements set forth in sections IV.A and IV.B of the Procedures.

Applicants that wish to enroll under a general order would follow current practice and follow the directions specified in the general order for obtaining coverage and abide by conditions outlined in that specific general order.

6.10 Activities and Areas Excluded from the Application Procedures for Regulation of Discharges of Dredged or Fill Material to Waters of the State

Section IV.D of the Procedures generally excludes certain areas and activities from the application procedures in order to better align the Water Boards' dredge or fill program with the federal CWA section 404 program. In addition, Section IV.D. includes an exclusion for certain operation and maintenance activities that may be more appropriately regulated through other processes. It is important to note that these activities and areas, although exempt from these application procedures, are not exempt from other Water Board regulatory authorities. Therefore, discharges into waters of the state within these areas or through these activities may be regulated under other Water Board policies, plans, or Orders.

1. ***Activities excluded from application procedures in sections IV.A and IV.B:***

    a. ***Activities that are exempt under CWA section 404(f) (33 USC § 1344(f)). The permitting authority shall use 33 CFR 323.4 (1986) and 40 CFR 232.3 (1988) to determine whether certain activities are exempt under CWA section 404(f). These regulations are hereby incorporated by reference and shall apply to all waters of the state. Consistent with CWA section 404(f)(2) and 40 CFR section 232.3, any discharge of dredged or fill material to a water of the state incidental to any of these activities is not exempt under CWA section 404(f) and shall be subject to the application procedures set forth in sections IV.A and IV.B, if (1) the purpose of the activity is bringing a water of the state into a use to which it was not previously subject,***

where the flow or circulation of water of the state may be impaired or the reach of such waters be reduced, or (2) the discharge contains any toxic pollutant listed in CWA section 307.

Certain activities described in CWA section 404(f) are exempted from the Corps' permit requirements under CWA section 404. These same activities would be exempt from the application submittal, review and approval process set forth in the Procedures. Examples of activities include, but are not limited to, normal farming, ranching and silviculture activities; constructing and maintaining stock or farm ponds and irrigation ditches; constructing or maintaining farm, forest, or mining roads; maintaining or reconstructing structures that are currently serviceable; and constructing temporary sedimentation basins for construction. Section IV.D.1.a includes the federal regulations that will be used when determining whether certain activities are excluded from the application procedures.

b. Suction dredge mining activities for mineral recovery regulated under CWA section 402.

Suction dredge mining activities for mineral recovery regulated under section 402 of the CWA would be exempt from the application procedures.

c. Routine and emergency operation and maintenance activities conducted by public agencies, water utilities, or special districts that result in discharge of dredged or fill material to artificial existing waters of the state:

i. currently used and maintained primarily for one or more of the purposes listed in section II.3.d. (ii), (iii), (iv), or (xi); or

ii. for the purpose of preserving the line, grade, volumetric or flow capacity within the existing footprint of a flood control or stormwater conveyance facility.

This exclusion does not relieve public agencies, water utilities or special districts of their obligation to submit an application for a water quality certification consistent with California Code of Regulations, title 23, section 3856 or waste discharge requirements consistent with Water Code section 13260, whichever is applicable, to the permitting authority for these activities; or their responsibility to avoid and minimize adverse impacts to aquatic resources and beneficial uses from these activities. The permitting authority has full discretion to determine whether an activity described above qualifies for this exclusion based on the application submitted and other relevant information. If the permitting authority determines that an activity qualifies for this exclusion, the permitting authority retains full authority and discretion under the Porter-Cologne Water Quality Control Act to determine how to regulate the discharge of dredged or fill material. Where a permitting authority has already determined it appropriate to regulate these types of activities in specific instances, this exclusion in no way disturbs or limits the permitting authority's current regulation of these types of activities. This exclusion does not apply to the discharge of dredged or fill material to a water of the state approved by an agency as compensatory mitigation.

d. Routine operation and maintenance activities that result in discharge of dredged or fill material to artificially-created waters currently used and maintained primarily for one or more of the purposes listed in section II. 3.d. (i), (ii), (iii), (vi), (vii), (x), or (xi). This exclusion does not apply to the discharge of dredged or fill material to (a) a water of the U.S., (b) a water specifically identified in a water quality control plan, (c) a water created by modification of a water of the state, or (d) a water approved by an agency as compensatory mitigation.

Routine emergency operation and maintenance activities that result in a discharge of dredged or fill material to artificial waters of the state currently used and maintained primarily for one or more of the listed purposes are excluded from the Procedures. The exclusion does not apply to the discharge of dredged or fill material to a water of the state approved by an agency as compensatory mitigation. Note that this exclusion would not prevent the Water Boards from regulating routine operation and maintenance activities when an artificial feature is initial created.

2. Areas excluded from application procedures in sections IV.A and IV.B:

- ***a. Wetland areas that qualify as prior converted cropland (PCC), and has not been abandoned due to five consecutive years of non-agricultural purposes, within the meaning of 33 CFR section 328.3(b)(2). The applicant may establish that the area is PCC by providing relevant documentary evidence that the area qualifies as PCC and has not been abandoned due to five consecutive years of non-use for agricultural purposes, or by providing a current PCC certification by the Natural Resources Conservation Service, the Corps, or the U.S. EPA to the permitting authority.***
- ***b. This exclusion does not apply to discharges of dredged or fill material that convert the wetland areas to a non-agricultural use.***
- ***c. Wetlands that meet all of the following criteria:***
    - ***i. Are, or have been, in rice cultivation (including wild rice) within the last five years April 2, 2019:***
    - ***ii. Have not been abandoned due to five consecutive years of non-use in rice production; and,***
    - ***iii. are not being converted to a non-agricultural use.***

The exclusions in section IV.D.2 do not apply to discharges of dredged or fill material that convert wetland areas to a non-agricultural use.

A PCC is an area that was cleared, drained, or otherwise manipulated for cropland use prior to December 23, 1985. PCC is not considered “waters of the United States” for purposes of the CWA, and accordingly are not regulated under CWA section 404. The application procedures set forth in sections IV.A and IV.B do not apply to areas that qualify as PCC. Applicants may provide a certification that the land is PCC from the Natural Resources Conservation District, the Corps, or the U.S. EPA, which are the three federal agencies that make PCC determinations. Where the applicant does not have a certification, the applicant may also provide other documentary evidence that the area qualifies as PCC. However, if the wetland area in the PCC changes to a non-agricultural use, the PCC exclusion will no longer apply. In this case, the discharge of dredged or fill material to areas exhibiting wetland characteristics would be subject to the Procedures.

For requests for approvals from the Division of Water Rights for activities associated with (1) an appropriation of water subject to Part 2 (commencing with section 1200) of Division 2 of the Water Code, (2) a hydroelectric facility where the proposed activity requires a Federal Energy Regulatory Commission (FERC) license or amendment to a FERC license, or (3) any other diversion of water for beneficial use where

> ***approval by the Division of Water Rights is required, the Division of Water Rights will inform the applicant whether the application procedures in sections IV.A and IV.B will apply to the application.***

Activities associated with an appropriation of water, a hydroelectric facility which requires a Federal Energy Regulatory Commission (FERC) license, or amendment to a FERC license, or any other diversion of water for beneficial use *could* be exempt from the application procedures outlined in the Procedures. The Division of Water Rights retains the discretion to apply the Procedures to projects that fall under its regulatory authority.

6.11 Definitions

The Procedures contain three sets of definitions: one pertains to the body of the Procedures (section V), and the second (section 230.3) and third (section 230.92) pertain to the State Guidelines. Many of the definitions found in the State Guideline are retained from the federal Guidelines. In addition, if there is a term not defined in the Procedures, but is defined in the Water Code and/or the California Code of Regulations, then the definitions in those regulations would apply to the Procedures. The following are a subset of definitions presented in the main body of the Procedures (section V) that inform the application submittal, review, and approval requirements. For a complete list of definitions, please refer to the sections listed above.

Ecological Restoration and Enhancement Project

An Ecological Restoration and Enhancement Project (EREP) is one that is undertaken voluntarily for the purposes of assisting or controlling the recovery of an aquatic ecosystem that has been degraded, damaged, or destroyed to restore some measure of its natural condition. A project qualifies as an EREP if it is undertaken in accordance with the terms and conditions of a binding stream or wetland enhancement agreement, restoration agreement, or a wetland establishment agreement between the real property interest owner or the entity conducting the habitat restoration or enhancement project and a federal or state resource agency, a local agency with the primary function of managing land or water for wetland habitat purposes, or a non-governmental conservation organization. An EREP may also be undertaken by a state or federal agency that is statutorily tasked with natural resource management.

There are some incentives outlined in the Procedures for projects that qualify as an EREP. They are exempt from an alternatives analysis and compensatory mitigation requirements. This regulatory relief aims to help incentivize the creation of projects that qualify as an EREP. Instead of an alternatives analysis and a compensatory mitigation plan, EREP applicants are required to provide a draft assessment plan, which includes information used to assess the long-term viability of the project, performance standards, and condition assessment requirements that will be used to evaluate attainment of project objectives (Procedures section IV.A.2(e)).

Due to the regulatory relief discussed above, an EREP do not include actions required under a Water Board Order for compensatory mitigation, actions to service required mitigation, or actions undertaken for the primary purpose of land development. In addition, EREPs do not include the conversion of a stream or natural wetland to uplands or stream channelization.

Watershed Profile

Section IV.A.2(b)(i) of the Procedures requires an applicant to submit a watershed profile with a draft compensatory mitigation plan in order for an application to be deemed complete. A watershed profile is a compilation of data or information on the abundance, diversity, and condition of aquatic resources in a project evaluation area. The watershed profile shall include a map and a report characterizing the location, abundance, and diversity of aquatic resources in the project evaluation area, assessing the condition of aquatic resources in the project evaluation area, and describing the environmental stress factors affecting that condition. The project evaluation area is an area that includes the project impact site, and/or the compensatory mitigation site, and is sufficiently large to evaluate the effects of the project. The project evaluation area should comprise of an ecologically meaningful unit based on reasonable rational.

The watershed profile shall include information sufficient to evaluate direct, secondary (indirect), and cumulative impacts of a project and factors that may favor or hinder the success of compensatory mitigation projects and help define watershed goals. A watershed profile may include such things as current trends in habitat loss or conservation, cumulative impacts of past development activities, current development trends, the presence and need of sensitive species habitat, and chronic environmental problems or site conditions such as flooding or poor water quality.

The scope and the detail of the watershed profile shall be commensurate with the magnitude of impact associated with the proposed project. Information sources include online searches, maps, watershed plans, and possibly some fieldwork, if necessary. In some cases, some or all of the information may be obtained from a watershed plan. Information required in a watershed profile is consistent with information requirements outlined in the federal Guidelines, and described in the State Guidelines, Subpart J: section 230.93(c)(3)(i).

Watershed Plan

There are some incentives outlined in the Procedures for applicants that plan projects and proposed compensatory mitigation in accordance with a watershed plan that has been approved for use by the Water Boards. Applicants may be exempt from the alternatives analysis requirement or they may be eligible for a reduced compensatory mitigation ratio.

A watershed plan is a document, or a set of documents, that was developed in consultation with relevant stakeholders, a specific goal of which is aquatic resource restoration, establishment, enhancement, and preservation within a watershed. A watershed plan addresses aquatic resource conditions in the watershed, multiple stakeholder interests, and land uses. Watershed plans should include information about implementing the watershed plan. Watershed plans may also identify priority sites for aquatic resource restoration and protection. Examples of watershed plans include special area management plans, advance identification programs, and wetland management plans. The Water Boards may also approve the use of other plans, including for example, habitat conservation plans, natural community conservation plans, or municipal stormwater permit watershed management programs as watershed plans, if they substantially meet the specific requirements stated above. Any NCCP approved by the California Department of Fish and Wildlife before December 31, 2020, and any regional HCP approved by the United States Fish and Wildlife Service before

December 31, 2020, which includes biological goals for aquatic resources, shall be used by the permitting authority as a watershed plan for such aquatic resources, unless the permitting authority determines in writing that the HCP or NCCP does not substantially meet the definition of a watershed plan for such aquatic resources.

Watershed Approach

By requiring a watershed profile and creating incentives for applicants to use watershed plans allows for the Water Boards, and applicants, to consider impacts and compensatory mitigation using a watershed approach. As defined in the Procedures, the watershed approach is an analytical process for evaluating the environmental effects of a proposed project and making decisions that support the sustainability or improvement of aquatic resources in a watershed. The watershed approach recognizes that the abundance, diversity and condition of aquatic resources in a watershed support beneficial uses. Diversity of aquatic resources includes both the types of aquatic resources and the locations of those aquatic resources in a watershed. Consideration is also given to understanding historic and potential aquatic resource conditions, past and projected aquatic resource impacts in the watershed, and terrestrial connections between aquatic resources. The watershed approach can be used to evaluate avoidance and minimization of direct, indirect, secondary, and cumulative project impacts. It also can be used in determining compensatory mitigation requirements.

6.12 Appendix A: State Supplemental Dredge or Fill Guidelines

The Procedures include the State Supplemental Dredge or Fill Guidelines (State Guidelines) as an appendix. The intent of the State Guidelines is to align Water Board dredge or fill requirements with federal requirements, to the extent practicable. The text in the State Guidelines is retained from the U.S. EPA's 404(b)(1) Guidelines (federal Guidelines) to avoid conflicting regulations. Full integration of the federal Guidelines was not possible due to jurisdictional and procedural differences. In creating the State Guidelines, the approach used was generally to limit changes to omissions of portions of the federal Guidelines that provided illustrative examples or other non-binding descriptions, did not reflect state practice or conflicted with state law, and were redundant with the Procedures. In addition, global edits were made to the federal Guidelines to change federal terms to the state equivalent. For example, "District engineer" was changed to "permitting authority." However, the integrity of the State Guidelines is maintained because it includes only text from the federal Guidelines; minimal language was added.

The State Supplemental Dredge or Fill Guidelines have been carefully reviewed to ensure that they are consistent with, and do not conflict with, the Procedures. In the event that there are any unforeseen implied inconsistencies, the State Guidelines shall be applied in a manner most consistent with the Procedures.

6.13 Project Location

Compliance with the Procedures will be carried out in the state of California and will be implemented through the Regional Water Quality Control Boards or the State Water Board, if the project would cross Regional Board boundaries. The Regional Water Boards are defined (for the most part[67]) by the boundaries of hydrologic regions, as described in Water Code section 13200. The Water Code divides the state into nine hydrologic regions (Figure 4): 1) North Coast Region, 2) San Francisco Bay Region, 3) Central Coast Region, 4) Los Angeles Region, 5) Central Valley Region, 6) Lahontan Region, 7) Colorado River Basin Region, 8) Santa Ana Region and 9) San Diego Region.

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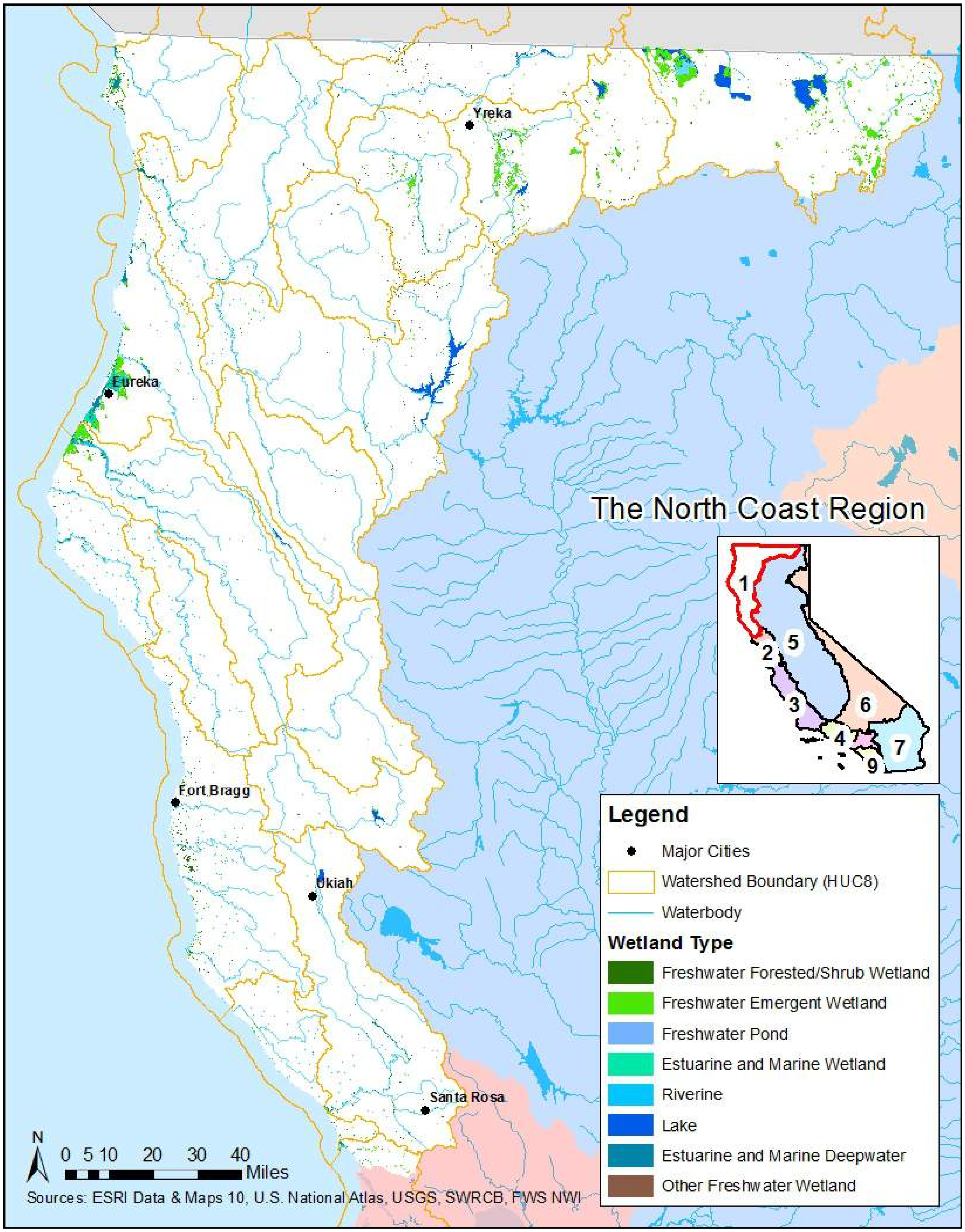
[67] The South Coast hydrologic region is divided among 3 Regional Water Boards (Los Angeles, Santa Ana, and San Diego) because it is the most populous area of the state.

Figure 4: Regional Water Board Jurisdictional Boundaries

North Coast Region

The North Coast Region (Figure 5) encompasses a total area of approximately 19,390 square miles, including 340 miles of coastline and remote wilderness areas, as well as urbanized and agricultural areas. The North Coast Region comprises all regional basins, including Lower Klamath Lake and Lost River Basins, draining into the Pacific Ocean from the California-Oregon state line southern boundary and includes the watershed of the Estero de San Antonio and Stemple Creek in Marin and Sonoma Counties. Two natural drainage basins, the Klamath River Basin and the North Coastal Basin divide the region. The region covers all of Del Norte, Humboldt, Trinity, and Mendocino Counties, major portions of Siskiyou and Sonoma Counties, and small portions of Glenn, Lake, and Marin Counties.

Beginning at the Smith River in northern Del Norte County and heading south to the Estero de San Antonio in northern Marin County, the Region encompasses a large number of major river estuaries. Other north coast streams and rivers with significant estuaries include the Klamath River, Redwood Creek, Little River, Mad River, Eel River, Noyo River, Navarro River, Elk Creek, Gualala River, Russian River and Salmon Creek (this creek mouth also forms a lagoon). Northern Humboldt County coastal lagoons include Big Lagoon and Stone Lagoon. The two largest enclosed bays in the North Coast Region are Humboldt Bay and Arcata Bay (both in Humboldt County). Another enclosed bay, Bodega Bay, is located in Sonoma County near the southern border of the Region.



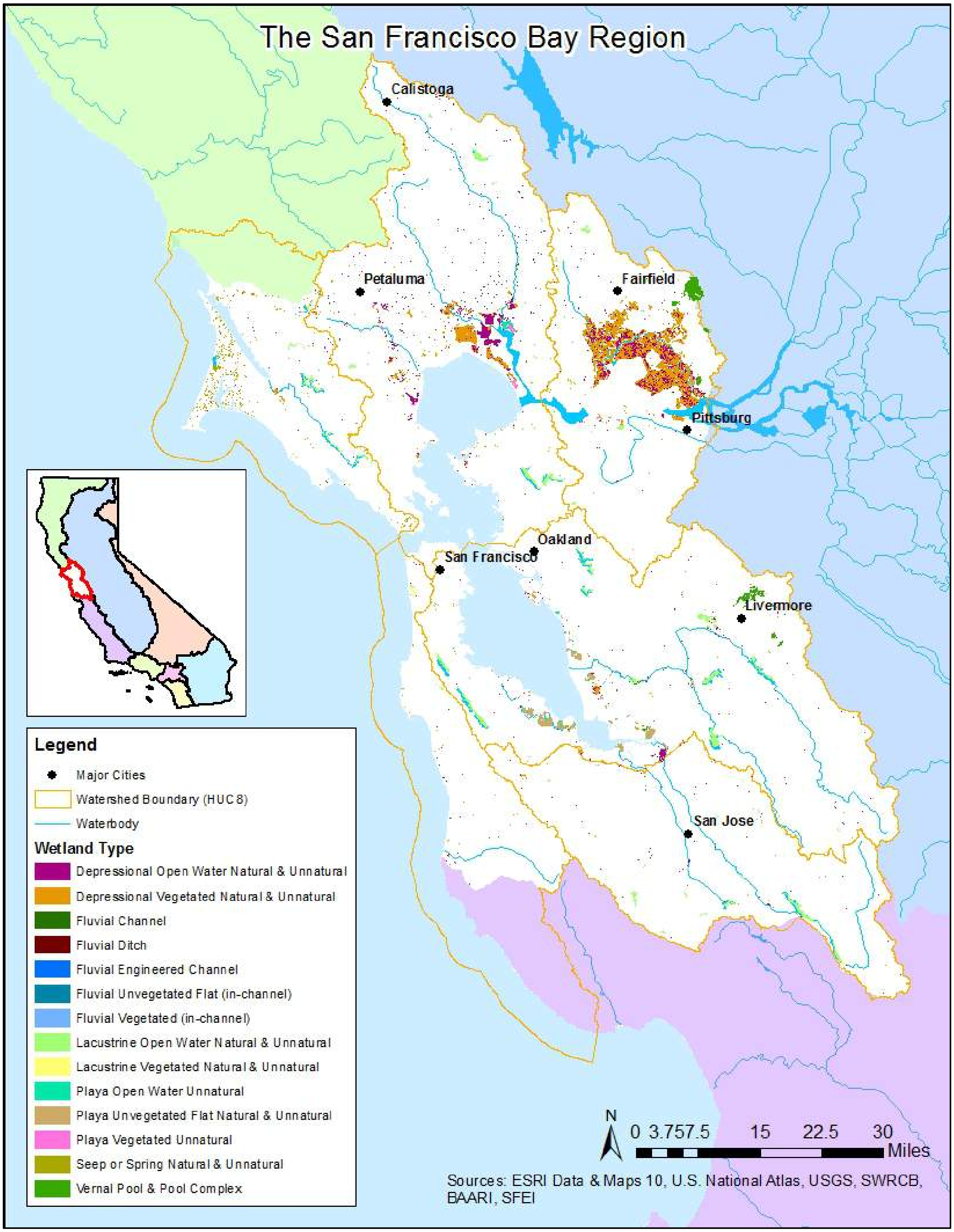
Sources: ESRI Data & Maps 10, U.S. National Atlas, USGS, SWRCB, FWS NWI

Figure 5: North Coast Region

San Francisco Bay Region

The San Francisco Bay Region (Figure 6) has jurisdiction over the part of San Francisco Estuary that includes all of San Francisco Bay segments extending east to the Delta (Winter Island near Pittsburg). The San Francisco Estuary marks a natural topographic separation between the northern and southern coastal mountain ranges.

The Region comprises San Francisco Bay, Suisun Bay beginning at the Sacramento River, and San Joaquin River westerly, from a line which passes between Collinsville and Montezuma Island. The Region's boundary follows the borders common to Sacramento and Solano counties and Sacramento and Contra Costa counties west of the Markely Canyon watershed in Contra Costa County. All basins west of the boundary, described above, and all basins draining into the Pacific Ocean between the southern boundary of the North Coast Region and the southern boundary of the watershed of Pescadero Creek in San Mateo and Santa Cruz counties are included in the Region.



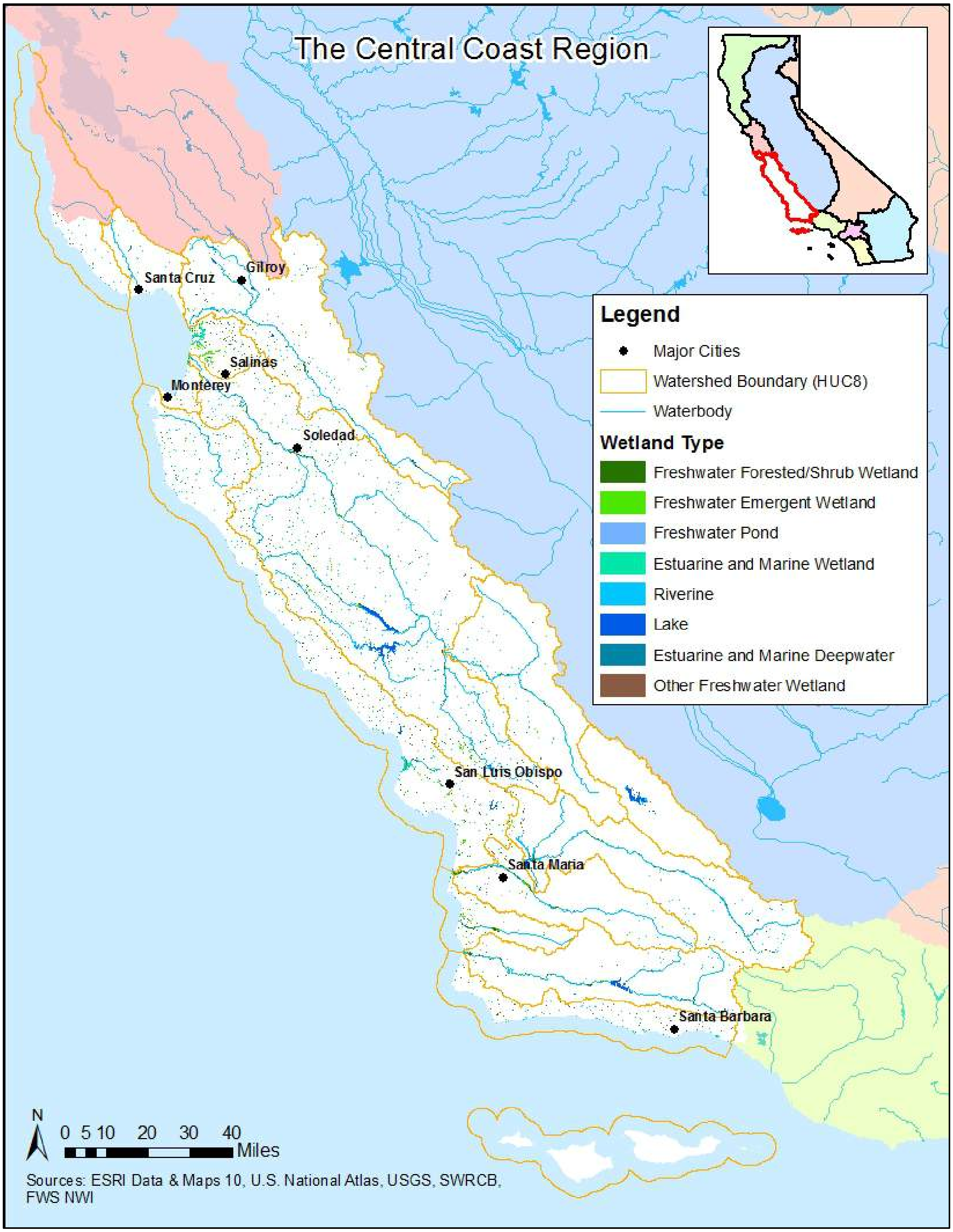
Sources: ESRI Data & Maps 10, U.S. National Atlas, USGS, SWRCB, BAARI, SFEI

Figure 6: San Francisco Bay Region

Central Coast Region

The Central Coast Region (Figure 7) comprises all basins (including Carrizo Plain in San Luis Obispo and Kern Counties) draining into the Pacific Ocean from the southern boundary of the Pescadero Creek watershed in San Mateo and Santa Cruz Counties to the southeastern boundary of the Rincon Creek watershed, located in western Ventura County. The Region extends over a 300-mile long by 40-mile wide section of the State's central coast.

This Region's geographic area encompasses all of Santa Cruz, San Benito, Monterey, San Luis Obispo, and Santa Barbara Counties as well as the southern one-third of Santa Clara County, and small portions of San Mateo, Kern, and Ventura Counties. Included in the Region are urban areas such as the Monterey Peninsula and the Santa Barbara coastal plain; prime agricultural lands such as the Salinas, Santa Maria, and Lompoc Valleys; National Forest lands; extremely wet areas such as the Santa Cruz Mountains; and arid areas such as the Carrizo Plain.



Sources: ESRI Data & Maps 10, U.S. National Atlas, USGS, SWRCB, FWS NWI

Figure 7: Central Coast Region

Los Angeles Region

The Los Angeles Region (Figure 8) comprises all basins draining into the Pacific Ocean between the southeastern boundary of the watershed of Rincon Creek, located in western Ventura County, and a line which coincides with the southeastern boundary of Los Angeles County, from the Pacific Ocean to San Antonio Peak, and follows the divide, between the San Gabriel River and Lytle Creek drainages to the divide between Sheep Creek and San Gabriel River drainages. It also includes the drainages of five coastal islands (Anacapa, San Nicolas, Santa Barbara, Santa Catalina and San Clemente). In addition, the Region includes all coastal waters within three miles of the continental and island coastlines.

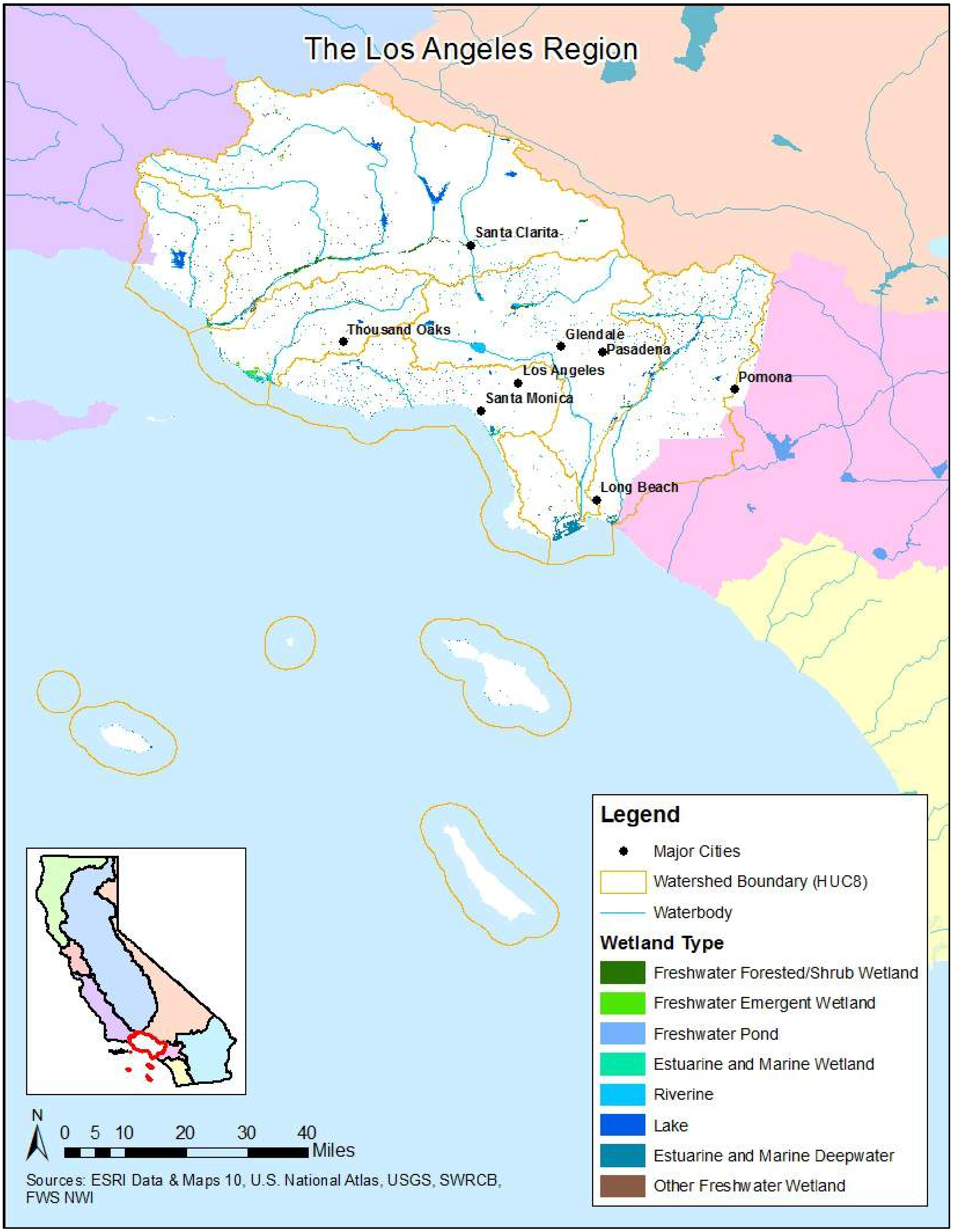


Figure 8: The Los Angeles Region

Central Valley Region

The Central Valley Region (Figure 9) is divided into three basins: Sacramento River, San Joaquin River, and Tulare Lake. For planning purposes, the Sacramento River Basin and the San Joaquin River Basin are covered under one Basin Plan and the Tulare Lake Basin is covered under a separate Basin Plan.

The Sacramento River Basin covers 27,210 square miles and includes the entire area drained by the Sacramento River. The principal streams are the Sacramento River and its larger tributaries: the Pitt, Feather, Yuba, Bear, and American Rivers to the east; and Cottonwood, Stony, Cache, and Putah Creek to the west. Major reservoirs and lakes include Shasta, Oroville, Folsom, Clear Lake, and Lake Berryessa.

The San Joaquin River Basin covers 15,880 square miles and includes the entire area drained by the San Joaquin River. Principal streams in the basin are the San Joaquin River and its larger tributaries: the Consumnes, Mokelumne, Calaveras, Stanislaus, Tuolumne, Merced, Chowchilla, and Fresno Rivers. Major reservoirs and lakes include Pardee, New Hogan, Millerton, McClure, Don Pedro, and New Melones.

The Tulare Lake Basin covers approximately 16,406 square miles and comprises the drainage area of the San Joaquin Valley south of the San Joaquin River. The planning boundary between the San Joaquin River Basin and the Tulare Lake Basin is defined by the northern boundary of Little Pinoche Creek basin eastward along the channel of the San Joaquin River to Millerton Lake in the Sierra Nevada foothills, and then along the southern boundary of the San Joaquin River drainage basin. Main rivers within the basin include the King, Kaweah, Tule, and Kern Rivers, which drains the west face of the Sierra Nevada Mountains. Imported surface water supplies enter the basin through the San Luis Drain- California Aqueduct System, Friant- Kern Channel and the Delta Mendota Canal.

The two northern-most basins are bound by the crests of the Sierra Nevada on the east and the Coast Range and Klamath Mountains on the west. They extend about 400 miles from the California-Oregon border southward to the headwaters of the San Joaquin River. Surface water from the two drainage basins meets and forms the Delta, which ultimately drains into the San Francisco Bay. The legal boundary of the Delta is described in California Water Code section 12220.

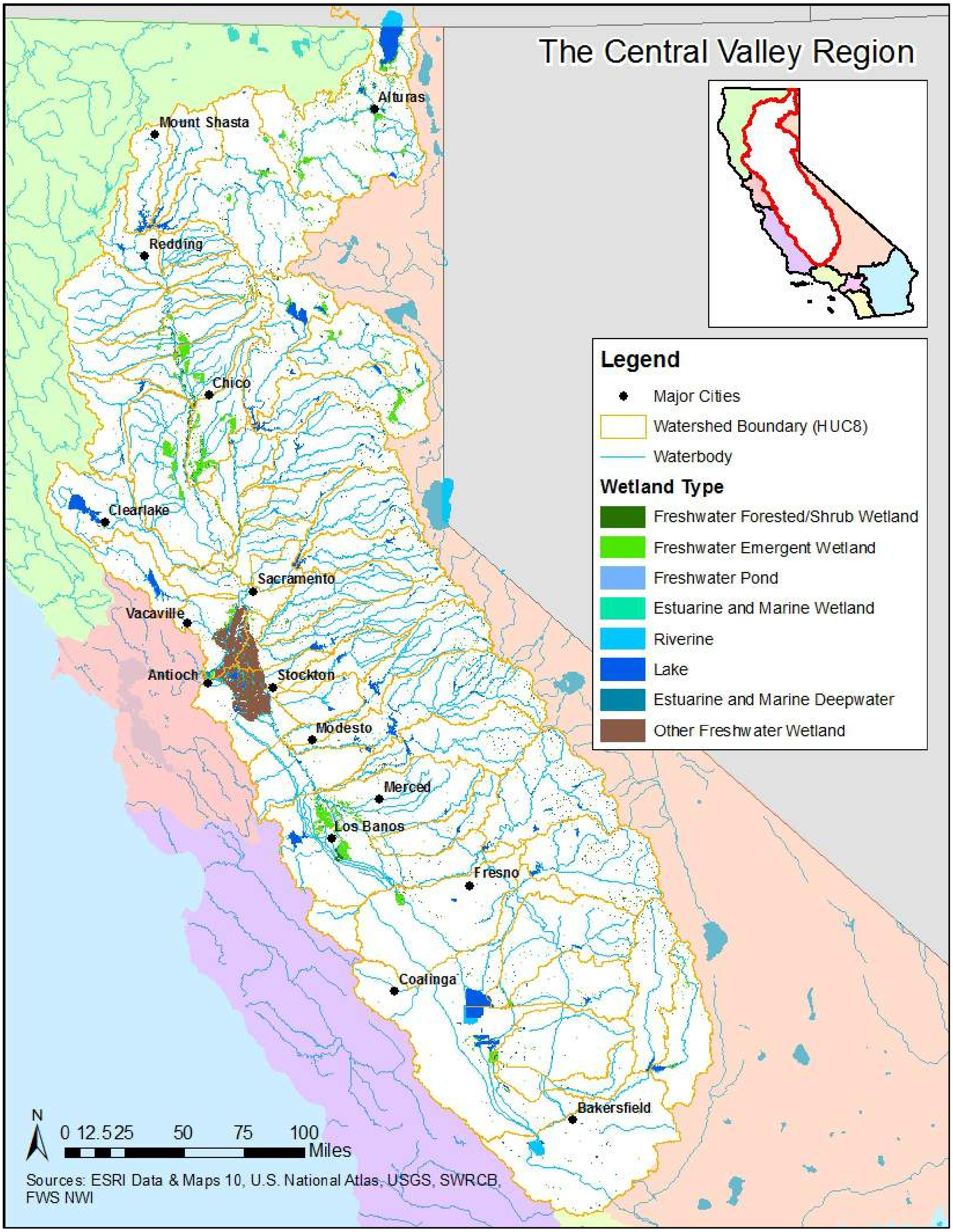
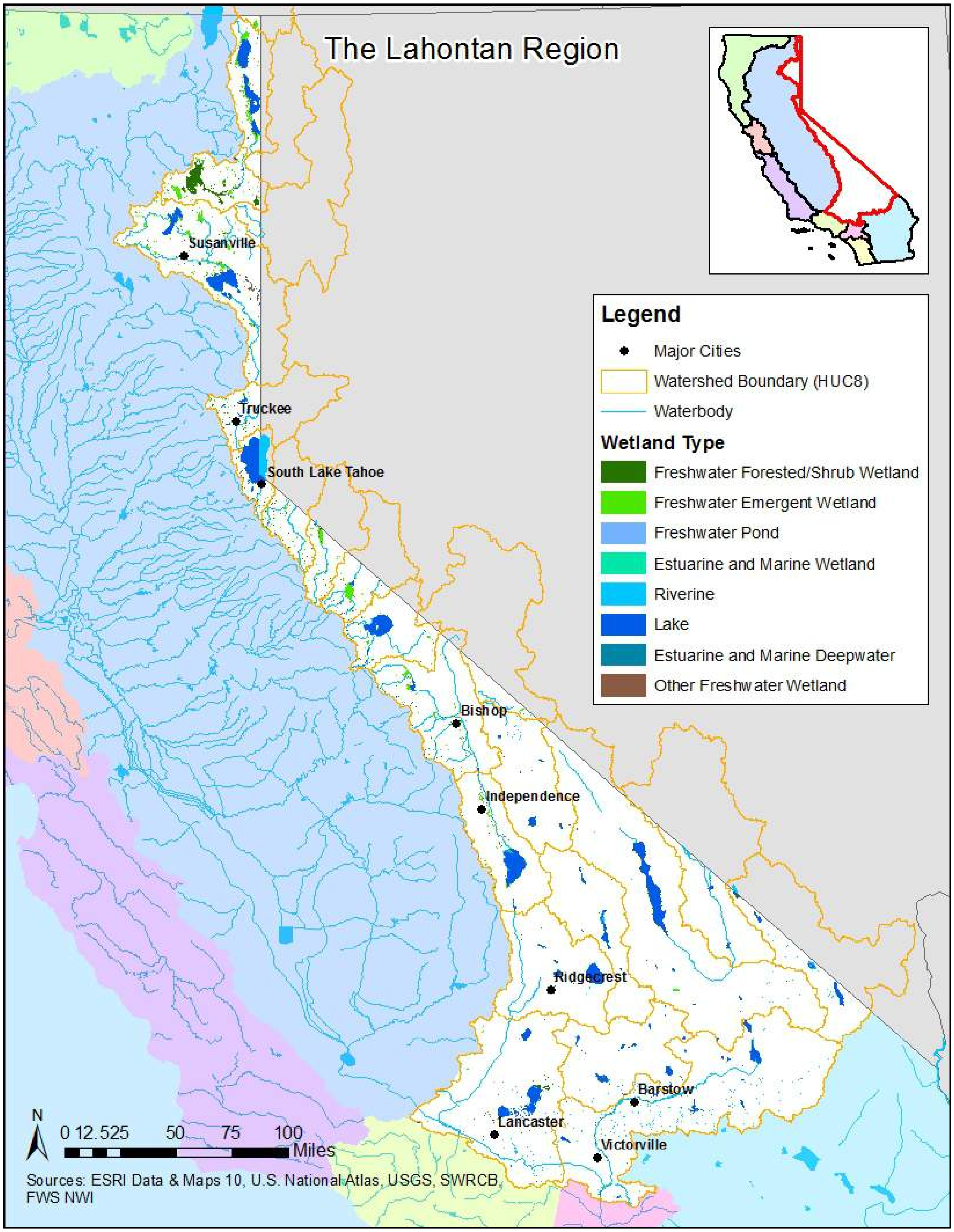


Figure 9: Central Valley Region

Lahontan Region

The Lahontan Region (Figure 10) has historically been divided into North and South Lahontan Basins at the boundary between the Mono Lake and East Walker River watersheds. It is about 570 miles long and has a total area of 33,131 square miles. The Region includes the eastern slopes of the Warner, Sierra Nevada, San Bernardino, Tehachapi and San Gabriel Mountains, and all or part of other ranges including the White, Providence, and Granite Mountains. Topographic depressions include the Madeline Plains, Surprise, Honey Lake, Bridgeport, Owens, Antelope, and Victor Valleys.



Sources: ESRI Data & Maps 10, U.S. National Atlas, USGS, SWRCB, FWS NWI

Figure 10: Lahontan Region

Colorado River Basin Region

The Colorado River Basin Region (Figure 11) covers approximately 13 million acres (20,000 square miles) in the southeastern portion of California. It includes all of Imperial County and portions of San Bernardino, Riverside, and San Diego Counties. It shares a boundary for 40 miles on the northeast with the State of Nevada, on the north by the New York, Providence, Granite, Old Dad, Bristol, Rodman, and Ord Mountain ranges, on the west by the San Bernardino, San Jacinto, and Laguna Mountain ranges, on the south by the Republic of Mexico, and on the east by the Colorado River and State of Arizona.

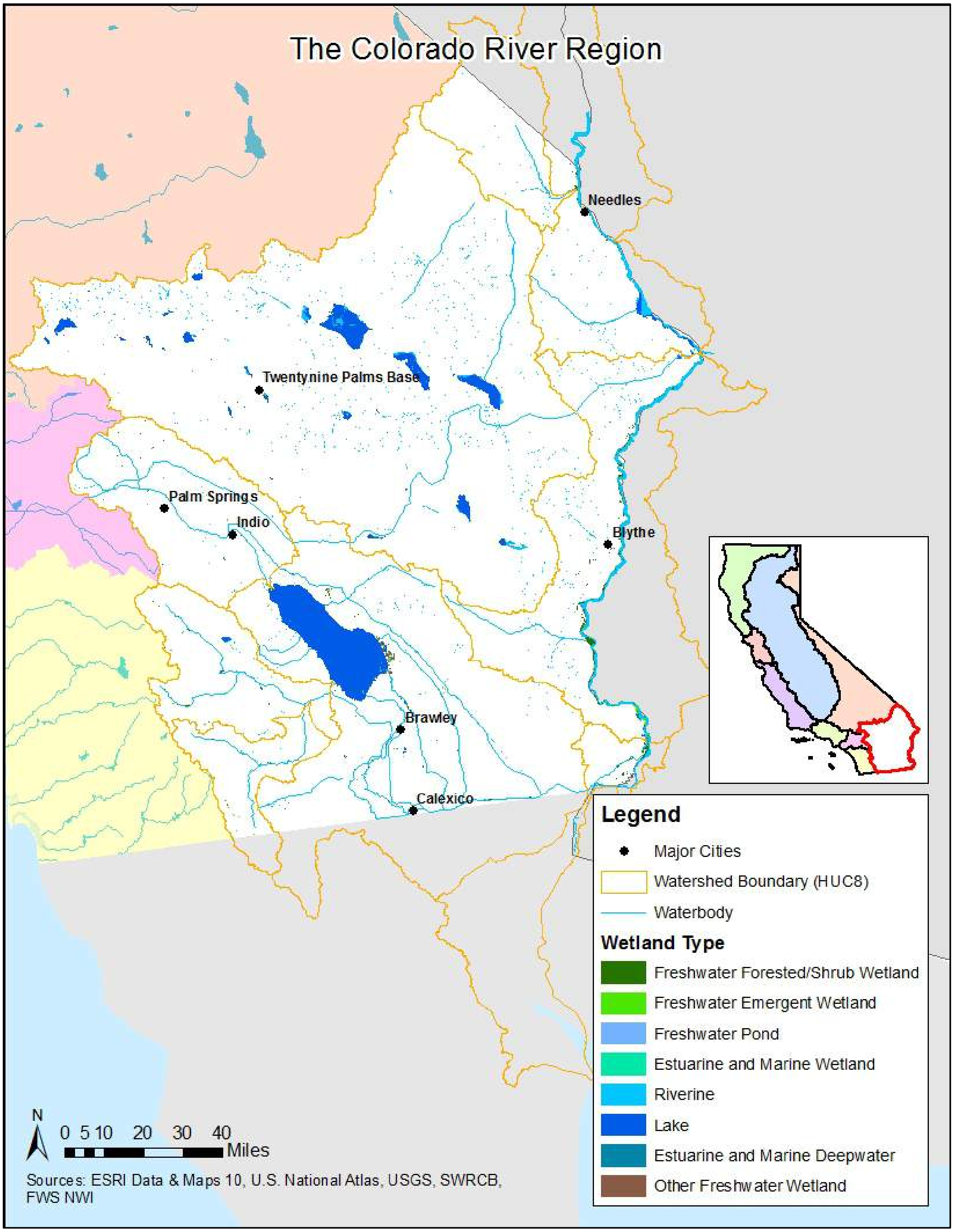
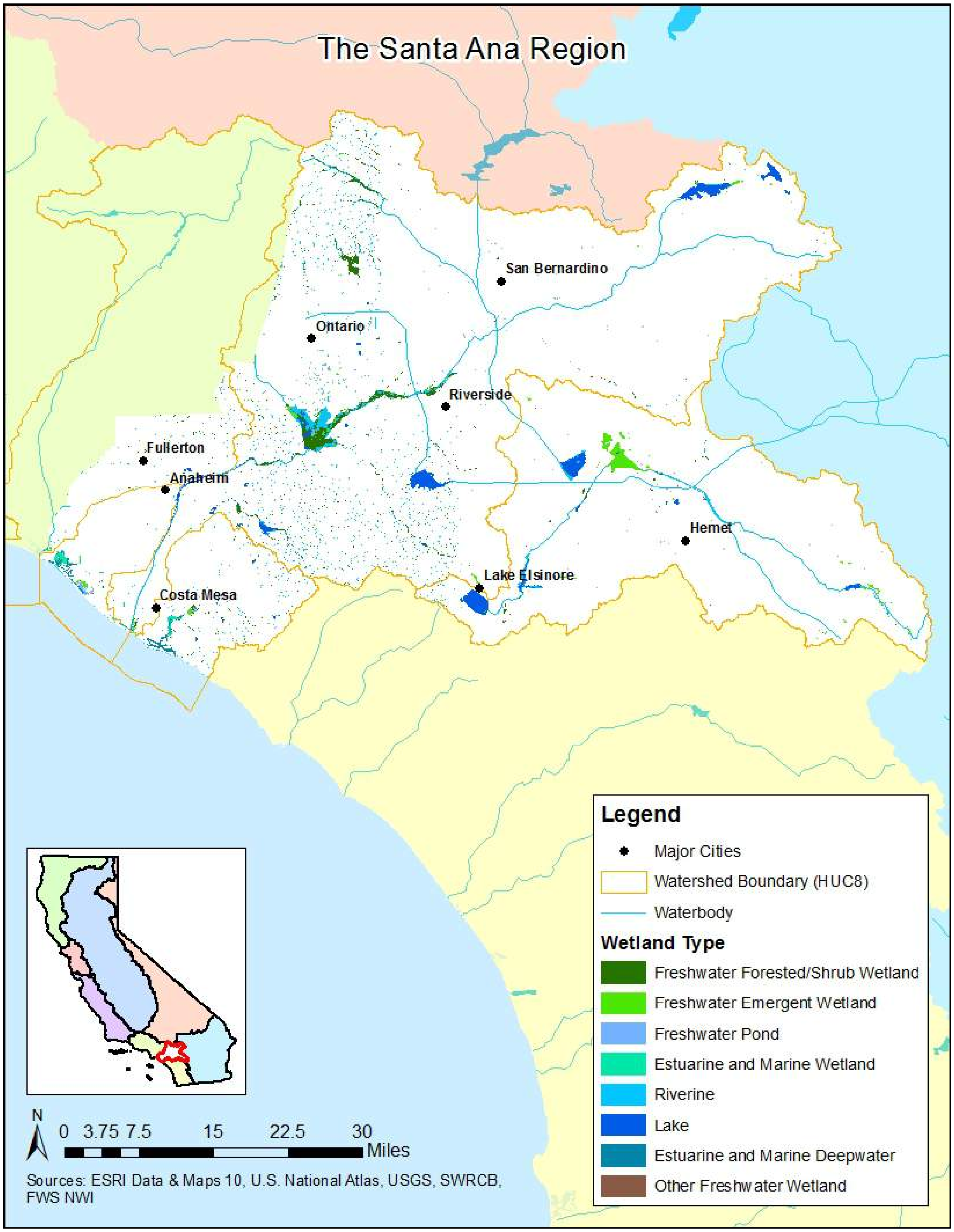


Figure 11: Colorado River Basin Region

Santa Ana Region

The Santa Ana Region (Figure 12) comprises all basins draining into the Pacific Ocean between the southern boundary of the Los Angeles Region and the drainage divide between Muddy and Moro Canyons, from the ocean to the summit of San Joaquin Hills; along the divide between lands draining into Newport Bay and Laguna Canyon to Niguel Road; along Niguel Road and Los Aliso Avenue to the divide between Newport Bay and Aliso Creek drainages; and along the divide and the southeastern boundary of the Santa Ana River drainage to the divide between Baldwin Lake and Mojave Desert drainages; to the divide between the Pacific Ocean and Mojave Desert drainages.

The Santa Ana Region is the smallest of the nine regions in the state (2,800 square miles) and is located in southern California, roughly between Los Angeles and San Diego.

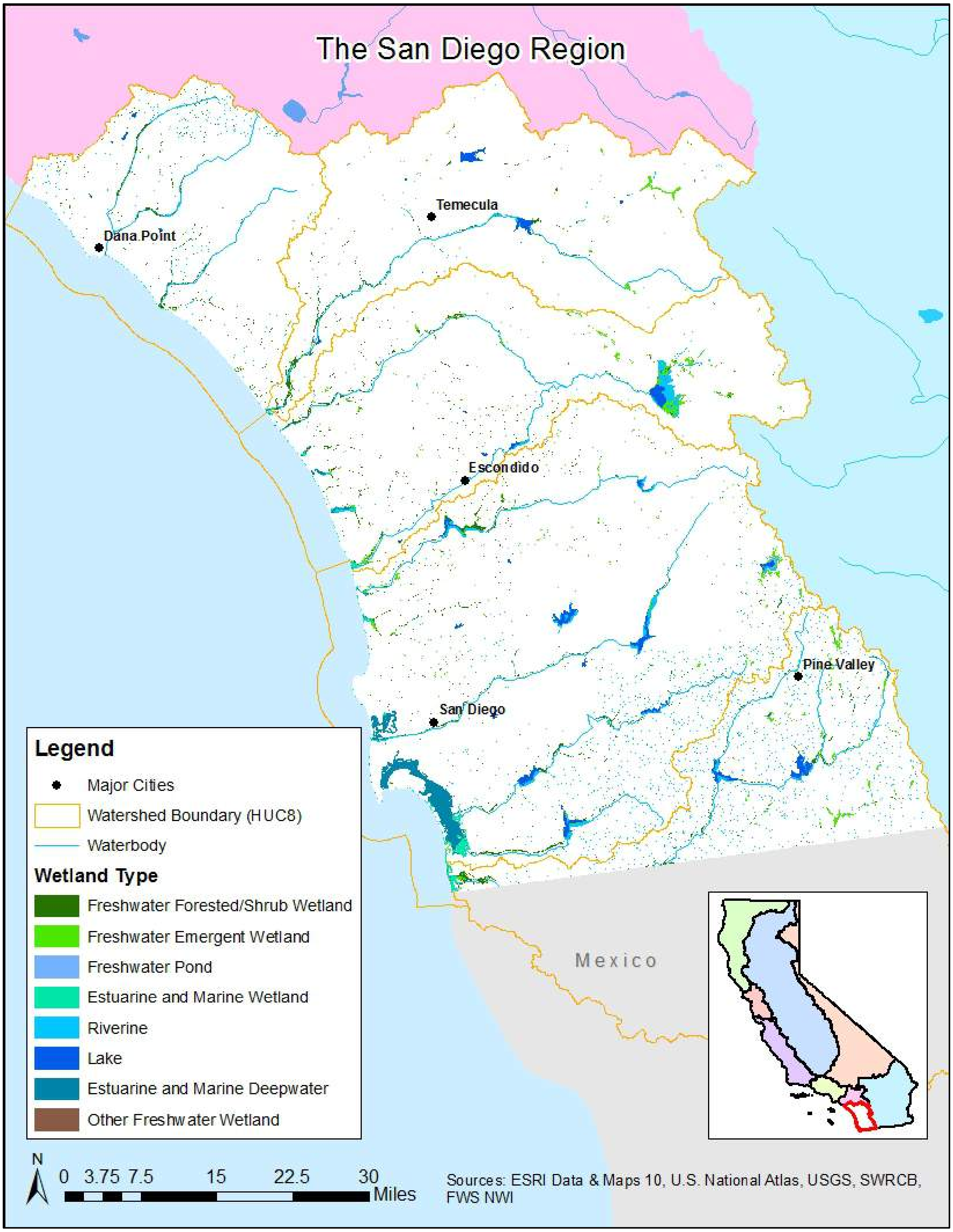


Sources: ESRI Data & Maps 10, U.S. National Atlas, USGS, SWRCB, FWS NWI

Figure 12: Santa Ana Region

San Diego Region

The San Diego Region (Figure 13) comprises all basins draining into the Pacific Ocean between the southern boundary of the Santa Ana Region and the California-Mexico boundary. The San Diego Region is located along the coast of the Pacific Ocean from the Mexican border to north of Laguna Beach. The Region is rectangular in shape and extends approximately 80 miles along the coastline and 40 miles east to the crest of the mountains. The Region includes portions of San Diego, Orange, and Riverside Counties.



Sources: ESRI Data & Maps 10, U.S. National Atlas, USGS, SWRCB, FWS NWI

Figure 13: San Diego Region

6.14 State Hydrologic Regions

North Coast Hydrologic Region

A majority of the surface water in the North Coast hydrologic region is committed to environmental uses because of the “wild and scenic” designation of most of the region’s rivers. Average annual precipitation in this hydrologic region ranges from 100 inches in the Smith River drainage to 29 inches in the Santa Rosa area.

Waterbodies that provide municipal water include the Smith, Mad, and Russian Rivers. Areas providing agricultural water are more widespread than those for domestic, municipal and industrial use, as they occur in all of the hydrologic units within the region. Many of the smaller communities and rural areas are generally supplied by small local surface water and groundwater systems. Water recreation occurs in all hydrologic units on both fresh and salt water, attracting over ten million people annually. Coastal areas receiving the greatest recreational use are the ocean beaches, the lower reaches of rivers draining to the ocean, and Humboldt and Bodega Bays. The Russian, Eel, Mad, Smith, Trinity, and Navarro Rivers and Redwood Creek provide the most freshwater recreational use.

Groundwater aquifers in the northeastern portion of the North Coast hydrologic region consist primarily of volcanic rock aquifers and some basin-fill aquifers. Coastal basin aquifers are predominantly found in the southern portion of this hydrologic region and along the northern coast. In general, though, a large percentage of this region is underlain by fractured hard rock zones that may contain localized sources of groundwater.

San Francisco Bay Hydrologic Region

Major rivers in the San Francisco Bay hydrologic region include the Napa and Petaluma, which drain to San Francisco Bay. Although this is the smallest hydrologic region in the state, it contains the second largest human population. Coastal basin aquifers are the primary type of aquifer system in this region. These aquifers can be found along the perimeter of San Francisco Bay extending southeast into the Santa Clara Valley, as well as in the Livermore Valley. The northeastern portion of this region, which includes the eastern Sacramento–San Joaquin Delta, is underlain by a portion of the Central Valley aquifer system. The remaining areas in this region are underlain by fractured hard rock zones.

Central Coast Hydrologic Region

Groundwater is the primary source of water in the Central Coast hydrologic region, accounting for approximately 75% of the annual supply. Most of the freshwater in this region is found in coastal basin aquifers, with localized sources of groundwater also occurring in fractured hard rock zones throughout the region.

South Coast Hydrologic Region

The South Coast hydrologic region is divided among 3 Regional Water Boards because it is the most populous area of the state: Los Angeles, Riverside, and San Diego. Groundwater supplies approximately 23% of the region’s water in normal years and about 29% in drought years. Like the Central Coast hydrologic region, the majority of aquifers in this region are coastal basin aquifers. In the eastern central portion of the region includes lies a small section of basin and range aquifer and the remainder of the region is comprises fractured hard rock zones.

Central Valley Hydrologic Region

The Central Valley hydrologic region is the largest in California, and encompasses the three subregions described below.

Sacramento River Hydrologic Subregion

The Sacramento River hydrologic subregion includes the entire drainage area of the Sacramento River, the largest river in California, and its tributaries. Groundwater in the northern half of this hydrologic subregion is, for the most part, contained in volcanic rock aquifers and some basin-fill aquifers. The southwestern half of this subregion is underlain by part of the Central Valley aquifer system. The remaining areas that comprise the southeastern half of the subregion and portions of the northern half of the subregion are underlain by fractured hard rock zones. Surface water quality in this hydrologic subregion is generally good. Groundwater quality in the Sacramento River subregion is also generally good, although there are localized problems.

San Joaquin River Hydrologic Subregion

A portion of the Central Valley aquifer system underlies nearly all of the eastern half of the San Joaquin River subregion, while the western half of this subregion consists of fractured hard rock zones. The groundwater quality throughout this hydrologic region is generally good and usable for most urban and agricultural uses, although localized problems occur.

Tulare Lake Hydrologic Subregion

A small area at the southern end of the Tulare Lake subregion is underlain by basin and range aquifers, while a majority of the western half is underlain by a portion of the Central Valley aquifer system. The eastern half, once again, consists of fractured hard rock zones.

Lahontan Hydrologic Region

The Lahontan hydrologic region encompasses two subregions: the North Lahontan and the South Lahontan.

The North Lahontan hydrologic subregion consists of the western edge of the Great Basin, and water in the region drains eastward toward Nevada. Groundwater in the northern half of this subregion is primarily contained in basin-fill and volcanic rock aquifers, with some fractured hard rock zones. The southern half of this region is dominated by fractured hard rock zones, but small segments of basin and range aquifers also exist in this part of the subregion.

In general, the water quality in the North Lahontan hydrologic region is good. In basins in the northern portion of the region, groundwater quality is widely variable. The groundwater quality along these basin margins tends to be of higher quality, but the potential for future groundwater pollution exists in urban and suburban areas where single-family septic systems have been installed, especially in hard rock areas. Groundwater quality in the alpine basins ranges from good to excellent.

The South Lahontan hydrologic subregion is bounded on the west by the crest of the Sierra Nevada and on the north by the watershed divide between Mono Lake and East Walker River drainages; on the east by Nevada and the south by the crest of the San Gabriel and San Bernardino mountains and the divide between watersheds draining south toward the Colorado River and those draining northward. The subregion includes all of Inyo County and parts of Mono, San Bernardino, Kern, and Los Angeles Counties.

The South Lahontan hydrologic subregion contains numerous basin and range aquifers, separated by fractured hard rock zones. Although the quantity of surface water is limited in the South Lahontan hydrologic subregion, the quality is very good, being greatly influenced by snowmelt from the eastern Sierra Nevada. However, at lower elevations, groundwater and surface water quality can be degraded, both naturally from geothermal activity, and as a result of human-induced activities. Drinking water standards are most often exceeded for TDS, fluoride, and boron content. Groundwater near the edges of valleys generally contains lower TDS content than water beneath the central part of the valleys or near dry lakes.

Colorado River Hydrologic Region

The southeast portion of California consists of the Colorado River hydrologic region. It includes a large portion of the Mojave Desert and has variable arid desert terrain that includes many bowl-shaped valleys, broad alluvial fans, sandy washes, and hills and mountains.

7. ENVIRONMENTAL SETTING

7.1 Bioregions

The California Biodiversity Council has divided California into ten bioregions: Modoc, Klamath/North Coast, Sacramento Valley, Bay Area/Delta, Sierra, San Joaquin Valley, Central Coast, Mojave Desert, South Coast, and Colorado Desert (Figure 14). The bioregions were based on the state's major physiographic provinces and were defined in order to improve communication and coordination among public and private organization (California Biodiversity Council (CBC), 2008). The bioregions contain unique mixes of biodiversity and public agency responsibilities (CBC, 2008).

Figure 14. California Bioregions (California Department of Forestry and Fire Protection (CDF), 2011)

Modoc Bioregion

The Modoc bioregion, an area of stark contrast to the rest of the state, extends across northeast corner of the state from Oregon to Nevada, and south to the southern border of Lassen County (California Environmental Resources Evaluation System (CERES), 2011a). From many vantage points, the view to the west is of forests and mountains, while the vista to the east is high desert characteristic of Nevada. Much of this sparsely populated bioregion of forests, mountains, high desert, valleys, piney woodlands, and volcanic remains in its natural state.

Location, People, Cities

Bounded by Oregon on the north and Nevada on the east, the Modoc bioregion extends westward across the Modoc Plateau, encompassing the Lassen and Modoc national forests. It includes all or part of seven counties: Modoc, Lassen, the eastern end of Shasta, Siskiyou and Tehama, and the northern edges of Butte and Plumas. Because bioregions have only fuzzy lines and can take in portions of several counties, it is difficult to estimate their populations precisely, but the rural nature of the Modoc Bioregion is reflected in the populations of the two counties totally contained within its boundaries: Modoc (10,700) and Lassen (29,800). According to 1990 census figures, the Modoc bioregion has the smallest population of all ten bioregions, with fewer than 81,000 people. The largest cities are Alturas, the Modoc County seat; Susanville, the Lassen County seat; Burney in eastern Shasta County; and Maglia in northern Butte County.

The Northern Paiute and the Paiute-Shoshone tribes are native to this bioregion. Indian reservations include Fort Bidwell, Alturas, Cedarville, Likely, and Lookout Rancherias; and Pit River, all in Modoc County. Main highways are U.S. Highway 395 and state routes 299, 139, 89, 44, and 36.

Industries

Ranching is the major agricultural industry, and timber is a significantly large employer.

Climate and Geography

The climate features hot, dry summers and cold, moist winters with snow at higher elevations. Geography is varied in the Modoc bioregion, with volcanic areas and wetlands to the west and high desert to the east. Lassen Volcanic National Park is studded with lakes and crowned by 10,457-foot Lassen Peak; Tule Lake, and Clear Lake National Wildlife Refuges. Ahjumawi Lava Springs State Park and Lava Beds National Monument are on the western side. The eastern side, which resembles its neighbor, Nevada, has desert alkali lakes, Honey Lake Valley, and Modoc National Wildlife Refuge. The last volcanic activity at Mount Lassen was in 1915.

The bioregion includes Modoc and Lassen National Forests and part of the Klamath National Forest. The largest lakes are Lake Almanor in Plumas County, Eagle Lake in Lassen County, Lower Klamath Lake in Siskiyou County, and Goose Lake in Modoc County. The Pit River flows southwest from the rugged Warner Mountains in eastern Modoc and Lassen counties across the Modoc Plateau and into the Sacramento River.

Plants and Wildlife

Juniper and sagebrush cover much of the eastern side of the Modoc bioregion, while yellow and Jeffrey pine, white fir, mixed conifer, cedar, and aspen are common in the more mountainous and forested areas to the west. Rare plants include yellow arrowleaf, balsam root, long-haired star tulip, spiny milkwort, Ash Creek ivesia, Raven's lomatium, and woolly stenotus.

Wildlife include bald eagles, antelope, greater sandhill cranes, ospreys, Canada geese, black-crowned night herons, mule deer, muskrats, pronghorn, cinnamon teal, northern pintails, Swainson's hawks, sage grouse, rainbow trout, marmots, hummingbirds, great horned owls, black bears, coyotes, porcupine, Modoc sucker, goshawk, bank swallow, Shasta crayfish, sage grouse, and Lost River sucker.

Klamath/North Coast Bioregion

The Klamath/North Coast bioregion in the northwestern corner of the state extends roughly one-quarter of the way down the 1,100-mile coast and east across the Coastal Range and into the Cascades (CERES, 2011b). This bioregion is famous for its rocky coastline, salmon fishing, and lush mountain forests of spectacular ancient redwoods and Douglas fir. Redwood National Park and numerous state parks, rivers, wilderness areas, and four national forests are in this bioregion.

Location, Cities, People

Ten counties make up the Klamath/North Coast Bioregion: Del Norte, most of Siskiyou, Humboldt, Trinity, Mendocino, Lake, and the northwestern portions of Shasta, Tehama, Colusa, and Glenn. Its boundaries are the Oregon border on the north, and the southern borders of Lake and Mendocino counties on the south. Despite the huge area of this bioregion, its population is only about 410,000 according to 1990 census figures. The bioregion extends from the Pacific Coast eastward more than halfway across California to the Modoc Plateau and the Sacramento Valley floor. The Hoopa Valley, Yurok, Karok, Paiute-Shoshone, and Pomo-Kato Indians are native to various parts of this bioregion.

The largest cities are Redding – a Northern California crossroad on Interstate 5 – and Eureka, a Humboldt County seaport. Smaller cities include Clearlake, Ukiah, Arcata, Fort Bragg, Yreka, Mendocino, and Crescent City. Main highways are I-5, U.S. 101, and state Highways 36, 299, 96, and 3, which cross mountains and can be steep and winding.

Industries

Along the coast, redwood trees hundreds or thousands of years old are a cherished natural resource and major tourist attraction. These forests are home to the endangered marbled murrelet, a seabird that nests in old-growth, and the threatened northern spotted owl, whose decline prompted severe reductions in federal timber harvest sales to preserve its habitat. Listing of the owl under the federal Endangered Species Act (ESA) and other 1990s environmental actions caused economic impacts upon the once-booming timber industry, such as forcing closure of many sawmills and dislocation of workers. Communities once dependent on timber activities are being forced to diversify their economies, and are encouraging the growth of tourism, improving infrastructure, and seeking ways to attract and accommodate new businesses. Cattle ranching, dairy farming, and fishing are popular traditional industries of the bioregion.

Climate and Geography

Much of the Klamath/North Coast bioregion is covered by forest: the Klamath, Shasta-Trinity, Six Rivers, and Mendocino National Forests, Jackson State Forest, and private forests, including the famous Headwaters ancient redwood forest in Humboldt County. This mountainous bioregion includes the North Coast Range and the Klamath, Siskiyou, Marble, Salmon, Trinity, and Cascade mountains. The Klamath/North Coast is the state's wettest climate, with rainfall distribution varying widely from an average annual 38 inches at Fort Bragg to 80 or more inches in the King Range National Conservation Area. The coastal climate is cool, moist, and often foggy, with rainy winters at lower elevations and snow in the higher mountains. Inland the climate is drier with low rainfall in winter and hot, dry summers.

Major rivers include the Eel, Trinity, Klamath, Russian, Smith, Salmon, Scott, Mad, and Mattole, which flows into the Pacific Ocean near seismically active Cape Mendocino. Clear Lake, Whiskeytown Lake, Clair Engle, and the western part of Shasta are the largest lakes in the bioregion.

Plants and Wildlife

Vegetation includes mixed conifer habitat of white fir, Douglas fir, ponderosa pine, Sierra lodgepole pine, incense cedar, sugar pine, red pine, Jeffrey pine, mountain hemlock, knobcone pine, western red cedar, red alder, redwood, tanoak, Pacific madrone, and chaparral. Rare plants include Sebastopol meadowfoam, Burke's goldfields, Humboldt Bay owl's clover, Calistoga ceanothus, Baker's navarretia, coast lily, swamp harebell, Tracy's sanicle, Snow Mountain willowherb, marsh checkerbloom, pale yellow stonecrop, Scott Mountain phacelia, McDonald's rock cress, Klamath Mountain buckwheat, Oregon fireweed, Adobe lily, dimorphic snapdragon, Colusa layia, Indian Valley brodiaea, and Stebbins' lewisia.

Wetlands provide places for resting, nesting, feeding and breeding for native and migrating birds and waterfowl. Wildlife in the bioregion includes deer, fox, black bear, mountain lion, California clapper rail, Aleutian Canada geese, Roosevelt elk, osprey, fisher, bank swallow, Coho salmon, king salmon, otis blue butterfly, bald eagle, Point Arena mountain beaver, Swainson's hawk, willow flycatcher, western sandpiper, and Oregon silverspot butterfly. Rare species include northern spotted owl, marbled murrelet, American peregrine falcon, Lotis blue butterfly, Trinity bristle snail, red-legged frog, Siskiyou Mountains salamander, Pacific fisher, Del Norte salamander, Karok Indian snail, wolverine, goshawk, and Chinook salmon.

Sacramento Valley Bioregion

The Sacramento Valley bioregion, a watershed of the Sierra Nevada, is rich in agriculture, but is also significant as the seat of state government (CERES, 2011c). Lying halfway between the Pacific Ocean and the Sierra Nevada, the Sacramento Valley affords convenient travel time to San Francisco and Lake Tahoe. The bioregion encompasses the northern end of the great Central Valley, stretching from

Redding to the southeast corner of Sacramento County. Its southern boundary borders the northern edge of the Sacramento-San Joaquin River Delta. Sacramento, the home of the state Capitol, sits at the confluence of the Sacramento and American Rivers.

Location, Cities, People

The broad, flat valley that comprises this bioregion touches nine counties, including all of Sutter, most of Sacramento and Yolo, and portions of Butte, Colusa, Glenn, Placer, Shasta, Tehama, and Yuba counties. Sacramento, with a population of about 400,000, is the bioregion's largest city and ranks seventh in the state behind Fresno, Long Beach, San Francisco, San Jose, San Diego, and Los Angeles. Other large cities include Redding, Chico, Davis, West Sacramento, and Roseville. More than 1.5 million people inhabit this bioregion, making it the fourth most populous of the ten bioregions, based on 1990 census figures. The cultural roots of the region date from Native American inhabitants, such as the Wintun Indians, to 19th century settlers who established and worked farms and ranches.

Two of the state's major interstate highways, I-5, the state's main north-south artery, and transcontinental I-80, intersect in Sacramento. Other main highways include U.S. Highway 50, and State Highways 99, 44, 113, 70, and 20.

Industries

Agriculture and state government are important industries in the Sacramento Valley bioregion, but only three of the counties – Sutter, Yolo, and Colusa – rank among California's top 20 agricultural producers. Still, the valley is known for tomatoes, rice, and olives, among other prominent crops produced in the plentiful fields and orchards. Food canneries, high-technology, and biotechnology play a significant role. The bioregion once had a substantial military presence with three Air Force bases, but downsizing changed the picture, closing Mather, then adding McClellan to the closure list, but sparing Beale. Shipping is important in the port of West Sacramento.

Climate and Geography

The changing of the seasons is more evident in the Sacramento Valley than in the coastal regions to the west. Summer hot spells that drive daytime temperatures into triple digits are relieved by cooling “Delta breezes” that carry moist air from San Francisco Bay eastward through the Delta and into the Sacramento area. The brief, mild autumn ends when tule fog blankets the valley for much of the winter season from December into February, keeping temperatures chilled. Except during droughts, rainfall is frequent in winter, but snowfall is unusual because temperatures, particularly in the daytime, normally remain well above freezing.

The Sacramento Valley is flat for the most part, but is situated within view of mountains, which are particularly visible on clear days. To the west, the coastal range foothills loom on the horizon, while the snow-capped peaks of the Sierra Nevada can be seen to the east.

The valley's two major rivers, the Sacramento and American, carry water that originates in the Sierra Nevada south and west into the Sacramento-San Joaquin River Delta. The Delta supplies water to about two-thirds of the 32 million residents of the state. Other rivers include the Cosumnes – the largest free-flowing river in the Central Valley – the lower Feather, Bear, and Yuba Rivers.

Plants and Wildlife

Oak woodlands, riparian forests, vernal pools, freshwater marshes, and grasslands provide the major natural vegetation of the Sacramento Valley bioregion. The Sacramento Valley is the most prominent wintering site for waterfowl, attracting more than 1.5 million ducks and 750,000 geese to its seasonal marshes along the Pacific Flyway. Species include northern pintails, snow geese, tundra swans, sandhill cranes, mallards, grebes, peregrine falcons, heron, egrets, and hawks. Black-tailed deer, coyotes, river otters, muskrats, beavers, ospreys, bald eagles, salmon, steelhead, and swallowtail butterflies are just some of the wildlife that abounds in this bioregion. Species on the endangered species list include the winter-run Chinook salmon, delta smelt, giant garter snake, and the western yellow-billed cuckoo.

Bay Area/Delta Bioregion

The Bay Area/Delta bioregion is one of the most populous, encompassing the San Francisco Bay Area and the Sacramento-San Joaquin River Delta (CERES, 2011d). Environmentally, the bioregion is the focus of debate over conflicting demands for the water that flows through the Delta, supplying two-thirds of the drinking water in the state, irrigating farmland, and sustaining fish and wildlife and their habitat. Under a historic accord in 1994, competing interests initiated a process for working together to “fix” the Delta.

Location, Cities, People

The bioregion fans out from San Francisco Bay in a jagged semi-circle that takes in all or part of 12 counties, including the state's top six in family income: Marin, Contra Costa, Santa Clara, Alameda, Solano, San Mateo, as well as the counties of San Francisco, Sonoma, Napa, San Joaquin, and parts of Sacramento, and Yolo. Major cities include San Francisco, Santa Rosa, Oakland, Berkeley, Vallejo, Concord, and San Jose. Though of moderate size, the Bay-Delta bioregion is the second most populous bioregion, next to the South Coast, with 6.6 million people, based on the 1990 census.

The Bay Area/Delta bioregion extends from the Pacific Ocean to the Sacramento Valley and San Joaquin Valley bioregions to the northeast and southeast, and a short stretch of the eastern boundary joins the Sierra bioregion at Amador and Calaveras counties. The bioregion is bounded by the Klamath/North Coast bioregion on the north and the Central Coast bioregion to the south.

Major highways are Interstate 80, which concludes its transcontinental journey in San Francisco, I-280, I-580 and I-680, U.S. 101. State highways include 1, 12, 24, 29, 84, 92, 113, 116, 121, and 128.

Industries

Prominent industries of this bioregion include banking, high-technology and biotechnology, wine-making, fishing, shipping, oil refining, dairy farming, beer brewing, and fruit ranching. The Pacific coastal area of this bioregion features Point Reyes National Seashore, John Muir Woods National Monument, Golden Gate National Recreation Area, and numerous state parks and state beaches.

Climate and Geography

The temperatures in this Mediterranean climate don't vary much year-around. The coast experiences relatively cool, often foggy summers, mild falls, and chilly, rainy winters. Further inland, hot dry summers and warm autumns are followed by mild, wet winters. Snowfall is rare. The bioregion is mostly hilly with low coastal mountains and several peaks rising above 3,000 feet, including Mt. Diablo at 3,849 feet, in a state park. Coastal prairie provides grazing for wild and domestic animals, including dairy cattle.

The bioregion is named for its two major watersheds, San Francisco Bay and the Delta. Major rivers include the Russian, Gualala, Napa, Petaluma, and Alameda, and Putah Creeks. A network of reservoirs and canals comprise the State Water Project delivery system. Lake Berryessa in Napa County is the largest lake.

Plants and Wildlife

The habitats and vegetation of the Bay Area/Delta bioregion are as varied as the geography. Coastal prairie scrub, mixed hardwoods and valley oaks are found among the rolling hills and mountains that descend to the ocean. Redwoods abound in Santa Cruz County. Coastal salt marsh lies around San Francisco Bay, and freshwater marshes are found in the Delta. Eucalyptus, manzanita, northern coastal scrub, California buttercups, goldfields, and Tiberon mariposa lily also are popular in the bioregion. Rare plants include Marin western flax, Baker's manzanita, Point Reyes checkerbloom, and Sonoma sunshine. Salt and freshwater marshes provide pickleweed, great bulrush, saltbush, and cattail.

Wetlands in the Bay-Delta – brackish and freshwater – furnish resting, nesting, feeding and breeding places for birds and waterfowl along the Pacific Flyway. These marshes, rich in biodiversity, are popular and necessary wintering spots for migrating birds.

Birds include canvasback, western grebe, black-crowned night heron, great egret, snowy egret, California brown pelican, white pelican, gull, acorn woodpecker, golden eagle, western bluebird, Caspian tern, American avocet, and cedar waxwing. Marine life includes Chinook salmon, harbor seal, sea lion, leopard shark, and bat ray. Other wildlife includes grey fox, mule deer, bobcat, raccoon, Pacific tree frog, and the swallowtail and painted lady butterfly.

Endangered species include the California least tern, California black rail and clapper rail, Smith's blue butterfly, salt marsh harvest mouse, California freshwater shrimp, northwestern pond turtle, and tidewater goby.

Sierra Bioregion

The Sierra bioregion is a vast and rugged mountainous area extending some 380 miles along eastern side of the state, and largely contiguous with Nevada (CERES, 2011e). Named for the Sierra Nevada mountain range it encompasses, the Sierra bioregion includes magnificent forests, lakes, and rivers that generate much of the state's water supply. It shares Lake Tahoe with Nevada and features eight national forests, three national parks – Yosemite, Kings Canyon and Sequoia – numerous state parks, historical sites, wilderness, special recreation and national scenic areas, and mountain peaks, including 14,495-foot Mt. Whitney.

Location, Cities, People

Eighteen counties, or their eastern portions, comprise the Sierra bioregion: Alpine, Amador, Butte, Calaveras, El Dorado, Fresno, Inyo, Kern, Madera, Mariposa, Mono, Nevada, Placer, Plumas, Sierra, Tulare, Tuolumne, and Yuba. The bioregion extends from the northern edge of the Plumas National Forest south to Tejon Pass in the Tehachapi Mountains about 30 miles southeast of Bakersfield. The northern half of the Sierra bioregion is bordered by the Nevada state line to the east and the Sacramento Valley floor to the west. The southern half of the Sierra extends westward from the Nevada state line and the western edge of the Bureau of Land Management's California Desert Conservation Area to the San Joaquin Valley floor. The historic Mother Lode region of 19th century Gold Rush fame is in the Sierra bioregion.

Scattered throughout the mountains are small cities such as Truckee, Placerville, Quincy, Auburn, South Lake Tahoe, and Bishop. The Sierra Nevada Ecosystem Project fixed the Sierra population at 650,000, which is consistent with 1990 census figures.

Major routes for vehicular traffic are Interstate 80, U.S. Highways 50 and 395, and state highways 4, 49, 70, 88, 89, 108, 120, and 178. Some mountain roads at higher elevations are closed in winter because of snow, and highways frequently require chains or snow tires for travel.

Industries

High tech has emerged as a significant industry in the Sierra, introducing satellite, on-line, and computer software companies and stimulating entrepreneurial small businesses. This growing segment of the economy joins staples such as hydropower, tourism and recreation. Other industries include logging, cattle ranching, and in the northern Sierra foothills, apple orchards and wineries.

Climate and Geography

The climate varies with the elevation, offering cold snowy winters and cool summers at higher elevations and rainy winters and mild summers in the foothills. Summers are dry. Snowy winters in the northern Sierra are crucial to the water supply in the state, which depends heavily upon spring snowmelt to feed the reservoirs of the State Water Project and a portion of the federal Central Valley Project. The projects supply about two-thirds of water for drinking, irrigation, and industrial use in the state. Snowfall also is welcomed by the ski industry and a myriad of other businesses that serve and supply skiers. Mild dry mountain summers accommodate outdoor sports and activities, but when high pressure areas push temperatures upward and gusty winds blow, California is vulnerable to wildfires that consume thousands of acres of brush and timber every year.

National forests of the Sierra bioregion are the Plumas, Tahoe, Sierra, Eldorado, Stanislaus, Sequoia, Inyo, and Toiyabe. Major rivers include the American, Feather, Yuba, Cosumnes, Tuolumne, Merced, San Joaquin, Kern, Owens, Kings, Carson, Truckee, Walker, and Stanislaus. Mono Lake east of Yosemite is famous for its peculiar tufa formations rising from the lake bed.

Plants and Wildlife

The Sierra bioregion is rich in biodiversity, containing over half the plant species found in California and more than 400 of the state's terrestrial wildlife species, or about two-thirds of the birds and mammals and half the reptiles and amphibians. The variety of habitat types include annual grassland, blue oak savannah, chaparral, ponderosa pine, black oak woodland, mixed conifer, red fir, riparian, alpine meadow, Jeffrey pine, sagebrush, and bitter brush.

Animals that inhabit the Sierra bioregion include lodgepole chipmunk, mountain beaver, California mountain king snake, black bear, wolverine, California big horn sheep, Pacific fisher, mule deer, and mountain lion. The California Golden Trout – the state fish – is native to the Southern Sierra. Birds include the northern goshawk, mountain chickadee, pine grosbeak, California spotted owl, mountain quail, willow flycatcher, bald eagle, and great grey owl.

San Joaquin Valley Bioregion

The San Joaquin Valley bioregion in the heart of California is the state's top agricultural producing region (CERES, 2011f). The bioregion is bordered on the west by the coastal mountain ranges. Its eastern boundary joins the southern two-thirds of the Sierra bioregion, which features Yosemite, Kings Canyon, and Sequoia National Parks.

Location, Cities, People

Eight counties comprise the San Joaquin Valley bioregion, including all of Kings County, most of Fresno, Kern, Merced, and Stanislaus counties, and portions of Madera, San Luis Obispo, and Tulare counties. This growing bioregion, the third most populous out of ten, has an estimated 2 million people, according to 1990 census data. The largest cities are Fresno, Bakersfield, Modesto, and Stockton. Some of poorest cities in the state are in Fresno, Kern, and Tulare counties. At its northern end, the San Joaquin Valley bioregion borders the southern end of the Sacramento Valley bioregion. To the west, south, and east, the bioregion extends to the edges of the valley floor. Native people of the bioregion include the Mono and Yokut Indians. Native lands include the Tule River Indian Reservation in Tulare County, Cold Springs Rancheria, and Table Mountain and Big Sandy Reservations in Fresno County, and Santa Rosa Rancheria in Kings County.

Interstate 5 and State Highway 99 are the major north-south roads that run the entire length of the bioregion. Other main routes include State Highways 33, 41, 43, 65, 132, 140, 178, 180, and 198.

Industries

The San Joaquin Valley is the leading agricultural producing bioregion in the state, and five of its counties – Fresno, Kern, Tulare, Merced, and Stanislaus – rank among the top ten counties in farm production value. Oil and gas also are important industries in the San Joaquin bioregion. The deepest wells and about half of the largest oil fields are found in Kern County, as is the Elkhorn Hills Naval Petroleum Reserve. Lemoore Naval Air Station west of Visalia also is in this bioregion.

Climate and Geography

Well-suited for farming, the bioregion is hot and dry in summer with long, sunny days. Winters are moist and often blanketed with heavy fog. The broad, flat valley is ringed by the Diablo and Coast Ranges on the west and the Sierra Nevada foothills on the east. Habitat includes vernal pools, valley sink scrub and saltbush, freshwater marsh, grasslands, arid plains, orchards, and oak savannah. The growth of agriculture in the Central Valley has converted much of the historic native grassland, woodland, and wetland to farmland.

The major river is the San Joaquin, with tributaries of the lower Stanislaus, Tuolumne, Merced, and Fresno rivers. The California Aqueduct extends the entire length of the bioregion. The southern portion of the bioregion includes the Kings, Kaweah, and Kern rivers, which drain into closed interior basins. No significant rivers or creeks drain into the valley from the Coast Range.

Plants and Wildlife

Historically, millions of acres of wetlands flourished in the bioregion, but stream diversions for irrigation dried all but about 5 percent. Precious remnants of this vanishing habitat are protected in the San Joaquin Valley bioregion in publicly owned parks, reserves, and wildlife areas. Seasonal wetlands are found at the Kern National Wildlife Refuge west of Delano, owned by the U.S. Fish and Wildlife Service. It attracts a variety of ducks, shorebirds, and song birds, as well as peregrine falcons.

The Tule Elk State Reserve west of Bakersfield, owned by the state Department of Parks and Recreation, features the habitat of the tule elk, which is natural grassland with ponds and marshes. The reserve sustains four endangered species: the San Joaquin kit fox, blunt-nosed leopard lizard, San Joaquin antelope squirrel, and Tipton kangaroo rat; the threatened plant Hoover's woolystar; and other rare species, such as western pond turtles, tricolored blackbird, and northern harrier. Endangered species of the bioregion also include the California tiger salamander, Swainson's hawk, and giant and Fresno kangaroo rat. Other rare species include the western yellow-billed cuckoo and valley elderberry longhorn beetle.

About one-fifth of the state's remaining cottonwood and willow riparian forests are found along the Kern River in the South Fork Wildlife Area. Great blue herons, beavers, coyotes, black bears, mountain lions, red-shouldered hawks, and mule deer can be seen in the wildlife area. Other wildlife viewing sites are Millerton Lake State Recreation Area west of Madera, Little Panoche Wildlife Area near Los Banos, and the Valley Grasslands of Merced County, which attract 500,000 to 1 million birds each winter to privately owned lands and lands owned by the CDFW and Parks and Recreation and the U.S. Fish and Wildlife Service. The San Luis Dam and Reservoir area, jointly operated by the state Department of Water Resources and U.S. Bureau of Reclamation, draws wintering bald eagles, abundant ducks, gopher snakes, San Joaquin kit foxes, and black-tailed deer.

Rare plants in the bioregion include Mason's lilaeopsis, San Joaquin woollythreads, and California hibiscus.

Central Coast Bioregion

The Central Coast bioregion features coastal scenery, with a mild, seasonally moist, and sometimes foggy climate that favors rich farmland and vineyards (CERES, 1996). This highly agricultural region is famous for artichokes, garlic, and an array of fruits and vegetables. Other industries include wine-making, dairy, and cattle ranching. The coast supports a brisk fishing industry, and oil production along the southern end of the bioregion.

Industries

The bioregion extends some 300 miles from just north of Santa Cruz to just south of Santa Barbara, and inland to the floor of the San Joaquin Valley. It encompasses the counties of Santa Cruz, Monterey, San Benito, Santa Barbara, and portions of Los Angeles, San Luis Obispo, Fresno, Merced, Stanislaus, and Ventura. The region includes military installations Fort Ord, Camp Roberts, and Vandenburg Air Force Base. The geography offers coastal mountain ranges including the Santa Lucia and Santa Ynez, and coastal sand dunes. Vegetation includes chaparral, mixed hardwood and redwood forests in the bioregion's northern coastal area, and oak woodlands. The Los Padres National Forest covers much of the southern portion of the bioregion. The Salinas and Cuyama rivers feed the bioregion's two major watersheds.

Mojave Desert Bioregion

The Mojave bioregion is one of the largest bioregions in the state, and a desert showcase (CERES, 2011g). The eastern boundary is contiguous with the borders of Nevada and Arizona. To the north and west, the Mojave borders the Sierra bioregion, and to the south, it is bounded by the South Coast and Colorado Desert bioregions.

Location, Cities, People

Seven counties make up the Mojave bioregion: nearly all of San Bernardino, most of Inyo, the southeastern tips of Mono and Tulare, the eastern end of Kern, northeastern desert area of Los Angeles, and a piece of northern-central Riverside County. The largest cities are Palmdale – one of the fastest-growing communities in the state – Victorville, Hesperia, Ridgecrest, and Barstow. The Mojave bioregion, historically a sparsely populated expanse of desert, had nearly 612,000 people as of the 1990 census, but is growing rapidly, as urban congestion and housing costs push people farther into the open areas.

Native Americans lands in the Mojave bioregion include the Chemehuevi Indian Reservation on the Colorado River, Twentynine Palms Indian Reservation, Fort Mojave Indian Reservation, and Fort Mojave Trust Lands, which both straddle the California-Nevada border.

Industries

The Mojave bioregion is the home of three national parks under the National Park Service: Death Valley, East Mojave, and Joshua Tree. The state Department of Parks and Recreation manages the Providence Mountains State Recreational Area near Goffs in eastern San Bernardino County, and the U.S. Fish and Wildlife Service operates Havasu National Wildlife Refuge on the Colorado River near Lake Havasu.

Military installations include Edwards Air Force Base in Kern, Los Angeles, and San Bernardino counties; Twentynine Palms Marine Corps Air Ground Combat Center, Fort Irwin Military Reservation, Inyokern Naval Ordnance Test Station, and China Lake U.S. Naval Ordnance Test Station in San Bernardino, Inyo, and the eastern end of Kern counties. Much of the desert is under the U.S. Bureau of Land Management, which manages the Desert Tortoise Natural Area northeast of Palmdale, and Harper Lake near Barstow. The Bureau of Land Management has created a multi-agency, multi-species plan for the desert that designates certain areas for habitat, multiple uses, and development. It is designed to conserve habitat, foster economic development, and streamline the permitting process for development.

Major highways in the bioregion are Interstates 15, 40, U.S. Highway 395, and State Highways 18, 58, 62, and 127, and 247.

Mining, including lucrative gold mining, is a major industry in the Mojave bioregion. Off-road vehicle riding is a popular sport in the desert, which offers many trails across the plains and through the scrub. Ranching and livestock grazing are significant economic interests in this bioregion.

Climate and Geography

The Mojave bioregion is the western extension of a vast desert that covers Southern Nevada, the southwestern tip of Utah, and 25 million acres of Southern California, which is one quarter of the state. The climate is hot and dry in summer. Winters are cool to cold, depending on the elevation, with occasional rainstorms that can quickly turn a gulch or dry lake into a flash flood zone.

The landscape is mostly moderately high plateau with elevations averaging 2,000 to 3,000 feet and isolated peaks that exceed 6,000 and 7,000 feet. Though appearing barren and remote, the desert teems with biodiversity, and more than 90 percent is within three miles of a paved road or off-road vehicle track.

Palm oases provide water for wildlife, as do many streams and springs. In prehistoric times, the bioregion contained great desert lakes, which have long since evaporated and seeped underground. This bioregion has the lowest elevation in North America, 282 feet below sea level in Death Valley National Park. The Mojave, Amargosa, and Colorado Rivers are the largest rivers in this mostly arid bioregion.

Plants and Wildlife

Common habitats of the Mojave bioregion are: desert wash, Mojave creosote bush, scattered desert saltbush, Joshua tree scrub, alkali scrub, palm oasis, juniper-pinyon woodland, and some hardwood and conifer forests at higher elevations. Cottonwood willow riparian forest is rare habitat in this bioregion, as is alkali marsh and open sandy dunes.

Rare animals include the Mohave ground squirrel, prairie falcon, Le Conte's thrasher, Nelson's bighorn sheep, gray vireo, desert tortoise, pale big-eared bat, Amargosa vole, and Mohave tui chub, an olive-brown and silver fish, and the cottontail marsh pupfish, found only in Death Valley National Park. Parks and recreation areas that provide water are the home of snowy plovers, least sandpipers, killdeer, white pelicans, teal, and thousands of migratory wading shore birds, as well as eagles, harriers, falcons, owls, coyotes, badgers, great blue herons, least Bell's vireos, red-tailed hawks, and Canada geese.

Rare plants include white bear poppy, Barstow woolly sunflower, alkali mariposa lily, Red Rock poppy, Mojave monkeyflower, and Stephen's beardtongue.

Colorado Desert Bioregion

The Colorado Desert bioregion in the southeastern corner of California extends from the Mexican border north to San Bernardino County and the southern edge of the Joshua Tree National Park, east to the Colorado River and Arizona, and west into Riverside and San Diego counties (CERES, 2011h). This agriculturally rich bioregion is semi-arid, but heavily irrigated.

Location, Cities, People

With a population of about 375,000, according to 1990 census figures, the Colorado Desert is the second least populous of the ten bioregions. Only the Modoc bioregion has fewer people. The bioregion encompasses all of Imperial County, the southeastern portion of Riverside County, the eastern end of San Bernardino County, and the eastern portion of San Diego County. Its most prominent cities are Palm Springs, Rancho Mirage, El Centro, and the smaller, but landmark communities of Blythe, Coachella, and Calexico. The bioregion is home to the Fort Yuma Indian Reservation in Imperial County and Arizona, the Colorado River Indian Reservation in Riverside County, and the Campo and Manzanita Indian Reservations in San Diego County. Imperial County has the state's lowest median family income.

Major highways are Interstate 10 in Riverside County, Interstate 8 in Imperial and San Diego counties, and State Highways 111 and 115 in Imperial County.

Industries

Picacho State Recreation Area on the Arizona border, operated by the state Department of Parks and Recreation, offers boat rides on the Colorado River from which can be seen migratory cormorants, mergansers, white pelicans, and wintering bald eagles. Trails into the rugged backcountry lead to the habitat of desert bighorn sheep, feral burros, golden eagles, and nesting prairie falcons.

The Salton Sea National Wildlife Refuge features open water, salt marshes, freshwater ponds, and desert scrub which attract nearly 400 bird species, including great roadrunners, Gambel's quail, Albert's towhees, endangered Yuma clapper rails, egrets, plovers, northern pintails, Canada geese, snow geese, rough-legged hawks, peregrine falcon, terns, yellow-headed blackbirds, hooded orioles, and white-faced ibises. The refuge is operated by the CDFW and Parks and Recreation, and the U.S. Fish and Wildlife Service.

Dos Palmas Preserve, near Indio, owned by the U.S. Bureau of Land Management, offers a lush desert oasis with a restored wetlands that accommodates endangered desert pupfish. The preserve attracts an array of wildlife, such as hooded orioles, warblers, snowy egrets, ospreys, American avocets, and horned lizards. The western fringe of the Imperial National Wildlife Refuge, located mostly in Arizona, is also in this bioregion.

Imperial County is one of the top-ranking agricultural counties in the state, a product from which is cotton. Military installations include the Chocolate Mountains Naval Aerial Gunnery Range and the Naval Desert Test Range.

Climate and Geography

The Colorado Desert is the western extension of the Sonoran Desert that covers southern Arizona and northwestern Mexico. It is a desert of much lower elevation than the Mojave Desert to the north, and much of the land lies below 1,000 feet elevation. Mountain peaks rarely exceed 3,000 feet. Common habitat includes sandy desert, scrub, palm oasis, and desert wash. Summers are hot and dry, and winters are cool and moist.

The Colorado River flows along the entire eastern boundary of the Colorado Desert bioregion on its way to Yuma, Ariz., where the two states and Mexico come together. The only other river of significant size in this bioregion is the polluted New River, which flows from Mexico into the Salton Sea, the region's largest body of water, on the border of Imperial and Riverside counties. The Salton Sea was created in 1905 when the Colorado River broke through an irrigation project and flooded a saline lake bed, creating an inland sea, which now lies about 235 feet below sea level and is some 35 miles long and 15 miles wide.

Anza Borrego Desert State Park located mostly in eastern San Diego County, but jutting into Imperial County, is the bioregion's largest recreation area, covering 600,000 acres. It offers more than 225 bird species and dozens of mammals, amphibians, and reptiles. Bighorn sheep can be seen there, as well as thrashers and owls.

Plants and Wildlife

Other species in the Colorado Desert are Yuma antelope ground squirrels, white-winged doves, muskrats, southern mule deer, coyotes, bobcats, and raccoons. Rare animals include desert pupfish, flat-tailed horned lizard, prairie falcon, Andrew's dune scarab beetle, Coachella Valley fringe-toed lizard, Le Conte's thrasher, black-tailed gnatcatcher, and California leaf-nosed bat. Rare plants include Orcutt's woody aster, Orocopia sage, foxtail cactus, Coachella Valley milk vetch, and crown of thorns.

South Coast Bioregion

The South Coast bioregion is an area of starkly contrasting landscapes ranging from rugged coastal mountains, world-famous beaches, rustic canyons, rolling hills, and densely populated cities (CERES, 2011i). The bioregion extends from the southern half of Ventura County to the Mexican Border and east to the edge of the Mojave Desert. Two of California's largest metropolitan areas, Los Angeles and San Diego, are in this bioregion.

Location, Cities, People

Bounded on the north by the southern end of the Los Padres National Forest, the bioregion extends some 200 miles south to Mexico, east to the Mojave Desert and west to the Pacific Ocean. The bioregion encompasses all or part of six counties: the coastal half of Ventura County, all of Orange County, most of Los Angeles County, the southwestern edge of San Bernardino County, the western end of Riverside County, and the western two-thirds of San Diego County. Major cities include Los Angeles, San Diego, Long Beach, Santa Ana, Anaheim, Riverside, and San Bernardino. The South Coast, home to two of the state's largest cities, is the most populous bioregion with more than 16.1 million people, according to 1990 census figures.

Metropolitan Los Angeles, a major transportation hub, is criss-crossed by a network of freeways that have names as well as numbers. For example, Interstate 5, the main north-south highway in the state, is known in different segments as the Golden State Freeway, the Santa Ana Freeway, and the San Diego Freeway. Other major routes are Interstates, 8, 10, 15, 110, 210, 405, 605, and 805, U.S. 101, and State Highways 1 (the Pacific Coast Highway), 57, 60, 74, 76, 78, 91, 118, and 126.

As in much of California, the people of the South Coast bioregion reflect the state's cultural history. The Native American population includes many bands of Mission Indians, and the Spanish and Mexican heritage is evident in architecture, geographic names, and a large Spanish-speaking population. Rapid growth, employment opportunity, and a mild, mostly dry climate has attracted immigrants from all over the world, particularly in metropolitan Los Angeles.

Industries

Major industries include oil, agriculture, fishing, shipping, movies and television, banking and finance, computers, and aerospace, which has declined with the ending of the Cold War. Military installations include Camp Pendleton Marine Corps Base, El Toro Marine Corps Air Station, March Air Force Base, Miramar Naval Air Station, North Island Naval Air Station, and Point Mugu Naval Pacific Missile Test Center.

Climate and Geography

The year-round mild climate and varied geographical features of the South Coast contribute to its great popularity. Hot dry summers with predictable wildfires are followed by wet winters with storms that can trigger mudslides on fire-denuded slopes. Smog remains a serious problem in the South Coast bioregion, particularly the Los Angeles basin, but air quality regulations have helped to control it.

The South Coast bioregion is a study in contrasts, ocean and desert, flatlands and mountains, including 11,500-foot San Gorgonio Peak in Riverside County. Major rivers and their watersheds are: the Santa Clara, Los Angeles, Santa Ana, San Gabriel, San Luis Rey, San Jacinto, Santa Margarita, and San Diego.

Publicly owned or managed lands include four national forests: the Angeles, Los Padres, Cleveland, and San Bernardino; numerous parks, state beaches, historic parks; and federal wilderness, recreation and wildlife areas, including Malibu Creek and Point Mugu State Parks, Bolsa Chica Ecological Reserve, Torrey Pines State Reserve, and Sweetwater and Tijuana National Wildlife Refuges. In San Diego, Orange and Riverside counties, the state's NCCP pilot program involving local, state, and federal partners is helping to protect the coastal sage scrub habitat of the threatened California gnatcatcher. In the Santa Monica Mountains, the National Park Service, Santa Monica Mountains Conservancy, and state Department of Parks and Recreation are helping to preserve spectacular habitat. In Ventura County, endangered California condors are protected at the Sespe Condor Sanctuary.

Plants and Wildlife

Tremendous urbanization in the South Coast bioregion has brought about the most intense effects on natural resources of any bioregion, resulting in alteration and destruction of habitat and proliferation of exotic or non-native species. In fact, the popular palm tree is not native to the Golden State. Habitat varies widely, from chaparral, juniper-pinyon woodland, and grasslands at lower elevations to mixed hardwood forest, southern oak, southern Jeffrey pine and southern yellow pine at higher levels. Along the coast, where real estate is especially prized, salt marshes and lagoons no longer are common habitat. However, efforts are underway from Ventura County to the Mexican border to preserve and restore coastal wetlands.

The bioregion is home to mountain lions, coyotes, badgers, grey foxes, kit foxes, black bears, raccoons, mule deer, hawks, herons, golden eagles, ospreys, peregrine falcons, desert iguanas, dolphins, whales, endangered brown pelicans, and California sea lions. Rare animals include the Stephen's kangaroo rat, monarch butterfly, San Diego horned lizard, Peninsula desert bighorn sheep, orange-throated whiptail, California least tern, Belding's savannah sparrow, least Bell's vireo, Santa Ana sucker, arroyo southwestern toad and Tehachapi pocket mouse.

Rare plants include San Diego barrel cactus, Conejo buckwheat, Plummer's mariposa lily, mountain springs bush lupine, Otay tarplant, Laguna Mountains jewelflower, San Jacinto prickly phlox, and Mt. Gleason Indian paintbrush.

7.2 California Ecosystems

The U.S. EPA has developed an ecoregion classification system derived and refined from Omernik (1987). The ecoregions are based on the premise that ecological regions can be identified through the analysis of the patterns and the composition of biotic and abiotic phenomena that affect or reflect differences in ecosystem quality and integrity.[68] Biotic and abiotic phenomena include geology, physiography, vegetation, climate, soils, land use, wildlife, and hydrology. There are four different levels of ecoregions, with level I being the coarsest and level IV being the most detailed. In California, there are twelve level III ecoregions (Figure 15). The twelve level III ecoregions of California are described below.[69]

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[68] http://www.epa.gov/wed/pages/ecoregions.htm (accessed 1/30/2014)

[69] Level III ecoregion descriptions verbatim from Word document located at http://www.epa.gov/wed/pages/ecoregions/na_eco.htm#Downloads (accessed 1/30/2014).

Sources: ESRI Data & Maps 10, Tele Atlas, USEPA

Figure 15: Level III Ecoregions of California (U.S. EPA, 2013a)

Coast Range

The low mountains of the Coast Range of western Washington, western Oregon, and northwestern California are covered by highly productive, rain-drenched coniferous forests. Sitka spruce forests originally dominated the fog-shrouded coast, while a mosaic of western red cedar, western hemlock, and seral Douglas-fir blanketed inland areas. Today, Douglas-fir plantations are prevalent on the intensively logged and managed landscape. In California, redwood forests are a dominant component in much of the region. In Oregon and Washington, soils are typically Inceptisols and Andisols, while Alfisols are common in the California portion. Landslides and debris slides are common, and lithology influences land management strategies. In Oregon and Washington, slopes underlain by sedimentary rock are more susceptible to failure following clear-cutting and road building than those underlain by volcanic rocks. Coastal headlands, high and low marine terraces, sand dunes, and beaches also characterize the region.

Cascades

This mountainous ecoregion stretches from the central portion of western Washington, through the spine of Oregon, and includes a disjunct area in northern California. It is underlain by Cenozoic volcanics and much of the region has been affected by alpine glaciation. In Oregon and Washington, the western Cascades are older, lower, and dissected by numerous, steep-sided stream valleys. A high plateau occurs to the east, with both active and dormant volcanoes. Some peaks reach over 14,000 feet. Soils are mostly of cryic and frigid temperature regimes, with some mesic soils at low elevations and in the south. Andisols and Inceptisols are common. The Cascades have a moist, temperate climate that supports an extensive and highly productive coniferous forest that is intensively managed for logging. At lower elevations in the north, Douglas-fir, western hemlock, western red cedar, big leaf maple, and red alder are typical. At higher elevations, Pacific silver fir, mountain hemlock, subalpine fir, noble fir, and lodgepole pine occur. In southern Oregon and California, more incense cedar, white fir, and Shasta red fir occur along with other Sierran species. Subalpine meadows and rocky alpine zones occur at highest elevations.

Sierra Nevada

The Sierra Nevada is a mountainous, deeply dissected, and westerly tilting fault block. The central and southern part of the region is largely composed of granitic rocks that are lithologically distinct from the mixed geology of the Klamath Mountains (78) and the volcanic rocks of the Cascades (4). In the northern Sierra Nevada, however, the lithology has some similarities to the Klamath Mountains. A high fault scarp divides the Sierra Nevada from the Northern Basin and Range (80) and Central Basin and Range (13) to the east. Near this eastern fault scarp, the Sierra Nevada reaches its highest elevations. Here, moraines, cirques, and small lakes are common and are products of Pleistocene alpine glaciation. Large areas are above timberline, including Mt. Whitney in California, the highest point in the conterminous United States at nearly 14,500 feet. The Sierra Nevada casts a rain shadow over Ecoregions 13 and 80 to the east. The ecoregion slopes more gently toward the Central California Valley (7) to the west. The vegetation grades from mostly ponderosa pine and Douglas-fir at the lower elevations on the west side, pines and Sierra juniper on the east side, to fir and other conifers at the higher elevations. Alpine conditions exist at the highest elevations. Large areas are publicly-owned federal land, including several national parks.

Central California Foothills and Coastal Mountains

The primary distinguishing characteristic of this ecoregion is its Mediterranean climate of hot dry summers and cool moist winters, and associated vegetative cover comprising mainly chaparral and oak woodlands; grasslands occur in some lower elevations and patches of pine are found at higher elevations. Surrounding the lower and flatter Central California Valley (7), most of the region consists of open low mountains or foothills, but there are some areas of irregular plains and some narrow valleys. Large areas are in ranch lands and grazed by domestic livestock. Relatively little land has been cultivated, although some valleys are major agricultural centers such as the Salinas or the wine vineyard center of Napa and Sonoma.

Central California Valley

Flat, intensively farmed plains with long, hot dry summers and mild winters distinguish the Central California Valley from its neighboring ecoregions that are either hilly or mountainous, forest or shrub covered, and generally nonagricultural. It includes the flat valley basins of deep sediments adjacent to the Sacramento and San Joaquin rivers, as well as the fans and terraces around the edge of the valley. The two major rivers flow from opposite ends of the Central Valley, flowing into the Delta and into San Pablo Bay. It once contained extensive prairies, oak savannas, desert grasslands in the south, riparian woodlands, freshwater marshes, and vernal pools. More than half of the region is now in cropland, about three fourths of which is irrigated. Environmental concerns in the region include salinity due to evaporation of irrigation water, groundwater contamination from heavy use of agricultural chemicals, wildlife habitat loss, and urban sprawl.

Southern California Mountains

Similar to other ecoregions in central and southern California, the Southern California Mountains have a Mediterranean climate of hot dry summers and moist cool winters. Although Mediterranean types of vegetation such as chaparral and oak woodlands predominate in this region, the elevations are considerably higher, the summers are slightly cooler, and precipitation amounts are greater than in adjacent ecoregions, resulting in denser vegetation and some large areas of coniferous woodlands. In parts of the Transverse Range, a general slope effect causes distinct ecological differences. The south-facing slopes typically have higher precipitation (30-40 inches) compared to many of the north slopes of the range (15-20 inches), but high evaporation rates on the south contribute to a cover of chaparral. On the north side of parts of the ecoregion, lower evaporation, lower annual temperatures, and slower snow melt allows for a coniferous forest that blends into desert montane habitats as it approaches the Mojave Desert ecoregion boundary. Woodland species such as Jeffrey, Coulter, and Ponderosa pines occur, along with sugar pine, white fir, bigcone Douglas-fir, and, at highest elevations, some lodgepole and limber pines. Severe erosion problems are common where the vegetation cover has been destroyed by fire or overgrazing. Large portions of the region are National Forest public land.

Eastern Cascade Slopes and Foothills

The Eastern Cascade Slopes and Foothills ecoregion is in the rainshadow of the Cascade Range (4). It has a more continental climate than ecoregions to the west, with greater temperature extremes and less precipitation. Open forests of ponderosa pine and some lodgepole pine distinguish this region from the higher ecoregions to the west where hemlock and fir forests are common, and the lower, drier ecoregions to the east where shrubs and grasslands are predominant. The vegetation is adapted to the prevailing dry, continental climate and frequent fire. Historically, creeping ground fires consumed accumulated fuel and devastating crown fires were less common in dry forests. Volcanic cones and buttes are common in much of the region. A few areas of cropland and pastureland occur in the lake basins or larger river valleys.

Central Basin and Range

The Central Basin and Range ecoregion is composed of northerly trending, fault-block ranges and intervening, drier basins. In the higher mountains, woodland, mountain brush, and scattered open forest are found. Lower elevation basins, slopes, and alluvial fans are either shrub- and grass-covered, shrub-covered, or barren. The potential natural vegetation, in order of decreasing elevation and ruggedness, is scattered western spruce-fir forest, juniper woodland, Great Basin sagebrush, and saltbush-greasewood. The Central Basin and Range is internally-drained by ephemeral streams and once contained ancient Lake Lahontan. In general, Ecoregion 13 is warmer and drier than the Northern Basin and Range (80) and has more shrubland and less grassland than the Snake River Plain (12). Soils grade upslope from mesic Aridisols to frigid Mollisols. The land is primarily used for grazing. In addition, some irrigated cropland is found in valleys near mountain water sources. The region is not as hot as the Mojave Basin and Range (14) and Sonoran Basin and Range (81) ecoregions and it has a greater percent of land that is grazed.

Mojave Basin and Range

Stretching across southeastern California, southern Nevada, southwest Utah, and northwest Arizona, Ecoregion 14 is composed of broad basins and scattered mountains that are generally lower, warmer, and drier than those of the Central Basin and Range (13). Its creosotebush-dominated shrub community is distinct from the saltbush–greasewood and sagebrush–grass associations that occur to the north in the Central Basin and Range (13) and Northern Basin and Range (80); it is also differs from the palo verde–cactus shrub and saguaro cactus that occur in the Sonoran Basin and Range (81) to the south. In the Mojave, creosotebush, white bursage, Joshua-tree and other yuccas, and blackbrush are typical. On alkali flats, saltbush, saltgrass, alkali sacaton, and iodinebush are found. On mountains, sagebrush, juniper, and singleleaf pinyon occur. At high elevations, some ponderosa pine, white fir, limber pine, and bristlecone pine can be found. The basin soils are mostly Entisols and Aridisols that typically have a thermic temperature regime; they are warmer than those of Ecoregion 13 to the north. Heavy use of off-road vehicles and motorcycles in some areas has made the soils susceptible to wind and water erosion. Most of Ecoregion 14 is federally owned and grazing is constrained by the lack of water and forage for livestock.

Klamath Mountains and California High North Coast Range

This physically and biologically diverse ecoregion covers the highly dissected ridges, foothills, and valleys of the Klamath and Siskiyou mountains. It also extends south in California to include the mixed conifer and montane hardwood forests that occur on mostly mesic soils in the North Coast Range mountains. The region's mix of granitic, sedimentary, metamorphic, and extrusive rocks contrasts with the predominantly volcanic rocks of the Cascades (4) to the east. It was unglaciated during the Pleistocene epoch, when it served as a refuge for northern plant species. The regions diverse flora, a mosaic of both northern Californian and Pacific Northwestern conifers and hardwoods, is rich in endemic and relic species. The mild, subhumid climate of the Klamath Mountains is characterized by a lengthy summer drought.

Northern Basin and Range

The Northern Basin and Range consists of dissected lava plains, rocky uplands, valleys, alluvial fans, and scattered mountain ranges. Overall, it is cooler and has more available moisture than the Central Basin and Range (13) to the south. Ecoregion 80 is higher and cooler than the Snake River Plain (12) to the northeast in Idaho. Valleys support sagebrush steppe or saltbush vegetation. Cool season grasses, such as Idaho fescue and bluebunch wheatgrass are more common than in Ecoregion 13 to the south. Mollisols are also more common than in the hotter and drier basins of the Central Basin and Range (13) where Aridisols support sagebrush, shadscale, and greasewood. Juniper woodlands occur on rugged, stony uplands. Ranges are covered by mountain brush and grasses (e.g. Idaho fescue) at lower and mid-elevations; at higher elevations aspen groves or forest dominated by subalpine fir can be found. Most of Ecoregion 80 is used as rangeland. The western part of the ecoregion is internally drained; its eastern stream network drains to the Snake River system.

Sonoran Basin and Range

Similar in topography to the Mojave Basin and Range (14) to the north, this ecoregion contains scattered low mountains and has large tracts of federally owned lands, a large portion of which are used for military training. However, the Sonoran Basin and Range is slightly hotter than the Mojave and contains large areas of palo verde-cactus shrub and giant saguaro cactus, whereas the potential natural vegetation in the Mojave is largely creosote bush. Other typical Sonoran plants include white bursage, ocotillo, brittlebush, creosote bush, catclaw acacia, cholla, desert saltbush, pricklypear, ironwood, and mesquite. Winter rainfall decreases from west to east, while summer rainfall decreases from east to west. Aridisols and Entisols are dominant with hyperthermic soil temperatures and extremely aridic soil moisture regimes.

7.3 General Hydrology

Using data from California EcoAtlas[70], State Water Board staff estimate that there are almost 4 million acres of wetlands and other waters throughout California. Table 7-1shows the area of waters by type and region.

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[70] California EcoAtlas is an interactive web based mapping tool that provides access to information for wetland management. http://www.ecoatlas.org/

Table 7-1: Area of Wetlands and other waters (in acres) by Water Board Region

Habitat Type	Central Coast	Central Valley	Colorado River	Lahontan	Los Angeles	North Coast	San Diego	San Francisco Bay	Santa Ana	Total
Beach, Dune, and Rocky Shore	8,849	58	0	0	2,661	8,813	2,589	3,250	871	27,092
Fluvial Channel	0	32,068	0	223	0	515	0	3,028	0	35,835
Lake, Reservoir and associated vegetation	24,102	588,500	273,175	673,525	13,334	67,655	12,332	16,494	12,153	1,681,269
Managed and Muted Tidal Habitats	311	0	0	0	9	0	926	0	29	1,275
Playa	0	6	92,510	41,802	0	0	0	6,986	0	141,304
Estuarine Pond (many of these are managed, but not all)	0	0	0	0	0	0	0	24,768	0	24,768

Table 7-1: Area of Wetlands and other waters (in acres) by Water Board Region

Habitat Type	Central Coast	Central Valley	Colorado River	Lahontan	Los Angeles	North Coast	San Diego	San Francisco Bay	Santa Ana	Total
Pond and associated vegetation	64,666	767,241	34,679	320,710	23,318	157,279	36,551	69,234	7,542	1,481,219
Slope and Seep Wetlands	0	111	0	2,251	0	1,544	0	5,691	0	9,597
Subtidal Water	1,918	446	0	0	5,580	13,399	14,055	257,643	2,118	295,158
Tidal Channel	0	36,291	0	0	0	0	0	825	0	37,116
Tidal Flat and Marsh Panne	1,697	14	0	0	527	8,114	1,181	38,476	233	50,243
Tidal Marsh	3,467	64	0	0	1,529	6,641	1,830	43,764	1,052	58,347
Vernal Pool		41,410	0	0	0	2,629	0	5,090	0	49,129
Total	105,010	1,466,209	400,364	1,038,511	46,957	266,589	69,465	475,249	23,998	3,892,353

Source: California EcoAtlas; data based on landscape profiles (at the HUC-8 level) in California.

Most of California is within one hydrological region as defined by the United States Geological Survey (USGS), but that region is further divided into the major bioregions described in section 7.1, with 153 hydrological cataloging units (moderate-sized watersheds; Planert and Williams, 1995).[71]

Since the ultimate determinants of the availability of surface and groundwater resource within the individual Regional Water Boards is the climatic pattern, this section provides a brief overview of the key hydrological elements for California.

Precipitation

Much of the climatic variation in the state results from the patterns of global weather systems, oceanic influences, and the location and orientation of the mountains. As shown in Figure 16, northern California is much wetter than southern California, with more than 70% of the average annual precipitation and runoff occurring in the northern part of the state (California Department of Water Resources (DWR), 2003).

On average, about 75% of the annual precipitation in the state falls between November and March, with about 50% occurring between December and February. However, amounts of precipitation vary greatly from year to year, which can often make the services of surface water supplies undependable. The extreme northern part of California has slightly wetter summers than the rest of the state. Fog also occurs frequently on the coast and provides some additional moisture that is used primarily by vegetation.

Currently, California is in an extended dry period. Since 2007, there have been seven dry years, with record warm temperatures reducing normal snowpack levels. 2014 was the warmest year in 121 years recorded for California. Drought conditions were reached in 2012 and, although 2016 has been a wet year, the four-year drought still persists.

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[71] Further data and descriptions of the individual watersheds are available online from USGS (2011).

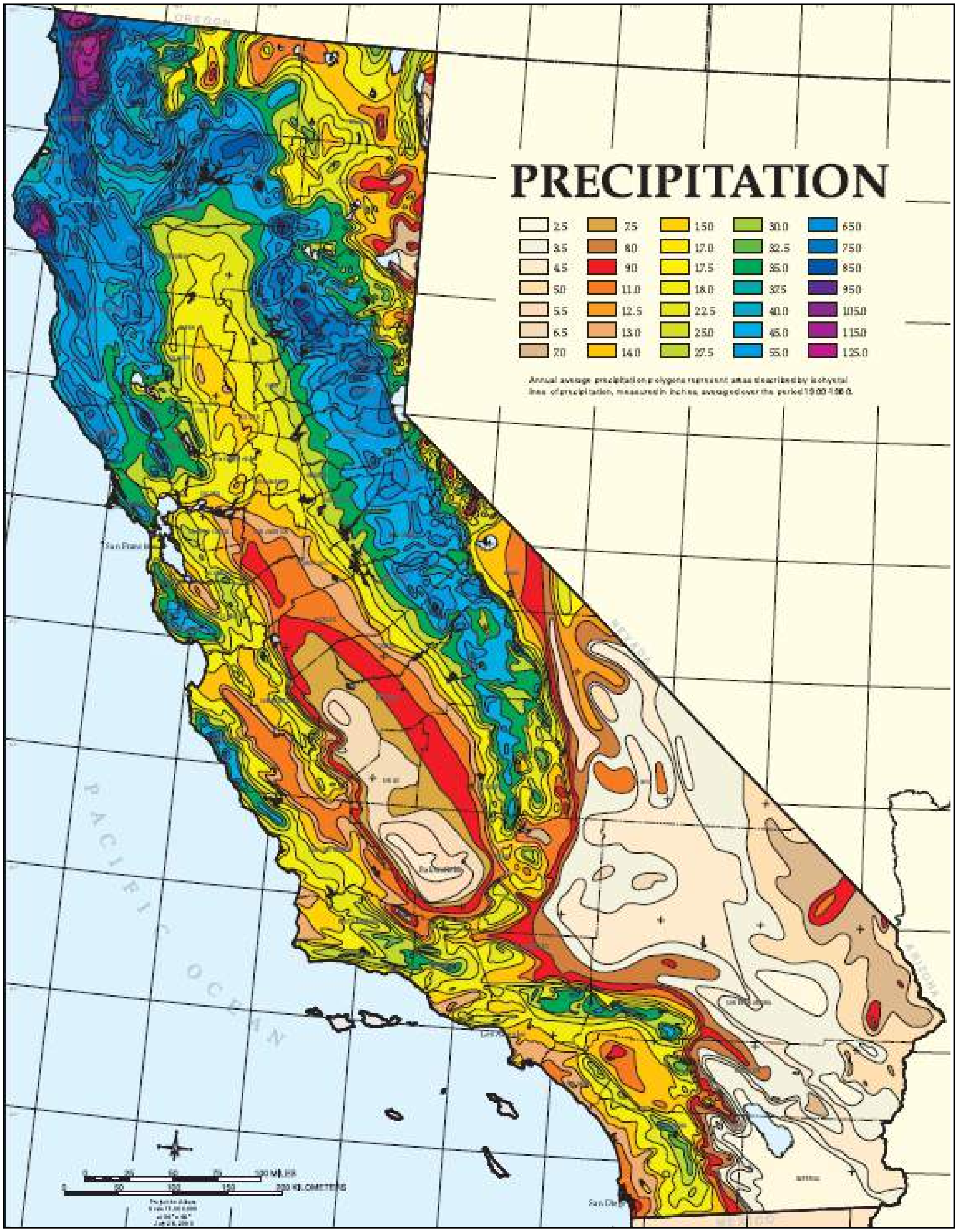

Figure 16. Annual Precipitation Rates in California (CDF, 2011)

Runoff

Runoff is the amount of water left from precipitation that can be measured as streamflow after losses to evaporation, transpiration by plants, and the replenishment of storage within the aquifers (Planert and Williams, 1995). The areal distribution of runoff closely follows the areal distribution of precipitation. Runoff is greatest in the mountains (exceeding 40 inches per year in many areas), where the majority of precipitation falls as snow, which melts during the spring and runs off with minimal evapotranspiration. In contrast, the basins in the arid parts of southeastern California have virtually zero runoff because most precipitation due to high rates of evaporation. However, high-intensity storms or rapid snowmelt in the mountains that border the basins may cause flash floods that reach the floors of the basins. Coastal areas have a direct relation between the amount of precipitation and runoff.

Water Surplus and Deficit

The relation between precipitation and evapotranspiration is a major factor in water availability. If annual precipitation exceeds annual potential evapotranspiration, then there is a net surplus of water and streamflow is perennial. Water is available to recharge aquifers only at times when precipitation or snowmelt is greater than actual evapotranspiration. However, annual potential evapotranspiration can exceed annual precipitation, which causes a net deficit of water. A net annual moisture deficit is present almost everywhere in California except the northern California coast (which receives considerable rainfall from winter storms) and the mountainous regions of northern and east-central California.

In most of southern California, nearly all streams that arise in the mountains are ephemeral and lose flow to alluvial aquifers within a short distance of where the streams leave the mountains and emerge onto the valley floors. Before the inception of agriculture, the largest rivers in the vast Central Valley of California overflowed their banks during periods of peak winter flows and formed extensive marshlands. An elaborate flood control system and the lowering of the water table by withdrawals for irrigation now keep these rivers within their banks and have significantly affected the distribution of riparian wetlands.

7.4 Hydrologic Regions of California

Hydrologists divide California into hydrologic regions (Figure 17). The Regional Water Boards are defined (for the most part[72]) by the boundaries of these hydrologic regions, as described in Water Code §13200. Hydrologic regions are further divided into hydrologic units, hydrologic areas, and hydrologic subareas.

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[72] The South Coast hydrologic region is divided among 3 Regional Water Boards (Los Angeles, Santa Ana, and San Diego) because it is the most populous area of the state.

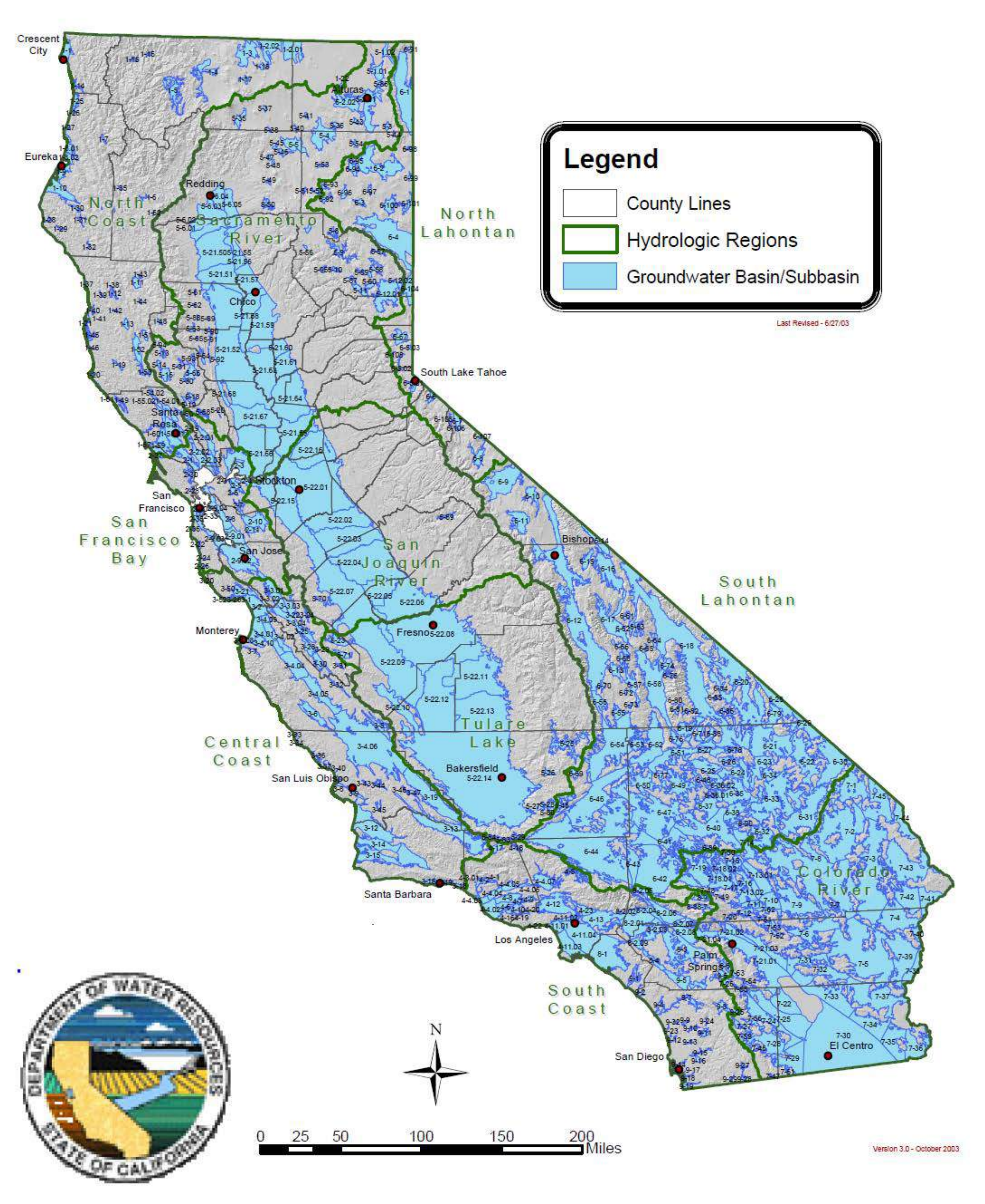

Figure 17. Hydrologic Regions and Groundwater in California (California DWR, 2003)

North Coast Hydrologic Region

A majority of the surface water in the North Coast hydrologic region is committed to environmental uses because of the “wild and scenic” designation of most of the region’s rivers. Average annual precipitation in this hydrologic region ranges from 100 inches in the Smith River drainage to 29 inches in the Santa Rosa area.

Waterbodies that provide municipal water include the Smith, Mad, and Russian Rivers. Areas providing agricultural water are more widespread than those for domestic, municipal and industrial use, as they occur in all of the hydrologic units within the region. Many of the smaller communities and rural areas are generally supplied by small local surface water and groundwater systems. Water recreation occurs in all hydrologic units on both fresh and salt water, attracting over ten million people annually. Coastal areas receiving the greatest recreational use are the ocean beaches, the lower reaches of rivers draining to the ocean, and Humboldt and Bodega Bays. The Russian, Eel, Mad, Smith, Trinity, and Navarro Rivers and Redwood Creek provide the most freshwater recreational use.

Groundwater aquifers in the northeastern portion of the North Coast hydrologic region consist primarily of volcanic rock aquifers and some basin-fill aquifers. Coastal basin aquifers are predominantly found in the southern portion of this hydrologic region and along the northern coast. In general, though, a large percentage of this region is underlain by fractured hard rock zones that may contain localized sources of groundwater.

San Francisco Bay Hydrologic Region

Major rivers in the San Francisco Bay hydrologic region include the Napa and Petaluma, which drain to San Francisco Bay. Although this is the smallest hydrologic region in the state, it contains the second largest human population. Coastal basin aquifers are the primary type of aquifer system in this region. These aquifers can be found along the perimeter of San Francisco Bay extending southeast into the Santa Clara Valley, as well as in the Livermore Valley. The northeastern portion of this region, which includes the eastern Sacramento–San Joaquin Delta, is underlain by a portion of the Central Valley aquifer system. The remaining areas in this region are underlain by fractured hard rock zones.

Central Coast Hydrologic Region

Groundwater is the primary source of water in the Central Coast hydrologic region, accounting for approximately 75% of the annual supply. Most of the freshwater in this region is found in coastal basin aquifers, with localized sources of groundwater also occurring in fractured hard rock zones throughout the region.

South Coast Hydrologic Region

The South Coast hydrologic region is divided among 3 Regional Water Boards because it is the most populous area of the state: Los Angeles, Riverside, and San Diego. Groundwater supplies approximately 23% of the region’s water in normal years and about 29% in drought years. Like the Central Coast hydrologic region, the majority of aquifers in this region are coastal basin aquifers. In the eastern central portion of the region includes lies a small section of basin and range aquifer and the remainder of the region is comprises fractured hard rock zones.

Central Valley Hydrologic Region

The Central Valley hydrologic region is the largest in California, and encompasses the three subregions described below.

Sacramento River Hydrologic Subregion

The Sacramento River hydrologic subregion includes the entire drainage area of the Sacramento River, the largest river in California, and its tributaries. Groundwater in the northern half of this hydrologic subregion is, for the most part, contained in volcanic rock aquifers and some basin-fill aquifers. The southwestern half of this subregion is underlain by part of the Central Valley aquifer system. The remaining areas that comprise the southeastern half of the subregion and portions of the northern half of the subregion are underlain by fractured hard rock zones. Surface water quality in this hydrologic subregion is generally good. Groundwater quality in the Sacramento River subregion is also generally good, although there are localized problems.

San Joaquin River Hydrologic Subregion

A portion of the Central Valley aquifer system underlies nearly all of the eastern half of the San Joaquin River subregion, while the western half of this subregion consists of fractured hard rock zones. The groundwater quality throughout this hydrologic region is generally good and usable for most urban and agricultural uses, although localized problems occur.

Tulare Lake Hydrologic Subregion

A small area at the southern end of the Tulare Lake subregion is underlain by basin and range aquifers, while a majority of the western half is underlain by a portion of the Central Valley aquifer system. The eastern half, once again, consists of fractured hard rock zones.

Lahontan Hydrologic Region

The Lahontan hydrologic region encompasses two subregions: the North Lahontan and the South Lahontan.

The North Lahontan hydrologic subregion consists of the western edge of the Great Basin, and water in the region drains eastward toward Nevada. Groundwater in the northern half of this subregion is primarily contained in basin-fill and volcanic rock aquifers, with some fractured hard rock zones. The southern half of this region is dominated by fractured hard rock zones, but small segments of basin and range aquifers also exist in this part of the subregion.

In general, the water quality in the North Lahontan hydrologic region is good. In basins in the northern portion of the region, groundwater quality is widely variable. The groundwater quality along these basin margins tends to be of higher quality, but the potential for future groundwater pollution exists in urban and suburban areas where single-family septic systems have been installed, especially in hard rock areas. Groundwater quality in the alpine basins ranges from good to excellent.

The South Lahontan hydrologic subregion is bounded on the west by the crest of the Sierra Nevada and on the north by the watershed divide between Mono Lake and East Walker River drainages; on the east by Nevada and the south by the crest of the San Gabriel and San Bernardino mountains and the divide between watersheds draining south toward the Colorado River and those draining northward. The subregion includes all of Inyo County and parts of Mono, San Bernardino, Kern, and Los Angeles Counties.

The South Lahontan hydrologic subregion contains numerous basin and range aquifers, separated by fractured hard rock zones. Although the quantity of surface water is limited in the South Lahontan hydrologic subregion, the quality is very good, being greatly influenced by snowmelt from the eastern Sierra Nevada. However, at lower elevations, groundwater and surface water quality can be degraded, both naturally from geothermal activity, and as a result of human-induced activities. Drinking water standards are most often exceeded for TDS, fluoride, and boron content. Groundwater near the edges of valleys generally contains lower TDS content than water beneath the central part of the valleys or near dry lakes.

8. ENVIRONMENTAL IMPACTS

This section describes the potential environmental impacts of the Procedures in compliance with 23 CCR 3777 which requires that the Water Boards identify significant or potentially significant adverse environmental impacts of any state policy for water quality control proposed for board approval. This Staff Report evaluates the Procedures on a programmatic level. As such, this Staff Report is not as detailed as an environmental document would be for a specific project that would be regulated under the Procedures. State regulations allow a program-level environmental document to be prepared on a series of actions that can be characterized as one large project and related in connection with issuance of rules, regulations, plans, or other general criteria to govern the conduct of a continuing program (CEQA Guidelines,[73] §15168(a)(3)).

CEQA does not require individual project-level analysis until proposals for such projects exist (PRC 21159(d); 23 CCR 3777(c)), and the lead agency, with primary responsibility for those projects, will conduct any required analysis at that time. Lead agencies evaluating future projects subject to CEQA may draw upon the analytical approach or appropriate general impacts from this Staff Report for initial planning. However, the State Water Board expects future environmental reviews of projects that are subject to the requirements of the Procedures to identify project-specific environmental effects. At that time, the lead agency must identify any project-specific environmental effects, and adopt all feasible mitigation for these effects, and if no feasible mitigation or alternatives are available the lead agency must adopt a statement of overriding considerations before approving the project.

Staff could not predict the exact nature of environmental impacts because such forecasting would require knowledge about future projects (e.g., scope, scale, location, and design) throughout the state.[74] However, the assessment below may be representative of the types and magnitude of most project-specific environmental impacts.

8.1 Aesthetics

CEQA requires that the lead agency consider aesthetics in determining the effects of a project. The purpose of assessing aesthetics is to identify and evaluate key visual resources in the project area and determine the degree of visual impact that would be attributable to a proposed project. For example, CEQA requires assessment of whether a project has the potential to affect or degrade scenic vistas (e.g., coastal vistas), scenic resources associated within a scenic highway, or the visual character or quality of a site and its surroundings.

Table 8-1 lists the potential categorical impacts and determinations of significance.

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[73] http://resources.ca.gov/ceqa/guidelines/

[74] According to 23 CCR section 3777(c), the "environmental analysis shall take into account a reasonable range of environmental, economic, and technical factors, population and geographic areas, and specific sites, but the board shall not be required to conduct a site-specific project level analysis of the methods of compliance, which CEQA may otherwise require of those agencies who are responsible for complying with the plan or policy when they determine the manner in which they will comply."

Table 8-1. Aesthetics Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
i. *Would the project have a substantial adverse effect on a scenic vista?*	LTS
ii. *Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?*	LTS
iii. *Would the project substantially degrade the existing visual character or quality of the site and its surroundings?*	LTS
iv. *Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*	LTS

LTS=Less than significant

The Procedures may lead to less alteration, filling, or dredging of wetlands and other waters of the state. The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduce discharge of dredged or fill materials, potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing practices. More of the natural landscape would be undisturbed and, as such, there would be less potential for impact to visual resources.

The Procedures could shift development to upland areas away from wetlands and other waters of the state, or to areas where development would not have occurred in the absence of the Procedures. However, the State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential impacts to aesthetics under the CEQA process.

Further, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework, as described in Section 5 Project Background, the State Water Board determined that the effect of the Procedures on aesthetics would be less than significant.

8.2 Agriculture and Forest Resources

The Agriculture and Forest Resources category addresses the potential of a project to impact federal and state designated farmland and forest areas, and to convert these lands to other uses. More than 1.3 million acres of agricultural land in California has been converted to nonagricultural land use since 1984, according to the California Farmland Conversion Report for 2006 – 2008 (California Department of Conservation, 2011). This acreage represents an area larger in size than Merced County or a rate of one square mile every four days. The largest losses have been in Prime Farmland and Grazing Land, while Unique Farmland has shown a small net increase since 1984.

Figure 18 shows a map of important farmland in 2010 created by the Farmland Mapping and Monitoring Program. Much of the state's important farmland is located in the Sacramento and San Joaquin Valleys extending from Red Bluff in the north to just past Bakersfield in the south. Much of the state's grazing land is in Tehama and Mendocino counties and along the edges of Sacramento and San Joaquin Valleys. The percentage of important farmland in the counties that have a projected growth rate of greater than 100% (as described in section 8.13) is Sutter: 73%; Madera: 42%; Kern: 17%; Yuba: 20%; San Joaquin: 67%; Merced: 47%; Imperial: 52%.

Figure 19 shows a map of federal lands in California, which include national forest. Much of the national forest land is located in the Sierra Nevada mountain range, as well as the Klamath Mountains in northern California. Some national forest land is also located in the Transverse and Peninsular mountain ranges in southern California.

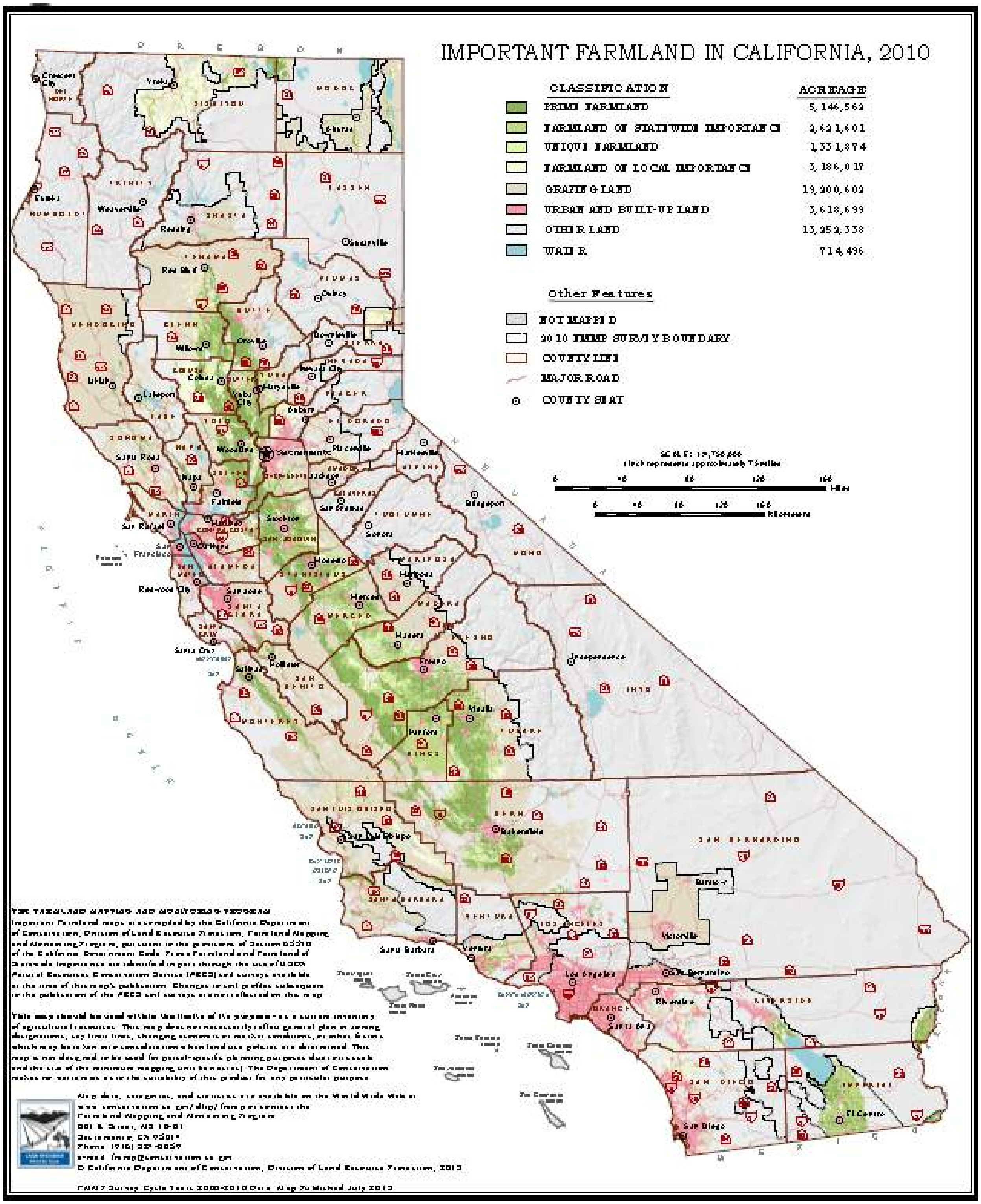

Figure 18. Important Farmland in California, 2010 (Source: Farmland Mapping and Monitoring Program)

Figure 19. Federal Lands and Indian Reservations in California

Table 8-2 lists the potential categorical impacts and determinations of significance.

Table 8-2. Agriculture and Forestry Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	LTS
i. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?	LTS
ii. Would the project conflict with existing zoning for, or cause rezoning of, forest land or timberland?	LTS
iii. Would the project result in loss of forest land or conversion of forest land to non-forest use?	LTS
iv. Would the project involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	LTS
LTS=Less than significant	

The CWA section 404(f) exempts certain farming, ranching, and silviculture activities as does the Procedures. Thus, these described activities and the effects of the activities on land conversion and zoning would not be subject to the Procedures.

As discussed above, the Procedures could shift proposed development to upland areas away from wetlands and other waters of the state, or to areas where development would not have occurred in the absence of the Procedures. The existing regulatory framework relevant to converting agricultural and forest land to other uses includes the California Land Conservation Act of 1965 (Government Code §51200 et seq.), commonly known as the Williamson Act. The Williamson Act provides a tax incentive for the voluntary enrollment of agricultural and open space lands in contracts between local government and landowners. The contract language restricts the land to agricultural and open space uses or other compatible uses defined in state law and local ordinances. Landowners would have to cancel Williamson Act contracts, and the land would have to be on the market for development, for such sites to be included in alternatives analyses to the dredge and fill of wetlands, and other waters of the state.

The State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential impacts to agricultural or forest resources under the CEQA process. Further, given the relatively small number of agricultural and forest land projects that would be regulated significantly differently under the Procedures compared to existing regulatory practices as described above, the State Water Board determined that the effect of the Procedures on agriculture and forestry resources would be less than significant.

8.3 Air Quality

Under the CEQA Guidelines, the Air Quality evaluation considers the impacts of a project on ambient air quality and the exposure of people, especially sensitive individuals, to hazardous pollutant concentrations and/or possible violations of air quality standards or regional attainment of such standards. These pollutants include criteria pollutants and toxic air contaminants.[75]

Table 8-3 lists the potential categorical impacts and determinations of significance.

Table 8-3. Air Quality Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project conflict with or obstruct implementation of the applicable air quality plan?	LTS
i. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?	LTS
ii. Would the project expose sensitive receptors to substantial pollutant concentrations?	LTS
iii. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	LTS
iv. Would the project create objectionable odors affecting a substantial number of people?	LTS
LTS = less than significant	

As discussed above, the Procedures could shift proposed development to upland areas away from wetlands and other waters of the state, or to areas where development would not have occurred in the absence of the Procedures. The use of construction equipment could result in some or all of the impacts listed above in areas where projects would not have been in the absence of the Procedures. Most of the

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[75] The criteria pollutants include those regulated by federal and state laws: ozone, carbon monoxide, suspended particulate matter, oxides of nitrogen, and sulfur dioxide. State regulations identify additional toxic air contaminants (i.e., particulate matter from diesel-fueled engines, asbestos, chlorinated organic compounds, metals, radon and iodine gas, and other contaminants).

counties with high projected growth rates as discussed in Section 7, “Environmental Setting,” are also counties designated for nonattainment of national ambient air quality standards for one or more criteria air pollutants as of December 2013 (U.S. EPA, 2013b). Overall, however, small locational changes would not cause an increase in air emissions in California as the Procedures would not increase the total number of projects in California. In many cases, project proponents will consider potential impacts of air quality under the CEQA process.

Further, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to existing regulatory practices, the State Water Board determined that the effect of the Procedures on air quality would be less than significant.

8.4 Biological Resources

California contains a wide variety of terrestrial and aquatic habitats that are home to numerous indigenous and/or sensitive plant and animal species. This section focuses primarily on wetland habitats, but because the Procedures regulate all waters of the state, and may influence the location of future projects and the quantity of compensatory mitigation sites that may be constructed, most habitats in California are potentially relevant to this analysis. Section 7 describes the environmental setting in detail.

Wetland Habitats

As noted in Section 5, “Project Background,” wetlands serve numerous critical ecological functions. Wetlands provide habitat for a variety of plant and animal species, some of which are threatened or endangered. California historically had a vast quantity of wetlands, of which greater than 90 percent have been lost since European settlement. In recent years, largely due to compensatory mitigation policies, net wetland losses have slowed, but compensatory mitigation wetlands have not always succeeded in replicating the functions of the natural wetlands they replace.

Table 8-4 shows the acreage of wetlands in California by wetland type according to a report on the state’s wetlands released by the California Natural Resources in 2010. The total in Table 8-4 is slightly higher than the total wetland acreage from EcoAtlas data shown in Table 8-4, or 2,175, 249 acres (all habitat types except fluvial channel, and lake, reservoir, and associated vegetation). The data from EcoAtlas comes from CARI v0, or the California Aquatic Resource Inventory. CARI represents a compilation of the best available local, regional, and statewide maps of surface waters. Datasets used in CARI include the National Wetland Inventory (NWI) of the U.S. Fish and Wildlife Service and the National Hydrography Dataset (NHD) of the U.S. Geological Survey, as well as maps from regional and local agencies. CARI is likely more accurate than the data from the 2010 State of the State Wetland Report, although CARI is still not a complete representation of California’s wetlands as the maps contributing to CARI v0 vary in detail and accuracy, and they represent different time periods, different areas of the state, and different classification systems. These differences greatly complicate the efforts to accurately assess total amounts and over time as map base layers are updated. These measures will improve as

CARI v0 is replaced by CARI v1, which is based on a standardized mapping approach developed by statewide experts and implemented regionally to meet the needs of local land use planners and managers.

Palustrine wetlands, which are what most people think of when hearing the term "wetland," make up more than half of all wetlands in California. Most palustrine wetlands lack flowing waters and are dominated by vegetation, but the category also includes small, shallow wetlands without vegetation (Figure 20, Cowardin et al., 1979). The palustrine category covers a variety of wetlands including marsh, swamp, bog, fen, and prairie wetlands as well as small, shallow, permanent or intermittent waterbodies (Cowardin et al., 1979).

Table 8-4. Summary of Acreage by Wetland Type in California

Wetland Type	Wetland Area (acres)
Intertidal beaches and rocky shoreline	10,365
Saline and brackish estuarine wetlands	159,534
Palustrine (playas, ponds, wet meadows, etc.)	1,751,212
Lacustrine (wetlands associated with lakes and reservoirs)	740,240
Streams, rivers, canals, etc.	251,150
Total	2,912,501

Source: California Natural Resources Agency (2010)

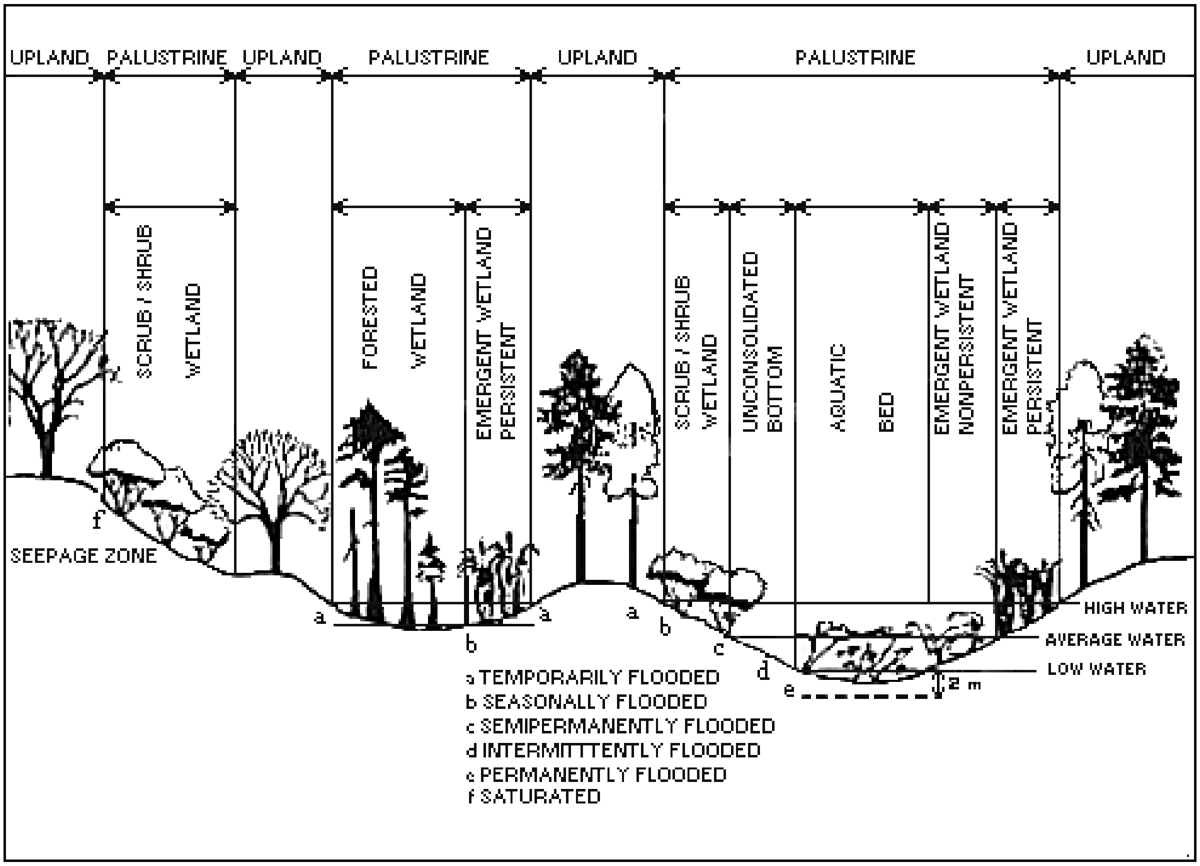

Figure 20. Distinguishing features and examples of habitats in the Palustrine System (Cowardin et al., 1979)

Biodiversity and Special Status Species

Bunn et al. (2007) report that California has more biodiversity, in terms of number of species, than any other state in the country. The California Natural Diversity Database (CNDDB) tracks species endemic to the state. As of November 3, 2011, the CNDDB contained records for 13,374 species of animals, 44,554 species of plants, 179 species of lichens, 398 species of fungi, and 45 species of algae and diatoms (CNDDB, 2014). The list of species tracked in CNDDB is not comprehensive, so it is likely that numerous other species exist in the state.

Some of this biodiversity includes special status species listed as threatened or endangered at the federal or state level, or are otherwise considered to be rare or at risk in California. As of January 2011 (the most recent update to the list of special status animal species), there were 898 taxa of special status animals. As of April 2014, there were 149 state and/or federally listed threatened and endangered (T&E) animal species, of which 49 appear on both lists. As of April 2014 (the most recent update to the list of special status plant species), there were 32 bryophytes, 10 lichens, and approximately 2,200 vascular plants on the list (CNDDB, 2014). This list includes 218 state-listed T&E plants and 184 federally-listed T&E plants, with 122 of these appearing on both lists.

Nationally, wetlands comprise less than 10 percent of the landscape, but provide important habitat for 68 percent of T&E birds, 66 percent of T&E mussels, and 75 percent of T&E amphibians (Perkins et al. 2005). In California, wetlands support 41 percent of the state's rare and endangered species, including 55 percent of T&E animal species and 25 percent of T&E plant species (WEF 2000).

Significance Determination

Adverse environmental impacts to biological resources could be significant if, relative to the existing conditions, implementation of the Procedures would result in:

- ***Potential modification or destruction of habitat, breeding areas, or movement corridors for any special status species;***
- ***Potential adverse impacts or any measurable degradation of wetlands, sensitive vegetation communities, riparian habitats, or protected habitats;***
- ***Potential mortality of a number of members of any species substantial enough to affect a species' viability, abundance, or diversity, including any direct or indirect mortality of special status species;***
- ***Potential conflicts with any provisions of an adopted NCCP, HCP, or other approved plan to conserve habitat; or***
- ***Potential conflicts with any local ordinances designed to protect biological resources.***

Table 8-5 lists the potential categorical impacts and provides staff's determinations of significance.

Table 8-5. Biological Resources Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project have a substantial adverse effect, either directly or through habitat modification, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS?	NI
i. Would the project have a substantial adverse effect on any aquatic resource, including adjacent riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS?	NI
ii. Would the project have a substantial adverse effect on State or federally-protected wetlands as defined by various State regulations and §404 of the CWA (including but not limited to marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption or other means?	NI

iii. Would the project have substantial interference with the movement of any native resident or migratory fish or wildlife species or within established native resident or migratory corridors, or impede the use of native wildlife nursery sites?	LTS
iv. Would the project conflict with any local policies or ordinances protecting biological resources, such as tree preservation projects or ordinances?	NI
v. Would the project conflict with the provision of an adopted HCP, NCCP, or other approved local, regional, or State plan?	NI
NI = No Impact	

The Procedures would provide consistent identification of wetlands, and strengthen efforts to avoid and minimize impacts to wetlands and other waters of the state through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid wetland impacts, potentially resulting in the protection and retention of a greater proportion of natural wetlands and other waters of the state relative to existing policy. The Procedures also require a watershed approach to mitigation and incentivize compliance with Water Board approved watershed plans by reducing mitigation requirements. Improved wetland protection may increase protection of species identified as a candidate, sensitive, or special status species.

The Procedures have the potential to shift projects or activities to upland areas away from wetlands. The State Water Board does not have information on the location of future projects or the effect of upland project locations relative to sensitive species or habitats. Given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework. For these reasons, the State Water Board determined that the effect of the Procedures on protected species would have no significant impact.

Similarly, the Procedures will strengthen efforts to avoid and minimize impacts to adjacent riparian habitats or state and federally-protected wetlands. This will result in the protection and retention of a greater proportion of these wetland and riparian areas relative to existing practices. Therefore, the Procedures would not have significant impact on these resources.

Adverse impacts to the movement of native resident or migratory fish or wildlife species are most likely to occur when natural habitats are altered or destroyed. The Procedures would increase protection of natural wetlands and other waters of the state; therefore, it would protect movements of native resident or migratory species in these habitats. The Procedures have the potential to shift projects or activities to upland areas away from wetlands and other waters of the state, and it is possible that projects could affect some migratory wildlife species within migratory corridors. The State Water Board does not have information on the location of future projects or the effect of upland project locations on wildlife migration. However, selection of the LEDPA would avoid more damaging impacts to the movement of species. Accordingly, the State Water Board determined that the effect on the Procedures on ecological migration would be less than significant.

Finally, the Procedures would strengthen efforts to avoid and minimize impacts to wetlands and other waters of the state by requiring an evaluation of alternatives to identify and implement the LEDPA. This process will avoid or reduce conflicts with policies, regulations, and planning documents, including HCPs, NCCPs, or other similar plans. The Procedures would have no significant adverse impact for these issues.

8.5 Cultural Resources

The purpose of the cultural resources evaluation is to identify and evaluate the potential for a project to adversely affect paleontological, archaeological, and historical resources.[76] National, state, or local authorities may designate a cultural resource as significant. The resources of concern include, but are not limited to, fossils, prehistoric and historic artifacts, burials, sites of religious or cultural significance to Native American groups, and historic structures.

Table 8-6 lists the potential categorical impacts and determinations of significance.

Table 8-6. Cultural Resources Categorical Impacts and Significance Determination

Impact Questions	Significance Determination
a) Would the project cause a substantial adverse change in the significance of a historical resource as defined in section 15064.5?	NI
i. Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to section 15064.5?	NI
ii. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	NI
iii. Would the project disturb any human remains, including those interred outside of formal cemeteries?	NI
NI = No Impact	

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[76] The CEQA Guidelines section 15064.5 define a historical resource as: (1) a resource in the Register of Historical Resources; (2) a resource included in a local register of historical resources, as defined in PRC §5020.1(k) or identified as significant in a historical resource survey meeting the requirements of PRC §5024.1(g); or (3) any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant or significant to California. Archaeological resources may refer to an archaeological artifact, object, or site as defined in CEQA §21083.2.

The Procedures would potentially lead to less alteration, filling, or dredging of wetlands and other waters of the state. As a consequence of the adoption of the Procedures, more of the natural landscape adjacent to and including waters of the state would be undisturbed and as such, there would be less potential for impact to cultural resources associated with these areas.

The Procedures could shift development to upland areas away from wetlands and other waters of the state. However, the State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential impacts to cultural resources under the CEQA process. Also, selection of the LEDPA process, along with other relevant environmental regulations, would avoid selection of sites with adverse alternatives. Further, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to existing regulatory practices, the State Water Board determined that the effect of the Procedures on cultural resources would have no impact.

8.6 Geology and Soils

The changes associated with the Procedures would be implemented within the existing framework of regulations surrounding the maintenance of the state's soil resources. There are many regulatory protections and policies that address erosion and retention of natural topsoil. These include, but are not limited to: soil conservation and agricultural best management practices, permitting of excavation, construction, and road building activities, flood control and stormwater management and pollution prevention plans, forestry harvesting practices, and local land use regulations requiring counties and cities to adopt land use plans that address the conservation and development of soils among other natural resources. The resources of interest are the geologic conditions, soil resources, and surface and sub-surface features found in the state.

The topographic diversity within geological provinces combined with the geologic weathering process break down rock material to produce a variety of soils. Some of these soils are 'residual' in that they've formed in place above bedrock as opposed to being transported from elsewhere (Carle, 2010). However, sediments from the regular weathering of the state's mountain ranges are frequently carried via major river systems and deposited in areas of lower elevation (DeCourten, n.d.). The topographic diversity in California in combination with an abundance of exposed sandy soils encourages this phenomenon. As a result of this transport, California is relatively vulnerable to erosion (Natural Resource Conservation Service (NRCS), 2003). Erosion may also be the result of anthropogenic activities such as construction, land clearing, farming, forestry and hydrologic engineering (NRCS, 2003).

Table 8-7 lists the potential categorical impacts and determinations of significance.

Table 8-7. Geology and Soils Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	NI
i. Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	NI
ii. Strong seismic ground shaking?	NI
iii. Seismic-related ground failure, including liquefaction?	NI
iv. Landslides?	NI
i. Would the project result in substantial soil erosion or the loss of topsoil?	LTS
ii. Would the project be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	NI
iii. Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	NI
iv. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	NI

The State Water Board expects that the Procedures would have no impacts relative to seismic risk issues (i.e., it would not increase the number or extent of populations or structures exposed to adverse seismic conditions). Therefore, this analysis is restricted to consideration of impacts to soil resources. Discussions of the decision-making regarding the level of significance for selected individual categorical impacts are provided below.

The State Water Board intends for the Procedures to provide consistent identification of wetlands, and strengthen efforts to avoid and minimize impacts to wetlands and other waters of the state through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in the protection and retention of a greater proportion of natural wetlands and other waters relative to the existing regulatory practices. Since trapping sediments moved by flooding or rain is a common service provided by wetlands and riparian areas, the Procedures would result in reduction of soil erosion in many locations.

The Procedures have the potential to shift projects to upland areas away from wetlands and other waters of the state. However, the State Water Board does not have information on the location of future projects or the effect of upland project locations on potential erosive soils. Also, selection of the LEDPA process, along with other relevant environmental regulations, would avoid selection of sites with adverse alternatives. In addition, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to existing regulatory practices, the State Water Board determined that the effect on the Procedures on erosion would be less than significant.

The Procedures may result in retaining intact more natural aquatic resources through a shift in development activities to upland areas. However, the State Water Board does not have information on the location of future projects or the effect of upland project locations on potential unstable or expansive soils. By directing development away from wetlands (and associated hydric soils), the Procedures should have no significant effect on the ability of development to support on-site wastewater disposal systems. Selection of the LEDPA under the Procedures, together with other appropriate local regulations (zoning, building codes, sanitary laws, etc.), would avoid selection of such alternatives. Overall, the State Water Board determined that the soil impact issues would not be significant.

8.7 Greenhouse Gas Emissions

The term “greenhouse effect” refers to the process by which greenhouse gases (GHGs), including CO_2, methane, ozone, water vapor, nitrous oxide, and chlorofluorocarbons, insulate the earth by reflecting light and infrared radiation back to earth. Some GHGs are also stored (“sequestered”) outside the atmosphere through natural processes. Two major natural providers of carbon sequestration include plants by assimilation of atmospheric carbon into structural organic carbon (vegetation, stems, roots) via photosynthesis, and the oceans via deposition of organic carbon in sediments at the ocean floor.

Human activities have increased atmospheric concentrations of GHGs both directly, through the emissions associated with combustion of fossil fuels, and indirectly, through the degradation and destruction of natural resources that sequester GHGs outside the atmosphere (i.e., carbon sinks). As atmospheric concentrations of GHGs continue to rise due to human activity, so will global climate change, which may increase average temperatures. These changes could have the following impacts:

- ***Human health impacts, including those associated with increased frequency of air quality issues, increased number of extreme heat events, and increased conditions favorable to disease vectors (World Health Organization, 2003; Intergovernmental Panel on Climate Change (IPCC), 2007);***

- ***Sea level rise, resulting in increases in coastal flooding events (Heberger et al. 2009);***
- ***Increased variability in local and regional weather patterns and flooding events (IPCC 2007);***
- ***Increased water shortfalls as a result of decreased snowfall in the Sierra Nevada mountain range (California DWR, 2008); and***
- ***Changes in habitat distributions, species ranges, and invasive species vulnerability (IPCC 2007).***

Wetlands sequester atmospheric carbon in living vegetation and by converting fine rocks, sediments, and mineral deposits and litter to organic rich soils. Wetlands also release methane, a GHG, through the activity of bacteria present in flooded wetlands. Climate scientists debate whether wetlands are climate neutral where increases in carbon storage are offset by increases in methane production. However, there is general agreement that the role of wetlands in storing vast amounts of carbon, especially in peat land, is crucial to reducing atmospheric carbon.

For GHG emissions, a categorical impact is significant if, relative to existing policy, implementation of the Project would result in:

- ***Generation of significant quantities of GHG emissions, directly or indirectly, that may have a significant impact on the environment, or***
- ***Conflict with any applicable plan, project, or regulation of an agency adopted for the purpose of reducing the emissions of GHGs.***

Table 8-8 lists the potential categorical impacts and determinations of significance.

Table 8-8. Greenhouse Gas Emissions Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	LTS
i. Would the project conflict with any applicable plan, project, or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	NI

The Procedures would provide consistent identification of wetlands, and strengthens efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. As noted above, natural wetlands functions both as a carbon sink through sequestration and as a GHG source through natural methane release. However, the Procedures would retain current wetlands rather than increase wetland area, so the present carbon balance would be maintained.

The Procedures have the potential to shift projects or activities to upland areas away from wetlands and other waters of the state. However, the State Water Board does not have information on the location of future projects. Changes in projects locations would not result in a net increase of GHG emissions because the Procedures would not increase the number of projects. Finally, there would be a relatively small number of projects that would be regulated significantly differently under the Procedures as compared to the existing regulatory practices. Accordingly, the State Water Board determined that the effect on the Procedures on GHG emissions would be less than significant.

The Procedures would increase preservation of natural wetlands and aquatic resources. Existing GHG plans, projects, and regulations, where applicable, are typically triggered by projects that alter existing resources. Therefore, the Procedures would have no significant impact on existing plans, projects, or regulations designed to reduce GHG emissions.

8.8 Hazards and Hazardous Materials

Although wetlands are responsible for a host of invaluable ecosystem services, these waters may also present hazards under specific circumstances. For example, significant concentrations of inorganic mercury are present in many of the soils and hydrologic systems in the state, and mercury is the most pervasive and problematic trace metal in the state's aquatic systems (Davis et al., 2007). In addition, as wetlands provide essential habitat for migratory bird species, these waters attract large bird populations. Proximity of a wetland area to an airstrip could present a bird strike hazard; the higher the concentration of birds in close proximity to an airfield, the higher the risk that a bird will strike an aircraft in a way that jeopardizes the lives of those onboard. Finally, the presence of wetland vegetation near urban areas may pose an increased risk of wildfire damage, especially if the wetland is unsaturated during the dry season and located in the arid southern regions of the state.

Methylmercury Exposure

Significant amounts of inorganic mercury have been released into the major water systems in the state, primarily into the Sacramento-San Joaquin Delta. The chief sources of inorganic mercury are mercury mining sites in the Coast Range, and gold mining operations in the Sierra Nevada and Klamath Mountains, which historically used mercury to enhance gold recovery (Alpers et al., 2005; Davis et al., 2007). After being released from historical mines, mercury travels in the form of surface water particulate matter, eventually settling throughout connected waterbodies. Mercury concentrations are highest in areas where historical mercury and gold mines were concentrated.

Once deposited in the surface sediments of waterbodies, sulfate- and iron-reducing bacteria process inorganic mercury compounds into methylmercury, a toxic compound that bioaccumulates in living species, posing serious health risks to humans from consumption of mercury-contaminated fish and game. The association of these formation processes within wetlands is well established (Lacerda and Fitzgerald, 2001). Habitats with the highest level of methylmercury production, concentration, and exposure to biota are those with periodic flooding periods separated by enough time for complete drying to occur (Gilmour et al., 2003; St. Louis et al., 2004; Alpers et al., 2008). As such, the wetlands most likely to present methylmercury hazards are those that are periodically flooded and dried as well as wetlands located in or downstream of areas populated by historical mines.

Wildlife Hazards to Aircraft

Wildlife hazard in this context refers to the risk of 'bird strikes' or collisions between birds and aircraft. Most bird strikes do not result in any aircraft damage, but some have led to serious accidents involving aircraft of all sizes. According to Bird Strike Committee USA (2012), collisions between aircraft and birds and other wildlife result in over $600 million in damage to United States civil and military aviation each year.

The risk of such bird strikes is heightened in areas of high aircraft traffic located near habitats that attract birds, such as wetlands. As a consequence, the Federal Aviation Administration (FAA) requires that commercial airports comply with its wildlife hazard mitigation measures to minimize hazardous wildlife attractions in consultation with a wildlife damage management biologist, and otherwise follow FAA guidelines to reduce the risks. Additionally, since information about whether projects are located in close proximity to airports is not available, the potential for this risk would be determined at the individual project level on a case-by-case basis. As airport operators are already required to comply with FAA guidelines regarding wildlife hazards, the appropriate mitigation measures are already incorporated at most airports.[77]

Wildfire Hazards to Populated Areas

Wildfire risk is a potential hazard in many parts of California. The California Department of Forestry and Fire Protection maps wildfire frequency and behavior statewide and has combined both analyses into a single assessment known as 'Fire Threat' (City of Roseville, 2005). Areas of high threat include large zones in Southern California, the central coast, lower elevations of the Sierra Nevada, and much of the northern interior of California. A significant amount of this fire threat is located near densely populated areas. Wetlands could contribute to wildfire risks under some circumstances, by providing fuel in the form of vegetation during dry periods.

Wildfire risk is influenced by the local terrain and climate conditions as well as the standing stock of vegetation that could provide fuel for wildfires during dry periods. As needed, the potential risk can be mitigated through fuel modification strategies consistent with local fire codes that protect populated areas from exposure to wildfires, along with other locally established best management practices.

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[77] Additionally, when applicable, proposed projects must comply with Public Resources Code section 21096, which requires that lead agencies utilize the Department of Transportation's Airport Land Use Planning Handbook to assist in the development of environmental impact reports.

Significance Determination

There are four categories for significance thresholds under hazards and hazardous materials, based on the nature of the categorical impacts: hazardous material exposure thresholds, wildlife hazard thresholds, wildfire risk thresholds, and response planning interference thresholds. Thresholds of significance are:

- ***An impact to hazardous materials exposure risks would be considered significant if the implementation of the Project would: a) result in the handling, storage, and treatment of hazardous materials, or b) provide for activities on or within 1,000 feet of a known contaminated site, or within 2,000 feet of a Superfund site;***
- ***An impact to risk from bird strikes would be considered significant if the implementation of the Project presents any form of safety hazard to a nearby airport as specified in the FAA Code of Federal Regulations;***
- ***An impact to risk from exposure to wildfire would be considered significant if the implementation of the Project prevents brush management requirements from being met;***
- ***An impact to response planning interference would be considered significant if the implementation of the Project would substantially affect Police or Fire-Rescue response times.***

Table 8-9 lists the potential categorical impacts and determinations of significance.

Table 8-9. Hazards and Hazardous Materials Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	NI
i. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	NI
ii. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within ¼ mile of an existing or proposed school:	NI
iii. Would the project be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code section 65962.5 and, as a result, would it create a significant hazard to the public or to the environment?	NI
iv. and f) For a project located within an airport land use plan, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area. Or, for a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	LTS
v. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	NI

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid wetland impacts and reduced discharge of dredged or fill material potentially resulting in the protection and retention of a greater proportion of natural wetlands relative to existing practices.

Although wetland areas are potential sites of mercury methylation, the Procedures would not create any additional mercury that is not already present in existing wetlands. Additionally, reducing the scale or frequency of discharge of dredged or fill material in wetland areas could reduce mercury exposure resulting from the disturbance and erosion of potentially mercury-rich sediments. Overall, the

Procedures would not increase mercury concentrations or increase exposure compared to existing conditions.

Because the Procedures is intended to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, the Procedures would result in fewer opportunities for spills, leaks, discharges (i.e., oil and gas used for construction equipment), emissions or transportation accidents involving hazardous materials within aquatic resource areas.

An increase in alternative project sites associated with the Procedures has the potential to shift projects or activities associated with hazardous materials to areas that may not have been developed in the absence of the Procedures. Determining whether use of alternative sites would result in changes in risk from hazardous materials is impossible to predict. However, selection of the LEDPA, along with other relevant environmental regulations, would ensure the selection of sites with the least adverse environmental impacts. In addition, the State Water Board determined that the effect on hazardous materials would be less than significant.

The Procedures are not expected to significantly increase existing wetland area nor result in a significant number of additional compensatory mitigation sites given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to existing regulatory practices. The Procedures would thus have no impact on development of alternative sites within five miles of any airport and pose no added danger to air traffic safety. Accordingly, staff determined potential impacts due to air safety issues to be less than significant.

The Procedures would have no significant impact on implementation of an adopted emergency response plan or emergency evacuation plan because the Procedures do not override the requirements for project developers to ensure projects do not interfere with these plans.

8.9 Hydrology and Water Quality

California is divided into nine Regional Water Quality Control Boards based on major watersheds. The Water Boards share the responsibility for protecting water resources in the state. In addition to those reviewed in section 5.1, several other federal and state laws are designed specifically to protect the state's hydrologic resources associated with streams and water quality, including:

- ***Section 10 of the Rivers and Harbors Act (33 U.S.C. 401 et seq.);***
- ***Executive Order 11988—Floodplain Management (United States Department of Transportation Order 5650.2; 23 C.F.R. 650, Subpart A.);***
- ***CDFW Code (§160o–1616 [Streambed Alteration]); and***
- ***Cobey-Alquist Flood Plain Management Act (Wat. Code §8400 et seq.)***

Surface waters include permanent, intermittent and ephemeral ponds, lakes, reservoirs, coastal estuaries and lagoons, and sloughs. Surface waters include human-made water features such as aqueducts, salt evaporating ponds, and improved flood control or drainage channels. Surface waters are important for water supply, irrigation waters, assimilative capacity, and flood control. These waters provide important habitat for fish and wildlife species, support wetland and riparian areas, provide direct pathways connecting to downstream ecological or human resources, and provide locations for groundwater recharge.

Groundwater is found in subsurface water-bearing formations. A groundwater basin is defined as a hydrogeologic unit containing one large aquifer or several connected and interrelated aquifers. Groundwater basins, which do not necessarily coincide with surface drainage basins, are defined by surface features and/or geological features such as faults, impermeable layers, and natural or artificial divides in the water table surface. The elevation of groundwater varies with the amount of withdrawal and the amount of recharge to the groundwater basin.

High water quality supports the designated water uses of a waterbody. Water quality in California is high in the largely unpopulated mountainous source areas but may be adversely affected as it reaches lower elevation where human activities and anthropogenic land uses occur. Land use affects surface water and groundwater quality. Both point and nonpoint source discharges contribute contaminants to surface waters. Pollutant sources in urban areas include parking lots and streets, rooftops, exposed earth at construction sites, and landscaped areas. Pollutant sources in rural/agricultural areas primarily include farming, ranching, forestry, and mining operations.

Contaminants in runoff waters may include sediment, hydrocarbons (e.g., fuels, solvents, etc.), metals,[78] pesticides, bacteria, nutrients, and trash. The impacts of pollutants on aquatic systems are many and varied. Polluted runoff waters can result in impacts on aquatic ecosystems, public use, human health (from ground and surface water contamination), damage to and destruction of wildlife habitat, decline in fisheries, and loss of recreational opportunities.

As a result of the Procedures, potential adverse impacts on water quality may result from construction activity associated with building and compensatory mitigation activities (e.g., grading, which removes vegetation, exposing soil to wind and water erosion). A potential erosive condition occurs in areas with a combination of erosive soil types and steep slopes. Erosion can result in sedimentation that ultimately flows into surface waters. Small soil particles washed into streams can clog fish gills and smother spawning grounds and marsh habitat. Suspended small soil particulates can restrict light penetration into water and limit photosynthesis of aquatic biota.

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[78] Including mercury.

Based on the nature of the categorical impacts, significance thresholds can be divided into water quality significance thresholds, groundwater recharge significance thresholds, and hydrology significance thresholds, as follows.

- ***A water quality impact is significant if, relative to existing policy, implementation of the Procedures would result in increased potential for exceeding numeric water quality standards or narrative objectives or violation of the state "anti-degradation" water quality policy (i.e., lead to a reduced capacity of the waterbody to support its designated uses);***

- ***A groundwater impact is significant if, relative to existing policy, implementation of the Procedures would result in depletion of groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table;***

- ***A hydrological impact is significant if, relative to existing policy, implementation of the Procedures would result in in alteration of the existing drainage patterns, cause significant flooding or erosional problems, or result in large volumes of polluted stormwater discharges;***

Table 8-10 lists the potential categorical impacts and determinations of significance.

Table 8-10. Hydrology and Water Quality Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project violate any water quality standards or waste discharge requirements?	NI
i. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level?	LTS
ii. Would the project substantially alter the existing drainage pattern of the site or area, resulting in increased sediment erosion and transport?	LTS
iii. Would the project substantially alter the existing drainage pattern of the site or area, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off-site?	LTS
iv. Would the project create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems?	NI
v. Would the project substantially degrade water quality?	NI
vi. Would the project place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary	NI

	or Flood Insurance Rate May or other flood hazard delineation map?	
vii.	*Would the project place structures within 100-year flood hazard area which would impede or redirect flood flows?*	NI
viii.	*Would the project expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam, or by inundation by seiche, tsunami, or mudflow?*	NI

The State Water Board intends for the Procedures to provide consistent identification of wetlands, and strengthen efforts to avoid, minimize, and mitigate for impacts to wetlands and other waters of the state, through evaluation of an alternatives analysis to identify and implement the LEDPA. This consistency may result in a greater effort to avoid impacts to aquatic resources and reduced discharge of dredged or fill material potentially resulting in the protection and retention of a greater proportion of aquatic resources relative to the existing regulatory framework. Additionally, the Procedures would strengthen compensatory mitigation requirements. Accordingly, by reducing impacts to aquatic resources and strengthening compensatory mitigation requirements, the Procedures would have no significant adverse impact on water quality and would not violate any water quality standards or waste discharge requirements.

The Procedures may result in the increased protection of natural streams and wetlands and is unlikely to deplete groundwater supplies or interfere substantially with groundwater recharge (i.e., result in a net deficit in aquifer volume or a lowering of the local groundwater table level). Some, but not all, types of aquatic resources can be important groundwater recharge areas and the hydrology of individual wetland or streams would need to be evaluated on a permit-specific level. Overall, since the protection of current aquatic resource areas would potentially increase, the Procedures would unlikely deplete or interfere substantially with groundwater recharge, and the State Water Board determined the adverse impact to be less than significant.

The Procedures have the potential to shift projects or activities associated with hazardous materials to upland areas away from wetlands and other waters of the state. Alternative project sites could cause alterations of existing drainage patterns of the alternative sites or affect the rate or amount of surface runoff in a manner that could result in flooding on or off-site. Alternative project sites could also create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems. However, the State Water Board does not have information on the location of future projects or the effect of upland project locations on local drainage.

In these cases, selection of the LEDPA, along with other relevant environmental regulations, would ensure the site is selected with the least adverse environmental damage. Accordingly, the State Water Board determined that the effect on the Procedures on altered drainage or runoff would be less than significant. Natural wetlands tend to act as sinks not sources of stormwater and tend to provide purification services relative to water quality. Natural wetlands can act as effective retention reservoirs for storing flood volumes for more gradual release to downstream areas. Therefore, retention of natural wetlands would not create or contribute runoff waters that would exceed the capacity of stormwater drainage systems. Accordingly, staff determined that this impact would not be significant.

Water quality degradation happens in several forms, but generally is the result of individual finite impacts that do not, alone, constitute water quality standards violations, but which cumulatively lead to a significant reduction in the inherent properties of the waterbody or ability to support designated beneficial uses including reduction in assimilative capacity, reduction in biodiversity, or degraded water quality (e.g., more water treatment needs to produce potable water). The protection and retention of current aquatic resources, at the watershed level, would avoid possible degradation of existing water quality. Overall, the Procedures would have no significant impact on water quality degradation or changes to water uses.

The Procedures would likely deter the placement of housing or structures within a 100-year flood hazard area. Therefore, the Procedures would not have an impact on 100-year flood hazard area. The Procedures would also not expose people or structures to risk of loss, injury or death involving flooding or by inundation by seiche, tsunami, or mudflow. Accordingly, staff determined that these impacts would not be significant.

8.10 Land Use and Planning

The Procedures would be implemented within the existing framework of regulations surrounding land use. Some of the relevant federal, state, and local regulations that pertain to land use in California are:

- ***Coastal Zone Management Act (16 USC §1451-1465);***
- ***California Farmland Protection and Plan Act (Title 440, Part 523);***
- ***California Land Conservation Act (Williamson Act; CA §51220 et seq.);***
- ***Natural Community Conservation Planning Act (Fish & G. Code, §2800 et seq.); and***
- ***Government Code, Title 7, Planning and Land Use (§65000 et seq.).***

In California, the majority of land use planning is done at the local level, since local or regional agencies have primary responsibility for land use control and regulation within their areas of jurisdiction. State planning and zoning law requires all counties and incorporated cities in the state to prepare, adopt, and implement a comprehensive general plan to guide the community’s growth and development. Under state planning law, a general plan must contain seven elements: land use, open space, transportation/circulation, housing, safety, noise, and conservation.

A general plan may also include optional elements at the discretion of the local agency, such as an agricultural element or a recreation element. Water resource and use issues are typically addressed in a general plan in terms of natural resource values as well as an essential requirement for land use and development. The general plan is commonly implemented through zoning and other local land use and development ordinances, which must be consistent with the general plan.

In reviewing and making decisions on applications for various land use development projects, the local agency must typically produce findings that the proposed activity (e.g., a conditional use permit or a subdivision of real property) is consistent with its general plan. If the decision is discretionary and the project could have an effect on the physical environment, then the county or city must comply with the procedural and documentation requirements of CEQA (California Department of Conservation, 2007).

Table 8-11 lists the potential categorical impacts and provides staff's determinations of significance.

Table 8-11. Land Use and Planning Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project physically divide an established community?	NI
i. Would the project conflict with any applicable land use plan, project, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	NI
ii. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?	NI

The Procedures would potentially lead to less alteration, filling, or dredging of wetlands and other waters of the state. The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduced discharge of dredged or fill materials potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing practices. As a consequence of the adoption of the Procedures more of the natural landscape associated with aquatic resources would be undisturbed and as such, there would be less potential for impact to existing land use planning regulations.

The Procedures could shift development to upland areas away from aquatic resources. However, the State Water Board does not have information on the location of future projects or the potential for land use planning conflicts. The Procedures and clarification of wetland status should support – rather than conflict with – any applicable HCP or NCCP. The Procedures encourage the watershed approach and incentivize compliance with watershed plans approved by the Water Boards, which would potentially include HCPs and NCCPs. In many cases, project proponents would consider potential impacts to land use planning under the CEQA process. Further, the clarification of wetland status should improve planning accuracy and resolve planning issues. In addition, given the relatively small number of projects that would be regulated significantly differently under the Procedures, compared to the existing regulatory framework, the State Water Board determined that the effect of the Procedures on land use planning would be less than significant.

As the Procedures would likely result in the increased preservation and maintenance of existing waters of the state, including wetlands, there should be decreased conflict with land use plans, projects, or regulations, especially since watershed plans, including HCPs and NCCPs, and local general plans should have been designed to avoid or mitigate environmental impacts. As a result, the Procedures would have no impact on HCPs or NCCPs.

8.11 Mineral Resources

California ranked seventh in the nation in the value of non-fuel mineral production in 2011, accounting for about 3.9 percent of the nation's total (Clinkenbeard and Smith, 2011). The state produced more than two dozen different non-fuel mineral commodities, such as diatomite, natural sodium sulfate, boron compounds, cement, gold, silver, clay, feldspar, fuller's earth, gemstones, gypsum, iron ore, kaolin clay, lime, magnesium compounds, pumice, salt, soda ash, and zeolites (Clinkenbeard and Smith, 2011).

Table 8-12 lists the potential categorical impacts and determinations of significance.

Table 8-12. Mineral Resources Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project result in the loss of availability of a known mineral resource that would be of future value to the region and residents of the state?	LTS
i. Would the project result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	LTS

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduced discharge of dredged or fill materials potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing practice. The Procedures would potentially lead to less alteration, filling, or dredging of wetlands and other waters of the state. As a consequence of the adoption of the Procedures more of the aquatic resource areas would be undisturbed compared to the existing regulatory practices.

However, by avoiding impacts to aquatic resources, the Procedures could shift development to upland areas away from wetlands and other waters of the state. It is possible that this effect could restrict access to a known mineral resource that would be of future value to the region and residents of the state, or a locally-important mineral resource recovery site delineated on a local general plan or other land use plan. However, the State Water Board does not have information on the location of future mining projects or their potential environmental impacts.

In these cases, selection of the LEDPA, along with other relevant environmental regulations, would avoid selection of sites with adverse alternatives. In addition, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework, the State Water Board determined that the effect on the Procedures on mineral resources would be less than significant.

8.12 Noise

The CEQA Guidelines require evaluation of the significance of environmental noise impacts attributable to a project. The purpose of the noise assessment is to identify, describe, and evaluate sources of noise and potential land use conflicts related to environmental noise, beginning with a characterization of the baseline noise conditions and surrounding existing sensitive land uses. A noise assessment provides evaluation of potential changes in noise levels or noise exposure circumstances caused by the proposed project. A significant noise impact would be identified if a project results in generation or exposure of people to noise levels in excess of standards, excessive ground-borne vibration or noise, or substantial temporary, periodic or permanent increases in ambient noise levels. Additional impacts are involved if a project would create excessive noise levels within an airport land use plan or in the vicinity of a public airport or private airstrip.

Table 8-13 lists the potential categorical impacts and determinations of significance.

Table 8-13. Noise Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	LTS
i. Would the project result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	LTS

ii. *Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?*	LTS
iii. *Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?*	LTS
iv. *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*	LTS
v. *For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?*	LTS

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduced discharge of dredged or fill materials potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing policy. The Procedures would potentially lead to less alteration, filling, or dredging of wetlands and other waters of the state. As a consequence of the adoption of the Procedures more of the aquatic resource areas would be undisturbed and as such, there would be less potential for generation of noise from future development in these areas.

The Procedures could shift development to upland areas away from wetlands and other waters of the state or could cause them to relocate to a location within an airport land use plan or within two miles of a public airport or public use airport. However, the State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential noise impacts during the CEQA process for individual projects that would be regulated under the Procedures.

Further, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework, the State Water Board determined that the effect of the Procedures on noise impacts would be less than significant.

8.13 Population and Housing

CEQA Guidelines indicate that SEDs should address social and economic effects only to the extent that these effects create adverse impacts on the physical environment.[79] The Procedures could result in a shift in housing projects to upland areas where they would not impact aquatic resources. There could be more project activity and thus more selection of LEDPA sites in areas of the state with higher population growth. The California Department of Finance projects some counties to have greater than one million people by 2060, while other counties may increase by greater than 100% between 2010 and 2060 (Table 8-14; Figure 21). The California Department of Finance projects that the population will exceed 50 million in 2049, and that about 62%, or about 32 million people, will be in eight southern California counties in 2060 (Table 8-14; Figure 21).

The California Department of Finance projections indicate that the highest growth rates will occur in the Central Valley (specifically in the greater Sacramento region), portions of the Northern Sacramento Valley, and the San Joaquin Valley, as well as in the Southern California and the southern border. The projections also indicate that much of the state's population in 2060 will be in Southern California. Due to high growth and large numbers of people, the potential environmental impacts associated with identifying alternative project sites could be the greatest in these areas.

Table 8-14: California County Growth Projections[80]

Projection	Counties
2060 population > 62% of state population	Imperial, Kern, Los Angeles, Orange, Riverside, San Bernardino, San Diego, Ventura
2060 population > 1 million people	Alameda, Contra Costa, Fresno, Sacramento, San Joaquin, Santa Clara
2060 population > 2 million people	Kern, Orange, Los Angeles, Riverside, Sacramento, Santa Clara, San Bernardino, San Diego
2010 – 2016 growth > 50%	Butte, Colusa, Contra Costa, El Dorado, Fresno, Kings, Lake, Nevada, Placer, San Benito, San Bernardino, Riverside, Sacramento, Solano, Stanislaus, Tehama, Tulare, Yolo
2010 – 2060 growth > 100%	Imperial, Kern, Madera, Merced, San Joaquin, Sutter, Yuba

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[79] Note that residential planning is linked to land use planning, which is evaluated separately in section 4.3.3.

[80] Source: California Department of Finance (2013)

Figure 21: Year 2060 Population Projections (California Department of Finance, 2013)

However, housing would likely occur within the same general area of the original proposed project location. The Procedures would not induce substantial population growth in an area, but rather shift the location of future projects that would have occurred regardless of the Procedures to avoid and minimize impacts to aquatic resources. The Procedures would also not create a demand for additional housing or displace any existing housing units or persons. Therefore, the Procedures would have no impact on population growth or housing demand.

Table 8-15 lists the potential categorical impacts and determinations of significance.

Table 8-15. Population and Housing Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	NI
i. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	NI
ii. Would the project displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	NI

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduced discharge of dredged or fill materials potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing policy. The Procedures would potentially lead to less alteration, filling, or dredging of wetlands and other waters of the state. As a consequence of the adoption of the Procedures, more of the aquatic resource areas would be undisturbed, but this would not affect population growth and housing other than the potential shift of the location of these impacts as mentioned above.

The Procedures could shift development to upland areas away from aquatic resource areas. However, the State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential impacts due to population and housing during the CEQA process.

Further, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory. Practices. Accordingly, the State Water Board determined that the effect of the Procedures on population and growth would not have an impact.

8.14 Public Health and Vector Control

Although potential biological vectors (i.e., animal species capable of acting as reservoirs and transmitting agents of human diseases) include ticks, fleas, and small mammals, the primary public health issue associated with the Procedures is mosquito vectors. The Procedures affect jurisdictional protection of waters of the state, including wetlands. Intact wetlands are often a preferred breeding habitat for mosquito vector species, and therefore policies that affect the quantity, location, and type of wetlands in the state will potentially have implications for mosquito populations and potential human exposure risk to mosquito-borne diseases.

Local vector control agencies survey breeding habitat and observe changes in population size, disease risk, and public nuisance levels to assess local risks. Some of the major diseases of concern in California include West Nile virus, St. Louis encephalitis, western equine encephalomyelitis, California encephalitis, and malaria (Kwasny et al., 2004). Mosquito abatement typically relies on an integrated pest management approach, combining pesticides, biological controls such as mosquitofish (*Gambusia* spp.), and habitat reductions through activities such as draining wetlands and others. In more remote, sparsely populated areas, authorities may elect not to control mosquitos directly, relying only on signs and barriers to prevent people from coming into contact with breeding areas.

Vector control agencies' actions are governed by federal laws, including the CWA, ESA, and Federal Fungicide and Rodenticide Act, as well as state law under the Health and Safety Code (§2000 et seq., §106925, §16100-116250) and other state regulations governing pesticides. Pesticide applications may adversely affect water quality, although application of pesticides in strict accordance with state and federal regulations should minimize these impacts. Discharges of pesticides and pesticide residues are required to meet criteria under the California Toxics Rule as well as water quality criteria designed by the Water Boards to protect beneficial uses of waters. The most protective appropriate criteria are applied in order to protect all designated uses of the receiving water.

Recently, the Sixth Circuit Court ruled that the application of pesticides at, near, or over waters of the U. S. that results in discharges of pollutants requires coverage under a NPDES permit. In response to the Sixth Circuit Court's decisions and previous decisions by other courts on pesticide regulation, the State Water Board has adopted four pesticide permits for various applications of pesticides at, near, or over waters of the United States that enforce water quality standards. All pesticides used for vector control must be registered for use in California, must be applied by a certified technician or someone working under the direct supervision of a certified technician, and must be applied in accordance with the pesticide product's registered label.

All species of mosquito require standing water for breeding and larval development. Female mosquitos lay batches of eggs, which hatch in the water, undergoing four aquatic larval stages and an aquatic pupal stage before developing into aerial adults (Kwasny et al., 2004). Species that are most of concern, as vectors prefer stagnant water, can be found in many types of wetlands. Any waters that remain undisturbed for more than three to five days are considered potential mosquito breeding habitats

(California Bay-Delta Authority (CALFED), 2000). Although mosquitos breed year-round in some parts of California, peak breeding occurs during the warmer months from mid-spring and mid-autumn.

Individual natural wetlands may or may not contain mosquito breeding habitat, requiring identification of such habitats on a site-specific basis. In some cases, natural wetland habitat could require mosquito abatement activities (including pesticide applications) in some areas in order to ensure that human populations are not at risk from vector-borne diseases. However, a large number of mosquito mitigation measures are currently utilized by local mosquito control authorities. Local vector control agencies have broad authority to manage and abate mosquito breeding habitats to ensure they do not become a nuisance. For example, potential mitigation measures to reduce or control mosquito breeding habitat include (California Division of Health Services, 2005):

- ***Site maintenance and frequent site inspections;***
- ***Netting over target areas;***
- ***Constructing and maintaining appropriate drainage slopes;***
- ***Encouraging mosquitofish (Gambusia spp.) and other mosquito predators, including invertebrates (e.g. water boatmen and dragonfly larvae), birds (e.g., swallows), and bats, among others;***
- ***Vegetation management to ensure adequate predator access to mosquitos;***
- ***Open water marsh management, which connects marshes to a canal or pond using a system of ditches to enable water flow and allow aquatic predators into marshes; and***
- ***Application of pesticides (e.g., methoprene) or biological control agents (e.g., the bacterium Bacillus thuringiensis).***

A public health and vector control impact is significant if, relative to existing policy, implementation of the Project would result in:

- ***An increase in the potential exposure of the public to disease vectors; or***
- ***An increase in potential mosquito/vector breeding habitat.***

Table 8-16 lists the potential categorical impacts and determinations of significance.

Table 8-16. Public Health and Vector Control Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project increase the potential exposure of the public to disease vectors (i.e., mosquitos, ticks, and rats)?	LTS
i. Would the project increase potential mosquito/vector breeding habitat (i.e., areas of prolonged standing/ponded water like wetlands or stormwater treatment control BMPs)?	LTS

The Procedures provide consistent identification of wetlands and strengthens efforts to avoid, minimize, and mitigate for impacts to wetlands, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid wetland impacts and reduced discharge of dredged or fill material potentially resulting in the protection and retention of a greater proportion of natural wetlands relative to the existing regulatory framework.

Risk of human exposure to disease through vectors is a complex function affected by the quantity of mosquito breeding habitat, concentrations of mosquito populations, presence of infectious disease in the mosquito population, seasonal climactic factors, and the proximity of mosquito breeding sites to human populations. The Procedures would not change current wetland areas or locations. Since the area of mosquito breeding habitat and its location relative to human populations would not be affected, there should be not any increase in the mosquito population or risk to humans. However, the State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential impacts due to public health during the CEQA process. The Procedures have the potential to shift projects or activities to upland areas away from wetlands. Selection of the LEDPA, along with other relevant environmental regulations, would avoid selection of sites with increased human risks. In addition, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework. Therefore, the State Water Board determined that the effect on the Procedures on public heath vectors would be less than significant.

8.15 Public Services

The Public Services section assesses the impact of a project on law enforcement, fire protection, schools, and other public services. Staff assessed whether a project would result in substantial adverse physical impacts or alteration of governmental facilities needed to maintain acceptable service ratios, response times, education metrics, or other performance objectives for any of the public services. Analysis of impacts on relative police and fire protection could consider facilities and equipment, fire flows, emergency response, and emergency access.[81]

A project would have an effect on public services if it would result in substantial adverse physical impacts associated with the creation of new or physically altered governmental facilities, or a need for new or physically altered governmental facilities in order to maintain acceptable service ratios, response times, or other performance objectives. Altered or increased school services would likely be a secondary effect of housing and population which has been found above to be of no significance.

Table 8-17 lists the potential categorical impacts and determinations of significance.

Table 8-17. Public Services Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	NI
i. Fire protection?	NI
ii. Police protection?	NI
iii. Schools?	NI
iv. Parks?	NI
v. Other public facilities?	NI

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduced discharge of dredged or fill materials potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing policy.

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[81] Wildland fire hazards are considered separately under Hazards and Hazardous Materials in section 4.3.3.

More aquatic resource areas would be undisturbed and as such, there would be less potential for impact to public services related to aquatic resources.

The Procedures would not impose a substantially greater demand for public services beyond that which already exists. The Procedures would not result in a need for altered or new facilities to provide law enforcement, fire protection services, or required additional educational services. Review of the potential categorical impacts listed under this category indicates there would be no significant impact.

8.16 Recreation

Because of the importance of recreational resources to quality of life, CEQA requires consideration of environmental effects on parks, recreation, and open space, including any environmental consequences that would likely result from a project. Of particular concern is whether the project would result in either (1) increased use of and/or possible deterioration of existing neighborhood or regional parks or (2) lead to conditions that might lead to a need for construction of new parks or expansion of existing parkland.

Table 8-18 lists the potential categorical impacts and determinations of significance.

Table 8-18. Recreation Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	LTS
i. Would the project include recreational facilities or require the construction or expansion of recreational facilities that might have an adverse physical effect on the environment?	NI

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduced discharge of dredged or fill materials potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing policy.

As a consequence of the adoption of the Procedures more of the aquatic resource areas would be undisturbed and as such, there would be less potential for impact to recreational areas associated with aquatic resources. In general, recreational resources should benefit from protection of wetlands, steams, wildlife habitat, open space, improved water quality, increased flood protection, and increased fish and waterfowl populations.

The Procedures could shift development to upland areas away from wetlands. However, the State Water Board does not have information on the location of future projects or possible related change to the use of existing neighborhood and regional parks or other recreational facilities. In many cases, project proponents will consider potential impacts to recreation during the CEQA process.

Given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework, the State Water Board determined that the effect of the Procedures on recreation would be either be less than significant or have no impact.

8.17 Transportation/Traffic

CEQA review requires consideration of the potential impact of a project on existing and projected transportation and circulation conditions. This consideration includes:

- ***Direct traffic impacts, which are those projected to occur at the time a proposed development becomes operational, including other developments not presently operational but which are anticipated to be operational at that time (near term); and***
- ***Cumulative traffic impacts, which are those projected to occur at some point after a proposed development becomes operational, such as during subsequent phases of a project and when additional proposed developments in the area become operational (short-term cumulative) or when the affected community plan area reaches full planned build out (long-term cumulative).***

Table 8-19 lists the potential categorical impacts and provides staff’s determinations of significance.

Table 8-19. Transportation/Traffic Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including, but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	LTS
i. Would the project conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures or other standards established by the county congestion management agency for designated roads or highways?	LTS

ii. *Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?*	LTS
iii. *Would the project substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*	LTS
iv. *Would the project result in inadequate emergency access?*	LTS
v. *Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?*	LTS

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduce discharge of dredged or fill materials, potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing policy.

The Procedures could shift development to upland areas away from aquatic resources. The Procedures, either through the retention of aquatic resources or the movement of projects to upland locations, could potentially affect the design of roads or conflict with plans that establish measures of effectiveness for the performance of traffic circulation systems, traffic congestion management programs, or plans that support alternative transportation. However, the State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential impacts to transportation during the CEQA process. In addition, given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework, the State Water Board determined that the effect on the Procedures on transportation and traffic would be less than significant.

8.18 Utilities and Service Systems

CEQA requires assessment of the impact of a project on general utilities such as water supply and wastewater, solid waste disposal, electricity, natural gas, solar power, telecommunications, and other relevant service systems such as stormwater management. A project would have an effect on utility systems if it would affect potable water, wastewater treatment, stormwater, or solid waste facilities either directly (via new or expanded facilities) or indirectly (via a new generation source, and/or demand that would exceed the capacities of existing facilities). Each utility provider generally establishes its own threshold criteria for utility capacity and service expansion. Utility providers are typically a combination of municipal, quasi-public agencies, and privately-owned companies and corporations.

The Procedures would not result in a greater number of residential projects requiring public service in the state, but rather could result in locating projects to alternative sites. Implementation of the Procedures would not change wastewater treatment requirements, require new or expansion of wastewater treatment facilities, require new or expansion of stormwater drainage facilities or affect local solid waste disposal services. The Project would not cause a net exceedance of wastewater treatment facilities, stormwater treatment, or landfills or create a net increase of water use. The Procedures would not affect how projects comply with federal, state, and local statues and regulations related to solid waste.

Table 8-20 lists the potential categorical impacts and determinations of significance.

Table 8-20. Utilities and Service Systems Categorical Impacts and Significance Determinations

Impact Questions	Significance Determination
a) Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	LTS
i. Would the project require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	LTS
ii. Would the project require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	LTS
iii. Would the project have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	LTS
iv. Would the project result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	LTS
v. Would the project be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	NI
vi. Would the project comply with federal, state, and local statutes and regulations related to solid waste?	NI

The State Water Board intends for the Procedures to provide consistent identification of wetlands and strengthen efforts to avoid and minimize impacts to wetlands, and other waters of the state, through evaluation of alternatives to identify and implement the LEDPA. This consistency may result in a greater effort to avoid aquatic resource impacts and reduced discharge of dredged or fill materials potentially resulting in the protection and retention of a greater proportion of natural wetlands, and other waters of the state, relative to existing policy.

As a consequence of the adoption of the Procedures more of the aquatic resource areas would be undisturbed and thus would not affect utilities and service systems in those areas, other than to shift the location of the potential effects.

The Procedures could shift development of public services to upland areas away from wetlands and other waters of the state. However, the State Water Board does not have information on the location of future projects. In many cases, project proponents will consider potential impacts to public services during the CEQA process.

Given the relatively small number of projects that would be regulated significantly differently under the Procedures compared to the existing regulatory framework, the State Water Board determined that the effect of the Procedures on public service would be either be less than significant or have no impact.

9. CUMULATIVE IMPACTS

The term “cumulative impacts” refers to two or more individual effects which, when considered together, are significant or which compound or increase other environmental impacts. This section describes the potentially cumulatively considerable[82] impacts of individual effects arising from the Project, as well as those arising from the Project in combination with past, present, and reasonably foreseeable future projects.

9.1 Cumulative Impacts from Two or More Individual Effects

The Procedures would not allow Water Boards to approve projects that have cumulative impacts based upon past or reasonably anticipated future impacts that could cause a violation of downstream water quality standards, violate regional air quality objectives, or other appropriate requirements of state law. As documented in section 8, the State Water Board has determined that there would be no potentially significant adverse effects arising from the Procedures. As such, the Procedures would not result in any cumulatively considerable impacts arising from two or more individual effects.

9.2 Past, Present, and Reasonably Foreseeable Future Projects

The cumulative impacts from several projects is the change in the environment which results from the incremental impact of the Project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

Relevant past projects include the key historical wetland protection initiatives in California, as summarized in Section 5.4, “Project Background.” Specifically, the Procedures expands the use of a watershed approach to review and approve dredge or fill projects. Future projects may also be relevant, but are often hard to predict. As such, this section provides a discussion of the potential for cumulatively considerable impacts arising from the Procedures in combination with past projects only.

Taken together, past initiatives in the state (including provisions in the CA Water Code) and the Procedures collectively protect waters of the state, including those that are not currently subject to CWA protections. As such, they have cumulatively considerable impacts with regard to the protection afforded to these waters throughout California. Specifically, they apply protections to waters of the state, including wetlands that may otherwise be subject to unregulated dredge or fill projects.

The CEQA Guidelines state that:

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[82] “Cumulatively considerable” means that the incremental effects of an individual project are significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (14 CCR §15065(a)(3)).

> The mere existence of significant cumulative impacts caused by other projects alone shall not constitute substantial evidence that the proposed project's incremental effects are cumulatively considerable (14 CCR §15065(a) (3)).

Therefore, the State Water Board considered whether the impacts of the Procedures are cumulatively considerable within the context of and relative to impacts caused by other past, present, or future projects that protect wetlands in California.

The Procedures would supplement, clarify, and support the wetland protections that arise from earlier statewide projects, particularly as implemented under the CA Water Code. Compared to existing policies, the Procedures would add consistency and transparency to the determination of wetland areas and help resolve uncertainties regarding wetland identification in areas of overlapping regulatory jurisdiction. The Procedures would also provide certainty for applicants regarding the requirement to evaluate project alternatives and select the LEDPA.

A small portion of projects that discharges to waters of the state, including wetlands, may be impacted by the requirements of the Procedures, and the State Water Board anticipates that only a subset would result in project design changes to avoid wetland impacts. The Procedures clarify and supplement existing regulations, including the CA Water Code, that are intended to protect all waters of the state, including wetlands. Additionally, implementation would be consistent with all applicable regional or local plans regarding conservation or land use.

Compared with the more comprehensive protection provisions in the existing CA Water Code, the share of incremental protection for waters of the state, including wetlands, attributable to the Procedures would be minimal. As such, the Procedures would not result in any cumulatively considerable impacts when combined with other past, present, or reasonably foreseeable related projects.

10. ISSUES AND PROCEDURES ALTERNATIVES

This section describes a reasonable range of potentially feasible alternatives that might attain the basic objectives of the Procedures (as discussed in Section 6, "Project Description"). According to CEQA Guidelines, economic, social, and particularly housing factors shall be considered by public agencies together with technological and environmental factors in deciding whether changes in a project are feasible to reduce or avoid the significant effects on the environment. As discussed in Section 8, "Environmental Impacts," the Procedures will not have any significant effects. Nonetheless, the State Water Board considered a variety of alternatives that might attain the objectives of the Procedures. The State Water Board based the alternatives primarily on stakeholder input.

10.1 Issue: Applicability of Procedures

Resolution 2008-0026, adopted by the State Water Board on April 15, 2008, is the main directive for the Procedures. It directs the State Water Board staff to "establish a policy to protect wetlands from dredge or fill activities." The Procedures address concerns including the limited protection of waters not under federal jurisdiction, inconsistent wetland identification across the Water Boards, and the failure of compensatory mitigation to adequately protect the quantity and quality of wetlands in California (see Section 6, "Project Description").

No-Project Alternative: Do Not Adopt Procedures

Under the No-Project alternative, existing relevant regulations, policies, and plans would continue without the Procedures. The existing regulatory framework includes reasonably foreseeable modifications and new plans, policies, and regulations that the Water Boards are currently considering for adoption or are required to adopt. The Water Boards would continue the current program of protecting wetlands and regulating dredge or fill discharges to waters of the state.

The current program, however, has a number of major deficiencies (see Section 6, "Project Description"). There would continue to be a lack of regulatory consistency in the review and approval of applications for discharges of dredged or fill material. There would not be consistent requirements for avoidance and minimization of impacts to waters, increasing (relative to the Procedures) the chances of greater project-level impacts to aquatic resources. There would not be a standard wetland definition and delineation method across Water Boards, potentially causing regulatory uncertainty over identifying wetlands and their extent, thereby increasing the chances of adverse impacts to wetlands. There would also not be a comprehensive Water Board framework for compensatory mitigation, which would likely result in inconsistent mitigation requirements statewide.

Therefore, continuing current Water Board regulatory practices under the No-Project alternative would not meet project objectives, and is likely to result in greater impacts to aquatic resources.

Adopt Procedures for Non-federal Waters ("Gap") Only

In 2001 and 2006, the U.S. Supreme Court made decisions that have had the effect of restricting the meaning of "waters of the United States," and thereby reducing the extent of federal CWA jurisdiction. This reduction has caused what is referred to as a "gap" between those waters subject to federal jurisdiction and those that are not. The State Water Board could apply the Procedures to these non-federal (gap) waters only.

Under this alternative, there would be only changes to existing state permitting requirements for discharges of dredged or fill material to non-federal waters. As discussed in Section 6, "Project Description," this is a very small share of permits, or about 1% of those issued by Water Boards.

However, this option would result in two different "rulebooks" for permitting discharges of dredge or fill – one for CWA section 401 certifications, and one for discharges of dredged or fill material to non-federal waters. This would not meet the objective of establishing a uniform regulatory approach for the discharge of dredged or fill material into waters of the state, including wetland areas. Administering two programs is also inefficient.

Therefore, applying the Procedures only to non-federal (gap) waters contributes to regulatory uncertainty, is likely to result in greater impacts to wetland resources by not addressing protection of federally jurisdictional wetlands and other waters, and contributes to higher program costs.

Administer CWA Section 404 Program for All State Waters

Under this alternative, the Water Boards would take responsibility for administering the CWA section 404 permitting program from the Corps, thereby eliminating duplication between state and federal permitting programs. Section 404 permit applicants would need only a state permit for dredge or fill discharges into waters subject to federal jurisdiction, which includes most wetlands. However, the Corps would continue to regulate navigable waters (including tidal waters and their adjacent wetlands) under section 10 of the Rivers and Harbors Act of 1899.

In order to assume administration of the section 404 program, the Water Boards would need to develop a permit program to replace the federal Corps program, and successfully submit an application to U.S. EPA to assume the program. Such a program must provide at least the same level of protection, regulation, enforcement and public participation as the current CWA section 404 program. State regulations can provide greater resource protection, but cannot be less stringent than federal regulations. Under this alternative, Water Board staff would take over the work and responsibilities currently being performed by Corps staff, such as verification of all wetland delineations, not just for those that are outside of federal jurisdiction. The Water Boards would determine what areas and activities are regulated for discharges of dredged or fill material, process permits, and carry out enforcement activities.

U.S. EPA has responsibility for oversight of state-assumed CWA section 404 programs (see 40 CFR Part 233). U.S. EPA typically waives review of most permit applications, but is required to review applications for projects with the potential to impact critical resource areas such as wetlands that support federally listed species, sites listed under the National Historical Preservation Act, components of the National Wild and Scenic River System, and similar areas. U.S. EPA in turn is required to coordinate with other federal agencies (the Corps, USFWS, and the National Marine Fisheries Service).

However, this alternative is not viable because (1) the significant administrative costs to the state would outweigh the benefits of a state only dredge or fill regulatory program and (2) a state program would need to address the additional complexities of meeting federal requirements for dredge or fill discharges and complying with federal oversight. Citing similar challenges, most other states have also declined to pursue assumption of the federal CWA section 404 program.[83] Only two states, Michigan and New Jersey, have assumed the federal CWA section 404 program, although some states are working towards it or have pursued cooperative permit programs.

Preferred Alternative: Adopt Uniform Procedures for All State Waters

This alternative consists of adopting a single set of procedures that apply to all waters of the state, including those that are under federal jurisdiction (subject to CWA section 404 requirements) and those that are not (subject to California WDR requirements only). The Procedures (as described in Section 6, ‘Project Description”) meet project objectives, and are consistent with this alternative.

10.2 Issue: Wetlands Definition

Wetland definitions generally include one or more of three related factors (parameters): hydrology, hydric soils, and hydrophytic vegetation. Hydrology is recognized as the “master” factor as it allows for the development of the dependent factors of hydric soils and hydrophytic vegetation that are characteristic of wetland areas. The Corps’ definition of wetlands, along with its guidance documents, is an example of a “three-parameter approach” because all three factors are included in the definition.

As discussed in more detail in Section 5, “Project Background,” the definition of wetlands differs across the Water Boards. The Water Boards frequently rely on the Corps’ wetland definition when reviewing applications for section 401 certifications. Some Regional Water Boards have adopted the federal wetland area definition and delineation methods, but others have not. As such, there is need for a single wetland definition across all Water Boards that can be applied consistently statewide in the regulatory and monitoring programs.

Do Not Define Wetlands

Using this approach, the State Water Board would not include a definition of wetlands within the Procedures, and would instead rely only on existing definitions by the Regional Water Boards. Under this approach, there would continue to be inconsistency by the Water Boards with regards to the

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[83] see http://aswm.org/wetland-programs/s-404-assumption for further information.

identification of wetlands. When applications include wetland areas, this inconsistency would lead to confusion in locating wetland boundaries for the purposes of avoidance, minimization, and mitigation. In the absence of a Water Board-specific wetland definition, members of the regulated community often assume that state waters, including wetlands, are defined and similarly identified as those under federal jurisdiction.

Because of the inconsistencies, uncertainty, and inefficiencies associated with the current absence of a Water Board wetland definition, the State Water Board has rejected this option.

Apply a One-Criterion Test

The State Water Board considered adopting a wetland definition based on any one-of-three approach. For example, under the USFWS wetland definition, a positive indicator of any one of the factors of wetland hydrology, hydric soils, or hydrophytic vegetation is considered sufficient to make a wetland determination (Cowardin et al., 1979).

Under this type of definition, wetland identification relies on identification of individual wetland characteristics rather than a combination of multiple characteristics. This is more inclusive than the three-of-three approach used by the Corps since more areas would qualify as wetland areas based on exhibiting the most extensive of one or more factors.

One consequence of this increased inclusivity is that it is possible that some non-wetland upland areas may be identified as wetlands due to relic indicators of previous wetland characteristics that no longer reflect current hydrologic conditions. This is because indicators of wetland characteristics, particularly indicators of hydric soil, can persist at a site even after hydrologic conditions have changed, either due to natural or anthropogenic causes (Lewis, 1995).

An inherent weakness of the one-of-three approach is that any one indicator may be used alone to classify an area as a wetland. Relic soil indicators may be a useful tool when hydrologic conditions have recently changed, such as through unpermitted wetlands fill; however, changes in the more distant past may or may not be within an agency’s intended regulatory scope. The problem of false-positive wetland identifications can be further complicated when considering indicators of hydrophytic vegetation. As noted in the National List of Plant Species that Occur in Wetlands (USFWS, 1997), a number of plant species can grow in either wetland or non-wetland conditions. The specific hydrophytic status of such facultative species depends on factors such as the geographic location and individual site conditions. Relying on the presence of these species alone to make a wetland determination may in some cases lead to the classification of non-wetland areas as wetlands.

A further weakness of the one-of-three parameter approach is that there have been no delineation manuals developed by any agency for this type of definition. This is significant because, as the National Research Council recognized in its report to Congress on wetland characteristics and boundaries:

> All [wetland] definitions…are too broad to be applied directly to regulatory practice without substantial accompanying interpretation (Lewis 1995, p. 59).

And,

> Any regulatory definition of wetlands has full practical significance only through interpretation at three levels: criteria, indicators, and recognition of regional variation (Lewis 1995, p. 63).

By contrast, the Corps' 1987 Manual and Supplements provide clear field delineation standards for identifying wetlands under Corps three-of–three wetland definition.

Finally, because the one-of-three parameter approach is not used for regulatory purposes at the federal level, if the Water Boards were to adopt this type of definition as the state wetland definition, it would create major inconsistencies with U.S. EPA and Corps wetland definitions. For these reasons, the State Water Board rejected the "one-parameter approach" as a viable alternative.

Apply a Two-Criteria Test

The State Water Board also considered a two-criteria test, in which an area must have any two of the three wetland indicators (wetland hydrology, hydric soils, and hydrophytic vegetation) to be considered a wetland. The two-criteria alternative is less inclusive than the one-criteria alternative, but more inclusive than the other alternatives. This alternative may result in more areas being identified as wetlands than is currently the case. As such, this alternative could meet the Procedures objective of advancing statewide efforts to ensure no overall net loss and a long-term net gain in the quantity, quality and sustainability of wetlands in California.

While not as prone to inaccurate identifications as the one-criterion alternative, this approach has not been used by state or federal agencies for either monitoring or regulatory purposes. There are therefore no field manuals describing how to delineate wetlands specifically using this method (although the Corps' manuals could potentially be used to identify each of the criteria). The two-criteria alternative would also result in "false-positive" issues as noted above if based on either soils or vegetation. It would create inconsistencies with U.S. EPA and the Corps permitting of discharges of dredged and fill material, which employs the three-criteria test. This alternative would therefore not conform to the Procedures objective of establishing a uniform regulatory approach consistent with the federal CWA section 404 program for the discharge of dredged or fill material into waters of the state, including wetland areas that are also waters of the state.

Apply a Three-Criteria Test

The Corps' definition of wetlands, along with its guidance documents, is an example of a three-criteria approach because consideration of all three factors – hydrology, hydric soils, and hydrophytic vegetation – is included. Without all three parameters present, an area is not considered a wetland by the Corps.

From a wetland identification standpoint, strength of the three-of-three parameter approach is that there is an internal verification scheme inherent within the identification process that ensures that individual indicators of wetland hydrology, hydric soils, and hydrophytic vegetation are in fact wetland indicators. This verification occurs by virtue of the requirement that an indicator of any one characteristic be used to support wetland identification only when indicators of the other two characteristics are also present.

However, the weakness of this approach is that the three-of-three test leads to the exclusion of some important wetland types in California, such as un-vegetated coastal mudflats, playas and some seasonal wetlands.[84] As such, the State Water Board rejected the "three-criteria test" as a viable alternative.

Preferred Alternative: Apply a Modified Three-Criteria Test

Under this alternative, the wetland definition is:

> An area is wetland if, under normal circumstances, (1) the area has continuous or recurrent saturation of the upper substrate caused by groundwater, or shallow surface water, or both; (2) the duration of such saturation is sufficient to cause anaerobic conditions in the upper substrate; and (3) the area's vegetation is dominated by hydrophytes or the area lacks vegetation.

This definition is similar to the federal definition[85] in that it identifies three wetland characteristics that determine the presence of a wetland: wetland hydrology, hydric soils, and hydrophytic vegetation. Unlike the federal definition, however, the Procedures' wetland definition includes one exception: it would only require the presence of hydric soils and wetland hydrology for an area devoid of vegetation (less than 5% cover) to be considered a wetland. However, if any vegetation is present, then the Corps' delineation procedures would apply to the vegetated component (i.e., hydrophytes must dominate). Examples of waters that would be considered wetlands by the Procedures, but not by the federal definition, are non-vegetated wetlands, or wetlands characterized by exposed bare substrates like mudflats and playas. The Corps definition refers to "saturated soil conditions", whereas the Water Board definition refers to saturated substrate leading to "anaerobic conditions in the upper substrate" which is a more inclusive term. However, both of these descriptions are functionally equivalent because both define conditions that would lead to dominance of hydrophytes, if the site is vegetated.

10.3 Issue: Wetlands Delineation Methods

The Water Boards generally apply the Corps' 1987 Manual and Supplements for wetland delineation. However, as described in Section 5, "Program Background," delineation procedures are inconsistent

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[84] To at least some extent, these concerns are mitigated by the use of Corps wetland delineation manuals designed for application to arid Western wetland delineation.

[85] U.S. EPA wetland definition: areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and that under normal circumstances do support a prevalence of vegetation typically adapted for life in saturated soil conditions (40 CFR 230.3(t) and 40 CFR 230.41(a)(1)).

across Water Boards. There is a need for a single set of delineation methods for all Water Boards, to ensure the consistent identification of wetlands as defined in Section 6, “Project Description.”

Rely on the Corps’ Delineation Methods

One option is to continue to rely on the Corps’ Manual and Supplements for wetland delineation. This approach would be consistent with delineation methods already used at the federal level. There is an internal verification scheme inherent within the identification process that ensures that individual indicators of wetland hydrology, hydric soils, and hydrophytic vegetation are in fact wetland indicators.

However, using the Corps’ delineation methods with no modifications would lead to the exclusion of some important wetland types in California, such as un-vegetated coastal mudflats, playas, and some seasonal wetlands. As such, an unmodified application of the Corps’ delineation methods would not meet the objectives of the Procedures.

Preferred Alternative: Use Modified Corps’ Delineation Methods

The wetland delineation procedures in the Procedures are based on the Corps’ 1987 Manual and Supplements, but allow Water Boards to adjust the 1987 Manual and Supplements to delineate non-vegetated wetlands. In addition, the Procedures would allow for supplemental field data from the wet season to be collected to substantiate wetland delineations conducted in the dry season. As such, the delineation procedures take advantage of established federal procedures while accommodating the variable wetland types present in California, meeting the stated objectives of the Procedures.

10.4 Issue: Defining Wetland Waters of the State

Water Code section 13260(a)(1) defines the term “waters of the state” as “any surface water or groundwater, including saline waters, with the boundaries of the state.” Specific water body types, such as wetlands and streams, are not defined in the Water Code. The Procedures include a technical definition of a wetland that was developed by a technical advisory team without regard to jurisdictional considerations. Therefore, it is necessary to clarify when an area meeting the wetland definition is a water of the state under the Water Code.

Include All Areas Meeting the Wetland Definition as Wetland Waters of the State

One alternative would be to provide that any feature meeting the wetland definition would be considered a water of the state. This would include the universe of all the areas which exhibit the defined wetland characteristics, regardless of size or nature. However, this alternative could include some areas that the Water Boards have generally not protected as waters of the state, such as small, artificially-created ornamental ponds and some temporary features such as puddles and tire ruts.

Include Only Natural Areas Meeting the Wetland Definition as Wetland Waters of the State

A second alternative would be to provide that only natural features meeting the wetland definition would be considered waters of the state. This alternative would increase regulatory uncertainty because of the difficulty in determining which wetlands are "natural." California has a highly modified hydrologic landscape, in which water bodies have been channelized, rerouted, dammed, or hardscaped. Therefore, this alternative could arguably exclude some areas that the Water Boards have historically protected as waters of the state such as some reservoirs and hardened flood control channels.

Determine Wetland Waters of the State on a Case-by-case Basis

A third alternative would be to have the Water Boards determine whether wetland areas are waters of the state on a case-by-case basis. This alternative would grant the Water Boards the greatest amount of flexibility in addressing jurisdictional issues. This alternative would codify how jurisdictional determinations were made prior to the adoption of the Procedures. The version of the Procedures that was publicly noticed in June 2016 proposed making jurisdictional determinations on a case-by-case basis. Stakeholders expressed widespread opposition to this proposal because case-by-case determinations would fail to provide regulatory certainty and would likely result in statewide inconsistency in jurisdictional determinations.

Preferred Alternative: Jurisdictional Framework for Determining Wetland Waters of the State

A third alternative is to provide that (1) all natural wetlands; (2) wetlands created by modification of waters of the state; (3) wetlands that are immediately adjacent to other waters of the state; (4) all wetlands meeting current or historic definitions of waters of the U.S.; and (4) some qualified artificial wetlands that meet the wetland definition would be considered waters of the state. This alternative is preferred because it is not overly inclusive and it will not exclude categories of features that have traditionally been regulated by the Water Boards. It would not include temporary features that have not traditionally been regulated as waters of the state. This alternative is also preferred because it would not rely exclusively on a distinction between natural and artificial wetlands that is sometimes difficult to determine. Instead, this alternative sets forth a number of categories of wetlands that are waters of the state that do not exclusively rely on the determination that a wetland is either natural or artificial. Establishing a "jurisdictional framework" will help reduce regulatory uncertainty, thereby reducing time and costs of projects and increasing regulatory efficiency and effectiveness. Because the framework still relies on the exercise of professional judgment in difficult cases and is somewhat complex, there will be less certainty than with some of the other alternatives. However, this alternative was ultimately preferred because it was a reasonable balance between regulatory certainty, historic practices, and needed flexibility.

10.5 Issue: Procedures for Regulation of Discharges of Dredged or Fill Material

Currently, the Water Boards are responsible for issuing section 401 certifications for projects involving waters of the United States. Projects discharging dredged or fill material to non-federal waters (which are not subject to CWA section 404 regulations) also fall under the Water Code permitting requirements for water quality administered by the Water Boards. The Water Boards issue WDRs for these projects. One of the objectives of the Procedures is to create a single set of permitting requirements for these activities under both section 401 certifications and WDRs.

Do Not Provide Uniform Procedures

Under this alternative, the State Water Board would not provide uniform procedures, and current practices would continue. It is possible that some Water Boards are currently applying some or all of the elements of the Procedures requirements. However, it is not possible to determine the full extent of these applications. Each Water Board's practice is based on how that Water Board interprets its authority to regulate waters of the state, and it is not always readily apparent simply by reviewing Basin Plans, existing permits, and other regulations.

Because of the inconsistencies, uncertainty, and inefficiencies associated with the current absence of uniform permitting procedures for all waters of the state, the State Water Board rejected this option.

Establish Uniform Permitting Procedures Modeled on Federal Permitting Procedures

The State Water Board considered adopting the federal Guidelines and associated Regulatory Guidance Letters without any changes or modifications. The Water Boards would apply the federal Guidelines to all waters of the state (including those that are not under federal jurisdiction). The advantage of this approach would be consistency with the federal program.

The disadvantage would be a missed opportunity to adjust the federal program for long-standing Water Board issues with the federal program. Specifically, the Procedures adds clarity to the use of the watershed approach to the approval of permits and mitigation for the discharge of dredged or fill material, incentivizes the use of watershed plans by reducing mitigation requirements for plan approval by the Water Boards, and adjusts mitigation requirements to better address project watershed aquatic resource needs. Therefore, this alternative would not be as protective of waters of the state.

Additionally, there would be no process for exempting the alternative analysis requirement for projects with minimal impacts. For these reasons, the State Water Board has rejected this alternative.

Preferred Alternative: Establish Uniform Procedures Modeled on Federal Procedures, but Provide Additional Guidance and Requirements

This alternative is to establish uniform procedures based on federal procedures, but applicable to all waters of the state (including those not under federal jurisdiction) and with modifications for additional guidance and requirements. The additional guidance and requirements beyond those included in federal permitting procedures and existing WDR requirements are described in detail in Section 6, “Project Description.” As described above, these differences support a more comprehensive watershed approach to review and approval of applications. Additionally, the Procedures provide a process for exempting the alternatives analysis requirement for projects with minimal impacts in order to better align with the Corps’ alternatives analysis requirements. As to the latter, the Corps generally does not require a project-specific alternatives analyses from applicants for general permits for projects with minimal impacts (e.g., nationwide permits) since the Corps provides the analysis when developing general permits.

10.6 Issue: Exclusions

The CWA exempts six categories of activities, including farming, ranching, and silviculture, from dredge or fill regulation (see CWA section 404(f), 33 CFR 232.3(c), and 33 CFR 323.4). In addition to these classes of activities, certain areas that are outside of the definition of “waters of the United States” are also excluded, including prior converted cropland and waste treatment systems.

Do Not Exclude Any Activities or Areas

One potential alternative to maximize protection of wetlands is not to exclude any activities or areas from application requirements. Under this alternative, all project proponents seeking to discharge dredged or fill material would be subject to the Procedures. The advantage of this approach is that there would be increased evaluation of project alternatives, and potentially increased protection of all state waters, including wetlands, from dredge or fill discharges related to the farming, ranching and silvicultural activities.

The disadvantages of this approach are that the Procedures would not be consistent with the CWA section 404 program. This could contribute to potential compliance issues stemming from confusion over differences in federal/state regulations, and cause inefficiencies and increases in administrative costs due the lack of a supporting federal program regulating these activities and areas. It would require Water Board regulation of farming, ranching and silvicultural activities for dredge or fill discharges under the Procedures requirements that may be more effectively regulated under other Water Board authorities and programs. For these reasons, the State Water Board rejected this alternative.

Preferred Alternative: Exclude All CWA Section 404(f)(1) Activities and Areas

For consistency with the federal program and efficiency in program management, the Procedures for the regulation of dredge or fill discharges conform to the federal dredge or fill program. This alternative excludes the same activities and areas as the federal program. However, the exclusions do not limit the Water Boards’ ability to issue WDRs for these waters or activities in accordance with the California Water Code.

Note that the jurisdictional framework excludes certain waste treatment wetlands that were artificially created. In addition, there is an exclusion from the Procedures for routine operation and maintenance activities for artificially-created waters that are used and maintained for wastewater treatment. These differences in regulation of waste treatment systems were necessary in part to account for differences in jurisdiction. For example, waste treatment systems may affect groundwater and are accordingly not appropriate to exclude categorically. In addition, certain waste treatment systems were created in existing waters of the state such that regulating the water quality of the waste treatment systems is appropriate.

11. ECONOMIC CONSIDERATIONS

Several sections of the California Water Code and CEQA require that the Water Boards consider economics when they regulate water quality. Water Code section 13000 states that “[a]ctivities and factors which may affect the quality of the waters of the state shall be regulated to attain the highest water quality which is reasonable, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible.” This section of the Water Code, while applicable to the Procedures, does not place any affirmative duty on the Water Boards to conduct a formal economic analysis.

Water Code section 13141 relates to implementation of agricultural water quality control programs, and is not applicable to the Procedures. Water Code section 13241 requires that the Water Boards consider economics when they adopt water quality objectives. Because the Procedures do not contain water quality objectives, section 13241 is not applicable.

CEQA requires that whenever the Water Boards adopt rules that require the installation of pollution control equipment or establish a performance standard or treatment requirement, the Water Boards must conduct an environmental analysis of the reasonably foreseeable methods of compliance.[86] This analysis must take into account a reasonable range of factors, including economics. However, the Procedures do not require the installation of pollution control equipment or establish a performance standard or treatment requirement.

The CWA and its implementing regulations do not require consideration of economics when setting water quality criteria. According to the U.S. EPA, economics should be addressed during the designation, or de-designation, of potential beneficial uses,[87] which the Procedures do not attempt to do. Federal public participation regulations also require, whenever possible, that social, economic and environmental consequences be clearly stated in informational material.[88]

Porter-Cologne section 13241 requires the Water Boards to take “economic considerations,” among other factors, into account when they establish water quality objectives. To meet the economic considerations requirement, State Water Board (1999; 1994) concluded that, at a minimum, the Regional Water Boards must analyze:

- ***Whether the proposed objective is currently being attained;***

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[86] Pub. Res. Code § 21159, 14 CCR 15064
[87] 40 CFR 131.10(d) and 40 CFR 131.10(g)(6)
[88] 40 CFR 25.4

- ***If not, what methods are available to achieve compliance; and***
- ***The cost of those methods.***

If the economic consequences of adoption are potentially significant, the Water Boards must explain why adoption is necessary to ensure reasonable protection of beneficial uses or prevent nuisance. The Boards can adopt objectives despite significant economic consequences; there is no requirement for a formal cost-benefit analysis.

The Procedures do not include water quality objectives. However, consistent with State Water Board guidance for considering economics of policies that establish objectives, and that the Regional Boards then adopt in their Basin Plans, this section of the Staff Report includes an analysis of compliance with the Procedures, methods for achieving compliance, and the cost of those methods.[89]

11.1 Baseline for the Analysis

Section 5 provides a description of the program, including existing regulations. Under baseline requirements, discharges to waters of the state, including wetlands, must comply with a variety of federal and state procedural, analytical, and discharge limitation requirements. The current regulatory framework is the baseline for measuring the potential incremental changes associated with the Procedures.

11.2 Estimated Extent of Current Consistency with Procedures

As discussed in Section 6, “Project Description,” many elements of the Procedures are the same as the federal Guidelines, meaning that much of the Procedures are already applicable to projects in waters that are under federal jurisdiction. As such, the Procedures will not significantly change the regulation of dredge or fill projects in waters of the state under federal jurisdiction, and the majority of applicants are already in compliance with the Procedures.

A small number of WDRs each year (currently less than 1% of permits; see Section 5, “Project Background”) are for discharges to waters of the state that are not federally jurisdictional and therefore not already subject to the CWA and Corps permitting requirements. In many cases, elements of the Procedures are already applicable to these WDRs. For example, State Water Board Water Quality Order No. 2004-004-DWQ, which is restricted to non-federal waters, requires compensatory mitigation for discharges to all waters of the state. However, the current regulatory framework for these WDRs does

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[89] This analysis does not represent a cost-benefit analysis.

not include a formal alternatives analysis and selection of the LEDPA. In addition, as discussed in section 6, alternatives analysis procedures have been inconsistent across the Water Boards. Some regions may require fewer alternatives analyses under the Procedures, and others may require more. This could be true for both discharges solely to waters of the state, and for discharges to waters of the U.S. that are regulated under individual Orders. However, this is expected to affect only a small number of applicants and, on balance, the statewide effect would be similar to baseline.

To identify the extent of current compliance with the Procedures, the State Water Board evaluated a selection of these types of Orders. Table 11-1 summarizes the results. The Procedures may also have the effect of shifting activities away from waters of the state to avoid dredge and fill impacts. However, there is no information with which to assess the magnitude of resulting costs. Where upland land costs are higher, there may also be opportunity for higher project returns. Such circumstances are highly site and project specific.[90]

Table 11- 1. Estimated Compliance with Procedures

Order (Year)	Project Type	Evaluation of Consistency with Procedures
State Water Board		
Water Quality Certification Amendment 2, CALTRANS Donner Segment 3 Roadway Rehabilitation Project (2008)	Transportation (road rehabilitation and upgrade)	May not be consistent with proposed requirement for alternatives analysis; Corps NWP 23 (non-certified)[1]
WDR for Southern California Edison Company for Segments 4, 5, and 10 of the Tehachapi Renewable Transmission Project; WDID No. SB10003IN (2010)	Construction of electricity transmission infrastructure	Consistent; Order indicates alternatives were evaluated and LEDPA selected
2004-0004-DWQ, Statewide General WDR for Dredged or Fill Discharges to Waters Deemed by the Corps to be Outside of Federal Jurisdiction (2004)	Discharge of not more than 0.2 acre and 400 linear feet of fill [waivers for discharges exempt from CWA section 404(f)]	Not applicable. This project qualifies for a general Order and therefore are not subject to the Procedures. Note, consistent with the Procedures, mitigation plan requires alternatives analysis effort commensurate with the purpose of the discharge and value of waters/level of impact

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[90] Orders used in the economic analysis are from Orders that were issued in 2008-2011. Procedures for application review and approval remains unchanged from the time this sample was taken and reflects current practice.

Table 11- 1. Estimated Compliance with Procedures

Order (Year)	Project Type	Evaluation of Consistency with Procedures
Region 1		
Notice of Coverage, Waiver of WDRs for Minor Dredging and Fill Activities for the Rudy Light, West Fork Russian River Streambank Stabilization Project (2010)	Streambank stabilization	Consistent; Procedures allows for on-site alternatives analysis for projects that by their nature cannot be located in alternate locations, such as bank stabilization projects. On-site alternatives were implemented for this project by implementing bioengineering techniques and minimizing the installation of rip-rap.
Water Quality Certification for the Campbell Creek Apartments; WDID No. 1B11088NHU (2011)	Apartment building construction	May not be consistent with requirement for alternatives analysis and selection of LEDPA; Corps NWP 29(non-certified); Mitigated Negative Declaration issued under CEQA
Water Quality Certification for the Humboldt County DPW – Williams Creek Bridge Replacement at Williams Creek Road; WDID N. 1B11048NHU (2011)	Bridge replacement	Likely consistent; on-site avoidance and minimization measures implemented may have met the alternatives analysis requirements because the project could not be located anywhere else; Corps NWP 3 issued (non-certified)
Region 2		
WDR for Stanford University; Culverting of a Seasonal Channel Between Olmstead Road and Stanford Ave; Order No. R2-2008-0072 (2008)	Construction of campus housing; filling of a seasonal channel	Consistent; project is consistent with University plan, which was subject to full EIR pursuant to CEQA and associated alternatives analysis requirements for impacts to waters
Water Quality Certification for Repair and Restoration of Creek Channel and Riparian Area (2010)	Channel stabilization, repair, and restoration	Consistent; project will restore natural channel and would receive an alternatives analysis exemption because the project would have met the requirements of a restoration project; Corps issued NWP (non-certified)

Table 11- 1. Estimated Compliance with Procedures

Order (Year)	Project Type	Evaluation of Consistency with Procedures
Water Quality Certification for the Irrigation Pond Project at the Sunol Valley Golf Course (2010)	Improvement of golf course irrigation water retention system	May not be consistent with requirement for alternatives analysis and selection of LEDPA; Corps permit issued under non-certified NWP 13; Negative Declaration issued under CEQA
Region 3		
Technically Conditioned Water Quality Certification Number 34210WQ17 for Santa Maria River: Bonita School Road and Flap Gate Pilot Channels (2010)	Channel excavation	Likely consistent; on-site avoidance and minimization measures implemented may have met the alternatives analysis requirements because the project could not be located in an alternate location
Water Quality Certification Number 33510WQ01 for the Storm Repair at Coalinga Road Over Horsethief Canyon Creek Project (2010)	Culvert replacement and road washout repair	Likely consistent; on-site avoidance and minimization measures implemented may have met the alternatives analysis requirements because the project could not be located in an alternate location; Corps NWPs 14 and 33 (non-certified)
Water Quality Certification and WDR for Los Angeles County Flood Control District, Proposed Maintenance clearing of Engineered Earth-Bottom Flood Control Channels; Order No. R4-2010-0021 (2010)	Vegetation and debris clearing from 99 earth-bottom channel reaches for flood protection	Likely consistent; on-site avoidance and minimization measures implemented may have met the alternatives analysis requirements because the project could not be located in an alternate location; Corps NWP 31 (non-certified)
Region 4		
Water Quality Certification for Proposed Viewpoint School Modernization – 2010 Hydrology Improvement Project (2010)	Flood control improvements for school modernization project	Consistent; permit indicates that an alternatives analysis was completed and LEDPA selected
WDR for City of Ventura, Moreland Drainage Ditch Channel Maintenance; Order No. R4-2009-0093 (2009)	Ditch dredging	Likely consistent; on-site avoidance and minimization measures implemented may have met the alternatives analysis requirements because the project could not be located in an alternate location

Table 11- 1. Estimated Compliance with Procedures

Order (Year)	Project Type	Evaluation of Consistency with Procedures
Region 5		
WDR for Tejon Mountain Village, LLC; Order No. R5-2011-0018	Resort development	May not be consistent with requirement for alternatives analysis and selection of LEDPA; EIR completed pursuant to CEQA
Clean Water Act §401 Technically Conditioned Water Quality Certification and WDR for Discharge of Dredge and/or Fill Material; Feather River Parkway/Willow Island Project (WDID#5A51CR00055) (2010)	Park establishment	May not be consistent with need for alternatives analysis and selection of LEDPA; Corps permit issued under non-certified NWP 42; Mitigated Negative Declaration issued under CEQA
Amendment for the Clean Water Act §401 Technically Conditioned Water Quality Certification and WDR for Discharge of Dredged and/or Fill Materials; Granite Lakes Estates Project (WDID#5A1CR00291) (2010)	Residential development	May not be consistent with need for alternatives analysis and selection of LEDPA; EIR completed pursuant to CEQA; Corps permit issued under non-certified NWP 29
Region 6		
Notice of Applicability for General WDR for Small Construction, including Utility, Public Works, and Minor Streambed/Lakebed Alteration Projects, Board Order No R6T-2003-0004, Coram California Development Limited Partners Cameron Ridge Wind Project (2011)	Construction and operation of wind energy generation facility	May not be consistent with need for alternatives analysis and selection of LEDPA; Mitigated Negative Declaration issued under CEQA
Water Quality Certification for the Eagle Lake Sewage Pond Fence Project; WDID 6A181004007 (2010)	Repair and upgrade of wastewater treatment facility	Consistent; permit indicates that alternatives were considered in the Environmental Assessment; Corps permit issued under non-certified NWP 18; Mitigated Negative Declaration issued under CEQA

Table 11- 1. Estimated Compliance with Procedures

Order (Year)	Project Type	Evaluation of Consistency with Procedures
Order to Amend CWA §401 Water Quality Certification and WDR Exemption, Donner Lake Public Pier Replacement Project; WDID No. 6A290906004 (2010)	Replacement of 2 piers	Likely consistent; Procedures allow for alternatives analysis based on a description of avoidance and minimization measures because the project has impacts less than 0.1 acres; Corps NWP 18 (non-certified); exempt from CEQA
Region 7		
Order for Technically-Conditioned CWA §401 Water Quality Certification for Discharge of Dredged and/or Fill Materials (2010)	Bridge replacement	Likely consistent; on-site avoidance and minimization measures implemented may have met the alternatives analysis requirements because the project could not be located in an alternate location; Corps NWP 3 (non-certified); exempt from CEQA
Regional General Permit No. 63 Pre-Construction Notification for No. SPL-2010-01178-SME (2010)	Pole replacement	Not applicable. This project qualifies for a general Order and therefore are not subject to the Procedures.
Region 8		
CWA §401 Water Quality Standards Certification for Stonefield Chino Hills 37 – TTM 18393 (2010)	Residential development	May not be consistent with requirement for alternatives analysis and selection of LEDPA; EIR completed pursuant to CEQA; Corps permit issued under non-certified NWP 29
WDR Order No. R8-2010-54 for Hemet Hospitality Investments LLC, Florida Promenade Specific Plan Amendment (2010)	Commercial development	Likely not consistent with requirement for alternatives analysis and selection of LEDPA; Mitigated Negative Declaration issued under CEQA
CWA §401 Water Quality Standards Certification for the Rancho Jurupa Sports Park Project (2010)	Installation of a drainage outlet	Likely consistent; Procedures allow for alternatives analysis based on a description of avoidance and minimization measures because the project has impacts less than 0.1 acres; (permit indicates that impacts would be restricted to 0.003 acres); Corps NWP 7 (non-certified); Mitigated Negative Declaration issued under CEQA

Table 11- 1. Estimated Compliance with Procedures

Order (Year)	Project Type	Evaluation of Consistency with Procedures
Region 9		
Action on Request for CWA §401 Water Quality Certification and Waste Discharge Requirements for Discharge of Dredged and/or Fill Materials; Kingdom Hall of Jehovah's Witnesses Project, Certification No. 11C-028 (2011)	Kingdom Hall construction	Likely not consistent with requirement for alternatives analysis and selection of LEDPA; Corps permit issued under non-certified NWP 14; Mitigated Negative Declaration issued under CEQA
Action on Request for CWA §401 Water Quality Certification for Tijuana River Valley Wetland Mitigation Project, 09C-021 (2011)	Wetland restoration for mitigation credits	May not be consistent with requirement for alternatives analysis and selection of LEDPA; EIR completed pursuant to CEQA; However, it is likely that information regarding consideration of alternative sites would have already been collected as part of the process of choosing the selected site. Corps permit issued under non-certified NWP 27, 33, and 43
CWA §401 Water Quality Standards Certification No 11C-007 for the State Route 79 Widening Project (2011)	Road widening	Likely consistent; on-site avoidance and minimization measures implemented may have met the alternatives analysis requirements because the project could not be located in an alternate location; Corps permit issued under non-certified NWP 14; Mitigated Negative Declaration issued under CEQA

Orders for discharges of dredged or fill material to waters of the state (including wetlands), as shown in Table 11-1, are largely in compliance with the Procedures.[91] However, there may be some inconsistency with respect to the alternatives analysis requirement and selecting the LEDPA. In some instances, information contained in the Orders is not sufficient to make such a determination. Additionally, the alternatives analysis requirements may already be partially or fully satisfied if the project is subject to

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[91] Activities that are exempt from requirements under CWA §404(f) are also exempt from the Procedures requirements.

full CEQA review (whether or not the proposal affects waters of the state under existing regulations). CEQA Guidelines require EIRs to:

> "describe a range of reasonable alternatives to the project, or to the location of the project which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives" (section 15126.6(a)).

Since EIRs cover a much broader set of environmental impacts[92] than impacts to water resources (including wetlands), alternatives analyses conducted pursuant to CEQA may be very detailed and rigorous. As such, the CEQA alternatives analyses for individual projects may be sufficient to fulfill Procedures requirements. However, the alternatives analysis in an EIR does not always include alternatives designed specifically to avoid or minimize impacts to waters; rather, the alternatives assessed are often larger-scale project alternatives. An alternatives analysis specific to the Procedures would include other alternatives more focused on impacts to these waters only, such as alternative locations to the waters. Nevertheless, a site-specific project EIR analysis likely contains all the site description and project planning documentation needed for the alternatives analysis and LEDPA selection.

Additionally, the Procedures require that the Water Boards consider the potential effects of a discharge using a watershed approach, which is an analytical process for evaluating the environmental effects of a proposed project and making compensatory mitigation decisions that support the sustainability or improvement of the abundance, diversity, and condition of aquatic resources in a watershed. Some existing Orders do not explicitly cite a watershed approach. Further, while the federal Guidelines require using a watershed approach in establishing compensatory mitigation plans, federal guidelines do not require such an approach for evaluating discharges of dredged or fill material.

However, the Water Boards are generally already implementing a watershed approach, as demonstrated by the preference for on-site mitigation within the project watershed and restoration of natural functions of waterbodies for Orders requiring mitigation to sustain watershed services.

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[92] EIRs must consider impacts to the following resource areas: aesthetics, agriculture and forest resources, air quality, biological resources, cultural resources, geology and soils, greenhouse gas emissions, hazards and hazardous materials, hydrology and water quality, land use and planning, mineral resources, noise, population and housing, public health and vector control, public services, recreation, transportation and traffic, and utilities and service systems.

11.3 Compliance Methods and Costs

The universe of future applicants and projects involving dredge or fill discharges is largely unknown. Although the types of future activities that could impact waters of the state, are expected to be similar to those that have required section 401 certification and WDRs in the past (e.g., infrastructure construction and maintenance, housing development), the particular projects, extent and location of the waters that may be affected will be shaped by a number of factors, including future economic and demographic trends. Thus, only a general qualitative assessment of potential incremental costs is practicable. This section discusses the potential cost impacts of methods available to achieve compliance with the Procedures.

Alternatives Analysis

The Procedures require that, with some exceptions, applicants seeking to discharge dredged or fill material to waters of the state conduct an analysis of practicable alternatives to determine the LEDPA. Practicable alternatives may include alternative available locations, designs, and reductions in size, configuration, or density.

The level of effort associated with alternatives analyses requirements may be minimal. For example, the certification by the San Francisco Bay Water Board for an irrigation pond project at a golf course, permitted by the Corps under Nationwide Permit 13 did not indicate an alternatives analysis was required. However, detailed site design, and stormwater control were documented in the certification. Therefore, the level of effort associated with evaluating project alternatives may be relatively small. The same would likely be true for many of the section 401 certifications as roughly 80% of these Orders are typically issued for impacts of less than one-tenth of an acre to waters of the state (data based on compilation of water quality certifications issued 2009-2013).

The Procedures requires applicants to consider a range of practicable alternatives that may have less adverse environmental impacts. It incorporates the federal Guidelines, which describe “practicable” as:

> “available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. If it is otherwise a practicable alternative, an area not presently owned by the applicant, which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered.”

Consideration of what constitutes a practicable alternative will vary depending on the type of project proposed. The determination of what constitutes an unreasonable expense of an alternative should relate to whether the projected cost is substantially greater than the costs normally associated with the particular type of project.

Under existing policy and regulatory conditions, for projects that are not minimally impacting, applicants are likely to compile extensive documentation of the environmental impacts, site design, stormwater controls, mitigation strategies, and other relevant factors, especially if they are subject to full CEQA review. As such, analysis to examine alternatives that would avoid or minimize impacts to waters of the state may represent a small portion of the costs of the existing analysis. Projects that are not subject to CEQA review are likely to be less complex than those subject to CEQA. As such, the level of effort that would be needed would likely be commensurate with the scope and potential for adverse environmental impacts on the aquatic environment, similar to implementation of federal Guidelines. Since these projects are not subject to full CEQA review, significant environmental impacts may be unlikely.

The costs of analyzing project alternatives and selecting LEDPA will be highly site- and project-specific; however, such costs are not likely to account for a large share of overall project costs. For example, the need to evaluate alternatives to filling a roadside drainage ditch that includes some wetland as part of widening a road may involve determining the impacts of a number of alternatives: not widening the road, widening the road on the other side, and widening the road around the wetland area with a separated lane. The applicant may have evaluated many of these options as part of the current design plan (e.g., in identifying lowest cost design alternatives; evaluating stormwater control plans).

The cost of preparing an alternatives analysis is some fraction of the total cost of permit preparation. Based on a sample of 103 individual permits and nationwide permits (primarily for projects such as road maintenance, flood control, and stormwater management work), Sunding and Zilberman (2002) estimated an average cost to an applicant of preparing a Nationwide Permit application of $30,000, with a median of $11,000 and range of $2,000 to $140,000. In one study, 58 percent of a sample of projects receiving nationwide permits had discharges affecting more than one-half of an acre of wetlands.

If the applicable Water Board determines that an alternatives analysis or justification for LEDPA selection is insufficient, it may request additional information, analyses, or justifications. Selection of the LEDPA may also require additional project planning or longer-term construction. There may be opportunity costs in such cases including for idled and extended labor and equipment costs, storage, bonds, material inflation, home office overhead, field office overhead, and other project components (Zack and Badala, 2011). Alternatively, the consistency provided by the Procedures may enable better and more efficient project planning, reducing costs associated with uncertainty.

Alternate Project Designs

Alternatives analysis may or may not result in identifying alternate project designs that avoid or minimize adverse environmental impacts, including cumulative impacts. Whether such analyses will lead to project design alterations with implications for overall project costs is also unknown. Design changes associated with avoiding areas recurrently inundated with water could lead to costs (e.g., if applicants are required to move the project to a more expensive upland lot away from wetlands) or cost savings (e.g., if design or site alterations lead to less extensive alterations or construction or results in less compensatory mitigation).

Additionally, by selecting the LEDPA, applicants may avoid other regulatory requirements arising from proposed discharges to wetland ecosystems if the alternate project design eliminates such discharges. For example, the California Fish and Wildlife Code (section 1601- section 1603) restricts alterations to rivers, streams, and lakes, including diversion, obstruction, and fill-related activities that will impact fish and wildlife resources. It requires proposed projects to obtain a permit from the California Department of Fish and Wildlife (CDFW) detailing measures that the applicant will take to protect fish and wildlife resources. By avoiding potential for these impacts, LEDPA selection may reduce the associated permitting and project design costs. If the LEDPA avoids impacts to wetland habitats, this alternative may similarly reduce costs associated with federal and state Endangered Species Act consultations, local zoning for wetland projects, and other requirements.

Selection of the LEDPA may be associated with opportunity costs compared to the proposed site location, or may result in increased project profitability. There may also be other distributional economic impacts that may accrue to different parties (not just the applicant), just as there are with the original project design. However, given that the universe of potentially affected projects is unknown, the types and magnitudes of potential costs or cost savings are unknown.

Compensatory Mitigation

Since all waters of the state area already subject to compensatory mitigation requirements, the Procedures are not likely to change the quantity of compensatory mitigation required statewide. However, there may be some minor increases or decreases in compensatory mitigation project requirements at the project level. For example, if the Procedures result in some projects relocating away from wetlands via selection of LEDPA, this may result in a decrease in compensatory mitigation requirements. As such, there may be some indirect cost savings to project developers due to avoided compensatory mitigation projects and associated requirements. For informational purposes and to document the range of economic considerations, this section discusses the potential magnitude of these costs or cost savings.

Compensatory mitigation includes costs associated with the purchase of credits, biological studies, land acquisition, engineering design, capital (including plant and materials), monitoring, and operations and maintenance (including labor and energy). Such costs are site- and project-specific, reflecting a number of factors: availability of onsite mitigation opportunities; availability and value of nearby offsite mitigation locations; amount and type of mitigation; and complexity and value of the resources affected. Additionally, the costs of compensatory mitigation also include financial assurances (e.g., performance bonds, escrow accounts, casualty insurance, letters of credit, and legislative appropriations) and long-term site protection. The Water Boards also include compensatory mitigation provisions in WDRs.

The Environmental Law Institute (ELI, 2007) notes that while all compensatory mitigation methods face the same costs of long-term management, site protection, and easement defense, other factors result in significant cost differentials. The primary costs related to wetland preservation may be land acquisition, while creation may require significant earth-moving activities, planting, and the installation of water-control structures. Restoration and enhancement involve manipulating conditions at existing or previously existing wetland sites, and therefore may carry fewer construction costs than creation.

Martin et al. (2006) note that permittee-responsible compensatory mitigation costs are not fully observable, and are likely to be highly variable based on project size, difficulty, and land costs. Costs include those associated with:

- ***Compliance***: identifying and securing compensatory mitigation sites; preparing mitigation project plans for review and approval; and construction, monitoring, and long-term maintenance of the project;
- ***Time***: potential opportunity costs of any delay in permit issuance associated with the development and approval of mitigation plan; and
- ***Risk***: potential remediation costs if the compensatory mitigation project fails to fulfill objectives.

As part of an economic analysis of guidance regarding the definition of waters of the United States, U.S. EPA and the Corps (2011) estimated compensatory mitigation costs in each state, based on public data records, phone inquiries, internet searches, and published studies. U.S. EPA and the Corps (2011) found that costs for compensatory mitigation projects in California (2009 to 2010) range from $18,500 to $159,250 per acre.[93]

These mitigation costs are not likely to represent a substantial portion of total project costs. Parker et al. (2007) evaluated the impacts of compensatory mitigation requirements on development potential on 11 sites in Oregon, and found that, due to the rapid increases in development and construction costs, on-site or off-site mitigation do not account for a large percentage of development costs overall. According to their analysis, mitigation costs represent 1% to 5% of total project construction costs.[94]

Permittee-responsible compensatory mitigation costs may be inferred from restoration project costs. Tables 11-2 and 11-3 below show the costs associated with wetland restoration projects completed by the Southern California Wetlands Recovery Project (SCWRP). Table 11-2 lists total project costs for restoration work, land acquisition and planning, and Table 11-3 lists the per acre costs of these projects for restoration work and land acquisition. Smaller scale mitigation projects may be associated with higher unit costs (e.g., due to lack of economies of scale, or expertise of entity performing the

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[93] U.S. EPA and the Corps (2014), an updated cost-benefit analysis of the proposed waters of the United States definition, uses the same cost estimate.

[94] This excludes one outlier, for which on-site mitigation represented 65% of construction costs because it required using a large portion of the buildable land on-site. Off-site mitigation for the project was less than 5%.

mitigation) or lower unit costs (e.g., need for smaller area; higher potential for success with lower complexity).

Table 11- 2. Southern California Wetlands Recovery Project Completed Projects

Title (Local Lead)	Total Cost	Description
Sample Restoration Project Costs - Southern California		
Cottonwood Creek Park Riparian Restoration (City of Encinitas)	$272,500	Recreate portions of riparian stream corridor on Cottonwood and Moonlight Creeks, in northern San Diego County
Upper Sulphur Creek Restoration Project (City of Laguna Niguel)	$1,385,780	Restore up to 28 acres of wildlife habitat as native wetland, transitional and scrub plant communities along 1.7-miles of Upper Sulphur Creek, including removing 3600 feet of concrete channel.
Summerland/Greenwell Preserve Restoration (Summerland Greenwell Preserve)	$181,827	Restore 2 acres of riparian habitat at the Summerland/Greenwell Preserve
San Elijo Lagoon Exotics Removal (San Elijo Lagoon Conservancy)	$73,000	Remove exotics plants from approximately 2.4 acres along the southern edge of San Elijo Lagoon and revegetate with native and buffer species.
Malibu Creek Arundo Removal Project (Mountains Restoration Trust)	$358,400	Remove *Arundo donax* from approximately 5.2 miles of stream corridor along Malibu Creek.
Santa Barbara Urban Streams and Wetlands Restoration (Community Environmental Council)	$322,000	Implementation of the San Jose Creek Restoration Plan, and preparation of an enhancement plan for four Santa Barbara County watersheds.
Arroyo Burro Estuary and Mesa Creek Restoration (City of Santa Barbara)	$1,089,000	Expanded the Arroyo Burro Estuary, restoring the lower portion of Mesa Creek, planting native vegetation and improving access.

Table 11- 2. Southern California Wetlands Recovery Project Completed Projects

Title (Local Lead)	Total Cost	Description
Western Goleta Slough Wetland Restoration Project	$2,734,312	Enhance and expand wetland habitat throughout the 34.41 acres owned by the Department of Fish and Wildlife in the Goleta Slough Ecological Reserve.
Prisoners Wetland and Lower Canada del Puerto Restoration	$775,069	Restore a coastal wetland and one mile of a stream corridor at Prisoners Harbor and Cañada del Puerto, the primary access point for Santa Cruz Island, Channel Islands National Park.
Colorado Lagoon Restoration	$13,335,683	Completed Phase I of the restoration of Colorado Lagoon, a 44-acre saltwater lagoon connected to Alamitos Bay. Phase I included dredging of the lagoon, stormwater diversion, bank stabilization, culvert cleaning, and native plantings.
Las Flores Creek Restoration	$4,693,733	Restore approximately one-half mile of Las Flores Creek in Malibu including exotic plant removal, bank stabilization and riparian habitat enhancement.
Malibu Lagoon Restoration and Enhancement	$6,596,695	Restore and enhance the ecological structure and function of Malibu Lagoon by increasing circulation and enhancing wetland habitat.
Restoration of Riparian Habitat in the Carlsbad Hydrologic Unit	$5,460,000	Remove non-native plant species, and restore riparian and select upland habitat areas in the Carlsbad Hydrologic Unit.
Sample Project Land Acquisition Costs – Southern California		
Fenton Properties Acquisition	$3,000,000	Acquire approximately 100 acres of riparian habitat located along the Otay River from I-5 to highway 805

Table 11- 2. Southern California Wetlands Recovery Project Completed Projects

Title (Local Lead)	Total Cost	Description
San Dieguito Lagoon Wetland Acquisition - Boudreau Total (San Dieguito River Park Joint Powers Authority)	$4,253,000	Acquire 75 acres within the floodplain of the San Dieguito River, located east of and immediately adjacent to the 400-acre San Dieguito Wetland Restoration Project.
San Elijo Lagoon Acquisition Program (San Elijo Lagoon Conservancy)	$3,717,000	Acquire up to 100 acres of property along the margins of San Elijo Lagoon
Buena Vista Creek Acquisition, Sherman Parcel (County of San Diego)	$9,500,000	Acquire approximately 133.8 acres of land along Buena Vista Creek.
Huntington Beach Wetlands -- Piccirelli Acquisition (Huntington Beach Wetlands Conservancy)	$1,693,066	Acquire 45 acres of the Huntington Beach wetlands located on either side of Magnolia Avenue
Huntington Beach Wetlands -- Edison Acquisition (Huntington Beach Wetlands Conservancy)	$945,000	Acquire 20-acre parcel of the Huntington Beach wetlands adjacent to power plant
Los Cerritos Wetlands Complex - Bryant Acquisition (Los Cerritos Wetlands Authority)	$14,000,000	Acquire approximately 360 acres of the historic Los Cerritos Wetlands Complex, near the mouth of the San Gabriel River
Ballona Wetlands Acquisition (Dept. of Fish and Game)	$140,000,000	Acquire from willing sellers properties within the Ballona Wetlands complex
Upper Zuniga Road Acquisitions (Mountains Restoration Trust)	$1,020,000	Acquire approximately 120 acres in the upper Topanga watershed including Zuniga Pond, a man- made pond near Upper Zuniga Road in the Topanga Creek watershed to protect western pond turtle habitat, a state-listed species of special concern.
Tuna Canyon SEA Acquisition (Mountains Restoration Trust)	$1,625,000	Acquire approximately 417 acres of land at the lower end of Tuna Canyon to protect a perennial spring and well-developed riparian habitat

Table 11- 2. Southern California Wetlands Recovery Project Completed Projects

Title (Local Lead)	Total Cost	Description
Cold Creek Riparian Acquisitions, Part 1 (Mountains Restoration Trust)	$1,950,000	Acquire 71.5 acres of upland and riparian habitat along Cold Creek, a tributary to Malibu Creek
Arroyo Hondo Ranch Acquisition (Land Trust of Santa Barbara County)	$6,176,000	Acquire 778 acres of riparian and grassland habitat along Arroyo Hondo Creek
Devereux Slough: Ocean Meadows Acquisition	$7,000,000	Acquired a 63-acre parcel in upper Devereux Slough for the purposes of preserving and restoring fish and wildlife habitat and open space.
Lower Los Angeles River Acquisitions	$20,000,000	Acquire properties adjacent to the lower Los Angeles River suitable for wetland and riparian restoration projects.
San Diego River Land Conservation Program: Hanlon-Walker Acquisition	$2,144,500	Purchased approximately 105-acres and 1.3 miles of riparian habitat along the San Diego River at the Hanlon-Walker Property in the City of Santee.
Sample Project Study and Planning Costs - Southern California		
Famosa Slough Culvert Extension and Retrofit Design (City of San Diego)	$82,500	Prepare feasibility study and design plans to reactivate an inoperable culvert between Famosa Channel and Famosa Slough to increase the tidal prism in the slough
San Elijo Lagoon Preliminary Sediment Quality Assessment (San Elijo Lagoon Conservancy)	$133,882	Perform preliminary assessment of sediment quality and depositional environment of San Elijo Lagoon as the first step in a feasibility analysis of proposed dredging activities

Table 11- 2. Southern California Wetlands Recovery Project Completed Projects

Title (Local Lead)	Total Cost	Description
San Joaquin Marsh Enhancement - Phase II, Feasibility Study (University of California, Irvine)	$315,136	Prepare a feasibility study, conduct environmental review, consult with permitting agencies, and prepare final construction designs and contract documents for Phase II of San Joaquin Marsh restoration[1]
Big Canyon Creek Restoration Plan (Community Conservancy International)	$304,000	Prepare restoration plan for Big Canyon Creek, a tributary to Upper Newport Bay.
Huntington Beach Wetlands Restoration Plan (Huntington Beach Wetlands Conservancy)	$350,000	Prepare a comprehensive restoration plan for the entire Huntington Beach Wetlands ecosystems
Colorado Lagoon Restoration Project-Planning (City of Long Beach)	$200,000	Develop a restoration plan for Colorado Lagoon, a 44-acre saltwater lagoon.
El Dorado Wetlands Restoration Plan (City of Long Beach)	$100,000	Prepare a plan to restore up to 20 acres of wetlands at the confluence of the San Gabriel River and Coyote Creek, adjacent to the El Dorado Nature Park
Hazard Park Wetlands Restoration Concept Plan (North East Trees)	$251,098	Conduct technical studies and detailed designs for restoration of one-half mile of creek corridor and enhancement of existing wetland habitat in Hazard Park in the City of Los Angeles
Solstice Creek Steelhead Enhancement Design Plans (RCD of the Santa Monica Mountains)	$122,000	Prepare engineering plans, permits, and environmental review documents for project to restore steelhead access to approximately 1.5 miles of Solstice Creek in the Santa Monica Mountains
Carpinteria Salt Marsh, Basin 1 Enhancement Plan (Land Trust of Santa Barbara County)	$100,000	Prepare an enhancement plan for restoration of Basin 1, approximately 23 acres

Table 11- 2. Southern California Wetlands Recovery Project Completed Projects

Title (Local Lead)	Total Cost	Description
Mission Creek Museum Area Restoration Plan (Community Environmental Council)	$148,000	Prepare restoration plan for removal of invasive species, revegetation, implementation of stormwater best management practices, and installation of interpretive trails and exhibits along Mission Creek.
Mission Creek Steelhead Passage Project	$1,394,000	Planning and design for a fish passage project along Mission Creek in Santa Barbara
DeForest-Dominguez Wetlands Restoration: Planning and Design	$1,050,000	Prepare a preliminary plan, environmental review document, and permits for creation of wetland and riparian habitat along approximately 1 mile of the east bank of the Los Angeles River.
San Juan Hydrologic Unit - Non Native Species Eradication Plan	$2,500,000	Developed a comprehensive program to remove non-native, invasive species from the San Juan Hydrologic Unit.
Buena Vista Creek Watershed Plan	$374,500	Prepare a comprehensive watershed management plan for Buena Vista Creek.
Source: SCWRP (2010), SCWRP (2013)		

Table 11- 3. Southern California Wetlands Recovery Project Completed Projects: Imputed Unit Costs

Project	Calculated Unit Cost	Habitat
Sample Restoration Per Acre Costs - Southern California		
Upper Sulphur Creek Restoration Project	$49,500/acre	native wetland, transitional and scrub plant communities
Summerland/Greenwell Preserve Restoration	$91,000/acre	Riparian
San Elijo Lagoon Exotics Removal	$30,400/acre	Riparian
Malibu Creek Arundo Removal Project	$69,000/mile	Riparian

Table 11- 3. Southern California Wetlands Recovery Project Completed Projects: Imputed Unit Costs

Project	Calculated Unit Cost	Habitat
Western Goleta Slough Wetland Restoration Project	$79,463/acre	Not specified
Colorado Lagoon Restoration	$303,084/acre	Lagoon
Sample Land Acquisition Per Acre Costs - Southern California		
Fenton Properties Acquisition	$30,000/acre	riparian habitat
San Dieguito Lagoon Wetland Acquisition	$57,000/acre	Floodplain
San Elijo Lagoon Acquisition Program	$37,000/acre	along lagoon margins
Buena Vista Creek Acquisition, Sherman Parcel	$71,000/acre	riparian area
Huntington Beach Wetlands – Piccirelli Acquisition	$37,624/acre	Wetlands
Huntington Beach Wetlands – Edison Acquisition	$47,250/acre	Wetlands
Los Cerritos Wetlands Complex – Bryant Acquisition	$38,889/acre	Wetlands
Upper Zuniga Road Acquisitions	$8,500/acre	Not specified (includes manmade pond)
Tuna Canyon SEA Acquisition	$4,000/acre	Not specified
Cold Creek Riparian Acquisitions	$27,000/acre	upland and riparian
Arroyo Hondo Ranch Acquisition	$8,000/acre	riparian and grassland habitat
Devereux Slough: Ocean Meadows Acquisition	$111,111/acre	Not specified
Source: Imputed from total costs and acreage reported in SCWRP (2010) and SCWRP (2013).		

Should compensatory mitigation be in the form of the purchase of credits from a mitigation bank or in-lieu fee program, rates are highly variable. For example, estimates obtained by the State Water Board in 2007 (i.e., reflecting the market for credits in 2007) indicate that preservation credits at the Barry Jones Wetland Mitigation Banks were priced at $60,000 per acre whereas vernal pool preservation credits in Placer County sell for $300,000 per acre; the average price for credits pursuant to CWA section 404 was $110,000 per acre at the Kimball Island Mitigation Bank. However, some banks did not report rates. Active and pending banks and fee programs in California from which credits can be purchased vary by region and type of habitat being conserved.

These estimates are similar to those reported for California by ELI (2007). The Corps' Sacramento District's in-lieu fee program charged $110,000 per acre for seasonal wetland, seasonal marsh, perennial marsh, and open water credits; $134,000 per acre for riverine wetland credits; $151,000 per acre for riparian wetland credits; $171,000 per acre for vernal pool credits; and $183,000 per acre for shallow water marsh credits in April 2007. Another large mitigation bank in the district charged about $150,000 per acre for most types of wetland credits and about $300,000 per acre for vernal pool credits (ELI, 2007). The Corps obtained similarly varying estimates in a 2005 survey of District mitigation practices: per acre or per credit rates in the South Pacific Division were $400,000 for commercial mitigation banks and $125,000 for in-lieu fee programs (Martin et al., 2006).

Limitations and Uncertainties

There are a number of uncertainties associated with this analysis of current compliance, methods to achieve compliance, and the cost of those methods. For example, existing WDRs and section 401 certifications do not always contain sufficient information to assess compliance, or elaborate on certain evaluations (e.g., state that the applicant avoided impacts to wetlands rather than describe the manner in which this was done).

There is also little documentation of the cost of conducting alternatives analysis, or the resulting changes that may occur from selection of the LEDPA. Whether these methods are associated with opportunity costs, including costs from delays, or cost savings from avoiding wetland features, is site-and project specific. Finally, this analysis does not consider the benefits associated with considering alternative site designs in terms of protecting the functions of wetlands that may not be identified in the absence of the Procedures.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 16

Van Horne
DENSITY AS A MISLEADING INDICATOR OF HABITAT QUALITY

DENSITY AS A MISLEADING INDICATOR OF HABITAT QUALITY

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Abstract: Current methods of evaluating wildlife habitat for management purposes can be arranged in a hierarchy of increasing generality. The most general level is evaluation of wildlife habitat for entire communities on the basis of inferences drawn from vegetational structure. At the base of the hierarchy the high resolution studies, upon which accuracy at the higher hierarchical levels depends, usually assume that habitat quality for a species is positively correlated with the density of the species. If habitat quality for a wildlife species is a measure of the importance of habitat type in maintaining a particular species, habitat quality should be defined in terms of the survival and production characteristics, as well as the density, of the species occupying that habitat. Situations in which habitat quality thus defined is not expected to be positively correlated with density are described, along with the species and environmental characteristics that are most likely to produce these situations. Examples drawn from the literature in which density and habitat quality are not positively correlated are described. The positive correlation of density with habitat quality in specific instances cannot be assumed without supporting demographic data.

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The foundation of any wildlife habitat management plan is the ability to assess habitat quality accurately. Without this key ingredient, the effort put into carefully prepared objectives and elegant categorizations of habitat types is largely wasted. Yet biologists often dwell on objectives and categories while treating lightly the assumptions implicit in their assessments of habitat quality. For instance, they seldom question the assumption that the density of a species in a habitat is a direct measure of the quality of that habitat. Perhaps this is because any more accurate investigation of habitat quality to truly reflect the importance of that habitat in maintaining wildlife species populations must be intensive, often at the expense of the broader information base that could be achieved by simple surveys. Such surveys are a particularly common means of evaluating nongame wildlife habitat.

The objectives of this paper are to provide some examples of situations in which this correlation does not hold, and to make predictions regarding species and environmental types for which the density–habitat quality relationship is likely to be decoupled. In such cases, management policies based directly on species abundance may be misleading and these errors may be amplified when management approaches are restricted to the higher levels of the hierarchy.

This paper is dedicated to the late O. C. Wallmo, who was always eager to discuss ideas and whose refusal to be anything but completely honest in evaluating his own ideas, objectives, and research ideas, as well as those of others, set an example for us to follow.

METHODS OF HABITAT EVALUATION

Habitat assessment procedures can be visualized in a 3-level hierarchy of increasing generality in which the accuracy of predictions at 1 level is dependent on accuracy at the next lower level (Fig. 1). The lowest level is the assessment of the habitat relationships of individual species at a particular site. Accuracy at this level is dependent upon an intimate understanding of the demography of the species and of the factors influencing population levels through their influences on survival and production, although such analyses are often abandoned in favor of simple estimation of total density. Biases of the different censusing techniques are a problem, particularly when these are habitat dependent, as are many of the bird censusing techniques (Emlen 1971) and most mammal censusing techniques where home range size varies among habitats. At the next higher level, the species–habitat relationships are extrapolated to sites not actually sampled. The success of this inference is dependent upon the correct identification of the important factors influencing density in the higher resolution studies. At the highest levels of the hierarchy, the extrapolated information is used to put together a habitat quality assessment for an entire wildlife community. Generally, in evaluating the effects of management options on the wildlife community, species interrelationships such as competition and predation are ignored and the community assessment is based solely on the aggregation of individual species assessments.

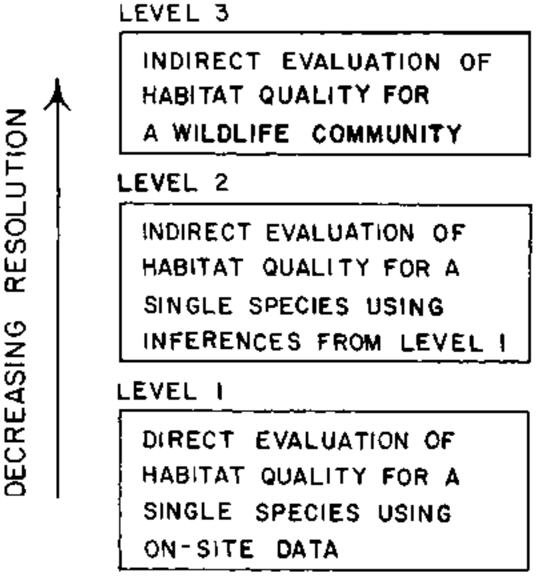

Fig. 1. Hierarchical description of habitat quality assessments.

Over the last decade there has been considerable pressure to develop rapid means of habitat-quality assessment, such that the higher-resolution levels at the base of the hierarchy (Fig. 1, levels 1 and 2) are skipped altogether. For instance, in 1 approach maximizing species diversity is assumed to be the primary objective of management and this diversity is assumed to be directly correlated with habitat diversity (Asherin et al. 1979). There are several problems associated with this approach. First, maximum diversity achieved in the limited areas being managed (α diversity) may not produce maximum diversity on a larger scale (β diversity) (Samson and Knopf 1982), because some wildlife species, such as old-growth specialists, are not adapted to areas of high habitat diversity. Maximizing plant community diversity on a local scale selects for the generalist wildlife species common to disturbed habitats and may ignore the sensitive species with greater habitat specificity. Second, habitat diversity and wildlife species diversity are not always positively correlated; this depends on the ratio of generalist to specialist wildlife species in the area being managed and the specific requirements of those species.

Assessment of a range of habitat types for the presence or absence of wildlife species is a procedure at the 2nd level of resolution. The general objective in this case is to manage lands so that sufficient habitat types are retained to allow for representation of all species while maximizing diversity within this constraint (Thomas 1979). Determination of the presence or absence of species is usually based on the available literature; there is no explicit treatment of the densities required to avoid extinction (minimum viable populations) or of home range size and no evaluation of habitats on the basis of wildlife species densities or the relative favorability of the occupied habitats.

Another example of a procedure at this 2nd level of resolution is the U.S. Fish and Wildlife Service's Habitat Evaluation Procedures (HEP) (Flood et al. 1977). This procedure relies on assessment of habitat requirements of individual species taken from the literature, followed by assessment of habitat types based on the ability of each type to provide for these requirements. The 2 major problems with this approach are that our knowledge of species requirements is often poor and synergistic effects among resources are ignored. Thus, a habitat that provided cover but no food would still get a positive value rating, even though the species might not be able to exist in that habitat. Likewise, the sum of 2 "good" resource attributes might well be greater than their separate values.

All 3 of the above methods allow for rapid habitat assessment without direct censusing of wildlife species. They are thus based on untested inferences about which species "ought" to occur in each habitat type and are not suited to management for viable population levels.

ASSUMPTIONS OF HABITAT EVALUATION

The assessment of individual species–habitat relationships is the lowest level of the hierarchy; these data are critical to the success of the HEP type of analyses. The usual assumption at this level is that the local density of a species is positively correlated with habitat quality. Often a range of habitat variables is measured and correlated with species density. Multivariate procedures are used to reduce the number of variables and to aid in interpretation of results (e.g., Carey 1980, Maurer et al. 1980). Although this type of habitat assessment depends more explicitly on density as an indicator of habitat quality than do assessments at higher levels of generality, it has been suggested that the accuracy of any habitat rating technique, such as HEP, should be tested by comparing habitat ratings to the observed relative abundances of a variety of wildlife species (Whelan et al. 1979).

Thus, the assumed positive correlation of a species' abundance with habitat quality underlies most methods used for assessing habitat quality and is explicit for the species-specific level of resolution. It is therefore the basis for a broad range of management decisions regarding wildlife communities.

The assumed relationship often breaks down under intensive study. One reason that it may break down, particularly in northern climates, is that habitat use in winter is critical, whereas most censuses and surveys are taken in warmer months. For northern deer (*Odocoileus* spp.), the availability of winter range may contribute disproportionately to carrying capacity (and thus survival and reproductive patterns) (Wallmo et al. 1977). Identification of habitat quality on the basis of summer densities would thus be misleading; retention of the summer habitat type would not serve to maintain the population if the winter range was destroyed.

A 2nd reason for a breakdown in the density–habitat quality assumption is that there may be multi-annual variability in local population densities that reflects small-scale variability in the food source, in predator populations, or in abiotic environmental factors. Densities may thus reflect conditions in the recent past or temporary present, rather than long-term habitat quality. For instance, site tenacity in breeding passerines can produce local densities that reflect past, rather than current, habitat quality (e.g., Hildén 1965, Rotenberry and Wiens 1978).

Third, social interactions may prevent subdominant animals from entering what is actually the high-quality habitat, while at the same time suppressing reproduction in the high-quality habitat. The surplus individuals may then collect in habitat "sinks," where densities may fluctuate widely (Lidicker 1975). Animals in the low quality sinks survive and/or reproduce poorly. Thus, in a good year, the source population may produce a large excess of juveniles that will emigrate and build up to high densities in the sinks. Because the juveniles are subdominant, there is no social interaction factor to prevent high densities in the sink habitats, which is in contrast to the adult-dominated high-quality or source habitats. Densities in the lower-quality habitat may thus actually be greater at times than in the high-quality habitat. A similar scenario is embodied in the theoretical model of habitat occupancy developed by Fretwell and Lucas (1969). In this model, the movement of individuals into poor habitat is a reflection of individual fitness maximization. According to the model, the per-individual probability of success for unestablished immigrants may be higher in low-quality than in high-quality habitat, because high densities in the high-quality habitat promote a high probability of failure to reproduce successfully and a high mortality rate among the unestablished immigrants. Thus, it may be individually advantageous for them to settle in the lower-quality habitat.

DEFINITION OF HABITAT QUALITY

Fitness of an individual animal (Fisher 1930) is a relative measure that increases with increasing survival probability and increasing offspring production. I propose that habitat quality be defined as the product of density, mean individual survival probability, and mean expectation of future offspring, for residents in 1 area as compared to other areas. More precisely,

$$Q_j = \frac{\left\{\left[\sum_{x_j} n_{x_j}(l_{\alpha_j}B_{x_j} + P_{x_j})\right] \Big/ \sum_{x_j} n_{x_j}\right\}(1/a_j)}{\sum_i \left\langle \left\{\left[\sum_{x_i} n_{x_i}(l_{\alpha_i}B_{x_i} + P_{x_i})\right] \Big/ \sum_{x_i} n_{x_i}\right\}(1/a_i)\right\rangle} \tag{1}$$

where Q_j is the relative quality of habitat j for the species, B_x is the fecundity of an x-year-old and l_α the probability that the offspring will survive to α, the 1st age of breeding. P_x is the probability of surviving from age x to age $x + 1$, n is the number of individuals in each of the i habitats being compared, and a is the area that includes all sampled individuals in the ith habitat. The areas must encompass the home ranges of the individuals included. Conceptually, this is a measure of mean individual "fitness" per unit area. "Fitness" is used here in a management rather than an evolutionary context; it describes a mean group characteristic in 1 habitat as compared to other habitats, rather than comparing 1 individual of a population to other individuals of the population. The measure of habitat quality thus has components of density, offspring production, and survival. High density alone does not infer quality habitat. To give an extreme example, one could imagine a habitat in which all animals were immigrants and none emigrated or reproduced. The quality of the habitat would be zero. If either individual survival probability or number

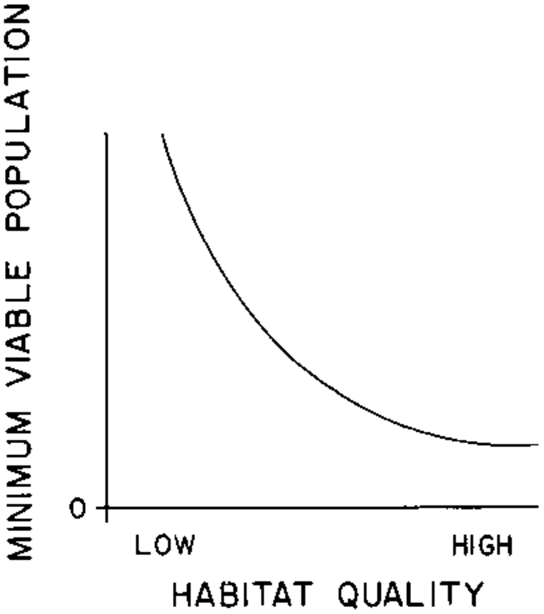

Fig. 2. Change in minimum viable population size with increasing habitat quality.

of offspring produced is zero, then the habitat is making no contribution toward maintaining populations of the species and its quality is zero.

Given this definition of habitat quality, the minimum viable population size will be greater in low-quality than in high-quality habitat, because low survival and production rates in low-quality habitat mean that a higher density is needed to ensure persistence of the species in that habitat (Fig. 2).

To measure habitat quality, one must determine the mean production and survival characteristics of each age-class and the number of resident individuals in each age-class in each habitat. Such a determination will be impractical for most studies. The above formula is thus presented to clarify the definition of habitat quality and provide an ideal standard. This measure of habitat quality may be approximated sufficiently through intensive demographic study of single species in a variety of habitats. In this way one can separate low-quality habitats, which may contain largely immigrants that are unlikely to survive or reproduce well, from higher-quality habitats, containing a lower density of animals but in which densities are more stable, reproductive output of the population is dependable, and the population is more likely to persist in poor or "crunch" years. Where such intensive demographic study is impractical, density-based estimates could be greatly improved through attention to immigration patterns, to adult survival, and to the production of juveniles that survive to reproduce.

The actual parameters used in equation 1 will be means for a certain time period, commonly a year. An accurate assessment of habitat quality requires the calculation of a grand mean and variance over several such time periods. The number of time periods required for a useful measure of habitat quality will be greater for highly unpredictable habitats.

There are some problems inherent in the use of this habitat quality measure. The areas encompassed by habitat patches a_i may in some cases influence survival and production characteristics, particularly for wide-ranging species. This will result in lower Q_j's for smaller patches containing habitat equivalent in quality to that of the larger patches. Area of the patches considered is thus an implicit variable influencing Q_j. Calculating Q_j's for large or for similar-sized patches will remove the area effect. Calculating Q_j's for different-sized patches with similar habitat characteristics will make the area effect explicit. Also, home ranges may encompass several patches of what we perceive as different habitat types, and the delineation of areas for which favorability is to be determined must thus be somewhat arbitrary. Further, the patches used by a species may be from widely separated areas, as for migratory birds. In such cases, it may be useful to make separate assessments of summer and winter range, and of the degree to which different habitat types in each of these ranges contribute to mean relative fitness.

I have defined habitat quality in terms of a single species. The habitat quality for a wildlife community is the sum of habitat qualities for species members, as modified by the effects of species interaction. I have discussed the problems of simply equating habitat quality with diversity. Although it has been asserted (Cringan et al. 1979) that more community-level research is needed as input to the development of habitat management plans, a valid assessment of the effects of habitat manipulation at the community level is dependent upon the accuracy of assessments at the individual species level. In most cases, our understanding of individual species–habitat relationships is still rudimentary.

EXAMPLES

Several examples of situations can be considered in which habitat quality and species density are not positively correlated, because of the influence of social dominance factors. In my own studies of a series of populations of *Peromyscus maniculatus* in spruce (*Picea* spp.) and hemlock (*Tsuga* spp.) stands of different seral stages in southeast Alaska (Van Horne 1982), the populations occurred at a high latitude (55°N) where there was no breeding by young of the year and the dominant adults were clearly separable from the subdominant juveniles on the basis of weight, pelage, and trapping history. Because of forced emigration, reproductive success in different habitats was difficult to estimate. Overwinter survival, however, was a critical component of fitness because there was no breeding by young of the year.

Two different habitat types were distinguished for both adults and juveniles by discriminant function analysis: those characterized by high densities or low densities of the age-class. Individual animals whose home ranges encompassed high-density adult habitat had a significantly higher probability of surviving over the winter period than those whose home ranges encompassed low-density adult habitat, whether these animals were adults or juveniles. Thus, high-quality habitat could be distinguished by the adult habitat discriminant function and appeared to be positively correlated with overwinter survival for both age-groups. The opposite was true of the juvenile discriminant function, for which the habitat characterized by high densities of juveniles conferred lower overwinter survival probability. Thus, high-density adult habitat was of high quality, while high-density juvenile habitat was of low quality.

These quality inferences were corroborated by the observation that adult male weights on the grid containing mostly high-density adult habitat were significantly higher than those on the other trapping grids and the population density on this grid was relatively stable. However, in 1979, the last year of the study, total densities on those grids containing mostly low-quality habitat exceeded those on the grid containing mostly high-quality habitat. This was due to irruptions of juveniles that consisted largely of immigrants that were probably forced into the lower-quality habitat. Additional evidence for the importance of intraspecific dominance interactions in these populations came from breeding inhibition in high-density populations and from the observation that subdominant juvenile diets were of lower quality when these animals were found in high-density populations. Thus, the densities measured in 1979 would have been a completely misleading indicator of overall habitat quality.

Other studies of small mammal populations have reported similar patterns. Kock et al. (1969), for example, found the highest densities of lemmings (*Lemmus lemmus*) during a population "peak" farthest from the optimum habitat as defined by food availability. Animals in the lower-quality habitat tended to be smaller and were probably younger subdominants.

States (1976) reported that subdominant yellow-pine chipmunks (*Tamias amoenus*) accumulated in marginal habitat where their survival probability was relatively low. A large component of these marginal populations consisted of immigrants. Thus, the marginal areas appeared to be acting as dispersal sinks for animals forced out of the central areas, and density in the range of habitats investigated was not correlated with habitat quality.

In an in-depth radio-tracking study, Schantz (1981) found similar numbers of red foxes (*Vulpes vulpes*) in mineral soil and peat soil habitats. He was able to identify the mineral soil habitat as being of higher quality despite the similarity in density, as it contained a higher proportion of reproducing adults.

Similar observations have been made for breeding passerines. Fretwell (1969) reported that there was "no positive correlation between density and suitability" for breeding field sparrows (*Spizella pusilla*) where suitability was measured in terms of breeding success; densities were higher in an area where breeding success was lower. O'Connor (1981) summarized data for a number of migrant and non-migrant bird species in Great Britain. The species showed a pattern of filling only a certain, presumably preferred, habitat when densities were low, but filled the less preferred habitats when densities were high. These species included the wren (*Troglodytes troglodytes*), the chiffchaff (*Phylloscopus collybita*), the great tit (*Parus major*), the yellowhammer (*Emberiza citrinella*), and the Eurasian kestrel (*Falco tinnunculus*). For these species, density would be a reasonably good measure of habitat quality in years of low-overall density, but would be a misleading indicator in years of high-overall density.

When breeding birds are territorial and favorable habitat is limited, a surplus of adults of breeding age ("floaters") may accumulate in poor habitat where either no breeding takes place or where breeding attempts are largely unsuccessful. Thus, a group with low current "fitness" may be found in moderate densities in poor habitat. This phenomenon has been reported for great tits (Krebs 1971), the Santa Cruz Island scrub jay (*Aphelocoma coerulescens*) (Atwood 1980), and the Australian magpie (*Gymnorhina tibecen*) (Carrick 1963).

PREDICTIONS

Problems with assuming density to be a measure of habitat quality are thus found over a wide range of taxa. We are left with several important questions. To what extent can we extrapolate these findings to other species? How general is this lack of close relationship of density to habitat quality? Where do we expect to find density and habitat quality to be decoupled? I suggest that this phenomenon might be found in association with 3 main environmental types (Table 1). The 1st is highly seasonal habitat in which different habitat types may be preferred at different seasons, such that the density–habitat quality relationship cannot be inferred from surveys or censuses taken during only 1 season. The real high-quality habitat in this situation would be that which in some way

Table 1. Factors that increase the probability that density will not be positively correlated with habitat quality.

Environmental characteristics	Species characteristics
Seasonal habitat	Social dominance interactions
Temporal unpredictability	High reproductive capacity
Patchiness	Generalist

was most critical for successful individual survival and reproduction. A 2nd environmental attribute is unpredictability over time. This would allow for opportunistic density increases in low-quality habitat, or overflow into lower-quality habitats during periods of high production and high overall density. Third, habitat must be patchy on a scale allowing for migration between patches if environmental unpredictability is to produce wide density changes in the resident animals of 1 habitat type relative to other habitat types. High densities in low-quality habitat could not be observed if there was no source pool in nearby high-quality habitat.

I would predict 3 main species characteristics to be associated with the habitat quality–density decoupling (Table 1). First, the species should have a social pattern of dominance interactions where it is found in stable populations in high-quality habitat. This type of dominance social interaction is common to a wide range of vertebrates. Its demographic effects are most pronounced in those animals with a 2nd species attribute, high reproductive capacity. This high reproductive capacity can allow "sink" populations to reach high densities when the environment becomes temporarily favorable. Third, this decoupling should be most characteristic of habitat generalists. This is particularly important as such generalists may be used as indicators of habitat quality for a variety of species in those cases where habitat-quality ratings are based on actual survey or census data. This is because generalists are relatively easy to survey and are more likely than specialists not only to occupy a wide range of habitats, but to be found in high densities in at least some habitat types and to have a high reproductive capacity. The 3 species characteristics are more closely associated with small, than with large, body size.

It is likely that for rare species, density may remain a reasonably good indicator of habitat quality if seasonal changes in habitat use are taken into account and if habitat is not patchy. If the habitat is patchy, the presence of a rare species in a given patch will have a larger stochastic element than the presence of a common species in a habitat patch, because of the susceptibility of rare species to local extinctions (e.g., Hanski 1982).

MANAGEMENT IMPLICATIONS

Management plans that depend only on habitat characteristics to infer habitat quality contain a large amount of guesswork, both with regard to viable population levels and with regard to predicatability of species densities on the basis of habitat characteristics. Such plans depend heavily on the correct identification of favorable habitat for the wildlife species being managed. Intensive multi-annual demographic study of a single species over the range of habitats being measured is needed to interpret the broader surveys. Without attention to demography, even multi-annual surveys or censuses will not necessarily be sufficient to distinguish "source" and "sink" habitats. Management plans adopted on the basis of a species survey or census taken during only 1 year, or on the basis of measured habitat characteristics coupled with inadequate knowledge of the factors actually determining habitat quality, are particularly unsatisfactory.

Thus, we cannot afford to ignore the processes that produce the densities we observe, or attempts to maintain target densities by retaining areas of specified habitat types will founder. We need to be much more careful in identifying high-quality or critical habitat and not assume simple density–habitat quality relationships without the demographic data to support them.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 17

Wallrichs
BAT ACTIVITY ON GOLF COURSES IN DELAWARE

BAT ACTIVITY ON GOLF COURSES IN DELAWARE

By

Megan Ann Wallrichs

A THESIS

Submitted to the Faculty of Delaware State University in Partial Fulfillment of the
Requirements for the Degree of Master of Science in Natural Resources in the
Department of Agriculture and Natural Resources.

Dover, Delaware
May 2019

This thesis is approved by the following members of the Final Oral Review Committee:

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Dr. Elizabeth Braun, External Committee Member, Fish and Wildlife Research Institute, Florida Fish and Wildlife Conservation Commission

DEDICATION

To my sister, Lauren, because I said that I would.

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BAT ACTIVITY ON GOLF COURSES ON THE DELMARVA PENINSULA

Megan Ann Wallrichs
Faculty Advisor: Kevina Vulinec, Ph.D.

ABSTRACT

Due to landscape modifications and chemical use, golf courses have earned a negative reputation among some environmental groups, but their park-like landscapes may offer habitat for some wildlife species, especially over other land use types. In this study, I monitored bat activity using ultrasonic acoustic detectors in different small-scale habitats found on golf courses on the Delmarva Peninsula. My objective was to evaluate if and how bats are using course landscapes. I found differences in overall activity levels at the habitat level but not on different golf courses. Areas with closed canopy and open understory that were managed had significantly higher activity than other four habitats that reflected more natural habitats (open grass, dense canopy forest fragment, and open canopy forest fragment). The open understory managed areas also had significantly higher foraging activity than the other four habitats. Six of the eight bat species thought to occur on the Delmarva Peninsula were recorded, but *Eptesicus fuscus* and *Lasiurus borealis* dominated bat activity across all golf courses and habitats and had highest activity in open understory managed habitat. These findings indicate that bats are using golf courses on the Peninsula regularly as flyways and foraging grounds, and even substantially disturbed areas are used extensively. This study adds to the growing body of literature that positive partnerships can be created between wildlife and golf courses.

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Chapter I:

Introduction

Golf courses offer outdoor recreation opportunities in a park-like landscape. Despite the "natural" appearance of golf course premises, courses across the globe are under scrutiny because of the many real and perceived negative environmental effects associated with the construction and maintenance of a course. However, in light of increased urbanization and wildlife habitat loss, golf courses may offer one of the few development types that do provide wildlife habitat. A variety of wildlife species can be found inhabiting golf courses and studies have focused on investigating the potential for golf courses to serve as refuges across several taxa. Urban-adapted species tend to thrive on courses, while disturbance-sensitive species generally fare more poorly. Much of the literature has focused on the effects of golf courses on birds but other studies have concentrated on insects, amphibians, and some small mammals. There is a lack of information on the use of golf courses by bats (Order Chiroptera).

As an important insect predator, bats could potentially benefit from foraging and roosting at golf courses. Many landscape features on golf courses mimic natural features that bats are known exploit, yet little work has attempted to explore bats' use of these manicured landscapes.

Bat populations face many threats and determining bats' presence on golf courses and investigating how they use the local landscape in order to maximize a golf course's potential as a habitat refuge, could be an important step towards their conservation. Additionally, greenskeepers may benefit from the pest control services that bats provide. Therefore, the general objective of this study was to investigate if and how bats are using golf course landscapes and to use the results to make management recommendations for more bat-friendly golf courses.

Study Objectives

I. Examine the effects of five small-scale golf course landscape variables (water hazard, open grass, open understory managed, open understory natural, and dense understory natural habitats) on 1) general bat activity, 2) foraging activity, 3) species richness and 4) species-specific activity using acoustical survey methods.

Chapter II contains a thorough literature review on golf courses and wildlife, bat biology and life history, and the use of acoustic surveys for bat research. Chapter III details the methods used to accomplish the outlined objectives of this study. Chapter IV reports the results of the study followed by a discussion of the results in Chapter V.

Although this project is limited in geographic scope to golf courses in Delaware, this study is the first to investigate bats on golf courses and serves as a critical first step towards understanding bat habitat use on golf courses. Golf courses across the United States share many similar physical landscape features, and results from this study may be applicable to golf courses in a range of ecological systems.

Chapter II:

Literature Review

Golf Course History and Environmental Impact

It is generally thought that the game of golf began in Scotland with St. Andrews Golf Club being described as the "birthplace of golf." While the rules of the game have fundamentally stayed the same, today's golf courses are much different than St. Andrews and other historical courses. The design of the first courses to be established was determined by the existing landscape. Golfers took advantage of existing features (rolling hills, naturally short grass, or dirt pits created by sheep herds) to create a diverse and challenging course (Stuller 1997). The landscape was not specifically modified or manicured for playing purposes.

With the first major televised golf event in 1968, The Master's Tournament forever changed the way spectators, players, and golf course greenskeepers viewed golf course aesthetics. Termed the "Augusta National Syndrome," every golf course strove to mimic the intensely manicured grounds at Augusta National Golf Course, the home of the annual Master's Tournament (Wheeler and Nauright 2006). Consequently, efforts associated with turf maintenance and manicured landscapes have been detrimental to the environment.

Construction of a golf course is commonly associated with deforestation and major clearing of natural vegetation, often being replaced by non-native plants (Winter et al. 2003, Kuvan 2010). To provide a more challenging game, the golf course landscape is sometimes disturbed and molded through considerable changes of topography and hydrology of the land (Winter and Dillon 2005). Additionally, golf course construction is usually accompanied by increased urbanization: housing developments, shopping malls, roads, and sometimes airports (Kuvan 2005, Wheeler and Nauright 2006, Kuvan 2010). Urbanization is widely accepted as a leading and persistent cause of habitat loss (Czech 2000, Czech et al. 2000, Marzluff 2001, McIntyre 2001, McKinney 2002, Turner et al. 2004). Golf course construction and the subsequent associated development have the potential to negatively impact many existing native habitats.

After a golf course is constructed, necessary maintenance practices can have continued adverse effects on the environment and place a strain on natural resources. Chemical application has been a major primary concern of environmental scientists and citizens in the last few decades. Golf courses regularly apply insecticides, herbicides, fungicides (classified here as “pesticides”), and fertilizers to combat pests and promote turf grass growth. A 1982 study found in the Mid-Atlantic region of the United State, golf courses were applying 1000 -1500+ pounds (450-680+ kg) of pesticides per golf course per year (Cox 1991). In 1991, pesticide use per acre on golf courses was seven times that of agricultural pesticide use and without the benefit of food production (Attorney General Office of New York State 1991, Suzuki et al. 1998). In Southeast Asia, it is purported that courses use 1500kg per golf course per year (Chatterjee 1993). In the United States, Chamberlain (1995) estimated an average golf course will apply 22,680 kg of dry and liquid chemicals annually. Results from a comprehensive survey conducted by the Golf Course Superintendents Association of America reported a total of 101,096 tons of nitrogen and 36,810 tons of phosphate was applied to all U.S golf courses in 2006 (Golf Course

Environmental Profile Volume V 2012). For comparison, a total of 1.24 and 4.48 million tons of nitrogen and phosphate, respectively, were used for crop production in 2006 (corn, cotton, wheat, soybeans, and other) (USDA 2018). Pesticide runoff loads are a concern for the environment and society, but will vary depending on initial application load, local climate, and grass surface type (Haith and Duffany 2007).

Large-scale chemical applications of fertilizers and pesticides have been found to be damaging to wildlife populations on and around golf courses. Stansley et al. (2001) found chlordane (a popular underground turf treatment for termite control used until 1980s) responsible for recurring poisonings of birds and bats, as they were consuming insects that had high concentrations of chlordane in suburban areas with golf courses. Migratory waterfowl, such as American widgeon and Canada geese, often forage on turf grasses and several mortality events of these species have been associated with the application of such pesticides like diazinon (Kendall et al. 1993, Zinkl et al. 1978). The role of organophosphate pesticides in avian poisonings and deaths is well documented (Grue 1982, White et al. 1982, Henderson et al. 1994, Fry 1995, Rainwater et al.1995, Mitra et al. 2011). An incident at Sapporo Kokusai Country Club in Japan led to the death of over 90,000 fish after greenskeepers applied copper compounds to the turf to prevent it from dying underneath the snow (Chatterjee 1993). Additionally, there have been reports of non-fatal golf course pesticide poisonings in humans and elevated levels of brain, lymphoma, prostate, and large intestine cancers in golf course superintendents (Edmondson 1987, Cox 1991, Chatterjee 1993, Kross et al. 1996). Furthermore, golf courses require enormous amounts of water to keep the turf green and to fill water hazards (small to large ponds created as obstacles in the game). The large water consumption of golf courses sometimes equals or exceeds the water usage of the town itself (Platt 1994). In Southeast Asia, golf courses exceed water use needed by local families, and the local governments are bearing the costs associated with transporting the golf courses' water supply (Chatterjee 1993). The proposal for a golf course luxury resort to be built in a small Mexican town in the state of Morelos, estimated to need 800,000 gallons of water per day for construction (five times that of the normal daily use of its residents), led to riots and hostage situations (Hurriaga 1995). Golf courses in desert environments must pump water in from outside sources. Several golf courses in the Palm Springs, CA area draw in water from the already exhausted Colorado River Basin (Wheeler and Nauright 2006).

Mitigating negative interactions between the environment and golf courses should be a chief concern for both greenskeepers and environmental scientists as golf continues to increase in popularity across the globe. Despite a small drop in the number of golfers in the 2000s, the 2010s saw an overall increase in the number of golfers with over 23 million golfers in the United States, creating an $84.1 billion-dollar industry (SRI International for World Golf Foundation 2011, Ozawa et al 2016). Economic booms, rises of the middle class, social uses of golf to solidify business relationships, and the inclusion of golf in the 2016 Olympic Games contribute to expected trends of golfer increase worldwide (Futures Company for HSBC 2012). The United States currently has over 15,000 golf courses, and there are over 40,000 courses worldwide, with 400-600 new courses being built each year in Canada and The U.S. (Knopper and Lean 2004, 2012 HSBC Report). According to the 2018 U.S. Golf Economy Report, there was a net decline of 737 golf facilities from 2011 to 2016, but the construction of the surrounding golf communities increased 18.5%. Given the number of existing golf courses and the continued associated land development, and considering the park-like environment courses offer, it is critical to continue research investigating how environmental scientists and private industry can work together to ensure better outcomes for wildlife.

Golf Course Land Use and Wildlife Habitat Potential

Golf courses have the potential to play a key role in wildlife biodiversity conservation (Terman 1997, Tanner and Gange 2005, Colding and Folke 2009). Golf courses account for almost 930,00 hectares (2.3 million acres) of land in the U.S., comprising maintained turfgrass, natural areas, water bodies, facility buildings, bunkers, and parking lots (Golf Course Environmental Profile Phase II, Volume IV). According to the 2017 report released by the Golf Course Superintendent Association of America, the average size of 18-hole golf course in the United States in 2015 is 60ha (150 acres) of which 67% of the area is maintained turfgrass (Golf Course Environmental Profile Phase II, Volume IV; Figure 2.1).

Many manicured golf courses offer a heterogeneous landscape consisting of a variety of features. All courses generally feature 9-18 “holes” which consist of a tee, fairway, green, and the “rough.” While the tee, fairway, and green are well established and distinguished by the way they are maintained (short grass that is optimal for hitting a golf ball), the “rough” is anything outside these favorable playing areas and can be tall grass, a pond or stream, small forested areas, man-made sand traps or “bunkers”, or a combination of all these features. Different shapes, lengths, and lay of the fairways and greens with different features of the rough all contribute to the difficulty and enjoyment of the game and make each course unique. The heavily-manicured short grasses on the tees, fairways, and greens, sandy bunkers, buildings, and parking lots likely do not provide enough food, water, or shelter for wildlife and may not provide suitable habitat for most wildlife Those features make up approximately 40% of the total course landscape leaving 60% of the remaining landscape (forested fragment, man-made ponds, taller grassed areas or "roughs") to be developed or managed in such a way to promote wildlife occupancy (Threlfall et al. 2017).

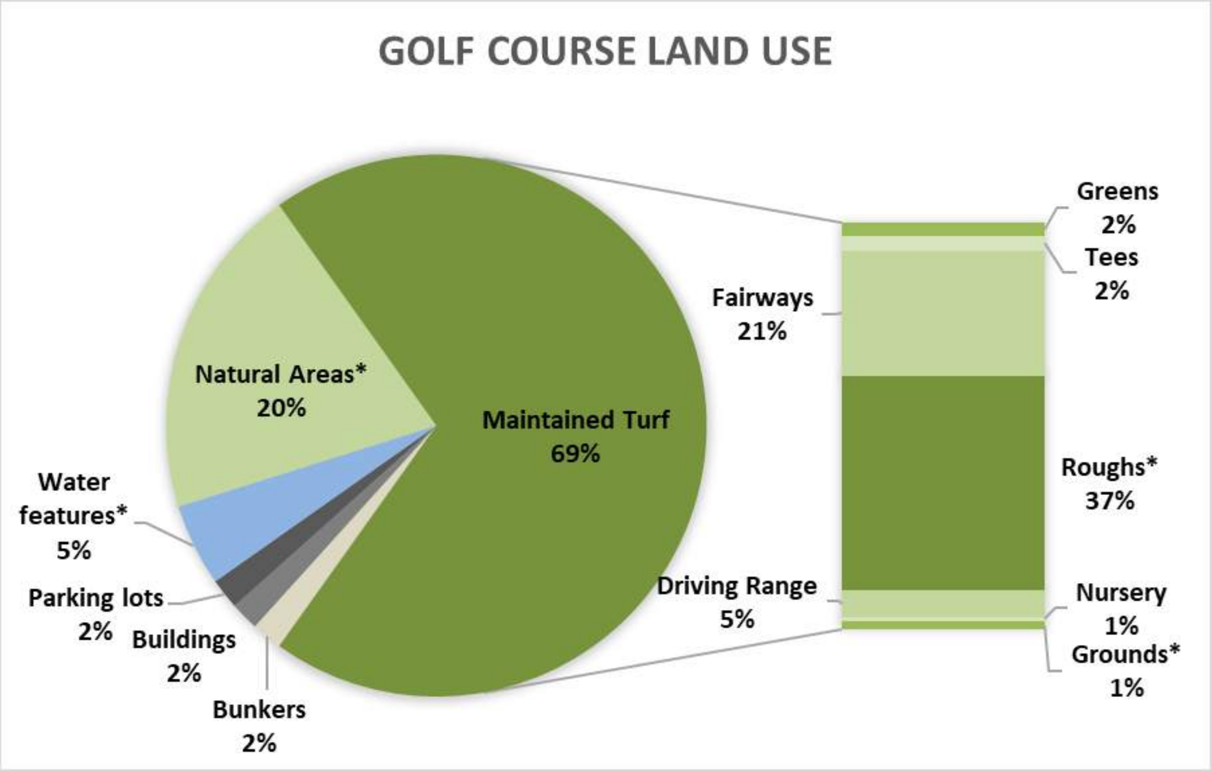

Figure 2.1 Percentage of land uses on a median-sized golf course in the United States in 2015. Asterisks indicate land use type that may provide potential wildlife habitat. Figure was created using data from the 2017 GCSAA Golf Course Environmental Profile Report

In light of the negative attention golf courses have received from environmental scientists in the last few decades regarding pesticide and water use, a multi-disciplinary meeting of golf course superintendents, environmental scientists, and concerned citizens was held in 1995

(Barton 2008). In the years after this meeting, more golf course managers and superintendents have since implemented more environmentally friendly and sustainable practices and researchers have begun to investigate golf courses' potential to serve as wildlife refuges. Alongside this push for more eco-friendly courses, several voluntary programs have been created through conservation organizations, like the Audubon Society, that offer programs and guidelines for golf courses that encourage increased wildlife inhabitance. Additionally, recognizing a lack of a comprehensive national dataset of management practices across the U.S. the Golf Course Superintendents Association of America (GCSAA) began to address this need in 2005 by conducting large scale surveys of golf course superintendents about their course management practices and have since published several reports summarizing their results. These reports have focused on characterizing and quantifying physical features, water, nutrient pesticide, and energy use at golf courses across the U.S. Data about environmental practices that golf course managers have implemented was also collected.

The GSCAA report found that 29% of 18-hole golf courses participate in some type of voluntary environmental stewardship program (GSCCA 2007). Whereas almost all courses have made an environmental improvement to the land, courses involved in the stewardship program have made significantly more improvements over a ten-year period (Golf Course Environmental Profile Phase I). Constructing or improving wildlife habitat, reducing waste, recycling, and improving chemical storage and irrigation systems are example of actions that golf courses have reported as environmental improvements (GCSSA 2012). However, an updated survey in 2015 found that participation in stewardship programs remained the same with a significant decrease in many types of environmental improvement (e.g. wetland restoration, erosion control, wildlife habitat, stormwater retention), with budget and time restrictions being the most frequent grounds for lack of participation (GSCCA 2017). Recycling was the only improvement that had an increase in participation from 2005 to 2015 (38% to 53%, respectively) (GSCCA 2017).

While golf course vegetation is not always an equal replacement for natural landscapes (especially if non-native plants are used), it may be more beneficial to wildlife than other types of urban development that completely eradicate natural features. Many baseline studies have shown that golf courses are able to support some wildlife species (Colding and Folke 2008). The Canada goose (*Branta canadensis*) has been so successful at occupying some golf courses in Delaware they have become a nuisance for greenskeepers and are strategically culled (J. Jacobs pers. comm.). Bird diversity was similar on Kansas golf courses to the surrounding natural areas but had lower relative abundance of most species (Terman 1997). Additional studies have analyzed life history and fitness metrics of species on golf courses. Eastern bluebirds on golf courses had lower reproductive rates at golf course sites than non-golf course sites in Virginia but were able to successfully reproduce at higher rates than that of other disturbed systems (Stanback and Seifert 2005, Cornell et al. 2011). Given the productivity of eastern bluebirds on some golf courses, courses may even be able to serve as a population source, allowing bluebirds to persist in the surrounding lower quality habitats (LeClerc et al 2005). Burrowing owls in Washington are attracted to the short turfgrass on golf courses and have successfully nested in artificial nest boxes placed away from maintained areas (Smith et al. 2005). Golf course ponds provide suitable habitat for many species of semi-aquatic turtles in the western piedmont of North Carolina (Failey et al. 2007). Different life history traits lead to variable rates of success of a species' ability to occupy a golf course habitat; thus, the potential of golf courses serving as a refuge should be evaluated on a species-specific basis (Hodgkison et al. 2007). Many bird, insect, amphibian, reptile, and small mammal species have been studied in the context of golf courses, but at the time of this study, little attention has been focused on bats (Chiroptera).

Bat (Chiroptera) Biology and Conservation Status

Bats are a diverse and ubiquitous group of volant mammals. With over 1200 species worldwide, they compose one-fifth of the known mammalian species, and within the United States there are 47 species with diverse life-histories (Harvey et al. 2011).

In the Northeast and Mid-Atlantic region of the United States there are twelve species, and eight of these species are known within Delaware (Figure 2.2): *Lasiurus borealis* (Eastern red bat), *Lasiurus cinereus* (hoary bat), *Lasionycteris noctivagans* (silver haired bat), *Eptesicus fuscus* (big brown bat), *Myotis lucifugus* (little brown bat), *Myotis septentrionalis* (northern long-eared bat), *Perimyotis*

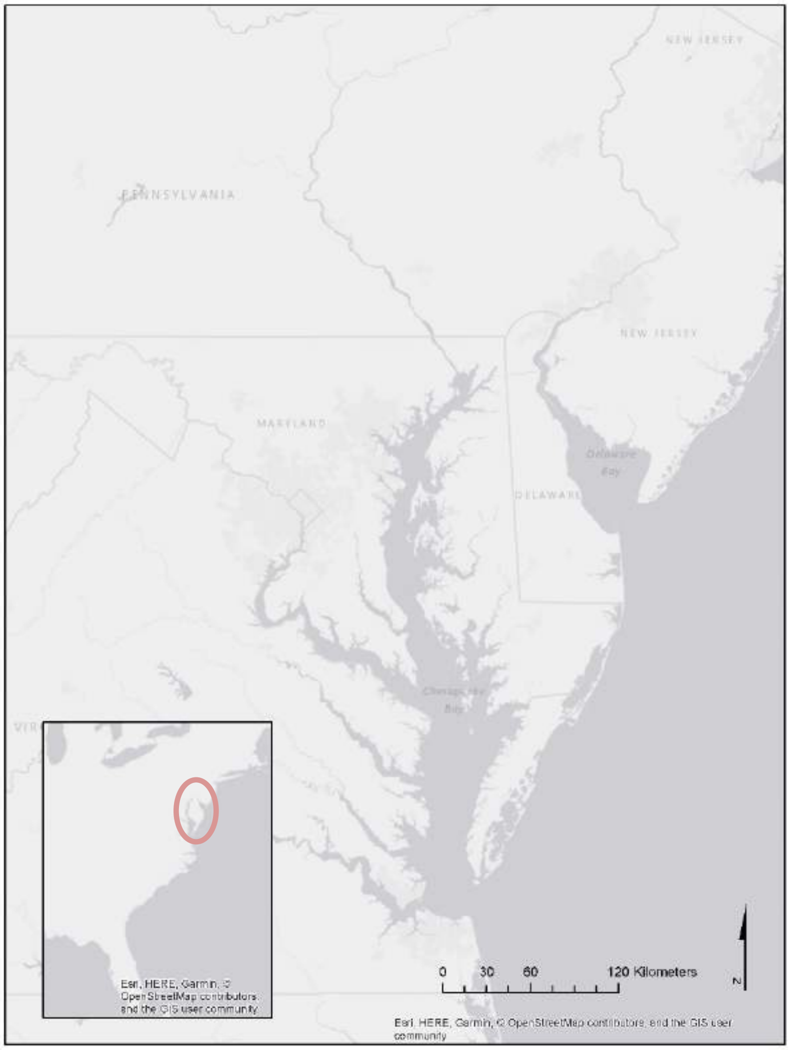

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Figure 2.2 Location of Delaware on the mid-Atlantic coast, USA *subflavis* (tri-colored bat, formerly known as *Pipistrellus subflavis,* the eastern pipestrelle), and *Nycticeius humeralis* (evening bat). These eight species can be divided into two groups: cave bats or tree bats. Cave bats are species that hibernate in caves over winter and form large maternity colony roosts away from their hibernacula in the summer, while adult male cave bats tend to roost alone or in small bachelor colonies. (Kunz 1982). They may also form maternity colonies in tree cavities, bat boxes, bridges, or other man-made structures. Tree bats are highly migratory and mostly solitary species that may hibernate under certain conditions (Cryan et al. 2003). These species typically are found roosting alone or in small family groups under loose bark or in clusters of leaves on a tree (Shump and Shump 1982, Barclay et al. 1988).

Delaware

Both cave bats and tree bats in the Northeast and Mid-Atlantic are insectivorous. Bats are the primary predator of night flying insects (Anthony and Kunz 1977, Cleveland et al. 2006). Coleoptera and Lepidoptera make up the majority of insectivorous bat diets (Black 1974). While bats eat a variety of insect species, bat morphology and foraging strategies have been shown to affect prey preference (Belwood and Fenton 1976; Fenton and Morris 1976, Feldhammer et al. 2009). Feldhammer et al. (2009) established a relationship between mean body mass of bats and prey hardness, where larger bats, such as *E. fuscus,* tended to eat mostly coleopterans. In southern Indiana, *L. borealis* were shown to prefer primarily lepidopterans, *N. humeralis* prefer coleopterans, *P. subflavus* prefer trichopterans, and *M. lucifugus* and *M. septentrionalis* prefer Lepidoptera and Coleoptera. Coleoptera, Lepidoptera, and Hemiptera are among the top preferred insects of *N. humeralis* (Whitaker Jr and Clem 1992). Regional and temporal differences will also affect prey preference flexibility and availability in insectivorous bats. While many studies show *E. fuscus* to be primarily a beetle-consumer, a colony on the

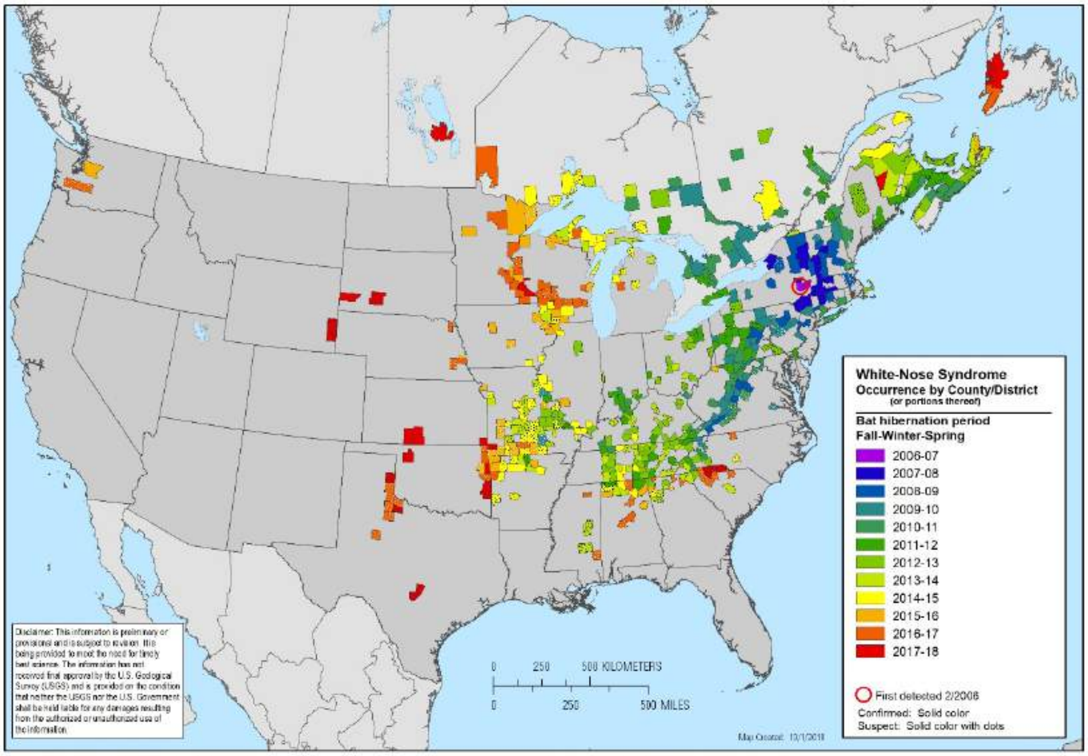
Pennsylvania/Delaware border was found to eat almost exclusively dipteran species (Black 1974, Balke et al. unpublished data).

As insectivores, bats are critical biological pest control agents (Kunz et al. 2011). Their pest control services are not only beneficial to human comfort and safety but have been estimated to be worth up to 57 billion US dollars to the agriculture industry annually (Boyles et al. 2011). Maine and Boyles (2015) conducted exclusion studies on corn fields and found that the presence of bats significantly reduced the number of pests and the presence of pest-associated fungi, resulting in an estimated 1 billion US dollars' worth of ecosystem services each year in corn production alone. A maternity colony of one million Brazilian free-tailed bats (*Tadarida brasiliensis*) can consume up to 8.4 metric tons of insects per night (Kunz et al. 1995). Kurta et al. (1989) estimated a 7.9g lactating female *M. lucifugus* can consume over 100% of her bodyweight in one night of foraging. Other native Delaware bat species such as *E. fuscus, L. noctivagans,* and *L. cinereus* can eat up to 25% of their weight in insects each night (Coutts et al 1973). In Delaware, it is estimated that bat pest control services are worth up to 17 million US dollars annually (Boyles et al. 2011). When referring to pest-control services of bats, it has often been reported that bats eat a large number of mosquitos (Order: Diptera), but there have not been many studies to support this statement. However, a recent study found that some species are eating more mosquitos than previously thought (Wray et al. 2018). Bats are also considered to be potential indicators of ecosystem integrity and important for maintaining forest health and potentially contribute to nutrient transport (Marcot 1996, Agosta 2002, Jones et al 2009).

In the last decade, bat conservation in the United States has become a top priority for many wildlife biologists. Bats in the United States face many novel problems that threaten their populations' existence. In 2006, an emerging fungal disease caused by *Psuedogymnoascus destructans* or *Pd* (formally known as *Geomyces destructans* or *Gd*), referred to as white-nose syndrome (WNS), was discovered (Blehart et al. 2009, Lorch et al. 2011). Since its discovery in Howe's Cave near Albany, New York in 2006, the disease has quickly spread throughout most of the Northeastern and Eastern United States; continuing with an unknown trajectory (Figure 2.3). At the end of the 2017-2018 hibernating season, WNS was present in 33 states in the US and 7 Canadian provinces affecting at least 11 species of bats (White-nose Syndrome Response Team 2018). White-nose syndrome seems to primarily affect cave bat species. Some tree bats have tested positive for *Pd* but have not been documented exhibiting any symptoms of white-nose syndrome. Cave bats' aggregating behavior while hibernating in cold, dark, and humid caves makes them an excellent target for *Pd,* a saprophytic psychrophilic fungus (Frick et al 2010, Turner et al. 2011). The spread of the disease is suspected to be primarily through bat-to-bat contact, and the extent of the role of humans or other animals in its spread is not fully understood (Turner et al. 2011). An isolated instance of a *Pd* positive little brown bat in

Washington state (1300 miles from the nearest detection in Nebraska) complicates our understanding of the pathogen spread (Lorch et al. 2016).

Since its discovery the United States Fish and Wildlife Service (USFWS) has estimated a loss of at least 5.5-6.7 million bats to WNS, with no guarantee of recovery in the next century and even potential regional extinction of the once common *M. lucifugus* (Frick et al 2010, USFWS 2012). White-nose syndrome seems to severely disrupt normal physiological processes in the hibernating bat, yet the exact cause of mortality is still unknown (Blehert et al. 2009, Cryan et al 2010). Symptoms of white-nose syndrome include increased arousals during winter hibernation, wing damage, visible white "fuzz" around the head and muzzle, dehydration, and



Citation: White-nose syndrome occurrence map - by year (2018). Data Last Updated: 10/1/2018. Available at: https://www.whitenosesyndrome.org/resources/map.

Figure 2.3 Spread map of white-nose syndrome across the United States and Canada since 2006. Map from www.whitenosesyndrome.org. Accessed 2/7/2019 depleted stores of body fat (Blehert et al. 2009, Cryan et al. 2010, Reeder et al. 2012, Cryan et al. 2013).

Wind turbines present another recent threat to bat populations. With the increased popularity of wind as an alternative energy source, there has been an unexpectedly high number of bat fatalities occurring at wind energy facilities across the US (Kunz et al. 2007a and Kunz et al. 2007b). It is estimated that wind turbines in the United States kill hundreds of thousands of bats annually (Hayes 2013). In contrast to white-nose syndrome, wind turbine fatalities largely affect the highly migratory tree bat species, as wind energy facilities are often placed along important fly-ways (e.g. ridge tops, coastal areas) that bats use during migration, but area-resident bats may also be affected (Cryan and Barclay 2009). Many hypotheses have been put forward as to why bats are much more affected by these turbines than birds, but a consensus among scientists has not yet been reached. Turbines may appear as a lekking structure, a potential roosting site, or may simply be a curiosity to passing bats (Horn et al. 2008, Cryan and Barclay 2009). Mortality has been shown to occur from blunt physical trauma from the blade and from pulmonary barotrauma (fatal tissue damage to lung structures due to rapid changes in air-pressure near the fast spinning turbine blades) (Baerwald 2008, Cryan and Barclay 2009, Grodsky et al. 2011). Some have suggested that barotrauma is not as prevalent as previous studies have suggested and traumatic injury from the turbine blades is likely the leading cause of bat mortality at wind farms (Capparella et al. 2012). Regardless of how bats are being killed by turbines, the high number of bats being killed by wind turbines is of great concern for conservationists.

Bats and Golf Courses

Habitat destruction and fragmentation is one of the top threats to most wildlife, including bats, and golf courses may offer a novel opportunity for the conservation of bats by providing suitable habitat (Tilman 1994). Golf courses offer many local landscape features that may be attractive to bats. Many species of bats have shown preference for hard tree line edge habitats that encourage successful foraging and commuting (Walsh and Harris 1996, Morris et al. 2010, Wolcott and Vulinec 2012). Tree lines edges are a ubiquitous feature on many golf courses that are manicured and designed to enhance game play difficulty. *Lasiurus. cinereus* show preference for foraging high over large open grass patches (Gruver 2002), features that are prominent on every golf course. Vindigni et al (2009) found that modified water sources in managed landscapes are important water and insect prey sources for bats. Higher levels of *E. fuscus* activity have been found near standing water (Krusic and Neefus 1996). Water hazards (man-made ponds created to add difficulty to the golf game) are another prevalent feature of golf courses that could provide a source of drinking water and foraging for bats. Additionally, many golf courses have partially unmaintained patches of forest, which may contain suitable day roosts for tree bats and/or cave bats forming maternity colonies. The availability of suitable day roosts is an important factor for bat habitat selection (Kunz 1982, Agosta 2002, Kalcounis-Rueppell et al. 2005, Limpert et al. 2007). Conserving and properly managing these areas that potentially contain day roosts may promote higher bat occupancy on golf courses. Recently, the endangered *Eumops floridanus,* Florida bonneted bat, was observed on a roosting in a tree on a golf course in Florida (Gore et al. 2015).

The combination of these features suggests a high potential for golf courses to provide roosting and foraging opportunities for bats and help mitigate the problem of habitat destruction.

Additionally, bats may provide valuable pest control services that could optimally result in the reduction of chemical use. Despite this potential, I could find no study that has quantified bat activity or habitat use on golf courses.

Acoustic surveys as a method to study bats

Bats' elusive nocturnal and aerial behaviors make them an inherently difficult organism to study. Additionally, the sounds bats make are most often outside of the audible range of humans (ultrasonic, approximately >20kHz). In the last two decades, technology for recording bat sounds has improved tremendously and has been increasingly used in studies to measure relative bat activity by recording bat echolocation sounds as they fly through the landscape (O'Farrell et al. 1999, Ochoa et al. 2000, Miller 2001, Flaquer et al 2007). These specialized acoustic monitoring devices (hereafter 'bat detectors') use microphones that detect and record high frequency sounds. The bat detectors I used in this project record sound in full-spectrum. Full-spectrum bat detectors record bat echolocation calls that are stored as hi-fidelity signals that retain all the original information of the signal, including information regarding power spectrum and temporal characteristics of the recording (Brigham et al. 2004). Compared to other types of recording, full-spectrum allows for improved recording in noisy environments.

Bat echolocation sounds are emitted as a series of short high-frequency pulses as the bat is flying. Bat detectors are configured to be triggered by a high-frequency noise that is a certain threshold above the ambient noise. Once the high-frequency signal is detected (e.g. bat echolocation), the detector will record a sound file of the high-frequency noise until the signal is not detected for a defined amount of time (settings are configured by user; North American Bat Protocol for Bat Monitoring recommends 2 seconds) or the maximum file length has been reached (15s max file length recommended for bat monitoring). In this detector configuration each file is considered a “bat pass,” (Loeb et al 2015) while an individual pulse may be referred to as a “bat call” (Figure 1.4).

Bat acoustic monitoring is generally broken down into two types: active and passive monitoring. An active acoustic survey (also referred to as mobile survey) requires an acoustic monitoring device to record as a surveyor travels along a pre-determined route at approximately 20 miles per hour during fair-weather nights (little wind and rain). The surveyor can travel by vehicle or vessel, with vehicle travel being the most common method used to conduct mobile surveys. The length of active surveys will vary based on available routes to safely survey and will depend on the monitoring needs or research question. The speed at which the surveyor is travelling, allows each recorded bat pass to be considered an individual bat (Loeb et al. 2015). From these data, population trends can be calculated from repeated surveys across years (if surveys are conducted at approximately the same time each year). If mobile surveys are conducted multiple times throughout the year, seasonal differences in activity and abundance can be measured. Active acoustic surveys are biased toward detecting bat species that are more common and more commonly tend to use road-ways as flight paths. Active acoustic surveys often miss rare or more cryptic species (Coleman et al. 2014, Braun de Torrez et al. 2017).

Passive acoustic monitoring involves a bat detector placed at a stationary point and left to record with no user present. The length of time the acoustic monitor is left to record is determined by the monitoring needs or research question. Determining population trends is not possible using passive acoustic data. Unlike the active acoustic surveys, each bat pass cannot be considered an individual bat as a single individual may fly repeatedly over the bat detector throughout the night. Passive acoustic monitoring, instead, allows biologists to measure relative activity, and look at temporal and seasonal activity trends.

In addition to the number of bat passes indicating activity levels, an examination of call structure can also inform us about behavior. A foraging bat will generally have three parts to an echolocation sequence: search phase, approach phase, and terminal phase or feeding “buzz” (Figure 1.4). During the search phase, a bat is searching for prey in its environment by emitting pulses at a general rate of one pulse per wing beat (Griffin et al. 1960, Britton et al. 1997, Jones 1999). After the detection of an insect, the pulse rate increases to several pulses per wing beat allowing a bat to get closer to their prey without overlapping the pulse and echo; this change in pulse rate facilitates greater information retrieval (Britton et al. 1997, Kalko and Schnitzler 1989). At the end of the approach phase, a terminal buzz is emitted. A terminal buzz is a rapid succession of broadband pulses, giving the bat position information immediately before it attempts to capture its prey, that when made audible to the human ear resembles a “buzz” or “zip” sound (Fenton and Bell 1979).

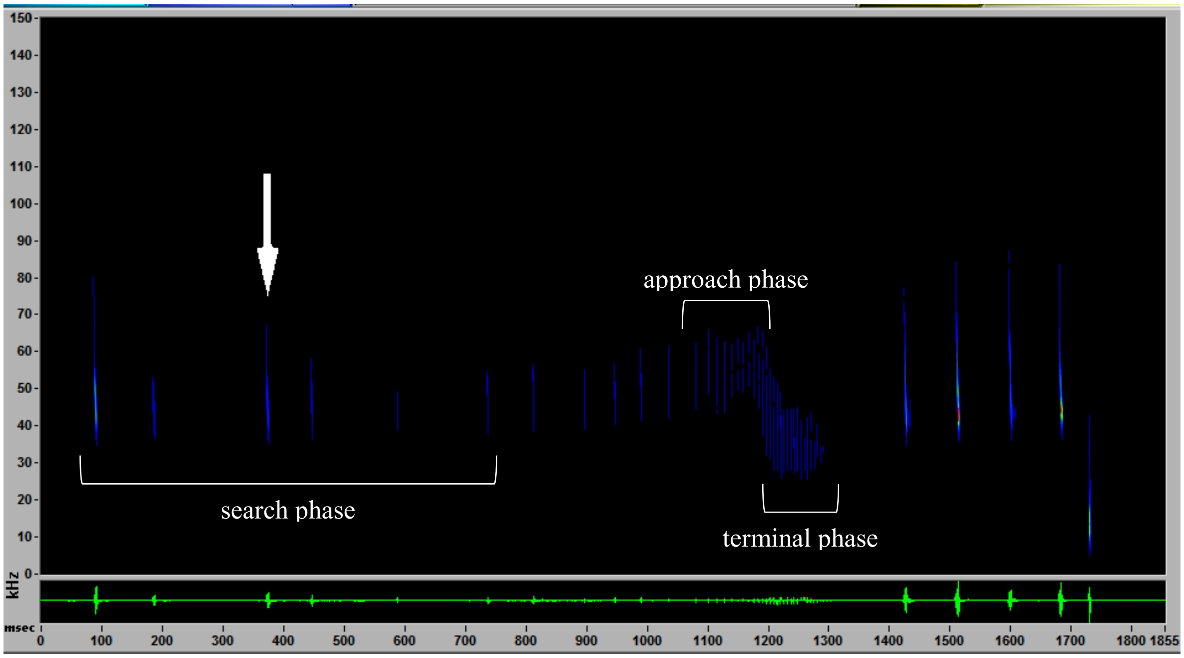


Figure 2.4 Spectrogram of a bat pass with the three phases of a bat call sequence: search phase, approach phase, and terminal phase or "feeding buzz." White arrow indicates an individual echolocation pulse.

Search phase pulses are used in species identification. Despite bats exhibiting major plasticity in their call structure (often sharing many call characteristics with other species), improvements in technology allow us to measure call parameters (e.g., minimum frequency, maximum frequency, duration) quantitatively and successfully attribute them to species using a combination of commercially available classifiers and manual identification based on the parameters (Fenton and Bell 1981, Obrist 1995, O'Farrell et al. 1999, Szewczak 2004, Britzke et al. 2011).

Summary

While the gameplay of golf has remained largely the same, golf course management has drastically evolved over the last half-century. Environmental impacts from intensive management activities have drawn criticisms from environmentalists and conservation biologists.

With more environmentally-friendly management practices that have been implemented on some golf courses over the last few decades, golf courses have the capacity to successfully support a variety of wildlife (especially more urban-adapted species). Using acoustical survey methods, this project aims to explore the relationship between bat activity on golf courses in Delaware.

Study Objectives

I. Examine the effects of five small-scale golf course landscape variables (water hazard, open grass, open understory managed, open understory natural, and dense understory natural habitats) on 1) overall bat activity, 2) bat foraging activity, 3) species richness and 4) species-specific activity using acoustical survey methods.

I predict that bat activity and richness will be higher in the open understory natural and dense understory natural habitats, as they more closely reflect the natural habitats that many species of bat prefer. I also predict that foraging activity will be highest at water hazard habitats, as the man-made ponds may have higher levels of insect activity for increased foraging opportunities.

Chapter III:

Research Methods

Site Selection

Four golf courses were chosen across Delaware using aerial imagery to identify courses had similar small-scale landscape characteristics (e.g. amount of wooded areas present on the course, number of water hazards). Once the prospective sites were chosen, I visited each golf course and met with the greenskeepers of each course to explain the project and request their involvement in the study. All golf courses queried agreed to be a part of the project: Deerfield Golf and Tennis Club (Newark, DE), Frog Hollow Golf Club (Middletown, DE), Garrisons Lake Golf Club (Smyrna, DE), and Sussex Pines Country Club (Georgetown, DE)

Figure 3.1. Map of the locations of golf courses used in the study Delaware, USA. Dark gray areas indicate forest cover and light gray areas indicate developed or agricultural land.

(Figure 3.1). The fours golf courses ranged in size from 62-139Ha, with an average size of 87.25Ha.

After establishing and visiting each golf course site I chose five visually distinguishable small-scale landscape areas to be studied (hereafter referred to as Habitats, Table 3.1), that were represented on all five courses: water hazard, open grass, open understory managed, open understory natural, and dense understory natural. Water hazards were defined as a man-made or natural water features. Open grass areas were areas where grasses grew mostly unmaintained (0.5-0.75m), but occasionally mowed (0.1m). Open understory managed areas were defined as areas where the ground was manicured in some way (mowed or mulched ground) often accompanied by a golf cart path and a closed high canopy cover with no understory, achieved by trimming low branches. Open understory natural areas were defined as forest fragments that were left to grow naturally and had a fairly open mid-understory. Dense understory natural areas were also forest patches left to grow naturally but tended to be younger forest patches with

Table 3.1 Habitat site description of habitats sampled at each golf course

Habitat	Description
Dense Understory Natural	Forest fragments that were left unmanaged and had a closed canopy with a cluttered understory
Open Grass	Tall grassed areas that were occasionally mowed but outside of the playing area.
Open Understory Managed	Ground was maintained (mowed and/or mulched) with a high closed canopy with an open understory obtained by pruning lower branches. Often times, golf cart paths ran through these areas
Open Understory Natural	Forest fragments that were left unmanaged with a closed canopy but more open understory than the Dense Understory Natural Habitat
Water Hazard	Man-made ponds on the golf course built to increase the difficulty of the game.

higher amounts of clutter in the low- to mid-understory. I chose these five areas as the main focus of the study because they are more representative of natural landscapes and can be more easily managed or altered than the already established fairways and greens on golf courses.

Acoustic Surveys

To capture the peak summer activity, in June and July of 2011, I visited one golf course a night for a total of 6 nights per golf course and placed a Wildlife Acoustics (Massachusetts, USA) SM2BAT bat detector (192kHz) paired with an omnidirectional SMX-US microphone at each microhabitat. Each microphone was positioned 2m off the ground with a metal conduit pole and angled at slightly less than 90° to prevent signal interference, capture as many bat passes as possible, and prevent microphone damage from unexpected rain events (Patriquin and Barclay 2003, Wildlife Acoustics SM2BAT User Manual). Surveys were only conducted on fair weather nights. I canceled surveys during heavy rain and high winds as both are known to affect bats' normal flight behavior (Voigt et al. 2011) and can reduce or permanently damage microphone sensitivity. Bat detectors were programed to begin recording at sunset and to record for four hours to capture the first peak of nightly bat activity (Hayes 1997). Detectors recorded full-spectrum files with a file length limit of 15 seconds. Files were compressed in the Wildlife Acoustics proprietary .WAC file format. Detector settings can be found in Table 2.2.

Bat echolocation files were processed using SonoBat™ (v. 3.8.6), a software specific for viewing, parameterizing and identifying recorded bat passes. To be included in the analysis, the recorded acoustic file containing a bat pass did not exceed 15s and contained a sequence of ≥ 2 bat echolocation pulses, separated by <1s (Fenton 1970). The number of files containing bat passes recorded each survey period (4-hour period after sunset) was used as an index of bat activity. Any recorded files that did not contain a bat pass were considered noise and removed from analysis (e.g. insect noise, electrical interference). Any night where the full period of recording did not occur (e.g. because of inclement weather or detector failure) was also removed from analysis.

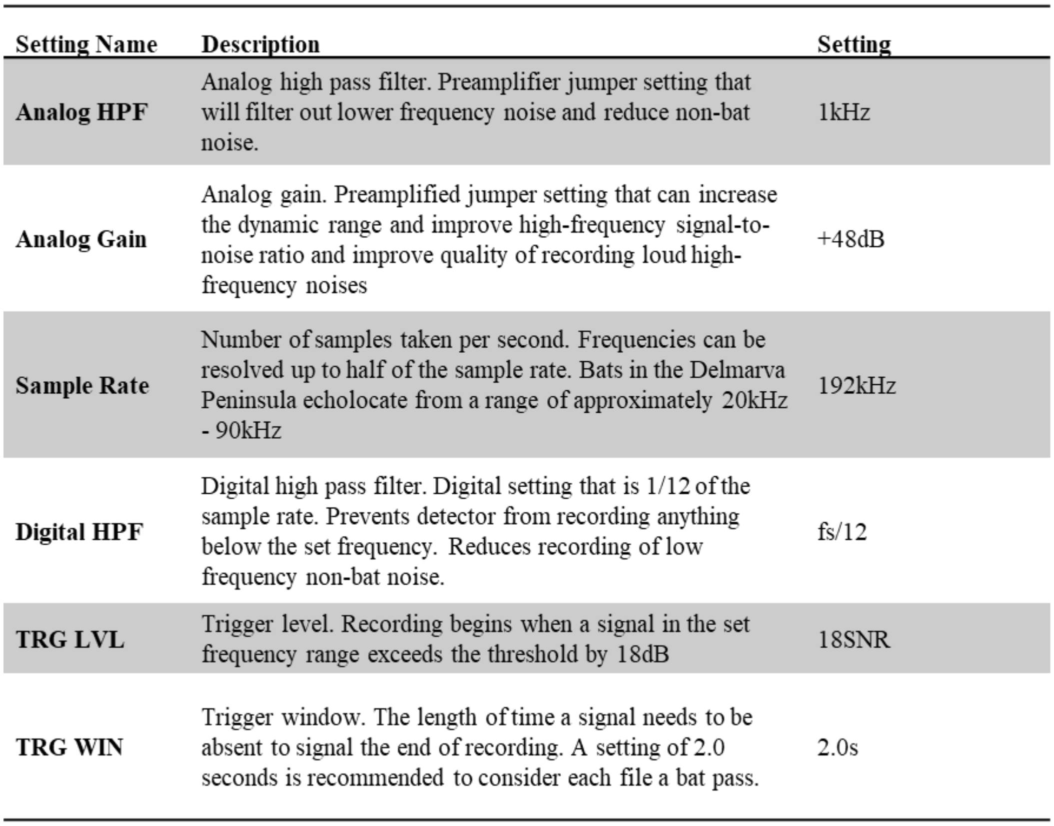
All files containing a bat pass were visually inspected for the presence of feeding buzzes. The total number of feeding buzzes was recorded for each survey night at each habitat. If multiple feeding buzzes were present in one bat pass, all buzzes were included. The number of feeding buzzes recorded each survey period was used as an index of bat foraging activity.

Species were identified using the automated species identification algorithm feature of SonoBat 3.8.6. The automated classifier measures 72 different parameters from the recorded bat pulses (e.g. characteristic frequency – frequency at the flattest part of the pulse, frequency maximum and minimum, pulse duration, etc.). and makes an identification decision based on a reference library of known species call parameters using a discriminate probability function. All bat passes that were identified to a species were manually vetted to confirm that the software made a reasonable species choice. The elasticity of bat echolocation calls prohibits a single pulse to be used for species identification. To be included in the species-specific analysis, the recorded acoustic file containing a bat pass did not exceed 15s and contained a sequence of ≥ 3 bat echolocation pulses, separated by <1s (Fenton 1970). I used the reference library of known calls provided with SonoBat™ software along with guidance documents that described common bat call characteristics for identification (Humboldt State University Bat Lab 2011). Pulse shape, characteristic frequency, pulse duration, frequency maximum and minimum were the primary characteristics considered when vetting calls. Unidentified bat passes were labeled as “NoID.”

Given the plasticity of bat echolocation call structure and many factors affecting the quality of the recording (e.g., abiotic environmental conditions, bat flight directions, bat proximity to the microphone, etc.), identifying all recorded call files to a species level is not achievable (Reichert et al. 2018).

I quantified the following metrics per survey night (4-hour period) to evaluate the effect of habitat on bats using golf courses: 1) total activity levels (total number of files containing bat passes), 2) foraging activity (total number of feeding buzzes), 3) species-specific activity (total number of bat passes from each species), and 4) species richness (total number of species identified).

Table 3.2 Detector settings configured for the Wildlife Acoustics SM2BAT. Detectors were set based on recommendations from the Wildlife Acoustics SM2BAT User User Guide (https://www.wildlifeacoustics.com/images/documentation/Song-Meter-SM2Bat-Suppement.pdf)



Setting Name	Description	Setting
Analog HPF	Analog high pass filter. Preamplifier jumper setting that will filter out lower frequency noise and reduce non-bat noise.	1kHz
Analog Gain	Analog gain. Preamplified jumper setting that can increase the dynamic range and improve high-frequency signal-to-noise ratio and improve quality of recording loud high-frequency noises	+48dB
Sample Rate	Number of samples taken per second. Frequencies can be resolved up to half of the sample rate. Bats in the Delmarva Peninsula echolocate from a range of approximately 20kHz - 90kHz	192kHz
Digital HPF	Digital high pass filter. Digital setting that is 1/12 of the sample rate. Prevents detector from recording anything below the set frequency. Reduces recording of low frequency non-bat noise.	fs/12
TRG LVL	Trigger level. Recording begins when a signal in the set frequency range exceeds the threshold by 18dB	18SNR
TRG WIN	Trigger window. The length of time a signal needs to be absent to signal the end of recording. A setting of 2.0 seconds is recommended to consider each file a bat pass.	2.0s

I used the statistical program R (v.3.5.0, R Core Team 2018) with Rstudio (v.1.1.463 RStudio Team 2016) for all statistical analyses. I constructed generalized linear mixed effects models (GLMMs; function *glmer,* R package *lme4,* Bates et al. 2012) for each response variable (total activity, foraging activity, species-specific activity, and species richness per survey night) with habitat as a fixed effect and detector site nested within golf course as a random effect. I tested the effect of categorical predictors (i.e., golf course, habitat) by comparing 2 nested models (one with and one without the categorical variable) using a likelihood ratio test (LRT, function *anova*, R Stats package). I first tested for an effect of golf course on each response variable, but because it was not significant for most metrics, I included it as a random effect to account for any potential differences in activity across courses. If the categorical predictor variable was significant, I then used post-hoc Tukey contrasts for multiple comparisons to test pair-wise comparisons among the habitats with *p*-values adjusted with a Bonferonni correction (function *glht,* R package *multcomp*).

This modeling framework accounted for the non-independent observations of repeated survey nights at each detector site in each golf course (Braun de Torrez 2017). Standard diagnostics of the distribution of all response variables showed that the data was right skewed, therefore a Poisson distribution for count data was used in all models. A Poisson distribution was selected over a Gaussian distribution with a natural log transformation because Poisson is able to handle 0-values in the response variables (present in the foraging and several of the less common species-specific activity datasets).

Along with habitat, several combinations of biologically relevant temporal and spatial variables were included as covariates to determine the best model for predicting activity levels and species richness: mean temperature, mean humidity, mean wind speed, distance to closest water body, distance to the closest agricultural field. To determine the best model, I used the second order Akaike Information Criterion (AICc) for small sample sizes. If the difference between AICc values was ≤ 2, models were considered to be equivalent, and the model with the fewest parameters was chosen. To compare models, parameters were estimated using maximum likelihood and Laplace approximations (Bolker et al. 2009, Pinheiro et al. 2012).

Graphical analysis was performed in Microsoft Excel 2016.

Mist-netting

For further validation of bat species present at the golf courses, I used standard bat mist-netting techniques to physically capture bats at each golf course one time in 2010 and 2011. I used two sets of triple-high mist-net poles with 3 stacked 6meter mist-nets (Avinet, Inc.). The nets were placed non-randomly at locations on the golf course that were likely to improve capture rate (e.g. forested corridors with closed canopies, near sources of drinking water). Nets were opened 15 minutes before sunset and checked every 10-15 minutes for four hours. If a bat was captured, I documented the following demographic data: species, sex, age, reproductive status, weight, forearm length, and noted wing damage according the U.S. Fish and Wildlife's wing damage index (Reichard and Kunz 2009). Bat demographic data can indicate general health of the individual bats. Bats were released within 30-minutes of initial capture. After each mist-netting session, I decontaminated all mist-netting equipment following the most up-to-date U.S. Fish and Wildlife protocols, to prevent accidental spread of *Pd* (USFWS 2010).

Chapter IV:

Results

Acoustic Surveys

Each golf course was visited 6 times throughout June and July of 2011, but some nights were excluded from analysis because inclement weather (high winds, thunderstorms) or equipment failure prevented a full survey period from being recorded. A total of 272 detector hours were recorded (68 survey nights * 4 hours of recording/survey night) across all four courses (Deerfield Golf and Tennis Club, Frog Hollow Golf Club, Garrisons Lake Golf Club, Sussex Pines Country Club; Table 4.1). I visually inspected all recorded files to verify they contained a bat pass and removed any files that were considered noise (e.g. insect noise, electrical interference) from analysis. A total of 6899 (bat passes were recorded across all golf courses and habitats (Table 4.2).

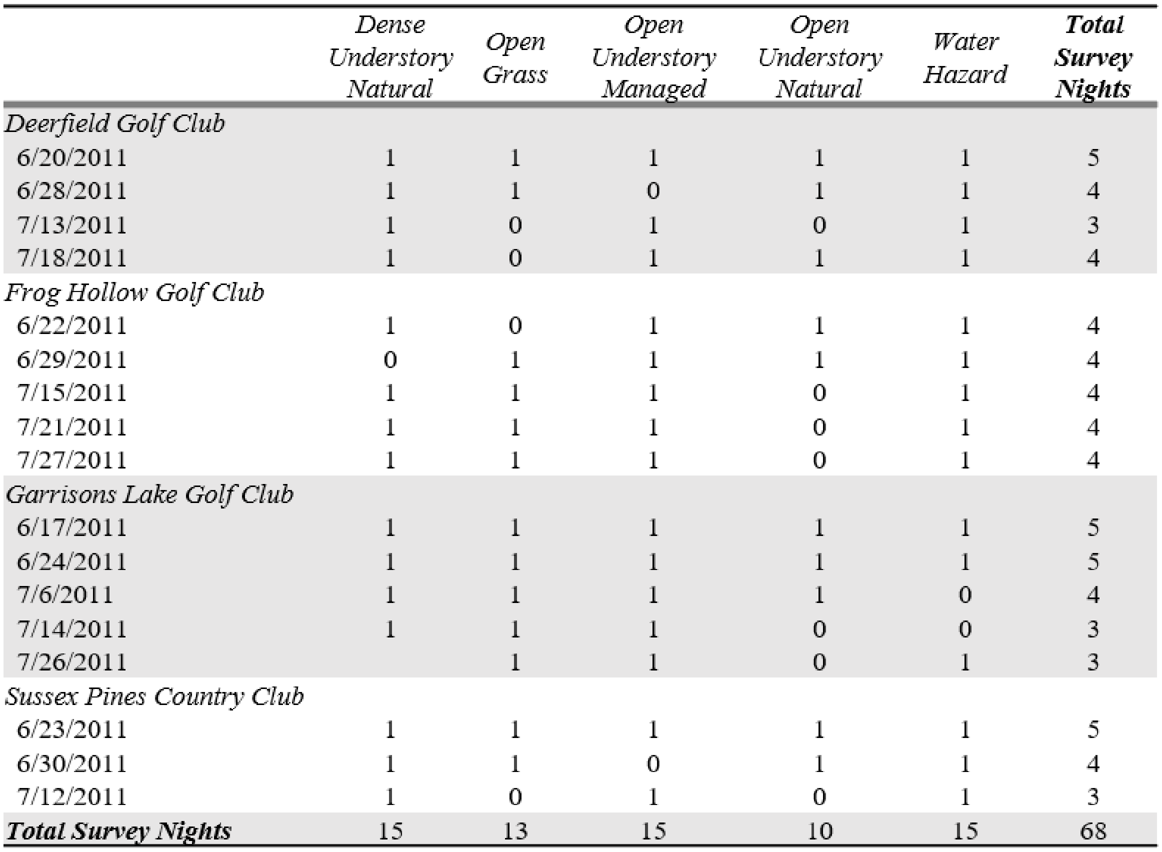
Overall Bat Activity

The model that best explained overall bat activity (number of bat pass files per survey night) included habitat, mean temperature, mean humidity, and mean wind speed (Table 4.3, Table 4.4). In the pairwise comparisons, open understory managed habitat had significantly more bat activity (244.33 ± 72.92) than the open understory natural (43.7 ± 18.59; $z = -3.32$, $p = 0.004$) and open grass habitats (40.85 ± 15.11; $z = 3.54$ $p = 0.002$; Table 4.5 Figure 4.1A). No other pairwise comparisons were statistically significant.

Foraging Activity

The best model for predicting foraging activity (number of feeding buzzes per recording night) included both habitat and mean temperature (Table 4.3). Foraging activity significantly increased as temperature increased (Table 4.4). Pairwise comparisons showed significantly higher foraging activity in the open understory managed habitats (7.6 ± 2.82) than in the open grass (0.38 ± 0.18; z = 3.6,1 *p* = 0.002) and open understory natural (1 ± 0.49; z = -2.89, *p* = 0.03; Table 4.5, Figure 4.1B)

Table 4.*1 Total number of acoustic survey nights per golf course and habitat. Each golf course was visited 6 times through June and July 2011. Survey nights included in this table included nights where detectors recorded successfully for the full 4-hour survey period at all and/or some of the habitats. A "1" indicates a full survey night. A "0" indicates an incomplete survey night due to detector failure. Dates where surveys were canceled because of inclement weather were not included in this table.*



	Dense Understory Natural	*Open Grass*	*Open Understory Managed*	*Open Understory Natural*	*Water Hazard*	***Total Survey Nights***
Deerfield Golf Club						
6/20/2011	1	1	1	1	1	5
6/28/2011	1	1	0	1	1	4
7/13/2011	1	0	1	0	1	3
7/18/2011	1	0	1	1	1	4
Frog Hollow Golf Club						
6/22/2011	1	0	1	1	1	4
6/29/2011	0	1	1	1	1	4
7/15/2011	1	1	1	0	1	4
7/21/2011	1	1	1	0	1	4
7/27/2011	1	1	1	0	1	4
Garrisons Lake Golf Club						
6/17/2011	1	1	1	1	1	5
6/24/2011	1	1	1	1	1	5
7/6/2011	1	1	1	1	0	4
7/14/2011	1	1	1	0	0	3
7/26/2011		1	1	0	1	3
Sussex Pines Country Club						
6/23/2011	1	1	1	1	1	5
6/30/2011	1	1	0	1	1	4
7/12/2011	1	0	1	0	1	3
Total Survey Nights	15	13	15	10	15	68

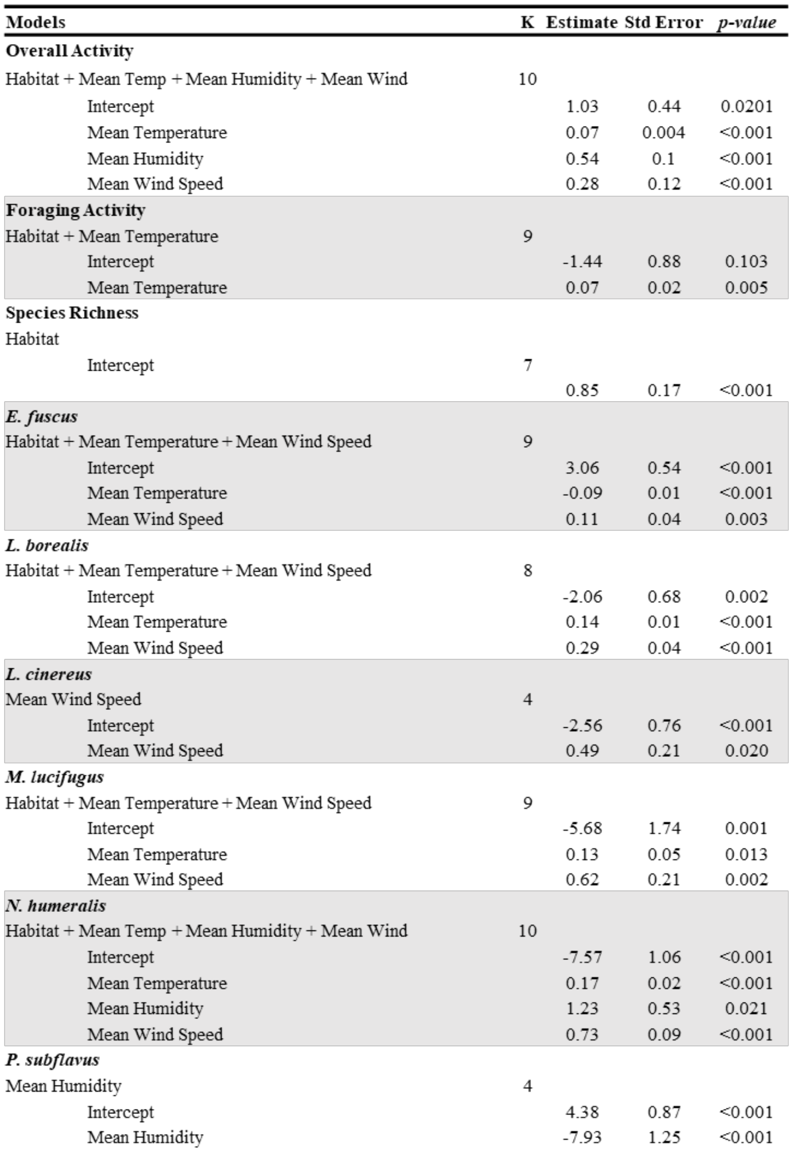
Table 4.2 Total bat activity and species-specific activity by habitat and by golf course. Total number of files and percentage of recorded files are reported. Species percentages represent total number of species-specific calls per the number of identified calls.

	Total Bat Passes	*Total Identified to Species*	*Eptesicus fuscus*	*Lasiurus borealis*	*Lasiurus cinereus*	*Myotis lucifugus*	*Nycticieus humeralis*	*Perimyotis subflavus*
Golf Course								
Deerfield Golf Club	1532	698	400	152	26	7	62	51
		46%	57%	22%	4%	1%	9%	7%
Frog Hollow Golf Club	2450	1037	239	572	8	24	186	8
		42%	23%	55%	1%	2%	18%	1%
Garrisons Lake Golf Club	2385	1164	716	344	16	10	62	16
		49%	62%	30%	1%	1%	5%	1%
Sussex Pines Country Club	532	330	96	212	0	3	12	7
		62%	29%	64%	0%	1%	4%	2%
Total	6899	3229	1451	1280	50	44	322	82
		47%	45%	40%	2%	1%	10%	3%
Habitat								
Dense Natural	742	337	70	230	2	9	20	6
		45%	21%	68%	1%	3%	6%	2%
Open Understory Natural	437	186	74	70	1	2	30	9
		43%	40%	38%	1%	1%	16%	5%
Open Understory Managed	3665	1738	668	788	13	30	228	11
		47%	38%	45%	1%	2%	13%	1%
Open Grass	531	242	164	49	12	2	9	6
		46%	68%	20%	5%	1%	4%	2%
Water Hazard	1524	726	475	143	22	1	35	50
		48%	65%	20%	3%	0%	5%	7%
Total	6899	3229	1451	1280	50	44	322	82
		47%	45%	40%	2%	1%	10%	3%

Figure 4.3 *Selection of generalized linear mixed-effects models (GLMMs; Poisson distribution) to explain overall bat activity, foraging activity, species richness, and species-specific activity per survey night on golf courses in Delaware. For each activity dataset, the top three models are listed or only models with a total cumulative Akaike weight (ωi) ≥ 0.95 are listed. The top model selected was the model with the lowest AICc score. If the difference between AICc scores was ≤ 2, models were considered to be equivalent, and the model with the fewest parameters was selected. Categorical predictor variables are habitat (dense understory natural, open grass, open understory managed, open understory natural, and water hazard). Continuous predictor variables are mean temperature (mean temp), mean humidity, and mean wind speed (mean wind).*

Models (Bat Activity)	K	ΔAICc	ωi	Cumulative ωi
Overall Activity				
Habitat + Mean Temp + Mean Humidity + Mean Wind	10	0.00	1.00	1.00
Foraging Activity				
Habitat + Mean Temp + Mean Wind	9	0.00	0.40	0.40
Habitat + Mean Temp	8	0.73	0.28	0.68
Habitat + Mean Temp + Mean Humidity + Mean Wind	10	2.41	0.12	0.80
Species Richness				
Habitat	7	0.00	0.17	0.17
Null	3	0.19	0.33	0.33
Mean Wind	4	1.17	0.10	0.43
E. fuscus				
Habitat + Mean Temp + Mean Wind	9	0.00	0.54	0.54
Habitat + Mean Temp + Mean Humidity + Mean Wind	10	0.56	0.41	0.04
Habitat + Mean Temp + Mean Humidity	9	5.52	0.03	0.98
L. borealis				
Habitat + Mean Temp + Mean Wind	9	0.00	0.71	0.71
Habitat + Mean Temp + Mean Humidity + Mean Wind	10	1.77	0.29	1.00
L. cinereus				
Habitat + Mean Wind	8	0.00	0.23	0.23
Mean Humidity	4	0.26	0.20	0.43
Habitat	7	1.46	0.11	0.54
M. lucifugus				
Habitat + Mean Temp + Mean Wind	9	0.00	0.55	0.55
Habitat + Mean Temp + Mean Humidity + Mean Wind	10	1.49	0.26	0.82
Habitat + Mean Wind	8	3.32	0.11	0.92
N. humeralis				
Habitat + Mean Temp + Mean Humidity + Mean Wind	10	0.00	0.78	0.78
Habitat + Mean Temp + Mean Wind	9	2.53	0.22	1.00
P. subflavus				
Mean Humidity	4	0.00	0.93	0.93
Habitat + Mean Humidity	8	6.61	0.03	0.96

Figure 4.4 *Best generalized linear mixed-effect models (GLMMs; Poisson distribution) to explain bat activity and species richness per survey night on golf courses in Delaware reported. Categorical predictor variables are habitat (dense understory natural, open grass, open understory managed, open understory natural, and water hazard). Continuous predictor variables are mean temperature (mean temp), mean humidity, and mean wind speed (mean wind).*



Models	**K**	**Estimate**	**Std Error**	***p-value***
Overall Activity				
Habitat + Mean Temp + Mean Humidity + Mean Wind	10			
Intercept		1.03	0.44	0.0201
Mean Temperature		0.07	0.004	<0.001
Mean Humidity		0.54	0.1	<0.001
Mean Wind Speed		0.28	0.12	<0.001
Foraging Activity				
Habitat + Mean Temperature	9			
Intercept		-1.44	0.88	0.103
Mean Temperature		0.07	0.02	0.005
Species Richness				
Habitat				
Intercept	7			
		0.85	0.17	<0.001
E. fuscus				
Habitat + Mean Temperature + Mean Wind Speed	9			
Intercept		3.06	0.54	<0.001
Mean Temperature		-0.09	0.01	<0.001
Mean Wind Speed		0.11	0.04	0.003
L. borealis				
Habitat + Mean Temperature + Mean Wind Speed	8			
Intercept		-2.06	0.68	0.002
Mean Temperature		0.14	0.01	<0.001
Mean Wind Speed		0.29	0.04	<0.001
L. cinereus				
Mean Wind Speed	4			
Intercept		-2.56	0.76	<0.001
Mean Wind Speed		0.49	0.21	0.020
M. lucifugus				
Habitat + Mean Temperature + Mean Wind Speed	9			
Intercept		-5.68	1.74	0.001
Mean Temperature		0.13	0.05	0.013
Mean Wind Speed		0.62	0.21	0.002
N. humeralis				
Habitat + Mean Temp + Mean Humidity + Mean Wind	10			
Intercept		-7.57	1.06	<0.001
Mean Temperature		0.17	0.02	<0.001
Mean Humidity		1.23	0.53	0.021
Mean Wind Speed		0.73	0.09	<0.001
P. subflavus				
Mean Humidity	4			
Intercept		4.38	0.87	<0.001
Mean Humidity		-7.93	1.25	<0.001

Table 4.5 *Pairwise comparisons among habitats. If habitat was a significant predictor variable in the top GLMM, I used post-hoc Tukey contrasts for multiple comparisons with p-values adjusted with a Bonferonni correction. Only significant pairwise comparisons are included.*

	Estimate	Std. Error	*p*-value
Overall Activity			
Open Understory Managed - Open Grass	1.193	0.55	0.004
Open Understory Natural - Open Understory Managed	-1.81	0.55	0.008
Foraging Activity			
Open Understory Managed - Open Grass	3.01	0.83	0.003
Open Understory Natural - Open Understory Managed	-2.23	0.77	0.03
Species Activity			
Habitat not significant			
E. fuscus			
Open Managed Understory - Dense Natural	2.7	0.44	<0.001
Water Hazard - Dense Natural	2.09	0.44	<0.001
Open Managed Understory - Open Grass	1.65	0.42	<0.001
Open Understory Natural - Open Understory Managed	-2.2	0.43	<0.001
Water Hazard - Open Understory Natural	1.6	0.44	0.002
L. borealis			
Open Managed Understory - Open Grass	2.96	0.84	0.004
Open Understory Natural - Open Understory Managed	-2.45	0.84	0.029
L. cinereus			
Habitat not significant			
M. lucifugus			
Habitat not significant			
N. humeralis			
Habitat not significant			
P. subflavus			
Habitat not significant			

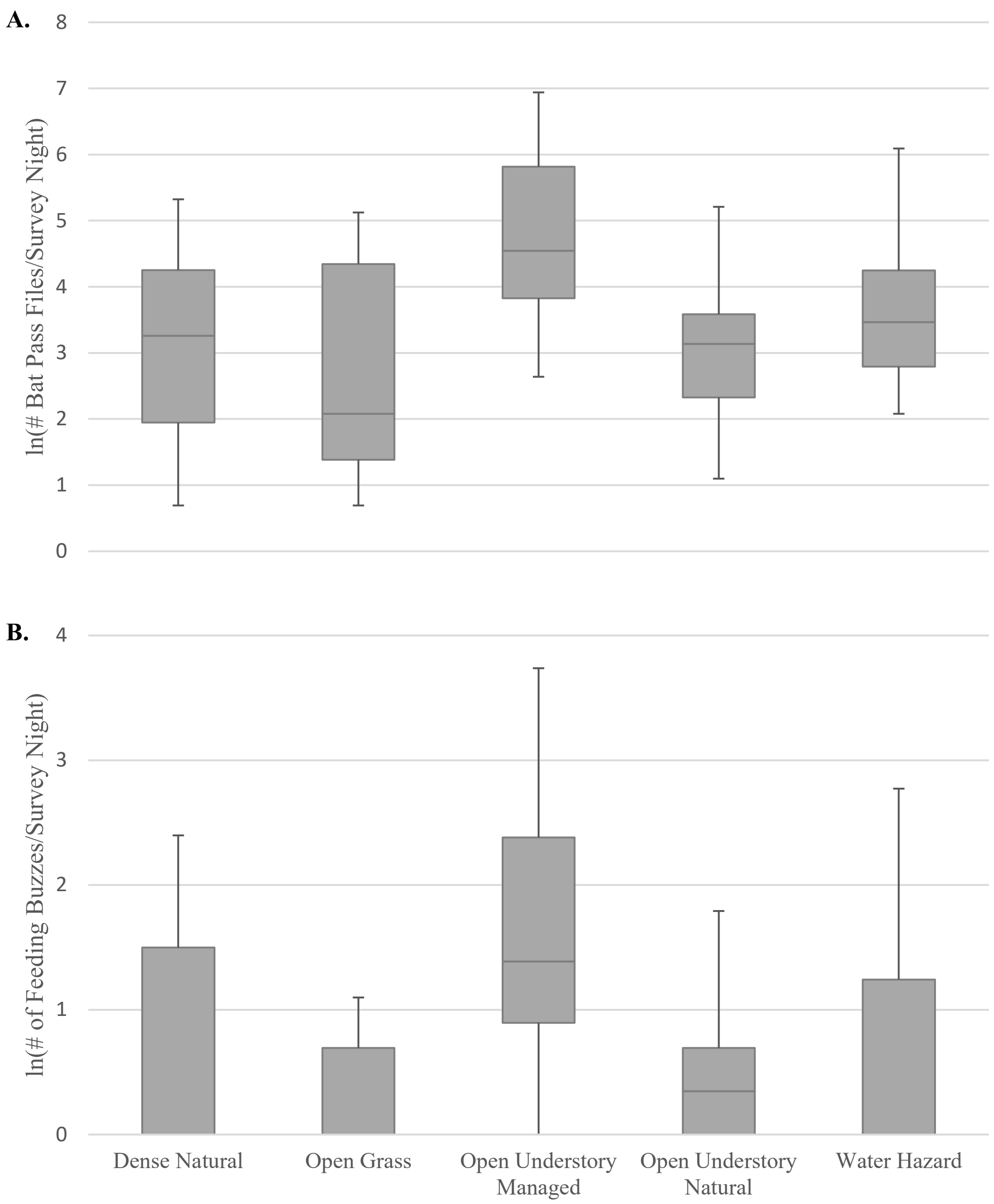


Figure 4.1 *Differences in A) overall bat activity (number of bat pass files per survey night) and B) foraging activity (# of feeding buzzes detected per survey night)) between habitats on golf courses in Delaware in June and July 2011. Y-axes are in the log scale.*

Species Richness and Species Composition

SonoBat (3.8.6) identified 46.8% (n = 3228) of all passes to a species and 53.2% (n = 3671) remained unidentified (NoID) (Table 4.2). Six species were identified from the files across all four golf courses and all habitats: *Myotis lucifigus* (little brown bat), *Eptesicus fuscus* (big brown bat), *Lasiurus borealis* (red bat), *L. cinereus* (hoary bat), *Nycticieus humeralis* (evening bat), and *Perimyotis subflavus* (tricolored bat).

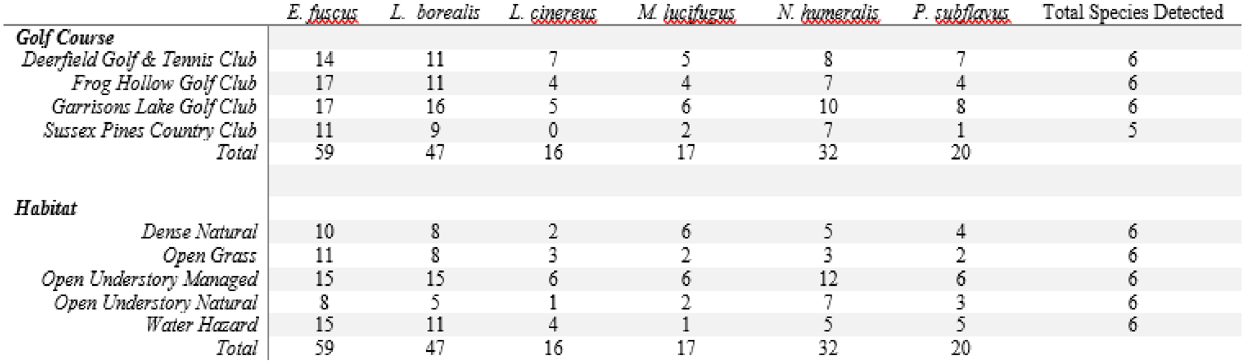
The top model to explain species richness (number of species detected per survey night per detector) included only the categorical predictor habitat, but in pairwise comparisons there was not an effect of habitat. Six species were detected at every golf course, except for Sussex Pines Country Club where *L. cinereus* was not detected over any of the survey nights. The same six species were detected at every habitat type (Table 4.6).

Eptesicus fuscus and *L. borealis* were the most commonly identified calls for all golf courses and accounted for 45% and 40% of all identified calls, respectively (Table 4.2). *Nycticieus humeralis* accounted for 10% of the identified calls. *Lasiurus cinereus, M. lucifugus,* and *P. subflavus* were the least identified species across all golf courses with only 2%, 1%, and 3%, respectively, of the bat passes identified to those species (Table 4.2).

Lasiurus borealis was the most commonly identified species in the Dense Understory Natural habitat (68% of the identified calls) and Open Understory Managed habitat (45% of the calls; Figure 4.2). *Eptesicus fuscus* was the most commonly identified species in the Open Grass (68%) and Water Hazard (65%) habitats. In the Open Understory Natural habitat, *E. fuscus* and *L. borealis* made up approximately the same amount of the identified calls (40% and 38%, respectively). Occurring less frequently, *N. humeralis* was identified more often in the Open

Understory Natural and Open Understory Managed habitats (16% and 13% of identified calls) than in the other three habitat types. *Perimyotis subflavus, L. cinereus,* and, *M. lucifugus*, made up the smallest proportion of identified calls, ranging from 0.15% to 7% across species and habitat (Table 4.2, Figure 4.3)

Table 4.6 Number of survey nights (4-hour survey period) each species was detected at each golf course and habitat type in Delaware in June and July 2011.



	E. fuscus	*L. borealis*	*L. cinereus*	*M. lucifugus*	*N. humeralis*	*P. subflavus*	Total Species Detected
Golf Course							
Deerfield Golf & Tennis Club	14	11	7	5	8	7	6
Frog Hollow Golf Club	17	11	4	4	7	4	6
Garrisons Lake Golf Club	17	16	5	6	10	8	6
Sussex Pines Country Club	11	9	0	2	7	1	5
Total	59	47	16	17	32	20	
Habitat							
Dense Natural	10	8	2	6	5	4	6
Open Grass	11	8	3	2	3	2	6
Open Understory Managed	15	15	6	6	12	6	6
Open Understory Natural	8	5	1	2	7	3	6
Water Hazard	15	11	4	1	5	5	6
Total	59	47	16	17	32	20	

Species Specific Activity

Eptesicus fuscus

The best model to explain *E. fuscus* activity included predictor variables of mean temperature, mean wind, and habitat (Table 4.3). Activity increased with a decrease in mean temperature and increase in mean wind speed (Table 4.4). Pairwise comparisons showed significant differences in habitat (Table 4.5). Open understory managed habitat had significantly higher *E. fuscus* activity (44.53 ± 13.14) than open understory natural (7.4 ± 2.97; z =-5.07, $p <$ 0.001), open grass (12.62 ± 4.02; z = 3.92, p <0.001), and dense understory natural habitats (4.67 ± 2.18; z = 6.11, $p < 0.001$, Table 4.3, Figure 4.3A). The water hazard habitat also had significantly more *E. fuscus* activity (31.67 ± 13.39) than the dense natural (4.67 ± 2.18; z =

4.73, $p < 0.001$) and open understory natural habitats (7.4 ± 2.97; $z = 3.67$, $p = 0.002$, Table 4.5, Figure 4.3A)

Lasiurus borealis

Habitat, mean temperature, and mean wind were included in the best model to predict activity levels of *L. borealis* (Table 4.3). In pairwise comparisons, activity was significantly higher at the open understory managed habitat (52.53 ± 19.03) than the open understory natural (7.00 ± 4.30; $z = 2.92$, $p = 0.03$) and open grass habitat (3.77 ± 2.48; $z = 3.52$, $p = 0.003$; Table 4.5, Figure 4.3B).

Lasiurus cinereus

Mean wind speed was the best predictor of *L. cinereus* activity (Table 4.3). Activity increased with mean wind speed (Table 4.4). In the pairwise comparisons, there were no significant differences in *L. cinereus* activity between habitats (Figure 4.3C).

Myotis Lucifugus

The best model for predicting activity of *M. lucifugus* was mean temperature, wind speed, and habitat (Table 4.3). However, in pairwise comparisons, the effect of habitat was not significant (Figure 4.3D).

Nycticeius humeralis

Habitat, mean temperature, mean humidity, and mean wind speed were included in the best model for predicting *N. humeralis* activity (Table 4.3). There was no significant effect of habitat on activity of *N. humeralis* (LRT, $\chi^2=5.76$, $df = 4$, $p = 0.218$, Figure 4.3E).

Periomytois subflavus

The best predictor of *P. subflavus* activity was mean humidity (Table 4.3). There was no significant effect of habitat on activity of *P. subflavus* (LRT, χ^2=3.2, df = 4, p = 0.525, Figure 4.3F).

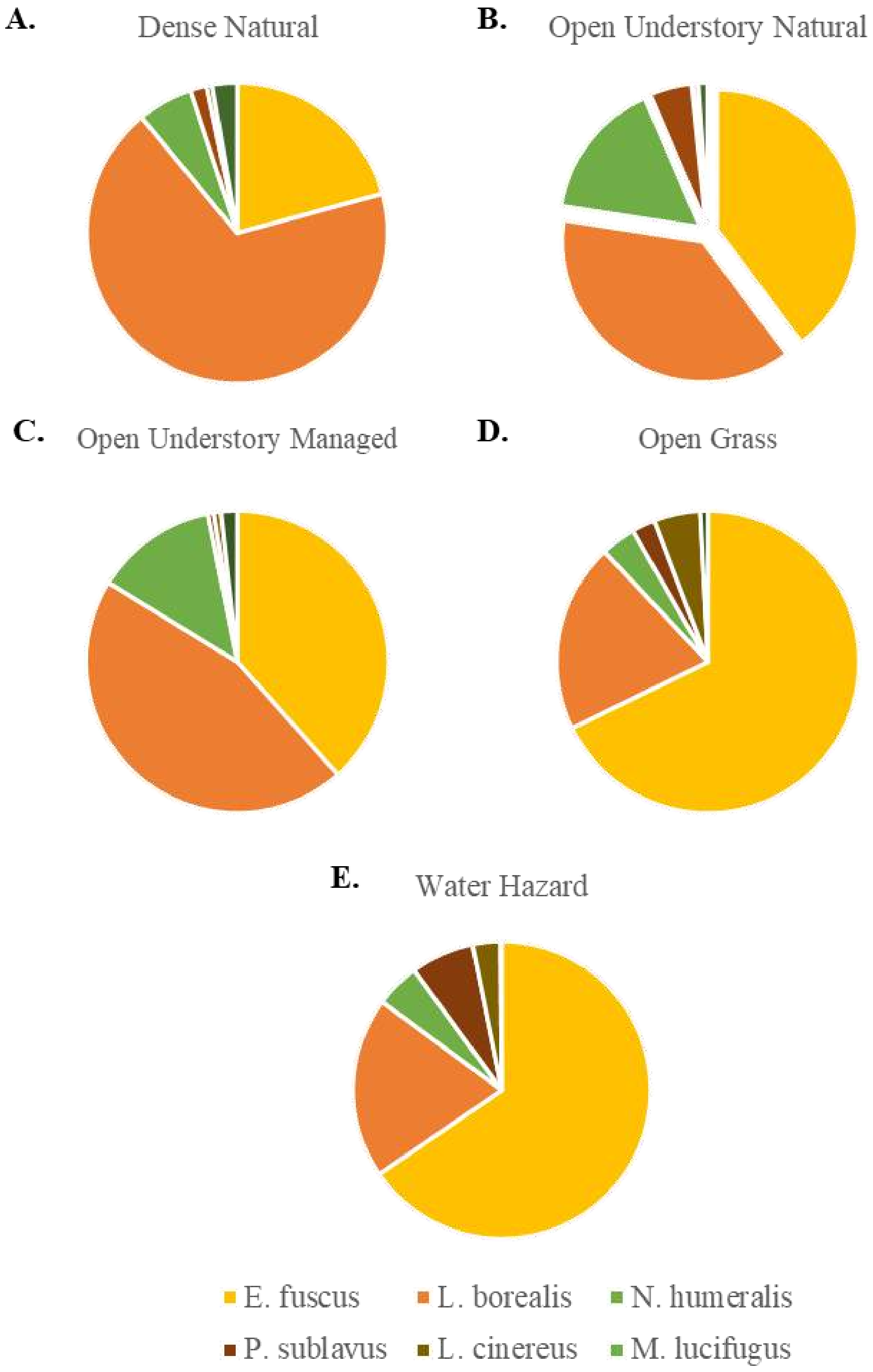


Figure 4.2 Species composition of identified bat passes between habitats on golf courses in Delaware recorded in June and July 2011. Six species were identified and detected in all five

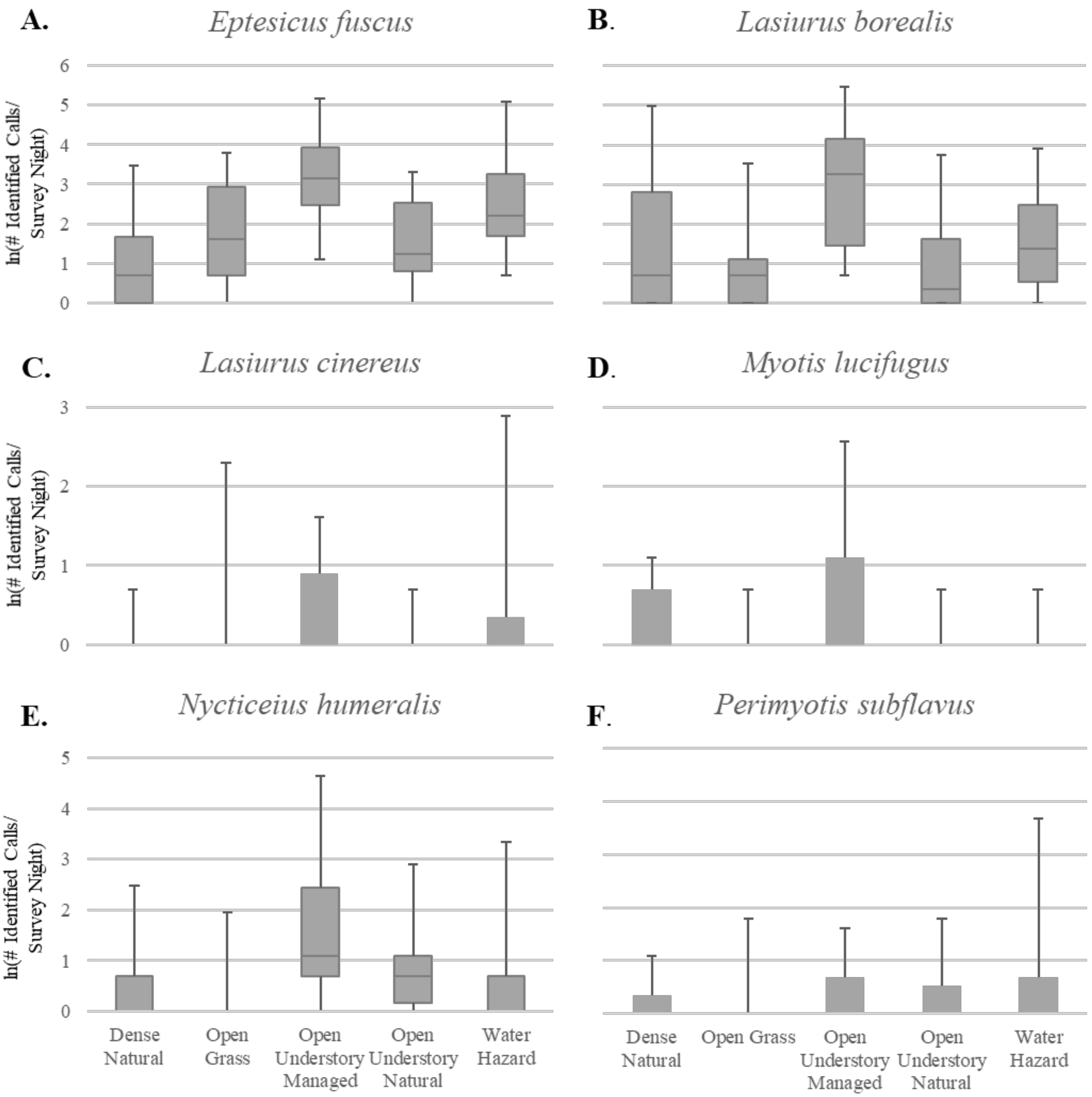


Figure 4.3 Differences in species-specific activity (number of identified calls per survey night) between golf course habitats recorded in Delaware in June and July 2011.Y-axes are in log scale.

Mist-Netting Surveys

Each golf course was netted with two triple-high 6m mist-net pole sets one time in 2010 and 2011 for a total of 192 net hours (6 6m nets * 4-hour net session * 8 nights) or 720 m^2 of net effort (6m net length * 2.5m net height * 3 nets per pole set * 2 pole sets * 8 net nights). Fifty-four bats were captured and fifty were able to be identified to species. Three species were identified: *E. fuscus, L.s borealis,* and *P. subflavus.* Four bats escaped from the net before an identification could be made.

Table 4.7 Species captured at each golf course in Delaware. Golf courses were mist-netted one time each in the summer of 2010 and 2011 for a total of 192 net hours or 720m^2 of net effort. Unknown (unknwn) bats were bats that escaped the mist-net before identification could be made.

Golf Course	**Year**	***E. fuscus***	***L. borealis***	***P. subflavus***	***Unknwn***	***Total***
Deerfield Golf and Tennis Club	2010	0	0	0	0	0
	2011	8	0	0	0	8
Frog Hollow Golf Club	2010	6	1	0	0	7
	2011	7	9	1	4	17
Garrisons Lake Golf Club	2010	3	2	0	0	5
	2011	2	4	0	0	6
Sussex Pines Country Club	2010	2	0	0	0	2
	2011	0	0	0	0	0

Chapter V:

Discussion

Effects of Golf Course Habitat on Overall Bat and Foraging Activity

In this study, I confirmed that many species of bats are using and foraging on a variety of habitats on golf courses in Delaware. Contrary to my predictions, significantly more bat activity occurred in the open understory managed habitats than the habitats the more closely reflected natural habitats (dense understory natural, open grass, and open understory natural). However, bats tend to use habitats that serve as flight corridors (e.g. hard tree line edges) and the open understory managed habitats provide vegetative structures that allow for easy flight (lack of low hanging branches) while offering some protection from potential predators by having an enclosed canopy (Agosta 2002, Hein 2009, Vaugh et al 1997, Wolcott and Vulinec 2012). Similarly, managed chestnut orchards (lack of dense undergrowth, closed canopy) in Switzerland had increased bat foraging activity and species richness compared to unmanaged chestnut orchards where the undergrowth was denser (Obrist et al. 2011). Also contrary to my predictions that the water hazard habitat would have the most foraging activity, foraging activity was highest in the open understory managed habitats. Foraging bats may also benefit from the insects disturbed by regular mowing of areas underneath this high canopy (Vandevelde et al. 2014).

Although in this study we did not sample non-golf course habitats, overall bat activity levels were comparable with other studies of regional habitats other than golf courses. In this study, we found 25.7 average passes/hour (This was calculated by dividing the total bat passes recorded by the 4-hour recording period), with a minimum of 0.25 and a maximum of 258 for all habitats. In Bombay Hook National Wildlife Refuge, one of the most undisturbed areas on the Peninsula, peak passes/hour were 140, with an average of around 5 passes/hour throughout the night (Fox 2007). McGowan and Hogue (2016) found an average of 65 passes/hour with active point-count transect surveys and 3.4 passes/hour for passive surveys. Wolcott and Vulinec (2012) found an average of 80.7 passes/hour combining recordings from the edges and in the middle of agricultural fields. However, these comparisons are limited and must be drawn carefully as the equipment used was different in all four studies. Different detectors and microphones have variable detection rates and can affect the variation in the amount and quality of the datasets (Adams et al. 2012). Additionally, only the Bombay Hook study (2007) and the passive detectors used by McGowan and Hogue (2016) looked at full nights. This study, Wolcott and Vulinec (2012), and McGowan and Hogue (2016) active transects examined peak activity time (directly after sunset for about 4 hours) therefore potentially overinflating nightly bat activity per hour measurements.

Other studies on golf courses documented similar diversity of bird species on golf courses as adjacent natural areas, but in lower numbers (Terman 1997). Birds and some insects showed higher species richness and abundance on golf courses than surrounding farmland (Tanner and Gange 2004). Higher insect abundance on golf courses may offer more foraging opportunities for bats.

Species Richness and Composition

Golf course or habitat did not have any significant effect on species richness per survey night. All six species were detected across all habitats and most golf courses (Sussex Pines lacked any identified detections of *L. cinereus*). This lack of effect is likely due to a small number of species in Delaware (8 species) and sampling occurring in a relatively small area (golf course size averaged 87.25ha). In this study, the species-richness metric did not consider relative activity levels as it only counted a species as present or absent on a given survey night. The species-specific activity levels may be a better indication of habitat use by each species.

The dominance of *E. fuscus* and *L. borealis* in the acoustic data set suggest either that they are more abundant than other species or are more commonly detected in urban and altered areas. Additionally, the calls of these species may be more easily detected and identified by acoustic survey methods. *Eptesicus fuscus* and *L. borealis* had the highest activity levels in the open understory managed habitat. In addition to attractive flight corridors, these large-boled trees in this habitat may provide roosting opportunities (e.g., leaf clusters in hardwoods for *L. borealis* or tree cavities for *E. fuscus*) Mist-netting captures from the golf courses corroborate that *E. fuscus* and *L. borealis* may be more abundant or commonly caught in these areas (Sturgis and Vulinec, unpublished).

The observed lower presence of other species may be explained by life history differences or by limitations of our survey methods. Lower acoustic detection and capture rates of the cave bat species (*M. lucifugus, P. subflavus*) may be because of regional population declines due to white nose syndrome (Ford et al. 2011). The endangered *Myotis septentrionalis* is an uncommon species in Delaware, restricted to the northern portions of the state, and was not identified in any of the recorded calls. The lack of detection of *Lasionycteris noctivigans* is not surprising given that it has been rarely documented in Delaware.

The lack of observable effect of habitat on some species activity (*L. cinereus, M. lucifugus, N. humeralis,* and *P. subflavus*) may be a lack of preference for these species. However, trends of greater use in some habitats were observed, and the lack of effect is more likely the result of small sample size.

Mist-net and acoustical sampling each have their own biases and are best when used in conjunction with one another (Kuenzi and Morrison 1998, O'Farrell and Gannon 1999). Mist-netting capture often misses high-flying bat species (e.g., *L. cinereus or L. noctivigans*). Acoustical sampling methods frequently miss quiet echolocating (low intensity) bat species that typically glean insects from trees (e.g. *M. septentrionalis*). In this study, mist-netting on golf courses typically occurred in areas along hard tree line edges that served as bat flight corridors. Water sources are ideal locations to catch other bats not typically caught in nets because even high-flying bats need to drink water but netting over water was largely avoided in this study due to logistics of setting mist-nets over deep-water hazards. Catching only three species (*E. fuscus, L. borealis¸* and *P. subflavus*) across the golf courses was not unexpected given the habitats sampled and inherent mist-netting biases. Mist-netting in combination with acoustic sampling may not be as important in areas, such as Delaware, where species diversity is relatively low. Netting is nevertheless often recommended because it allows researchers to collect demographic and general body condition data that is not possible to assess through acoustical methods alone

Explaining the Effect of Climatic Variables on Bat Activity

While the purpose of my study was to look at the effect of golf course habitat on bat activity, I included biologically relevant environmental variables as covariates to account for variation in bat activity. Mean temperature was an important covariate in predicting overall activity, foraging activity, and species-specific activity of *E. fuscus, L. borealis, M. lucifugus,* and *N. humeralis*. All the relationships were positive, except for *E. fuscus*, whose activity levels increased as mean temperature decreased. Positive relationships between temperature and bat activity are well documented in the literature (Hayes 1997, Erickson and West 2002, Agosta et al. 2005, Wolbert et al 2014). Low temperatures are generally associated with decreased insect activity (Mellanby1939). Decreased activity of the bats' food source (insects) may result in lower activity levels of bats as they choose to forage for a shortened period of time or not at all (Anthony et al 1981). In this study, I conducted surveys only in June and July when temperatures are relatively warm and stable and should not result in significantly reduced levels of insect activity.

One initially puzzling result from this study was the positive relationship between mean wind speed and bat activity. Mean wind speed was an important factor in predicting overall activity and activity of *E. fuscus*, *L. cinereus, M. lucifugus,* and *N. humeralis.* Increased wind speeds are typically associated with decreased bat activity as it increased the difficulty of flight (O'Farrell and Bradley 1970, Verboom and Spoelstra 1999). However, Verboom and Spoelstra (1999) found increased activities of bats along treelines during times of high winds. In this study, mean wind speed was not taken directly at each habitat, rather from a nearby weather station to indicate overall weather patterns rather than site specific metrics. I suggest that bats may be using the treelined edges of the open understory managed habitats as protected flight corridors during times of increased wind speeds.

Conservation Implications

This study highlights the conservation potential of highly disturbed habitats, golf courses, to function as alternative habitats for bats. In particular, open understory managed habitats had higher overall bat activity, foraging activity, and some species-specific activity, indicating that this habitat is a feature that bats are using more than other habitats on the golf courses in

Delaware. Rather than being barren of wildlife, golf courses can be opportunities to conserve and protect animals if managed appropriately. Based on my data, I suggest two management options that may encourage bat activity on golf courses. I suggest:

1) Stands of large-boled trees with maintained undergrowth, i.e. grass and trimmed lower tree limbs, are favored by bats for commuting and foraging. These areas also allow golf cart passage and are attractive and park-like to many people. These areas should be kept as maintained wooded areas, and minimal pesticide use should be encouraged

2) Water hazards provide a source of drinking water for bats but may also present problems. Pesticide and fertilizer run-off from the course turf may decrease water quality and be potentially harmful to imbibing animals. In light of this, it is recommended golf course managers attempt to ensure proper pesticide application to minimize run-off. Greenskeepers and golf course managers already do this on many courses, but this study adds bat conservation as another important reason to continue these practices.

Although not addressed in this study, other management options that may promote bat use of golf courses include:

1) Leaving patches of forest may afford bats increased potential of day roosts (Limpert et al. 2007) and for golfers, heighten the challenge of the game.

2) Creating and maintaining a golf course with more heterogeneous landscapes may increase bat diversity on a golf course by providing landscape features that are attractive to certain species.

As more golf courses expand over the globe, similar measures can be tailored to the biome and local ecosystem so that golf courses can provide conservation opportunities for numerous wildlife species. While developed and maintained landscapes are not a substitute for natural habitat, some of these disturbed areas can be beneficial to bats. Similar to peregrine falcons (*Falco peregrinus*) and other wildlife living in urban and suburban landscapes, many bat species can adapt to human landscaping. Patches of forest and buildings may serve as roosts and, as we have shown in this study, even heavily maintained parts of golf courses can provide foraging and commuting opportunities for bats.

This study was restricted to Delaware and was small in scope but is the first to examine bat activity on golf courses and serves as a first step in understanding bat habitat use on these landscapes. While open understory managed habitats had the highest overall bat and foraging activity, I did not compare these to non-golf course habitats. I suggest additional research in comparative acoustic surveys in habitats on and off golf courses with an increased amount of survey nights and expanded time frame to be able to also look at seasonal differences in activity. Additional studies to locate day-roosts of bats captured on golf courses can increase our knowledge of how bats are using golf courses as habitat (i.e., feeding, commuting, and/or roosting). Diet studies of bats captured on the golf course may also provide insight on what insects (especially turf grass pests) bats are eating on golf courses and be helpful in determining the economic value of bats as pest control agents to greenskeepers and golf course managers. This study, in addition to further research, opens the door for golf courses to mitigate some of the effects of habitat loss and fragmentation on bat populations.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 18

Winter, Hawks, Shaffer, and Johnson
Guidelines for Finding Nests of Passerine Birds in Tallgrass Prairie

7-13-2003

Guidelines for Finding Nests of Passerine Birds in Tallgrass Prairie

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Guidelines for Finding Nests of Passerine Birds in Tallgrass Prairie

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ABSTRACT -- The productivity of birds is one of the most critical components of their natural history affected by habitat quality. Birds might occur at high densities in a given habitat patch but have low nesting success. Such "population sinks" would not be detected if observers relied solely on estimates of bird density. Therefore, it is essential to monitor nests and determine their outcomes. Although interest in grassland-nesting passerines has increased greatly during the last decade, we still know little about factors affecting their nesting success. To stimulate more research in this area, we summarize several methods for nest-searching and provide suggestions for optimizing its success in tallgrass prairie. As a case study, we provide some data from a study on grassland-nesting birds in the northern tallgrass prairie.

Key words: bobolink, clay-colored sparrow, grassland birds, methods, nest-searching, Savannah sparrow, tallgrass prairie.

The nesting biology of some grassland-nesting passerines is still an enigma, especially for secretive species such as Le Conte's sparrow (*Ammodramus leconteii*) (Dechant et al. 1998). To develop conservation strategies for this group of birds, many of which have been suffering population declines (Peterjohn and

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Sauer 1999), we need to better understand how different factors (e.g., rates of nest depredation by predators and nest parasitism by brown-headed cowbird [*Molothrus ater*]) affect nesting success of grassland passerines. In addition, nesting success can vary greatly among years, regions, and even local study plots (Winter et al. 1998, 1999, 2000, 2001). This variability indicates the need for more studies across a wider geographical range to investigate the factors that influence nesting success. However, some researchers shy away from searching for grassland bird nests, mainly because nests of many of these species are inconspicuous and therefore hard to find (Bent 1968). Instead, most studies of grassland-nesting birds are restricted to presence/absence or density information, even though census data do not always reliably reflect the quality of a habitat for a given species (Van Horne 1983, Winter and Faaborg 1999). A reproductive index that bases estimates of nesting success on behavioral observations (Vickery et al. 1992) has recently been shown to be inappropriate for some species (Rivers et al. 2003).

We describe four general methods of searching for nests of passerines in tallgrass prairie, and suggest ways to improve their success. We use nesting data from our study in Minnesota and North Dakota tallgrass prairie as an example (Winter et al. 1998, 1999, 2000, 2001). For a detailed description of the general behavior of birds during different stages of the nesting cycle, see Martin and Geupel (1993), and for detailed descriptions on setting up a nest-searching study, nest-monitoring, and determining nest fate, see Martin et al. (1997). Ultimately, we hope to stimulate more research on the nesting biology of grassland passerines in order to improve our ability to manage grassland habitats for these birds.

METHODS OF NEST-SEARCHING

Nest-searching can be both extremely rewarding and extremely frustrating. It requires strong observational skills, patience, and knowledge of the breeding biology of the species of concern. For a person with these characteristics, minimal training is required to become successful at finding nests. The success of any nest-searching method depends upon an observer's knowledge of where birds nest, how nesting birds behave, the best time of day and time during the breeding season to search for nests, and how to mark nests so as not to lose them within a homogeneous environment.

Nests of grassland birds typically are located on the ground (e.g., bobolink [*Dolichonyx oryzivorus*], Bent 1965) or within live or dead plant material several cm above the ground (e.g., Le Conte's sparrow, Bent 1968). A few species generally place their nests higher above the ground in tall forbs or low shrubs (e.g., dickcissel [*Spiza americana*], Winter 1999; clay-colored sparrow [*Spizella pallida*], Bent 1965, 1968). Knowledge of general habitat preferences, such as topography, soil moisture, and vegetation structure (for an overview see Johnson and Igl 2001), enable the observer to focus nest-searching for an individual species on a particular area. However, within the general habitat preferred by a species, a bird potentially can place its nest anywhere. Therefore, specific search images for nest sites (e.g., grass clumps, large accumulations of dead plant material) should only be used after a search area is narrowed down to about 1 m^2. This is in contrast to many forest-breeding species, for which the observer can focus nest-searching on more specific habitat features (e.g., trees, shrubs, roots). Nest-searching methods for grassland birds can therefore differ greatly from those for forest species (Martin and Geupel 1993).

Besides the general habitat preferences of grassland birds, their behavior also must be considered. A critical aspect of the behavior of many grassland-nesting passerines, especially grassland sparrows, is their tendency to walk, rather than fly, to and from their nest. Consequently, the site where a bird enters or departs from the vegetation can be up to 5 m from the nest itself. During the nestling stage, adult birds are more likely to fly directly to the nest. However, a feeding adult might fool the observer by disappearing into the vegetation with food, only to come up again a few minutes later with food still in the bill. Therefore, an observer should wait until the bird reappears without food, and observe feeding at least three times before attempting to find a nest. Breeding birds are most likely to flush directly from their nest early in the morning and early in the breeding season. Therefore, nest-searching is most productive during those times (see case study).

Another aspect of behavior is that grassland passerines easily will abandon their nests if disturbed early in the nesting cycle. In order to reduce nest abandonment, the observer should avoid looking for the exact nest location during nest building. Instead, the observer should mark the general vicinity of the potential nest site, and return several days later to locate the nest. Finally, the observer must ensure that the found nest can be relocated. This can be difficult in grasslands because of the uniformity of vegetation and the scarcity of landmarks. Therefore, setting up a grid system with numbered surveyor flags or wooden lathes every 50 or 100 m (depending on the height of the vegetation) can be very useful.

There are four main methods for nest-searching in grasslands: 1) chain or rope dragging, 2) systematic walking with or without a sweeping stick, 3) haphazard walking, and 4) behavioral observation. The applicability of each method varies greatly, depending on the stage of the nesting cycle, the behavior of the individual bird, the time of day, and the structure of the vegetation. Therefore, the following descriptions should be understood as general guidelines that might not always work for the species or individual bird under study. Depending on the circumstances and the species of interest, nest-searching is most effective if one is flexible enough to switch from one method to another.

Chain or rope dragging

A long chain (Higgins et al. 1969, Lokemoen and Beiser 1997) or rope (e.g., Koford 1999) is pulled between either two vehicles or two people. Devices hanging from the rope, such as cans and bells, increase the disturbance caused by the rope and thus the likelihood of flushing a bird from its nest (Steve K. Davis, Saskatchewan Wetland Conservation Corporation, Regina, Saskatchewan, personal communication). This method is widely and successfully used in shortgrass and mixed-grass prairie, especially for finding waterfowl nests (Klett et al. 1986). Rope dragging also has been used successfully in pastures where vegetation had been reduced by grazing (Roz B. Renfrew, Vermont Institute of Natural Science, Elmer J. Finck, Fort Hays University, Hays, Kansas; personal communications). Its greatest advantage over any other nest-searching method is that one can cover a large area within a short time. However, in tallgrass prairie we found that rope dragging was less successful than other methods, because the vegetation was often too tall for the rope to cause sufficient disturbance for flushing passerines from their nest (Maiken Winter, personal observation; but see Koford 1999). Similarly, rope dragging was not efficient in dense Conservation Reserve Program fields in Kansas (Elmer J. Finck, personal communication).

Systematic walking

Several observers walk systematically across the study plot with or without a “sweeping stick.” A sweeping stick is a plastic or an aluminum pole about 1.5 m long that is swept back and forth across the top of the vegetation to flush birds from their nest. Nest-searchers systematically walk parallel to each other and about 4 m apart (such that the tips of the sticks almost touch each other) or closer (when not using a stick) in order to cover the entire study plot during nest-searching.

Nest-searchers walk at a fairly quick pace, and observe the area about 4 m ahead to watch for flushing birds. To stay in a straight line, it might help if the person on the outside of the line drops flags about every 20 m (the distance depends on the height of the vegetation and the topography). On the way back, the person walking on the inside of the line picks up the flags. This method enables nest-searchers to search an entire plot without missing or overlapping areas, and keeps effort consistent from one plot to the next (Steve K. Davis, personal communication). Systematic walking seems to work best during the incubation stage or at cold or hot temperatures, when birds stay on the nest to warm or shade their eggs or young, respectively.

Haphazard walking

While walking across the study plot without a predetermined route (alone or in pairs, and with or without a sweeping stick), an observer can nest-search either by flushing a bird from its nest or by detecting birds that indicate close proximity to a nest. The advantage of this method over systematic walking is that more attention can be given to the behavior of the birds, thus facilitating nest finding by behavioral observation (see below). A disadvantage is that it is not possible to closely track the area that has been searched. Therefore, some areas might be missed while others are searched more than once. Haphazard walking works well during any stage of the nesting cycle, but its efficiency varies with the species under study.

A specific type of nest-searching by haphazard walking is the "incidental flush"; nests are found during activities other than nest-searching, such as vegetation measurements or bird censuses. The only difference between incidental flush and haphazard walking is the intention and thus the attentiveness of the observer.

For the above methods to be successful, the observer must recognize which types of flush indicate a nest site. Before flushing, a bird might be engaged in one of several different activities, such as feeding, preening, resting, or incubation. To determine if a bird flushed from its nest, the observer needs to consider 1) the distance between the place from which a bird flushed and the observer, 2) the distance the flushed bird flew away from the observer, and 3) the behavior of the bird after it flushed. What we call a "good flush" occurs when a bird flushes within 1 m of the observer or when a bird drops back down after flying only a few meters. This type of flush often leads to a nest except for extremely furtive species, such as Le Conte's Sparrow or Henslow's sparrow (*Ammodramus henslowii*), and extreme care is necessary to avoid trampling the nest. If a bird flushes 1 to 5 m in front of the observer and flies 5 to 10 m away, the bird probably had detected the approach of the observer and had run away from the nest. Such an "okay flush" might or might not indicate a nest site. One can be relatively confident that a bird did not flush from a nest if it flushed more than 5 m in front of the observer and then flew a fairly long distance (e.g., more than 15 m). However, if the bird is chipping vigorously, it might still be worthwhile to follow up on such a "questionable flush". In some species, such as bobolink (Maiken Winter, personal observation), Le Conte's sparrow, red-winged blackbird (*Agelaius phoeniceus*), and dickcissel (Larry D. Igl, United States Geological Survey, Jamestown, North Dakota, personal communication), the female can be warned by the male, which causes the female to flush up to 10 m from the nest. For these species, we recommend delaying nest-searching until the male has left the area.

Nest-searching always should start at the location where the bird had flushed, which should get marked with flagging tape immediately after the flush. Assuming that the bird walked in a straight line away from its nest before it flushed, the nest-searcher should continue searching by retracing his/her footsteps up to about 2 m. If a nest cannot be found within 10 min, the observer should leave the area and return about 30 min later and try to flush the bird again ("directed flush"), preferably approaching the nest site from a different direction. The directed flush technique might increase the chance of nest abandonment, but our data provide no evidence of such an effect (see Table 1).

Behavioral observation

Any of the above methods can lead to an observation of a potentially nesting bird. Of all the methods, behavioral observation requires the most patience and the highest attentiveness. It should be used only when the observer is certain that a bird indicated a nest site. Therefore, the observer should learn the behavior of the species well enough to know which cues indicate a nearby nest site. Potential cues are: 1) alarm chipping, 2) flushing within 5 m and flying only a short distance, 3) nest material in the bill, 4) food in the bill, 5) fecal sac in the bill, 6) members of a pair in close vicinity to one another, 7) distraction displays, 8) repeated flights towards a distinct area, and 9) begging vocalizations by nestlings.

Unlike forest situations, observing bird behavior in grasslands has the advantage that there are no trees obstructing the view of the observer. However, this advantage is offset by several disadvantages:

1. Members of the breeding pair can see the observer just as well as the observer can see the pair. To minimize disturbance, the observer needs to be as inconspicuous as possible by either sitting in tall vegetation or standing behind a shrub or hill. Fondell et al. (2000) suggested using a mobile tower blind for observation, which they successfully used in a western Montana grassland.

2. Bird density is often so high that the observer might be sitting in a territory of a bird different from the one under observation. The observer should stay focused on one bird, and not get distracted by another chipping bird. Trying to observe more than one bird mostly leads to losing both. However, if the chipping of a neighboring bird persists, the observer should move to another location to minimize disturbance.

3. The scarcity of reference points in homogeneous grasslands makes it difficult to determine the exact location of a potential nest, especially the distance from the researcher to a bird that is being observed. To ameliorate this problem, the observer should attach flagging tape in a triangle around the area of the potential nest site with flags about 1 to 2 m apart. This procedure helps the observer to pinpoint the location in which a bird disappeared. But even with flagging tape, the exact location where a bird dropped down into the vegetation is sometimes difficult to determine. If this is the case, the observer should watch a potential nest site from several different angles.

If no flagging tape has been deployed, the observer should know exactly where to go before entering the area of a potential nest. This is accomplished by identifying reference points between the observer and the nest (e.g., tall forbs, patches of grass) or at the horizon (e.g., trees, shrubs, houses) before standing up.

Table 1. Percentage of nests found and percentage of nests abandoned in each of the three stages of the nesting cycle, organized by species and nest-searching method, 1998 to 2001.

Species[1]	Method	Egglaying	Incubation	Nestling	Unknown[2]	Total
Bobolink (n = 315)	Behavioral observation	3.9	32.9	41.6	21.6	73.6
	Systematic walking	18.2	22.7	4.5	54.6	7.0
	Haphazard walking	6.2	25.0	21.9	46.9	10.2
	Incidental flush	20.8	41.7	4.2	33.3	7.6
	Direct flush	20.0	40.0	40.0	0.0	1.6
	Total %	6.7	32.1	34.1	27.1	100.0
	Abandoned %[3]	0.0	32.1	2.0	25.0	7.9
		(1)	(53)	(249)	(12)	(315)
Clay-colored sparrow (n = 789)	Behavioral observation	14.1	29.6	38.7	17.6	28.8
	Systematic walking	17.7	38.2	4.3	39.8	32.2
	Haphazard walking	20.4	41.5	9.9	28.2	28.0
	Incidental flush	16.7	39.8	7.7	35.8	9.9
	Direct flush	0.0	66.7	11.1	22.2	1.1
	Total %	17.1	37.1	16.2	29.6	100.0
	Abandoned %	44.4	18.3	1.6	24.1	8.6
		(18)	(213)	(508)	(54)	(793)
Savannah sparrow (n = 681)	Behavioral observation	3.7	24.8	57.7	13.8	52.0
	Systematic walking	9.8	33.1	10.7	46.4	16.4
	Haphazard walking	15.2	46.6	15.3	22.9	17.3
	Incidental flush	16.3	42.5	16.2	25.0	11.7
	Direct flush	29.4	29.4	29.4	11.8	2.5
	Total %	8.8	32.2	37.0	22.0	100.0
	Abandoned %	33.3	25.0	0.8	20.6	6.3
		(12)	(112)	(529)	(34)	(687)

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[1] The number of nests (n) is lower than the total number of nests reported for clay-colored and Savannah sparrows in Table 1 because the search method was not recorded for all nests.

[2] The stage of the nesting cycle was unknown when nests that were found with an incomplete clutch were depredated at the next nest check.
[3] Percent of all nests in that nesting stage that were abandoned, with number in parenthesis equal to n.

The observer should recheck these reference points before walking to the nest site because vegetation can look very different when sitting versus standing.

A fifth method for nest-searching (which we did not use) that is being tested currently is the use of infrared cameras (Mike Guzi, University of Wisconsin, Madison, Wisconsin, personal communication). These cameras are able to detect the heat given off by eggs, young, or an incubating adult. However, it is not yet known how well these cameras work in areas of deep litter and tall vegetation. In addition, cameras are expensive such that only well-funded researchers will be able to use them.

Observer and species biases exist for each of the four nest-searching methods that we described. Because nest-searching is generally species-specific, success in finding nests with any of the methods depends on a species' behavior and habitat preferences. For example, our data indicate that nest-searching by behavioral observation favors some species (e.g., the bobolink; Table 1). Larry D. Igl (personal communication) noticed a similar bias for the dickcissel. Because observers often focus on a few species or individuals, behavioral observation has some degree of subjectivity. This bias can be problematic when the purpose of a study is to determine how many species nest in a given area. If this is the case, then nest-searching by rope dragging or systematic walking is more objective and will give a less observer-biased overview of the nesting species present.

MARKING THE NEST SITE AND INFLUENCES OF OBSERVERS AT THE NEST

Because many grassland bird nests are extremely difficult to find, observers should use great care to avoid losing a nest that has already been found. We placed a nest flag 5 m north of the nest to identify the nest location. On a nest card, detailed directions and nest observations should be recorded (Martin et al. 1997). This is especially true in grazed areas, where a cow's (*Bos taurus*) curiosity for flagging material might cause markers to be lost and thereby lead to lost nests. To help alleviate this problem, the observer should mark the ground with non-toxic spray-paint 5 m north of the nest instead of, or in addition to, using nest flags. Another method to prevent cattle from eating nest markers is to use thin rebar with the tips painted orange (Diane A. Granfors, United States Fish and Wildlife Service, Fergus Falls, Minnesota, personal communication), or piles of rock (Elmer J. Finck, personal communication). In addition, taking compass bearings from another reference point to the nest site, or taking GPS readings at the nest site might be helpful. For nests that were extremely hard to find, we placed a tiny piece of flagging tape on vegetation about 30 cm south of the nest to help relocate the nest during nest-monitoring (for detailed instructions on nest-monitoring see Martin et al. 1997). This piece of flagging tape should be as inconspicuous as possible so as not to attract predators.

To avoid influencing the natural outcome of nests, the observer should disturb the nest and its vicinity as little as possible during both nest-searching and nest-monitoring. Therefore, the observer should:

1. Avoid trampling the nest and the surrounding vegetation by leaving as few footsteps as possible at the nest site, and by avoiding nest-searching immediately after rain. When morning dew is heavy, the observer should mark the general area where a nest is assumed to be, and come back later in the morning - when the dew has evaporated - to find the nest.

2. Not look for a nest until the potential nest site is narrowed down to an area of about 1 m^2. In addition, the observer should wait until the bird has left the nest site, and spend only 10 min or less actively looking for a nest.

3. Avoid re-flushing birds that take over an hour to return to their nests after the previous flush. Instead, the observer should wait until the next scheduled visit to try to find their nest. These birds are more sensitive to disturbance, and are therefore probably more prone to abandon their nests.

4. Leave the nest site as quickly as possible after a nest has been found or checked, and move at least 20 m from the nest before recording information on the nest card.

5. Not walk the same way to and from the nest when revisiting a nest; instead, the observer should walk from a nest flag past the nest. This will minimize the possibility that nest predators follow the observer's footsteps to the nest.

6. Not interfere with the natural outcome of a nest by influencing nest predators or brown-headed cowbirds. The observer should delay nest-searching or nest-checking if predators or brown-headed cowbirds are nearby.

A CASE STUDY

In our study of grassland-nesting birds in Minnesota and North Dakota, we searched for nests in 30 study sites, ranging between 3 and 16 ha (Winter et al. 2001). The study was conducted during four years (1998-2001) between 15 May and 30 July. Depending on the weather conditions, nest-searching began at dawn (about 0500) and lasted until at least 1200. We focused nest-searching and monitoring efforts on bobolink, Savannah sparrow (*Passerculus sandwichensis*), and clay-colored sparrow, but we also monitored nests of other species that we found incidentally. Because our study was not set up to examine the efficiency of different nest-searching methods, we did not consistently record the time we spent nest-searching.

During four field seasons, we found 2075 grassland passerine nests with the help of an average 12.2 field assistants and 1 to 2 volunteers per year (Table 2). The number of grassland bird nests found per field assistant ranged from 10 to 108. On average, each field assistant found about four grassland bird nests per week. The wide range of nest-searching abilities and the low number of grassland passerine nests found by the average field assistant indicate that many field assistants are needed to ensure a large number of nests. Given the low number of nests found per human effort, researchers with little funding to employ field assistants might want to consider behavioral observations to generate measures of reproductive success (Vickery et al. 1992). However, these estimates might not be representative of reality (Rivers et al. 2003).

The number of nests found is not only influenced by the experience of the observer, but also by the 1) number of active nests on a plot, 2) amount of time spent searching, 3) nest-searching method, 4) light conditions and temperatures at different times of the day, and 5) time in the breeding season. Because we do not know the amount of time spent nest-searching, we can not compare the efficiency of nest-searching methods, nor determine at which times during the day and during the breeding season it is most productive to look for nests. However, based on our experience we suggest that the following observations are generally true for our study system, and might be applicable to other sites.

Most nests of all grassland passerines combined (see Table 2) were found by behavioral observation (n = 859), followed by systematic (n = 459) and haphazard walking (n = 453). More than 10 % of the nests were found incidentally (n = 252) (i.e., during activities other than nest-searching). A few nests were found by directed flush (n = 33). Because we found only two nests with rope-dragging, we did not continue using this method after the first year of the study. The large percentage of nests found incidentally points out that observers need to be highly attentive to bird behavior during the entire stay on a study plot.

During the peak nest-searching hours (0500-1200), most nests were found

Table 2. Number of nests found for each of the grassland passerines monitored in Minnesota and North Dakota tallgrass prairie, 1998 to 2001.

Common name	Scientific name	Number of nests found
Clay-colored sparrow	*Spizella pallida*	793
Savannah sparrow	*Passerculus sandwichensis*	687
Bobolink	*Dolichonyx oryzivorus*	315
Western meadowlark	*Sturnella neglecta*	71
Le Conte's sparrow	*Ammodramus leconteii*	51
Grasshopper sparrow	*Ammodramus savannarum*	39
Brewer's blackbird	*Euphagus cyanocephalus*	37
Vesper sparrow	*Pooecetes gramineus*	28
Sedge wren	*Cistothorus platensis*	28
Lark sparrow	*Chondestes grammacus*	25
Henslow's sparrow	*Ammodramus henslowii*	1

between 0600 and 1100. Light conditions before 0600 are often unfavorable for spotting a flushed bird and for finding nests. After 1100, adults spend more time off their nest, such that nest-searching becomes less efficient. In addition, less time was spent nest-searching in the late mornings and early afternoons. We did not attempt to nest-search during early evening hours, because adults might not return to the nest for the night when nests are disturbed later in the day.

Most nests were found between the end of May and the end of June. The low number of nests found early in the season might partly reflect the inexperience of the observers. Therefore, the field season should start early enough such that proper experience has been acquired before the peak of the nesting season. Nesting grassland birds are also least conspicuous during nest-building and egg-laying (Maiken Winter, personal observation). Few nests were found in July, probably because less time was spent nest-searching due to extreme heat and to the amount of vegetation measurements that needed to be done. In addition, at that time most birds had either finished nesting or were off their nests searching for food for their nestlings (Maiken Winter, personal observation). The systematic and haphazard walking methods were most efficient early in the day and early in the nesting season, because most females were still egg-laying or incubating. As both the day and the season progress, behavioral observations seemed to be more productive, because most birds were off their nests much of the time. However, these times depend on the species studied and the latitude in which a study is conducted. For example, in Kansas nest density of grassland birds remains high through mid- to late- July, and the sedge wren (*Cistothorus platensis*) and American goldfinch (*Carduelis tristis*) do not even start nesting until July (Elmer J. Finck, personal communication).

The earlier in the nesting cycle a nest is found, the more information it provides in terms of exposure days (Johnson 1979). Therefore, one should strive to find nests as early in the nesting cycle as possible. However, rates of nest abandonment might be higher early in the nesting cycle. In addition, the method by which a nest is found might affect rates of nest abandonment. We tested if rates of nest abandonment of all grassland-nesting bird species combined were dependent on the stage the nest was found in and on the search method, and if interactive effects existed between the stage of the nesting cycle and the nest-search method (PROC CATMOD, SAS 1995). Virtually no nests were abandoned during the nestling stage, so we restricted our analyses to the egg-laying and incubation stages. The probability that a nest was abandoned was significantly lower in the incubation than in the egg-laying stage (Chi-Square = 11.4, $P < 0.001$, df = 1, n = 467; Table 1). However, rates of nest abandonment did not vary with nest-searching method (Chi-square = 3.5, P = 0.48, df = 4, n = 573), and there was no interactive effect between the nesting stage and search method (Chi-square = 6.43, P = 0.17, df = 4, n = 462).

The percentage of nests found during the three stages of the nesting cycle differed greatly among methods and the three focal species (Table 1). Most nests of bobolink and Savannah sparrow were found by behavioral observation during the nestling stage. Fewer nests were found by using the systematic and haphazard walking methods. These nests were found mostly during incubation. As mentioned earlier, bobolink and Savannah sparrow rarely fly directly from their nests but tend to walk considerable distances before flushing. This behavior seems to become more prevalent as a bird invests more time and energy in its nest (i.e., later in the nesting cycle). Therefore, we recommend that the systematic or haphazard walking method be used early during incubation. Later in the breeding season, when nests from all stages are encountered, behavioral observations appear to provide the largest number of nests.

Most nests of clay-colored sparrow were found during incubation, by using the systematic and haphazard walking method (Table 1). Clay-colored sparrow places its nest above ground, and almost always flushes directly from the nest. For this reason, the systematic and haphazard walking methods are more successful during the incubation stage. During the nestling stage, behavioral observations lead to the discovery of most nests.

In summary, our results indicate that observers should vary their nest-searching methods according to the species under study, and the time during the day and the nesting season. Because rates of nest abandonment did not differ among methods, observers do not need to worry about biases in abandonment rates that result from different search methods. In our study areas and for our study species, the best time for nest-searching was between 0600 and 1100, and from the end of May until the end of June. The current concern about grassland birds highlights the importance of understanding their population dynamics and how they respond to management. Key to that understanding is to find and monitor adequate numbers of nests of these elusive species. We hope that our paper will help in achieving this goal.

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References Included in the Comment Letter by Scott Cashen, M.S. in Attachment C to our Comments on the Draft Environmental Impact Report for the Royal Vista Residential Project: Project No.: PRJ2021-002011-(1)

ATTACHMENT 19

Young

A COMPARATIVE STUDY OF NESTING BIRDS IN A FIVE-ACRE PARK

A COMPARATIVE STUDY OF NESTING BIRDS IN A FIVE-ACRE PARK

Howard Young

THIS paper presents quantitative data on the size and nesting success of a breeding population of birds in a five-acre park land area; it traces the changes in this population and its reproductive fortunes through a complete breeding season, and compares the breeding cycles, the nest density, and the success of the various species composing it.

The material is based on observations made during the spring and summer of 1947 at Ho-Nee-Um Pond, a small portion of the University of Wisconsin Arboretum, in the vicinity of Madison, Wisconsin. By means of frequent searches (almost daily in spring, later about twice a week) a high percentage of the nests on the area was found, and it was possible to trace the history of most of these through the nesting cycle. Approximately 250 man-hours were spent in the field. Mean temperatures for the study period averaged 2.2 degrees below normal during March through July. August was the hottest ever recorded for the Madison region, 8.8 degrees above normal, and September was slightly above normal. Precipitation for the study period was 2.89 inches above normal.

Acknowledgment for assistance in nest searching and examination is made to Carl Strelitzer, Ernest Boyce, Robert McCabe, James Hale, and Arnold Jackson, Jr. Acknowledgment is made to Professor John T. Emlen Jr. for helpful suggestions and for a critical reading of the manuscript.

Description of the Area

The Ho-Nee-Um Pond area (Fig. 1) is a low-lying park on the northwest shore of Lake Wingra. It is roughly trapezoidal in shape and has an area of 5.2 acres. The 2 main plant communities are a mowed lawn of blue grass (*Poa spp.*) covering about 40% of the total area, and numerous plantings of closely spaced arbor vitae (*Thuja occidentalis*), covering about 26% of the total area. These plantings are arranged in irregular patterns, making for extensive environmental edges with the grass area.

The arbor vitae varies in height from 5 to 30 feet, with the average tree about 15 feet high. Mixed with it are scattered patches of red osier dogwood (*Cornus stolonifera*) and staghorn sumac (*Rhus typhina*), and lesser amounts of white birch (*Betula alba*), elderberry (*Sambucus canadensis*), ninebark (*Physocarpus opulifolius*), box elder (*Acer negundo*), honeysuckle (*Lonicera tatarica*), hawthorn (*Crataegus sp.*), and highbush cranberry (*Viburnum opulus*). The ground cover under the plantings is mainly blue grass, nettle (*Urtica sp.*), thistle (*Cirsium sp.*), and burdock (*Arctium sp.*). The vegetation beneath the arbor vitae was cut once, in May, with scythes. Late in the season there were solid beds of swamp milkweed (*Asclepias incarnata*) along some of the edges.

The northeastern corner of the area contains a small group of black locust (*Robinia pseudo-acacia*). The lake shore is lined by occasional cottonwoods (*Populus deltoides*), and there is a thick clump of black willow saplings (*Salix nigra*) in the southwest corner. Near these is a small swampy pond of approximately .3 acres, thickly grown to sedge (*Carex sp.*), with a few patches of cattail (*Typha latifolia*) and reed grass (*Phragmites communis*). The grass contains liberal amounts of dandelion (*Taraxacum officinale*) and plantain (*Plantago major*).

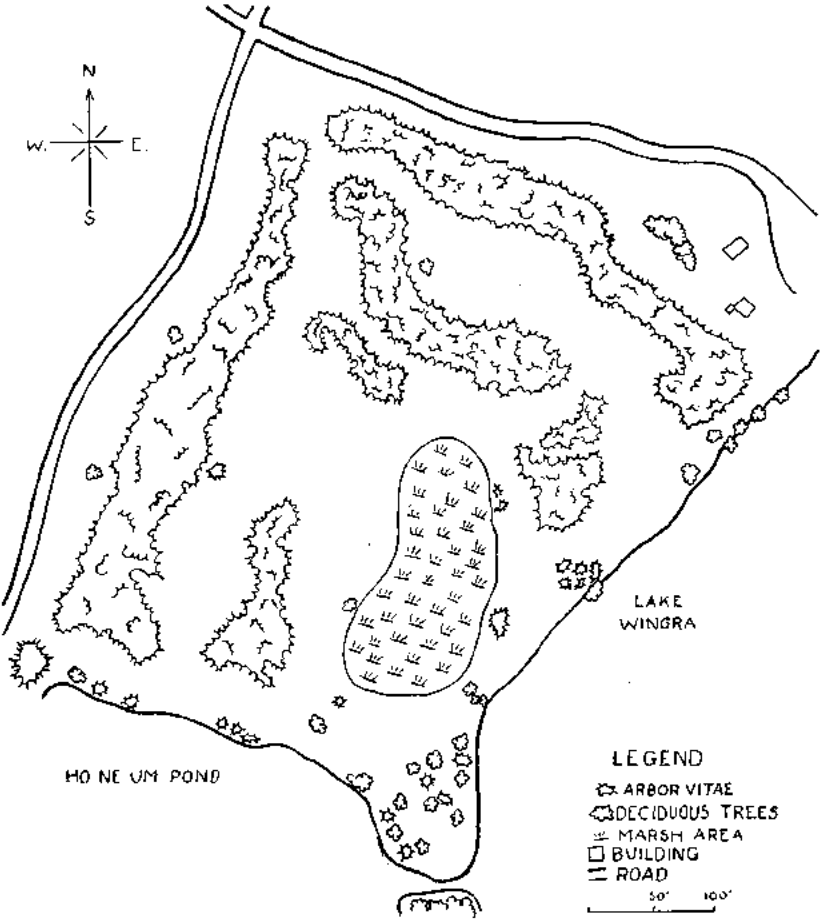

FIG. 1. Ho-Nee-Um Pond Area and Vicinity

NEST DENSITY AND NESTING CHRONOLOGY

The nesting population of the area is summarized in Table 1. Unless otherwise designated all the data refer to "active" nests (those in which at least one egg was laid). In addition to the species listed, the Cowbird (*Molothrus ater*) bred as a parasite of the Alder Flycatcher, Cedar Waxwing, Yellow Warbler, Rose-breasted Grosbeak, and Song Sparrow. Figure 2 presents the same material in graphic form; in this case, however, only nests actually found were considered.

The high density, ranging up to 9.6 nests per acre (May 19 -May 20) is considered of special interest. This is probably due to the great interspersion of plant types, and the large amount of "edge" as shown in Figure 1. There are approximately 5000 feet of arbor vitae-grass edge in the area.

Computed according to the usual manner, i.e., the total number of nests on the area during the season, the density was 164 nests, or 32.8 per acre. This is referred to as "Total Nest Density" in Table 1. These nests represent approximately 94 breeding pairs, a density of 18.5 per acre. Steinbacher (1942) found 111 pairs of birds nesting in the 19 acre Frankfort Zoo park. This density of 5.8 pairs per acre, while only one-third that of Ho-Nee-Um, was considered to be especially high. There do not appear to be other comparable studies in areas of similar size for comparison.

The density data were further analyzed by comparing them from month to month. This showed extensive fluctuations as some species ended their nesting and others started (Figure 2). Following are the average daily densities in nests per acre for the months covered by this study: April—3.5, May—8.6, June—6.0, July—4.8, Aug.—2.1, Sept.—.6. The overall average was 4.3 nests per acre.

It would seem that "Highest Nest Density" (Table 1–D) has a particular significance. Other workers have usually computed what is shown in Table 1 as "Total Pair Density" (Col. F) and "Total Nest Density" (Col. C). These are valuable as indices to the population, but computing the highest nest density has the advantage of showing the greatest nesting population at any one time, and as such is better suited for investigations of the various problems related to social competition such as density tolerance, density-induced behavior, reproductive success, etc.

Inter-specific strife was very low even during the periods of highest density. Of the two most abundant species, Bronzed Grackles and Robins, the Grackles exhibited no recognizable territorial behavior; Robin territories were poorly defined and defended with indifferent vigor (Young: 1947). The other species were not observed sufficiently to draw conclusions regarding territorial behavior.

In Figures 2 and 3, the numbers and stages of the nests shown were determined partly by daily examination, and partly by interpolation and extrapolation. Nests in various stages of the cycle were followed, and averages based on all records were determined for the length of time in each phase. When a new nest

TABLE 1

Species Nesting at Ho-Nee-Um Park, 1947

SPECIES	A	B	C	D	E	F
	Nests found	Estimated total of nests	Total nest density	Highest nest density	Total no. of pairs (estimated)	Total pair density
Bronzed Grackle *Quiscalus quiscula*	26	28	5.6	4.2	21	4.2
Robin *Turdus migratorius*	36	37	7.4	3.8	19	3.8
Catbird *Dumetella carolinensis*	22	22	4.4	2.2	11	2.2
Cedar Waxwing *Bombycilla cedrorum*	14	16	3.2	1.6	8	1.6
Yellow Warbler *Dendroica petechia*	12	12	2.4	1.4	7	1.4
Goldfinch *Spinus tristis*	9	9	1.8	1.2	6	1.2
Song Sparrow *Melospiza melodia*	2	15	3.0	.5	5	1.0
Mourning Dove *Zenaidura macroura*	11	11	2.2	1.0	5	1.0
Alder Flycatcher *Empidonax traillii*	5	5	1.0	.6	3	.6
Mallard *Anas platyrhynchos*	1	2	.4	.2	2	.4
R. N. Pheasant *Phasianus colchicus*	2	2	.4	.2	2	.4
Killdeer *Charadrius vociferus*	1	1	.2	.2	1	.2
Rose-Br. Grosbeak *Pheuticus ludovicianus*	1	1	.2	.2	1	.2
Chipping Sparrow *Spizella passerina*	1	1	.2	.2	1	.2
Warbling Vireo *Vireo gilvus*	0	1	.2	.2	1	.2
Yellowthroat *Geothlypis trichas*	0	1	.2	.2	1	.2
Total......................	143	164	32.8	9.6	94	18.5

C & F computed from B & E.
D highest density at any one time; computed from A.
C, D, & F computed on a per-acre basis.

was found it was thus possible to determine fairly accurately the date on which it was started. For example, observations showed that Robins took about 7 days on an average to build their nest; it then remained empty for an average of 4 days, after which the eggs were laid at the rate of 1 a day. A Robin nest found to contain 2 eggs on April 20 was therefore tallied as having been started on April 7, since 13 days were necessary to bring it to the 2-egg phase of the cycle. In most cases it was only necessary to extrapolate 3 or 4 days. About 35% of the material presented in the figures was thus computed.

The efficiency of nest searches was tested by comparing the extrapolated totals of any given day with the number of nests actually known on that day. On this basis it was found that the number known on any given day varied from 32% to 100% of the number actually present. This does not take into consideration nests of Song Sparrows, since time did not permit extensive searches for them, and only 2 were found. On the peak days, May 19–20, 88% of the nests had been located. Comparison of the number of nests found with the estimated total of nests in Table 1 shows that about 87% of all nests were eventually found. In view of these facts the writer believes that Figure 2 represents a fairly accurate graph of the nesting. Errors in extrapolation would push individual peaks and depressions 1 or 2 days in either direction, but these would tend to compensate for each other, and the general picture would remain the same.

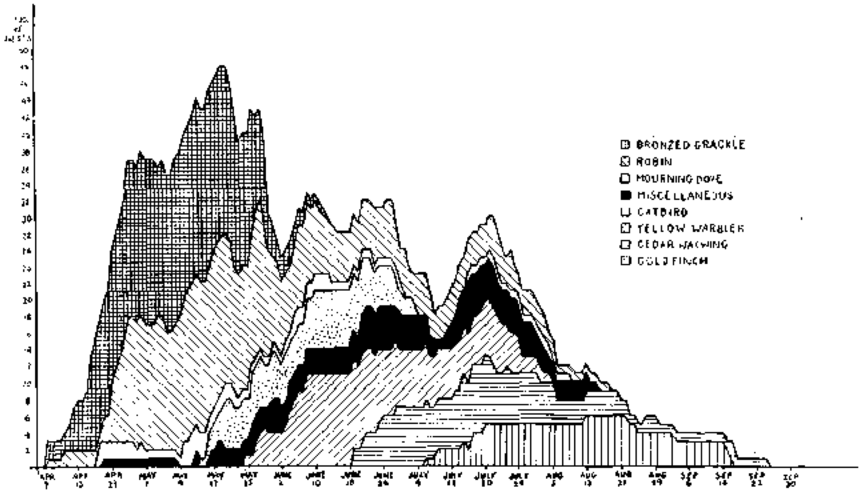

FIG. 2. Ho-Nee-Um Nests, 1947

Three major peaks in nesting density are discernible in Figure 2; late May (mainly Robins and Grackles), most of June (Robin, Catbird, Yellow Warbler and Cedar Waxwing), and mid-July (Catbird, Waxwing, Goldfinch). The meagerness of the data prevents extensive discussion, but a few interesting things may be pointed out. The overlapping nesting periods of Robins and Grackles, both using the same nesting sites (arbor vitae), makes them competitors. Cedar Waxwings also nested almost exclusively in arbor vitae, but did not start until the Grackles were gone and Robin nesting was much diminished. The Goldfinches and Yellow Warblers nested mainly in ninebark; there was about a two week overlap in their nesting periods. It is impossible to say how much competition for nesting sites affected the density of the various species; as previously mentioned, little interspecific strife was observed.

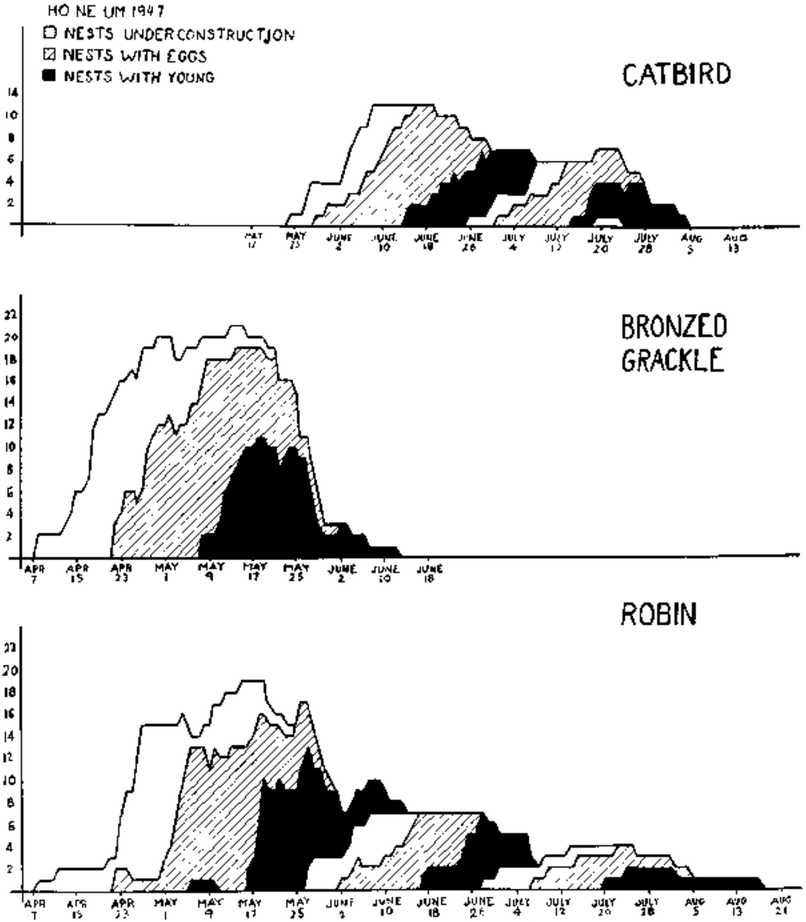

Fig. 3. Comparative Nesting Cycles, 1947

Figure 3 compares the nesting cycles of the 3 most abundant species at Ho-

Nee-Um. It demonstrates the "Highest Nest Density" discussed before and makes possible comparisons, as between the Robins and Grackles. More Robins nested on the area than Grackles (Table 1), but their nesting was spread over a much longer period, and at no time did they attain a density as high as that of the Grackle's peak. The graph of the Grackles, which are single-brooded, lacks the long "tail" characteristic of the other species. More than half of the Grackle nests were broken up, and it would seem that the lack of a "tail" on their graph indicates that either no renesting attempt was made, or that the birds moved entirely off the area for the next attempt. Part of the sharp fall in the number of Robin nests after May can possibly be explained by the scarcity of hardwood trees on the area. Howell (1942: 549) found that 57% of the Robin nests he studied were built in conifers during the first nesting period, but later, when the hardwood trees had leafed out, the number of Robins found nesting in conifers fell to 38%.

TABLE 2

Ho-Nee-Um Nesting Data, 1947

SPECIES	A Active nests	B Successful	C % Successful	D Eggs per nest	E % Hatched	F Fledglings per nest	G % Eggs producing fledglings	H % of young fledging	I Av. success of productive nests
Bronzed Grackle	26	12	45	4.5	72	4.3	44	61	84
Robin	36	18	50	3.3	61	2.4	37	61	73
Catbird	22	12	55	3.1	65	2.9	51	79	92
Cedar Waxwing	14	8	57	3.9	54	2.6	39	72	77
Yellow Warbler	12	5	42	3.5	48	2.8	33	70	74
Mourning Dove	11	2	18	1.8	30	2.0	20	66	100
Totals and averages	121	57	47	—	61	—	40	66	81

D computed from A; F computed from B.
B—Nests producing at least 1 young.

NESTING SUCCESS AND CAUSES OF FAILURE

Table 2 compares the nesting data of the various species for which at least ten nests were found. Again the small number of nests precludes intensive analysis of the figures, but some basis for comparison of nesting success is available.

Comparison of the percent of eggs hatching (E) with the percent of young fledging (H) shows a differential effect of environment on the various species under consideration. The Robins suffered losses approximately equal during the egg stage and the nestling stage. Catbirds and Grackles were affected in directly opposite fashion, the former having a heavier loss during the egg stage, the latter during the nestling stage. In the case of the Grackles, a bad storm when there were many small young in the nest accounted for much of the mortality.

The same comparison also indicates that the species having the poorest success in hatching eggs generally had a proportionately greater success in fledging their young. It is interesting to note that in comparing success from year to year, Nice's (1937: 141) figures for the Song Sparrow show the same general pattern within a single species. In her Table XVI, by dividing the number of fledglings by the number of hatched eggs, the following figures are obtained:

Year	*% of Eggs Hatching*	*% of Young Fledging*
1930	68%	63%
1931	72%	63%
1932	61%	61%
1933	51%	37%
1934	35%	78%
1935	41%	71%

The non-conformity of 1933 is apparently due to plowing of the nesting area at a time when most of the nests contained small young. Very close correlation should not be expected, since there are many other factors besides hatching success which could influence the fledgling success.

A similar situation is suggested in a study of the Eastern Red-winged Blackbird (*Agelaius phoeniceus*) by Smith (1943: 190). Of two nesting Red-wing populations, "A" hatched 74% of 563 eggs and fledged 80% of the young, "B" hatched 70% of 577 eggs and fledged 84% of the young. Much more data is needed for statistical testing, but it appears that there is possibly a compensatory interaction here following the general pattern that low egg survival results in high nestling survival, or conversely, that high nestling survival is associated with low egg survival. Errington (1946: 170) used Smith's data to illustrate the effects of predation, showing that a high loss of eggs apparently resulted in reduced vulnerability of the nestlings to predation. Another factor possibly involved is competition between nestlings, which Emlen (1942: 151) considered a major factor in nestling survival in the Western Crow.

Comparison between species of reproductive success, based on the number of young fledged per pair or per nest, will always be affected by the varying clutch size among the different species, and the varying number of broods raised. These factors can be eliminated by comparing the percent of eggs producing fledglings (Table 2–G). Considering each egg as a reproductive attempt, this shows what percent of the reproductive potential is attained. On this basis Catbirds were the most successful breeders at Ho-Nee-Um, (51% of their eggs producing fledglings) while Mourning Doves were the least successful, (only 20% of their eggs producing fledglings). The average success of productive nests (Table 2–I) was computed by dividing the number of fledglings by the number of eggs. The Mourning Dove nests were either complete failures or total successes, reflecting the birds' quickness to desert when molested. On the other hand, the Robins were able to bring off broods successfully after disturbances, though in only a few cases were their nests 100% successful.

Reproductive success possibly has the same inverse correlation with density as shown for reproductive activity by Kendeigh (1934: 308). Smith (1943: 204) found no evidence of this in the Red-wing, but Errington (1945: 14) found an inverse ratio between spring density and summer population gain of the Northern Bob-white (*Colinus virginianus*). Now that nesting studies have become more common it should be possible to compile similar data on various species from several areas. The value of these would be enhanced if it were also possible to compare the densities of the different areas, but this information is seldom available. More intensive studies might show optimum densities for the different species, such as has been shown for various invertebrates by Allee (1931: 161–180).

TABLE 3
Nest Success in Various Studies

SPECIES	NESTS	SUCCESSFUL %	REFERENCE	LOCATION	YEAR
Robin	501	78	Kendeigh, 1942	Ohio	?
	136	61	Howell, 1942	N. Y.	1937–38
	64	77	Koehler, 1945	Wisc.	1945
	36	50	This study	Wisc.	1947
	16	13	Thomsen, 1944	Wisc.	1944
Catbird	142	70	Kendeigh, 1942	Ohio	?
	22	55	This study	Wisc.	1947
Cedar Waxwing	29	58	Kendeigh, 1942	Ohio	?
	14	57	This study	Wisc.	1947
	12	50	Lea, 1942	Mich.	1940–41
Yellow Warbler	25	80	Kendeigh, 1942	Ohio	?
	16	75	Kendeigh, 1941	Iowa	1940
	12	42	This study	Wisc.	1947
Mourning Dove	2877	48	McClure, 1946	Iowa	1938–40
	325	47	McClure, 1946	Nebr.	1941–43
	57	54	Kendeigh, 1942	Ohio	?
	11	15	This study	Wisc.	1947
	10	70	McClure, 1946	Calif.	1944

Nice (1937: 143) postulates 40% to 46% as typical success for open nests of passerines in the North Temperate Zone. At Ho-Nee-Um the passerine species averaged 49.8% successful in nesting attempts, a figure which agrees quite well with her estimate.

Table 3 compares the nesting success at Ho-Nee-Um with that of the same species in other areas. No references were found for the Bronzed Grackles, and again the species are limited to those for which at least 10 nests were found at Ho-Nee-Um. The data of Kendeigh (1942) were adjusted to make them conform to "active" nests as defined in this study. Unfortunately, information on density was not given in the other studies, but the consistently low success at

Ho-Nee-Um (excepting Cedar Waxwings) is possibly a reflection of its high nesting density. However, such a comparison suffers from the fact that the other studies sometimes covered several years, and were from many different area types. Omitting the Ho-Nee-Um data, the nest success of the passerine species listed in Table 3 averages 74%, nearly double Nice's estimate for open nesting of passerine birds.

TABLE 4

Nest Failures Ho-Nee-Um, 1947

	SPECIES							
	Bronzed Grackle	Robin	Cat-bird	Cedar Wax-wing	Yellow Warbler	Mourn-ing Dove	Total	Per cent
Nest failures								
A Predation	4	7	7	3	2	6	29	45
B Desertion	8	6	3	2	4	2	25	39
C Weather	2	5	0	1	1	1	10	16
D Total	14	18	10	6	7	9	64	100
Eggs not hatching								
A Predation	19	14	20	8	11	12	84	52
B Desertion	2	15	2	8	5	2	34	21
C Weather	0	6	0	0	0	0	6	4
D Unaccounted	9	4	0	2	1	0	16	9
E Infertile/addled	3	7	2	7	5	0	24	15
F Total	33	46	24	25	22	14	164	100
Young not fledging								
A Predation	0	10	7	1	0	0	18	21
B Desertion	9	3	0	1	0	0	13	15
C Weather	17	8	0	2	0	2	29	34
D Unaccounted	5	7	2	2	0	0	16	18
E Fell from nest	1	1	0	1	3	0	6	7
F Died in nest	1	0	0	1	0	0	2	2
G Cowbird parasitism	0	0	0	0	3	0	3	3
H Total	33	29	9	8	6	2	87	100

All nest failures could be attributed to one of 3 causes: predation, desertion, or storm damage. The effect of these on the species studied, referring only to "active" nests, is shown in Table 4.

Two Robin nest desertions were directly due to activities of the observer. Three Robin eggs, 1 Grackle egg, and 1 Yellow Warbler egg were accidentally broken; they were listed as lost due to predation. As far as could be determined the activities of the study had no other effect upon the species under consideration.

The predation was nearly 100% by an unknown avian form which punctured the eggs in the nest. Bronzed Grackles were suspected, but were never seen at the nests of other species, or carrying their eggs or young. The Grackles were common on the area from late March to late June, but egg losses continued at about the same rate after their departure. If a predator took 1 egg out of a clutch and the owner deserted, the remainder of the eggs were listed as lost due to desertion. Predation on adult birds was not observed, and its extent is not known. However, it probably does introduce an error in the records on deserted nests, since some of the resident birds may have disappeared because of predation rather than because they deserted.

Predation was the chief cause of nest failure, operating most strongly during the egg stage. Weather of course would act differently on the various species from year to year, depending upon the time that bad storms happened to occur.

SUMMARY

Nesting birds were studied in a five-acre park area with arbor vitae and bluegrass lawn as the main cover types.

A total of at least 15 species (94 pairs) bred on the area during the period of study.

May and June were the months of highest nest density. On May 19–20 there were 9.6 active nests per acre. The average number of nests per acre for the season was 4.3. The total density for the season was 32.8 nests per acre.

The high density did not produce any noticeable interspecific strife.

Catbirds were the most successful breeders, producing fledglings from 51% of their eggs; Mourning Doves were the least successful, producing fledglings from 20% of their eggs.

Those species suffering the greatest loss of eggs in the nest generally appeared to be the most successful in raising nestlings.

Predation by an unknown avian form was the main cause of nest failures.

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Zoology Department, Univ. of Wisconsin, Madison, Wisconsin.

THE WILSON BULLETIN PUBLICATION DATES

The actual dates of publication of the four numbers in 1948 were: March 22, June 22, October 13, December 28.

Appendix R

LLG Supplemental Caltrans Off-Ramp Analysis

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MEMORANDUM

To:	Daryl Koutnik Kevin Smith Environmental Science Associates	Date:	January 31, 2023
From:	David S. Shender, P.E. DSS Grace Turney, P.E. Linscott, Law & Greenspan, Engineers	LLG Ref:	1-20-4388-2
Subject:	**Royal Vista Residential and Parks Project – Supplemental Caltrans Off-Ramp Analysis**		

Linscott, Law & Greenspan, Engineers (LLG) has prepared this memorandum to summarize the supplemental Caltrans off-ramp intersection analysis prepared for the proposed Royal Vista Residential and Parks project ("proposed project"), located in the Rowland Heights community of unincorporated Los Angeles County. The transportation impact analysis prepared in compliance with the requirements of Los Angeles County as lead agency is presented in the "Transportation Impact Analysis for the Royal Vista Residential and Parks Project" ("TIA Report"), prepared by Linscott, Law & Greenspan, Engineers on December 9, 2022.

The TIA Report includes an environmental impact assessment based on the requirements of the California Department of Transportation (Caltrans). In compliance with State law, Caltrans has formally adopted vehicle miles traveled (VMT) as the metric for evaluating the transportation impacts of local development projects on the State Highway System. Caltrans' *Transportation Impact Study Guide*[1] (TISG) states, "Additional future guidance will include the basis for requesting transportation impact analysis that is not based on VMT. This guidance will include a simplified safety analysis approach that reduces risks to all road users and that focuses on multi-modal conflict analysis as well as access management issues." While the final guidance is still being developed, Caltrans has released the "Interim Land Development and Intergovernmental Review (LDIGR) Safety Review Practitioners Guidance"[2]. Pursuant to Caltrans' analysis requirements, the TIA Report includes an analysis of the project's effect on off-ramp queuing at the SR-60 Freeway off-ramps at Fairway Drive in order to determine if the proposed project would cause, or contribute towards, slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes.

LLG has received and reviewed a letter from Caltrans requesting analysis of additional freeway off-ramps located in the vicinity of the proposed project. This supplemental analysis has been prepared to evaluate the proposed project's effect on

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[1] "Vehicle Miles Traveled-Focused Transportation Impact Study Guide", Caltrans, May 20, 2020.
[2] "Traffic Safety Bulletin 20-02-R1: Interim Local Development Intergovernmental Review Safety Review Practitioners Guidance", Caltrans, December 18, 2020.

off-ramp queuing at the intersection of the SR-57 Freeway northbound off-ramp at Brea Canyon Cut-Off Road-Diamond Bar Boulevard. This memorandum presents a summary of the Caltrans comment letter requesting the analysis, a description of the study intersection and traffic controls, a review of the traffic volumes utilized in the analysis, a summary of the off-ramp queuing analysis, and a traffic safety analysis for the off-ramp queuing.

CALTRANS COMMENT LETTER

In the letter dated November 21, 2022 from the California Department of Transportation to Ms. Marie Pavlovic of LA County Planning[3], Caltrans staff requested off-ramp queuing analysis for the following locations in the vicinity of the project site to be included in the environmental documentation for the proposed project:

- SR-60 Freeway Eastbound and Westbound Off-Ramps/Fairway Drive
- SR-60 Freeway Eastbound and Westbound Off-Ramps/Lemon Avenue
- SR-57 Freeway Northbound and Southbound Off-Ramps/Pathfinder Road
- SR-57 Freeway Northbound and Southbound Off-Ramps/Brea Canyon Cut-off Road-Diamond Bar Boulevard

It is noted that an analysis of off-ramp queuing at the SR-60 Freeway Eastbound and Westbound off-ramps at Fairway Drive is included in the TIA Report prepared for the proposed project. It is also noted that no westbound off-ramp is provided at the SR-60 Freeway interchange with Lemon Avenue. The remaining five (5) off-ramp locations were reviewed for potential inclusion in the supplemental analysis, as described in further detail below.

SR-60 Freeway Eastbound Off-Ramp/Lemon Avenue

No project trips are assumed to utilize the SR-60 Freeway eastbound off-ramp at Lemon Avenue. Therefore, the proposed project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed

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[3] Miya Edmonson, California Department of Transportation to Marie Pavlovic, LA County Planning. *Royal Vista Residential and Parks Project*, November 21, 2022, via State Clearinghouse.

differentials between adjacent lanes in the area of the SR-60 Freeway eastbound off-ramp at Lemon Avenue.

SR-57 Freeway Southbound Off-Ramp/Pathfinder Road

No project trips are assumed to utilize the SR-57 Freeway southbound off-ramp at Pathfinder Road. Therefore, the proposed project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes in the area of the SR-57 Freeway southbound off-ramp at Pathfinder Road.

SR-57 Freeway Northbound Off-Ramp/Pathfinder Road

No project trips are assumed to utilize the SR-57 Freeway northbound off-ramp at Pathfinder Road. Therefore, the proposed project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes in the area of the SR-57 Freeway northbound off-ramp at Pathfinder Road.

SR-57 Freeway Southbound Off-Ramp/Brea Canyon Cutoff Road-Diamond Bar Boulevard

No project trips are assumed to utilize the SR-57 Freeway southbound off-ramp at Brea Canyon Cutoff Road-Diamond Bar Boulevard. Therefore, the proposed project is not expected to cause or contribute towards slowing or stopped traffic on mainline travel lanes resulting in unsafe speed differentials between adjacent lanes in the area of the SR-57 Freeway southbound off-ramp at Brea Canyon Cutoff Road-Diamond Bar Boulevard.

SR-57 Freeway Northbound Off-Ramp/Diamond Bar Boulevard

A portion of project trips are assumed to utilize the SR-57 Freeway northbound off-ramp at Diamond Bar Boulevard. Therefore, a supplemental analysis of off-ramp queuing has been prepared in order to determine if the proposed project would cause or contribute towards unsafe conditions on the State Highway System. The analysis and findings of the supplemental analysis is presented below.

ROADWAY DESCRIPTIONS AND INTERSECTION CONTROLS

The following paragraphs provide a brief description of the roadways and intersection controls present at the SR-57 Freeway Northbound Ramps/Brea Canyon Cut-Off Road-Diamond Bar Boulevard intersection.

SR-57 (Orange) Freeway is a north-south oriented freeway located approximately one (1) to two (2) miles southeast of the project site. The SR-57 Freeway provides regional access to the project site vicinity and connects to I-210 (Foothill) Freeway to the north and I-5 (Santa Ana) Freeway to the south, linking the Los Angeles Basin with the eastern San Gabriel Valley and Pomona Valley. The SR-57 Freeway generally contains five (5) mainline travel lanes in the northbound direction and four (4) mainline travel lanes in the southbound direction near the study area.

Brea Canyon Cut-Off Road is generally a northwest-southeast oriented roadway located in the City of Diamond Bar and unincorporated Los Angeles County. In the vicinity of the supplemental study intersection, Brea Canyon Cut-Off Road is an east-west oriented roadway. Brea Canyon Cut-Off Road is classified as a Secondary Arterial in the *Diamond Bar General Plan 2040*[4]. Two through lanes are provided in each direction, with opposing lanes separated by a two-way left-turn lane. Brea Canyon Cut-Off Road is posted for a speed limit of 40 miles per hour (MPH) in the vicinity of the study intersection.

Diamond Bar Boulevard is generally a northeast-southwest oriented roadway located in the City of Diamond Bar. In the vicinity of the supplemental study intersection, Diamond Bar Boulevard is an east-west oriented roadway. Diamond Bar Boulevard is classified as a Boulevard in the *Diamond Bar General Plan 2040*. Two through lanes are provided in each direction, with opposing lanes separated by a raised concrete median. Diamond Bar Boulevard is posted for a speed limit of 45 MPH.

The intersection of the SR-57 Freeway Northbound Ramps and Brea Canyon Cut-Off Road-Diamond Bar Boulevard is controlled by a traffic signal. The northbound off-ramp approach consists of one shared left-turn/through lane and one right-turn lane. The eastbound approach consists of one left-turn lane and two through lanes; note that eastbound right-turns are not permitted as the movement would result in wrong-way travel on the northbound off-ramp. The westbound approach consists of one free-

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[4] *Diamond Bar General Plan 2040*, adopted December 17, 2019 by City Council Resolution No. 2019-44, prepared by Dyett & Bhatia, Urban and Regional Planners.

flow right-turn lane and two through lanes; note that westbound left-turns are not permitted as the movement would result in wrong-way travel on the northbound off-ramp. No southbound movements are accommodated at the study intersection.

TRAFFIC VOLUMES

Project Trip Distribution and Assignment

The trip generation forecast for the proposed project is summarized in *Section 2.6.1* of the TIA Report. As presented in the report, the proposed project is expected to generate 176 net new vehicle trips (31 inbound trips and 145 outbound trips) during the weekday AM peak hour. During the weekday PM peak hour, the proposed project is expected to generate 204 net new vehicle trips (136 inbound trips and 68 outbound trips). Over a 24-hour period, the proposed project is forecast to generate 2,243 daily trip ends (approximately 1,122 inbound trips and approximately 1,122 outbound trips) on a typical weekday.

The general, directional traffic distribution pattern through the supplemental study intersection is presented in ***Figure 1***, which presents the distribution of project traffic generated by Planning Area Lots 1, 2, 3, and 5. *Figure 1* also presents the distribution of traffic generated by the existing uses at the project site which are to be removed. The forecast net new AM and PM peak hour project traffic volumes at the supplemental study intersection is presented in ***Figure 2***. The traffic volume assignments presented in *Figure 2* reflects the traffic distribution characteristics shown in *Figure 1* and the project trip generation forecasts presented in *Section 2.6.1* of the TIA Report.

Existing Traffic Count Data

Manual counts of vehicular turning movements at the supplemental study intersection were conducted during the weekday morning (AM) and afternoon (PM) commuter periods to determine peak hour traffic volumes. The manual counts utilized in this supplemental assessment were conducted in year 2019 by an independent traffic count subconsultant (National Data & Surveying Services) from 7:00 to 9:00 AM and from 4:00 to 6:00 PM to determine the AM and PM peak commute hours, respectively.

Based on a review of the general traffic growth factors provided in the Los Angeles County Congestion Management Program (CMP) for the project study area (i.e., RSA

26, which is generally bounded by Azusa, Glendora, West Covina, Diamond Bar, and Hacienda Heights), a compounding annual growth rate of 0.38 percent (0.38%) has been applied to bring the count data to year 2021 existing conditions. The derivation of the growth rate is provided in *Section 3.5.2* of the TIA Report.

The existing year 2021 traffic volumes during the weekday AM and PM peak hours are shown in ***Figure 3***. Summary data worksheets of the manual traffic counts of the study intersection is contained in ***Appendix A***.

Future Cumulative Conditions

The proposed project is planned to be fully constructed and occupied by the end of year 2027. Therefore, a forecast of future year 2027 traffic volumes has been prepared. The forecast of future cumulative pre-project conditions was prepared in accordance to procedures outlined in Section 15130 of the CEQA Guidelines. Specifically, the CEQA Guidelines provide two options for developing the future traffic volume forecast:

> "(A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the [lead] agency, or
>
> (B) A summary of projections contained in an adopted local, regional or statewide plan, or related planning document, that describes or evaluates conditions contributing to the cumulative effect. Such plans may include: a general plan, regional transportation plan, or plans for the reduction of greenhouse gas emissions. A summary of projections may also be contained in an adopted or certified prior environmental document for such a plan. Such projections may be supplemented with additional information such as a regional modeling program. Any such document shall be referenced and made available to the public at a location specified by the lead agency."

This traffic analysis provides a forecast of future cumulative traffic volumes through incorporation of traffic associated with other known development projects located in the project study area as well as an ambient traffic growth rate. The following paragraphs provide additional details.

- Cumulative Development Projects
  The list of other known development projects (related projects) in the study area and the corresponding traffic volumes expected to be generated by the related projects is provided in *Section 3.5.1* of the TIA Report. The assignment of the related project traffic volumes at the supplemental study intersection is displayed in ***Figure 4***.

- Ambient Growth Factor
  In order to account for area-wide regional growth beyond the listed related projects, the existing traffic volumes were increased at an annual compounding rate of 0.38 percent (0.38%) between existing year 2021 and the project's future build-out year of 2027, resulting in a total growth factor of 2.30% applied to the existing year 2021 traffic volumes.

Application of the annual growth factor in addition to the forecast traffic generated by the related projects allows for a conservative forecast of future baseline year 2027 traffic volumes in the project study area, as incorporation of both (i.e., an ambient traffic growth rate and a detailed list of cumulative development projects) is expected to overstate potential future traffic volumes. The cumulative development projects should already be incorporated as part of the growth rate projection per the adopted local and regional planning documents (i.e., which account for the future population, housing, and employment [socio-economic data] projections).

Analysis Scenarios

The off-ramp queuing analysis were prepared for the typical weekday AM peak hour and PM peak hour time periods for the following scenarios:

1. Existing traffic conditions.

2. Existing with project traffic conditions.

3. Future cumulative without project conditions (i.e., condition 1 plus application of ambient growth through year 2027 and with completion and occupancy of the related projects).

4. Future cumulative with project conditions (i.e., condition 3 with completion and occupancy of the proposed project).

The existing traffic volumes (i.e., condition 1) at the study intersections during the weekday AM and PM peak hours are displayed in *Figure 3*. The existing with project traffic volumes (i.e., condition 2) at the study intersections during the weekday AM and PM peak hour are displayed in ***Figure 5***. The future cumulative without project traffic (i.e., condition 3) at the study intersections during the weekday AM and PM peak hours are displayed in ***Figure 6***. The future cumulative with project traffic volumes (i.e., condition 4) at the study intersections during the weekday AM and PM peak hour are displayed in ***Figure 7***.

OFF-RAMP QUEUING ANALYSIS

Pursuant to prior direction from Caltrans staff, the off-ramp queuing was analyzed using the Highway Capacity Manual (HCM) method for signalized intersections. The off-ramp queuing calculations were prepared using the *Synchro 11* software package which implements the HCM operational methodology. A *Synchro* network was created based on existing conditions field reviews at the above noted ramp intersection. In addition, specifics such as traffic volume data, lane configurations, available vehicle storage lengths, crosswalk locations, posted speed limits, traffic signal timing and phasing, etc., were coded to complete the existing network.

The freeway off-ramp intersection approach was reviewed in terms of expected maximum vehicle queues (i.e., 95th percentile queues) during the weekday AM and PM peak hours which represent the maximum back of vehicle queues with 95th percentile traffic volumes. The corresponding maximum vehicle queue lengths were then compared to the total ramp storage lengths (i.e., the available storage length as measured from the applicable off-ramp lane striping from the point of gore to the respective off-ramp approach limit lines). The total queuing for the off-ramp was determined based on the sum of the maximum vehicle queues for each off-ramp lane. The total ramp storage length was determined based on the sum of the striped storage for all lanes provided at the off-ramp location.

The off-ramp queuing analysis prepared for the supplemental study location of SR-57 Freeway Northbound Ramps/Brea Canyon Cut-Off Road-Diamond Bar Boulevard is summarized in ***Table 1***. The corresponding weekday AM and PM peak hour HCM worksheets are contained in ***Appendix B***.

Existing Conditions

As shown in *Table 1*, adequate storage area is provided at the SR-57 Freeway northbound off-ramps to accommodate the forecast 95th percentile queues under existing conditions, both without and with project-generated traffic during the weekday AM and PM peak hours.

Future Cumulative Conditions

As shown in *Table 1,* adequate storage area is provided at the SR-57 Freeway northbound off-ramps to accommodate the forecast 95th percentile queues under future cumulative without project-generated traffic conditions during the weekday AM and PM peak hours. Under future cumulative with project-generated traffic conditions, the off-ramp queue is expected to extend beyond the available storage space during the PM peak hour, resulting in a queue that potentially would extend into the mainline travel lanes. The queue is expected to increase by approximately 112 feet, or the equivalent of 4.5 vehicles (assuming a total length of 25 feet per queued vehicle, including vehicle separation).

SAFETY IMPACT ANALYSIS

Caltrans's Interim Safety Review Practitioners Guidance requires a review of traffic safety impacts for locations where a proposed development project adds two (2) or more car lengths to a ramp queue that will extend into the freeway mainline. Since project generated traffic is expected to result in more than two (2) vehicle lengths being added to a queue which extends into the freeway mainline travel lanes, the supplemental study intersection is required to be reviewed for safety impacts.

The review of traffic safety impacts includes a review of the speed differential between the off-ramp queue and the mainline of the freeway during the same peak hour. Speed differentials of 30 MPH or greater in congestion related rear-end collisions have shown the potential to increase severe injury and fatal injuries exponentially as the speed differential increases above 30 MPH. If the speed differential between the mainline speeds and the ramp traffic is below 30 MPH, the project would be considered to cause a less-than-significant safety impact, and no traffic safety impact mitigation would be required.

For the purpose of the safety analysis, it is assumed that the maximum back of off-ramp queue is slowing and near stopped. Therefore, a speed of less than five (5) MPH is assumed for the back of queue. The freeway mainline travel speeds were obtained from the Caltrans Performance Measurement System (PeMS). Speeds were obtained for the month of September 2019, corresponding to the month of the manual intersection traffic counts at the study intersection. The data represents an approximately one-mile segment of the SR-57 Freeway upstream of the point of gore for the off-ramp (i.e., postmiles R0.62 to R1.82, with point of gore at approximately postmile R1.751). An average travel speed was calculated based on five-minute interval speed data provided at three detector locations within the postmile range. It should be noted that the three detector locations had varying degrees of detector health, ranging from a high percent of direct observation to fully imputed (i.e., estimated) speed values. Thus, averaging the speed data from the three locations minimizes potential variation due to the differing data validation processes. The PM peak period speeds obtained from PeMS and the computed average speed is presented in ***Table 2***. As presented in *Table 2*, the average speed of the SR-57 northbound freeway mainline travel lanes in the vicinity of the supplemental study intersection is 29.61 MPH during the PM peak period. Therefore, a speed differential of less than 30 MPH is anticipated between the freeway mainline and the back of the off-ramp queue during the PM peak hour. Pursuant to the Interim Safety Review Practitioners Guidance, the project would be considered to cause a less-than-significant safety impact, and no traffic safety impact mitigation is required.

It should be noted that 95th percentile queueing represents the maximum queues which are expected to occur with 95 percent probability; the queue would be equivalent to or less than the reported queuing 95 percent of the time. The 95th percentile traffic volume condition would occur at a signalized intersection only during one or two signal cycles within a given analysis peak hour.

SUMMARY AND CONCLUSIONS

This memorandum has been prepared in response to Caltrans' request that the environmental documentation for the proposed Royal Vista Residential and Parks Project include an analysis of queuing at freeway off-ramps in the vicinity of the project site.

The SR-60 Freeway off-ramps at Fairway Drive are evaluated in the "Transportation Impact Analysis for the Royal Vista Residential and Parks Project", prepared by Linscott, Law & Greenspan, Engineers, dated December 9, 2022. No project trips are assumed to use the off-ramps at SR-60 Freeway Eastbound Ramps/Lemon Avenue, SR-57 Freeway Northbound and Southbound Ramps/Pathfinder Road, or SR-57 Freeway Southbound Ramps/Brea Canyon Cut-Off Road-Diamond Bar Boulevard.

A supplemental analysis has been prepared for the SR-57 Northbound Ramps at Brea Canyon Cut-Off Road-Diamond Bar Boulevard. A summary of the findings is presented below:

- The forecast queue on the SR-57 northbound off-ramp at Brea Canyon Cut-Off Road-Diamond Bar Boulevard will be adequately accommodated by the existing storage area under existing, existing with project, and future cumulative without project conditions.

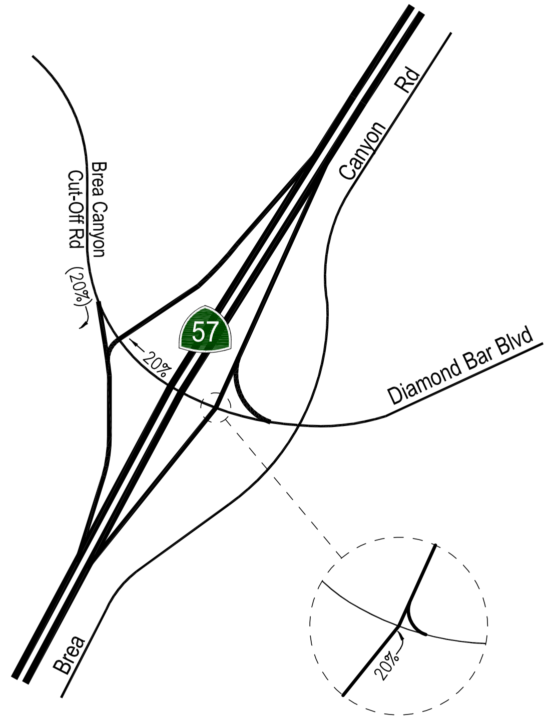
- Under future cumulative with project conditions, the forecast queue on the SR-57 northbound off-ramp at Brea Canyon Cut-Off Road-Diamond Bar Boulevard is expected to exceed the available off-ramp storage area, resulting in a queue that could potentially extend into the SR-57 northbound freeway mainline travel lanes. The addition of project traffic is expected to contribute approximately 112 feet of additional queuing, or the equivalent of 4.5 vehicles (assuming a total length of 25 feet per queued vehicle, including vehicle separation).

- Since the proposed project will add more than two vehicle lengths to the queue, a safety impact review is required, including a review of the speed differentials between the mainline travel lanes and off-ramp queue speeds.

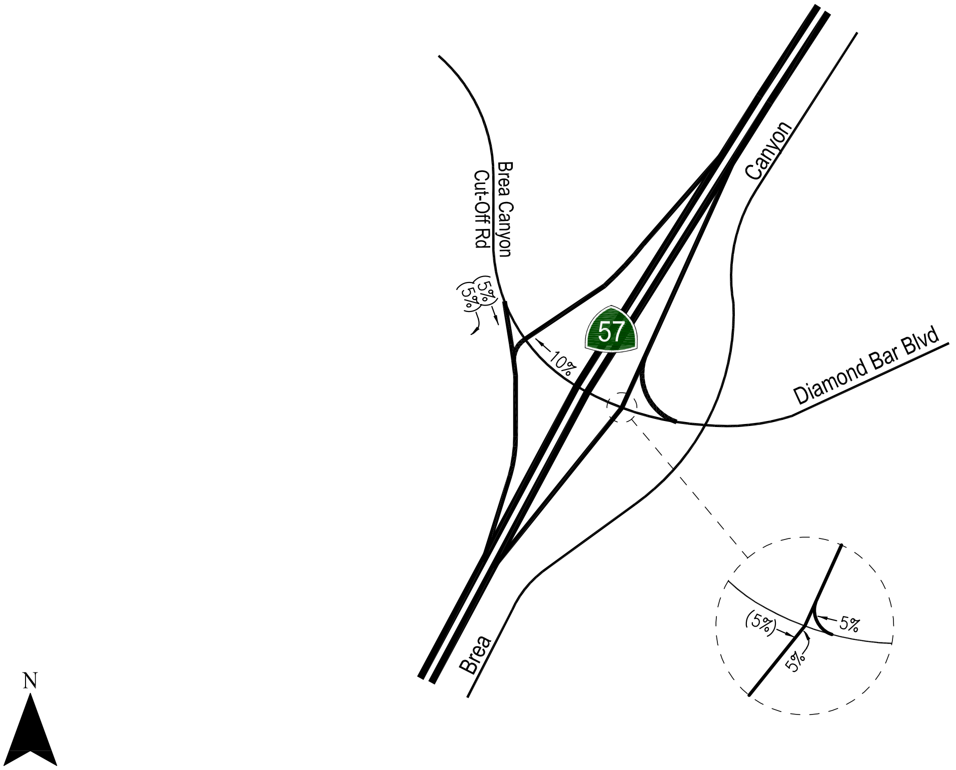
- Based on weekday PM peak period speed data obtained from PeMS, the average SR-57 northbound freeway mainline travel speed in the vicinity of the Brea Canyon Cut-Off Road-Diamond Bar Boulevard off-ramp point of gore is 29.61 MPH. The off-ramp queue speed is assumed to be less than five (5) MPH. Therefore, a speed differential of less than 30 MPH is anticipated between the freeway mainline and the back of the off-ramp queue.

- Since the speed differential between the SR-57 northbound freeway mainline and the Brea Canyon Cut-Off Road-Diamond Bar Boulevard off-ramp queue is less than 30 MPH during the PM peak hour, the proposed project is considered to cause a less-than-significant safety impact, and no traffic safety impact mitigation is required.

c: Jon Conk, Project Dimensions
File



Project Trip Distributions - Planning Area Lots 1, 2, 3, and 5



Existing Use Trip Distribution

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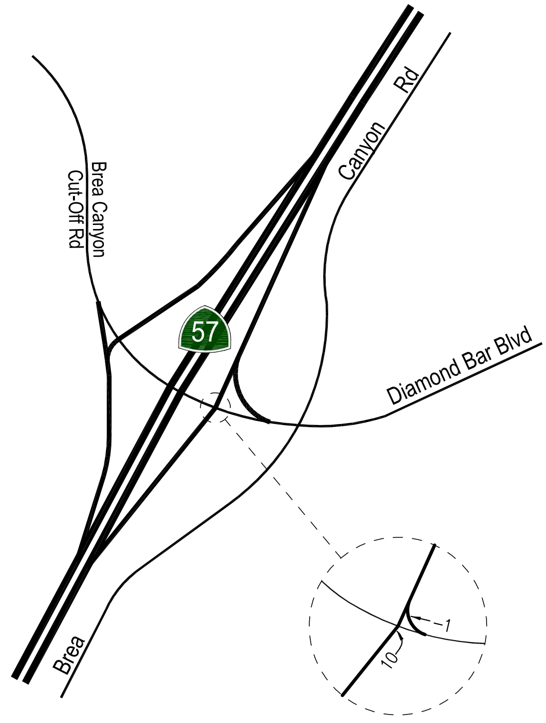
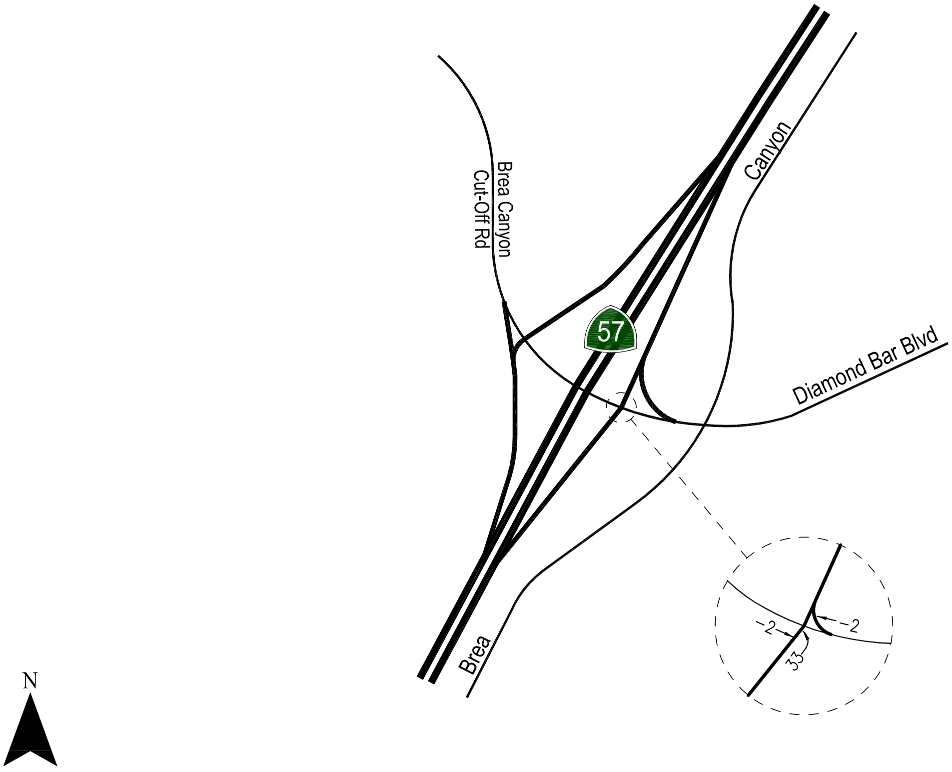
engineers

Figure 1
Directional Trip Distribution

Royal Vista Residential and Parks Project



Weekday AM Peak Hour



Weekday PM Peak Hour

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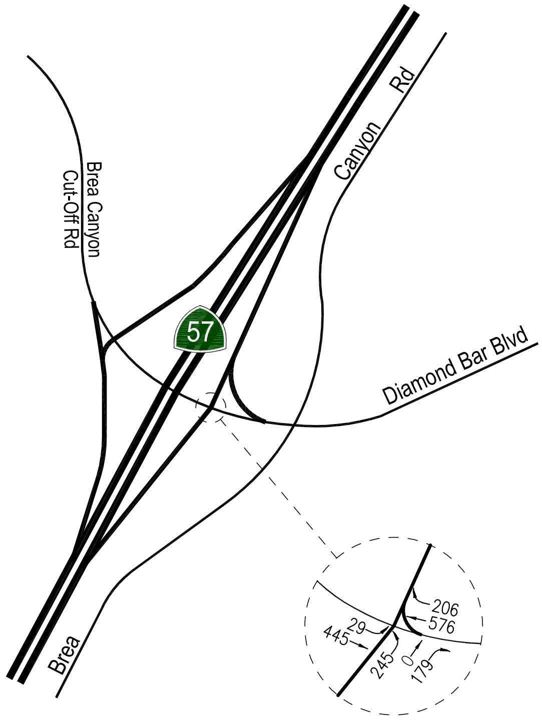
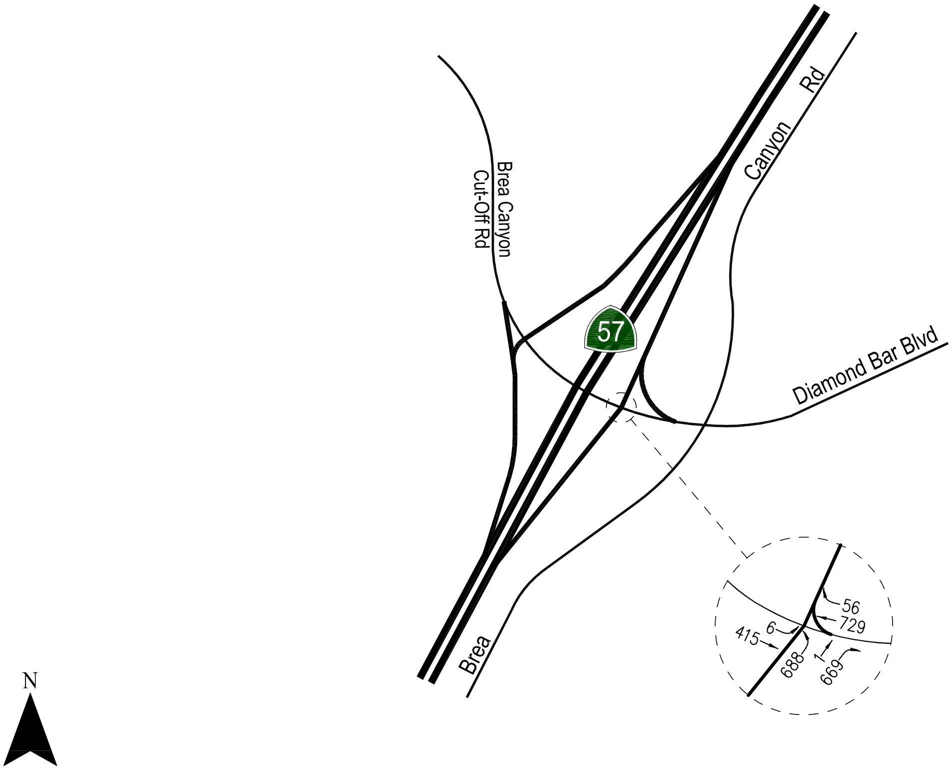
Figure 2
Project Traffic Volumes

Royal Vista Residential and Parks Project



Weekday AM Peak Hour



Weekday PM Peak Hour

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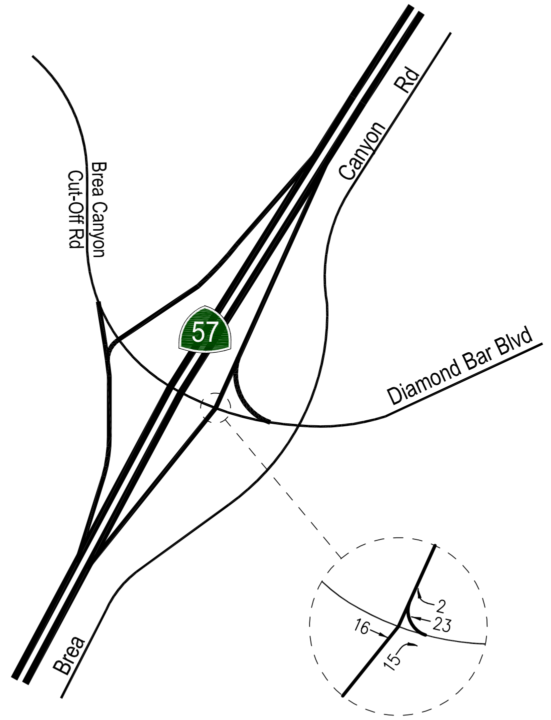
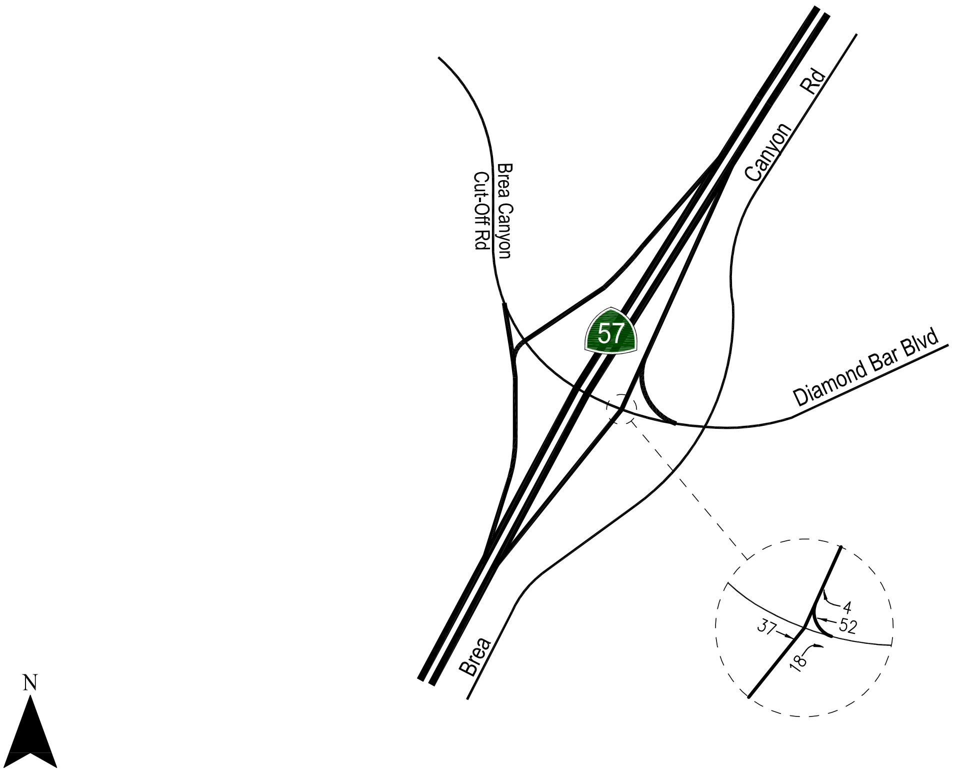
Figure 3
Existing Traffic Volumes

Royal Vista Residential and Parks Project



Weekday AM Peak Hour



Weekday PM Peak Hour

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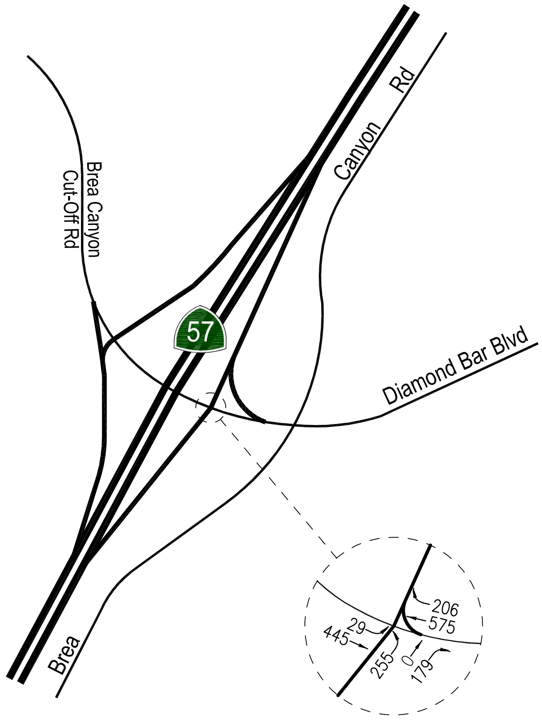
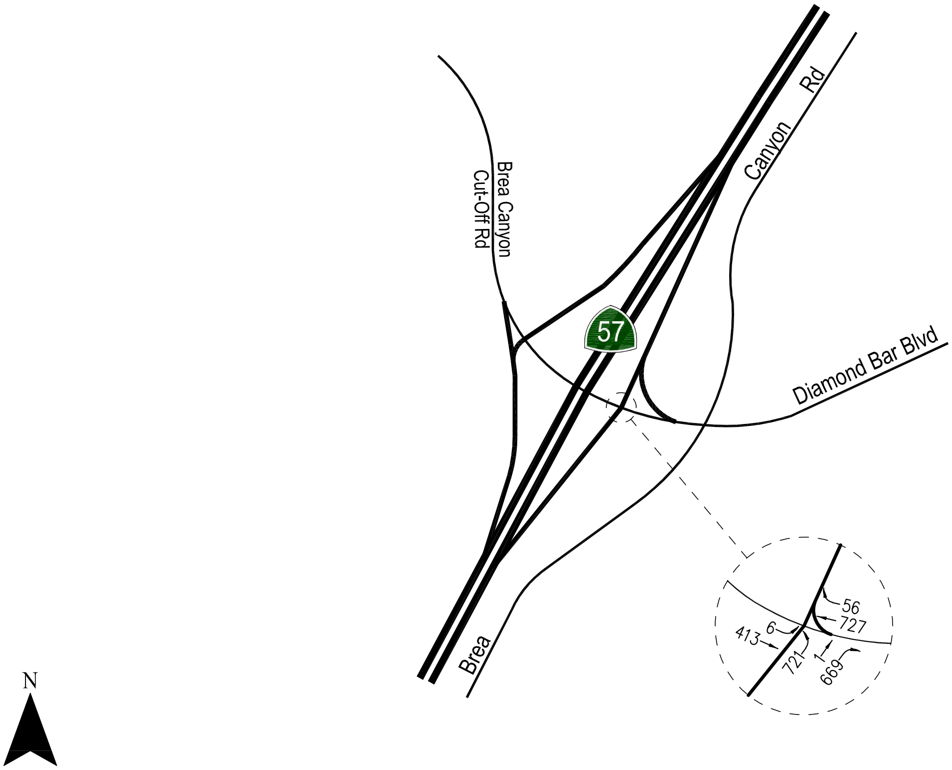
Figure 4
Related Projects Traffic Volumes

Royal Vista Residential and Parks Project



Weekday AM Peak Hour



Weekday PM Peak Hour

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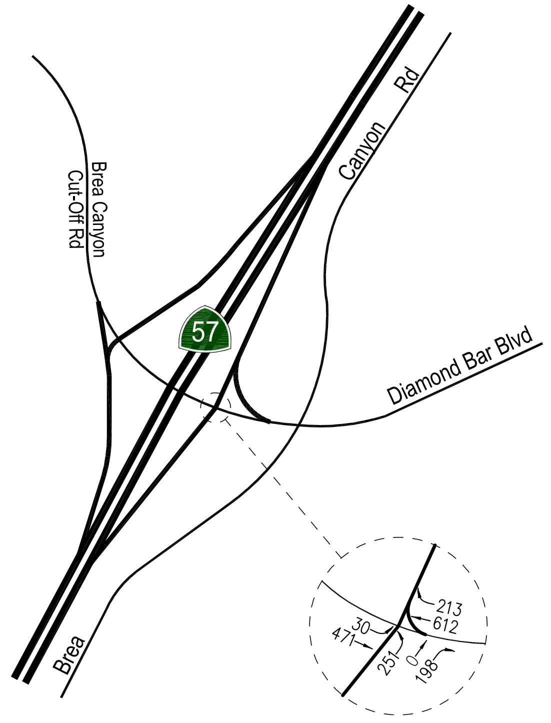
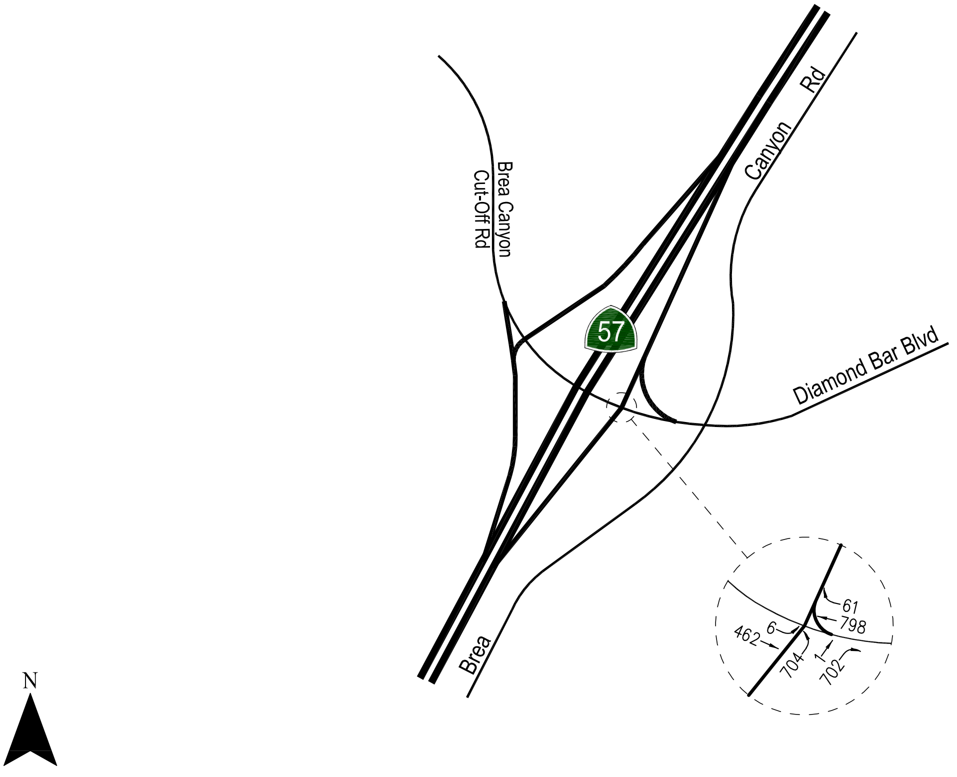
Figure 5
Existing with Project Traffic Volumes

Royal Vista Residential and Parks Project



Weekday AM Peak Hour



Weekday PM Peak Hour

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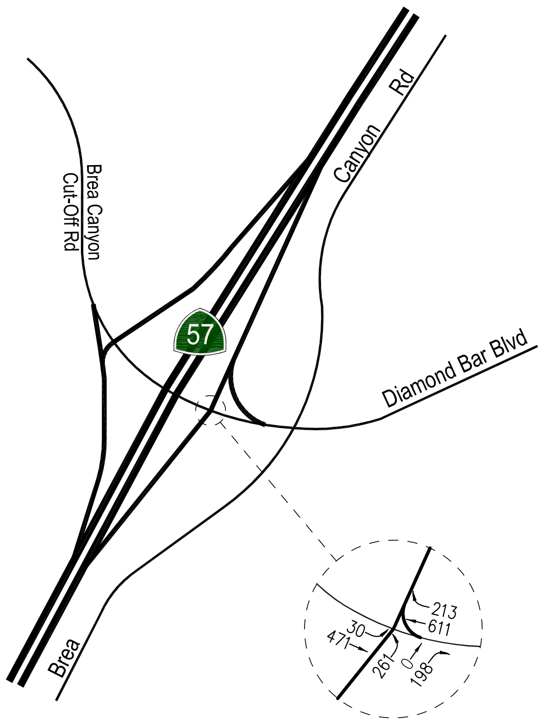
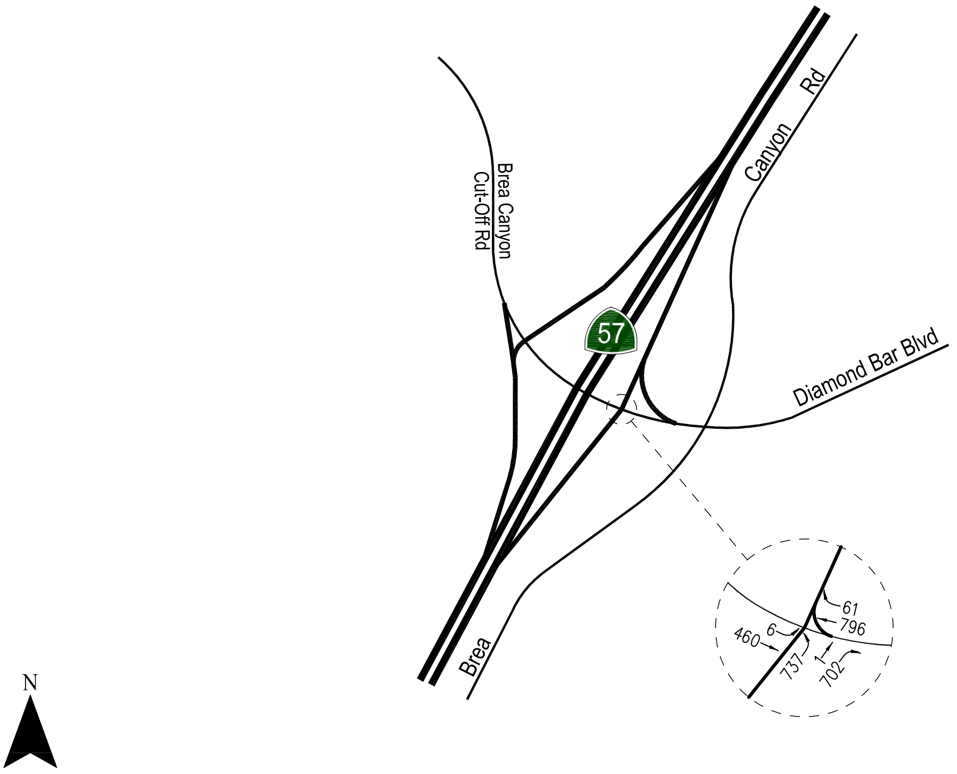
Figure 6
Future Cumulative without Project Traffic

Royal Vista Residential and Parks Project



Weekday AM Peak Hour



Weekday PM Peak Hour

Figure 7
Future Cumulative with Project Traffic

Royal Vista Residential and Parks Project

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Table 1
SUMMARY OF OFF-RAMP VEHICLE QUEUING [1]

NO.	INTERSECTION	PEAK HOUR	AVAILABLE OFF-RAMP STORAGE [2] (FEET)	EXISTING		EXISTING WITH PROJECT		FUTURE WITHOUT PROJECT		FUTURE WITH PROJECT	
				95th PERCENTILE QUEUE [3] (FEET)	EXCEEDS STORAGE? (YES/NO)	95th PERCENTILE QUEUE [3] (FEET)	EXCEEDS STORAGE? (YES/NO)	95th PERCENTILE QUEUE [3] (FEET)	EXCEEDS STORAGE? (YES/NO)	95th PERCENTILE QUEUE [3] (FEET)	EXCEEDS STORAGE? (YES/NO)
1	SR-57 Freeway NB Ramps/ Diamond Bar Boulevard	AM PM	1,490 1,490	288 1,295	No No	293 1,398	No No	305 1,483	No No	310 1,595	No Yes

[1] Queuing analysis based on the Highway Capacity Manual, 6th Edition operational analysis methodologies.

[2] Available storage represents the sum of storage space provided by all off-ramp lanes, as measured via Google Earth, 2022.

[3] The 95th percentile queue is the maximum back of queue with 95th percentile traffic volumes. An average vehicle length of 25 feet (including vehicle separation) was assumed for analysis purposes. The reported queue represents the sum of queues for all off-ramp lanes.

Table 2
SUMMARY OF FREEWAY MAINLINE TRAVEL SPEEDS
SR-57 NORTHBOUND NEAR DIAMOND BAR BOULEVARD [1]

	SPEED IN MILES PER HOUR		
	September 2019		
TIME	**PM R0.62**	**PM R1.26**	**PM R1.82**
4:00 PM	25.40	32.70	26.40
4:05 PM	25.70	32.40	26.10
4:10 PM	26.20	32.40	26.60
4:15 PM	26.00	32.30	26.40
4:20 PM	26.00	33.10	27.70
4:25 PM	25.80	34.10	28.70
4:30 PM	26.10	34.60	29.30
4:35 PM	26.00	34.50	28.60
4:40 PM	26.80	34.40	29.00
4:45 PM	27.10	34.80	29.40
4:50 PM	27.50	36.00	30.60
4:55 PM	27.30	35.20	29.30
5:00 PM	28.00	34.80	28.90
5:05 PM	28.20	34.40	28.90
5:10 PM	28.10	33.20	28.20
5:15 PM	27.90	33.30	28.20
5:20 PM	27.50	33.40	28.20
5:25 PM	27.20	34.20	28.60
5:30 PM	26.90	33.80	29.10
5:35 PM	26.60	32.90	27.70
5:40 PM	26.50	32.40	27.10
5:45 PM	26.60	33.30	27.40
5:50 PM	27.30	33.90	28.40
5:55 PM	27.60	33.80	28.30
6:00 PM	27.60	33.20	28.50
AVERAGE	**29.61**		

[1] Speed data obtained from Caltrans Performance Measurement System (PeMS) Long Contours reports for SR-57 Northbound for weekdays during the month of September 2019. The Diamond Bar Boulevard exit ramp gore is located at approximately postmile R1.751. The average speed during the weekday PM peak period within an approximately one-mile segment located south of Diamond Bar Boulevard (corresponding to PM R0.62-R1.82) is reported.

APPENDIX A

TRAFFIC COUNT DATA WORKSHEETS

Prepared by National Data & Surveying Services

SR-57 NB Ramps & S Diamond Bar Blvd

Peak Hour Turning Movement Count

ID: Historical
City: Diamond Bar

Day: Tuesday
Date: 09/10/2019

PEAK HOURS		COUNT PERIODS
07:45 AM - 08:45 AM	AM	07:00 AM - 09:00 AM
NONE	NOON	NONE
05:00 PM - 06:00 PM	PM	04:00 PM - 06:00 PM

SR-57 NB Ramps
SOUTHBOUND

	↲	↓	↳	⮌	⇧
AM	0	0	0	0	227
NOON	0	0	0	0	0
PM	0	0	0	0	61
	0	0	0	0	

S Diamond Bar Blvd
EASTBOUND

		AM	NOON	PM
⇦		820	0	1407
⮌	0	6	0	2
⬏	1	23	0	4
→	2	441	0	412
↴	0	0	0	0

S Diamond Bar Blvd
WESTBOUND

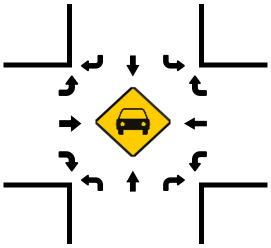
		PM	NOON	AM
↰	1	56	0	204
←	2	723	0	571
↲	0	0	0	0
⮎	0	0	0	0
⇨		1076	0	619

CONTROL			
Signalized			
TEV	1666 AM	0 NOON	2544 PM
PHF	0.94		0.93

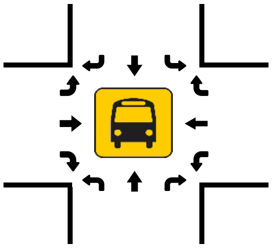
NORTHBOUND
SR-57 NB Ramps

		⮍	↰	↑	↱
	⇩	0	0.5	0.5	1
PM	0	0	682	1	664
NOON	0	0	0	0	0
AM	0	0	243	0	178

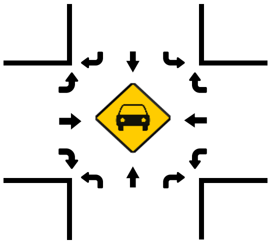
Total Vehicles (AM)



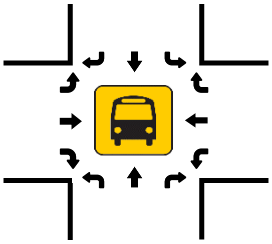
Total Vehicles (AM)



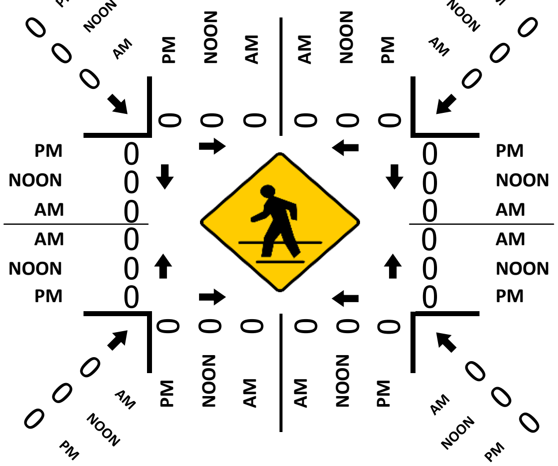
Total Vehicles (NOON)



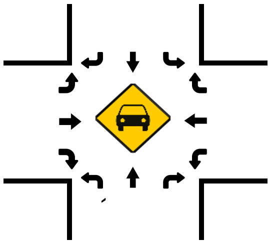
Total Vehicles (NOON)



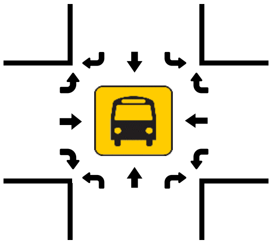
Pedestrians (Crosswalks)



Total Vehicles (PM)



Total Vehicles (PM)



APPENDIX B

HCM DATA WORKSHEETS – WEEKDAY AM AND PM PEAK HOURS

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	29	445	0	0	576	206	245	0	179	0	0	0
Future Volume (veh/h)	29	445	0	0	576	206	245	0	179	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	31	473	0	0	613	0	261	0	190			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	106	2303	0	0	1846		339	0	302			
Arrive On Green	0.06	0.65	0.00	0.00	0.52	0.00	0.19	0.00	0.19			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1781	0	1585			
Grp Volume(v), veh/h	31	473	0	0	613	0	261	0	190			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	1.1	3.5	0.0	0.0	6.5	0.0	9.0	0.0	7.2			
Cycle Q Clear(g_c), s	1.1	3.5	0.0	0.0	6.5	0.0	9.0	0.0	7.2			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	106	2303	0	0	1846		339	0	302			
V/C Ratio(X)	0.29	0.21	0.00	0.00	0.33		0.77	0.00	0.63			
Avail Cap(c_a), veh/h	288	2303	0	0	1846		617	0	549			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	29.3	4.6	0.0	0.0	9.1	0.0	25.0	0.0	24.2			
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	0.5	0.0	2.8	0.0	1.6			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.8	1.5	0.0	0.0	3.6	0.0	6.8	0.0	4.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	4.8	0.0	0.0	9.6	0.0	27.7	0.0	25.8			
LnGrp LOS	C	A	A	A	A		C	A	C			
Approach Vol, veh/h		504			613			451				
Approach Delay, s/veh		6.4			9.6			26.9				
Approach LOS		A			A			C				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		47.6			8.4	39.3		17.4				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		32.0			10.5	17.0		22.5				
Max Q Clear Time (g_c+I1), s		5.5			3.1	8.5		11.0				
Green Ext Time (p_c), s		4.2			0.0	3.1		1.3				

Intersection Summary			
HCM 6th Ctrl Delay			13.5
HCM 6th LOS			B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: SR-57 Fwy NB Ramps & Diamond Bar Blvd

Existing Conditions
Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	6	415	0	0	729	56	688	1	669	0	0	0
Future Volume (veh/h)	6	415	0	0	729	56	688	1	669	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	6	446	0	0	784	0	740	1	719			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	25	1503	0	0	1207		739	1	658			
Arrive On Green	0.01	0.42	0.00	0.00	0.34	0.00	0.42	0.42	0.42			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1779	2	1585			
Grp Volume(v), veh/h	6	446	0	0	784	0	741	0	719			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	0.2	5.4	0.0	0.0	12.2	0.0	27.0	0.0	27.0			
Cycle Q Clear(g_c), s	0.2	5.4	0.0	0.0	12.2	0.0	27.0	0.0	27.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	25	1503	0	0	1207		740	0	658			
V/C Ratio(X)	0.24	0.30	0.00	0.00	0.65		1.00	0.00	1.09			
Avail Cap(c_a), veh/h	247	1503	0	0	1207		740	0	658			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.7	12.4	0.0	0.0	18.2	0.0	19.0	0.0	19.0			
Incr Delay (d2), s/veh	1.8	0.5	0.0	0.0	2.7	0.0	33.4	0.0	62.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.2	3.3	0.0	0.0	8.2	0.0	22.9	0.0	28.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	12.9	0.0	0.0	20.9	0.0	52.4	0.0	81.8			
LnGrp LOS	C	B	A	A	C		F	A	F			
Approach Vol, veh/h		452			784			1460				
Approach Delay, s/veh		13.1			20.9			66.9				
Approach LOS		B			C			E				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		33.0			5.4	27.6		32.0				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		27.5			9.0	14.0		27.0				
Max Q Clear Time (g_c+I1), s		7.4			2.2	14.2		29.0				
Green Ext Time (p_c), s		3.6			0.0	0.0		0.0				
Intersection Summary												
HCM 6th Ctrl Delay			44.5									
HCM 6th LOS			D									

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	29	445	0	0	575	206	255	0	179	0	0	0
Future Volume (veh/h)	29	445	0	0	575	206	255	0	179	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	31	473	0	0	612	0	271	0	190			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	106	2283	0	0	1826		349	0	311			
Arrive On Green	0.06	0.64	0.00	0.00	0.51	0.00	0.20	0.00	0.20			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1781	0	1585			
Grp Volume(v), veh/h	31	473	0	0	612	0	271	0	190			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	1.1	3.6	0.0	0.0	6.6	0.0	9.4	0.0	7.1			
Cycle Q Clear(g_c), s	1.1	3.6	0.0	0.0	6.6	0.0	9.4	0.0	7.1			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	106	2283	0	0	1826		349	0	311			
V/C Ratio(X)	0.29	0.21	0.00	0.00	0.34		0.78	0.00	0.61			
Avail Cap(c_a), veh/h	288	2283	0	0	1826		617	0	549			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	29.3	4.8	0.0	0.0	9.3	0.0	24.8	0.0	23.9			
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	0.5	0.0	2.8	0.0	1.4			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.8	1.5	0.0	0.0	3.7	0.0	7.0	0.0	4.7			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	5.0	0.0	0.0	9.8	0.0	27.6	0.0	25.3			
LnGrp LOS	C	A	A	A	A		C	A	C			
Approach Vol, veh/h		504			612			461				
Approach Delay, s/veh		6.5			9.8			26.6				
Approach LOS		A			A			C				
Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		47.3			8.4	38.9		17.7				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		32.0			10.5	17.0		22.5				
Max Q Clear Time (g_c+I1), s		5.6			3.1	8.6		11.4				
Green Ext Time (p_c), s		4.2			0.0	3.1		1.4				
Intersection Summary												
HCM 6th Ctrl Delay			13.7									
HCM 6th LOS			B									

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
1: SR-57 Fwy NB Ramps & Diamond Bar Blvd

Existing with Project Conditions
Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	6	413	0	0	727	56	721	1	669	0	0	0
Future Volume (veh/h)	6	413	0	0	727	56	721	1	669	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	6	444	0	0	782	0	775	1	719			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	25	1503	0	0	1207		739	1	658			
Arrive On Green	0.01	0.42	0.00	0.00	0.34	0.00	0.42	0.42	0.42			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1779	2	1585			
Grp Volume(v), veh/h	6	444	0	0	782	0	776	0	719			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	0.2	5.4	0.0	0.0	12.1	0.0	27.0	0.0	27.0			
Cycle Q Clear(g_c), s	0.2	5.4	0.0	0.0	12.1	0.0	27.0	0.0	27.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	25	1503	0	0	1207		740	0	658			
V/C Ratio(X)	0.24	0.30	0.00	0.00	0.65		1.05	0.00	1.09			
Avail Cap(c_a), veh/h	247	1503	0	0	1207		740	0	658			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.7	12.4	0.0	0.0	18.2	0.0	19.0	0.0	19.0			
Incr Delay (d2), s/veh	1.8	0.5	0.0	0.0	2.7	0.0	46.6	0.0	62.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.2	3.3	0.0	0.0	8.2	0.0	27.0	0.0	28.9			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	12.9	0.0	0.0	20.9	0.0	65.6	0.0	81.8			
LnGrp LOS	C	B	A	A	C		F	A	F			
Approach Vol, veh/h		450			782			1495				
Approach Delay, s/veh		13.1			20.9			73.4				
Approach LOS		B			C			E				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		33.0			5.4	27.6		32.0				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		27.5			9.0	14.0		27.0				
Max Q Clear Time (g_c+I1), s		7.4			2.2	14.1		29.0				
Green Ext Time (p_c), s		3.5			0.0	0.0		0.0				

Intersection Summary			
HCM 6th Ctrl Delay			48.4
HCM 6th LOS			D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	30	471	0	0	612	213	251	0	198	0	0	0
Future Volume (veh/h)	30	471	0	0	612	213	251	0	198	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	32	501	0	0	651	0	267	0	211			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	108	2288	0	0	1827		346	0	308			
Arrive On Green	0.06	0.64	0.00	0.00	0.51	0.00	0.19	0.00	0.19			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1781	0	1585			
Grp Volume(v), veh/h	32	501	0	0	651	0	267	0	211			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	1.1	3.8	0.0	0.0	7.1	0.0	9.2	0.0	8.0			
Cycle Q Clear(g_c), s	1.1	3.8	0.0	0.0	7.1	0.0	9.2	0.0	8.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	2288	0	0	1827		346	0	308			
V/C Ratio(X)	0.30	0.22	0.00	0.00	0.36		0.77	0.00	0.68			
Avail Cap(c_a), veh/h	288	2288	0	0	1827		617	0	549			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	29.2	4.8	0.0	0.0	9.4	0.0	24.8	0.0	24.3			
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	0.5	0.0	2.7	0.0	2.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.8	1.6	0.0	0.0	4.0	0.0	6.9	0.0	5.3			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	5.0	0.0	0.0	9.9	0.0	27.5	0.0	26.3			
LnGrp LOS	C	A	A	A	A		C	A	C			
Approach Vol, veh/h		533			651			478				
Approach Delay, s/veh		6.5			9.9			27.0				
Approach LOS		A			A			C				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		47.4			8.4	38.9		17.6				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		32.0			10.5	17.0		22.5				
Max Q Clear Time (g_c+I1), s		5.8			3.1	9.1		11.2				
Green Ext Time (p_c), s		4.4			0.0	3.2		1.4				

Intersection Summary			
HCM 6th Ctrl Delay			13.7
HCM 6th LOS			B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

1: SR-57 Fwy NB Ramps & Diamond Bar Blvd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	6	462	0	0	798	61	704	1	702	0	0	0
Future Volume (veh/h)	6	462	0	0	798	61	704	1	702	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	6	497	0	0	858	0	757	1	755			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	25	1503	0	0	1207		739	1	658			
Arrive On Green	0.01	0.42	0.00	0.00	0.34	0.00	0.42	0.42	0.42			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1779	2	1585			
Grp Volume(v), veh/h	6	497	0	0	858	0	758	0	755			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	0.2	6.1	0.0	0.0	13.7	0.0	27.0	0.0	27.0			
Cycle Q Clear(g_c), s	0.2	6.1	0.0	0.0	13.7	0.0	27.0	0.0	27.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	25	1503	0	0	1207		740	0	658			
V/C Ratio(X)	0.24	0.33	0.00	0.00	0.71		1.02	0.00	1.15			
Avail Cap(c_a), veh/h	247	1503	0	0	1207		740	0	658			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.7	12.6	0.0	0.0	18.7	0.0	19.0	0.0	19.0			
Incr Delay (d2), s/veh	1.8	0.6	0.0	0.0	3.6	0.0	39.4	0.0	83.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.2	3.8	0.0	0.0	9.1	0.0	24.8	0.0	34.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	13.2	0.0	0.0	22.3	0.0	58.4	0.0	102.0			
LnGrp LOS	C	B	A	A	C		F	A	F			
Approach Vol, veh/h		503			858			1513				
Approach Delay, s/veh		13.4			22.3			80.2				
Approach LOS		B			C			F				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		33.0			5.4	27.6		32.0				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		27.5			9.0	14.0		27.0				
Max Q Clear Time (g_c+I1), s		8.1			2.2	15.7		29.0				
Green Ext Time (p_c), s		4.0			0.0	0.0		0.0				

Intersection Summary	
HCM 6th Ctrl Delay	51.2
HCM 6th LOS	D

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	30	471	0	0	611	213	261	0	198	0	0	0
Future Volume (veh/h)	30	471	0	0	611	213	261	0	198	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	32	501	0	0	650	0	278	0	211			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	108	2267	0	0	1805		357	0	318			
Arrive On Green	0.06	0.64	0.00	0.00	0.51	0.00	0.20	0.00	0.20			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1781	0	1585			
Grp Volume(v), veh/h	32	501	0	0	650	0	278	0	211			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	1.1	3.9	0.0	0.0	7.2	0.0	9.6	0.0	8.0			
Cycle Q Clear(g_c), s	1.1	3.9	0.0	0.0	7.2	0.0	9.6	0.0	8.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	108	2267	0	0	1805		357	0	318			
V/C Ratio(X)	0.30	0.22	0.00	0.00	0.36		0.78	0.00	0.66			
Avail Cap(c_a), veh/h	288	2267	0	0	1805		617	0	549			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	29.2	5.0	0.0	0.0	9.6	0.0	24.6	0.0	24.0			
Incr Delay (d2), s/veh	0.6	0.2	0.0	0.0	0.6	0.0	2.7	0.0	1.8			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.8	1.7	0.0	0.0	4.1	0.0	7.2	0.0	5.2			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	29.8	5.2	0.0	0.0	10.2	0.0	27.4	0.0	25.7			
LnGrp LOS	C	A	A	A	B		C	A	C			
Approach Vol, veh/h		533			650			489				
Approach Delay, s/veh		6.7			10.2			26.6				
Approach LOS		A			B			C				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		47.0			8.4	38.5		18.0				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		32.0			10.5	17.0		22.5				
Max Q Clear Time (g_c+I1), s		5.9			3.1	9.2		11.6				
Green Ext Time (p_c), s		4.4			0.0	3.1		1.4				

Intersection Summary			
HCM 6th Ctrl Delay			13.9
HCM 6th LOS			B

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.

	↗	→	↘	↙	←	↖	↖	↑	↗	↘	↓	↙
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰	↑↑			↑↱			↰	↱			
Traffic Volume (veh/h)	6	460	0	0	796	61	737	1	702	0	0	0
Future Volume (veh/h)	6	460	0	0	796	61	737	1	702	0	0	0
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0			
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00			
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Work Zone On Approach		No			No			No				
Adj Sat Flow, veh/h/ln	1870	1870	0	0	1870	1870	1870	1870	1870			
Adj Flow Rate, veh/h	6	495	0	0	856	0	792	1	755			
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93			
Percent Heavy Veh, %	2	2	0	0	2	2	2	2	2			
Cap, veh/h	25	1503	0	0	1207		739	1	658			
Arrive On Green	0.01	0.42	0.00	0.00	0.34	0.00	0.42	0.42	0.42			
Sat Flow, veh/h	1781	3647	0	0	3741	0	1779	2	1585			
Grp Volume(v), veh/h	6	495	0	0	856	0	793	0	755			
Grp Sat Flow(s),veh/h/ln	1781	1777	0	0	1777	0	1781	0	1585			
Q Serve(g_s), s	0.2	6.1	0.0	0.0	13.6	0.0	27.0	0.0	27.0			
Cycle Q Clear(g_c), s	0.2	6.1	0.0	0.0	13.6	0.0	27.0	0.0	27.0			
Prop In Lane	1.00		0.00	0.00		0.00	1.00		1.00			
Lane Grp Cap(c), veh/h	25	1503	0	0	1207		740	0	658			
V/C Ratio(X)	0.24	0.33	0.00	0.00	0.71		1.07	0.00	1.15			
Avail Cap(c_a), veh/h	247	1503	0	0	1207		740	0	658			
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Upstream Filter(I)	1.00	1.00	0.00	0.00	1.00	0.00	1.00	0.00	1.00			
Uniform Delay (d), s/veh	31.7	12.6	0.0	0.0	18.7	0.0	19.0	0.0	19.0			
Incr Delay (d2), s/veh	1.8	0.6	0.0	0.0	3.5	0.0	54.0	0.0	83.0			
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
%ile BackOfQ(95%),veh/ln	0.2	3.8	0.0	0.0	9.1	0.0	29.3	0.0	34.5			
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	33.5	13.2	0.0	0.0	22.2	0.0	73.0	0.0	102.0			
LnGrp LOS	C	B	A	A	C		F	A	F			
Approach Vol, veh/h		501			856			1548				
Approach Delay, s/veh		13.4			22.2			87.1				
Approach LOS		B			C			F				

Timer - Assigned Phs		2			5	6		8				
Phs Duration (G+Y+Rc), s		33.0			5.4	27.6		32.0				
Change Period (Y+Rc), s		5.5			4.5	5.5		5.0				
Max Green Setting (Gmax), s		27.5			9.0	14.0		27.0				
Max Q Clear Time (g_c+I1), s		8.1			2.2	15.6		29.0				
Green Ext Time (p_c), s		4.0			0.0	0.0		0.0				

Intersection Summary		
HCM 6th Ctrl Delay		55.3
HCM 6th LOS		E

Notes

Unsignalized Delay for [WBR] is excluded from calculations of the approach delay and intersection delay.