Final

Environmental Impact Report for the Palms Groundwater Recovery Project

State Clearinghouse Number 2020060315

Prepared for:

Buena Vista Water Storage District

February 2022

Prepared by:

GEI Consultants, Inc.

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Consulting Engineers and Scientists

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Abbreviations and Acronyms

§	Section
AF	acre-feet
AFY	acre-feet per year
AGR	Agricultural Supply
Aqueduct	California Aqueduct
B.P.	before the present
Basin Plan	Water Quality Control Plan for the Tulare River Basin
bgs	below ground surface
BMPs	best management practices
BV8	Buena Vista Turnout #8
BVGSA	Buena Vista Groundwater Sustainability Agency
BVGSP	Groundwater Sustainability Plan
BVWSD	Buena Vista Water Storage District
C2VSimFG-Kern	California Central Valley Groundwater-Surface Water Simulation Model
cal B.P.	calibrated years before the present
cal A.D.	calibrated years before the anno Domini
CCR	California Code of Regulations
CCTS	Central California Taxonomic System
CESA	California Endangered Species Act
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CDFG	California Department of Fish and Game
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CORS	Continuously Operating Reference Stations
County	Kern County
CRHR	California Register of Historical Resources
CRPR	California Rare Plant Rank
CVHM	USGS Central Valley Hydrologic Model
CWA	Clean Water Act
District	Buena Vista Water Storage District
DEIR	Draft Environmental Impact Report
DWR	California Department of Water Resource
EIR	Environmental Impact Report
ESA	Endangered Species Act
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FGC	California Fish and Game Code
GAMAQI	Guidance for Assessing and Mitigating Air Quality Impacts
GHG	greenhouse gas
GNSS	Global Navigation Satellite System
GSA	Groundwater Sustainability Agencies

GSP	Groundwater Sustainability Plan
HCP	Habitat Conservation Plan
HCCP	Natural Community Conservation Plans
HUD	United States Department of Housing and Urban Development
IND	Industrial Supply
InSAR	Interferometric Synthetic Aperture Radar
IPaC	Information for Planning and Conservation
IS	Initial Study
JOC	Joint Operating Committee
JPA	Joint Powers Agreement
KCWA	Kern County Water Agency
KGA	Kern Groundwater Authority
KGAGSP	Kern Groundwater Authority Groundwater Sustainability Plan
KFMC	Kern Fan Monitoring Committee
KRGSA	Kern River Groundwater Sustainability Agency
KSA	Kenneth D. Schmidt and Associates
KWB	Kern Water Bank
KWBA	Kern Water Bank Authority
LAFCo	Local Agency Formation Commission
lead agency	Buena Vista Water Storage District
MBTA	Migratory Bird Treaty Act
MCL	maximum contaminant level
MLD	Most Likely Descendant
MMRP	Mitigation Monitoring and Reporting Program
msl	mean sea level
MOs	management objectives
MTs	minimum thresholds
MUN	Municipal and Domestic Supply
NAHC	Native American Heritage Commission
NCCP	Natural Community Conservation Plan
NEHRP	National Earthquake Hazards Reduction Program
NGS	National Geodetic Survey
NOAA	National Oceanic and Atmospheric Administration
NOP	Notice of Preparation
N.P.D.E.S.	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
Palms Project	Palms Groundwater Banking Project
PCE	Primary constituent element
PIP	Pump-In Proposal
PM	particulate matter
PM10	particulate matter less than 10 microns in diameter
Porter-Cologne Act	Porter-Cologne Water Quality Control Act
ppb	parts per billion
ppm	parts per million

PRC	Public Resources Code
Program	Worker Environmental Awareness Program
Recovery Project	Palms Groundwater Recovery Project
RRBMA	Rosedale Rio-Bravo Management Area
RRBWSD	Rosedale Rio-Bravo Water Storage District
RMW	representative monitoring well
RPA	Registered Professional Archeologist
RWQCBs	Regional Water Quality Control Boards
SCH	State Clearinghouse
SGMA	Sustainable Groundwater Management Act
S.J.V.A.P.C.D.	San Joaquin Valley Air Pollution Control District
SMC	Sustainable Management Criteria
SPAL	Small Project Analysis Level
S.S.J.V.I.C.	Southern San Joaquin Valley Information Center
State Water Board	State Water Resources Control Board
SWP	State Water Project
SWPPP	Stormwater Pollution Prevention Program
SWSD	Semitropic Water Storage District
TCP	1,2,3-Trichloropropane
TCRs	Tribal Cultural Resources
TDS	total dissolved solids
Tribe	Torres Martinez Desert Cahuilla Indians Tribe
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	United States Code
USGS	United States Geological Survey
USFWS	United States Fish and Wildlife Service
Valley	San Joaquin Valley
WDRs	waste discharge requirements
WKWD	West Kern Water District

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Executive Summary

ES.1. Introduction

The California Environmental Quality Act (CEQA) specifies that a public agency must prepare an environmental impact report (EIR) on any project that it proposes to carry out or approve that may result in a significant effect on the environment (California Public Resources Code [PRC], Section [§] 21080[d]). Serving as the CEQA lead agency, the Buena Vista Water Storage District (BVWSD or District) has prepared this project-level EIR in accordance with CEQA and CEQA Guidelines (California Code of Regulations [CCR] [F], Title 14, Division 6, Chapter 3, § 15000 et seq.) to evaluate the potential environmental impacts associated with implementing the Palms Groundwater Recovery Project (Recovery Project). This EIR is an informational document which will inform public agency decision makers and the public generally of the significant environmental effect of a project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the Recovery Project (CEQA Guidelines, § 15121[a]).

The District published an Initial Study (IS) and a Notice of Preparation (NOP) of an EIR on June 16, 2020. A draft EIR was released on December 4, 2020. The draft EIR was revised in response to the comments received by the District. These minor revisions include edits to the draft EIR, which are included in this document. None of the revisions provide significant new information as no new environmental impacts are identified, there is no known increase to the severity of an impact, nor is a considerably different feasible alternative or mitigation measure identified. Rather, the revisions simply provide further clarification of the information already disclosed in the Draft EIR (DEIR). In addition, the comments letters received on the draft EIR are included in Chapter 7, and the District's response to those comments are included in Chapters 8 and 9.

ES.2. Project Purpose and Objectives

CEQA Guidelines (§ 15124[b]) require that the project description contain a clear statement of the project objectives, including the underlying purpose of the project. The statement of objectives is important under CEQA in helping the lead agency (the District) develop a range of reasonable alternatives for evaluation in the EIR. These objectives also define the underlying need for the project.

The overall purpose of the Recovery Project is to enhance groundwater management by increasing the District's ability to recharge groundwater in wet years and return that banked water in dry years. Additionally, enhanced groundwater management would benefit agriculture by providing irrigation water supplies in years with limited surface water supplies.

The Recovery Project has the following primary objectives:

- Increase conjunctive management on the west side of Kern County (County) by improving the District's ability to meet demands during periods when supply of surface water is limited with previously banked water supplies

- Improve conveyance of previously stored water throughout the District to neighboring districts
- Install recovery facilities to attract new banking partners in order to increase groundwater in the Kern Subbasin for District use
- Recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the California Aqueduct (Aqueduct)

These objectives were important for the identification, development, selection, and consideration of the CEQA alternatives evaluated in this FEIR (Chapter 5 – Alternatives to the Proposed Project)

Project Benefits

The Recovery Project will provide up to 25,000 acre-feet (AF) of banked groundwater to the District's water customers in dry years, while meeting the requirements of the Sustainable Groundwater Management Act (SGMA).

Need for Project

The District has a gross irrigable acreage of about 49,000 acres. Currently about half the District lands are planted with permanent crops with growers migrating away from row crops. The conversion to permanent crops may increase the water demand by 1 acre-foot per acre. In the short term, this conversion typically reduces demand, as a pistachio tree will not reach full demand for water until about the 12th year, with the 1st year being as low as 0.25 AF per acre. The Recovery Project will allow for the highs and lows of the District's water supply to be managed in a manner that ensures full production of permanent crops regardless of the current year's water supply.

With the District's Kern River water supply, as well as its State Water Project (SWP) water supply, the District should be able to meet future demands. This Recovery Project will help in meeting those demands as well as being available to partner with others to help meet their water supply needs.

ES.3. Proposed Project

The Recovery Project will extract water banked within the District. For this purpose, the District would utilize a suite of 14 wells: nine proposed new wells and five replacement wells.

Conveyance pipes would be installed to connect new and replacement wells for the Recovery Project water delivery system. Construction activities would include excavation and trenching to install the wells, and approximately 11.9 miles of conveyance pipe. The total area of disturbance would be approximately 72 acres. The new and replacement wells would be drilled to a depth of up to 500 feet and include an 18-inch casing. Trench depths would be 5 feet for pipes up to 24 inches in diameter and 6 feet for larger pipes. Trench widths would be 3 feet for pipes up to 24 inches in diameter and 6 feet for larger pipes.

Anticipated construction activities for pipelines would begin 2023 and could be completed within 11 months. Wells will be installed as the need arises. Staging areas for the construction equipment and materials would be adjacent to the Recovery Project on previously disturbed land. Construction vehicles for the pipeline would consist of a front wheel loader, three excavators, two water trucks, backhoe, and three pickup trucks. Equipment needed for well construction would consist of a drilling rig, engine and gear drive, air compressor, backhoe, and pipe trailer.

The water pipelines will connect to the California Aqueduct at Buena Vista Turnout #8 (BV8). BV8 will be modified to convey water both to and from the Aqueduct.

The District has successfully followed a conjunctive management policy by which surface water is recharged when available and stored in the principal aquifer system for recovery by pumping in years when surface water is insufficient to meet demands. Conjunctive management within the District begins with deliveries of surface water from the Kern River and the Aqueduct with these two sources generating an average annual supply sufficient to meet District-wide demands. Thus, during years when supplies are above average, surface water is recharged, and during years when supplies are limited, recharged water is pumped as a supplemental source of supply.

A high proportion of recharge in the District takes place through seepage in District-owned facilities, including canals, laterals and recharge basins. In January 2016, the District approved construction of the Palms Project in the southern portion of the Buttonwillow Service Area. The existing Palms Project is a groundwater replenishment and water banking project that covers approximately 1,150 acres and includes features needed to apply surface water for groundwater recharge. Available water supply will continue to be recharged at the Palms Groundwater Recharge Project (Palms Project) during wet years. As stated in the Palms Project 2016 IS / Mitigated Negative Declaration (State Clearinghouse [SCH] # 2015121030), the District anticipates recharging up to 100,000 acre-feet per year (AFY) through the Palms Project when water supply is available.

This Recovery Project seeks to supplement existing landowner recovery facilities for the recovery of water banked in the District in existing facilities/projects. The District manages recovery so that no more than 90 percent of water banked is recovered. Water recovered by the District will be distributed to District water users or exchanged with other districts or sold to other industrial or municipal users. This Recovery Project may also discharge into the Aqueduct to satisfy existing and future water contracts between the District and other public water agencies.

The Recovery Project will be managed so that groundwater elevations will, in the long term, improve from those observed historically. Annual water recovery will be limited to no more than 25,000 AF. Wells will be pumped at a rate of no more than 5 cubic feet per second, and the wells selected for recovery will be selected to optimize groundwater recovery and minimize impacts to groundwater levels.

For the District to use the Aqueduct to convey the recovered groundwater, approval from the California Department of Water Resources (DWR) is required. It is DWR's policy to assist with the conveyance of water to provide a reliable water supply and to protect the SWP's water quality within the Aqueduct. In order to facilitate this policy, DWR provides an implementation process to accept non-SWP water into the Aqueduct. To do so, the District is required to submit a Pump-In Proposal (PIP) to DWR which identifies the water sources, planned operation, inflow water quality, and any anticipated impacts to SWP water quality and/or operations. The PIP will also include a water quality monitoring plan to assure that the quality of water delivered by the Recovery Project meets the requirements of the PIP.

ES.4. Project Alternatives

CEQA requires that an EIR describe and evaluate a range of reasonable alternatives to a project or to the location of a project that would feasibly attain most of the basic project objectives and avoid or substantially lessen significant project impacts (CEQA Guidelines § 15126.6). The alternatives to the Recovery Project considered in this DEIR were developed based on information gathered during the development of the proposed project and during the EIR scoping process (*see* Chapter 5 – Alternatives to the Proposed Project).

The District intends to implement the environmentally preferred alternative, the Reduced Recovery Alternative.

Alternatives Considered but Rejected from Detailed Analysis

This number of alternatives analyzed in detail was constrained in part due to the fact that alternative design elements and configurations have already been incorporated by the District as a result of findings and recommendations of technical studies conducted during the planning processes for the Recovery Project, with a goal to limit environmental impacts of the Recovery Project. The design elements and configurations initially considered are summarized below.

Landowner Recovery Alternative

The District considered an alternative groundwater recovery option to provide flexibility by allowing private pumping in lieu of surface water deliveries. Under this alternative, landowners would have the option of continuing to receive surface water deliveries through the District's canals and pipelines or to utilize on-farm wells to pump water for irrigation needs.

This delivery option would not meet the Recovery Project objectives to improve conveyance of previously stored water throughout the District and to neighboring districts. Therefore, this alternative was not evaluated in detail because it cannot feasibly attain most of the Recovery Project's objectives.

Palms Area-Only Layout

An alternative to extract banked water from wells located solely within the boundaries of the Palms Groundwater Bank was evaluated by the District. This alternative would utilize a suite of 31 wells: seven proposed, new wells; 17 existing private wells; two currently inactive wells on District property (to be rehabilitated); and five wells within the neighboring West Kern Water District (WKWD). No more than 25 of these wells would have been used for groundwater recovery in any given year. Conveyance pipes (90,000 feet) would connect new and existing wells for the Recovery Project water delivery system.

The evaluation of water quality data for wells in the Palms area found that it may not be possible to meet water quality standards for pump-in to the Aqueduct without treatment. Therefore, this alternative was not evaluated in detail because it cannot feasibly attain the Recovery Project's objective of meeting water quality standards for pump-in to the California Aqueduct by blending, if necessary.

In addition, potential impacts to groundwater levels would be greater with this alternative because groundwater recovery would be concentrated within a smaller project footprint. Therefore, this alternative was not evaluated in detail because it did not avoid or substantially lessen an identified significant adverse environmental impact of the Recovery Project.

Alternative Northeastern Area Layout

The original layout in the northeastern area of the Recovery Project included wells and pipelines immediately adjacent to bush seepweed scrub habitat that could support sensitive biological resources. In addition, the original pipeline alignment may impact a previously documented archaeological resource.

The location of wells and pipeline in the northeastern area was revised in response to these survey results. The revised project layout, which is now the proposed Recovery Project, provides a minimum buffer of 50 feet between the anticipated construction disturbance corridor and bush seepweed scrub habitat. In addition, the pipeline route was adjusted to avoid the archeological resource. Therefore, the alternative northeastern project layout was not evaluated in detail, because it did not avoid or substantially lessen an identified significant adverse environmental impact of the Recovery Project.

Alternatives Evaluated in Detail

No-Project Alternative

Under the no project alternative, the District would not construct a groundwater recovery system to recover water banked at the Palms. The District would not recover banked groundwater except with existing wells and would not have a conveyance system to deliver recovered water.

Reduced Recovery Alternative (also known as Scenario B)

As described in Chapter 3.4.3.3 – Groundwater Level Impact Analysis, two operational scenarios were simulated using the Superposition Model to assess changes in groundwater conditions. The original project description (also known as Scenario A) included an assumption of 100 percent recovery of the recharged water as a worst-case scenario with respect to groundwater level impacts. The recovery pumping occurs at a rate of 25,000 AFY over a 6-month period over 4 consecutive years. This scenario was modeled as a worst-case scenario for impact analysis purposes, actual recovery would likely extend over a longer time period.

In the Reduced Recovery Alternative (also known as Scenario B), the Recovery Project includes a leave-behind requirement that would restrict the project to recovering 90 percent of the recharged water. The simulated recovery pumping would occur at a rate of 25,000 AFY over a 6-month period over 3 consecutive years. During Year 4, the recovery pumping would occur at a rate of 15,000 AFY. The same pumping rate occurs during the first 3 months, reduced pumping occurs in the 4th month, and no pumping during the final 2 months of Year 4 of the extraction period. As described for Scenario A, this recovery schedule is anticipated to be the worst-case scenario, with actual recovery extending over a longer time period, with less impact to groundwater levels.

This is the environmentally preferred alternative and the alternative the District intends to implement.

ES.5. Summary of Environmental Impacts and Mitigation Measures

CEQA requires that the environmental analysis contained in the DEIR also include a summary of the proposed project and its consequences, including an identification of each potentially significant effect of the proposed project, the level of effect the proposed project may have, as well as any proposed mitigation measures. A full description of each of the proposed impacts and mitigation measures is found in Chapter 3.0 – Environmental Setting, Impacts, and Mitigation Measures and summarized in Chapter 6.0 – Mitigation Summary. **Table ES-1** presents a summary of environmental impacts, then presents the level of significance of each impact before mitigation, mitigation measures for significant and potentially significant impacts, and the level of significance of each impact after mitigation.

Table ES-1. Summary of Project Impacts, Mitigation Program, and Residual Effect

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
Air Quality – Project construction of more than 5 acres will generate dust and particulate emissions.	Less-than-significant	**Mitigation Measure AQ-1: District Regulation VIII Fugitive PM_{10} (particulate matter less than 10 microns in diameter) Prohibitions Best Management Practices** All projects are subject to San Joaquin Valley Air Pollution Control District (S.J.V.A.P.C.D.) rules and regulations in effect at the time of construction. Control of fugitive dust is required by S.J.V.A.P.C.D. Regulation VIII. The District shall implement or require its contractor to implement all of the following measures as identified by S.J.V.A.P.C.D.: • Apply water to unpaved surfaces and areas • Use non-toxic chemical or organic dust suppressants on unpaved roads and traffic areas • Limit or reduce vehicle speed on unpaved roads and traffic areas • Maintain areas in a stabilized condition by restricting vehicle access • Install wind barriers • During high winds, cease outdoor activities that disturb the soil • Keep bulk materials sufficiently wet when handling • Store and hand material in a three-sided structure • When storing bulk material, apply water to the surface or cover the stage pile with a tarp • Don't overload haul trucks. Overlanded trucks are likely to spill bulk materials • Cover haul trucks with a tarp or other suitable cover. Or, wet the top of the load enough to limit visible dust emissions • Clean the interior of cargo compartments on emptied haul trucks prior to leaving the site • Prevent track-out by installing a track-out control device • Clean up track-out at least once a day. If along a busy road or highway, clean up track-out immediately	Less-than-significant	During construction	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		• Monitor dust-generating actives and implement appropriate measures for maximum dust control			
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species	Potentially significant	**Mitigation Measure BIO-1: Implement Measures to Educate On-site Construction Personnel and Maintain a Minimum 50-foot No-disturbance Buffer from Blunt-nosed Leopard Lizard Habitat during Project Construction**. The District will implement the following measures to minimize potential effects on blunt-nosed leopard lizard during project construction. • Before project activities begin, all on-site project personnel shall attend a Worker Environmental Awareness Program conducted by a qualified biologist. The program shall address special-status species that could occur in the project area and include a discussion of species identification, life history, general behavior, habitat, distribution and sensitivity to human activities; state and federal legal protections; and required avoidance and minimization measures. A handout containing the information provided in the training shall be provided to all personnel. Upon completion of the training, all personnel in attendance shall sign a form stating they received the training and understand all topics discussed. • Before project activities begin east of Morris Road, temporary fencing shall be installed to create and maintain a minimum 50-foot no disturbance buffer between the construction area and bush seepweed scrub habitat that supports burrows suitable for blunt-nose leopard lizard. The fencing shall be installed at least 50 feet from suitable blunt-nose leopard lizard habitat. • A qualified biologist shall determine where fencing will be installed, conduct a pre-installation survey of the fence alignment to confirm no suitable burrows for blunt-nose leopard lizard are present in or within 50 feet of the fence alignment, and be present during all fence installation and removal to ensure that no special-status species are harmed. • All project-related construction activities, construction personnel, and vehicles shall be prohibited from the bush seepweed and	Less than significant	Before and during construction	The District and its contractors

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		50-foot no-disturbance buffer. Fencing shall be inspected and repaired, as necessary, each day before work begins adjacent to the fencing. Fencing shall be removed after all construction activities adjacent to the bush seepweed habitat are complete.			
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species	Potentially significant	**Mitigation Measure BIO-2a: Conduct Focused Surveys for Burrowing Owls and Avoid Loss of Occupied Burrows and Failure of Active Nests**. To minimize potential effects of project construction on burrowing owl, the District will ensure that the following measures are implemented, consistent with the Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game [CDFG] 2012). • A burrowing owl take avoidance survey shall be conducted within 14 days before project activities begin. • If any occupied burrows are observed, protective buffers shall be established and implemented. A qualified biologist shall monitor the occupied burrows during project activities to confirm effectiveness of the buffers. The size of the buffer will depend on type and intensity of project disturbance, presence of visual buffers, and other variables that could affect susceptibility of the owls to disturbance. If it is not feasible to implement a buffer of adequate size and it is determined, in consultation with CDFW, that passive exclusion of owls from the project site is an appropriate means of minimizing impacts, an exclusion and relocation plan shall be developed and implemented in coordination with CDFW. However, passive exclusion cannot be conducted during the breeding season (February 1–August 31), unless a qualified biologist verifies through noninvasive means that either (1) the birds have not begun egg laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival.	Less than significant	Before and during construction	The District and its contractors
Impact BIO-1: Cause a substantial adverse effect, either directly	Potentially significant	**Mitigation Measure BIO-2b: Conduct Focused Surveys for Other Nesting Special-status Birds and Implement Buffers Around Active Nests**.	Less than significant	Before and during construction	The District and its contractors

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
or through habitat modifications, on special-status species		To minimize potential effects of project construction on special-status birds other than burrowing owl, the District will ensure that the following measures are implemented: • A qualified biologist shall conduct surveys of potential Swainson's hawk nesting trees within 0.25 mile of the project site. To the extent practicable, depending on timing of project initiation, surveys will be conducted in accordance with the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee 2000). At a minimum, a survey shall be conducted within 14 days before project activities begin near suitable nest trees during the nesting season (April-August). • A qualified biologist shall conduct surveys of suitable nesting habitat for tricolored blackbird, white-tailed kite, northern harrier, and loggerhead shrike within 500 feet of project activities. Surveys shall be conducted within 14 days before project activities begin near suitable nesting habitat during the nesting season (February-August). • If any active nests are observed, protective buffers shall be established and implemented until the nests are no longer active. A qualified biologist shall monitor the nest during project activities to confirm effectiveness of the buffer. The size of the buffer will depend on type and intensity of project disturbance, presence of visual buffers, and other variables that could affect susceptibility of the nest to disturbance.			
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications,	Potentially significant	**Mitigation Measure BIO-3: Conduct Pre-Construction Surveys and Implement Measures during Construction to Minimize Potential Impacts on American Badger and San Joaquin Kit Fox**. To minimize potential effects of project construction on American badger and San Joaquin kit fix, the District will ensure that the following measures are implemented, consistent with the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox (USFWS 2011):	Less than significant	Before and during construction	The District and its contractors

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
on special-status species		• No more than 30 days before project activities begin in a given area, a qualified biologist will conduct a pre-construction survey to determine the potential for American badger or San Joaquin kit fox to occur in the area. If potential or known dens for either species are found, exclusion zones will be established and maintained, in accordance with the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox (USFWS 2011). • If project activity would occur within 50 feet of a potential den (i.e., a den that is not known to be occupied), monitoring will be conducted at the potential den for 4 consecutive days. If no badger or kit fox activity is documented, project activities can proceed. If San Joaquin kit fox activity is documented, the appropriate exclusion zone will be established and maintained, in accordance with the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox (USFWS 2011). If it is infeasible to implement the prescribed exclusion zone, USFWS will be consulted and alternative measures will be implemented to ensure impacts are adequately minimized. If American badger activity is documented during the natal denning season, an appropriate buffer shall be established by a qualified biologist and maintained until the kits are no longer dependent on the den. • To prevent entrapment during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered with plywood or similar material at the end of each workday. If the trenches cannot be closed, one or more escape ramps of no more than a 45-degree slope will be constructed of earthen fill or created with wooden planks. All covered or uncovered excavations will be inspected at the beginning, middle, and end of each day. Before trenches are filled, they will be inspected for trapped animals. If a trapped badger or kit fox is discovered, project activities will stop, and escape ramps or structures will be installed immediately to allow the animal to escape. • All construction pipes or similar structures with a diameter of 4 inches or greater that are stored on the ground at a construction			

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		site for one or more overnight periods will be thoroughly inspected for wildlife before the pipe is buried, capped, or otherwise used or moved in any way. Pipes laid in trenches overnight will be capped. If a potential San Joaquin kit fox is discovered inside a pipe, all project activities that could result in take will stop, a qualified biologist will be summoned to identify the species, and USFWS will be notified. If a San Joaquin kit fox is unable to escape voluntarily, USFWS will be contacted immediately to determine what actions should be taken to adequately minimize potential impacts. • All food-related trash items such as wrappers, cans, bottles or food scraps generated during project activities will be disposed of in closed containers and removed daily from the project site. No deliberate feeding of wildlife will be allowed, and no pets associated with project personnel will be permitted on the project site.			
Impact CUL-1: Cause a substantial adverse change in the significance of a historical resource or an archaeological resource pursuant to CCR Section 15064.5	Potentially significant	**Mitigation Measure CUL-1: Implement a Worker Environmental Awareness Program** (Program) Prior to project-related, ground-disturbing activities, the Program will be implemented which will include all construction personnel. Once the project begins, any new personnel will undergo the Program prior to beginning work. The Program will include information regarding what constitutes cultural resources, what procedures to follow if there is an inadvertent cultural resources find, who to contact if there is an inadvertent find, brief description of applicable laws, and all participants will receive a brochure summarizing the Program with appropriate contact information. The Program may be delivered either in person, remotely *via* teleconferencing, or electronic format.	Less than significant	Prior to construction activities	District
Impact CUL-1: Cause a substantial adverse change in the significance of a historical	Potentially significant	**Mitigation Measure CUL-2: Address Previously Undiscovered Historical, Archaeological, and Tribal Cultural Resources** BVWSD shall implement measures to reduce or avoid impacts on undiscovered historic properties, archaeological resources, and tribal cultural resources. If buried or previously unidentified historic properties or archaeological resources are discovered during project construction, all work within a 100-foot-radius of the find shall cease. BVWSD shall retain	Less than significant	During construction activities	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
resource or an archaeological resource pursuant to CCR Section 15064.5		a professional archaeologist meeting the Secretary of the Interior's Professional Standards for Archaeologists to assess the discovery and recommend what, if any, further treatment or investigation is necessary for the find. Interested Native American Tribes will also be contacted. Avoidance is the preferred CEQA treatment for cultural resources. If avoidance is not possible, any necessary treatment/investigation shall be developed in coordination with interested Native American Tribes providing recommendations to BVWSD and shall be completed before project activities continue in the vicinity of the find.			
Impact CUL-2: Disturb any human remains, including remains interred outside of dedicated cemeteries	Potentially significant	**Mitigation Measure CUL-3: Avoid potential effects on undiscovered burials.** If human remains are found, BVWSD will be immediately notified. The California Health and Safety Code requires that excavation be halted in the immediate area and that the county coroner be notified to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code, § 7050.5[b]). If the coroner determines that the remains are those of a Native American, the coroner must contact the Native American Heritage Commission (NAHC) by telephone within 24 hours of making that determination (Health and Safety Code, § 7050.5[c]). Once notified by the coroner, the NAHC shall identify the person determined to be the Most Likely Descendant (MLD) of the Native American remains. With permission of the legal landowner(s), the MLD may visit the site and make recommendations regarding the treatment and disposition of the human remains and any associated grave goods. This visit should be conducted within 24 hours of the MLD's notification by the NAHC (PRC § 5097.98[a]). If a satisfactory agreement for treatment of the remains cannot be reached, any of the parties may request mediation by the NAHC (PRC § 5097.94[k]). Should mediation fail, the landowner or the landowner's representative must reinter the remains and associated items with appropriate dignity on the property in a location not subject to further subsurface disturbance (PRC § 5097.98[b]).	Less than significant	During construction activities	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
Impact CUL-3: Cause a substantial adverse change in the significance of a historical resource or an archaeological resource pursuant to CCR Section 15064.5 in project areas that have not been analyzed		**Mitigation Measure CUL-4: Investigate for the presence of historical resource or an archaeological resource pursuant to CCR § 15064.5 and for the presence of human remains, including remains interred outside of dedicated cemeteries.** Prior to commencement of ground-disturbing, project-related activities, a cultural resources pedestrian survey will be conducted in all project areas that could not be accessed earlier. The records search that was originally conducted for the project covers the un-accessed areas, therefore an additional records search is not necessary. If cultural resources or human remains are identified during the pedestrian survey, then Mitigation Measures CUL-2 and CUL-3 will be implemented, as appropriate.			
Impact HYDRO-2: Violate any water quality standards or waste discharge requirements (WDRs) or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-1: Isolation aquifer zone testing or installation of nested monitoring wells will be conducted to identify aquifers with poor quality water prior to new well construction until the aquifers and water quality is better understood and then may be discontinued**.	Less than significant	During construction activities	District
Impact HYDRO-2: Violate any water quality	Potentially significant	**Mitigation Measure HYDRO-2: If needed, patches will be installed into a constructed well to improve water quality from the well.** The depth of the pump may also be modified to improve water quality.	Less than significant	During construction activities	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
standards or WDRs or otherwise substantially degrade surface or ground water quality					
Impact HYDRO-2: Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-3: To develop the Pump-In Proposal, the District will conduct water quality sampling of all the wells quarterly for 1 year.** Sampling will include Division of Drinking Water's Title 22 constituents along with DWR's "Constituents of Concern" that are not included in Title 22.	Less than significant	During construction activities	District
Impact HYDRO-2: Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-4: When water quality data becomes available on the Recovery Project's production wells (both existing and new wells), blending calculations will be updated.** The final blending scenario will be selected to ensure that the final, blended water quality, meets DWR requirements.	Less than significant	During construction activities	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
Impact HYDRO-2: Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-5: The District will follow the water quality monitoring and reporting requirements in the Pump-In Agreement with DWR.**	Less than significant	During project operations	District
Impact GEO-2: Possible Damage to or Destruction of Previously Unknown Unique Paleontological Resources during Construction-Related Activities	Potentially significant	**Mitigation Measure GEO-1: Avoid Potential Effects on Paleontological Resources.** In the event that a paleontological resource is uncovered during Recovery Project implementation, all ground-disturbing work within 165 feet of the discovery shall be halted. A qualified paleontologist shall inspect the discovery and determine whether further investigation is required. If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is “unique” under CEQA, Appendix G, part VII. The determination and associated plan for protection of the resource shall be provided to the District for review and approval. If the resource is determined not to be unique, work may commence in the area. If the resource is determined to be a unique paleontological resource, work shall remain halted, and the paleontologist shall consult with the District staff regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to paleontological resources and shall be required unless there are other equally effective methods. Other methods may be used but must ensure that the fossils are recovered, prepared, identified, catalogued, and analyzed according to current professional standards under the direction of a qualified paleontologist. All recovered fossils	Less than significant	During construction	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		shall be curated at an accredited and permanent scientific institution according to Society of Vertebrate Paleontology standard guidelines; typically, the Natural History Museum of Los Angeles County and University of California, Berkeley accept paleontological collections at no cost to the donor. Work may commence upon completion of treatment, as approved by the District.			
Impact CUM-1: Have an impact that is individually limited, but cumulatively considerable for groundwater levels	Potentially significant	**Mitigation Measure CUM-1: Recovery Project pumping will be deferred prior to groundwater levels reaching their minimum thresholds (MTs) at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD.** Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90% of the recharged amount.	Less than significant	During project operation	District
Impact CUM-2: Have an impact that is individually limited, but cumulatively considerable for subsidence		**Mitigation Measure CUM-1: Recovery Project pumping will be deferred prior to groundwater levels reaching their MTs at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD.** Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90% of the recharged amount.	Less than significant	During project operation	District

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ES.6. Known Areas of Controversy and Issues of Concern

Pursuant to § 15123(b)(2) of the CEQA Guidelines, a lead agency is required to include areas of controversies raised by agencies and the public during the public scoping process. Based on comments made during the 30-day public review period in response to information published in the NOP and IS, the following areas of controversy and issues of concern have been identified for the proposed project:

- Impacts of pumping on water levels and water quality to neighboring water district's wells
- Water quality of recharged water
- Water quality of recovered groundwater
- Risk of Project-induced subsidence
- Impacts to Sustainable Groundwater Management Act sustainability goals
- Long-term water-supply considerations

ES.7. Public Participation and Additional Steps in the CEQA Review Process

As specified in the California Code Section 21092.5(a),

> At least 10 days prior to certifying an EIR, the lead agency shall provide a written proposed response to a public agency on comments made by that agency which conform with the requirements of this division. Proposed responses shall conform with the legal standards established for responses to comments on draft EIRs. Copies of responses or the environmental document in which they are contained, prepared in conformance with other requirements of this division and the guidelines adopted pursuant to Section 21083, may be used to meet the requirements imposed by this section.

This FEIR is being distributed to the public agencies who commented on the DEIR (WKWD, Kern County Water Agency, Kern Groundwater Authority, California Department of Fish and Wildlife, and Kern Water Bank Authority) at least 10 days prior to the District's Board of Directors meeting to make a decision whether or not to approve the Project.

Copies of the FEIR can be downloaded from the District's website http://www.bvh2o.com or from the state of California's CEQANet database https://ceqanet.opr.ca.gov/Search/Advanced (SCH # 2020060315).

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1.0 Introduction

In 2016, the Buena Vista Water Storage District (BVWSD or District) constructed the Palms Groundwater Recharge Project (Palms Project), approximately 1,150 acres of groundwater recharge basins. These groundwater recharge basins have allowed for high-quality surface water to be recharged at the Palms Project during wet years when available surface water supply exceeds demand.

The District is now proposing to construct and operate the Palms Groundwater Recovery Project (Recovery Project). The Recovery Project involves the construction and replacement of a suite of 14 wells: nine proposed new wells and five replacement wells. Additionally, conveyance pipelines would be installed to connect these wells to a water delivery system. Water recovered by the District from the Recovery Project would be distributed to District water users, exchanged with other districts, and sold to industrial or municipal users.

1.1 Purpose of this EIR

The California Environmental Quality Act (CEQA) of 1970 (as amended) requires that an Environmental Impact Report (EIR) be prepared for any project to be undertaken or approved by a state or local agency that has the potential to have a direct or indirect physical change in the environment. The purpose of this Final EIR (FEIR) is to present information relevant to the regulatory settings for federal, state, and local environmental policies, describe the existing physical conditions, evaluate potential environmental impacts, and recommend a mitigation program designed to reduce or avoid identified significant adverse environmental effects that could result from implementation of the Recovery Project. An EIR is an informational document used to inform public agency decision makers and the general public of the significant environmental impacts of a project, identify possible ways to minimize the significant impacts, and describe reasonable alternatives to the Recovery Project that could feasibly attain most of the basic objectives of the project while substantially lessening or avoiding any of the significant environmental impacts. Public agencies are required to consider the information presented in the EIR when determining whether to approve a project.

CEQA requires that state, regional, and local government agencies consider the environmental impacts of projects over which they have discretionary authority before taking action on those projects (California Public Resources Code [PRC] § 21000 et seq.). CEQA also requires that each public agency avoid or reduce to less-than-significant levels, wherever feasible, the significant environmental impacts of projects it approves or implements. If a project would result in significant and unavoidable environmental impacts that cannot be fully and feasibly reduced to less-than-significant levels, the Recovery Project can still be approved, but the lead agency's decision makers must issue a "statement of overriding considerations," explaining in writing the specific economic, social, or other considerations that they believe make those significant impacts acceptable.

The CEQA Guidelines (§ 15367) identify the lead agency as the public agency that is responsible for approving and implementing a project. As both the lead agency and the project proponent, the District intends to use this FEIR to fulfill the requirements of CEQA. The EIR also can be used as an informational document by responsible and trustee agencies that may have permitting or approval authority over aspects of the Recovery Project.

In summary, the FEIR is expected to be used for the following purposes:

- To inform the public, decision-makers, elected officials and other stakeholders regarding the Recovery Project
- To disclose to the public, decision-makers, elected officials and other stakeholders the potential environmental effects associated with short-term construction and long-term operation of the Recovery Project, and to solicit input on the potential environmental effects
- To identify ways to avoid or minimize potential environmental effects of the Recovery Project and evaluate alternatives to the proposed action(s)
- To provide responsible and trustee regulatory agencies with information necessary to evaluate Recovery Project permitting requirements.

1.2 Project Background and Context

The District has successfully followed a conjunctive management policy by which surface water is recharged when available and stored in the principal aquifer system for recovery by pumping in years when surface water is insufficient to meet demands. Conjunctive management within the District begins with deliveries of surface water from the Kern River and the California Aqueduct (Aqueduct) with these two sources generating an average annual supply sufficient to meet District-wide demands. During years when supplies are above-average, surface water is recharged; during years when supplies are limited, recharged water is pumped as a supplemental source of supply.

A high proportion of recharge in the District takes place through seepage in District-owned facilities, including canals, laterals and recharge basins. In January 2016, the District approved construction of the Palms Project in the southern portion of the Buttonwillow Service Area. The Palms Project is a groundwater replenishment and water banking project that covers approximately 1,150 acres and includes features needed to apply surface water for groundwater recharge and recovery of recharged water.

An Initial Study (IS) / Mitigated Negative Declaration (SCH # 2015121030) was prepared for the Palms Project in 2015, and the Notice of Determination was filed in January 2016. Initial construction of the Palms Project was completed in 2016. The recharge ponds were subsequently enlarged and today are located within an area of approximately 1,150 acres. To date, the District has recharged approximately 27,166 AF of water in the Palms Project; 14,164 AF in 2017 and 13,002 AF in 2019. High quality water recharged at the Palms Project flows to aquifers that are sources for domestic and municipal wells providing water to residents of Taft, Tupman, and to the disadvantaged community of Buttonwillow, and replenishes groundwater under the Tule Elk Reserve.

1.3 CEQA Environmental Review Process

1.3.1 CEQA Process Overview

The basic purposes of CEQA are to: (1) inform decision makers and the public about the potential, significant adverse environmental effects of proposed governmental decisions and activities; (2) identify the ways those environmental effects can be avoided or significantly reduced; (3) prevent significant, avoidable and adverse environmental effects by requiring changes in projects through the use of alternatives or mitigation measures when feasible; and (4) disclose to the public the reasons why an implementing agency may approve a project even if significant unavoidable environmental effects are involved.

An EIR uses a multidisciplinary approach, applying social and natural sciences to make a qualitative and quantitative analysis of all the foreseeable environmental impacts that a proposed project would exert on the project site and surrounding area. As stated in CEQA Guidelines § 15151:

> An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes account of environmental consequences. An evaluation of the environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in the light of what is reasonably feasible.

1.3.2 Notice of Preparation and Public Scoping

On June 16, 2020, the District issued a Notice of Preparation (NOP) and IS for the Recovery Project (**Appendix A** of this FEIR). Under CEQA, a Lead Agency (in this case, the District) shall conduct an IS to determine if a project may have a significant effect on the environment (CEQA Guidelines § 15063[a]). If the Lead Agency determines there is substantial evidence that any aspect of the Recovery Project may cause a significant effect on the environment, the Lead Agency shall prepare an EIR, or one of the other options listed in CEQA Guidelines § 15063(b)(1). The District's IS made a determination that the Recovery Project may cause a significant effect on the environment and that an EIR would be prepared.

The NOP invited comments on the scope and content of the document and participation at a public scoping meeting. The NOP was published in the SCH of the Governor's Office of Planning and Research and was mailed to agencies and members of the public. It was also posted on the District's website (http://www.bvh2o.com). The NOP was circulated for 30 days, as mandated by CEQA. The public comment period for the NOP closed on July 17, 2020.

The District held a scoping meeting to solicit input from the community and public agencies to be considered in the selection and design of project alternatives and on the scope and content of the EIR. The meeting was held on July 2, 2020, online due to COVID-19 restrictions, from 11:00 a.m. to 12:30 p.m. Notice of the scoping meeting was provided in the NOP, which was distributed in accordance with the CEQA Guidelines (§ 15092[c]), including mailing to all potentially affected landowners and the planning departments of the counties and cities bordering Kern County (County).

Six comments letters on the NOP/IS were received by the District. **Appendix B** of this FEIR contains copies of the comments that were received on the NOP.

1.3.3 Preparation of Draft EIR

The IS found that the Recovery Project may have "potentially significant impacts" to several environmental resources. Potential impacts to aesthetics, air quality, agriculture and forestry resources, energy, hazards and hazardous materials, land use/planning, population and housing, public services, mineral resources, noise, recreation, transportation, utilities and services, and wildfire are less-than-significant, or less-than-significant with mitigation incorporated, and therefore will not be discussed in detail in this FEIR.

The following describes the environmental issues that were addressed in detail in the DEIR:

- Biological Resources – The Recovery Project area contains natural lands with native habitat that may be suitable for special-status species. The DEIR evaluated potential impacts of the Recovery Project on terrestrial special-status plant and wildlife species, sensitive habitats, mature native trees, and migratory birds.
- Cultural Resources – Based on archival records search, background studies, and pedestrian surface cultural resources survey, one prehistoric archaeological site has been recorded in the Recovery Project's vicinity. The DEIR included an evaluation of whether the site will be impacted and provides mitigation to reduce impacts.
- Geological Resources – The DEIR identified geologic conditions in the Recovery Project area and evaluates potential impacts to subsidence and paleontological resources.
- Hydrology and Water Quality – Through the use of groundwater modeling and hydrogeologic analyses, the DEIR evaluated changes in local groundwater quality, storage, and levels within the groundwater basin as a whole and their subbasins, as appropriate. The DEIR described potential impacts of recovery activities and evaluates compliance with the Groundwater Sustainability Plan (GSP) under the Sustainable Groundwater Management Act (SGMA).
- Tribal Cultural Resources – Concurrently with release of the NOP/IS, the District extended invitations to consult with Native American tribes that are traditionally and culturally affiliated with the geographic area of the Recovery Project and that have filed written request to be notified of opportunities to consult. The DEIR included a discussion of potential impacts and mitigation to these resources.
- Mandatory Findings of Significance – The Recovery Project has the potential to substantially degrade the quality of the environment, have cumulative impacts to the environment, and/or have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly. The DEIR disclosed these potential impacts and mitigation.

1.3.4 Public Review of Draft EIR

A Notice of Completion for the DEIR was filed with the SCH of the Governor's Office of Planning and Research on June 16, 2020, in accordance with the CEQA Guidelines (§ 15085) and was noticed in accordance with the CEQA Guidelines (§ 15087).

The DEIR was distributed to responsible and other potentially interested agencies, stakeholder organizations, and individuals. This distribution ensured that interested parties had an opportunity to express their views regarding the environmental impacts of the Recovery Project and ensured that information pertinent to permits and approvals is provided to decision makers and CEQA responsible and trustee agencies by the lead agency. This document was available for public review during normal business hours in the District's office, located at 525 N Main St, Buttonwillow, CA 93206 and at https://www.bvh2o.com/Projects.html.

This DEIR was distributed for a 45-day public review period that ended at (5 p.m.) on Monday, January 18, 2021.

1.3.5 Final EIR Publication and Certification

Following the close of the DEIR public review period, this FEIR was prepared. This document contains comments received on the DEIR (Chapter 7), responses to significant environmental points raised in those comments (Chapters 8 and 9), and this FEIR incorporating minor revisions to the DEIR. None of the revisions provide significant new information as no new environmental impacts are identified, there is no known increase to the severity of an impact, nor is a considerably different feasible alternative or mitigation measure identified.

As specified in the California Code Section 21092.5(a),

> At least 10 days prior to certifying an EIR, the lead agency shall provide a written proposed response to a public agency on comments made by that agency which conform with the requirements of this division. Proposed responses shall conform with the legal standards established for responses to comments on draft EIRs. Copies of responses or the environmental document in which they are contained, prepared in conformance with other requirements of this division and the guidelines adopted pursuant to Section 21083, may be used to meet the requirements imposed by this section.

This FEIR is being distributed to the public agencies who commented on the DEIR (West Kern Water District, Kern County Water Agency [KCWA], Kern Groundwater Authority [KGA], California Department of Fish and Wildlife [CDFW], and Kern Water Bank Authority [KWBA]) at least 10 days prior to the District's Board of Directors meeting to make a decision whether or not to approve the Recovery Project.

1.3.6 Mitigation Monitoring Reporting Program

CEQA requires lead agencies to, "adopt a reporting and mitigation monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment" (CEQA Guidelines § 15097). The mitigation measures, if any, adopted as part of the FEIR will be included in the Final Mitigation Monitoring and Reporting Program (MMRP) and implemented by the District.

1.4 Organization of this EIR

This FEIR is organized as follows:

- Executive Summary. Summarizes the findings and conclusions of this DEIR.
- Chapter 1 – Introduction. Provides an overview of the background of the Recovery Project, the CEQA and EIR review processes, and the organization of this FEIR.
- Chapter 2 – Project Description. Describes the project location and details of the Recovery Project, including specific features, construction methods, and operations; and summarizes the regulatory requirements, permits, and approvals that will be required to implement the Recovery Project; and lists the lead, responsible, and trustee agencies.
- Chapter 3 – Environmental Setting, Impacts, and Mitigation Measures. Includes topical sections pertinent to the Recovery Project, each of which presents a discussion of the environmental setting; regulatory background; thresholds of significance, issues not discussed further in the DEIR, and analysis methodology; environmental impact analysis (identifying beneficial impacts, no impacts, less-than-significant impacts, potentially significant impacts, and significant impacts); mitigation for potentially significant and significant impacts; impacts remaining significant after the implementation of mitigation.
- Chapter 4 – Other CEQA-Required Sections. This chapter discusses potentially significant irreversible effects and irretrievable commitments of resources, the potential for growth inducing impacts, and cumulative impacts. Additionally, this chapter considers the effects of the Recovery Project that would result in a commitment of resources and uses of the environment that could not be recovered if the Recovery Project were constructed, as well as describing the potential for unavoidable adverse impacts from the Recovery Project. Cumulative impacts are those impacts that are individually less than significant but, when considered together with related impacts of other projects in the affected area, could result in a combined effect that is significant.
- Chapter 5 – Alternatives to the Proposed Project. The purpose of the alternatives analysis is to identify ways to mitigate or avoid the significant effects a project may have on the environment; as such, this chapter begins by providing an overview of the alternative selection process. This chapter describes the alternatives to the Recovery Project and compares their relative impacts to those of the Recovery Project while considering the Project objectives and specific evaluation criteria. This chapter also provides a description of alternatives considered but rejected from further analysis, as well as, the determination of the environmentally superior alternative.
- Chapter 6 – Mitigation Summary. This chapter presents a comprehensive matrix of the mitigation program recommended within the FEIR which catalogs the potential environmental impact, level of significance, related mitigation program, and residual impact after implementation of the mitigation program along with the implementation timing and responsible party.
- Chapter 7 – Comments Received on the DEIR. This chapter includes the comment letters received by the District, with comments numbered to aid the reader in finding the response to the comments.

- Chapter 8 – Responses to Comments. This chapter includes the District's response to the comments received on the DEIR in the form of individually numbered responses.
- Chapter 9 – Master Responses to Comments. These responses are Master Responses, which address comments made by multiple parties on the same or similar topic.
- Chapter 10 – Report Preparers and Reviewers. Names the individuals who have contributed to preparation or review of this FEIR.
- Chapter 11 – References. Lists the sources of information cited throughout this FEIR.
- The appendices provide background and technical information.

1.5 Known Areas of Controversy and Issues of Concern

Pursuant to § 15123(b)(2) of the CEQA Guidelines, a lead agency is required to include areas of controversies raised by agencies and the public during the public scoping process. Based on comments made during the 30-day public review period in response to information published in the NOP/IS, the following areas of controversy and issues of concern have been identified for the proposed project:

- Impacts of pumping on water levels and water quality to neighboring districts' wells
- Protective measures for neighboring districts
- Water quality of recovered water
- Risk of Project-induced subsidence
- Impacts to SGMA sustainability goals
- Long-term water-supply considerations

1.6 Standard Terminology

This FEIR uses several standard terms as follows:

- "Recovery Project site" refers to the area of potential impact of a particular project alternative.
- "Recovery Project area" refers to the areas where the Recovery Project will be constructed, as shown in pink on **Figure 2-2**.
- The "Palms Project area" is the area where the existing Palms Recharge Project has been constructed, as shown in the hatching on **Figure 2-2**.
- "Project vicinity" generally refers to an area that is broader than the project area, encompassing all the lands that would be represented on a map depicting the project sites for any particular environmental topic (e.g., visual resources, biological resources).
- A "no impact" conclusion means no change would occur from existing conditions.
- A "less-than-significant impact" conclusion means no substantial adverse change in the physical environment would occur. (No mitigation is required.)

- A “potentially significant impact” conclusion means a substantial adverse change in the physical environment might occur. (Feasible mitigation is required if available because potentially significant impacts are treated as if they were significant impacts.)
- A “significant impact” conclusion means a substantial adverse change in the physical environment would occur. (Feasible mitigation is required if available.)
- A “significant and unavoidable impact” conclusion means a substantial adverse change in the physical environment would occur and could not feasibly be avoided or reduced to a less-than-significant level even with the implementation of all available and feasible mitigation.

2.0 Project Description

2.1 Introduction

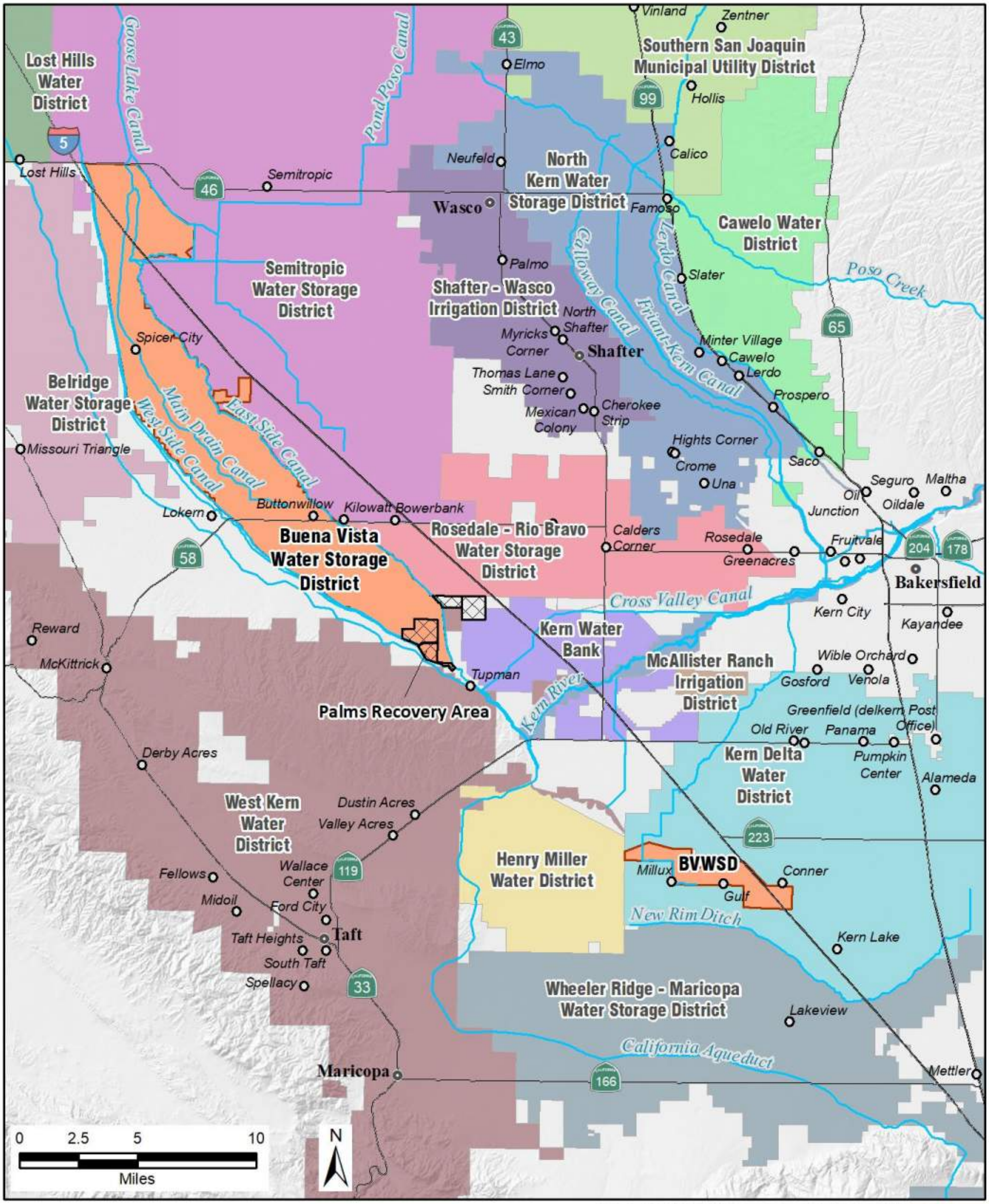
The District is located in Kern County in the southern San Joaquin Valley (Valley), approximately 16 miles west of the city of Bakersfield and encompassing the town of Buttonwillow (**Figure 2-1**). The District has a gross area of approximately 49,000 acres and lies within a portion of the lower Kern River Watershed characterized by heavy clay soils originating from former swamp and overflow lands.

The District is divided into two distinct service areas. The principal service area, known as the Buttonwillow Service Area, is situated north of the historic Buena Vista Lake. The smaller service area, lying east of the historic Buena Vista Lake, is known as the Maples Service Area.

The District has successfully followed a conjunctive management policy by which surface water is recharged when available and stored in the principal aquifer system for recovery by pumping in years when surface water is insufficient to meet demands. Conjunctive management within the District begins with deliveries of surface water from the Kern River and the Aqueduct with these two sources generating an average annual supply sufficient to meet District-wide demands. Thus, during years when supplies are above average, surface water is recharged, and during years when supplies are limited, recharged water is pumped as a supplemental source of supply.

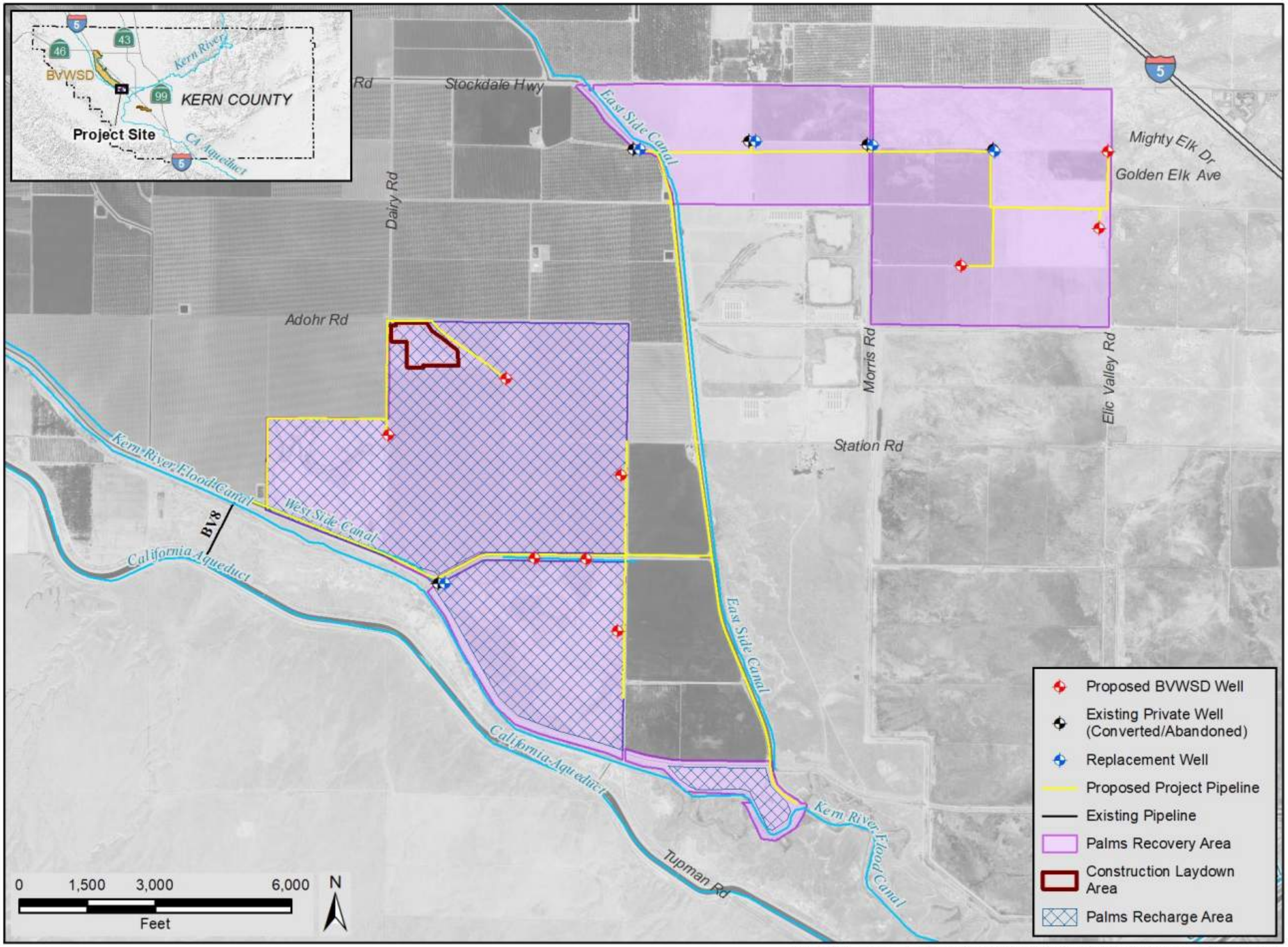
A high proportion of recharge in the District takes place through seepage in District-owned facilities, including canals, laterals and recharge basins. In January 2016, the District approved construction of the Palms Project in the southern portion of the Buttonwillow Service Area. The Palms Project is a groundwater replenishment and water banking project that covers approximately 1,150 acres and includes features needed to apply surface water for groundwater recharge (**Figure 2-2**). The general location of the Groundwater Sustainability Agencies (GSA) in the Project vicinity are shown in **Figure 2-3**.

Figure 2-1. Regional Location of the Recovery Project



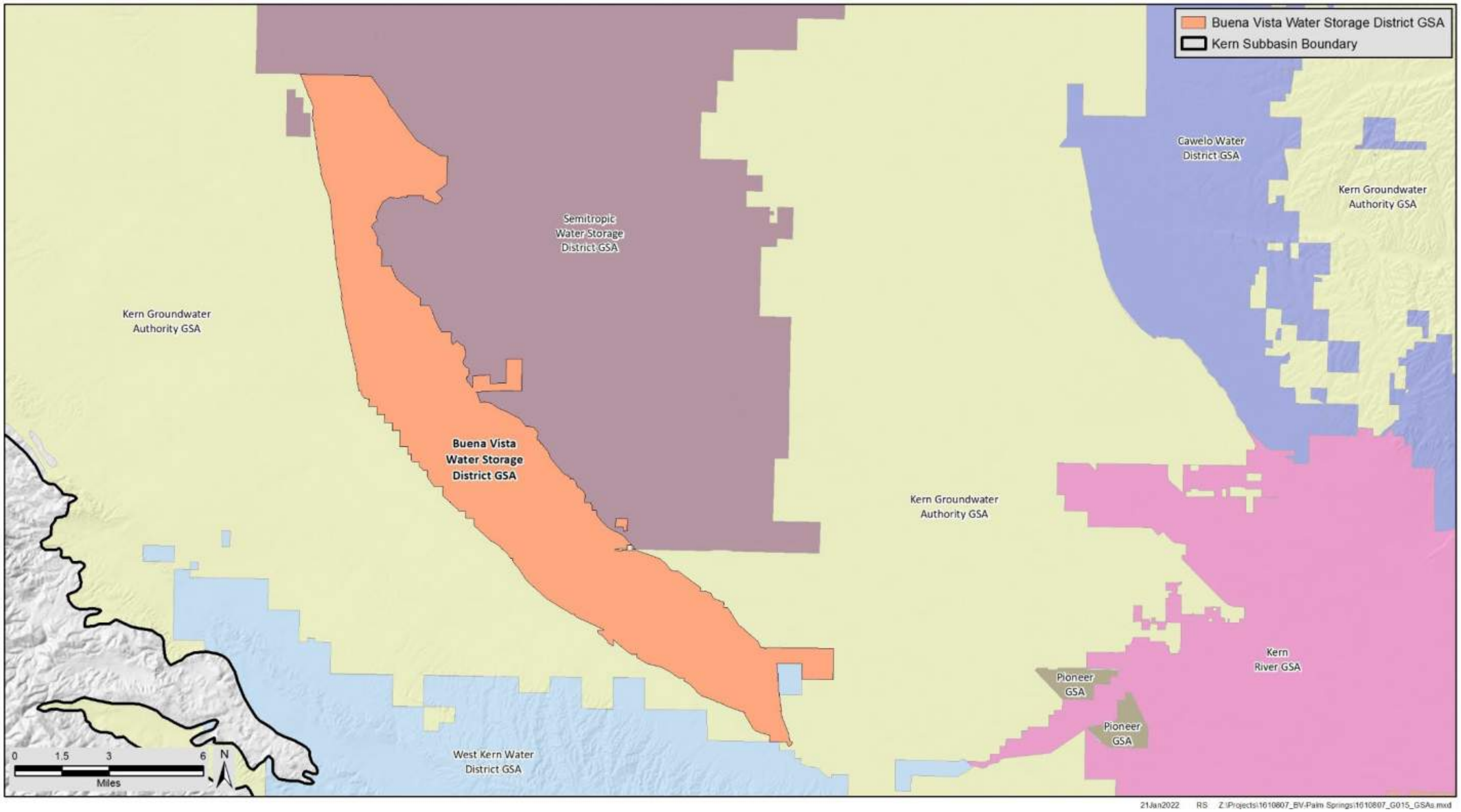
Z:\Projects\1610807_BV-Palm Springs\1610807_G016_WaterDistricts.mxd
24Jan2022 RS

Figure 2-2. Recovery Project Location



22Oct2020 RS Z:\Projects\2002532_BVWSD_Palms\2002532_G001_ProjectLocation.mxd

Figure 2-3. Groundwater Sustainability Agencies in Recovery Project Area



2.2 Goals and Objectives of the Project

CEQA Guidelines (§ 15124[b]) require that the project description contain a clear statement of the project objectives, including the underlying purpose of the project. The statement of objectives is important under CEQA in helping the lead agency (the District) to develop a range of reasonable alternatives for evaluation in the EIR. These objectives also define the underlying need for the project.

The overall purpose of the Recovery Project is to enhance groundwater management by increasing the District's ability to recover groundwater recharged in wet years and return that banked water in dry years. Additionally, enhanced groundwater management would benefit agriculture by providing irrigation water supplies in years with limited surface water supplies.

The Recovery Project has the following primary objectives:

- Increase conjunctive management on the west side of the County by improving the District's ability to meet demands during periods when supply of surface water is limited with previously banked water supplies
- Improve conveyance of previously stored water throughout the District and to neighboring districts
- Install recovery facilities to attract new banking partners in order to increase groundwater in the Kern Subbasin for District use
- Recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the Aqueduct

These objectives were important for the identification, development, selection, and consideration of the CEQA alternatives evaluated in this FEIR (*see* Chapter 5 – Alternatives to the Proposed Project).

2.2.1 Project Benefits

The Recovery Project will provide up to 25,000 AF of banked groundwater to the District's water customers in dry years, while meeting the requirements of SGMA.

2.2.2 Need for Project

The District has a gross irrigable acreage of about 50,000 acres. Currently about half the District lands are planted with permanent crops, as growers migrate away from row crops. The conversion to permanent crops may increase the water demand by 1 AF per acre. In the short term, this conversion typically reduces demand, as a pistachio tree will not reach full demand for water until about the 12th year, with the 1st year being as low as 0.25 AF per acre. The Recovery Project will allow for the highs and lows of the District's water supply to be managed in a manner that ensures full production of permanent crops regardless of the current years water supply.

With the District's Kern River Water Supply as well as its State Water Project (SWP) water supply, the District should be able to meet future demands. This Recovery Project will help in meeting those demands, as well as being available to partner with others to help meet their water supply needs.

2.3 Project Description

2.3.1 Facilities

In order to extract water banked within the District, the District would utilize a suite of 14 wells: nine proposed new wells and five replacement wells (*refer to* **Figure 2-2**).

The grouping of recovery wells is purposeful. Seven of the proposed 14 recovery wells lie within the footprint of the Palms Groundwater Recharge Project. Although this is the area where recovery activity is expected to begin, clustering all of the project's recovery capacity within this footprint would create a localized cone of depression that would jeopardize the efficiency and flexibility of the recovery program, risk violation of minimum thresholds (MTs) established by the Buena Vista Groundwater Sustainability Agency (BVGSA) and adjacent GSAs and have the potential to impact other well owners in the area.

The second group of seven recovery wells is located to the northeast of the recharge facilities. Locating half of the recovery wells in this area, not only captures the recharge water naturally moving in that direction, but also achieves the spacing between wells needed to allow efficient operation of the Recovery Project and to minimize impacts to other wells owners within the Recovery Project area and vicinity.

From an operational perspective the division of recovery facilities into the two areas, each within the same hydrological zone, enables the Recovery Project to meet its recovery objectives while minimizing impacts to other well owners. In addition, access to water of varying qualities enables the recovery project to pump from wells in the recharge area to meet the needs of uses such as agriculture. The data suggest that that wells from each section will meet the quality for pump back into the SWP. However, there are mutually exclusive characteristics of potential water quality issues, and the ability to blend the water recovered from both recovery areas provides flexibility which may be required in the future.

Conveyance pipes would be installed to connect new and replacement wells for the Recovery Project water delivery system. Construction activities would include excavation and trenching to install the wells, and approximately 11.9 miles of conveyance pipe. The total area of disturbance would be approximately 72 acres. The new and replacement wells would be drilled to a depth of up to 500 feet and include an 18-inch-diameter casing. Trench depths would be 5 feet for pipes up to 24 inches in diameter and 6 feet for larger pipes. Trench widths would be 3 feet for pipes up to 24 inches in diameter and 6 feet for larger.

Anticipated construction activities for the pipelines would begin 2023 and could be completed within 11 months. Wells will be constructed as needed. Staging areas for the construction equipment and materials would be adjacent to the Recovery Project area on previously disturbed land. Construction vehicles for the pipeline would consist of a front wheel loader, two excavators, two water trucks, backhoe, and three pickup trucks. Equipment required for well construction would consist of a drilling rig, air compressor, backhoe, and pipe trailer.

The water pipelines will connect to the California Aqueduct at the existing Buena Vista Turnout #8 (BV8). The District will work with DWR to develop a new construction, operation and maintenance agreement to convert BV8 to a bi-directional facility, that can be used to discharge water to, or withdraw water from, the Aqueduct. If needed, this work will include a hydraulic analysis to determine the potential impacts to water surface elevations in the Aqueduct.

2.3.2 Operation

Available water supply will continue to be recharged through seepage in District-owned facilities in wet years. This includes the existing Palms Project where it is anticipated that up to 100,000 AFY can be recharged. The District will also continue to recharge surface water through their canal system, a District practice for many decades.

As is the current practice, water recovered by the District is distributed to District water users, exchanged with other districts, or sold to industrial or municipal users. Recovery does not exceed 90 percent of the volume recharged. The Recovery Project will provide additional facilities to continue this practice and will also discharge into the Aqueduct to satisfy existing and future water contracts between the District and other public water agencies.

The Recovery Project will be managed so that groundwater elevations will, in the long term, improve from those observed historically without the project. Annual water recovery will be limited to no more than 25,000 AF. Wells will be pumped at a rate of no more than 5 cubic feet per second, and the wells selected for recovery will be selected to optimize groundwater recovery and minimize impacts to groundwater levels. The project recovery rate and the location of wells that will be operated at any given time will be adjusted in response to groundwater levels and other conditions and to conform with operational constraints described in the BVGSP and the mitigation measures in the Mitigation Monitoring Reporting Program.

Groundwater monitoring protocols for the District are specified in the BVGSA's Groundwater Sustainability Plan (BVGSP), Section 4.4.3.6 Monitoring Protocols, 2020. The District groundwater monitoring will include the Recovery Project wells in the groundwater monitoring program. The District intends to join the Joint Operating Committee (JOC), then those monitoring standards would be controlling for the Palms Project. The management objectives (MOs) and MTs in the recovery area are those agreed to in SGMA planning sessions with West Kern Water District [WKWD], Rosedale-Rio Bravo Water Storage District (RRBWSD), the KWBA, and the District.

For the District to use the Aqueduct to convey the recovered groundwater, approval from the California Department of Water Resources (DWR) is required. It is DWR's policy to assist with the conveyance of water to provide a reliable water supply, and to protect the SWP's water quality within the Aqueduct. In order to facilitate this policy, DWR provides an implementation process to accept non-SWP water into the Aqueduct. To do so, the District is required to submit a Pump-In Proposal (PIP) to DWR which identifies the water sources, planned operation, inflow water quality, and any anticipated impacts to SWP water quality and/or operations. The PIP will also include a water quality monitoring plan to continuously demonstrate that the water quality produced by the Project for delivery to the Aqueduct meets the standards set in the PIP.

2.3.3 Memorandum of Understanding

On October 26, 1995, the KWBA and its Member Entities (including BVWSD, RRBWSD Kern Delta Water District, Henry Miller Water District, and WKWD, as the "Adjoining Entities," entered into a Memorandum of Understanding (MOU), which provides that "…any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU…" In subsequent years, a JOC has been formed among these parties, which utilizes multiple groundwater models to assess impacts to groundwater from banking and recovery operations. Therefore, the District will either amend the existing MOU, develop a new MOU, or join the JOC, to address the operation and monitoring of the Recovery Project.

2.4 Discretionary Permits and Approvals Required

The District is required to apply for approvals from DWR to modify BV8 to a bi-directional turnout and to pump into the Aqueduct. It was built with the bi-directional concept in mind, so changes, if any, would be nominal. If necessary, the District will work with DWR to conduct a hydraulic study to determine the potential impacts to water surface elevations in the Aqueduct. If the results of that hydraulic analysis should trigger a need for additional environmental documentation, the additional environmental documents will be completed. The appropriate level of analysis will be determined at that time.

KCWA will be consulted for approval of agreements to modify BV8 and for approval of the agreements authorizing use of the Aqueduct to deliver, exchange and convey water.

2.5 Agencies Expected to Use This EIR

The CDFW is a Trustee Agency. DWR will be required to approve use of the Aqueduct as a conveyance.

3.0 Environmental Setting, Impact Analysis, and Mitigation Measures

The analysis in the June 2020 IS (**Appendix A**) concluded the Recovery Project would result in either no impact or impacts that are less-than-significant or less-than-significant with mitigation incorporated for the following topics: aesthetics, air quality, agriculture and forestry resources, energy, geology, hazards and hazardous materials, land use/planning, population and housing, public services, mineral resources, noise, recreation, transportation, utilities and services, and wildfire and therefore will not be discussed in detail in this FEIR. The analysis in the June 2020 IS (**Appendix A**) concluded the Recovery Project would result in potentially significant impacts to biological resources, cultural resources, hydrology and water quality, and cumulative impacts. These resources are discussed in detail in the following chapters. In addition, comments were received on the NOP (**Appendix B**) and on the DEIR (Section 7) expressing concern about water quality and subsidence risk. In response to those comments, water quality and geology are discussed in more detail in this FEIR.

Comments were received on the DEIR expressing concerns about air quality. The air quality analysis is updated in this FEIR Chapter 3.1.3 to utilize the Small Project Analysis Level (SPAL) for Ambient Air Quality Analysis – Combustion Exhaust Emissions published by the San Joaquin Valley Air Pollution Control District (S.J.V.A.P.C.D.). This update did not result in a change in the impact assessment conclusion in the DEIR.

This chapter describes the regulatory and environmental setting, impacts, and any mitigation measures identified, if necessary, for, Biological Resources (Chapter 3.2), Cultural Resources (Chapter 3.3), Hydrology and Water Quality (Chapter 3.4), and Geological Resources (Chapter 3.5).

3.1 Resources Dismissed from Further Analysis

Impacts dismissed in an analysis as clearly insignificant and unlikely to occur need not be discussed further in the EIR unless the Lead Agency subsequently receives information inconsistent with the finding (California Code of Regulations [CCR] § 15143). The following sections were addressed in the NOP/IS and were dismissed from further analysis in the EIR due to having less-than-significant or no impacts to the resource identified from construction of the Recovery Project. A summary of impact conclusions for each resource section dismissed from further analysis can be found below.

3.1.1 Aesthetics

There are no significant view-sheds, scenic vistas, or scenic highways located in the vicinity of the Recovery Project. The Recovery Project would be constructed in agricultural land and would consist of buried pipelines for conveying recovered water, and new well structures in an area that already contains wells. There would be little change to the visual character of the site and surrounding area. Construction equipment used onsite would not be substantially different that normal agricultural operations and would be removed from the site following construction activities. All construction activities would occur during daylight hours. There would be no impact to aesthetics.

3.1.2 Agriculture and Forestry

The Recovery Project would be implemented on the outer edges of agricultural parcels, along the established dirt roads which are primarily barren. Implementation of the Recovery Project would not convert farmland to non-farmland. The land will continue to be fallow open space, so would not conflict with existing Williamson Act contracts[1]. The Recovery Project's purpose is to benefit agriculture by providing irrigation water supplies in years with limited surface water supplies. The Recovery Project area is not forest land, timberland, or timberland zoned as Timberland Production, therefore, no loss or conversion of forest land to non-forest land would be necessary. There would be no impact to agricultural and forestry resources.

3.1.3 Air Quality

The Recovery Project is located in a predominately agricultural area; however, a residential property resides approximately 300 feet from the Recovery Project area. The Recovery Project would generate criteria pollutants from the use of gasoline and diesel-powered vehicles and equipment, and earthmoving activities. The S.J.V.A.P.C.D. has developed a screening tool, the SPAL for Ambient Air Quality Analysis – Combustion Exhaust Emissions, to assist in determining if constructing a project in S.J.V.A.P.C.D. would exceed the construction significance threshold for criteria pollutants. The screening tool uses Project type and size, and S.J.V.A.P.C.D. pre-quantified emissions to determine a size below which it is reasonable to conclude that a Project would not exceed applicable thresholds of significance for criteria pollutants (S.J.V.A.P.C.D. 2012).

SPAL levels are based on NOx emissions since NOx is the predominant combustion exhaust pollutant and would be the first pollutant to exceed the 100 pounds per day trigger for conducting an Ambient Air Quality Analysis. Projects in which total combined horsepower hours for all equipment operated on site, within a 24-hour period, is less than 18,278 horsepower hours are determined to not require an ambient air quality analysis. The proposed Recovery Project would result in a maximum of 15,920 horsepower hours within a 24-hour period, during the construction of the proposed project, which is significantly lower than the SPAL threshold (**Table 3-1**).

[1] As defined by the Kern County Agricultural Preserve Standard Uniform Rules (Form 505), compatible use on Williamson Act properties includes, "The erection, construction, alteration, operation, and maintenance of gas, electric, water, and communication utility facilities and similar public service facilities by corporations and companies under the jurisdiction of the Public Utilities Commission of the State of California and by public agencies." Because the District is a public agency that would construct, operate, and maintain the Palms Recovery Project, which is a water facility, the proposed Project is a compatible use consistent with the Williamson Act.

Table 3-1. Air Quality Small Project Analysis Level[2]

Equipment Type	Units	Estimated Hours of Use per Day for Phase	HP	Working Days Per Activity	Total Equipment Hours	hp-hr	hp-hr/ construction day
Phase 1 Mobilization							
Semi truck (equipment delivery)	5	8	402	4	160	64,320	16,080
Total Mobilization					0	**64,320**	**16,080**
Phase 2 Construction of Pipeline							
Front wheel loader	1	4	97	220	880	85,36	388
Excavator	2	6	158	220	2640	417,120	1,896
Water truck	2	4	330	220	1760	580,800	2,640
Backhoe	1	6	97	220	1320	128,040	582
Pick-up trucks	3	1	350	220	660	231,000	1,050
Pick-up trucks (worker commute)	7	0.5	350	220	770	269,500	1,225
Total Phase 2 Construction of Pipeline					0	**1,711,820**	**7,781**
Phase 2 Construction of Wells							
Engine & Gear Drive	1	8	500	42	336	168,000	4,000
Drill rig	1	8	221	140	1120	247,520	1,768
Air compressor	1	3.2	78	182	582.4	45,427	250
Backhoe	1	3.2	97	182	582.4	56,493	310
Pipe trailer	1	3.2	402	182	582.4	234,125	1,286
Pick-up trucks (worker commute)	3	0.5	350	182	273	95,550	525
Total Phase 2 Construction of Wells						**847,115**	**8,139**
Total for overlapping phases (construction of pipeline and construction of wells)						**2,558,935**	**15,920**

Notes: hp-hr = horsepower per hour

Neither the mobilization phase nor the construction phase of the Recovery Project would exceed the construction significance threshold; therefore, it would have a **less than significant** impact. Although this

[2] Horsepower was taken from California Emissions Estimator Model® or were provided by the District. Estimated hours of use per day were calculated by multiplying the usage factor (taken from the Federal Highway Administration Roadway Construction Noise Model) by the estimate hours of construction activities per day provided by the District.

impact is less than significant, mitigation measure AQ-1 is proposed to lessen any potential air quality impact during construction.

The Recovery Project would generate particulate matter (PM) from the use of construction equipment and ground disturbing activities. The Recovery Project would disturb more than 1 acre of soil, therefore, the District would be required to prepare a State Water Resources Control Board (State Water Board) National Pollutant Discharge Elimination System (N.P.D.E.S.) for general construction activity (Order 2009-0009 DWQ as amended by Order 2012-0006-DWQ), and Stormwater Pollution Prevention Program (SWPPP). Additionally, the District would need to submit a Dust Control Prevention Plan to S.J.V.A.P.C.D. Impacts related to the generation of PM are considered to be **less-than-significant** due to the relatively short duration of construction work, implementation of a Dust Control Plan, and complying with all best management practices (BMPs) established in the above-mentioned permits. However, S.J.V.A.P.C.D has established BMPs to further reduce impacts related to the generation of PM. Even though this impact is considered to be less than significant, the following mitigation measure would be implemented to incorporate S.J.V.A.P.C.D. BMPs into the Recovery Project.

Mitigation Measure AQ-1: District Regulation VIII Fugitive PM_{10} Prohibitions Best Management Practices

All projects are subject to S.J.V.A.P.C.D. rules and regulations in effect at the time of construction. Control of fugitive dust is required by S.J.V.A.P.C.D. Regulation VIII. The District shall implement or require its contractor to implement all of the following measures as identified by S.J.V.A.P.C.D.:

- Apply water to unpaved surfaces and areas
- Use non-toxic chemical or organic dust suppressants on unpaved roads and traffic areas
- Limit or reduce vehicle speed on unpaved roads and traffic areas
- Maintain areas in a stabilized condition by restricting vehicle access
- Install wind barriers
- During high winds, cease outdoor activities that disturb the soil
- Keep bulk materials sufficiently wet when handling
- Store and hand material in a three-sided structure
- When storing bulk material, apply water to the surface or cover the stage pile with a tarp
- Don’t overload haul trucks; overlanded trucks are likely to spill bulk materials
- Cover haul trucks with a tarp or other suitable cover or wet the top of the load enough to limit visible dust emissions
- Clean the interior of cargo compartments on emptied haul trucks prior to leaving the site
- Prevent track-out by installing a track-out control device
- Clean up track-out at least once a day. If along a busy road or highway, clean up track-out immediately
- Monitor dust-generating actives and implement appropriate measures for maximum dust control

Implementation of the above-mentioned mitigation measure would ensure that the Recovery Project would comply with all S.J.V.A.P.C.D. rules and regulations to reduce ambient concentrations of PM less than 10 microns in diameter (PM_{10}).

Additionally, during construction, the Recovery Project would generate odor from the use of diesel fuels that could affect the nearby residence, though this impact would be short-term and nonsignificant. During operation, the Recovery Project would consist of the operation of electrically powered pump. No odors would be generated by this use. Potential odor effects would be **less-than-significant**.

3.1.4 Energy

The Recovery Project would involve the use of diesel-fueled vehicles during constructions; however, use of these vehicles would be temporary and nonsignificant. The Recovery Project involves the installation of new, energy-efficient 250 horsepower pump motors in all proposed new wells, and replacement wells. The Recovery Project would be limited to the recovery of previously banked water at generally higher groundwater levels which would result in lower energy usage. Additionally, the County does not have a local plan for renewable energy or energy efficiency. Impacts related to energy would be **less-than-significant**.

3.1.5 Greenhouse Gas Emissions

Greenhouse gas (GHG) emissions would be generated during the construction phase of the Recovery Project. Temporary GHG emissions, primarily for the use of diesel-powered vehicles, would occur during construction. The County does not have an adopted local GHG reduction plan. Therefore, there is no conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of GHG. Impacts to GHG emissions would be **less-than-significant**.

3.1.6 Hazards and Hazardous Materials

The Recovery Project is located away from population centers, does not utilize hazardous materials, and would rely on electric power rather than liquid fuels. The nearest school is the Elk Hills Elementary School located approximately 1 mile southeast of the Recovery Project. The Recovery Project would not expose people to increased risks from wildland fire as the site is comprised entirely of farmland and are not located within a high severity fire zone. The Recovery Project would not affect emergency response plans as facilities would not interfere with traffic routes or response vehicle transport. The Elk Hills – Buttonwillow Airport is located approximately 3 miles west of the Recovery Project. The Recovery Project is not within the Elk Hills – Buttonwillow Airport Influence Area. There would be **no impact** to hazards and hazardous materials.

3.1.7 Land Use and Planning

The Recovery Project is located outside of existing communities and is consistent with existing zoning. There are no adopted Habitat Conservation Plans (HCPs), Natural Community Conservation Plans (NCCPs), other local, regional, or state habitat conservation plans within the site or vicinity. There would be **no impact** on land use and planning.

3.1.8 Mineral Resources

The Recovery Project is located in a Surface Mining Control and Reclamation Act study area. The Recovery Project is not located in areas of known significant mineral deposits. Although unlikely, there is potential for the temporary loss of access to a small amount of mineral resources, however, the amount that could be lost would be minimal and would not affect the overall availability of mineral resources in the County. The Recovery Project is not located within the vicinity of a locally important mineral resource recovery site. Impacts to mineral resources would be **less-than-significant**.

3.1.9 Noise

Construction of the Recovery Project would temporarily increase the ambient noise levels within the Recovery Project vicinity due to the use of heavy machinery during construction activities. Increase ambient noise would occur intermittently during the construction of the well. All work at the Recovery Project area would be limited to the hours identified in the County's Noise Ordinance. Ground vibration would only be caused during construction activities and would primarily occur during well drilling. Construction activities associated with the installation of all the proposed well would be short-term. No adverse levels of vibration would be generated during project operations. The Recovery Project is not within the Elk Hills – Buttonwillow Airport Influence Area, therefore, the Recovery Project would not expose people residing or working in the area to excessive noise levels. Impacts related to noise would be **less-than-significant**.

3.1.10 Population and Housing

The Recovery Project would increase the amount of water available for domestic and municipal wells that provide water to residences located within the District boundaries and the surrounding towns, as well as replenish groundwater under the Tule Elk Reserve. The Recovery Project is located in a primarily agricultural area away from population centers; therefore, the Recovery Project would not be growth inducing. The Recovery Project would not result in the development of new housing, nor would it displace people or housing. The Recovery Project would not require additional employees to operate. There would be **no impact** related to population and housing.

3.1.11 Public Services

The Recovery Project would not require new or altered government facilities, as the Recovery Project would not increase the need for public services from the existing conditions. There would be **no impact** to public services.

3.1.12 Recreation

The Recovery Project is not growth inducing and would not increase the use of existing parks or recreational facilities or require the construction or expansion of recreational facilities. There would be **no impact** to recreation.

3.1.13 Transportation

The Recovery Project would not conflict with any program plan, ordinance, or policies. Construction traffic would utilize existing public roads to deliver equipment, supplies, and workers to and from the site. The Recovery Project would not require any road closures or result in inadequate emergency access. Since no new roads are being developed, there would be no increase hazards due to a geometric design feature or incompatible uses. Therefore, impacts to transportation would be **less-than-significant**.

3.1.14 Utilities and Service Systems

No utility services would need to be constructed or expanded as a result of the Recovery Project. Additionally, the Recovery Project would not require a water supply nor would it result in a significant amount of wastewater. The Recovery Project would not create substantial amounts of solid waste, and as such would not exceed the capacity of local infrastructure. Minimal waste would be generated during construction and no increase in waste production would occur during the operation of the Recovery Project. The Recovery Project would comply with federal, state, and local management and reduction statues and regulations related to solid waste. There would be **no impact** to utilities and service systems.

3.1.15 Wildfire

The Recovery Project is located in a high severity fire zone; however, implementation of the Recovery Project would not increase the fire risk. There would not be an increase in the number of users at the site that could impair emergency response or evacuation. The Recovery Project would not require any infrastructure that would exacerbate fire risk or the risk of flooding, slope instability, or drainage changes. There would be **no impact** to wildfire.

3.2 Biological Resources

3.2.1 Environmental Setting

The discussion presented in this section is based on information from a variety of sources that address biological resources in the Recovery Project vicinity and larger region. Several biological resource databases were queried, including CDFW's California Natural Diversity Database (CNDDB) (CDFW 2020a) and the California Native Plant Society (CNPS) online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2020). A list of resources under jurisdiction of the United States Fish and Wildlife Service (USFWS) that could occur in the Recovery Project vicinity was obtained from the Information for Planning and Conservation (IPaC) (USFWS 2020a), and the USFWS online map of critical habitat for federally threatened and endangered species (USFWS 2020b) was reviewed. The Kern County General Plan (Kern County 2009) and associated Recirculated Draft Program EIR (Kern County Planning Department 2004), the First Public Draft of the Kern County Valley Floor HCP (Kern County Planning Department 2006), and Annual Wildlife Reports for the Kern Water Bank (KWB) were reviewed for information on biological resources that occur in the project vicinity and policies protecting such resources that could be applicable to the Recovery Project. Numerous additional sources of information on individual plant and wildlife species were also reviewed.

Information relating directly to the Recovery Project is based primarily on results of field surveys conducted by a GEI biologist in May 2019 and January 2020 and by McCormick Biological, Inc. in

September 2020. As recommended in the CDFW comment letter regarding the NOP, habitat suitability assessments and/or focused species surveys were conducted for special-status plants and animals in the anticipated project footprint and suitable habitat within 50 to 500 feet, depending on the species, habitat conditions, and access.

The most recent and intensive survey effort occurred in early September 2020 and included walking transects in remnant native habitat within 500 feet of the northeast portion of the Recovery Project site anticipated at the time these surveys were conducted (i.e., the Alternative Northeastern Area Layout shown in Chapter 5.6.2 – Alternative Project Layouts). Qualified biologists searched for San Joaquin (Nelson's) antelope squirrels (*Ammospermophilus nelsoni*) and physical sign (e.g., suitable burrows/dens, tail drag, tracks, scat, etc.) indicating potential presence of blunt-nosed leopard lizard (*Gambelia sila*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), giant kangaroo rat (*Dipodomys ingens*), San Joaquin kit fox (*Vulpes macrotis mutica*), and American badger (*Taxidea taxus*). Vehicle-based surveys were conducted in the remaining portions of the Recovery Project area and adjacent areas, which are dominated by existing roadways and other disturbed land cover, agricultural crops, and existing recharge areas. These surveys were conducted by slowly driving the pipeline alignments and searching for potential features (e.g., burrows and dens) associated with special-status wildlife such as San Joaquin kit fox and western burrowing owl (*Athene cunicularia*), which can occur in human-altered habitats.

The Biological Study Area discussed in this section includes the construction corridor for all pipeline routes and well sites, as well as areas within 200 feet of this anticipated disturbance footprint.

3.2.1.1 Habitats and Cover Types

Figures 3-1 through **3-3** show habitat and cover types in the Biological Study Area. These maps were developed based on field survey observations and review of Google Earth® aerial imagery.

No native vegetation assemblages occur in the anticipated areas of ground disturbance for pipeline installation or well installation, conversion, or abandonment. However, remnant areas of bush seepweed scrub occur adjacent to pipeline routes and well locations in the northeast corner of the Recovery Project site. Bush seepweed (*Suaeda moquinii*) is typically the dominant or codominant species in the shrub layer of this vegetative community. Other shrub species present include allscale (*Atriplex polycarpa*), quailbush (*Atriplex lentiformis*), spinescale (*Atriplex spinifera*) and narrowleaf goldenbush (*Ericameria linearifolia*). Herbaceous species include alkali heath (*Frankenia salina*), salt grass (*Distichlis spicata*), alkali mallow (*Malvella leprosa*), narrowleaf plantain (*Plantago lanceolata*), and Mediterranean grass (*Schismus* spp.). The Biological Study Area also includes grassland on the north side of the Kern River Flood Canal and grassland and seasonal wetland habitat in the west and south portions of the Tule Elk Reserve, including seasonally flooded portions of the Kern River Flood Canal and the Outlet Canal.

The remainder of the Biological Study Area is comprised of the Palms Project area and agricultural land actively cultivated or maintained for agricultural production. The recharge area is a mosaic of ponds and wide channels interspersed amongst mounded areas of higher ground. Vegetation is limited to nonnative ground cover in portions that are not regularly inundated. Areas in active agricultural production include orchards (pistachio and almond) and row and field crops (e.g., cotton, alfalfa, grain). Several agricultural fields were fallow when the most recent biological surveys were conducted. The Palms Project area and agricultural areas also include developed areas, such as paved and dirt roadways, agricultural buildings, rural residences, irrigation canals, and tailwater ponds. Occasional ornamental trees and shrubs are present near structures. Road shoulders, irrigation canals, and ponds are compacted, regularly maintained, and typically barren of vegetation.

3.2.1.2 Wildlife

The agricultural lands that dominate the Biological Study Area and vicinity support a relatively low diversity of wildlife species that are adapted to these managed environments. Wildlife in active agricultural areas is likely limited to common birds, reptiles, and mammals tolerant of high disturbance levels. Fallow agricultural land and recharge areas may support a slightly higher species diversity due to the reduced disturbance levels. The northeast portion of the Biological Study Area and the Tule Elk Reserve and Kern River Flood Canal in the south portion provide higher quality wildlife habitat and support a higher diversity of species, including some sensitive species, as discussed below.

3.2.1.3 Sensitive Biological Resources

Sensitive biological resources addressed in this section include those that are afforded consideration or protection under CEQA, the California Fish and Game Code (FGC), federal Endangered Species Act (ESA), California Endangered Species Act (CESA), Clean Water Act (CWA), and/or Porter-Cologne Water Quality Control Act (Porter-Cologne Act).

Special-status Species

Plants and animals addressed as special-status species in this analysis include taxa (distinct taxonomic categories or groups) that fall into any of the following categories:

- Taxa officially listed, candidates for listing, or proposed for listing by the federal government or the state of California as endangered, threatened, or rare
- Taxa that meet the criteria for listing
- Wildlife identified by CDFW as species of special concern and plant taxa considered by CDFW to be "rare, threatened, or endangered in California"
- Species listed as Fully Protected under the FGC
- Species afforded protection under local or regional planning documents

Plant taxa are assigned by CDFW to one of the following six California Rare Plant Ranks (CRPRs):

- CRPR 1A – Plants presumed to be extinct in California
- CRPR 1B – Plants that are rare, threatened, or endangered in California and elsewhere
- CRPR 2A – Plants that are presumed extirpated in California, but are more common elsewhere
- CRPR 2B – Plants that are rare, threatened, or endangered in California but more common elsewhere
- CRPR 3 – Plants about which more information is needed (a review list)
- CRPR 4 – Plants of limited distribution (a watch list)

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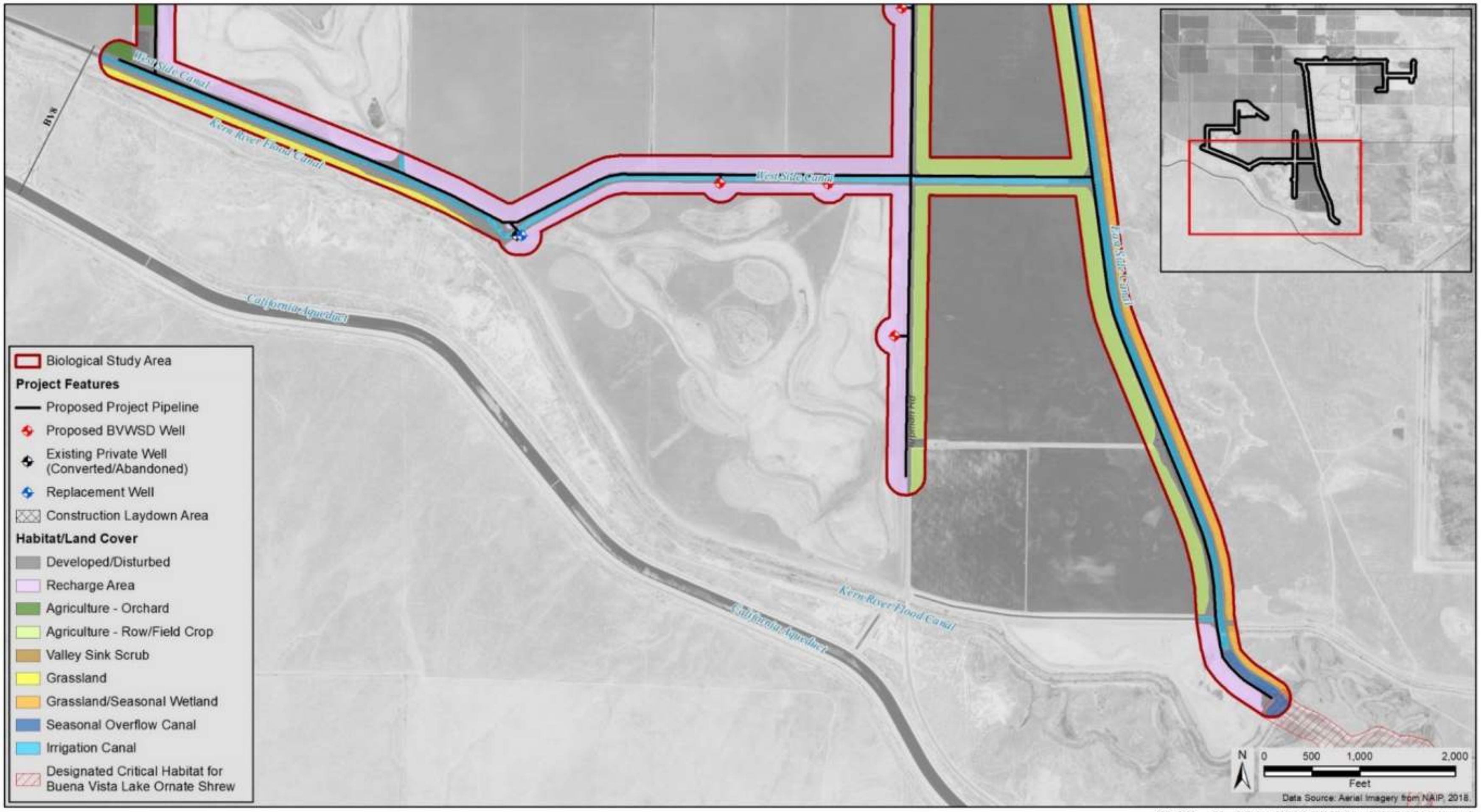
Figure 3-1. Habitat and Land Cover Types in the Biological Study Area – Map 1



Source: GEI Consultants, Inc. 2019 and 2020; file data from McCormick Biological, Inc. 2020

Figure 3-2. Habitat and Land Cover Types in the Biological Study Area – Map 2

Source: GEI Consultants, Inc. 2019 and 2020; McCormick Biological, Inc. 2020

Figure 3-3. Habitat and Land Cover Types in the Biological Study Area – Map 3

Source: GEI Consultants, Inc. 2019 and 2020; McCormick Biological, Inc. 2020

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All CRPR plants are considered "special plants" which is a broad term used by CDFW to refer to all plant taxa inventoried in the CNDDB, regardless of their legal or protection status. Plants ranked as CRPR 1 or 2 may qualify as endangered, rare, or threatened species within the definition presented in Section 15380 of the CEQA Guidelines. CDFW recommends, and local governments may require, that CRPR 1 and 2 plants be addressed in CEQA projects. In general, plants ranked as CRPR 3 and 4 do not meet the definition of endangered, rare, or threatened pursuant to CEQA Guidelines § 15380; however, these plants may be evaluated by the lead agency on a case-by-case basis when developing significance criteria under CEQA. For purposes of this analysis, special-status plants include those with a CRPR of 1 or 2.

CDFW applies the term "California species of special concern" to wildlife species that are not listed under the ESA or CESA but that are nonetheless declining at a rate that could result in listing, or that historically occurred in low numbers and are subject to current known threats to their persistence.

The CNDDB and CNPS inventory queries included the U.S. Geological Survey (USGS) East Elk Hills 7.5-minute quadrangle, within which the Recovery Project site is located, and the surrounding eight quadrangles (Lokern, Buttonwillow, Rio Bravo, West Elk Hills, Tupman, Fellows, Taft, and Mouth of Kern). Results of the CNDDB and CNPS inventory queries and the IPaC list are provided in **Appendix C**. (Note: Not all species tracked in the CNDDB and CNPS inventory and included on species lists meet the definitions of special-status species described above.)

Results of the CNDDB USGS 9-quadrangle search yielded occurrences of 18 special-status plant taxa and 19 special-status animal taxa. Twenty-two of these (7 plants; 15 animals) have been documented within 3 miles of the Recovery Project area, as shown in **Figures 3-4** and **3-5**.

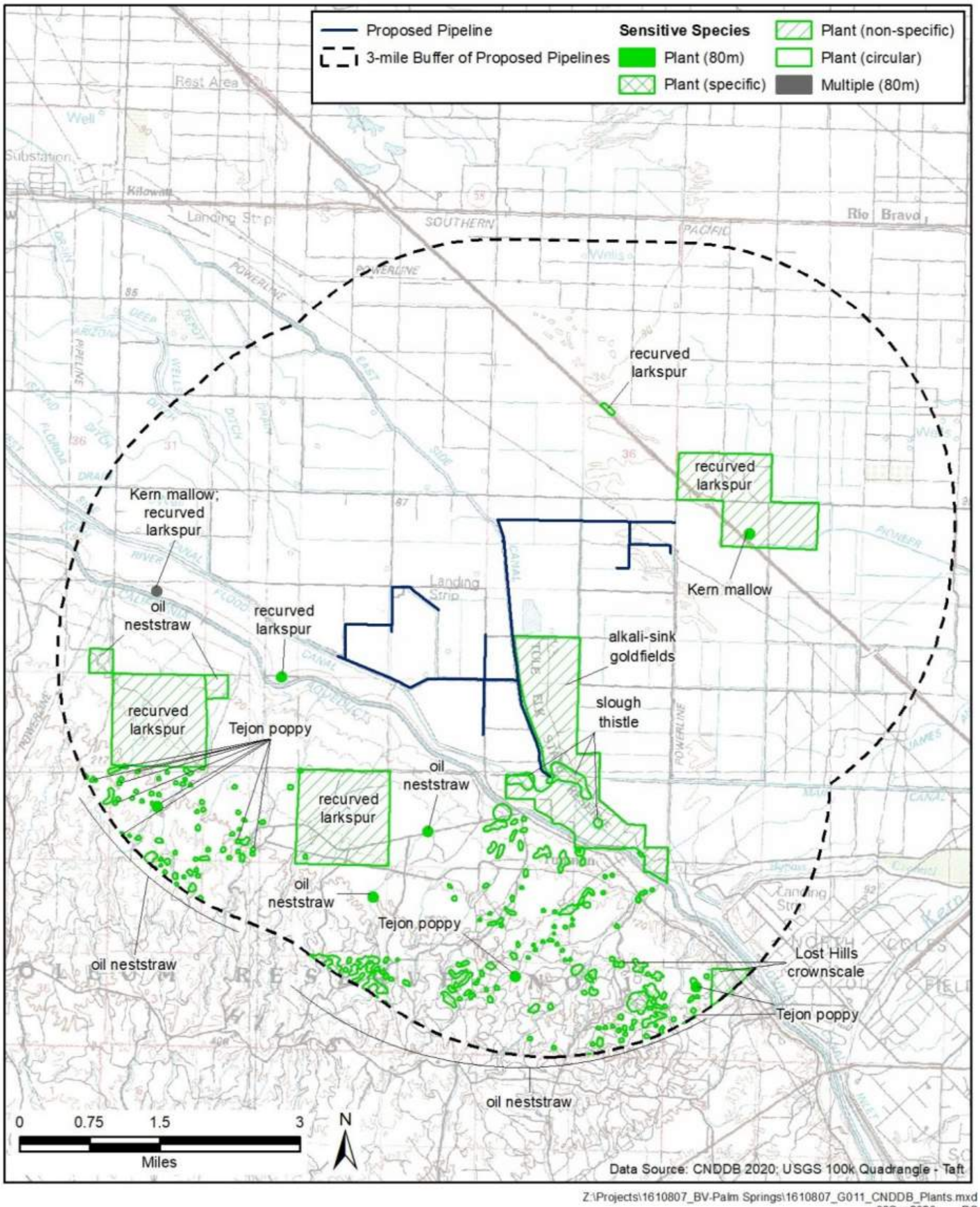
Special-Status Plants

Table 3-2 provides information on each special-status plant that was included in the CNDDB or CNPS search results and/or on the IPaC resource list. Based on observations made during field surveys, no suitable habitat for special-status plants occurs on the Recovery Project site. However, 10 special-status plant taxa were determined to have at least low potential to occur adjacent to the project site: Horn's milkvetch (*Astragalus hornii var.* hornii), heartscale (*Atriplex cordulata var. cordulata*), Earlimart orache (*Atriplex cordulata var. erecticaulis*), Lost Hills crownscale (*Atriplex cordulata var. vallicola*), lesser saltscale (*Atriplex minuscula*), subtle orache (*Atriplex subtilis*), recurved larkspur (Delphinium recurvatum), Kern mallow (*Eremalche parryi ssp. kernensis*), slough thistle (*Cirsium crassicaule*), and San Joaquin woollythreads (*Monolopia congdonii*). None of these taxa were observed during field surveys, but surveys were conducted very late in the blooming season.

All of the special-status plants determined to have potential to occur on or adjacent to the Recovery Project site are CRPR 1B plants (rare, threatened, or endangered in California and elsewhere). Slough thistle is associated with aquatic areas, such as rivers, sloughs, and marshes that support wetland and/or riparian vegetation. No such habitat occurs on the Recovery Project site, but the species has been documented in the Outlet Canal and other periodically flooded areas adjacent to the southeast end of the Recovery Project site. Horn's milkvetch also has been documented in the Outlet Canal and could occur in bush seepweed scrub adjacent to the northeast portion of the Recovery Project site. The remaining plants also could occur in bush seepweed scrub adjacent to the northeast portion of the Recovery Project site, and Horn's milkvetch, recurved larkspur, and Kern mallow have been documented at the nearby KWB. Although the

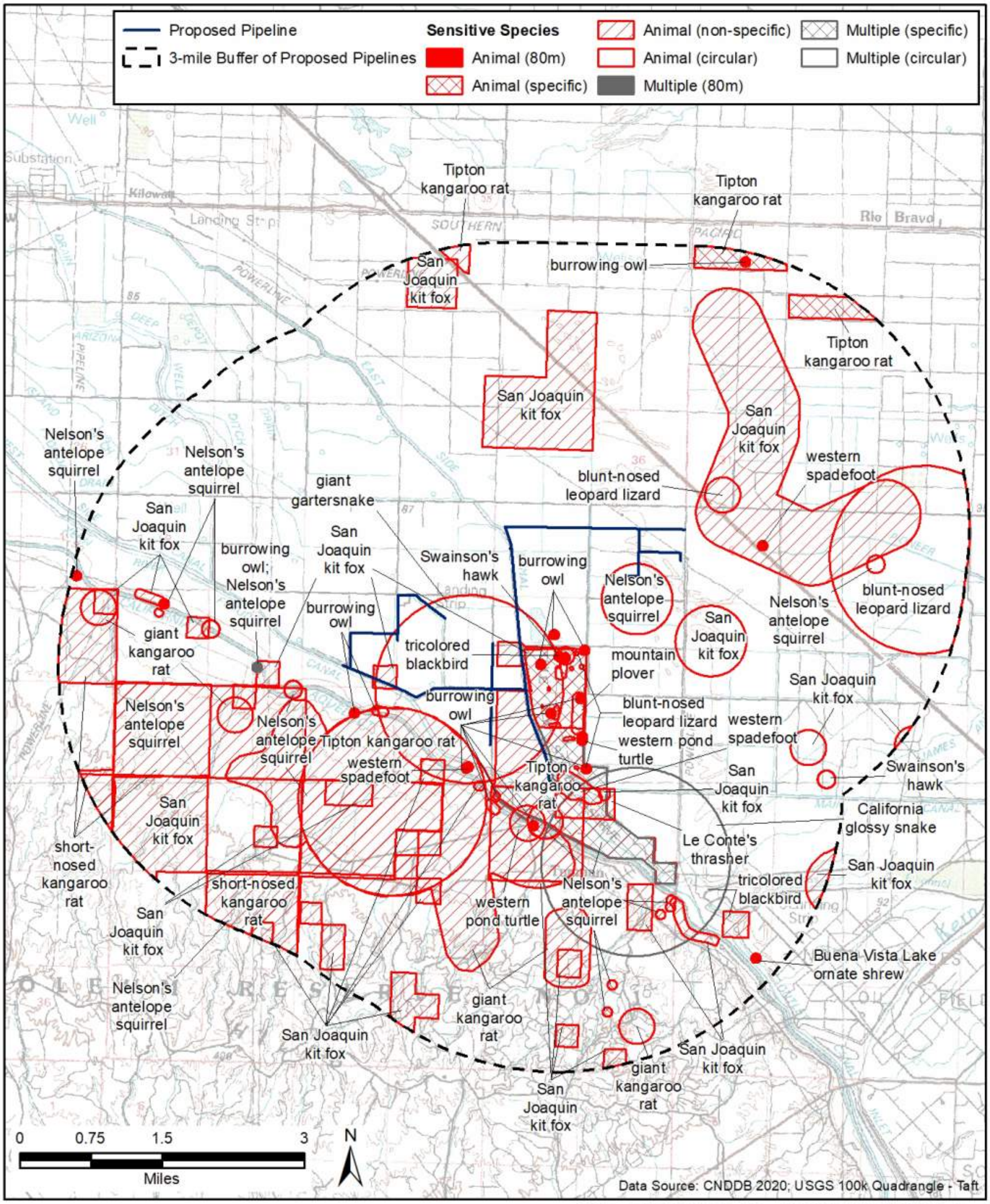
CNDDB includes an occurrence of alkali-sink goldfields (*Lasthenia chrysantha*) from the Tule Elk Reserve (CDFW 2020a), no specific information about the occurrence is available, and the Tule Elk Reserve is separated from the Recovery Project site by a maintained farm road and an irrigation canal.

Figure 3-4. California Natural Diversity Database Occurrences of Special-status Plants within 3 Miles of the Project Site



Source: CDFW 2020a

Figure 3-5. California Natural Diversity Database Occurrences of Special-status Animals within 3 Miles of the Project Site



Z:\Projects\1610807_BV-Palm Springs\1610807_G012_CNDDB_Animals.mxd
08Sep2020 RS

Source: CDFW 2020a, adapted by GEI Consultants, Inc. 2020

Table 3-2. Special-status Plants Evaluated for Potential to Occur on or Adjacent to the Project Site

Species	Blooming Period	Federal Status[1]	State Status[1]	Habitat Associations	Potential to Occur on or Adjacent to the Project Site
Horn's milkvetch *Astragalus hornii var. hornii*	May–October	Federal: No Status	State Status: 1B.1	Alkaline soils along lake margins, in meadows, seeps, and playas	Moderate; bush seepweed scrub adjacent to northeast portion of project site and the Outlet Canal and other periodically flooded areas adjacent to the south end of project site provide suitable habitat.
Heartscale *Atriplex cordulata* var. *cordulata*	April–October	Federal: No Status	State Status: 1B.2	Sandy saline or alkaline soils in chenopod scrub and valley and foothill grassland	Moderate; bush seepweed scrub adjacent to northeast portion of project site provides suitable habitat.
Earlimart orache *Atriplex cordulata* var. *erecticaulis*	August–November	Federal: No Status	State Status: 1B.2	Valley and foothill grassland	Low; bush seepweed scrub adjacent to northeast portion of project site provides suitable habitat, but the site is south of all other known populations.
Lost Hills crownscale *Atriplex coronata* var. *vallicola*	April–September	Federal: No Status	State Status: 1B.2	Sandy saline or alkaline soils in chenopod scrub, valley and foothill grassland, and vernal pools	Moderate; bush seepweed scrub adjacent to northeast portion of project site provides suitable habitat.
Lesser saltscale *Atriplex minuscula*	May–October	Federal: No Status	State Status: 1B.1	Alkaline sandy soils in chenopod scrub, valley and foothill grassland, and playas	High; known to occur in bush seepweed scrub adjacent to northeast portion of project site.
Subtle orache *Atriplex subtilis*	June–September	Federal: No Status	State Status: 1B.1	Alkaline soils in valley and foothill grassland	Moderate; bush seepweed scrub adjacent to northeast portion of project site provides suitable habitat.
California jewelflower *Caulanthus californicus*	February–May	Federal Status: E	State Status: E/1B.1	Sandy soil in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland	None; bush seepweed scrub adjacent to northeast portion of project site provides marginal habitat, but the species is considered extirpated from the San Joaquin Valley floor.
Slough thistle *Cirsium crassicaule*	February–May	Federal: No Status	State Status: 1B.1	Sloughs, riverbanks, and marshy areas in chenopod scrub, riparian scrub, and marshes and swamps	Low; Outlet Canal and other periodically flooded areas adjacent to the south end of project site provide marginally suitable habitat.
Recurved larkspur *Delphinium recurvatum*	March–June	Federal: No Status	State Status: 1B.2	Alkaline soils in chenopod scrub, cismontaine woodland, and valley and foothill grassland	Moderate; bush seepweed scrub adjacent to northeast portion of project site provides suitable habitat.

Kern mallow *Eremalche parryi* ssp. *kernensis*	January–May	Federal Status: E	State Status: 1B.2	Open sandy and clay soils, often at edge of clearings in chenopod scrub, pinyon and juniper woodland, and valley and foothill grassland	High; bush seepweed scrub adjacent to northeast portion of project site provides suitable habitat.
Temblor buckwheat *Eriogonum temblorense*	May–September	Federal: No Status	State Status: 1B.2	Valley or foothill grassland on clay or sandstone substrate	None; no suitable habitat occurs on or adjacent to the project site.
Tejon poppy *Eschscholzia lemmonii* ssp. *kernensis*	February–April	Federal: No Status	State Status: 1B.1	Chenopod scrub and valley and foothill grassland	None; project site is below the known elevation for this taxon.
Alkali-sink goldfields *Lasthenia chrysantha*	February–April	Federal: No Status	State Status: 1B.1	Alkaline soils in vernal pools and wet saline flats	None; no suitable habitat occurs on or adjacent to the project site.
Coulter's goldfields *Lasthenia glabrata* ssp. *coulteri*	February–June	Federal: No Status	State Status: 1B.1	Marshes and swamps, playas, and vernal pools	None; no suitable habitat occurs on or adjacent to the project site.
Showy golden madia *Madia radiata*	March–May	Federal: No Status	State Status: 1B.1	Cismontane woodland and valley and foothill grassland	None; no suitable habitat occurs on or adjacent to the project site.
San Joaquin woollythreads *Monolopia congdonii*	February–May	Federal Status: E	State Status: 1B.2	Sandy soils in chenopod scrub, and valley and foothill grassland	Moderate; bush seepweed scrub adjacent to northeast portion of project site provides suitable habitat.
California alkali grass *Puccinellia simplex*	March–May	Federal: No Status	State Status: 1B.2	Alkaline soils in wet areas, lake margins, meadows and seeps, vernal pools, chenopod scrub, and valley and foothill grassland	None; no suitable habitat occurs on or adjacent to the project site.
Oil neststraw *Stylocline citroleum*	March–April	Federal: No Status	State Status: 1B.1	Clay soils in chenopod scrub, coastal scrub, and valley and foothill grassland, often along drainage edges	None; no suitable habitat occurs on or adjacent to the project site.

Notes: CNDDB = California Natural Diversity Database; CRPR = California Rare Plant Rank

[1] **Status Definitions**

Legal Status

E = Listed as Endangered under the federal or state Endangered Species Act

California Rare Plant Ranks

1B = Plant species considered rare or endangered in California and elsewhere (but not legally protected under the ESA or CESA).

California Rare Plant Rank Extensions

.1 = Seriously endangered in California (greater than 80% of occurrences are threatened and/or have a high degree and immediacy of threat).

.2 = Fairly endangered in California (20-80% of occurrences are threatened and/or have a moderate degree and immediacy of threat).

Sources: CDFW 2020a; CNPS 2020; McCormick Biological, Inc. data collected in 2020; South Valley Biology Consulting 2021, USFWS 2020a

Special-Status Wildlife

Table 3-3 provides information on the special-status wildlife species that were included in the CNDDB search results or on the IPaC resource list. Several additional special-status bird species that are rarely documented in the CNDDB but whose range overlaps with the Recovery Project area were also considered. Based on observations made during field surveys and review of existing documentation, 16 special-status wildlife taxa were observed or determined to have low or moderate potential to occur on or adjacent to the Recovery Project site; these species and subspecies are discussed in more detail following the table.

Table 3-3. Special-status Fish and Wildlife Evaluated for Potential to Occur on or Adjacent to the Project Site

Species	Status: Federal	Status: State	Habitat Associations	Potential to Occur on or Adjacent to the Project Site
Fish				
Delta smelt *Hypomesus transpacificus*	T	E	Semi-anadromous; typically restricted to the Sacramento-San Joaquin River Delta and the lower Sacramento River	None; Biological Study Area is outside the range of this species.
Invertebrates				
Vernal Pool fairy shrimp *Branchinecta lynchi*	T	–	Vernal pools and seasonal wetlands, including a wide range of sizes and depths.	None; no suitable habitat occurs on or adjacent to the project site.
Crotch bumble bee *Bombus crotchii*	–	CE	Open grasslands and scrublands	Very low; Potential food plant *Asclepias fascicularis* was spaced sporadically and in low numbers in a small portion of the adjacent bush seepweed scrub, and no other known food plants were observed; no known occurrences in the San Joaquin Valley since 1970.
Amphibians				
California red-legged frog *Rana draytonii*	T	SSC	Lowlands and foothill areas, in or near permanent deep water with dense, shrubby or emergent riparian vegetation	None; Biological Study Area is outside the range of this species.
Western spadefoot *Spea hammondii*	–	SSC	Vernal pools and seasonal wetlands in grasslands and open woodlands	None; no suitable habitat occurs on or adjacent to the project site.
Reptiles				
Temblor legless lizard *Anniella alexanderae*	–	SSC	Sandy soil at the southeast base of the Temblor Ranges; likely in sparsely vegetated areas	None; Biological Study Area is outside the range of this species.
Blunt-nosed leopard lizard *Gambelia sila*	E	E, FP	Sparsely vegetated and relatively flat grasslands and alkali and desert scrub habitats	Moderate; suitable habitat occurs adjacent to the northeast corner and south end of the project site; no individuals were observed during focused surveys.
Coast horned lizard *Phrynosoma blainvillii*	–	SSC	Woodland and grassland habitats, most commonly along sandy washes with scattered low bushes	Moderate; suitable habitat occurs adjacent to the northeast corner and south end of the project site.
California glossy snake *Arizona elegans occidentalis*	–	SSC	Wide variety of habitats, including grassland and scrub, often with loose or sandy soils	Moderate; suitable habitat occurs adjacent to the northeast corner and south end of the project site.
San Joaquin coachwhip *Masticophis flagellum ruddocki*	–	SSC	Open, dry habitats with little or no tree cover, including grasslands and saltbrush scrub	Moderate; suitable habitat occurs adjacent to the northeast corner and south end of the project site.

Species	Status		Habitat Associations	Potential to Occur on or Adjacent to the Project Site
	Federal	State		
Giant gartersnake *Thamnophis gigas*	T	T	Open water and emergent vegetation in marshes, sloughs, and other aquatic habitats; also requires open upland habitat	None; Biological Study Area is outside the range of this species.
Western pond turtle *Actinemys marmorata*	–	SSC	Permanent or nearly permanent water bodies; nests in sunny uplands near suitable aquatic habitat	Very low; canals and other seasonal aquatic features in the Biological Study Area provide poor-quality, intermittent aquatic habitat.
Birds				
Western snowy plover *Charadrius alexandrinus nivosus*	T	–	Sandy beaches, salt pond levees, and shores of alkali lakes	None; no suitable habitat occurs on or adjacent to the project site.
Mountain plover *Charadrius montanus*	–	SSC	Flat areas with short vegetation and bare ground, including short grasslands, freshly plowed and sprouting fields	Very low; potentially suitable habitat occurs in uncultivated or recently planted fields, but recently documented occurrences in the region are very rare.
Fulvous whistling-duck *Dendrocygna bicolor*	–	SSC	Tule/cattail freshwater marsh	None; no suitable habitat occurs on or adjacent to the project site, and typical range does not include the Central Valley.
Burrowing owl *Athene cunicularia*	–	SSC	Nests and forages in grasslands, agricultural lands, and other open habitats with natural or artificial burrows or friable soils	Known to occur; observed in northeast and southern portions of Biological Study Area during field surveys.
Western yellow-billed cuckoo *Coccyzus americanus occidentalis*	T	E	Nests in riparian forest with developed understory; forages in riparian forest and scrub	None; no suitable habitat occurs on or adjacent to the project site.
White-tailed kite *Elanus leucurus*	–	FP	Nests in woodlands and isolated trees and forages in grasslands, pasture, and agricultural fields	Moderate; agricultural fields, recharge areas, and other uncultivated areas provide foraging habitat; ornamental trees at residences and agricultural facilities provide potential nest sites.
Swainson's hawk *Buteo swainsoni*	–	T	Nests in riparian forest and scattered trees; forages in grasslands and agricultural fields	Moderate; agricultural fields, recharge areas, and other uncultivated areas provide foraging habitat; ornamental trees at residences and agricultural facilities provide potential nest sites.
Northern harrier *Circus cyaneus*	–	SSC	Nests and forages in grasslands, field crops, and marshes; nests on the ground in patches of dense, often tall, vegetation	Moderate; agricultural fields, recharge areas, and uncultivated areas provide foraging habitat and may be suitable for nesting, depending on conditions.
Loggerhead shrike *Lanius ludovicianus*	–	SSC	Savannah, shrublands, and open woodlands with shrubs and small trees for nesting	Known to occur; observed during field surveys; potential nesting habitat occurs at residences and agricultural facilities and in northeast and southern portions of the Biological Study Area.

Species	Status		Habitat Associations	Potential to Occur on or Adjacent to the Project Site
	Federal	State		
Le Conte's thrasher *Toxostoma lecontei*	–	SSC	Dry, open scrub habitats with dense spiny vegetation	Very low; marginal quality habitat occurs in the northeast corner of Biological Study Area but lacks mature stands of common saltbush typical of this species.
Least Bell's vireo *Vireo bellii pusillus*	E	E	Structurally diverse riparian habitat with dense shrub layer	None; no suitable habitat occurs on or adjacent to the project site.
Tricolored blackbird *Agelaius tricolor*	–	T	Nests in dense cattails and tules, riparian scrub, grain crops, and other low dense vegetation; forages in grasslands and agricultural fields	Moderate; agricultural fields, recharge areas, and uncultivated areas provide foraging habitat, known to nest on Tule Elk ReserveK, but no suitable nesting habitat occurs on or adjacent to the project site.
Yellow-headed blackbird *Xanthocephalus xanthocephalus*	–	SSC	Nests in freshwater marsh with tall emergent vegetation; forages in freshwater marsh and upland habitats	Low; agricultural fields, recharge areas, and uncultivated areas provide foraging habitat; known to nest at KWB, but no suitable nesting habitat occurs on or adjacent to the project site.
Mammals				
Buena Vista Lake ornate shrew *Sorex ornatus relictus*	E	SSC	Moist soils in marsh and riparian habitat, with stumps, logs and litter for cover	Very low; has been documented along the Outlet Canal, but habitat adjacent to the south end of the project site is of very poor quality for this species.
Tulare grasshopper mouse *Onychomys torridus tularensis*	–	SSC	Dry, open scrublands	Low; suitable habitat occurs in the northeast corner of Biological Study Area, but the nearest known occurrences are approximately 6 to 10 miles southeast of the project site, at the KWB.
Giant kangaroo rat *Dipodomys ingens*	E	E	Dry grasslands and alkali scrub with sandy loam soils	Low; suitable habitat occurs in the northeast corner of Biological Study Area, and haystacks and burrows of proper size and shape were observed in this area; however, this subspecies is not known to occur at the nearby Tule Elk Reserve or KWB.
Tipton kangaroo rat *Dipodomys nitratoides nitratoides*	E	E	Saltbrush and sink scrub vegetation with soft, friable soils	Moderate; suitable habitat occurs in the northeast corner of Biological Study Area, and burrows of proper size and shape were observed in this area; known to occur at the nearby KWB and Tule Elk Reserve.
Short-nosed kangaroo rat *Dipodomys nitratoides brevinasus*	–	SSC	Grassland and shrub habitats with friable alkali soils	None; range of this subspecies is limited to west of the California Aqueduct.
Nelson's antelope squirrel *Ammospermophilus nelsoni*	–	T	Grasslands and open shrubland with gullies and washes	Very low; suitable habitat occurs in the northeast corner of Biological Study Area, but no individuals were observed during focused surveys, despite optimal temperatures for observation.

Species	Status Federal	Status State	Habitat Associations	Potential to Occur on or Adjacent to the Project Site
American badger *Taxidea taxus*	–	SSC	Dry, open areas in various habitats with friable soils and uncultivated ground	Low; suitable habitat occurs in the northeast corner of Biological Study Area; known to occur at nearby KWB, but no suitable burrows or evidence of individuals was observed during focused surveys.
San Joaquin kit fox *Vulpes macrotis mutica*	E	T	Primarily grasslands and sparsely vegetated shrublands with loose-textured soils; can also use open agricultural habitats	Moderate; suitable habitat and potential dens occur in the northeast corner of Biological Study Area; no evidence of individuals was observed during focused surveys but known to occur at the nearby KWB and Tule Elk Reserve.
Western mastiff bat *Eumops perotis californicus*	–	SSC	Various open, semi-arid to arid habitats; roosts in cliff crevices, high buildings, tunnels, and trees	Very low; potential artificial roost sites in Biological Study Area provide very poor-quality habitat.

Notes: CNDDB = California Natural Diversity Database

[1] **Status Definitions**

E = Listed as Endangered under the federal or state Endangered Species Act
T = Listed as Threatened under the federal or state Endangered Species Act
CE = Candidate for listing as Endangered under the state Endangered Species Act
FP = Fully Protected under the California Fish and Game Code
SSC = California Species of Special Concern

Sources: CDFW 2020a; GEI Consultants, Inc. data collected in 2019 and 2020; KWBA 2019; McCormick Biological, Inc. data collected in 2020; USFWS 2020a

Special-status Reptiles

Three special-status reptile taxa were determined to have potential to occur on the Recovery Project site, based on habitat conditions: blunt-nosed leopard lizard (*Gambelia sila*), California glossy snake (*Arizona elegans occidentalis*), and San Joaquin coachwhip (*Masticophis flagellum ruddocki*). Blunt-nosed leopard lizard is federally- and state-listed as endangered and is fully protected under FGC § 5050. The precise boundaries of the species' historic distribution are unknown, but it likely occupied most of the Valley and adjacent foothills. The current distribution, however, is limited to scattered undeveloped land on the Valley floor and in the foothills of the Coast Range, extending north into Merced County and south into Santa Barbara and Ventura counties (USFWS 2020c). Blunt-nosed leopard lizard occurs in sparsely vegetated alkali and desert scrub habitats and seeks cover in or under mammal burrows, shrubs, and artificial structures. The project site does not provide suitable habitat for blunt-nosed leopard lizard, but bush seepweed scrub adjacent to the northeast portion of the site and the Outlet Canal adjacent to the south end support suitable habitat. The Kern River Flood Canal and Tule Elk Reserve also provide suitable habitat, but these areas are separated from the Recovery Project site by irrigation canals and roadways. The other two special-status reptiles with potential to occur on or adjacent to the Recovery Project site are California species of special concern. These species can occur in a variety of habitats but are primarily associated with open, dry habitats including grasslands and open scrub. Suitable habitat for horned lizard, glossy snake, and coachwhip occurs adjacent to the northeast and south portions of the project site.

Special-status Birds

Six special-status bird species were observed during field surveys or have potential to occur on the Recovery Project site, based on habitat conditions: Swainson's hawk (*Buteo swainsoni*), burrowing owl (*Athene cunicularia*), northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), loggerhead shrike (*Lanius ludovicianus*), tricolored blackbird (*Agelaius tricolor*), and yellow-headed blackbird (*Xanthocephalus xanthocephalus*).

Burrowing owl is a California species of special concern that prefers open, dry habitats. In California, the species occurs throughout the Central Valley, southwestern deserts, northeastern basin, and the Carrizo Plain and other western valleys. Burrowing owl is primarily a grassland species, but it can thrive in some landscapes that are highly altered by human activity, including agricultural lands, if suitable burrows for roosting and nesting and short vegetation are present. These owls typically nest and roost in burrow systems created by medium-sized mammals or is artificial features (e.g., drainpipes and culverts) (Gervais et al. 2008). Two burrowing owls were observed in bush seepweed scrub adjacent to the northeast portion of the Recovery Project site during all field surveys conducted for the project; breeding was not confirmed, but adults were observed in January, May, and September. One burrowing owl was also observed in the recharge area adjacent to the southwest portion of the project site in September 2020. No individuals were observed on the project site, but there is limited potential for them to occur at the project laydown area and along canal and agricultural field margins.

Swainson's hawk is state listed as threatened. This species primary breeding distribution in California is the Central Valley. Kern County is at the south end of the Central Valley breeding range, and Swainson's hawk nests sparsely in this region (California Department of Fish and Game [CDFG] 2007). The CNDDB includes only 22 presumed extant active Swainson's hawk nests or nesting pairs documented since 1990 in the Central Valley portion of the County (CDFW 2020a). However, one of these locations is at the north end of the Tule Elk Reserve, approximately 0.4 mile east of the Recovery Project site, and nests regularly occur at the KWB (Sterling Wildlife Biology 2019). Swainson's hawks require grassland or other open habitat with adequate prey, in association with suitable nest trees. Suitable foraging habitats include grasslands and lightly grazed pastures, alfalfa and other hay crops, and certain grain and row crops. Few potential nest sites for Swainson's hawk occur in the project vicinity, but large ornamental trees at the project laydown area and farm residences and facilities on and near the project site provide marginally suitable nest sites, as well as trees associated with the active nest site at the Tule Elk Reserve. Suitable agricultural crops, groundwater recharge areas, and other uncultivated areas on and adjacent to the project site provide foraging habitat.

White-tailed kite is fully protected under FGC § 3511. This species occurs in virtually all lowlands of California, west of the Sierra Nevada, and in the southeast desert. White-tailed kite nests in trees in lowland grasslands, agricultural areas, wetlands, oak woodland and savanna, and riparian areas with nearby open habitats (Moore 2000). They forage in grasslands, pasture, and some agricultural crops. As with Swainson's hawk, few potential nest sites for white-tailed kite occur in the Recovery Project vicinity, but trees at the project laydown area, several farm residences and facilities on and near the project site, and the Tule Elk Reserve provide marginally suitable nest sites. Suitable agricultural crops, groundwater recharge areas, and other uncultivated areas on and adjacent to the project site provide foraging habitat.

Northern harrier is a California species of special concern that occurs primarily in lowlands of the state. The Central Valley supports most of the state's breeding birds, which nest and forage in a variety of open habitats, including marsh, wet meadows, borders of lakes, rivers, and streams, grasslands, weedy fields, and some agricultural crops. Northern harriers' nest on the ground in dense, often tall vegetation in relatively undisturbed areas (Davis and Niemla 2008). Grassland habitat adjacent to the project site in groundwater recharge areas, and near the site at the Tule Elk Reserve and the Kern River Flood Canal, provides potential nesting habitat; field crops and fallow agricultural fields also could be suitable for nesting. These areas, as well as bush seepweed scrub adjacent to the northeast portion of the project site, also provide suitable foraging habitat.

Loggerhead shrike is a California species of special concern that inhabits lowland and foothill areas with scattered shrubs and trees throughout most of California. In the Central Valley, loggerhead shrike nests in shrubs and small trees, primarily at the edges of riparian habitat (Humple 2008). Loggerhead shrike was observed in the southern portion of the Recovery Project site during field surveys. Few potential tree and shrub nest sites occur on the project site, but those at the project laydown area and farm residences and facilities on and near the project site, at the Tule Elk Reserve, along the Kern River Flood Canal, and in bush seepweed scrub provide suitable nest sites. Habitat throughout and adjacent to the project site is suitable for foraging.

Tricolored blackbird is state listed as threatened. This species is nearly endemic to California and occurs throughout the Central Valley and much of the coast south from the San Francisco Bay Area, and in isolated areas in the northeastern part of the state. Tricolored blackbirds nest colonially; they historically preferred freshwater marshes dominated by cattails or tules. However, an increasing number of colonies have been documented in Himalayan blackberry and thistles, with some of the largest recent colonies in silage and grain fields in the Valley. Preferred foraging habitats include crops such as rice, alfalfa, irrigated pastures, and ripening or cut grain fields (e.g., oats, wheat, silage), as well as annual grasslands, cattle feedlots, and dairies (Beedy 2008). Tricolored blackbirds have nested in recent years at Tule Elk Reserve (CNDDB 2021) and KWB (Sterling Wildlife Biology 2019), but no suitable nesting habitat for tricolored blackbird is currently present on or adjacent to the Recovery Project site; if grain crops are planted, these fields could provide suitable nesting habitat. Field crops and grassland habitat in recharge areas and adjacent to the project site provide suitable foraging habitat.

Yellow-headed blackbird is a California species of special concern that breeds in scattered areas throughout the state, almost exclusively in marshes with tall emergent vegetation. A substantial decline in the Valley population, compared to historic levels, has been attributed to agricultural expansion and loss of marsh habitat. Yellow-headed blackbirds are fairly numerous locally, where suitable habitat persists, but only three breeding areas are known from the County – KWB (South Valley Biology Consulting 2021), Lake Buena Vista Aquatic Recreation Area, and Kern National Wildlife Refuge (Jaramillo 2008). No suitable nesting habitat occurs on or adjacent to the Recovery Project site, but field crops and grassland habitat in recharge areas and adjacent to the project site provide suitable foraging habitat.

Special-status Mammals

Five special-status mammals were determined to have at least low potential to occur on the project site, based on survey observations and species range: Tulare grasshopper mouse (*Onychomys torridus tularensis*), giant kangaroo rat (*Dipodomys ingens*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), American badger (*Taxidea taxus*), and San Joaquin kit fox (*Vulpes macrotis mutica*).

Tulare grasshopper mouse is a California species of special concern. Formerly more widespread, this subspecies is now limited to western Kern County and portions of San Luis Obispo, Fresno, and San

Benito counties. Tulare grasshopper mouse typically occurs in arid grassland and shrubland, including bush seepweed scrub (ESRP 2020). Bush seepweed scrub adjacent to the northeast portion of the Recovery Project site and grassland along the Kern River Flood Canal and at the Tule Elk Reserve provide suitable habitat. However, the species is not known to occur at the Tule Elk Reserve, and the nearest known occurrences are approximately 6 to 10 miles southeast of the Recovery Project site, at the KWB.

Giant kangaroo rat is federally- and state-listed as endangered. Historically, this species occurred on hundreds of thousands of acres over the western slopes of the Valley and in the Tulare Basin, Carrizo Basin, and Cuyama and Panoche valleys (USFWS 2020d). Optimal habitat for giant kangaroo rat is typically annual grassland with few or no shrubs, though populations also occur in shrub communities, in loamy or sandy loam soils that do not flood (USFWS 2020d). Haystacks potentially diagnostic of this species and burrows of proper size and shape were observed during surveys of bush seepweed scrub adjacent to the northeast portion of the Recovery Project site. Grassland along the Kern River Flood Canal and at the Tule Elk Reserve also provides potentially suitable habitat. However, the species is not known to occur at the Tule Elk Reserve.

Tipton kangaroo rat is federally- and state-listed as endangered. This subspecies historically occurred in the once extensive arid plant communities of the Tulare Lake Basin on the southern Valley floor. Extant populations are limited to scattered, isolated areas of Kings, Tulare, and Kern counties, primarily associated with federal and state protected areas (USFWS 2010). Bush seepweed scrub and valley sink scrub communities provide the primary habitat for Tipton kangaroo rat. The species can also occur in terrace grasslands without woody shrubs, but sparse to moderate shrub cover is associated with populations of high density (USFWS 2010). Burrows of proper size and shape for Tipton kangaroo rat were observed in bush seepweed scrub adjacent to the northeast portion of the project site, and grassland along the Kern River Flood Canal and at the Tule Elk Reserve provide suitable habitat. This species is known to occur at the Tule Elk Reserve and the nearby KWB.

San Joaquin kit fox is federally listed as endangered and state listed as threatened. The historic range of this kit fox is thought to have extended from Contra Costa and Alameda counties in the northwest and Stanislaus County in the northeast to Kern County in the south. Although current rangewide survey data are not available, scattered data indicate kit foxes were likely distributed throughout most of the historical range through the early 2000's. However, data from northern portions of the range suggest a recent absence from that area. CNDDB data from the past decade show a concentration of occurrences in the southwest Valley (mainly Kern and Kings counties), the Carrizo Plain (San Luis Obispo County), and urban Bakersfield (Kern County). Occurrences are also regularly reported from portions of San Benito, Fresno County, and Merced counties (USFWS 2020e). Kit fox is primarily found in arid scrub communities, including bush seepweed scrub, and grassland communities. Optimal habitat is sparsely vegetated communities on gentle slopes. Kit fox can also occur in human-altered habitats, such as grazed grasslands, petroleum fields, and urban areas, and they can survive adjacent to tilled or fallow fields (USFWS 2020e). All nearby occurrences of San Joaquin kit fox documented in the CNDDB from the past 25 years are from natural habitats west and south of the Kern River Flood Canal (CDFW 2020a). Though not recorded in the CNDDB, kit fox is also regularly documented in the eastern portion of the nearby KWB (South Valley Biology Consulting 2020). No evidence of kit fox presence in the Biological Study Area was observed during focused field surveys, but burrows that provide potential dens occur in bush seepweed scrub adjacent to the northeast portion of the Recovery Project site. Potential dens also could occur in recharge areas, along the Kern River Flood Canal, and at the Tule Elk Reserve.

American badger is a California species of special concern that occurs in grassland and oak woodland. Badgers can be found in marginal habitat (e.g., agriculture, residential areas, roadsides) at the edge of intact habitat patches, but they do not appear to persist in fragmented habitat. Badger populations in California were substantially reduced in the 20th century, though they potentially continue to occur throughout most of California (Quinn 2008). Williams (1986) indicated they survive only in low numbers in peripheral parts of the Central Valley and adjacent lowlands, and a subsequent effort to compile reports of badger suggested the species range had contracted significantly and that populations may have been extirpated from the Central Valley (Quinn 2008). However, CNDDB occurrences since 1990 are scattered throughout the valley (CDFW 2020a). Most Kern County occurrences are from grassland hills west of the Aqueduct, but badger has been documented at the KWB. Potential for American badger to occur on the project site is low. No suitable burrows or sign of American badger were observed during field surveys, but bush seepweed scrub, recharge areas, the Kern River Flood Canal, and the Tule Elk Reserve adjacent to or near the project site provide suitable habitat.

Sensitive Habitats

Sensitive habitats include those that are of special concern to resource agencies or are afforded specific consideration under state and federal regulations. Sensitive habitats may be of special concern for a variety of reasons, including their locally or regionally declining status, or because they provide important habitat for special-status species.

Waters and Wetlands

Because canals and recharge areas in the Biological Study Area are used solely for irrigation delivery and groundwater recharge, respectively, and they do not have a significant connection to traditionally navigable waters, these features are not protected under the CWA. The Outlet Canal and Kern River Flood Canal are also not anticipated to qualify for protection under the CWA, because they do not meet the definition of a tributary under the Navigable Waters Protection Rule. The canals and recharge areas were excavated in uplands and do not coincide with historic rivers, streams, or lakes. However, CDFW sometimes claims jurisdiction over altered or artificial waterways, under FGC § 1602, based on the value of those waterways to fish and wildlife species. Canals and basins in the Biological Study Area also are likely to be protected under the Porter-Cologne Act.

Critical Habitat

ESA § 3(5)A defines “critical habitat” as the specific areas within the geographical area occupied by federally listed species on which are found physical or biological features essential to the conservation of the species and that may require special management considerations or protection. The northern end of Critical Habitat Unit 4 for Buena Vista Lake ornate shrew (*Sorex ornatus relictus*) is immediately adjacent to the pipeline at the southern end of the Recovery Project site.

Sensitive Natural Communities

CDFW maintains a list of sensitive natural communities (CDFW 2020b). Bush seepweed scrub, which occurs adjacent to the northeast portion of the project site, is identified as a sensitive natural community.

3.2.2 Regulatory Setting

Biological resources are subject to a variety of laws and regulations as part of the environmental review process. This section briefly describes the laws and regulations anticipated to apply to implementation of any of the project alternatives.

3.2.2.1 Federal Plans, Policies, Regulations, and Laws

Federal Endangered Species Act

Pursuant to the ESA (Title 16, § 1531 and following sections of the U.S. Code [16 USC 1531 et seq.]), USFWS and National Marine Fisheries Service have regulatory authority over species listed or proposed for federal listing as threatened or endangered and over projects that may result in take of federally listed species. In general, persons subject to the ESA (including private parties) are prohibited from "take" of endangered or threatened fish and wildlife species on private property, and from taking endangered or threatened plants in areas under federal jurisdiction or in violation of state law.

The ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." "Harass" is further defined as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, and sheltering. "Harm" is defined as an act which actually kills or injures wildlife. This may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

ESA Section 7 outlines procedures for federal interagency cooperation to protect and conserve federally listed species and designated critical habitat. ESA Section 7(a)(2) requires federal agencies to consult with USFWS to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species, or destroying or adversely modifying designated critical habitat. For projects where federal action is not involved and take of a listed species may occur, a project proponent may seek an incidental take permit under ESA Section 10(a). Section 10(a) allows USFWS to permit the incidental take of listed species if such take is accompanied by an HCP that ensures minimization and mitigation of impacts associated with the take.

Section 404 of the Clean Water Act

CWA Section 404 requires a project proponent to obtain a permit from U.S. Army Corps of Engineers (USACE) before engaging in any activity that involves discharge of dredged or fill material into waters of the U.S., including wetlands. Waters of the U.S., as codified in 33 USC 1251 et. seq. and defined in the Navigable Waters Protection Rule include: the territorial seas and waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including waters which are subject to the ebb and flow of the tide; tributaries; lakes, ponds, and impoundments of jurisdictional waters; and adjacent wetlands. Wetlands are areas that are inundated or saturated by surface water 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. During review of a project, USACE must ensure compliance with applicable federal laws, including the U.S. Environmental Protection Agency's (EPA) Section 404(b)(1) Guidelines. USACE regulations require that impacts on waters of the U.S., including wetlands, be avoided and minimized to the maximum extent practicable, and that unavoidable impacts be compensated (Title 33, § 320.4[r] of the Code of Federal Regulations [33 CFR 320.4[r]).

Section 401 Water Quality Certification

Under CWA Section 401, an applicant for a Section 404 permit must obtain a certificate from the appropriate state agency stating that the intended dredging or filling activity is consistent with the state's water quality standards and criteria. In California, the State Water Board delegates the authority to grant water quality certification to the nine Regional Water Quality Control Boards (RWQCBs); the Central Valley RWQCB has jurisdiction over the Valley.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) (16 USC, Sec. 703, Supp. I, 1989) prohibits killing, possessing, or trading migratory birds, except in accordance with regulations prescribed by the Secretary of the Interior. This act encompasses whole birds, parts of birds, bird nests, and eggs and applies to all persons and agencies in the U.S., including federal agencies. The MBTA is administered by the USFWS, but there is no process for obtaining project-related take authorization under the MBTA.

3.2.2.2 State Plans, Policies, Regulations, Laws

California Endangered Species Act

CESA (FGC 2050 et seq.) directs state agencies not to approve projects that would jeopardize the continued existence of an endangered or threatened species or result in the destruction or adverse modification of habitat essential to the continued existence of a species. Furthermore, CESA states that CDFW, together with the Recovery Project proponent and any state lead agency, must develop reasonable and prudent alternatives consistent with conserving the species, while maintaining the project purpose to the greatest extent possible. Take of state-listed species incidental to otherwise lawful activities requires a permit, pursuant to Section 2081(b) of CESA. Project-related impacts of the authorized take must be minimized, and fully mitigated, and adequate funding must be in place to implement mitigation measures and monitor compliance and effectiveness. Mitigation can include land acquisition, permanent protection and management, and/or funding in perpetuity of compensatory lands.

As under federal law, listed plants have considerably less protection than fish and wildlife under state law. The California Native Plant Protection Act (FGC § 19000 et seq.) allows landowners to take listed plant species from, among other places, a canal, lateral ditch, building site, or road, or other right-of-way, provided that the owner first notifies CDFW and gives the agency at least 10 days to retrieve (and presumably replant) the plants before they are destroyed.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act (California Water Code § 13000 et seq.) requires that each of the state's nine RWQCBs prepare and periodically update basin plans for water quality control. Each basin plan sets forth water quality standards for surface water and groundwater and actions to control nonpoint and point sources of pollution to achieve and maintain these standards. Basin plans offer an opportunity to protect wetlands through the establishment of water quality objectives. RWQCB jurisdiction includes federally protected waters and areas that meet the definition of "waters of the state." Waters of the state is defined as any surface water or groundwater, including saline waters, within the state's boundaries. The RWQCB has the discretion to take jurisdiction over areas not federally regulated under CWA Section 401, provided they meet the definition of waters of the state. Mitigation requiring no net loss of wetlands functions and values of waters of the state is typically required by the RWQCB.

California Fish and Game Code

Rivers, Lakes, and Streams
Under FGC Section 1602, it is unlawful for any entity to substantially divert or obstruct the natural flow of or substantially change or use any material from the bed, channel, or bank of, any river, stream, or lake, or to deposit or dispose of debris, waste, or other material where it may pass into any river, stream, or lake, without first notifying CDFW of such activity and obtaining an agreement authorizing the activity. In practice, CDFW may exert authority over any feature that holds water at least periodically or intermittently, and associated habitat (e.g., riparian vegetation), that supports fish, other aquatic life, or terrestrial wildlife.

Fully Protected Species
FGC Sections 3511, 4700, 5050, and 5515 provide protection from take for 37 fish and wildlife species referred to as fully protected species. Except for take related to scientific research or incidental take authorized as part of an approved NCCP, take of fully protected species is prohibited.

Protection of Birds
FGC Section 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird. Section 3503.5 states that it is unlawful to take, possess, or destroy any raptors (i.e., species in the orders Falconiformes and Strigiformes), including their nests or eggs.

3.2.2.3 Regional and Local Plans, Policies, Regulations, and Ordinances

The Land Use, Open Space, and Conservation Element of the Kern County General Plan (2009) includes the goal and associated policies designed to preserve natural resources, primarily threatened and endangered species, listed below:

GOAL GP-1: Ensure that the County can accommodate anticipated future growth and development while maintaining a safe and healthful environment and a prosperous economy by preserving valuable natural resources, guiding development away from hazardous areas, and assuring the provision of adequate public services.

- **Policy GP 1.10.5-27.** Threatened or endangered plant and wildlife species should be protected in accordance with state and federal laws.
- **Policy GP 1.10.5-28.** The County should work closely with state and federal agencies to assure that discretionary projects avoid or minimize impacts to fish, wildlife, and botanical resources.
- **Policy GP 1.10.5-29.** The County will seek cooperative efforts with local, state, and federal agencies to protect listed threatened and endangered plant and wildlife species through the use of conservation plans and other methods promoting management and conservation of habitat lands.

- **Policy GP 1.10.5-30.** The County will promote public awareness of endangered species laws to help educate property owners and the development community of local, state, and federal programs concerning endangered species conservation issues.
- **Policy GP 1.10.5-32.** Riparian areas will be managed in accordance with USACE, and California Department of Fish and Game (now CDFW) rules and regulations to enhance the drainage, flood control, biological, recreational, and other beneficial uses while acknowledging existing land use patterns.
- **Policy GP 1.10.10-65.** Oak woodlands and large oak trees shall be protected where possible and incorporated into project developments.
- **Policy GP 1.10.10-66.** Promote the conservation of oak tree woodlands for their environmental value and scenic beauty.

3.2.3 Environmental Impacts and Mitigation Measures

3.2.3.1 Thresholds of Significance

Significance criteria are based on Appendix G of the CEQA Guidelines. The proposed project would have a significant impact on biological resources if implementing the alternative would have one of the following:

- 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 CDFW or USFWS
- A substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations, or by CDFW or USFWS
- A substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of nursery sites by native wildlife
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance
- Conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP
- Substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; or substantially reduce the number or restrict the range of an endangered, rare, or threatened species.

3.2.3.2 Issues Not Discussed Further

The Kern County General Plan (2009), which is currently being updated, includes several policies and implementation measures designed to protect and conserve threatened and endangered species and oak trees (Kern County Planning Department 2004). No oak trees are present onsite. The General Plan requires discretionary projects to consider effects to biological resources and wildlife agency comments during the CEQA process; this is consistent with the CEQA process being implemented by the District for the Recovery Project. Therefore, implementing the project would not conflict with any local policies or ordinances protecting biological resources and this topic is not discussed further in this analysis.

The Recovery Project is outside the plan areas for the adopted Metropolitan Bakersfield Habitat Conservation Plan area and the Bakersfield Habitat Conservation Plan, in the later stages of development, and would not impact successful implementation of either of these plans. The Recovery Project is, however, within the area intended to be covered by the Kern County Valley Floor Habitat Conservation Plan. A draft of this plan was issued more than a decade ago (Kern County Planning Department 2006), but a final plan has not been released. Because it has not been adopted, the Kern County Valley Floor HCP does not be evaluated under CEQA. However, it is described and considered here for informational purposes only. The majority of the Recovery Project is within the "White Zone" identified in the draft HCP; this zone is of lower conservation concern and not identified for acquisition of preserve areas. A small portion of the Recovery Project site is within the "Green Zone," which is defined as habitat of moderate importance for conservation purposes. Implementing the Recovery Project is unlikely to impact the conservation value of lands in the Green Zone and would not conflict with any provisions, guidelines, goals, or objectives related to biological resources anticipated to be included in a potential final and adopted version of this HCP. Therefore, issue is not discussed further in this analysis.

Chapter 3.2.1 – Environmental Setting, discusses the special-status plants and animals evaluated in this analysis, and **Tables 3-2** and **3-3** summarize the potential for each of them to occur in the Biological Study Area. Although a comprehensive list of special-status species was considered and evaluated, the impact analysis focuses on resources with reasonable potential to be impacted by the Recovery Project. Therefore, special-status species determined to be unlikely to occur in the Recovery Project area (because of marginal habitat suitability and/or lack of occurrence records in the project vicinity) are not addressed further in this analysis. Additionally, special-status birds that would not nest in the project study area, but could occur occasionally or seasonally, are not expected to be impacted by project implementation and are not discussed further in this analysis.

Implementing the Recovery Project could adversely impact birds, if construction occurs during the nesting season. Loss of active nests of species that are not considered to have special status would not substantially reduce their abundance or cause them to drop below self-sustaining levels. Therefore, potential impacts on common migratory birds would not alone constitute a significant impact under CEQA, and this issue is not discussed further in this analysis. However, the District acknowledges that it is responsible for ensuring project implementation does not violate the MBTA or FGC.

As indicated in Chapter 2 – Project Description, the Recovery Project would be managed to improve groundwater elevations in the long term by recharging more water than is recovered. Based on this management principal, and the location of project facilities within existing disturbed corridors and agricultural lands, project operation is not anticipated to impact biological resources and is not discussed further in this analysis. Therefore, the impact analysis presented below focuses of project construction.

3.2.3.3 Analysis Methodology

The analysis of effects on biological resources from implementing the Recovery Project is based on current habitat types and conditions in the Biological Study Area and status of special-status species in the Recovery Project vicinity. The potential for loss of sensitive habitats, and effects on special-status species that could result from habitat loss, were evaluated based on observations made during fields surveys. Potential indirect effects on resources adjacent to the area of direct disturbance also were considered.

Impact significance was determined by evaluating the nature of the impact and characteristics of the habitat or species potentially affected, within the context of significance criteria listed above. It was assumed, for purposes of this analysis, that all habitats and cover types within the anticipated construction footprint could be directly removed. As indicated in Chapter 2 – Project Description, direct project disturbance would be limited to an approximately 50-foot-wide corridor along pipeline alignments and less than an acre at each well installation/conversion/abandonment location. In addition, disturbance corridors would be confined to existing roadways, roadway shoulders, agricultural lands, and other previously disturbed areas. Therefore, the previously undisturbed remnant area of bush seepweed scrub in the northeast corner of the Biological Study Area and portions of the Tule Elk Reserve, Kern River Flood Canal, and Outlet Canal near the project site boundaries would not be directly impacted.

3.2.3.4 Impact Analysis

Impact BIO-1: ***Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species:***

*Suitable habitat for special-status plants would not be disturbed by project construction, and **no impact** on special-status plants would occur. Special-status wildlife, including reptiles, birds, and mammals could be substantially adversely affected by construction activities. This would be a **potentially significant** impact.*

Special-status Plants

The Recovery Project area does not provide suitable habitat for special-status plants, but marginally suitable habitat for six special-status plants occurs adjacent to the site. Horn’s milkvetch, heartscale, Lost Hills crownscale, lesser saltscale, recurved larkspur, and Kern mallow have some potential to occur in bush seepweed scrub adjacent to the northeast portion of the Recovery Project site; Horn’s milkvetch and slough thistle could occur in seasonally flooded wetlands adjacent to the south portion of the site. However, the area of construction disturbance would be limited to agricultural fields, existing roadways, and other developed/disturbed areas. Pipelines and new and replacement wells in the northeast portion of the project site were placed specifically to provide a minimum 50-foot buffer between the disturbance area and nearby bush seepweed scrub habitat. Similarly, ground disturbance in the southern portion of the site would be limited to disturbed upland areas and is not anticipated to occur within 50 feet of potentially suitable habitat for slough thistle. Therefore, the proposed project would have no impact on special-status plants.

Mitigation Measure: No mitigation is required.

Special-status Reptiles

The Recovery Project area does not provide suitable habitat for special-status reptiles, but suitable habitat for blunt-nosed leopard lizard, coast horned lizard, California glossy snake, and San Joaquin coachwhip occurs adjacent to the northeast portion of the site. These species are unlikely to occur in the area of construction disturbance, which is at least 50 feet from areas of suitable habitat. However, because these species are mobile, potential for them to wander onto the project site cannot be entirely ruled out. If individuals occur in the construction area, they would be vulnerable to injury or death from project activities. Based on the distance between the disturbance area and suitable habitat, few, if any, individuals of these species would be affected. This is unlikely to have a substantial adverse effect on coast horned lizard, California glossy snake, or San Joaquin coachwhip populations. However, because of the endangered and fully protected status of blunt-nosed leopard lizard, injury or death of even one individual would be considered a substantial adverse effect. Therefore, this impact would be **potentially significant**.

Mitigation Measure BIO-1: Implement Measures to Educate On-site Construction Personnel and Maintain a Minimum 50-foot No-disturbance Buffer from Blunt-nosed Leopard Lizard Habitat during Project Construction.

The District will implement the following measures to minimize potential effects on blunt-nosed leopard lizard during project construction.

- Before project activities begin, all on-site project personnel shall attend a Worker Environmental Awareness Program (Program) conducted by a qualified biologist. The program shall address special-status species that could occur in the project area and include a discussion of species identification, life history, general behavior, habitat, distribution and sensitivity to human activities; state and federal legal protections; and required avoidance and minimization measures. A handout containing the information provided in the training shall be provided to all personnel. Upon completion of the training, all personnel in attendance shall sign a form stating they received the training and understand all topics discussed.
- Before project activities begin east of Morris Road, temporary fencing shall be installed to create and maintain a minimum 50-foot no-disturbance buffer between the construction area and bush seepweed scrub habitat that supports burrows suitable for blunt-nosed leopard lizard. The fencing shall be installed at least 50 feet from suitable blunt-nosed leopard lizard habitat.
- A qualified biologist shall determine where fencing will be installed, conduct a pre-installation survey of the fence alignment to confirm no suitable burrows for blunt-nosed leopard lizard are present in or within 50 feet of the fence alignment, and be present during all fence installation and removal to ensure that no special-status species are harmed.
- All project-related construction activities, construction personnel, and vehicles shall be prohibited from the bush seepweed scrub and 50-foot no-disturbance buffer area. Fencing shall be inspected and repaired, as necessary, each day before work begins adjacent to the fencing. Fencing shall be removed after all construction activities adjacent to the bush seepweed habitat are complete.

Timing: Before and during construction activities

Responsibility: Buena Vista Water Storage District and its contractors

Significance after Mitigation: Implementing Mitigation Measure BIO-1 would reduce the potentially significant impact on blunt-nosed leopard lizard to a less-than-significant level because it would minimize potential for individuals to enter the construction area and be injured or killed.

Special-status Birds

The project site and/or adjacent areas provide suitable nesting and foraging habitat for Swainson's hawk, burrowing owl, northern harrier, white-tailed kite, and loggerhead shrike. The site also provides suitable foraging habitat for tricolored blackbird and yellow-headed blackbird. No suitable nesting habitat for yellow-headed blackbird occurs on or adjacent to the site. Suitable nesting habitat for tricolored blackbird does not currently occur on or adjacent to the site, but grain crops could provide nesting habitat, if planted in the future. A very small amount of foraging habitat for special-status birds would be affected by project activities, because most pipelines and wells would be installed along existing roadways. Pipeline and wells in the northeast portion of the Recovery Project site would be installed in agricultural fields that currently provide suitable foraging habitat. Approximately 10 acres of foraging habitat would be disturbed during project construction. However, this disturbance would be temporary, and only a small proportion of the overall habitat would be disturbed at any one time. In addition, many hundreds of acres of similar habitat occur in the immediate vicinity. Therefore, foraging habitat disturbance would have a very minor impact on the potentially affected species.

The project site and adjacent areas currently provide marginal nesting habitat for burrowing owl, Swainson's hawk, white-tailed kite, and loggerhead shrike. Suitable nesting habitat for northern harrier and tricolored blackbird could also be present during project implementation, depending on crop types and habitat conditions at the time. Because nesting habitat is very limited and the project site is subject to regular disturbance from agricultural activities similar to disturbance levels anticipated during project construction, potential for project implementation to result in nest failure or burrow abandonment is low. However, if occupied burrows are present along the pipeline corridor or at the project laydown area, they could be destroyed, and burrowing owls could be injured or killed. In addition, if active nests are present in or very close to the construction area, project activities could result nest abandonment, reduced care of eggs or young, or premature fledging. Depending on the species and number of individuals that are affected, burrow destruction or nest failure could have a substantial adverse effect. Therefore, this impact would be **potentially significant**.

Mitigation Measure BIO-2a: Conduct Focused Surveys for Burrowing Owls and Avoid Loss of Occupied Burrows and Failure of Active Nests.

To minimize potential effects of project construction on burrowing owl, the District will ensure that the following measures are implemented, consistent with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012).

- A burrowing owl take avoidance survey shall be conducted within 14 days before project activities begin.

- If any occupied burrows are observed, protective buffers shall be established and implemented. A qualified biologist shall monitor the occupied burrows during project activities to confirm effectiveness of the buffers. The size of the buffer will depend on type and intensity of project disturbance, presence of visual buffers, and other variables that could affect susceptibility of the owls to disturbance.
- If it is not feasible to implement a buffer of adequate size and it is determined, in consultation with CDFW, that passive exclusion of owls from the project site is an appropriate means of minimizing impacts, an exclusion and relocation plan shall be developed and implemented in coordination with CDFW. However, passive exclusion cannot be conducted during the breeding season (February 1–August 31), unless a qualified biologist verifies through noninvasive means that either (1) the birds have not begun egg laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival.
- If passive exclusion is conducted, each occupied burrow that is destroyed will be replaced with at least one artificial burrow on a suitable portion of the project site or adjacent suitable habitat that would not be subject to inundation or project-related ground disturbance.

Timing: Before and during construction activities

Responsibility: Buena Vista Water Storage District and its contractors

Significance after Mitigation: Implementing Mitigation Measure BIO-2a would reduce the potentially significant impact on burrowing owl to a less-than-significant level because buffers would be implemented around occupied burrows to avoid disturbance and loss of owls and failure of active nests, and any potential passive relocation would be implemented in a manner that minimizes impact on affected individuals.

Mitigation Measure BIO-2b: Conduct Focused Surveys for Other Nesting Special-status Birds and Implement Buffers Around Active Nests.

To minimize potential effects of project construction on special-status birds other than burrowing owl, the District will ensure that the following measures are implemented:

- A qualified biologist shall conduct surveys of potential Swainson's hawk and white-tailed kite nesting trees within 0.5 mile of the Recovery Project site. To the extent practicable, depending on timing of project initiation, surveys will be conducted in accordance with the *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley* (Swainson's Hawk Technical Advisory Committee, 2000). At a minimum, a survey shall be conducted within 10 days before project activities begin near suitable nest trees during the nesting season (April-August).
- A qualified biologist shall conduct surveys of suitable nesting habitat for tricolored blackbird, white-tailed kite, northern harrier, and loggerhead shrike within 500 feet of project activities. Surveys shall be conducted within 10 days before project activities begin near suitable nesting habitat during the nesting season (February-August).
- If any active nests are observed, a qualified biologist shall establish and confirm implementation of appropriate protective buffers around the nests until the nests are no

longer active. A qualified biologist shall monitor the nest during project activities to confirm effectiveness of the buffer. The size of the buffer will depend on type and intensity of project disturbance, presence of visual buffers, and other variables that could affect susceptibility of the nest to disturbance. Minimum 300-foot no-disturbance buffers will be implemented around active tricolored blackbird nest colonies, in compliance with CDFW guidance regarding avoidance of impacts on tricolored blackbird nest colonies in agricultural fields (CDFW 2015).

Timing: Before and during construction activities

Responsibility: Buena Vista Water Storage District and its contractors

Significance after Mitigation: Implementing Mitigation Measure BIO-2b would reduce the potentially significant impact on Swainson's hawk, tricolored blackbird, white-tailed kite, northern harrier, and loggerhead shrike to a less-than-significant level, because buffers would be implemented to avoid project-related failure of active nests.

Special-status Mammals

The project site does not provide suitable habitat for Tulare grasshopper mouse, giant kangaroo rat, or Tipton kangaroo rat, but suitable habitat occurs adjacent to the northeast portion of the site. These species are unlikely to occur in the area of construction disturbance, which is at least 50 feet from areas of suitable habitat. However, because these species are mobile, potential for them to wander onto the Recovery Project site cannot be entirely ruled out. If individuals occur in the construction area, they would be vulnerable to injury or death from project activities. Based on the distance between the disturbance area and suitable habitat, few, if any, individuals of these species would be affected. This is unlikely to have a substantial adverse effect on the Tulare grasshopper mouse population, if present locally. However, because of the endangered status of giant and Tipton kangaroo rat injury or death of even one individual would be considered a substantial adverse effect. Therefore, this impact would be potentially significant.

Based on current habitat conditions and observations made during the field surveys, potential for American badger or San Joaquin kit fox to den on or adjacent to the project site is very low. However, if a den becomes established or transient individuals are present during project construction, the den could be abandoned, or individuals could be injured or killed if they come in contact with project equipment or become trapped in pipes or trenches. Potential impacts would be limited to an extremely small number of individuals, if any. However, because of the likely very low population densities of these medium-sized carnivores and the endangered and threatened status of San Joaquin kit fox, abandonment of a natal den or direct injury or death of even one individual would be considered a substantial adverse effect. Therefore, this impact would be **potentially significant**.

The southern end of the Recovery Project site is immediately adjacent to designated critical habitat for Buena Vista Lake ornate shrew. However, the Outlet Canal in this area does not currently provide the primary constituent elements (PCEs) required by this shrew, and the nearest know occurrence of the subspecies is from nearly 3 miles southeast of the project site. PCEs identified in the final critical habitat designation are permanent and intermittent riparian or wetland communities that contain a complex vegetative structure with a thick cover of leaf litter or dense mats of low-lying vegetation; suitable moisture supplied by a shallow water table, irrigation, or proximity to permanent or semi-permanent water; and a consistent and diverse supply of prey. The portion of the Outlet Canal that is adjacent to the project site is typically dry and supports relatively sparse upland vegetation primarily limited to the top of the canal banks. Although this area has potential to support the PCEs under appropriate conditions, such conditions are not currently present. In addition, installing pipeline along the adjacent existing agricultural roadway would not affect habitat along the canal or potential for this habitat to support the PCEs in the future. Therefore, implementing the project would have **no impact** on designated critical habitat for Buena Vista Lake ornate shrew.

Mitigation Measure BIO-1: Implement Measures to Educate On-site Construction Personnel and Maintain a Minimum 50-foot No-disturbance Buffer from Blunt-nosed Leopard Lizard Habitat during Project Construction.

Please *refer to* Mitigation Measure BIO-1 above for the full text of this mitigation measure.

Significance after Mitigation: Implementing Mitigation Measure BIO-1 would reduce the potentially significant impact on giant kangaroo rat and Tipton kangaroo rat to a less-than-significant level because it would minimize potential for individuals to enter the construction area and be injured or killed.

Mitigation Measure BIO-3: Conduct Pre-Construction Surveys and Implement Measures during Construction to Minimize Potential Impacts on American Badger and San Joaquin Kit Fox.

To minimize potential effects of project construction on American badger and San Joaquin kit fix, the District will ensure that the following measures are implemented, consistent with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (USFWS 2011):

- No more than 30 days before project activities begin in a given area, a qualified biologist will conduct a pre-construction survey to determine the potential for American badger or San Joaquin kit fox to occur in the area. If potential or known dens for either species are found, exclusion zones will be established and maintained, in accordance with *the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (USFWS 2011).
- If project activity would occur within 50 feet of a potential den (i.e., a den that is not known to be occupied), monitoring will be conducted at the potential den for 4 consecutive days. If no badger or kit fox activity is documented, project activities can proceed. If San Joaquin kit fox activity is documented, the appropriate exclusion zone will be established and maintained, in accordance with the *Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox* (USFWS 2011). If it is infeasible to implement the prescribed exclusion zone, CDFW and USFWS will be consulted, and alternative measures will be implemented before project activity begins in the vicinity of the den to ensure impacts are adequately minimized. If American badger activity is documented during the natal denning season, an appropriate buffer shall be established by a qualified biologist and maintained until the kits are no longer dependent on the den.
- To prevent entrapment during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered with plywood or similar material at the end of each workday.

If the trenches cannot be closed, one or more escape ramps of no more than a 45-degree slope will be constructed of earthen fill or created with wooden planks. All covered or uncovered excavations will be inspected at the beginning, middle, and end of each day. Before trenches are filled, they will be inspected for trapped animals. If a trapped badger or kit fox is discovered, project activities will stop, and escape ramps or structures will be installed immediately to allow the animal to escape.

- All construction pipes or similar structures with a diameter of 4 inches or greater that are stored on the ground at a construction site for one or more overnight periods will be thoroughly inspected for wildlife before the pipe is buried, capped, or otherwise used or moved in any way. Pipes laid in trenches overnight will be capped. If a potential San Joaquin kit fox is discovered inside a pipe, all project activities that could result in take will stop, a qualified biologist will be summoned to identify the species, and USFWS will be notified. If a San Joaquin kit fox is unable to escape voluntarily, USFWS will be contacted immediately to determine what actions should be taken to adequately minimize potential impacts.
- All food-related trash items such as wrappers, cans, bottles or food scraps generated during project activities will be disposed of in closed containers and removed daily from the Recovery Project site. No deliberate feeding of wildlife will be allowed, and no pets associated with project personnel will be permitted on the project site.

Implementing Mitigation Measures BIO-3 would reduce the potential impact related to San Joaquin kit fox to a less-than-significant level because destruction or disturbance of occupied dens and injury or death of individuals would be avoided.

Impact BIO-2: ***Cause a substantial adverse effect on any riparian habitat or other sensitive natural community:***

Riparian habitat does not occur on or adjacent to the project site. Bush seepweed scrub occurs adjacent to the project site but would be avoided during project construction. Therefore, ***no impact*** *would occur.*

The project site and immediately adjacent areas do not support any riparian habitat, and no riparian habitat would be removed by project activities. In addition, no riparian habitat would be indirectly impacted by project implementation. Therefore, implementing the Recovery Project would have no impact on riparian habitat.

Bush seepweed scrub, a sensitive natural community, occurs adjacent to the northeast portion of the project site. Because pipeline alignments and new and replacement wells in this area were sited specifically to provide a minimum 50-foot buffer between the construction disturbance area and bush seepweed scrub, there would be no impact on this sensitive natural community.

Mitigation Measure: No mitigation is required.

Impact BIO-3: ***Cause a substantial adverse effect on state- or federally protected wetlands through direct removal, filling, hydrological interruption, or other means:***

Federally protected waters, including wetlands, do not occur on or adjacent to the project site; therefore, ***no impact*** *on federally protected wetlands would occur. On-site irrigation canals are state-protected waters, but project construction would occur when the canals are dry. This would be a* ***less-than-significant*** *impact.*

Irrigation canals on the project site are used solely for irrigation delivery and do not have a significant nexus to traditionally navigable waters; therefore, they are not protected under the CWA. The canals are, however, protected as waters of the state under the Porter-Cologne Act. Canal impacts would be limited to installing pipeline crossings *via* open trench at seven locations. However, these pipeline segments would be installed when the canals are dry, and the canals would be restored to pre-installation conditions. Consequently, there would be no impact on water quality and no change to the ditch flow, bed, channel, or bank. Therefore, impacts on state-protected waters would be less than significant.

Mitigation Measure: No mitigation is required.

Impact BIO-4: ***Interfere substantially with the movement, use of migration corridors, or use of nursery sites for any native resident or migratory fish or wildlife species:***

The project site does not include established migration corridors or nursery sites. Wildlife may move through portions of the project site, and the nearby Kern River Flood Canal is a movement corridor for terrestrial wildlife, but project implementation would not substantially interfere with wildlife movement. This would be a ***less-than-significant*** *impact.*

The project site is part of a much larger extent of agricultural lands and does not serve as a migration corridor or other primary route for fish or wildlife movement. Other agricultural lands surrounding the Recovery Project site that would not be disturbed by project implementation provide equally suitable movement opportunities. Because the on-site canals are dry for much of the year and generally barren of vegetation, they do not provide migration or movement corridors for fish or wildlife. The project site also is not known or anticipated to serve as a nursery site for any wildlife species. Small numbers of terrestrial wildlife may occasionally move through the project site in transit between areas of more suitable habitat, but this does not occur along established routes. In addition, movement is more likely to occur along the Kern River Flood Canal, which is separated from the project site by a canal and maintenance road. Because the project site is subject to regular disturbance from agricultural activities similar to disturbance levels anticipated during project construction and work would only occur during daylight hours, potential for project implementation to disrupt wildlife movement is low. Therefore, the project would not substantially interfere with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites; this impact would be less-than-significant.

Mitigation Measure: No mitigation is required.

3.3 Cultural Resources

This section addresses cultural resources known or with potential to occur within the Recovery Project site. *Cultural Resources* are defined in this section as prehistoric and historical archaeological resources, architectural/built-environment resources (historic resources), places important to Native Americans and other ethnic groups, and human remains. The analysis describes the cultural setting and the methods used for assessment. This section also provides a brief overview of federal, state, and local laws and regulations pertaining to the protection of cultural resources in the County.

3.3.1 Environmental Setting

3.3.1.1 Prehistoric Setting

The chronology used for the area, the Central California Taxonomic System (CCTS), divides the prehistoric past into Early, Middle, and Late horizons, each defined more by artifact types and frequency than chronological methods. The stylistic divisions of the CCTS were further defined and incorporated with updated temporal information by Fredrickson, who proposed the Paleo-Indian, Archaic, and Emergent periods, each with associated date ranges and diagnostic artifact and burial styles (Fredrickson 1974, 1994).

The Paleo-Indian Period (11,550-8550 cal B.P.[3])
There is little evidence for terminal Pleistocene-early Holocene habitation in the Valley. Changing climate at the end of the Pleistocene brought floods, which covered much of the Central Valley with layers of alluvial soils that buried evidence of human occupation. People living in the Valley during this time are thought to have been hunters and foragers, living in small groups and travelling often from camp to camp in response to seasonal availability of resources. Sites are expected to have been primarily located along lakesides (Fredrickson 1994).

The Lower Archaic (8550-5550 cal B.P.)
The ancient shores of Tulare Lake are the nearest location for discovery of Lower Archaic period sites. In this area, north of the Recovery Project, stemmed projectile points (e.g., Borax Lake, Lake Mojave, Silver Lake, and Pinto point styles), chipped stone crescents, and bi-pointed "humpies" have been discovered (Rosenthal et al. 2007). Lower Archaic period artifacts found within the Valley are often found as isolates, without associated faunal bone or food processing tools, such as milling equipment.

The Middle Archaic (5550-550 cal B.P.)
Settlement patterns became more stable, especially along river corridors, towards the end of the Middle Archaic period (Rosenthal et al. 2007). During the Middle and Upper Archaic periods, the Windmiller Pattern was common throughout the Valley, extending south as far as Buena Vista Lake (Rosenthal et al. 2007). This archaeological pattern is identified by burial style in which individuals were interred in extended positions, oriented towards the west, and often buried with artifacts such as quartz crystals, red

[3] calibrated years before the present

pigment (ochre or cinnabar), Olivella shell beads (particularly types A1a and L), abalone (Haliotis) beads (type M) and pendants, stone pipes, charmstones, large, leaf-shaped projectile points associated with the atlatl, bone tools (e.g., awls, needles, strigles), baked-clay net weights, and ground stone tools (mortars, pestles, millingstones, and manos) (Moratto 1984).

The Upper Archaic (550 cal B.P. to cal A.D.[4] 1100)

The Upper Archaic period began at roughly the same time as the Late Holocene, ushering in a period of cooler, wetter conditions. More alluvium was deposited over the earlier archaeological sites as rivers and lakes grew and flooded. Cultural diversity and complexity both developed during the Upper Archaic, and new variation is seen in burial contexts, artifact styles, bead types, and ground stone tool forms.

While many sites dating to the Upper Archaic have been recorded in the Sacramento Valley and northern Valley, very few have been found from the southern Valley where the Recovery Project is located (Rosenthal et al. 2007).

The Emergent Period (cal A.D. 1000 to the Historic Era)

The Emergent Period was a time of economic diversity, including the expansion of trade networks, the increased social inequity, and the introduction of clamshell disc beads as a kind of currency (Fredrickson 1994). The introduction of bow and arrow technology saw several new styles of small projectile points developed; in the southern Valley, the most common of the new types were Cottonwood style points.

3.3.1.2 Ethnographic Setting

The Recovery Project is situated in the ethnographic territory of the Southern Valley Yokuts, specifically the Chuxoxi, who occupied the channels of the Kern River Delta (Wallace 1978). Neighboring Southern Valley Yokuts tribes, all within the Tulare Lake Basin, included the Wowol, Yawelami, and Hometwali. Cook estimates the population of the Southern Valley at 6,900 before European contact (Cook, 1955).

The Yokuts economy in the area depended heavily on fishing, waterfowl, and gathering shellfish, roots, and seeds. Reflecting the importance of fish resources, fish were caught in different ways: fish were dragged to shore by individuals on a tule raft using long nets attached to a pole; individuals would dive with nets; use bottomless baskets; communal drives would steer fish into stick pens; a wide, flat tule boat with a fishing hole in the center was used to spear fish; fish were also speared through holes cut in natural tule mats formed on the lakeshore. Basket traps, poisons, the bow and arrow, and spearing scaffolds were also used (Gayton 1948:14-15; Wallace 1978).

Another important resource was waterfowl. Various techniques were employed: snares and nets; shooting waterfowl from tule rafts while camouflaged; spring poles with triggers; water skipping arrows; and stuffed decoys. Eggs of waterfowl were harvested (Gayton 1948:15; Wallace 1978). Mussels were

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[4] Calibrated years before the anno Domini

gathered in large amounts and steamed on tule reeds. Turtles, which were roasted, provided meat (Wallace 1978).

Plant resources were vital components of the diet and a wide variety of plant foods were used. Wild seeds and roots were a large part of the diet; tule roots were gathered, dried, pounded, and used as a flour (Gayton 1948:15; Wallace 1978). Tule, grass, and flowering herb seeds were gathered by using a seed beater and basket. Grass nuts were roasted or made into a meal. Clover was an important food as was yellow mustard, fiddle-neck, and filaree (usually eaten with salt grass). Many plants were also used as medicines. Acorns, the staple food for much of ethnographic California, was generally only available to the Tachi (Gayton 1948:15-16; Wallace 1978).

Several types of structures were built by the Yokuts in the region. The most basic were single family houses with oval floors and tule mats on a wooden frame. Communities arranged homes in a single row. There were also long, steep-roofed communal houses used by the Southern Valley Yokuts, including the Wowol, that could house up to 10 families. Interior space was partitioned by mats for individual families. Domestic activities like cooking were done underneath a shaded porch at the front of the long house. There was little in terms of furnishing inside the house, with family belongings hanging from rafters (Gayton 1948:11-13; Wallace 1978).

Tule was an important resource for the Yokuts in the region. Tule was a necessary raw material in basket weaving. Baskets were made in numerous shapes and had several uses. Some of the most common forms were bowl shapes used as food containers, burden baskets, winnowing trays, seed beaters, water bottles, and cradles (Gayton 1948:17-18; Wallace 1978).

There was no political unity between the various Southern Yokuts tribes. Local groups of about 350 individuals in associated villages made up politically autonomous units. Exact composition was not standard, some groups made up of several villages, while others were only a single village. Villages were stable and members tended to live at a village throughout the year. Groups would break up during the spring, when smaller camps would be established, and move around the landscape to gather resources (Wallace 1978).

3.3.1.3 Historic Setting

Kern County

Kern County was established in 1866 and Bakersfield became the county seat in 1874. As early as the 1770s, Spanish explorers Don Pedro Fages and Father Francisco Garces passed through the region. Father Zalvidea and Lt. Francisco Ruiz were part of another survey expedition in the early 19th century. The first Americans to travel in the area were likely fur trappers Jedediah Strong Smith and Kit Carson who entered the region in the 1820s and 1830s. In the mid-1840s, John C. Fremont led numerous expeditions through the valley (Hoover et al. 1990).

In 1851, gold was discovered near the Kern River and gold mining became a dominant activity in the County, especially in the mountains and the desert. Although mining remained important to the local economy, many of the miners eventually settled in the flatlands and turned to agriculture as a more suitable means of sustaining a living. Sheep and cattle were initially introduced to the area as much of the terrain was inhospitable for crop farming (Kern County Centennial Observance Committee 1966:21, 23). In time, the locals constructed small canals and ditches to allow for farming. With irrigation improvements in place, farmers planted crops such as wheat, alfalfa, and cotton, and agriculture soon became the primary driver of the economy. Later, settlers introduced additional crops such as apples, wine grapes, potatoes, and nuts (Kern County Centennial Observance Committee 1966:77; Morgan 1914:151).

By the 1860s, oil was discovered in the County. Small communities grew into the towns of Whiskey Flat, later Kernville, Buttonwillow, Bakersfield, Oil City, Oil Center, and Oildale were founded near the oil fields. Further settlement was encouraged by the passage of the Desert Land Act of 1877 that promoted the development of the arid lands of the west. The Southern Pacific Railroad laid tracks near Bakersfield in 1877 and a few years later the San Francisco and San Joaquin Valley Railroad, later Santa Fe Railroad arrived in the area. Starting in the 1930s, the County became home to thousands of settlers who fled the Dust Bowl in the Midwestern U.S. (Morgan 1914:35). Agriculture and oil remained a mainstay of the County through the 20th century. Presently, the economy of the County is largely based on agriculture and petroleum extraction (Kern County Centennial Observance Committee 1966:117–118).

Irrigation

Cattle ranching and wheat farming were the predominant agricultural pursuits in the Valley in California's early years of statehood as it required little irrigation. By 1880, surveys showed that the Valley accounted for nearly half of irrigated farming in the state. Irrigation systems were typically beyond the financial means of individual farmers and arrangements related to the development of irrigation features were often made with the community and local institutions. These generally fell into four categories, private water companies, land colonies, mutual water companies, and irrigation districts representing the largest acreage and the most critical to the successful development of large-scale irrigated agriculture in the state (Hoover et al. 1990).

To curb conflicts over California's complicated water laws, the state legislature passed the Wright Act in 1887. The new law was intended to promote community values, small family-owned farms, and a democratic control by water users (Hundley 1992:98). The Act authorized the creation of irrigation districts, which were defined as special units of local government consisting of more than 50 people, or a majority of the local landowners. The Act also provided the irrigation districts with the power of eminent domain, power to overcome riparian rights by condemnation suits, and the ability to sell bonds to finance the purchase of water rights and the construction of irrigation features (Hoover et al. 1990). Within 2 years, California was the nation's leader in irrigated agriculture. Nonetheless, irrigation districts faced considerable barriers from large, litigious landowners.

Irrigation in the San Joaquin Valley

The Valley contains the southern two-thirds of California's Central Valley. Irrigation transformed the Valley landscape and created one of the nation's most productive agricultural region. During the 1850s and 1870s, most settlers in the Valley were not interested in irrigated agricultural as they were concentrating on cattle ranching or dry wheat farming. Cattle barons Miller and Lux amassed a vast amount of land in the Valley for their cattle ranching empire that included large-scale irrigation of 150,000 of their 700,000 acres, for pasturage (Galloway and Riley 1999:23).

By the early 20th century, much of the flow of the Kern River was redirected through canals and ditches and by 1910 all the surface-water supplies in the Valley was diverted, which resulted in the development of ground-water resources. These wells gradually depleted the water levels, which then led to the requirement of pumps to bring the water to the surface. By 1955, nearly one-fourth of the total ground water obtained for irrigation in the U.S. was pumped in the Valley, a trend that continued into the 1960s. With the completion of federal and state projects, including the Delta-Mendota Canal, Friant-Kern Canal, and the Aqueduct, cheaper water was available to irrigate agricultural crops (Galloway and Riley 1999:23-24, 27-29).

Buena Vista Water Storage District

Miller & Lux preferred a separate water district despite the 1920 recommendation of the State Engineer (Giefer 1967:78). In 1922, a petition was filed to create the BVWSD under the 1921 California Water Storage District Act. At the time of the petition the district included 125,890 acres. In 1923, the state concluded that as proposed, the BVWSD did not meet a reasonable standard of feasibility, practicality, and utility. After a 1924 survey of the land by the state, Miller & Lux's attorney, and their superintendent, Miller & Lux agreed to remove the land north of Wasco Road from the district because their superintendent agreed that the alkali content of the land made it non-irrigatable. The petition was approved in 1924 (Giefer 1967:87-89). The BVWSD was organized to achieve flood control, drainage, and irrigation of the land northwest and southeast of Buttonwillow. When it was created the BVWSD overlapped with Reclamation District 2055 (Bonte 1930:215). Miller & Lux linked water rights to their land within District 2055 so that future sales could be made. They also exchanged bonds with District 2055 for their existing canals and sold other bonds for the construction of future canals (Giefer 1967:90-91).

BVWSD has improved the canals and ditches that were originally constructed by Miller & Lux and developed new facilities over time for the surrounding agricultural purposes. Most of these water features are earthen and have concrete turnouts and gates added as necessary. The drains, ditches, and canals in the Area of Potential Effects were constructed in the early to mid-20th century. The structures, maintained by BVWSD, are shaped twice a year and excavated between every 5 and 10 years.

3.3.2 Regulatory Framework

3.3.2.1 Federal Plans, Policies, Regulations, and Laws

National Historic Preservation Act

Section 106 of the National Historic Preservation Act and its implementing regulations at 36 CFR Part 800 describe the process that a federal agency must take to identify cultural resources and assess the level of effect that a proposed undertaking would have on historic properties. This project is not considered a federal undertaking; however, if federal funding or permits are required, compliance with the National Historic Preservation Act will be required.

The NRHP is the nation's master inventory of known historic resources and includes listings of buildings, structures, objects, and districts that possess historic, architectural, engineering, archaeological, or cultural significance at the national, state, and local levels. Properties that are eligible for listing on the NRHP must be at least 50 years old, unless a property possesses exceptional significance, and must meet at least one of the following criteria (36 CFR 60):

A. Is associated with events that have made a significant contribution to the broad patterns of our history

B. Is associated with the lives of persons significant in our past

C. Embodies the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represents a significant and distinguishable entity whose components might lack individual distinction

D. Has yielded, or may be likely to yield, information important in prehistory or history.

Individually eligible properties and historic districts must retain key character-defining features, or integrity, to convey their significance as a resource. Integrity specifically refers to the ability of a property to convey its significance. In other words, a historic property must have enough intact physical characteristics or features to communicate its significance under one or more of the NRHP criteria.

3.3.2.2 State Plans, Policies, Regulations, Laws

California Environmental Quality Act

CEQA requires that public or private projects financed or approved by public agencies assess the effects of the Recovery Project on historical resources. CEQA also applies to effects on archaeological sites that may be included among “historical resources” as defined by CEQA Guidelines § 15064.5, subdivision (a), or may be subject to provisions of PRC § 21083.2, which governs review of “unique archaeological resources.” Historical resources are those meeting the following requirements:

- Resources listed in or determined eligible for listing in the California Register of Historical Resources (CRHR) (CEQA Guidelines § 15064.5[a][1]). Note that CRHR-eligible resources include resources listed on or eligible for the NRHP (PRC § 5024.1)
- Resources included in a local register as defined in PRC § 5020.1(k), “unless the preponderance of evidence demonstrates” that the resource “is not historically or culturally significant.” (CEQA Guidelines § 15064.5[a][2])
- Resources that are identified as significant in surveys that meet the standards provided in PRC § 5024.1[g] (CEQA Guidelines § 15064.5[a][3])
- Any object, buildings, structure, site, area, place, record, or manuscript that the lead agency determines are significant, based on substantial evidence (CEQA Guidelines § 15064.5[a][3])

The fact that a resource is not listed in, or determined to be eligible for listing in, the CRHR; not included in a local register of historical resources; or identified in an historical resource survey does not preclude a CEQA lead agency from determining that the resource may be an historical resource as defined in PRC § 5020.1(j) or 5024.1 (CEQA Guidelines § 15064.5[a][4]).

Cultural resources are significant and considered “historical resources” for the purpose of CEQA if they meet any of the following criteria for listing in the CRHR and possess integrity:

- Are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage, or the U.S. (CCR Title 14, § 4852[b][1])
- Are associated with the lives of persons important in our past (14 CCR § 4852[b][2])
- Embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values (14 CCR § 4852[b][3])
- Yield, or may be likely to yield, information important in prehistory or history (14 CCR § 4852[b][4])

Unique archaeological resources, on the other hand, are defined in PRC § 21083.2 as a resource that meets at least one of the following criteria:

- Contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information
- Has a special and particular quality such as being the oldest of its type or the best available example of its type
- Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC § 21083.2[g])

CEQA requires that if a project results in an effect that may cause a substantial adverse change in the significance of an historical resource or would cause significant effects on a unique archaeological resource, then the Recovery Project may have a significant impact under CEQA (CEQA Guidelines § 15064.5[b]) and alternative plans or mitigation measures must be considered. A substantial adverse change in the significance of an historical resource means physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired. The significance of an historical resource is materially impaired if the project demolishes or materially alters any qualities that justify the:

- Inclusion or eligibility for inclusion of a resource on the CRHR (CEQA Guidelines § 15064.5[b][2][A],[C])
- Inclusion of the resource on a local register (CEQA Guidelines § 15064.5[b][2][B])

Assembly Bill 52 (AB 52)

AB 52, effective on July 1, 2015, amended CEQA and added sections relating to Native American consultation and certain types of cultural resources, Tribal Cultural Resources (TCRs). TCRs are either (1) sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a California Native American Tribe that is either on or eligible for inclusion in the CRHR or a local historic register; or (2) the lead agency at its discretion and supported by substantial evidence, chooses to treat the resource as a TCR. Additionally, a cultural landscape may also qualify as a TCR if it meets the criteria to be eligible for inclusion in the CRHR and is geographically defined in terms of the size and scope of the landscape. Other historical resources (as described in California PRC 21084.1), a unique archaeological resource (as defined in California PRC 21083.2[g]), or non-unique archaeological resources (as described in California PRC 21083.2[h]) may also be TCRs if they conform to the criteria to be eligible for inclusion in the CRHR.

California PRC § 21084.2 provides that a project with an effect that may cause a substantial adverse change in the significance of a TCR may have a significant effect on the environment. California PRC Section 21080.3.1 (b) requires the lead agency to begin consultation with California Native American Tribes that are traditionally and culturally affiliated with the geographic area of the Recovery Project if the tribe requests the lead agency, in writing, to be informed by the lead agency through formal notification of projects that are proposed in that geographic area and the tribe subsequently requests consultation. California PRC Section 21084.3 states that, "public agencies shall, when feasible, avoid damaging effects to any tribal cultural resource."

AB 52 explicitly recognizes,

> …that California Native American tribes may have expertise with regard to their tribal history and practices, which concern the tribal cultural resources with which they are traditionally and culturally affiliated. Because the California Environmental Quality Act calls for a sufficient degree of analysis, tribal knowledge about the land and tribal cultural resources at issue should be included in environmental assessments for projects that may have a significant impact on those resources.

AB 52 and California PRC Section 21080.3.1 and Section 21080.3.2 therefore includes requirements for meaningful consultation with culturally and geographically affiliated Tribes to identify TCRs and to develop avoidance or mitigation as appropriate.

3.3.2.3 Regional and Local Plans, Policies, Regulations, and Ordinances

Kern County General Plan

The Kern County General Plan (2009) includes the following policies that pertain to cultural resources and are relevant to this analysis.

Archaeological, Paleontological, Cultural, and Historical Preservation

- Policy 25. The County will promote the preservation of cultural and historic resources which provide ties with the past and constitute a heritage value to residents and visitors.
- Implementation Measure K. Coordinate with the California State University, Bakersfield's Archaeology Inventory Center.
- Implementation Measure L. The County shall address archaeological and historical resources for discretionary projects in accordance with the CEQA.
- Implementation Measure N. The County shall develop a list of Native American organizations and individuals who desire to be notified of proposed discretionary projects. The notification will be accomplished through the established procedures for discretionary projects and CEQA documents.
- Implementation Measure O. On a project specific basis, the County Planning Department shall evaluate the necessity for the involvement of a qualified Native American monitor for grading or other construction activities on discretionary projects that are subject to a CEQA document.

3.3.3 Environmental Impacts and Mitigation Measures

3.3.3.1 Thresholds of Significance

Significance criteria are based on Appendix G of the CEQA Guidelines. A project alternative would have a significant impact on cultural resources if implementing the alternative would either:

- have a substantial adverse change in the significance of an historical resource because of physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired
- materially impair the significance of an historical resource because of the demolition or alteration of qualities that justify the inclusion or eligibility for inclusion of a resource on the CRHR or a local register

3.3.3.2 Analysis Methodology

Records Search

On June 14, 2019, GEI Consultants, Inc. archaeologist Matthew Chouest, Registered Professional Archeologist (RPA), submitted a records search request of the Recovery Project area and a surrounding 0.5-mile- radius at the Southern San Joaquin Valley Information Center (S.S.J.V.I.C.). The records search included a review of S.S.J.V.I.C.'s USGS 7.5-minute topographic base maps indicating previously conducted investigations and previously reported cultural resources, Department of Parks and Recreation 523 forms, and California Historic Landmarks documentation.

The records search identified 50 previously recorded cultural resources within 0.5-mile of the project area. Five previous investigations have been conducted within the project area and nineteen previous studies have been conducted within 0.5-mile of the project area.

Pedestrian Survey

GEI archaeologists Matthew Chouest, RPA, and Traci O'Brien conducted a pedestrian survey from June 7 to 9, 2019, of the proposed 22 miles of new conveyance pipeline alignment and nine new well sites in the southern Valley approximately 10 miles west of Bakersfield.

The pedestrian survey provided coverage of the proposed conveyance pipeline alignment to be installed in or adjacent to paved and dirt access roads. The roadway along with the accessible adjacent right-of-way that ranged from a few feet wide to approximately 30 feet wide was examined. The survey area covered the area between the edge of the road or canal up to existing agricultural cultivation or a fence line. Archaeologists walked both sides of the road or canal and wider areas were covered in 15-meter transects. In addition, the locations for the proposed nine new wells were examined along with a 100-foot-radius surrounding the well site.

No previously unrecorded cultural resources were identified during the pedestrian survey and a total of five historic-era (45 years old or older) built environment resources were identified in the project area: the East Side Canal, the West Side Canal, the Main Drain, and two unnamed canals in the western part of the project area. In 2018, the East Side Canal was determined ineligible for the NRHP and CRHR. The West Side Canal, Main Drain, and the unnamed canals were evaluated for CRHR significance and because of a lack of integrity and significance they do not meet CRHR criteria. The five water features are also not considered historical resources for the purposes of CEQA.

Native American Contacts

In consistency with AB 52, BVWSD send a letter to the Torres Martinez Desert Cahuilla Indians Tribe (Tribe) on July 16, 2020. The letter invited the Tribe to consult on the project and gave a brief description of the project and its location. No response was received from the Tribe as of the publication of this document. There are no identified Tribal Cultural Resources in the project.

3.3.3.3 Impact Analysis

Impact CUL-1: ***Cause a substantial adverse change in the significance of a historical resource or an archaeological resource pursuant to CCR Section 15064.5.***

It is possible that there are unidentified historical or archaeological resources within the project area that have not been identified that may be impacted by project-related, ground-disturbing activities. Therefore, implementing the project would result in a ***potentially significant*** *impact.*

No historical resources were identified during the pedestrian survey, however, the records search identified 50 prehistoric and historic-era resources within 0.5-mile of the Recovery Project area, several in proximity to the project alignment. It is possible, therefore, that buried, unidentified historical or archaeological resources may be impacted by project activities.

Mitigation Measure CUL-1: Implement a Worker Environmental Awareness Program

Prior to project-related, ground-disturbing activities a Program will be implemented which will include all construction personnel. Once the project begins, any new personnel will undergo the Program prior to beginning work. The Program will include information regarding what constitutes cultural resources, what procedures to follow if there is an inadvertent cultural resources find, who to contact if there is an inadvertent find, brief description of applicable laws, and all participants will receive a brochure summarizing the Program with appropriate contact information. The Program may be delivered either in person, remotely *via* teleconferencing, or electronic format.

Timing: Prior to construction work.

Responsibility: Buena Vista Water Storage District

Mitigation Measure CUL-2: Address Previously Undiscovered Historical, Archaeological, and Tribal Cultural Resources

BVWSD shall implement measures to reduce or avoid impacts on undiscovered historic properties, archaeological resources, and tribal cultural resources. If buried or previously unidentified historic properties or archaeological resources are discovered during project construction, all work within a 100-foot-radius of the find shall cease. BVWSD shall retain a professional archaeologist meeting the Secretary of the Interior’s Professional Standards for Archaeologists to assess the discovery and recommend what, if any, further treatment or investigation is necessary for the find. Interested Native American Tribes will also be contacted. Avoidance is the preferred CEQA treatment for cultural resources. If avoidance is not possible, any necessary treatment/investigation shall be developed in coordination with interested Native American Tribes providing recommendations to BVWSD and shall be completed before project activities continue in the vicinity of the find.

Timing: During construction work.

Responsibility: Buena Vista Water Storage District

Significance after Mitigation: The impact would be diminished to less-than-significant with implementation of the mitigation measures because any currently unidentified cultural resources would be identified and avoided, if possible, or treatment measures developed which would mitigate any impacts.

Impact CUL-2: ***Disturb any human remains, including remains interred outside of dedicated cemeteries.***

It is possible there are buried, undiscovered human remains that may be impacted by project-related, ground-disturbing activities. Therefore, implementing the project would result in a ***potentially significant*** *impact.*

No human remains were identified during investigation efforts for the Recovery Project. Human remains, however, have been reported in an agricultural field within 100 feet north of the project area. Given the proximity of the reported human remains, it is possible that buried, undiscovered human remains are within the project area.

Mitigation Measure CUL-3: Avoid potential effects on undiscovered burials.

If human remains are found, BVWSD will be immediately notified. The California Health and Safety Code requires that excavation be halted in the immediate area and that the County coroner be notified to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code § 7050.5[b]). If the coroner determines that the remains are those of a Native American, the coroner must contact the Native American Heritage Commission (NAHC) by telephone within 24 hours of making that determination (Health and Safety Code, § 7050.5[c]).

Once notified by the coroner, the NAHC shall identify the person determined to be the Most Likely Descendant (MLD) of the Native American remains. With permission of the legal landowner(s), the MLD may visit the site and make recommendations regarding the treatment and disposition of the human remains and any associated grave goods. This visit should be conducted within 24 hours of the MLD's notification by the NAHC (PRC § 5097.98[a]). If a satisfactory agreement for treatment of the remains cannot be reached, any of the parties may request mediation by the NAHC (PRC § 5097.94[k]). Should mediation fail, the landowner or the landowner's representative must reinter the remains and associated items with appropriate dignity on the property in a location not subject to further subsurface disturbance (PRC § 5097.98[b]).

Timing: During construction activities

Responsibility: Buena Vista Water Storage District

Significance after Mitigation: The impact would be reduced to less-than-significant because any currently unidentified human remains would be identified during construction and the human remains undergo treatment as proscribed by state law and recommendations provided by the MLD.

Impact CUL-3: ***Cause a substantial adverse change in the significance of a historical resource or an archaeological resource pursuant to CCR Section 15064.5 in project areas that have not been analyzed.***

It is possible there are buried, undiscovered human remains that may be impacted by project-related, ground-disturbing activities in project areas that have not yet been analyzed. Therefore, implementing the project would result in a ***potentially significant*** *impact.*

Approximately 2.6 miles of the pipeline alignment located in the northeast portion of the Recovery Project area could not be analyzed because of access issues. No cultural resources were identified during the records search in that area and no cultural resources were identified during the pedestrian survey that did occur within 100 feet of the Recovery Project area. A prehistoric site with reported burials, however, is located nearby. With cultural resources in proximity, it is possible that buried, undiscovered historical resources or archaeological resources are within the project area.

Mitigation Measure CUL-4: Investigate for the presence of historical resource or an archaeological resource pursuant to CCR Section 15064.5 and for the presence of human remains, including remains interred outside of dedicated cemeteries.

Prior to commencement of ground-disturbing, project-related activities, a cultural resources pedestrian survey will be conducted in all project areas that could not be accessed earlier. The records search that was originally conducted for the project covers the unaccessed areas, therefore an additional records search is not necessary. If cultural resources or human remains are identified during the pedestrian survey, then Mitigation Measures CUL-2 and CUL-3 will be implemented, as appropriate.

Timing: Prior to construction activities

Responsibility: Buena Vista Water Storage District

Significance after Mitigation: The impact would be reduced to less-than-significant because any identified historical resources, archaeological resources, or human remains would be addressed by Mitigation Measures CUL-2 and/or CUL-3.

3.4 Hydrology and Water Quality

3.4.1 Environmental Setting

3.4.1.1 Surface Water

The project site is located in the Tulare Lake Basin, in the South Valley Floor Hydrologic Unit, in the Semitropic Hydrologic Area, as designated by the Central Valley RWQCB (2018). In accordance with CWA Section 303, water quality standards for this basin are contained in the Water Quality Control Plan for the Tulare Lake Basin.

The District, established in 1924, is a public agency, which supplies surface water from the Kern River and SWP *via* the Aqueduct and pumps groundwater to agricultural customers, primarily. The District's principal source of surface water is the Kern River. The Kern River originates in the southern Sierra Nevada and flows in a south and southwesterly direction to the Central Valley northeast of Bakersfield. The District has utilized Kern River water under a schedule of long-standing diversion rights. BVWSD controls an average entitlement of approximately 150,000 acre-feet per year (AFY) of surface water from the Kern River, based on the Miller-Haggin Agreement of 1888. Kern River water is conveyed to the Second Point of Measurement *via* the Kern River Canal and is diverted at this location to the District's Alejandro Canal or the Kern River Channel. Water is also wheeled through the Aqueduct through exchanges with Kern River contractors further upstream.

The Kern River has a number of listed beneficial uses, including municipal supply, agricultural supply, industrial supply, industrial process, hydropower generation, contact and non-contact recreation; warm freshwater habitat; wildlife habitat; rare, threatened or endangered species; and groundwater recharge. The Kern River is not listed as an impaired water body because none of the water quality parameters to support beneficial uses exceed regulatory action levels (RWQCB 2018). Surface water quality in the Kern River is good, with concentrations for all constituents below their maximum contaminant levels (MCLs) (**Table 3-4**).

SWP water is supplied from the Sacramento/San Joaquin Delta area and is delivered through the Aqueduct to Kern County and other areas. In 1973, BVWSD contracted with the KCWA for an additional surface water supply from the SWP delivered *via* the Aqueduct. The contract provided for an annual firm supply of 21,300 AFY (Table A) and a supply of 3,750 AFY (Article 21). Over the period from 1995 through 2005, water imported *via* the SWP supplied 36 percent of the surface water available to the District, with the Kern River being the source of the remaining 64 percent (BVGSA 2020).

Available water quality data for water in the Aqueduct closest to the Palms Project was evaluated. Since Improvement District No. 4 receives their water from four sources, one being the Aqueduct with water quality samples collected at Tupman, results presented in KCWA Improvement District No. 4, Report on Water Conditions for years 2017, 2019, and 2020 were used for this evaluation. **Table 3-4** provides a summary of results from the Aqueduct at Tupman. Using this sampling location provides a representation of the Aqueduct water quality near the Palms Project.

Table 3-4. Summary of Water Quality in Kern River and California Aqueduct (at Tupman)

Constituent	Drinking Water Standard	Kern River	Aqueduct	Units
Arsenic	10	ND	ND - 3	µs/cm
Chloride	250 – 500	3 – 4	30 – 47	ppm
Conductivity	900 – 1,600	119 – 185	246 – 396	µs/cm
Sodium	DWR = 200	9 – 17	23 – 44	ppm
Sulfate	250 - 500	8 – 16	22 – 37	ppm
TDS	500 – 1,000	90 – 113	140 – 238	ppm
Boron	NL= 1	ND – 0.13	ND – 0.15	ppm
Hardness	Very Hard > 181	38 – 54	58 – 82	ppm

Notes: ppm = parts per million; µs/cm = microSiemens per centimeter; NL= notification level; DWR = California Department of Water Resources; TDS = total dissolved solids, ND= not detected
Data obtained from Kern County Water Agency Improvement District No. 4, Report on Water Conditions – Table 13 for years 2017, 2019, and 2020. Aqueduct samples collected near Tupman, CA.

The water conveyance systems in and around BVWSD consist of a network of levees and diversions to control the high flows of the Kern River, as well as a system of canals and drains that deliver surface water to, and collect runoff from, the lands within BVWSD. BVWSD provides water to two service areas, the larger is the Buttonwillow Service Area to the west and the smaller is the Maples Service Area to the southeast (*refer to* **Figure 2-1**). Altogether, there are approximately 60 miles of pipelines, 5 miles of lined canals, 152 miles of unlined canals and 42 miles of drainage ditches within BVWSD with seepage from the unlined canals recharging groundwater. BVWSD operates all of the water conveyance and control facilities within its service area and maintains flow records for each reach of District canal.

The proportion of surface water and groundwater used on an annual basis varies widely depending on hydrologic conditions, and over the years, regulatory requirements have impacted the availability of imported water. Environmental constraints on pumping from the Sacramento/San Joaquin River Delta have limited the reliability of SWP supplies. Typically, surface water supplies meet the majority of the District's water demand, the remaining water demands are met from district- and privately-owned wells.

3.4.1.2 Groundwater Resources

The project site is in the San Joaquin – Kern County Groundwater Subbasin (#5-022.14), as designated by DWR Bulletin 118 (DWR 2016). The site is located within a groundwater basin designated as "High Priority" or "Critically Overdrafted" (DWR 2019). Because of the status of the Kern County Groundwater Subbasin, water agencies in the subbasin are among the first to be required to complete GSPs and to implement SGMA. As part of this effort, new GSAs were formed with the responsibility to bring the Subbasin into compliance with SGMA by 2040. As part of this effort, the BVGSA was formed in 2015 and the BVGSA submitted its GSP to DWR in January 2020 along with four other GSAs in the Kern Subbasin. The following is a brief description of the BVGSA.

Buena Vista Groundwater Sustainability Agency

The BVGSA covers an agricultural area of the County located in the trough of California's southern Valley approximately 16 miles west of the city of Bakersfield. The boundaries of the BVGSA coincide closely with those of the District (*refer to* **Figure 2-3**).

The BVGSA is bordered by the following GSAs:

- Kern Groundwater Authority GSA
- Kern River GSA
- West Kern Water District GSA
- Semitropic Water Storage District GSA

The BVGSA is made up largely of reclaimed swamp lands in and along the pre-development course of the lower Kern River which, after exiting the Southern Sierra Nevada mountains and flowing south and then southwest across the southern Valley, runs through the topographic axis of the valley toward its terminus at a drainage basin which was once Tulare Lake. The water conveyance systems in and around the GSA consist of a network of levees and diversions to control the high flows of the Kern River, as well as a system of canals for delivery of surface water. Of the GSA's total area of 50,560 acres, approximately 46,600 acres receive water service from the BVWSD. Of that acreage approximately 35,000 acres are farmed each year, primarily in tree and row crops, with this number fluctuating based on factors including water supply and market conditions. The GSA also encompasses the Community of Buttonwillow, three other public water systems and domestic users all of whom rely entirely on groundwater for domestic, municipal and commercial users (BVWSD 2020).

The BVWSD has successfully followed a conjunctive management policy by which surface water is recharged when available and stored in the principal aquifer system for recovery by pumping in years when surface water is insufficient to meet demands. Prior to the construction of the SWP, the Kern River was the BVWSD's sole source of surface water. Kern River water is now stored in Lake Isabella for release in response to water orders from the District. With construction of the SWP regulated diversions from the Kern River have been supplemented by schedulable deliveries from the Aqueduct, which runs immediately to the west of the GSA (BVGSA 2020).

Conjunctive management within the BVGSA begins with deliveries of surface water from the Kern River and the Aqueduct with these two sources generating an average annual supply sufficient to meet District-wide demands. Thus, during years when supplies are above average, surface water is recharged, and during years when supplies are limited, recharged water is pumped as a supplemental source of supply.

A high proportion of recharge in the BVGSA takes place through seepage from facilities constructed by the BVWSD including canals, laterals and recharge basins. By contrast, due to the low infiltration rate of topsoils in the area, deep percolation of precipitation and irrigation water from farmland is not an important contributor to recharge.

Groundwater Monitoring

DWR's GSP regulations and guidance documents require that monitoring networks be established to monitor each relevant sustainability indicator within the GSA. BVWSD has been monitoring groundwater levels since the early 1990s. Monitoring performed by the BVWSD provides information on diversions of surface water from the Kern River and the SWP, deliveries to users, and groundwater extractions recorded by meters installed on all District and landowner production wells. Additional monitoring is performed by the Buena Vista Coalition to carry out their Groundwater Quality Trend Monitoring Work

Plan in compliance with the Irrigated Lands Regulatory Program. Monitoring is also carried out by the public water agencies within the GSA, notably the Buttonwillow County Water District which serves the Community of Buttonwillow.

BVWSD's groundwater monitoring network and protocols were evaluated and revised during the development of the Buena Vista Groundwater Sustainability Area's GSP and are described in detail in the GSP (BVWSD 2020). The objective of the BVGSA monitoring networks is to gather spatial and temporal data on parameters including groundwater levels, groundwater quality, and land surface elevations sufficient to characterize groundwater conditions as defined by locally established MOs and undesirable results.

The monitoring networks are intended to monitor four relevant undesirable results:

- Chronic lowering of groundwater levels
- Reduction in groundwater storage
- Degraded groundwater quality
- Land subsidence

Groundwater Level Conditions in the Project Area

Groundwater levels in areas north and west of the Recovery Project[5] show a relatively stable to slightly declining trend from 1970 to 2000. Following 2000, groundwater levels have declined by upwards of 100 feet through 2017. It should be noted that this period represents a time of unusually dry climatic conditions culminating in a statewide historic drought period from 2012 through 2016. The drought caused reductions in the local and imported water supplies available to the County which caused an increased demand on groundwater. Hydrographs grouped by geographic location, to the north, east, and in close proximity to the Recovery Project, are shown on **Figure 3-6**.

The middle and lower graphs on **Figure 3-6** shows that groundwater level data for wells in close proximity and to the east of the Recovery Project are generally similar. Overall, the groundwater levels show a variable trend from 1960 to 1993. However, increased banking by BVWSD, WKWD and other nearby agencies following 1993 shows a significant increase in groundwater levels from 1993 to 2000. As noted above, the unusually dry climatic conditions from 2000 to 2016 produced a general declining trend in groundwater levels. However, significant increases are noted in 2005 and 2011 as a result of increased groundwater banking during these unusually wet years due to the increased short-term availability of local and imported surface water supplies.

Multiple researchers have found that the area around the Palms Groundwater Recharge Project and the Recovery Project (the south end of the District, near the Tule Elk Preserve, Eastside Canal, and Main Canal) is hydraulically connected to areas to the south and east (ESA 2010). Groundwater flow directions

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[5] Water level measurements were obtained from DWR's state-wide water level database, and from BVWSD who has measured groundwater levels in nearby wells between two and four times a year since about 1993.

are interpreted from groundwater elevation contours. **Figure 3-7** shows regional groundwater level contours for 2015 for BVWSD (GEI 2017; BVWSD 2016). The groundwater elevations near the Recovery Project are lower than areas to the northwest of the project, indicating that water generally flows in a southeasterly direction. Local groundwater flow direction near the Recovery Project appears to be in an easterly direction. **Figure 3-7** shows that groundwater elevations in the vicinity of the Recovery Project where groundwater levels range from 160 feet above mean sea level (msl) to the west to 110 feet in the southeast corner of the Buttonwillow Service Area. Chapter 9.7 – Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis, includes a detailed analysis of groundwater levels and flow directions in the project area. **Figure 3-8** shows the depth to groundwater map for BVWSD (GEI 2017; BVWSD 2016). In the Recovery Project vicinity, depth to groundwater ranged from over 180 feet below ground surface (bgs) in the southeast to about 130 feet bgs to the northwest. This provides an indication of the potentially available capacity for aquifer storage at the Recovery Project site.

While most of the groundwater pumping within BVWSD is attributable to on-farm pumping from approximately 200 privately-owned wells, BVWSD maintains and operates seven production wells within BVWSD with an eighth well lying outside BVWSD's boundaries along the Alejandro Canal near the Kern River Channel. The majority of irrigation wells in BVWSD are completed to depths between 200 and 600 feet bgs with perforated intervals extending from around 150 feet bgs to the bottom, in a 21-inch-diameter (minimum) bore hole, however none are known to be perforated below the Corcoran Clay. Pumping lifts vary with hydrology and location; however, the average lift has been approximately 100 feet in recent years with pumping lifts being the greatest in the southern portion of the GSA, the area where the Palms Project is located (BVWSD 2014, 2016, 2020).

Figure 3-6. Regional Groundwater Trends near Recovery Project

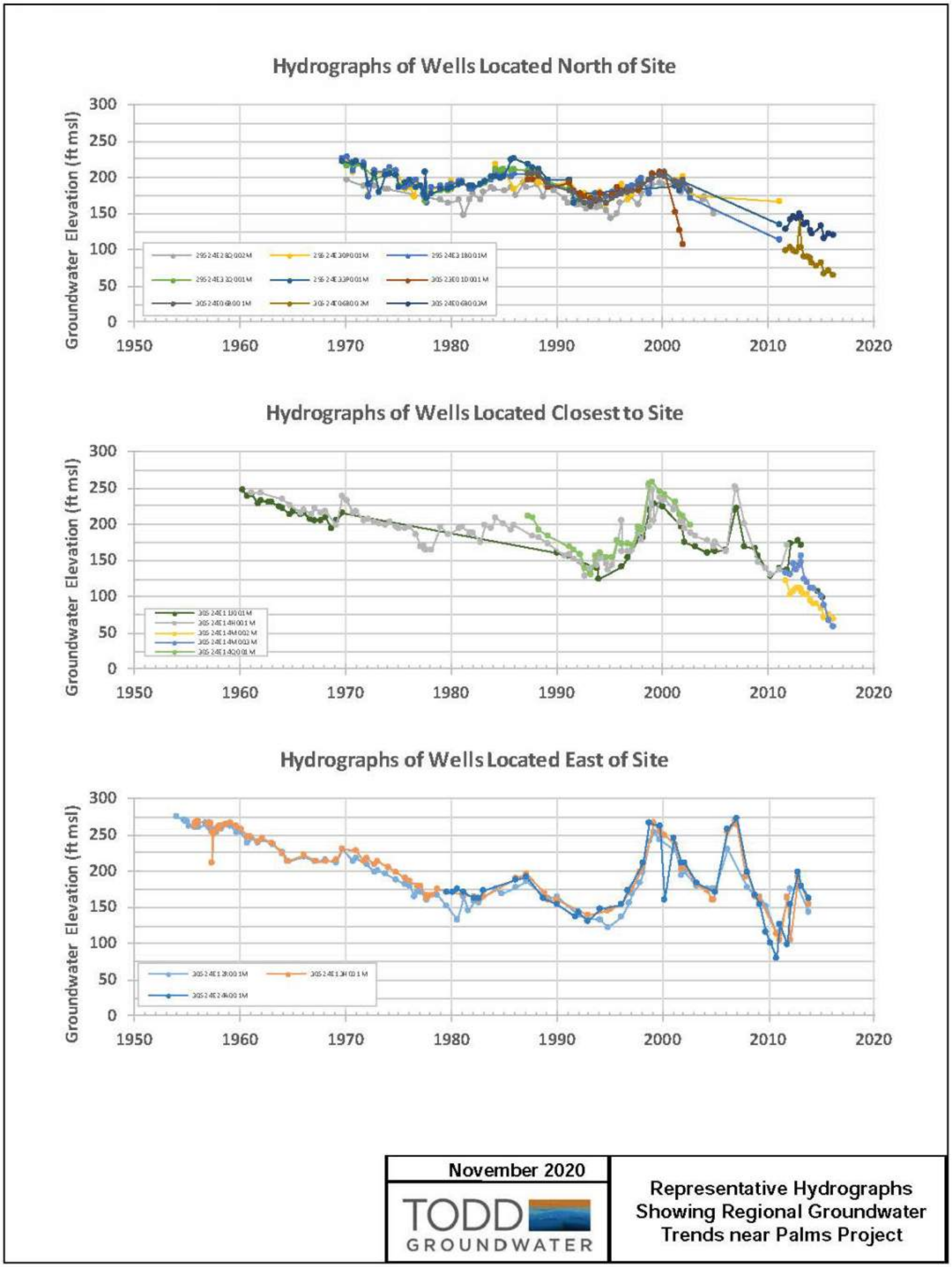


Figure 3-7. Groundwater Elevation Map of the Buena Vista Water Storage District

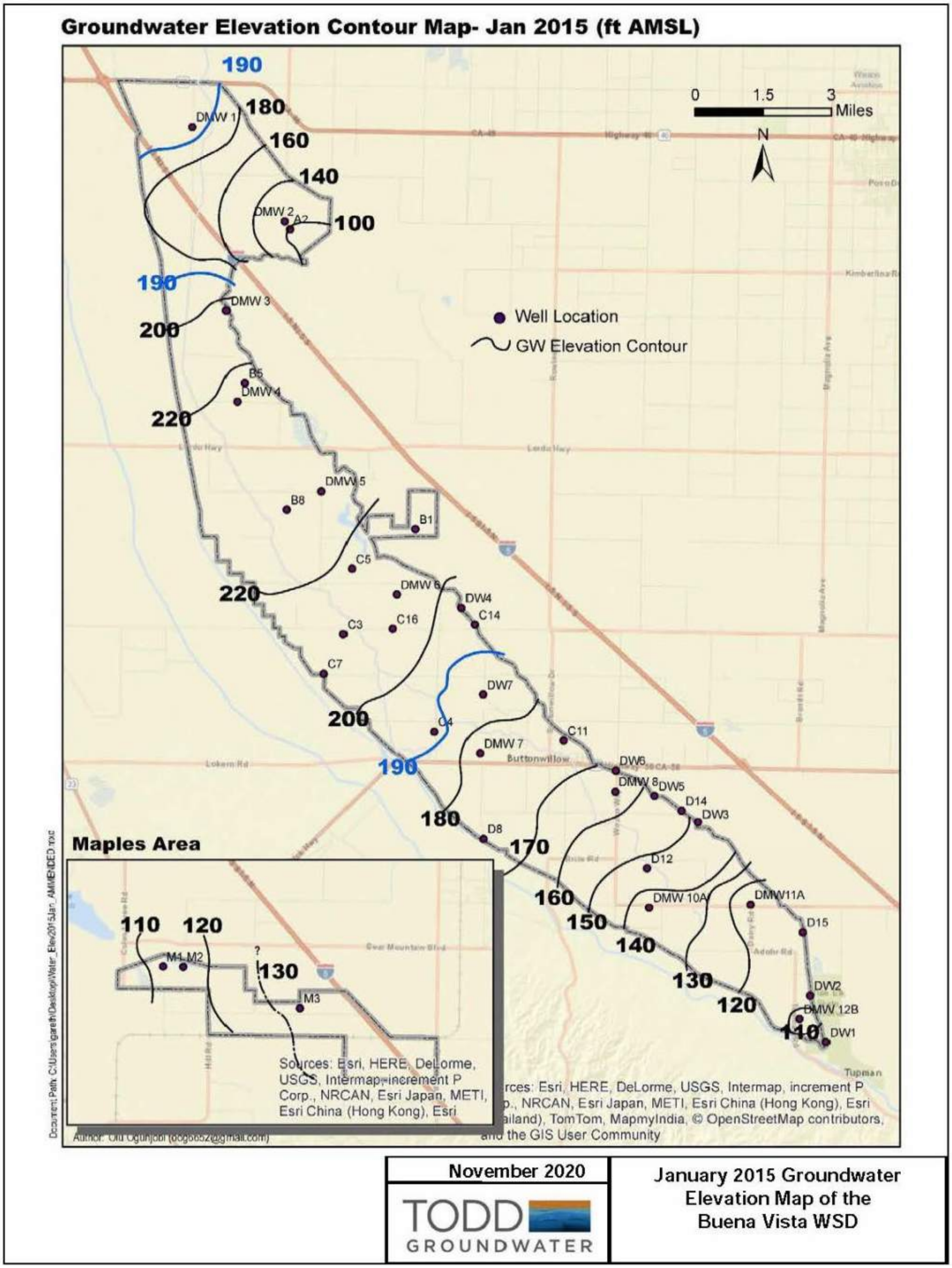
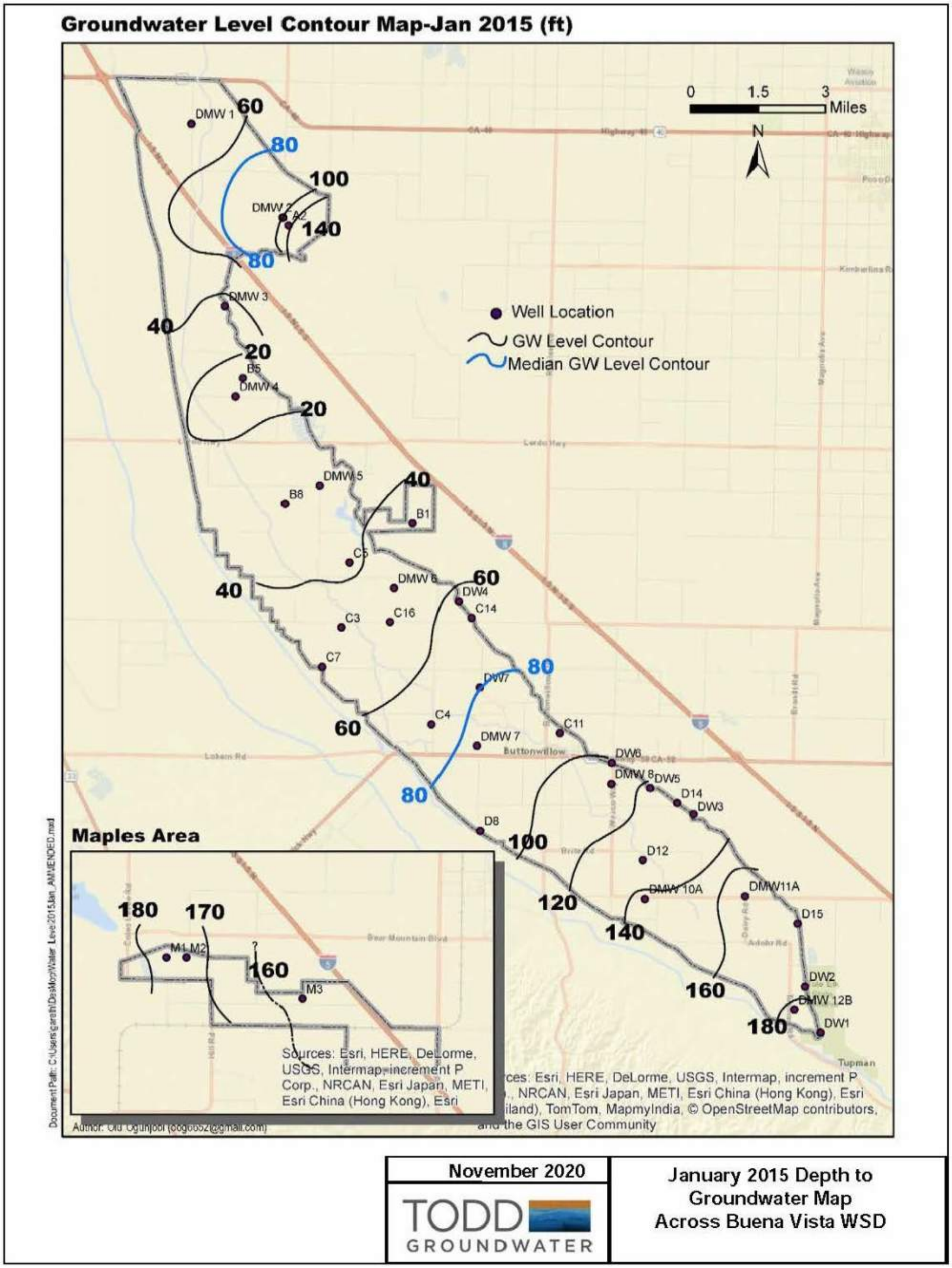


Figure 3-8. Depth to Groundwater, Buena Vista Water Storage District



3.4.1.3 Groundwater Quality

Groundwater in the southern Central Valley can be divided into three groups based on geography: east side, west side, and axial trough (Dale et al. 1966). The Recovery Project is at the western extent of the axial trough bordering the west side of the southern Central Valley. The boundary between the axial trough and west side groundwater may be the District's western border (RWQCB 1986). Consequently, groundwater quality tends to maintain the sulfate-rich characteristics of infiltration from the Coastal/Temblor Range as well as bicarbonate characteristics of the axial trough as it is a mixture of east side and west side groundwater.

To characterize the localized conditions of groundwater quality in the Recovery Project area, water quality from various wells located either within or around the Recovery Project area was evaluated. Wells evaluated were BVWSD's production and monitoring wells, private landowner wells, WKWD's production wells, and a KWBA monitoring well. Historical data was used in the evaluation, however there is a limited amount of data available that is representative of the portion of the Recovery Project area underlying the Palms Project area.

The boundaries for this water quality evaluation are Stockdale Highway on the north, BVWSD's southern boundary on the south, Dunford Road on the west, and Morris Road on the east. The Recovery Project area is divided into two areas – the western area underlying the Palms Project area and the eastern parcels of the Recovery Project area, with the East Side Canal serving as the dividing line.

Monitoring well DMW-13 middle zone was used to represent groundwater quality west of East Side Canal. This well was selected as being representative since it was determined that the newly-constructed Project wells would extract from the middle portion of the aquifer and water quality data for this well is the most representative of the future recovery wells. This is a newer constructed monitoring well, therefore only three sets of sample results were available ranging from one set of results in 2018 and two sets in 2020. Results in 2018 included more constituents, although not a complete set of Title 22 results. In 2020, a limited set of analysis was conducted for arsenic, hardness, EPA 504, gross alpha, agricultural suitability, mass balance, Sodium Adsorption Ratio, total dissolved solids (TDS), and 1,2,3-trichloropropane (TCP).

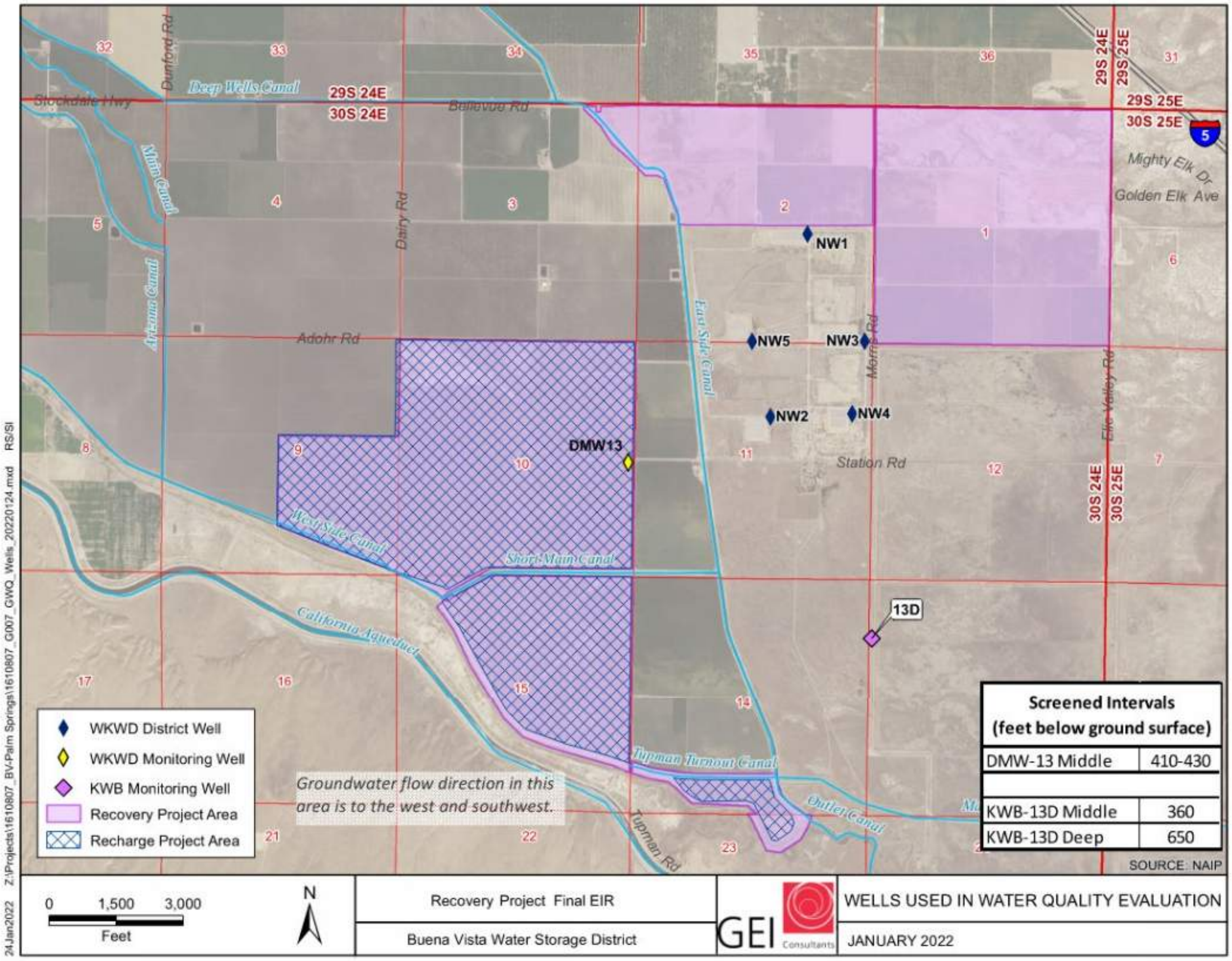
For the wells representing eastern parcels of the Recovery Area, there were five public drinking water wells from WKWD and one monitoring well from KWBA. Since the WKWD wells are regulated by DDW, results are at a more consistent frequency of once every three years. Based on DDW's Drinking Water Database, it appears the WKWD wells used in this evaluation are new since the wells were activated in 2012 and the first sample results are from 2012. Therefore, WKWD available results were from 2012 through 2019.

KWBA well 13D has historical data from early 1990s. KWB 13D has three nested wells representing shallow, middle, and deep. Similar to earlier discussions on the omission of DMW 13 shallow, KWB 13D shallow results were not used for the analysis. For most constituents, it appears samples are conducted annually. However, monitoring is not always consistent among the nested well, especially for the middle zone. Therefore, all historical data was used to have a larger dataset. Full Title 22 results do not appear to available, although a review of available data shows organics such as Volatile Organic Compounds and

Synthetic Organic Compounds may have been sampled in the early 1990s with no results after 1994. For the constituents of concern in the Project Area, results were available for KWB 13D.

At a minimum, sample results for agricultural suitability analysis were available for all wells. Complete Title 22 sample results were available for WKWD wells (NW-1 through NW-5). Title 22 drinking water standards are regulated by State Water Board – Division of Drinking Water.

Figure 3-9. Map of Water Quality Data Sources



In general, groundwater in the Recovery Project area meets drinking water standards and agricultural thresholds (**Table 3-5**). Agricultural thresholds, as established by Ayers and Westcot (1985), are not regulated but are used as a numerical reference for the suitability of water for irrigation use. These thresholds "contain criteria protective of various agricultural uses of water, including irrigation of various types of crops and stock watering. At or below the thresholds presented in the Water Quality Goals database, agricultural uses of water should not be limited" (Ayers and Westcot, 1985).

As shown in **Table 3-5**, water quality is comparable between DMW-13 and wells east of the East Side Canal. All constituents of concern are within the primary and secondary drinking water limits but salinity is higher than the conservative agricultural thresholds recommended by Ayers and Westcot; however, these wells are currently used for irrigation and are suitable for crops with a moderate salt tolerance that are presently planted in the District.

Table 3-5. Water Quality Constituents of Concern in the Project Area

Constituent	Drinking Water Standard	Agricultural Threshold	West of East Side Canal - Average	West of East Side Canal - Max	East of East Side Canal – Average	East of East Side Canal – Max
Antimony (ppb)	MCL = 6	N/A	0	0	0.7 Average	5 Max
Arsenic (ppb)	MCL = 10	100	0	0	2.7 Average	5.6 Max
Bromide (ppm)	N/A	N/A	0.75	0.75	0.09 Average	0.1 Max
Boron (ppm)	NL = 1	0.7	0.15 Average	0.24 Max	0.2 Average	0.5 Max
Chloride (ppm)	250 - 500	106	56 Average	62 Max	75 Average	95 Max
Conductivity (µS/cm)	900 – 1,600	700	981 Average	1100 Max	891 Average	976 Max
Gross Alpha (pCi/L)	MCL = 15	N/A	13.6 Average*	39.4 Max*	11.6 Average	14.6 Max
Hardness (ppm)	Very Hard > 181	N/A	268 Average	320 Max	179 Average	289 Max
Iron (ppb)	SMCL = 300	5000	44	44	80 Average	240 Max
Manganese (ppb)	SMCL = 50	200	49	49	10.9 Average	25 Max
Nitrate as N (ppm)	MCL = 10	N/A	0.04 Average	0.11 Max	4.7 Average	6.8 Max
Sodium (ppm)	DWR = 200	69	108 Average	120 Max	99 Average	123 Max
Sulfate (ppm)	250 - 500	N/A	330 Average	370 Max	257 Average	334 Max
TDS (ppm)	500 – 1,000	450	677 Average	750 Max	589 Average	808 Max
Total Organic Carbon (ppm)	N/A	N/A	N/A	N/A	0.8	0.8
Uranium (pCi/L)	MCL = 20	N/A	5.5	5.5	11 Average	15 Max

Notes: ppm = parts per million; µS/cm = microSiemens per centimeter; NL= notification level; DWR = California Department of Water Resources; N/A = not applicable; TDS = total dissolved solids.
SMCL = Secondary Maximum Contaminant Level, a drinking water standard set based on aesthetic concerns. Some SMCL's have a range of acceptable values, known as Consumer Acceptance Levels. The values presented in Table 3-5 are the Recommended and Upper Limits. The Upper Limit is commonly treated as an MCL.
* There was an outlier gross alpha result that cannot be explained as there are no subsequent sample results. Theoretical blend calculations include the outlier result.

3.4.1.4 Flood Management

The Kern River has been subject to flooding from storms and snowmelt in portions of its watershed. Flooding of the Kern River has resulted from high-intensity winter rainstorms which generally occur from November through April. Flooding can also be caused by snowmelt, which occurs in the late spring and early summer months. However, snowmelt is less damaging because it has a longer period of runoff and a lower peak than rain floods and due to operation of Isabella Dam, a USACE facility built and managed to regulate flows in the Kern River. Within the past 40 years, seven major floods have occurred including, the 1998 flood caused by the El Niño weather pattern. These floods have been investigated by the Kern

County Water Agency and the USACE. Since 1971, the U.S. Department of Housing and Urban Development (HUD) has designated the unincorporated portions of the County as a special flood hazard area. In compliance with the Federal Flood Insurance Program, HUD has provided the County with a series of 83 Flood Hazard Boundary Maps. These maps delineate major areas of flooding throughout the County.

The project site is relatively flat with an elevation of approximately 280 feet above msl. The project site is not located within a 100-year flood zone and is mapped as Zone X (area of minimal flood hazard) (FEMA 2011). The project site is not mapped within a dam inundation zone (DWR 2020a). The project site is not in a coastal area and is outside the tsunami hazard zone. Additionally, there are no water bodies on or near the project site large enough to be subjected to a seiche, as a result of an earthquake.

3.4.2 Regulatory Framework

3.4.2.1 Federal Plans, Policies, Regulations, and Laws

Federal Clean Water Act

The CWA (33 U.S.C. § 1251 et seq.), formerly the Federal Water Pollution Control Act of 1972, was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the U.S. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the N.P.D.E.S. permit process (CWA § 402). CWA Section 401 regulates surface water quality and a Water Quality Certification is required for federal actions (including construction activities) that may entail impacts to surface water. In California, N.P.D.E.S. permitting authority is delegated to, and administered by, the State Water Board and the nine RWQCBs.

National Pollutant Discharge Elimination System

The objective of the N.P.D.E.S. program is to control and reduce discharges of pollutants to water bodies in surface water discharges. Under the CWA Section 402, the State Water Board and RWQCBs have been delegated authority by EPA to implement and enforce the N.P.D.E.S. program within California. The State Water Board adopted Construction General Permit Order 2009-009-DWQ on September 2, 2009, and it became effective on July 1, 2010. Order 2009-009-DWQ was subsequently amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ. The 2009 order superseded Order 99-08-DWQ. The Construction General Permit Order includes the following requirements:

- Establishment of three project risk levels based on erosion potential of the project site and sensitivity of receiving waters
- Monitoring and reporting requirements based on project type and risk level, which may include analyzing samples of discharges and receiving waters
- Certification and training requirements for personnel preparing and implementing SWPPPs
- Postconstruction performance standards for the quality, quantity, and intensity of stormwater discharges
- Option for obtaining a rainfall erosivity waiver for projects that meet specific requirements

- Technology-based numeric action levels
- Specified minimum requirements for BMPs
- Site-specific soil characterization for determination of project risk levels
- Requirement for rain event action plans for risk level 2 and 3 projects
- Increased annual reporting and compliance certification requirements
- Documentation of final site stabilization based on percentage of stabilized area, analysis using the Revised Universal Soil Loss Equation (commonly referred to as RUSLE) model, or custom methods

These requirements seek to ensure that the construction and postconstruction conditions at a project site do not cause or contribute to direct or indirect impacts on water quality (i.e., pollution and/or hydromodification) upstream and downstream. To comply with the requirements of the Construction General Permit, developers must file a notice of intent with the State Water Board to obtain coverage under the permit; prepare a SWPPP; and implement inspection, monitoring, and reporting requirements appropriate to the project's risk level as specified in the SWPPP. The SWPPP includes a site map, describes construction activities and potential pollutants, and identifies BMPs that will be employed to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby water resources, such as petroleum products, solvents, paints, and cement.

3.4.2.2 State Plans, Policies, Regulations, Laws

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act defines water quality objectives as, "...the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area" (Water Code Section 13050(h)). It also requires the Regional Water Board to establish water quality objectives, while acknowledging that it is possible for water quality to be changed to some degree without unreasonably affecting beneficial uses.

The Water Quality Objective applicable to this project is the State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California (Antidegradation Polity).

The State Water Board General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit), Order 2009-009-DWQ as amended by Order Nos. 2010-0014-DWQ and 2012-0006-DWQ, applies to land-disturbing construction activities that would affect 1 acre or more and discharge stormwater to waters of the U.S. (*refer to* Chapter 3.3.2.1 – Federal Plans, Policies, Regulations, and Laws). The Central Valley RWQCB may also issue site-specific WDRs, or waivers to WDRs, for certain discharges to land or waters of the state.

Water Quality Control Plan

The Water Quality Control Plan for the Tulare Lake Basin (Basin Plan) designates beneficial uses in the Hydrologic Units of the Tulare Lake Basin. The Eastside Canal divides Hydrologic Units 257 and 258 in the Recovery Project Area. Beneficial uses of groundwater in Hydrologic Unit 258 are Municipal and Domestic Supply (MUN), Agricultural (AGR), Industrial Supply (IND) and Industrial Process Supply (PRO). The eastern parcels of the Recovery Project area are on the western boundary of Hydrologic Unit 257 which adds Water Contact Recreation (REC-1) in addition to beneficial uses listed for Unit 258 (RWQCB 2018).

The Basin Plan includes numerical and narrative water quality objectives for physical and chemical water quality constituents. The entire Recovery Project area is within the Tulare Lake Basin Ground Water Hydrographic Unit Westside South. Numerical objective for groundwater quality is set for Salinity, which is expressed as electrical conductivity and a maximum average annual increase in electrical conductivity of 1 micromoh per centimeter. Narrative objectives for groundwater are set for bacteria, chemical constituents (Title 22), pesticides, radioactivity, salinity, and tastes and odors.

Sustainable Groundwater Management Act

SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. DWR designates the Kern County Subbasin as a critically over-drafted basin, meaning it must achieve sustainability by 2040.

The BVGSA has been created to manage groundwater for a portion of the Kern County Subbasin (Basin Number 5-22.14, DWR Bulletin 118) within the San Joaquin Valley Groundwater Basin and is the exclusive GSA within its territory with powers to comply with SGMA (§ 10723[c][1][D]). The BVGSA notified the DWR of its intent to undertake sustainable groundwater management under SGMA and was granted exclusive GSA status under SGMA (§ 10723(c)).

Under SGMA, sustainable management of groundwater through attainment of a locally defined sustainability goal is assessed though monitoring of six sustainability indicators presented in the SGMA legislation. Undesirable results occur when conditions related to any of the sustainability indicators become significant and unreasonable on a scale that jeopardizes sustainable groundwater management basin wide. Therefore, determining whether a groundwater basin is being managed sustainably relies on monitoring of sustainability indicators at locations throughout the basin.

The four sustainability indicators of interest within the BVGSA have been defined to fit the conditions of the Kern County Groundwater Subbasin, using language agreed upon by each of the GSAs within the Subbasin, as follows:

- Chronic lowering of groundwater levels: The point at which significant and unreasonable impacts over the planning and implementation horizon, as determined by depth to water, affect the reasonable and beneficial use of, and access to, groundwater by overlying users. Declining groundwater levels during a prolonged drought are not alone sufficient to confirm a chronic lowering of groundwater levels. Extractions and groundwater recharge can be managed to ensure that reductions in groundwater levels or storage during a drought are offset by increases in groundwater levels during other periods.

- Significant and unreasonable reduction of groundwater storage: The point at which significant and unreasonable impacts, as determined by the amount of groundwater in the Subbasin, affect the reasonable and beneficial use of, and access to, groundwater of overlying users over an extended drought period.
- Significant and unreasonable degraded water quality: The point at which significant and unreasonable impacts over the planning and implementation horizon, as caused by water management actions, affect the reasonable and beneficial use of, and access to, groundwater by overlying users.
- Significant and unreasonable subsidence: The point at which significant and unreasonable impacts, as determined by a subsidence rate in the Subbasin, that affect the surface land users or critical infrastructure.

3.4.2.3 Regional and Local Plans, Policies, Regulations, and Ordinances

Department of Water Resources Bulletin 74-81 and Bulletin 74-90

DWR Bulletin 74-81, established in December 1981, developed standards for the construction, maintenance, and destruction of wells. These standards were developed to reduce groundwater quality deterioration. While wells themselves do not contribute to poor water quality, the inadequate construction or improper destruction can result in the deterioration of groundwater. Additionally, Bulletin 74-90, established in June 1991, is a supplement to DWRs Bulletin 74-81. Bulletin 74-90 was developed to satisfy DWRs contract with the State Water Board in which DWR was responsible for the review and update of water well standards in Bulletin 74-81, establishment of minimum standards for monitoring wells, and update and replacement of cathodic protection well standards in Bulletin 74-1. Additionally, Bulletin 74-90 was developed to respond to DWRs responsibilities under the Water Code in which DWR is responsible for developing standards for wells for the protection of water quality under Section 231, and to keep pace with technical advances during the 10-year period following publication of Bulletin 74-81. The Bulletin 74-90 supplement is to be used together with Bulletin 74-81 for a complete description of DWR water well standards. Monitoring well standards are presented separately in the Bulletin 74-90 supplement and are in parallel form to the water well standards. Cathodic protection well standards in the Bulletin 74-90 supplement replace those in Bulletin 74-1.

DWR Water Quality Policy for Acceptance of Non-Project Water into the State Water Project

It is the DWR policy to assist with the conveyance of water to provide water supply and to protect the SWP water quality within the Aqueduct. In order to facilitate this policy, DWR provides an implementation process to accept Non-Project water into the Aqueduct. The policy provisions are as follows:

- DWR shall consider and evaluate all requests for Non-Project water that will be pumped into the Aqueduct. Non-Project water is considered to be any water input into the Aqueduct that is not directly diverted from the Sacramento-San Joaquin Delta or natural inflow into SWP reservoirs.
- A proposal for any Non-Project water shall demonstrate that the water is of consistent, predictable, and acceptable quality.

- DWR will consult with SWP, existing Non-Project participants, and State Water Resources Control Board – Division of Drinking Water on drinking water quality issues relating to Non-Project water as needed to assure protection of SWP water quality.
- DWR's policy does not authorize the objectives of Article 19 of the SWP water supply contracts or drinking water MCLs to be exceeded.
- The policy shall not constrain the ability of DWR to operate the SWP for its intended purposes and shall not adversely impact SWP water deliveries, operation, or facilities.

When evaluating Non-Project water proposals for input into the Aqueduct, DWR uses a two-tiered approach. A Tier 1 PIP has water quality that is essentially the same or better than what is in the Aqueduct: PIPs deemed Tier 1 are approved by DWR. Tier 2 PIP has different and possibly worse water quality than what is in the Aqueduct. Tier 2 PIPs are referred and reviewed by a Non-Project Facilitation Group who, if needed, makes recommendations to DWR in consideration of the PIP. Tier 2 PIP must demonstrate that the lower quality water with constituents exceeding MCLs is either treated or blended with better quality water so that the SWP water will not be degraded.

DWR uses a stakeholder process to review and approve the water quality agreements. This allows downstream water users to voice concerns over impacts to the water they receive. From those concerns, a negotiated agreement may be reached to minimize impacts to water users while still allowing some transfer to occur.

Kern County Well Permits

DWR has responsibility for developing standards for wells for the protection of water quality under California Water Code Section 231. All counties and cities and water agencies, where appropriate, were required to adopt a well ordinance that meets or exceeds DWR's Water Resources Bulletin 74-81, "Water Standards: State of California" and Bulletin 74-90. Kern County Environmental Health Department has well-permitting authority in the Kern County Subbasin for new and replacement wells and well destruction. Kern County Ordinance Code, Section 14.08, describes well drilling permit requirements. The following requirements apply:

- Except as otherwise provided, it is unlawful for any person or contractor acting on his behalf to construct, reconstruct, deepen or destroy any well described in Section 14.08.116 or cause any of these acts to be done without first having filed a valid application for a permit with the County public health services department and having received approval to begin work.
- Every permit shall be deemed to be conditioned upon compliance with the requirements of Article III of this chapter, except that permits issued to construct, reconstruct, deepen or destroy cathodic protection wells and hazardous material monitoring wells shall be deemed to be conditioned on compliance with the respective reference documents specified in Sections 14.08.220 and 14.08.230.
- The safe and appropriate handling and disposal of drilling fluids and other drilling materials used in connection with the permitted work shall be required as a condition of the permit.

- Any abandoned wells located on the property for which a permit to construct or reconstruct a well has been issued shall be destroyed in accordance with the standards provided in Section 14.08.360 as a condition of that permit.
- It shall be the responsibility of the permittee to maintain a copy of the permit on the drilling site during all stages of construction or destruction.
- The health officer may prescribe additional permit conditions if the health officer determines that they are required to prevent degradation of underground waters as provided for in Section 14.08.010.

Kern County General Plan

The Kern County General Plan (2009) includes the following policies that pertain to hydrology and water quality and are relevant to this analysis.

Physical and Environmental Constraints

GOAL 1: To strive to prevent loss of life, reduce personal injuries, and property damage, minimize economic and social diseconomies resulting from natural disaster by directing development to areas which are not hazardous.

- Policy 11. Protect and maintain watershed integrity within the County
- Implementation Measure C. Cooperate with the Kern County Water Agency to classify lands in the County overlying groundwater according to groundwater quantity and quality limitations.

Public Facilities and Services

GOAL 1: Ensure that adequate supplies of quality (appropriate for intended use) water are available to residential, industrial, and agricultural users within the County.

- Policy 11. Protect and maintain watershed integrity within the County

Resources

- Policy 10. To encourage effective groundwater resource management for the long-term economic benefit of the County the following shall be considered:

  (a) Promote groundwater recharge activities in various zone districts.

  (b) Support for the development of Urban Water Management Plans and promote DWR grant funding for all water providers.

  (c) Support the development of groundwater management plans.

  (d) Support the development of future sources of additional surface water and groundwater, including conjunctive use, recycled water, conservation, additional storage of surface water and groundwater and desalination.

- Policy 11. Minimize the alteration of natural drainage areas. Require development plans to include necessary mitigation to stabilize runoff and silt deposition through utilization of grading and flood protection ordinances.

Surface Water and Groundwater

- **Policy 33.** Water related infrastructure shall be provided in an efficient and cost-effective manner.
- **Policy 34.** Ensure that water quality standards are met for existing users and future development.
- **Policy 35.** Ensure that adequate water storage, treatment, and transmission facilities are constructed concurrently with planned growth.
- Ensure that appropriate funding mechanisms for water are in place to fund the needed improvements resulting from growth and subsequent development.
- **Policy 37.** Ensure maintenance and repair of existing water systems.
- **Policy 39.** Encourage the development of the County's groundwater supply to sustain and ensure water quality and quantity for existing users, planned growth, and maintenance of the natural environment.
- **Policy 40.** Encourage utilization of community water systems rather than the reliance on individual wells.
- **Policy 43.** Drainage shall conform to the Kern County Development Standards and the Grading Ordinance.

Implementation Measure U. The Kern County Environmental Health Services Department will develop guidelines for the protection of groundwater quality which will include comprehensive well construction standards and the promotion of groundwater protection for identified degraded watersheds.

Implementation Measure Y. Promote efficient water use by utilizing measures such as:

(c) Requiring water-conserving design and equipment in new construction.

(d) Encouraging water-conserving landscaping and irrigation methods.

(e) Encouraging the retrofitting of existing development with water conserving devices.

3.4.3 Environmental Impacts and Mitigation Measures

3.4.3.1 Thresholds of Significance

Significance criteria are based on Appendix G of the CEQA Guidelines. A project alternative would have a significant impact on hydrology and water quality if implementing the alternative would:

- Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

- result in substantial erosion or siltation on- or off-site
- substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite
- create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or impede or redirect flood flows

- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation
- Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. For the Recovery Project, groundwater level drawdown would be considered a significant impact if it could result in groundwater levels falling below MTs as specified in a GSP.

3.4.3.2 Issues Not Discussed Further

The June 2020 IS (**Appendix B**) evaluated potential impacts to hydrology and water quality and found either less-than-significant impacts or no impacts to several thresholds of significance, specifically:

- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces. The Recovery Project will not alter the existing drainage pattern of the area, therefore there will be no impact and this topic will not be evaluated further in the EIR.
- In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation. The IS found the Recovery Project to have no impact.

These potential impacts will not be discussed further in this DEIR.

Comments were received on the NOP (**Appendix B**) expressing concern about groundwater levels and water quality. In response to those comments, groundwater quantity and water quality are discussed in more detail in this FEIR.

3.4.3.3 Groundwater Level Analysis Methodology

Modeling Approach

A superposition modeling approach was selected as the most suitable method to support the groundwater impacts analysis. The superposition approach enables the Recovery Project-related changes to be calculated throughout the basin and superimposed upon the groundwater system so that the accumulated effects of the Recovery Project over time can be determined. The Superposition Model was used as a screening model to evaluate various alternatives for the recovery of banked groundwater from the Recovery Project. For the Recovery Project, the various alternatives to pump the recharged groundwater at a rate up to 25,000 AFY for use by BVWSD. Additional details on the approach, setup and validation of the Superposition Model are presented in **Appendix D**, Attachments A, B, and C.

The modeling used to simulate the potential groundwater level impacts of the Recovery Project is based on the principle of superposition. The principle of superposition, as applied to a groundwater system, means that the result of multiple stresses on an aquifer system is equal to the sum of the results of the individual stresses. Additional information about applying the principle of superposition to numerical groundwater models is provided in Attachment A of **Appendix D**.

Superposition allows the groundwater impacts analysis to assess the effects of the Recovery Project on the groundwater system in isolation from other acting stresses (e.g., pumping, recharge, etc.) without having to obtain data of non-project related stresses to simulate the Recovery Project. Using a superposition model, calculation of groundwater impacts is inherently precise because flow quantities other than Recovery Project related components are set to zero (Leake 2011).

When the Principle of Superposition is used in groundwater modeling, the model results are presented in terms of change in groundwater levels rather than in absolute values of groundwater elevations. Therefore, the model results provide the relative change in groundwater levels due to the Recovery Project; in other words, a superposition model directly calculates the groundwater level impacts from the Recovery Project. By applying the Principle of Superposition, the relative change in groundwater levels can be added (superimposed) to measured or simulated groundwater elevations to determine a predicted groundwater elevation associated with Recovery Project impacts. This means that calculated changes in groundwater levels can then be added to other groundwater level distributions to determine the combined effects on the groundwater system (Reilly et al. 1987).

Groundwater Model Setup

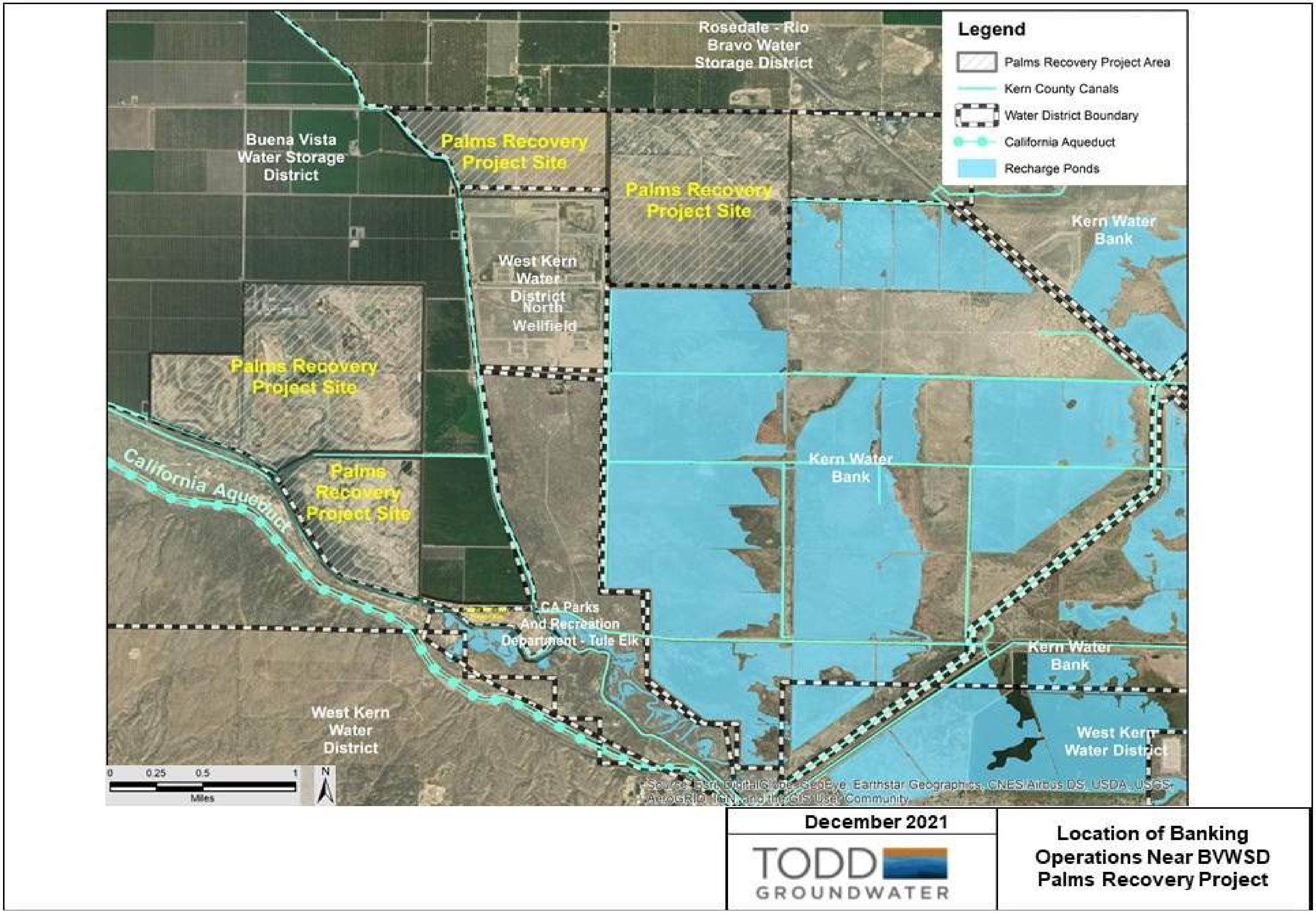
The Superposition Model used for the Recovery Project was previously developed and used for a recent CEQA analysis Supplemental EIR (for the Kern River Water Allocation Plan for Kern Delta Water District). The Draft Supplemental EIR was completed in 2017 (ESA 2017), and the description of the groundwater modeling used was included in the Groundwater Impacts Assessment Report (Todd Groundwater 2017). Following the general methodology for applying superposition methods to groundwater modeling (Reilly et al. 1987), the Kern County Superposition Model was developed from the existing, previously calibrated, USGS Central Valley Hydrologic Model (CVHM) (Faunt 2009). CVHM is a three-dimensional computer model developed by the USGS to simulate surface water and groundwater flow across the entire Central Valley (Faunt 2009). The geologic framework and aquifer properties of CVHM are based on a comprehensive geologic analysis (USGS Sediment Texture Analysis) that provides a regionally consistent evaluation of aquifer properties based on the analysis of local well logs (Faunt, Hanson, and Belitz 2009). Additional details on the setup and modifications of the Superposition Model are presented in Attachment B of **Appendix D**.

Superposition Model Validation

Although the underlying CVHM Base Model was calibrated by the USGS to data obtained throughout the Central Valley – presumably using reasonable care in developing the geologic framework and determining aquifer properties – it is appropriate to demonstrate that the use of the Kern County Superposition Model built from the CVHM for the specific objectives of this impact analysis reasonably reproduces historical groundwater level changes. Details on the setup and results of the Validation Scenarios are presented in **Appendix D**, Attachment C.

An initial validation scenario compared an analytical model simulation based on pumping tests at the WKWD North Wellfield which is located adjacent to the Recovery Project (**Figure 3-9**). The WKWD simulations projected the pumping test results for evaluating the potential drawdown for operating the WKWD North Wellfield.

Figure 3-10. Location of Banking Operations Operated by Others, near the Recovery Project[6]



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[6] The Palms Groundwater Recharge Project is operated by the Buena Vista Water Storage District

In July 2020, WKWD provided additional detailed data on aquifer testing, groundwater pumping and measured water levels for the North Wellfield. The pumping data from the five WKWD groundwater production wells was provided from October 2012 through December 2014. This period was the beginning of a significant drought, and groundwater pumping associated with the nearby groundwater banks was occurring, and the measured groundwater elevations at the WKWD North wells would be affected by this pumping as well. Therefore, the measured groundwater recovery pumping from the groundwater banks was also included in the validation scenario. Based on this comparison, modifications were made to the hydraulic conductivity in the Superposition Model for the BVWSD area as described in Attachments B and C of **Appendix D**.

A previous validation scenario had been constructed to evaluate groundwater level changes resulting from recharge operations at the KWB from 1993 to 1998 (Todd Groundwater 2017). This period represents the initial recharge operations at the KWB and other nearby recharge facilities prior to significant recovery activities. This scenario evaluates the capability of the Superposition Model to simulate the effects of major changes in groundwater levels as a result of managed aquifer recharge. The previous scenario was rerun using the modified hydraulic conductivities from the WKWD validation scenarios.

Since the changes in the validation scenario meet or exceed those produced by the Recovery Project, the validation results are considered to have a relative percentage of uncertainty that is comparable to that of the Recovery Project. The validation scenarios indicate a relative level of uncertainty of approximately 10 to 20 percent (Attachment C of **Appendix D**). This would apply to the overall model results with the acknowledgement that comparisons for a specific location may have a larger range. The model validation demonstrates the capability of the Superposition Model, as it is configured for this study, to reasonably simulate the change in groundwater levels and trends based on the comparison to measured data.

Operational Scenarios

Two operational scenarios were setup and run using the Superposition Model to assess changes in groundwater conditions:

- Scenario A simulates the Recovery Project operations using an assumption of 100% recovery of the recharged water as a worst-case scenario with respect to groundwater level impacts. The simulated recovery pumping occurs at a rate of 25,000 AFY over a 6-month period over 4 consecutive years. This scenario was modeled as a worst-case scenario for impact analysis purposes. Actual recovery would likely extend over a longer time period and therefore have less impact.
- Scenario B, the Reduced Recovery Alternative (*see* Chapter 5.7.2) simulates the Recovery Project operations using an assumption of 90% recovery of the recharged water as a most-likely case scenario with respect to groundwater level impacts. The simulated recovery pumping occurs at a rate of 25,000 AFY over a 6-month period over 3 consecutive years. During Year 4, the simulated recovery pumping occurs at a rate of 15,000 AFY. The same pumping rate occurs during the first 3 months, reduced pumping occurs in the 4th month, and no pumping during the final 2 months of Year 4 of the extraction period. As described for Scenario A, this recovery schedule is anticipated to be the worst-case scenario, with actual recovery extending over a longer time period, with less impact to groundwater levels.

3.4.3.4 Groundwater Level Impact Analysis

The Superposition Model results are presented in terms of change in groundwater levels rather than in absolute values of groundwater elevations. Therefore, the model results provide the relative change in groundwater levels due to the Recovery Project; in other words, a superposition model directly calculates the groundwater level impacts from the Recovery Project. Model results are presented using a variety of maps and graphs to provide for a comprehensive analysis of Recovery Project-related impacts on groundwater resources. Techniques used to present the results of the groundwater impacts analysis are summarized briefly below:

Groundwater Level Change Maps – contour maps that show the simulated change in groundwater levels over the areas in the vicinity of the Recovery Project. This analysis provides a direct assessment of the spatial distribution of groundwater level impacts of the Recovery Project.

Change Hydrographs – hydrographs that show the change in groundwater levels over time for representative locations in the vicinity of the Recovery Project to provide a direct assessment of the magnitude of impacts of the Recovery Project operations on groundwater levels over time.

Superposition Hydrographs – simulated groundwater elevation changes are superimposed onto hydrographs (based on measured groundwater elevation data) to evaluate Recovery Project-related impacts relative to historical groundwater elevation data. This analysis evaluates the scale of the impacts of the Recovery Project compared to the historical variation in groundwater levels in the Study Area over time. The superposition hydrographs are compared to historical data for Scenario B (*see* Chapter 5.8.2 – Reduced Recovery Alternative).

Collectively, these maps and graphs, along with additional model results, illustrate how the Recovery Project will impact groundwater in the vicinity of the Recovery Project. The results of the groundwater impacts analysis using the Superposition Model is summarized below.

Recovery Project Scenario Groundwater Change Maps

A series of groundwater level change maps are provided to show the simulated change in groundwater levels at key intervals during the simulated operations of the Recovery Project to illustrate the spatial distribution of groundwater level change resulting from the proposed Recovery Project operations.

Figure 3-10 shows the distribution of the change in groundwater levels representing the maximum mounding at the end of the Year 1 recharge event. Both Scenarios A and B use the same recharge setup, so **Figure 3-10** is the same for both Scenarios A and B. The contours show the wide areal distribution of these changes in groundwater levels from the distribution of a large area. As a result, the maximum increase of groundwater levels up to 100 feet occur near the center of the Palms Project but mounding of 10 to 50 feet covers a large area of the Palms Project area. Lesser amounts of mounding extend into WKWD and the western areas of the KWB.

Figure 3-11 shows the shows the distribution of the residual mound prior to the initiation of recovery pumping in Year 3. This map is the same for both Scenario A and B. This represents the buildup of groundwater levels as groundwater flows away from the recharge area to the surrounding areas over the 20 months between the end of recharge and the beginning of the recovery.

Figure 3-11. Maximum Mounding After One Year of Recharge

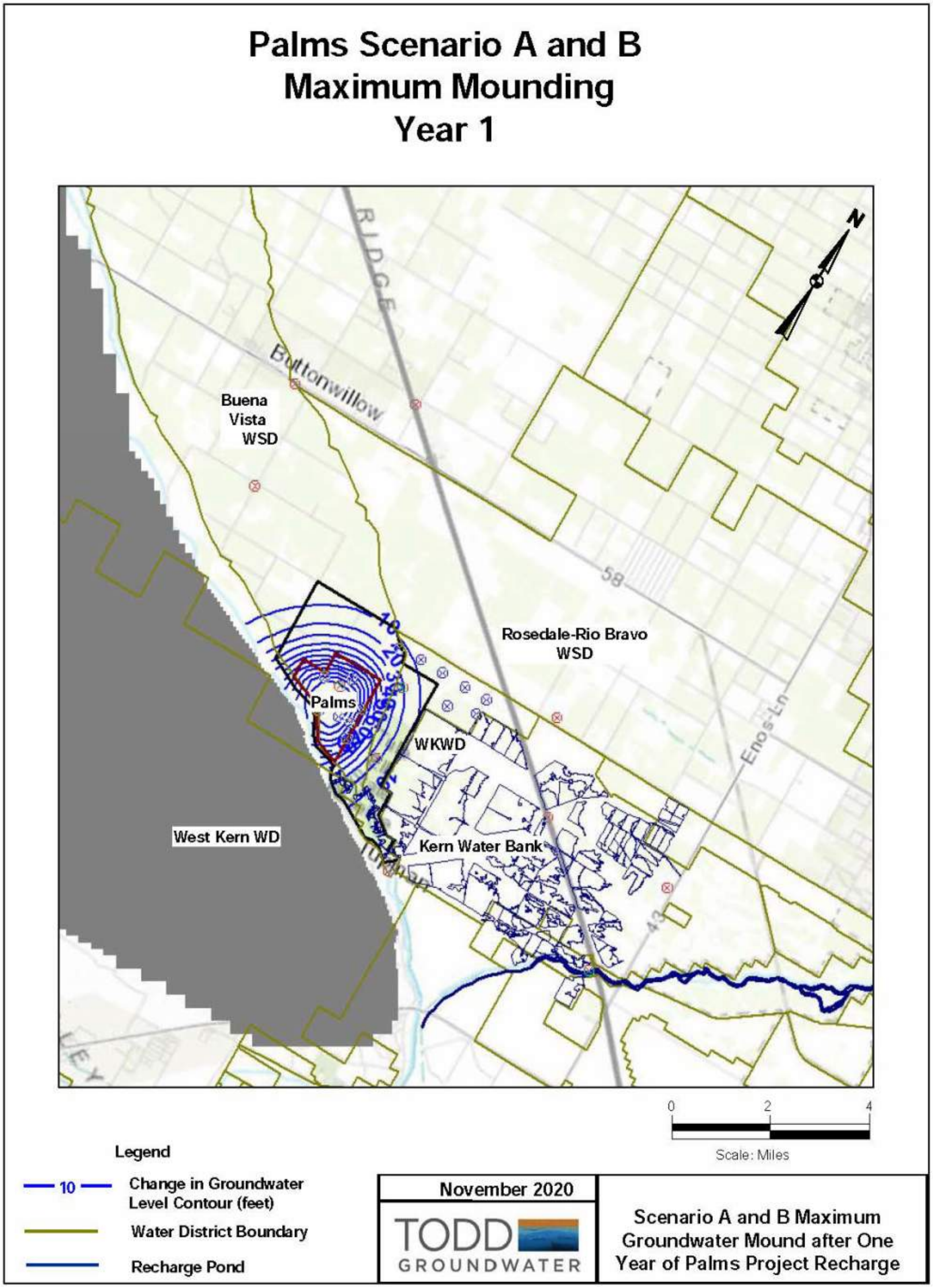


Figure 3-12. Residual Mound Prior to Start of Pumping

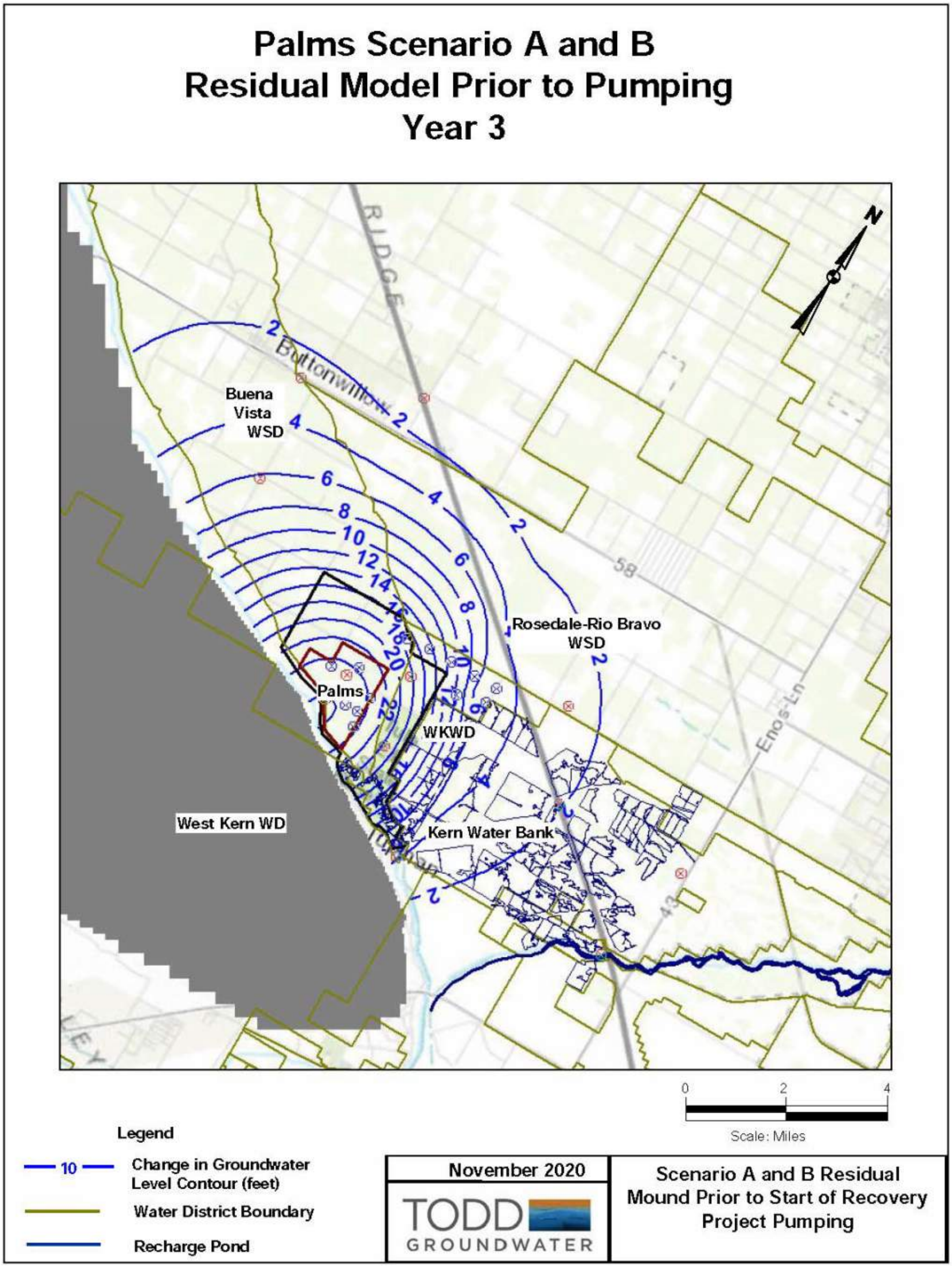


Figure 3-12 shows the distribution of the cumulative groundwater level change for the simulation after the 1st year of recovery pumping in Year 3 of the simulation. This map is the same for Scenarios A and B. Drawdown from Recovery Project pumping in Simulation Year 1 would be relative to the buildup resulting from the recharge (*refer to* **Figure 3-11**). Therefore, the change in groundwater levels relative to the beginning of the scenario as shown on Figure 3-12 show the maximum groundwater level change of less than 10 feet occurs near the recovery wells. Groundwater level declines of 0 to 10 feet occur in the vicinity of the Recovery Project recovery wells. Adjacent areas in WKWD North, RRBWSD, and KWB still have elevated groundwater levels of 0 to 4 feet resulting from the Palms Project's recharge.

Figure 3-13 shows the distribution of the cumulative groundwater level change for Scenario A after Year 4 of recovery pumping in Year 6 of the simulation. The contours show the maximum groundwater level change relative to the start of the simulation of 20 to 35 feet occurs near the recovery wells. The groundwater level declines of 2 to 10 feet cover the area of Recovery Project and extends further into western areas in RRBWSD and across the western half of the KWB primarily west of I-5. An area of the residual mound remains to the north of the Recovery Project in BVWSD.

Figure 3-13. Groundwater Level Change After One Year of Pumping

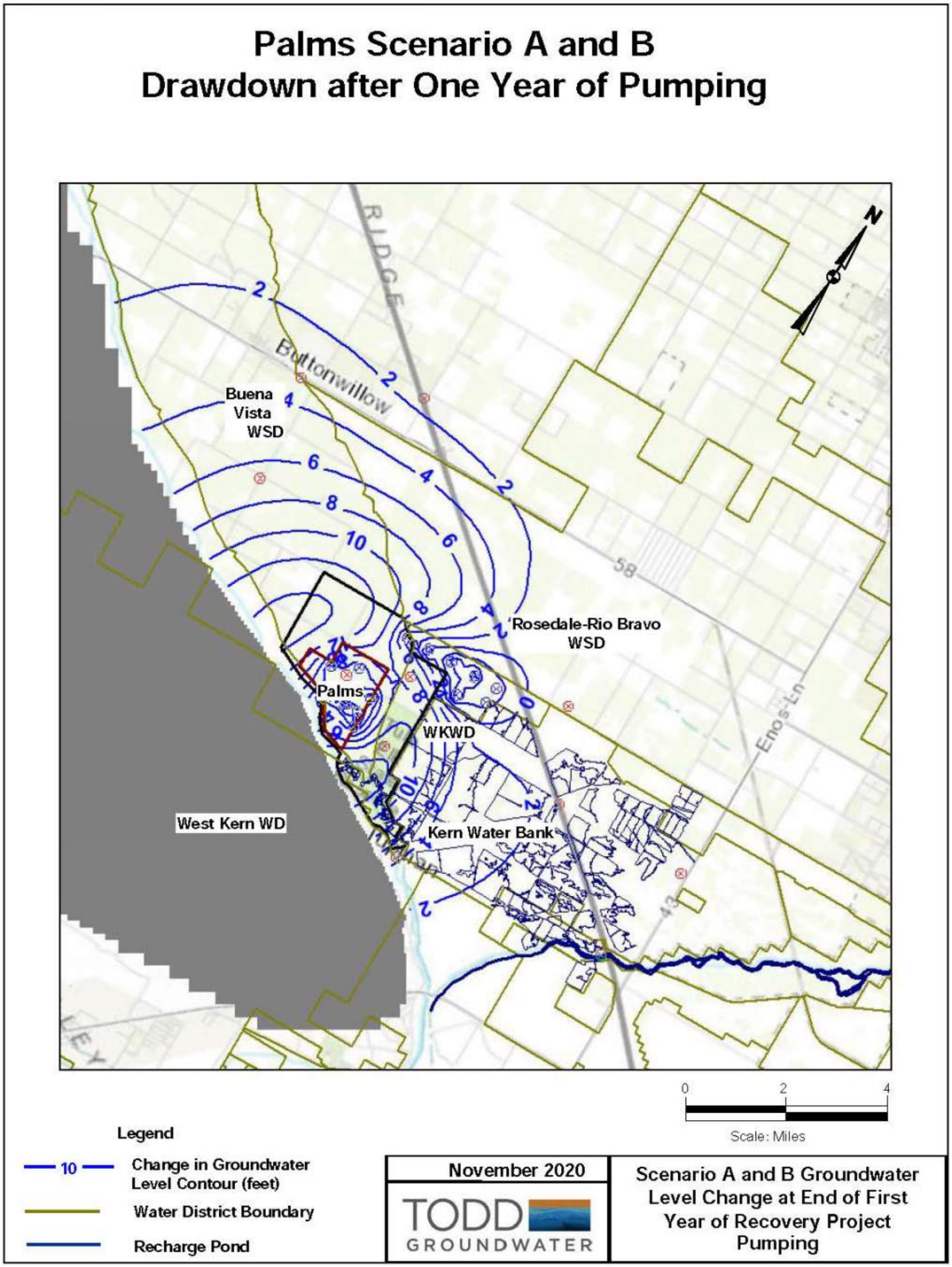
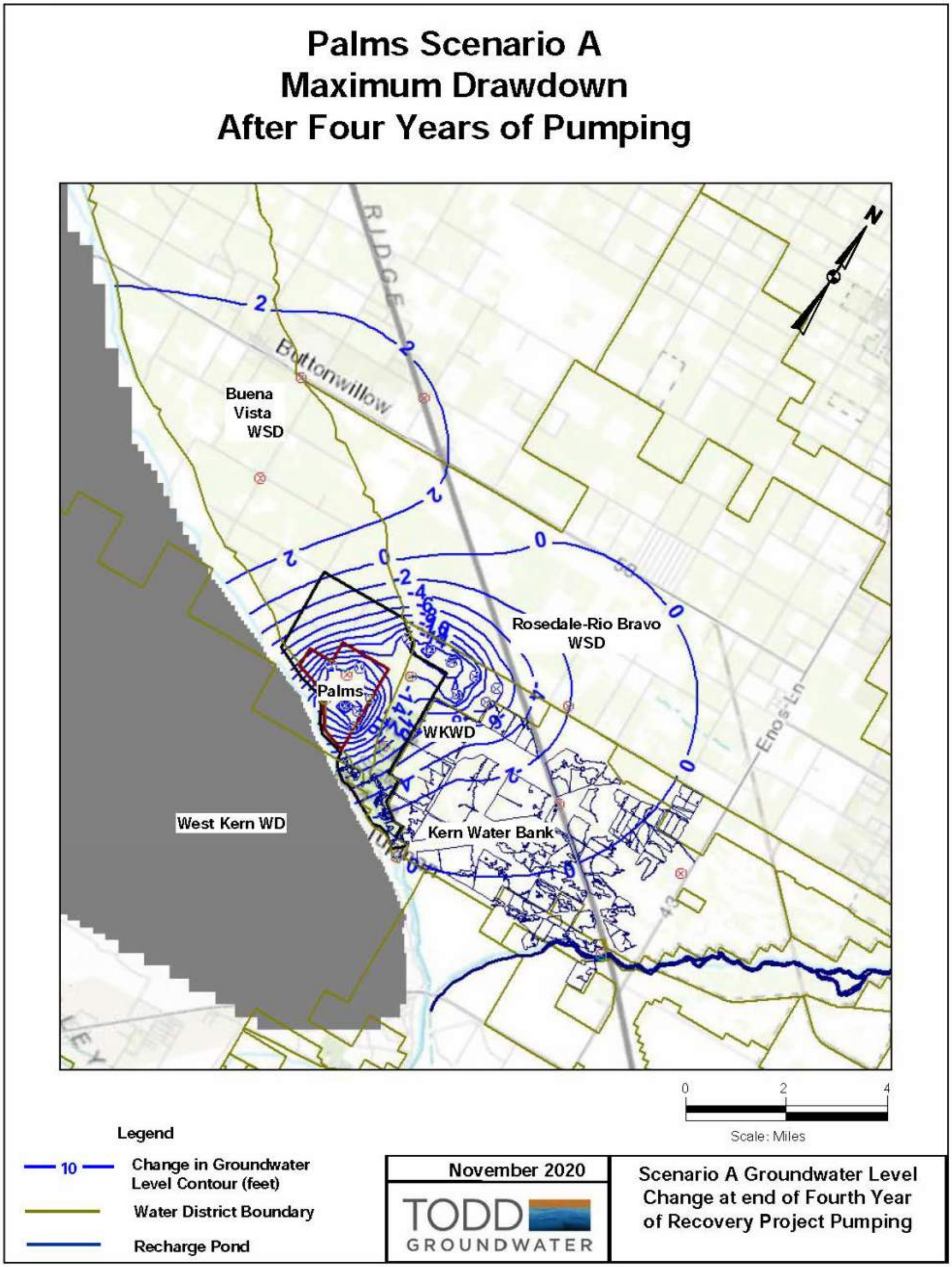


Figure 3-14. Groundwater Level Change After Four Years of Pumping and 100% Recovery of Recharged Water (Scenario A)



Recovery Project Scenario Groundwater Change Hydrographs

The groundwater change hydrographs show the change in groundwater levels over time for representative locations throughout the Study Area as a result of the Recovery Project. This analysis provides a direct assessment of the magnitude of impacts of the Recovery Project on groundwater levels over time in the Study Area.

Figure 3-14 shows the simulated change in groundwater levels at the Recovery Project recovery wells for Scenario A, 100 percent recovery of recharged water[7]. The upper graph on **Figure 3-14** provides the hydrographs for the seven wells located within the original Recovery Project. Here the mounding from the recharge reaches a maximum of about 100 feet at the end of the recharge period and a residual mound of 15 feet remains at the beginning of the first pumping period. Drawdowns over the pumping periods are generally on the order of about 20 feet for all wells. The cumulative groundwater level declines range from 15 to 25 feet over the 4-year pumping period with drawdown increasing with each successive pumping period.

The lower graph on **Figure 3-14** provides the hydrographs for the seven wells located within the northeast Recovery Project. Here the mounding is less. The mounding reaches a maximum of 8 to 28 feet at the end of the recharge period and a residual mound of 7 to 12 feet remains at the beginning of the first pumping period. The drawdowns, however, are on the order of about 20 feet for each successive pumping period reflecting the influence of higher hydraulic conductivities in this area. The groundwater level declines range from 10 to 18 feet over the 4-year pumping period.

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[7] Appendix D, Figure 15 shows the locations of the simulated Recovery Project Recovery Wells used for the Palms Scenario including interim reference names. There are two areas of pumping. One is located adjacent to the Palms Recharge Ponds and the second area is an annexed area to the northeast where BVWSD has purchased property for the Recovery Project.

Figure 3-15. Groundwater Level Change at Recovery Wells, 100% Recovery of Recharged Water (Scenario A)

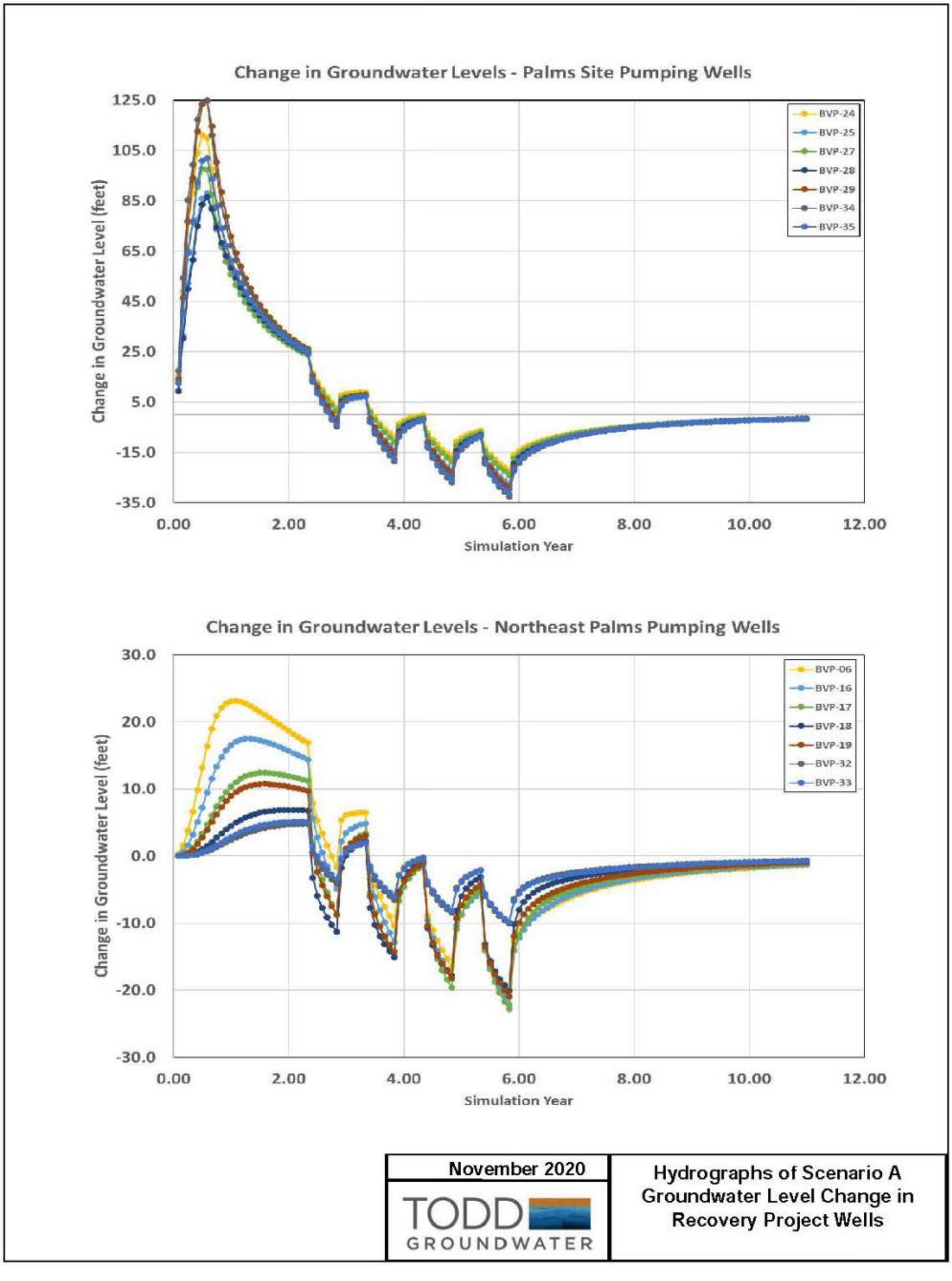
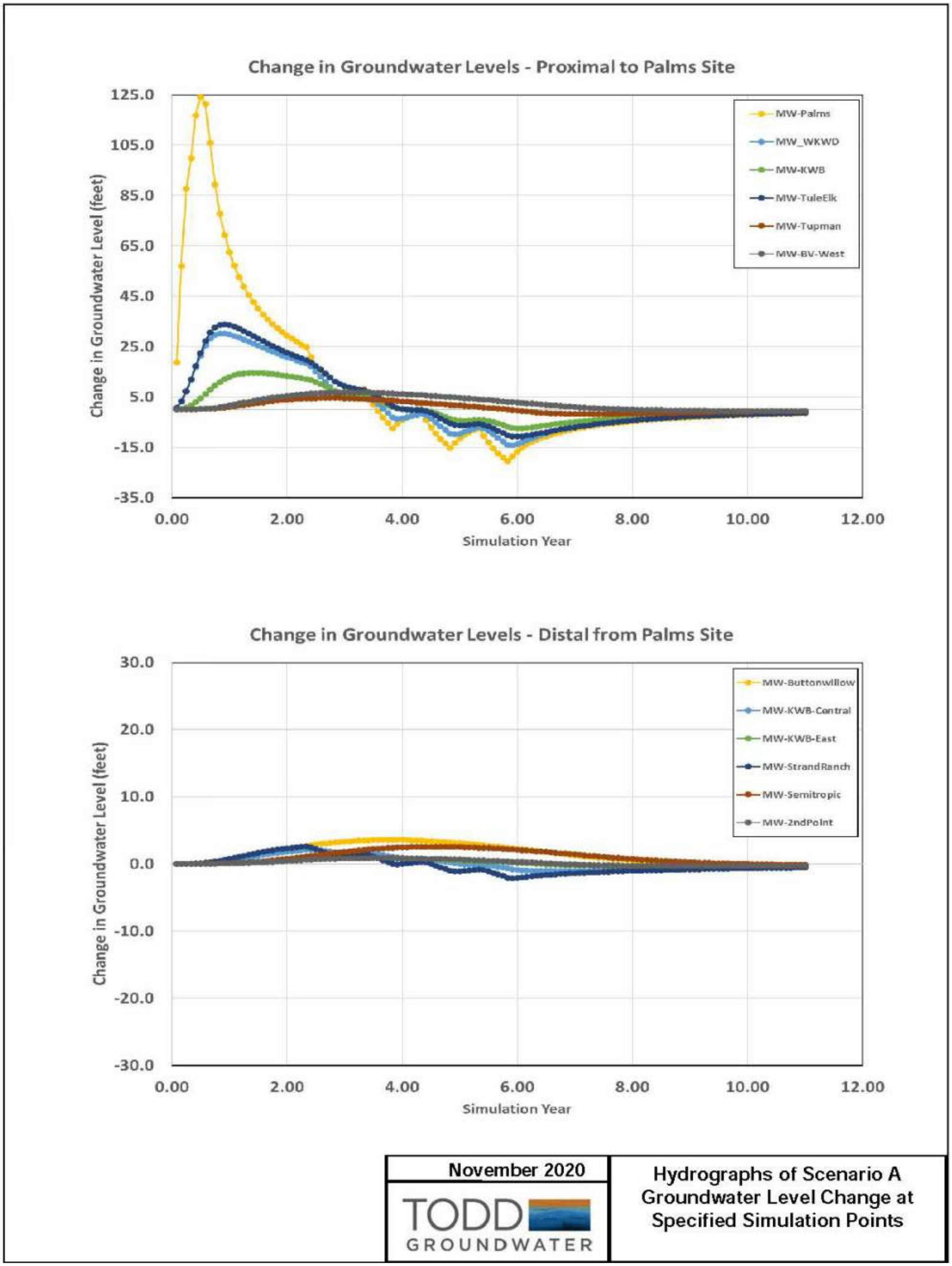


Figure 3-15 shows the simulated change in groundwater levels produced by the Superposition Model for the Recovery Project Scenario at the simulated monitoring points[8]. The upper graph on **Figure 3-15** provides the hydrographs for the six simulated monitoring points located proximal to the Recovery Project site. The simulated monitoring points located nearest to the recovery wells show responses similar to the recovery wells. At greater distances away from the Recovery Project Site, the effects of the Recovery Project operations produce lesser amounts of mounding and drawdown. This is also seen on the lower graph on **Figure 3-15** where the responses show groundwater level changes of 5 feet or less. Groundwater levels gradually recover at the end of the 4-year cycle of pumping.

[8] Appendix D, Figure 18 shows the locations of the simulated monitoring points placed in the Superposition to help with understanding the spatial distribution of response the Recovery Project operations. These do not reflect actual monitoring points; however, future simulations would include monitoring points at specific locations of interest for the groundwater impacts assessment.

Figure 3-16. Groundwater Level Change at Simulated Monitoring Points, 100% Recovery of Recharged Water (Scenario A)



The results of the Recovery Project Scenarios indicate that most of the drawdown associated with the recovery wells occurs within and adjacent to BVWSD and the Recovery Project. The simulation results indicate that drawdowns of 0 to 10 feet would be expected at areas adjacent to BVWSD as a result of Recovery Project operations after 4 years of full recovery of a recharge volume of 100,000 AF.

Impact HYDRO-1: Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.

Recovery Project pumping could result in a decline in groundwater levels, potentially affecting other water users or resulting in undesirable outcomes as defined in a GSP.

The results of the Recovery Project Scenarios indicate that most of the drawdown associated with the recovery wells occurs within and adjacent to BVWSD and the Recovery Project. The simulations results indicate that drawdowns of 0 to 10 feet would be expected at areas adjacent to BVWSD as a result of the Recovery Project recovery wells after 4 years of full recovery of a recharge volume of 100,000 AF. At greater distances away from the Recovery Project Site, the effects of the Recovery Project operations produce lesser amounts of mounding and drawdown. Groundwater levels gradually return to baseline conditions in the Project area after the completion of the 4-year recovery cycle. This impact is **less-than-significant**.

Mitigation Measure: No mitigation is required.

3.4.3.5 Water Quality Impact Analysis

Banked groundwater will be used for crop irrigation when surface water is not available, and in the future, BVWSD will apply to DWR for approval to Pump-In to the Aqueduct. Current groundwater quality data indicate that, when compared against conservative agricultural thresholds established by Ayers and Westcot (*refer to* **Table 3-5**), salinity is high for sensitive crops. However, groundwater is currently used, and is suitable for, irrigation for crops presently planted in the District. Since the groundwater is currently used for irrigation, no detrimental impact to agriculture is expected from the District's use of groundwater pumped from the Recovery Project. The Recovery Project benefits agriculture by providing a sustainable water supply.

For the future application to DWR for Pump-In to the Aqueduct, the impacts analysis focused on potential constituents of concern, which were selected because they either had noticeable detections or are part of the DWR's constituents of concern for non-SWP water that is pumped into the Aqueduct.

While dissolved salts and minerals (chloride, conductivity, hardness, sodium, sulfate and total dissolved solids) are within Title 22 consumer acceptance ranges, they are present at concentrations greater than the Aqueduct. To evaluate potential impact to Aqueduct water quality, theoretical (mass balance) blending calculations were performed to determine what ratio of wells would need to be constructed, where the ideal locations may be, and which zones within the aquifer should be used at the selected locations. Results of the theoretical blending calculations show that blending of the groundwaters with 50 percent of wells from each side of the Recovery Project Area will theoretically produce water that meets state and federal drinking water standards and will cause a **less than significant impact** to the water quality of the

Aqueduct. **Table 3-6** provides the theoretical blending calculations for the worst-case scenario, by using the historical maximum values, and the average concentrations.

Table 3-6. Theoretical Blending Calculation of Project Water before Pump-In

Constituent	Drinking Water Standard	Theoretical Blend Result (Worst Case) – Max Results	Theoretical Blend Result – Average Results
Antimony (ppb)	MCL = 6	2.7 Max Results	0.4 Average Results
Arsenic (ppb)	MCL = 10	3 Max Results	1.5 Average Results
Boron (ppm)	NL = 1	0.4 Max Results	0.2 Average Results
Bromide (ppm)	N/A	0.40 Max Results	0.39 Average Results
Chloride (ppm)	250 – 500	80 Max Results	66 Average Results
Conductivity (µS/cm)	900 – 1,600	1033 Max Results	933 Average Results
Gross Alpha (pCi/L)*	MCL = 15	26 Max Results	12.5 Average Results
Hardness (ppm)	Very Hard > 181	303 Max Results	220 Average Results
Iron (ppb)	SMCL = 300	150 Max Results	63 Average Results
Manganese (ppb)	SMCL = 50	36 Max Results	28 Average Results
Nitrate as N (ppm)	MCL = 10	3.7 Max Results	2.5 Average Results
Sodium (ppm)	DWR = 200	122 Max Results	103 Average Results
Sulfate (ppm)	250 – 500	351 Max Results	291 Average Results
Total Dissolved Solids (ppm)	500 – 1,000	781 Max Results	630 Average Results
Total Organic Carbon (ppm)	N/A	Not enough data	Not enough data
Uranium (pCi/L)	MCL = 20	10.6 Max Results	8.5 Average Results

Notes: ppb = parts per billion; ppm = parts per million; µS/cm = microSiemens per centimeter; MCL = maximum contaminant level; NL= notification level; DWR = California Department of Water Resources; N/A = not applicable; TDS = total dissolved solids.
SMCL = Secondary Maximum Contaminant Level, a drinking water standard set based on aesthetic concerns. Some SMCL's have a range of acceptable values, known as Consumer Acceptance Levels. The values presented in Table 3-6 are the Recommended and Upper Limits. The Upper Limit is commonly treated as an MCL.
* pCi/L = picocuries per liter of air; There was an outlier gross alpha result that cannot be explained as there are no subsequent sample results. Theoretical blend calculations include the outlier result.

To further evaluate the potential impacts of the Recovery Project water when it enters the Aqueduct, the average theoretical blend values were compared against the average values observed in the Aqueduct near the Tupman. **Table 3-7** presents a comparison of average blended Recovery Project water quality to Aqueduct water quality.

Table 3-7. Comparison of Average Project Water and Aqueduct Water Quality

Constituent	Aqueduct*	Project Water**
Antimony (ppb)	0	0.4
Arsenic (ppb)	ND – 3	1.5
Boron (ppm)	ND – 0.15	0.2
Bromide (ppm)	0.09 – 0.18	0.39
Chloride (ppm)	30 – 47	66
Conductivity (µS/cm)	246 – 396	933
Gross Alpha (pCi/L)	ND – 3.5	12.5***
Hardness (ppm)	58 – 82	220
Iron (ppb)	110 – 454	63
Manganese (ppb)	22 - 37	28
Nitrate as N (ppm)	ND – 1	2.5
Sodium (ppm)	23 – 44	103
Sulfate (ppm)	22 – 37	291

Constituent	Aqueduct*	Project Water**
TDS (ppm)	140 – 238	630
Uranium (pCi/L)	No data	8.5

Notes: ppb = parts per billion; ppm = parts per million; ND = not detected; μS/cm = microSiemens per centimeter; TDS = total dissolved solids.
*Data obtained from Kern County Water Agency Improvement District No. 4, Report on Water Conditions – Table 13 for years 2017, 2019, and 2020. Aqueduct samples collected near Tupman, CA.
**Project water is the theoretical blend using average results
***There was an outlier gross alpha result that cannot be explained as there are no subsequent sample results. Theoretical blend calculations include the outlier result.

One of DWR's requirements for pumping non-SWP water into the Aqueduct is that the water is of consistent, predictable, and acceptable quality prior to discharge and there cannot be adverse impacts to the receiving water. The District will comply with DWR's requirements as DWR will not permit pumping non-SWP water into the Aqueduct until the District demonstrates the water is of acceptable quality.

DWR also requires wellhead sampling for all Title 22 constituents every 3 years. Pump-In Entities may also be required to monitor the quality of the water pumped into the Aqueduct. If the Title 22 analysis indicates constituent(s) may exceed its drinking water standard, DWR will typically require a Pump-In Entity to monitor their list of "Constituents of Concern" weekly for 4 consecutive weeks to demonstrate the water is of consistent, predictable, and reliable quality upon startup. After a month of weekly monitoring, or until consistent water quality is demonstrated, the "Constituents of Concern" are then sampled quarterly at the turnout location where groundwater is discharged into the Aqueduct.

Results of the theoretical blending calculations shows that blending of the groundwaters with 50 percent of wells from each side of the Recovery Project Area will theoretically produce water that meets state and federal drinking water standards for most constituents. However, the water quality of the new production wells may vary from the water quality of the existing wells. Therefore, this impact is **potentially significant**. The District is proposing mitigation measures (listed below) to reduce this potential impact to a level of less-than-significant. Prior to well construction, either aquifer isolation zone testing, which is common water quality testing method used by the scientific and well drilling communities, will be conducted or alternatively, nested monitoring wells will be constructed.

In general, isolation aquifer zone testing consists of constructing a temporary monitoring well. If isolation zone testing is conducted, the pilot hole will be drilled, and geophysical characteristics logged to identify aquifers and clay beds that separate the aquifers. A piece of well screen is attached to the drilling rods inserted to a selected depth. Bentonite clay is placed above and below the screens' gravel pack opposite the screens to effectively seal off the aquifer to be tested. The temporary well is then developed and pumped to obtain a water quality sample representative of just that aquifer. After collection of the water sample the drill rods are extracted, raising the well screen to the next aquifer, and the process repeated. This method can only be used when clay layers are present so not all aquifers may be tested. This method will likely be used during construction of first few wells and may be discontinued for wells constructed after the water quality is better understood.

Alternatively, the District may construct nested monitoring wells adjacent to the proposed location of the production well. If this alternative is selected, the monitoring well can remain in place permanently. In either scenario, water quality sampling will be conducted at varying depths to determine the appropriate well screen interval for the production wells. The production wells will then be designed to just collect water from aquifers with favorable water quality. Newly constructed wells will be added to BVWSD's existing monitoring well network and the District will continue to operate their groundwater monitoring program.

During well construction, strong well screens will be used, which will allow patches to be placed over them to prevent poorer quality water from entering the well once it is constructed. Bentonite clay seals will again be placed along with the gravel pack to isolate aquifers so that if patches are installed the poor-quality water does not move vertically within the gravel pack and enter the well through another well screen. The water quality may also be able to be adjusted by changing the pump intake depth.

To further reduce unfavorable levels of constituents identified earlier, treatment by blending will be conducted in a transmission pipeline. All wells will be blended in the pipeline prior to discharge into the Aqueduct *via* a turnout.

Impact HYDRO-2: Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality

The Recovery Project could have impacts to the water quality of the Aqueduct, if discharges degrade the Aqueduct's existing water quality.

Results of the theoretical blending calculations shows that blending of the groundwaters with 50 percent of wells from each side of the Recovery Project Area will theoretically produce water that meets state and federal drinking water standards for most constituents. However, the water quality of the new production wells may vary from the water quality of the existing wells. Therefore, this impact is **potentially significant**.

MM HYDRO-1: Isolation aquifer zone testing or installation of nested monitoring wells will be conducted to identify aquifers with poor quality water prior to new well construction until the aquifers and water quality is better understood and then may be discontinued.

MM HYDRO-2: If needed, patches will be installed into a constructed well to improve water quality from the well. The depth of the pump may also be modified to improve water quality.

MM HYDRO-3: To develop the PIP, the District will conduct water quality sampling of all the wells quarterly for 1 year. Sampling will include Division of Drinking Water's Title 22 constituents along with DWR's "Constituents of Concern" that are not included in Title 22.

MM HYDRO-4: When water quality data becomes available on the Recovery Project's production wells (both existing and new wells), blending calculations will be updated. The final blending scenario will be selected to ensure that the final, blended water quality, meets DWR requirements.

MM HYDRO-5: The District will follow the water quality monitoring and reporting requirements in the Pump-In Agreement with DWR.

Timing: MM HYDRO-1 through MM HYDRO-4 will be implemented during Recovery Project construction. MM HYDRO-5 will be implemented during Recovery Project operation.

Responsibility: Buena Vista Water Storage District

Significance after Mitigation: Impacts after the implementation of mitigation will be **less-than-significant**.

3.5 Geological Resources

3.5.1 Environmental Setting

3.5.1.1 Regional Geology

The Recovery Project is located in the Great Valley geomorphic province near the eastern edge of the Coast Range (California Geologic Survey [CGS] 2002). The Great Valley is composed of thousands of feet of sedimentary deposits that have undergone periods of subsidence and uplift over millions of years. The Great Valley basin began to form during the Jurassic period as the Pacific oceanic plate was subducted underneath the adjacent North American continental plate. The faulted and folded sediments of the Coast Ranges extend eastward beneath most of the Central Valley. The igneous and metamorphic rocks of the Sierra Nevada extend westward beneath the eastern Central Valley. During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. Most of the surface of the Great Valley is covered with Holocene- and Pleistocene-age alluvium.

3.5.1.2 Seismicity and Other Hazards

Potential seismic hazards resulting from a nearby moderate to major earthquake can generally be classified as primary and secondary. The primary hazard is fault ground rupture, also called surface faulting. Common secondary seismic hazards include ground shaking, liquefaction, settlement, and subsidence. Each of these potential hazards is discussed below.

3.5.1.3 Fault Ground Rupture and Ground Shaking

Surface rupture is an actual cracking or breaking of the ground along a fault during an earthquake. Structures built over an active fault can be torn apart if the ground ruptures. Surface ground rupture along faults is generally limited to a linear zone a few yards wide. The Alquist-Priolo Earthquake Fault Zoning Act (Alquist-Priolo Act) (*refer to* Chapter 3.5.2.2 – State Plans, Policies, Regulations, Laws) was created to prohibit the location of structures designed for human occupancy across the traces of active faults, thereby reducing the loss of life and property from an earthquake. The Recovery Project is not located in or adjacent to an Alquist-Priolo Earthquake Fault Zone (CGS 2020a), and there are no known faults that cross or are located adjacent to the Recovery Project area (CGS 2020b).

The San Andreas Fault, located approximately 18 miles west of the Recovery Project, is the dominant structural feature of the eastern Coast Ranges. The San Andreas is more than 600 miles long, extending from Point Arena to the Gulf of California. This fault is one in which historic (last 200 years) displacement has occurred.

3.5.1.4 Liquefaction and Settlement

Soil liquefaction occurs when ground shaking from an earthquake causes a sediment layer saturated with groundwater to lose strength and take on the characteristics of a fluid, thus becoming similar to quicksand. The factors that determine liquefaction potential are the soil type, level and duration of seismic ground motions, type and consistency of soils, and depth to groundwater. Loose sands and peat deposits, as well as uncompacted fill and Holocene deposits, are more susceptible to liquefaction. Generally, clayey silts, silty clays, clays deposited in freshwater environments, and deposits that are older than 11,700 years B.P. (i.e., Holocene) are more stable under the influence of seismic ground shaking.

Liquefaction poses a hazard to engineered structures, such as bridges, roads, buildings, and levees, and to underground utility pipelines. The loss of soil strength can cause bearing capacity to be insufficient to support foundation loads, can increase lateral pressure on retaining walls, and can result in slope instability.

Vertical settlement and/or lateral deformation of the ground surface is a common result of liquefaction. Vertical settlement may result from volume loss from venting to the ground surface or densification of the deposit. Densification occurs as excess pore pressures dissipate, sometimes resulting in settlement at the ground surface. Lateral deformation may result from lateral spreading toward a sloping freeface or shear deformations resulting from a reduction in the shear strength of the deposit. These lateral ground movements are often associated with a weakening or failure of an embankment or soil mass overlying a layer of liquefied sands or weak soils.

The valley floor of western Kern County is comprised of thick, unconsolidated, coarse-textured alluvial sediments composed of gravel, sand and silt of granitic composition. Due to the depth to groundwater, liquefaction does not present a major potential hazard within these areas.

3.5.1.5 Subsidence

Subsidence is the gradual settling or sudden sinking of the ground surface resulting from subsurface movement of earth materials. Land subsidence has historically occurred within the Valley. This type of ground failure can be aggravated by ground shaking. It is most often caused by the withdrawal of large volumes of fluids from underground reservoirs, but it can also occur by the addition of surface water to certain types of soils (hydrocompaction). Subsidence from any cause accelerates maintenance problems on roads, railroads, power lines, lined and unlined canals, and underground utilities. All new installations in areas suspected of subsidence should be engineered to withstand such subsidence.

According to the Kern County General Plan (2009), there are four types of subsidence that occur in the County:

> Tectonic subsidence: a long-term, very slow sinking of the valley, which is significant only over a geologic time period.
>
> > Subsidence caused by the extraction of oil and gas. This type of subsidence in the project area is not a serious concern. The California Geologic Energy Management

Division (CalGEM) (formerly the California State Division of Oil, Gas, and Geothermal Resources (DOGGR)) monitors subsidence in oil and gas fields and regulates oil and gas withdrawal and repressurizing of the fields.

Subsidence caused by withdrawal of groundwater in quantities much larger than replacement can occur, causing a decline of the water level. This type of subsidence is of concern in parts of Kern County and should be closely observed and controlled. This practice has lowered the ground level over a large area south of Bakersfield and in other areas of the County. Subsidence of this type is one of the 6 undesirable results presented in California's Sustainable Groundwater Management Act (SGMA) where the undesirable result is defined as "significant and unreasonable land subsidence that substantially interferes with surface land uses".

Subsidence caused by hydrocompaction of moisture – deficient alluvial deposits. This is a one-time densification from collapse of the soil structure in near-surface strata where the rainfall or other moisture has not penetrated during a long period of time. Parts of the California Aqueduct were constructed through and over hydrocompactable deposits after compaction has occurred through ponding. The areas where hydrocompaction exists and suspect areas should be mapped, studied, and evaluated. Any development on these areas of damaging subsidence requires corrective measures.

The mechanism that could generate subsidence in the vicinity of the Recovery Project is withdrawal of groundwater. Infrastructure lying near or within the Recovery Project area include state and county roads, power lines, and water conveyance and control facilities including earth-lined canals and pipelines. This infrastructure has not exhibited damage from past subsidence. The principal subsidence concern is creation of groundwater conditions that could contribute to subsidence of Interstate Highway 5 and the Aqueduct, two facilities of regional and statewide importance that run near the Recovery Project area.

Subsidence in the Recovery Project area and the surrounding region is monitored at GPS stations P545 and P563, two participating stations of the Continuously Operating Reference Stations (CORS) network that provides Global Navigation Satellite System (GNSS) data. The two CORS stations are part of the National Geodetic Survey (NGS), an office of National Oceanic and Atmospheric Administration's (NOAA) National Ocean Service that manages the CORS network on behalf of a group of government, academic, and private organizations. CORS enhanced post-processed coordinates approach a few centimeters relative to the National Spatial Reference System, both horizontally and vertically.

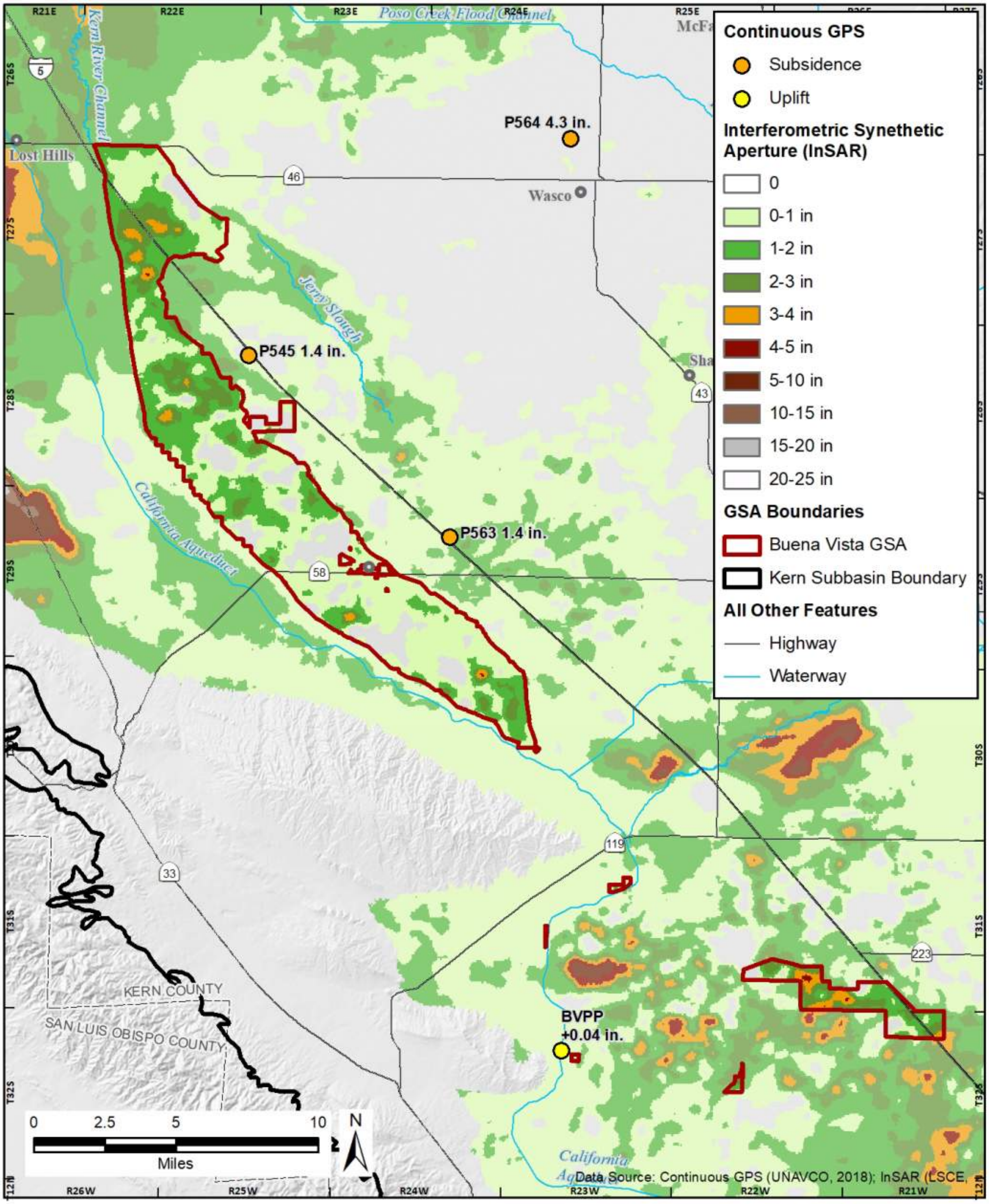
Data from CORS stations is supplemented by monitoring of ground surface elevations using data provided by DWR from the Interferometric Synthetic Aperture Radar (InSAR) network that measures vertical ground surface displacement. InSAR data is collected by the European Space Agency Sentinel-1A satellite and processed by the National Aeronautics and Space Administration's Jet Propulsion Laboratory.

Historical subsidence, as observed by the CORS network over the period between January 2007 and March 2011 is shown on **Figure 3-16** prepared for the GSP submitted by the BVGSA. As shown on **Figure 3-16**, subsidence of from 0 to 2 inches was observed in the vicinity of the Palms over this period. If the average rate of subsidence is 1 inch, the midpoint of this range, the average annual rate of subsidence would be approximately 0.25 inches per year. This rate is consistent with cumulative subsidence of 3.15 inches reported at CORS station P563 over the period from 2006 to 2019, which is equivalent to an annual rate of 0.24 inches.

Thus, while monitoring of land surface elevations described in the GSP has detected small levels of subsidence, there is insufficient evidence presented in the BVGSA GSP or in GSPs and other studies developed in neighboring areas to offer a correlation between land surface elevations and groundwater elevations sufficient to allow groundwater levels to serve as a proxy for ongoing or incipient inelastic subsidence.

Given these uncertainties, the BVGSA will join the other GSAs in the Subbasin "to develop a joint subsidence monitoring program to better understand the cause and impacts of subsidence and to develop MTs for subsidence for inclusion in the 2025 GSP update" (KGAGSP 2020).

Figure 3-17. Historical Subsidence January 2007 to March 2011



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3.5.1.6 Slope Stability

Seismic-induced landslides would not represent a hazard due to the construction of the Recovery Project (CGS 2020c). The Recovery Project site is not located in an area that is susceptible to landslides as the site is relatively flat.

3.5.1.7 Soils

According to the Natural Resources Conservation Service (NRCS) Web Soil Survey nine soil map units are present within the Recovery Project area (**Table 3-8**) (NRCS 2020). Buttonwillow clay and Lokern clay occupying approximately 73 percent of the Recovery Project area and exhibit a high shrink-swell potential.

Table 3-8. Soils in the Recovery Project area

Soil Series Name and ID	Parent Material	Shrink-Swell Potential
123, Buttonwillow clay, drained	Alluvium derived from granite	High
125, Granoso loam sand, 0 to 2% slopes	Alluvium derived from mixed rock sources	Low
126, Granoso loamy 2 to 5% slopes	Alluvium derived from mixed rock sources	Low
152, Excelsior sandy loam, 0 to 2% slopes, MLRA 17	Calcareous coarse-loamy alluvium derived from sedimentary rock	Low
156, Garces silt loam	Alluvium derived from granite	Low
174, Kimberlina fine sandy loam, 0 to 2% slopes MLRA 17	Alluvium derived from igneous and sedimentary rock	Low
187, Lokern clay, drained	Alluvium derived from granite	High
214, Calflax clay loam, saline-sodic, 0 to 2% slopes, MLRA 17	Alluvium derived from calcareous sedimentary rock	Moderate
245, Westhaven fine sandy loam	Alluvium derived from granite	Low

Notes: MLRA 17 = Major Land Resource Area 17, Sacramento and San Joaquin Valleys
Source: NRCS 2020

3.5.1.8 Paleontological Resources

The Recovery Project is located on Pleistocene-Holocene alluvium, basin and fan deposits (CGS 2010; DOC 1964). The bedrock underlying the site is comprised of marine and nonmarine sedimentary rock. Sediments associated with Holocene-age alluvium are too young to contain paleontologically sensitive resources.

3.5.2 Regulatory Framework

3.5.2.1 Federal Plans, Policies, Regulations, and Laws

Earthquake Hazards Reduction Act of 1977

The Earthquake Hazards Reduction Act of 1977 established the National Earthquake Hazards Reduction Program (NEHRP), "to reduce the risks of life and property from future earthquakes in the U.S. through the establishment and maintenance of an effective earthquake hazards reduction program." The four principal goals of the NEHRP are:

- Develop effective practices and policies for earthquake loss reduction and accelerate their implementation
- Improve techniques for reducing earthquake vulnerabilities of facilities and systems
- Improve earthquake hazards identification and risk assessment methods, and their use
- Improve the understanding of earthquakes and their effects

Many of the tools used to assess, as well as mitigate, earthquake hazards and impacts were developed under the NEHRP.

3.5.2.2 State Plans, Policies, Regulations, Laws

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Act (PRC § 2621–2630) was passed in 1972 to mitigate the hazard of surface faulting to structures designed for human occupancy. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law addresses only the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as Earthquake Fault Zones around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning efforts. Before a project can be permitted in a designated Alquist-Priolo Earthquake Fault Zone, cities and counties must require a geologic investigation to demonstrate that proposed buildings would not be constructed across active faults.

Seismic Hazards Mapping Act

The Seismic Hazards Mapping Act of 1990 (PRC § 2690–2699.6) addresses earthquake hazards from nonsurface fault rupture, including liquefaction and seismically induced landslides. The act established a mapping program for areas that have the potential for liquefaction, landslide, strong ground shaking, or other earthquake and geologic hazards. The act also specifies that the lead agency for a project may withhold development permits until geologic or soils investigations are conducted for specific sites and mitigation measures are incorporated into plans to reduce hazards associated with seismicity and unstable soils.

National Pollutant Discharge Elimination System Permit

In California, State Water Board administers regulations promulgated by EPA (55 CFR § 47990) requiring the permitting of stormwater-generated pollution under the N.P.D.E.S. In turn, State Water Board's jurisdiction is administered through nine regional water quality control boards. Under these federal regulations, an operator must obtain a general permit through the N.P.D.E.S. Stormwater Program for all construction activities with ground disturbance of 1 acre or more. The general permit requires the implementation of BMPs to reduce sedimentation into surface waters and to control erosion. One element of compliance with the N.P.D.E.S. permit is preparation of a SWPPP that addresses control of water pollution, including sediment, in runoff during construction. (*See* Chapter 3.4 – Hydrology and Water Quality, for more information about N.P.D.E.S. and SWPPP requirements.)

Professional Paleontological Standards

The Society of Vertebrate Paleontology (1995), a national scientific organization of professional vertebrate paleontologists, has established standard guidelines that outline acceptable professional practices in the conduct of paleontological resource assessments and surveys, monitoring and mitigation, data and fossil recovery, sampling procedures, specimen preparation, analysis, and curation. Most practicing professional paleontologists in the nation adhere to the Society of Vertebrate Paleontology assessment, mitigation, and monitoring requirements, as specifically spelled out in its standard guidelines.

3.5.2.3 Regional and Local Plans, Policies, Regulations, and Ordinances

Kern County General Plan

The Kern County General Plan (2009) includes the following policies that pertain to geological resources and are relevant to this analysis.

Landslides, Subsidence, Seiche[9], and Liquefaction

- **Policy 3.** Reduce potential for exposure of residential, commercial, and industrial development to hazards of landslide, land subsidence, liquefaction, and erosion.

3.5.3 Environmental Impacts and Mitigation Measures

3.5.3.1 Thresholds of Significance

Significance criteria are based on Appendix G of the CEQA Guidelines. The Recovery Project would have a significant impact on geology resources if it would either:

- expose people, property, or structures to potential substantial adverse impacts, including the risk of loss, injury, or death involving either:
  - 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
  - strong seismic ground shaking
  - seismic-related ground failure, including liquefaction
  - landslides
- result in substantial soil erosion or the loss of topsoil
- 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
- 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
- have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater

[9] A seiche is a standing wave in an enclosed or partly enclosed body of water.

- result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state or a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan

3.5.3.2 Issues Not Discussed Further

The project area is located approximately 11 miles from the nearest Alquist-Priolo Earthquake Fault Zone, and it is not underlain by or located immediately adjacent to any known faults. Because the damage from surface fault rupture is generally limited to a linear zone a few yards wide, the potential for surface fault rupture to cause damage to the proposed wells and conveyance pipes is negligible. Therefore, this impact is not evaluated further in this FEIR.

The Recovery Project facilities, wells and conveyance pipes, would either be buried or extend only a few feet above ground, and would not pose a direct risk to people during seismic activity. If a seismic event should cause a pipeline to break or well to collapse, the water would be released underground in a low gradient, agricultural area, posing minimal risk to people or structures. Therefore, Recovery Project implementation would result in no significant impact to people or structures from any seismic-related activity. as a result of implementation of the Recovery Project.

The Recovery Project is not located on unstable soils and implementation of the proposed project would not result in instability or excessive soil erosion. Because construction activities would disturb an area larger than 1 acre, the District is required by law to obtain coverage under the State Water Board N.P.D.E.S. stormwater permit for general construction activity, including preparation and submittal of a Notice of Intent to discharge with the Central Valley RWQCB. The District is required to prepare a SWPPP and comply with the conditions of the N.P.D.E.S. general stormwater permit for construction activities. The SWPPP shall describe the construction activities to be conducted, BMPs that would be implemented to prevent soil erosion and contaminated stormwater discharges into waterways, and inspection and monitoring activities that would be conducted. Topsoil may be stripped and stockpiled for later reuse on the site. With the implementation of a Dust Control Plan or Construction Notification form loss of topsoil would be minimized during construction. Operation of the Recovery Project would not create the potential for soil erosion or loss of topsoil as the area is in a cultivated agricultural field and is topographically flat.

During project construction activities, portable restroom facilities would be provided. The project would not require the provision of sewer service. Because project soils would not be used for septic systems or alternative means of waste disposal, there would be no impact, and this issue is not evaluated further in this FEIR.

Because the Recovery Project area is distant from the Pacific Ocean, tsunamis or seiches would not represent a hazard in the project area. Therefore, this issue is not evaluated further in this FEIR.

3.5.3.3 Analysis Methodology

The analysis prepared for this FEIR relied on NRCS soil survey data and published geologic literature and maps. The information obtained from these sources was reviewed and summarized to present the existing conditions and to identify potential environmental impacts, based on the thresholds of significance presented in this section. Impacts associated with geology resources that could result from project construction and O&M activities were evaluated qualitatively based on site conditions; expected construction practices; and the materials, locations, and duration of project construction, O&M, and related activities.

3.5.3.4 Impact Analysis

Impact GEO-1: ***Increase Subsidence-Induced Risks to People and Structures:***

The Recovery Project has the potential to cause subsidence during operations due to extraction of groundwater. However, groundwater extraction would not occur from beneath the E-clay and groundwater levels will not decline to levels significantly more than what the site has historically experienced. In addition, "significant and unreasonable land subsidence that substantially interferes with surface land uses" is defined as an undesirable result under SGMA. Therefore, subsidence is being monitored and mitigation measures would be taken to avoid operation of the Recovery Project leading to subsidence that compromised the sustainable management of the Kern County Subbasin. Therefore, this impact would be ***less-than-significant****.*

Inelastic land subsidence is a concern in areas of active groundwater extraction due to risks to canal and infrastructure damage, permanent reduction in the groundwater storage capacity of the aquifer, well casing collapse, and increased flood risk in low lying areas. Inelastic subsidence typically occurs in the clay layers within aquifers and aquitards due to the withdrawal of water in storage within these layers during over-pumping, which induces the permanent rearrangement or collapse of the clay layer.

According to DWR (2014), the Kern County Subbasin was rated at a high risk for future subsidence due to 1) a significant number of wells with water levels at or below historic lows; 2) documented historical subsidence; and 3) documented current subsidence. However, the BVGSA has displayed little evidence of any of these tendencies. This may be due to the BVWSD's long standing reliance on surface water, which has enabled water users to pump groundwater as a supplemental source of supply. Limiting reliance on groundwater has helped support groundwater elevations and has avoided the need to extract water from beneath the E-clay. By contrast other parts of the Subbasin have experienced greater reductions in groundwater levels and a greater need to extract water from both above and below the E-clay, practices which are likely to have fueled subsidence.

Future subsidence will depend on whether water levels decline below previous low levels and remain low for a considerable length of time (BVGSA 2020). The range of groundwater elevations at monitoring locations due to project operation is expected to be similar to the range of elevations that has been experienced in the past (*see* **Figure 5-5**).

The BVGSA discourages groundwater extraction from beneath the E-clay, in part, because of the potential for extraction from this confined zone to induce subsidence (BVGSA 2020). The BVGSA GSP states that the risk of inducing subsidence by extracting water from the zone above the E-clay is likely to be lower than the risk induced by extracting water from beneath the E-clay. The volume of groundwater stored above the E-clay is likely to be adequate to meet the demands of the Buttonwillow Service Area, which the Recovery Project resides in, under foreseeable conditions. Recovery wells constructed as part of the Recovery Project will not be constructed below the E-clay.

The BVGSA proposes to monitor subsidence as described in the BVGSA GSP. Subsidence is monitored directly at GPS stations participating in the CORS network that provides GNSS data. These stations are part of the NGS, an office of NOAA's National Ocean Service. Data from CORS stations in the Recovery Project vicinity will be supplemented through monitoring of ground surface elevations using data provided by DWR from the InSAR network that measures vertical ground surface displacement. The European Space Agency Sentinel-1A satellite collects InSAR data which now provides cumulative vertical ground surface displacement from June 2015 through September 2019 for lands in the Recovery Project vicinity.

Therefore, this impact would be **less-than-significant**.

Mitigation Measure: No mitigation is required.

Impact GEO-2: ***Possible Damage to or Destruction of Previously Unknown Unique Paleontological Resources during Construction-Related Activities:***

The Recovery Project would be constructed on Holocene Alluvium rock formation. This formation is not typically considered to be paleontologically sensitive, however, the exact age of the bedrock is unknown. Since sedimentary soils are found within the project site and fossils are found exclusively in sedimentary soils there is a chance that paleontological resources could be uncovered, therefore this impact would be ***potentially significant****.*

Paleontological resources are considered to be older than recorded human history and/or older than middle Holocene (i.e., older than about 5,000 radiocarbon years) (Society of Vertebrate Paleontology 2010). The Recovery Project would be constructed on Holocene (current geologic epoch which began approximately 111,650 cal B.P.) alluvium sediment. Holocene deposits contain only the remains of extant, modern taxa (if any resources are present), which are not considered “unique” paleontological resources. Therefore, this formation is not considered to be paleontologically sensitive and construction activities that occur in this rock formation would have no impact on unique paleontological resources. However, since the exact age of the bedrock is unknown and paleontological resources are found almost exclusively in sedimentary rock, there is a chance of discovering unknown paleontological resources within the Recovery Project site. With implementation of the below mentioned mitigation measure impacts would be less-than-significant with mitigation

Mitigation Measure GEO-1: **Avoid Potential Effects on Paleontological Resources**.

In the event that a paleontological resource is uncovered during Recovery Project implementation, all ground-disturbing work within 50 meters of the discovery shall be halted. A qualified paleontologist shall inspect the discovery and determine whether further investigation is required. If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is “unique” under CEQA, Appendix G, part VII. The determination and associated plan for protection of the resource shall be provided to the District for review and approval. If the resource is determined not to be unique, work may commence in the area. If the resource is determined to be a unique paleontological resource, work shall remain halted, and the paleontologist shall consult with the District staff regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to paleontological resources and shall be required unless there are other equally effective methods. Other methods may be used but must ensure that the fossils are recovered, prepared, identified, catalogued, and analyzed according to current professional standards under the direction of a qualified paleontologist. All recovered fossils shall be curated at an accredited and permanent scientific institution according to Society of Vertebrate Paleontology standard guidelines; typically, the Natural History Museum of Los Angeles County and University of California, Berkeley accept paleontological collections at no cost to the donor. Work may commence upon completion of treatment, as approved by the District.

Timing: During construction activities

Responsibility: BVWSD

Significance after Mitigation: The impact would be reduced to **less-than-significant**.

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4.0 Other CEQA Required Sections

4.1 Introduction

This chapter describes other required topics including growth inducing impacts, significant and unavoidable impacts, significant irreversible environmental changes relative to the proposed project, and the cumulative impact assessment.

4.2 Growth Inducing Impacts

CEQA (Guidelines § 15126.2(e)) requires that an EIR evaluate the growth inducing impact of a proposed project. The CEQA Guidelines describe the required growth inducement analysis as follows:

> Discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment.

Included in this definition are public works projects, which would remove obstacles to population growth, would tax community service facilities, or encourage or facilitate other activities that could significantly affect the environment, either individually or cumulatively. It must not be assumed that growth in any area is necessarily beneficial, detrimental, or of little significance to the environment.

A project can have the potential for direct and/or indirect growth inducement. Direct growth inducement would result if a project involved construction of new housing which would facilitate new population in an area. Indirect growth inducement or secondary growth-inducement potential would be present if it would establish substantial new permanent employment opportunities (e.g., commercial, industrial, or governmental enterprises), or if it would involve a substantial construction effort with substantial long-term employment opportunities which could indirectly stimulate the need for additional housing and services to support the new employment demand.

Similarly, a project could indirectly induce growth if it would remove a physical obstacle to additional growth and development, such as removing a constraint or adding a required public service. Examples of removing a physical obstacle would include construction of a new roadway into an undeveloped area or construction of a wastewater treatment plant with sufficient capacity to serve additional new development. Construction of these types of infrastructure projects cannot be considered isolated from the immediate development that they facilitate and serve. Projects that physically remove obstacles to growth, or projects that indirectly induce growth, are those that may provide a catalyst for future unrelated development in the area. The growth inducing potential of a project could also be considered significant if it fosters growth in excess of what is assumed in the local master plans and land use plans, or in projections made by regional planning agencies.

4.2.1 *Direct Growth Inducement*

The proposed project does not include the construction of new housing, businesses, or roadways, require acquisition of private property, or create new connections to undeveloped land. The proposed project aims to increase the District's ability to recharge groundwater in wet years and return that water in dry years. This would mainly benefit agriculture by providing irrigation water supplies in years with limited surface water supplies. No impacts would occur to the surrounding communities. The proposed project would also not create permanent employment. The Recovery Project is consistent with the Kern County General Plan (2009) as the proposed project would be zoned for Agriculture and the Recovery Project would not change the zoning designation of adjacent areas. Development of the site as proposed would not alter the existing landscape. Therefore, the Recovery Project will have **no impact** on growth.

4.3 Significant and Unavoidable Impacts

CEQA Guidelines section 15126(b) requires an EIR to "describe any significant impacts, including those which can be mitigated but not reduced to a level of insignificance. Where there are impacts that cannot be alleviated without imposing an alternative design, their implications and the reasons why the proposed project is being proposed, notwithstanding their effect, should be described."

Chapter 3.0 – Environmental Setting, Impact Analysis, and Mitigation Measures, provides a description of the potential environmental impacts of the proposed project and recommends mitigation measures to reduce impacts to a less than significant level, where possible. After implementation of the recommended mitigation measures, all of the potentially significant impacts associated with the proposed project would be reduced to a **less-than-significant** level. Therefore, the Recovery Project will not have significant and unavoidable impacts.

4.4 Irreversible and Irretrievable Commitment of Resources

CEQA Guidelines section 15126.2(d) describes irreversible environmental changes as follows:

> 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.

The CEQA Guidelines refer to the need to evaluate and justify the consumption of nonrenewable resources and the extent to which the proposed project commits future generations to similar uses of nonrenewable resources. In addition, CEQA requires that irreversible damage that could result from an environmental accident associated with the Recovery Project be evaluated.

Construction of the proposed project would result in the commitment of nonrenewable natural resources used in the construction process and during operation, including electricity, petroleum products and other materials. As described in Chapter 2.0 – Project Description, the proposed project would not require large areas to be excavated or include the demolition or removal of existing buildings or infrastructure that would generate large amounts of construction waste.

Construction and operation of the proposed project would also result in commitment of energy resources such as fossil fuels and electricity. Direct energy used during construction and operation would involve using petroleum products and electricity to operate equipment during construction activities, and to operate pump motors in all proposed new wells, and replacement wells during operations. Construction-related energy consumption would be temporary and would be confined to the construction period. Nevertheless, construction and operation activities would, as with any construction project, cause irreversible and irretrievable commitments of finite nonrenewable energy resources, such as gasoline and diesel fuel.

Although no significance thresholds are available for analysis of energy consumption, energy would be used wisely and efficiently during project construction and operations because air quality impacts would be mitigated to the extent feasible. Furthermore, the selected construction contractor(s) would use the best available engineering techniques, construction and design practices, and equipment operating procedures. In addition, the proposed project would comply with applicable federal, state and local policies and regulations pertaining to energy standards and would ensure that natural resources are conserved to the maximum extent possible. Therefore, due to the rate and amount of energy consumed, the proposed project would not result in the unnecessary, inefficient, or wasteful use of resources and energy use would be accomplished in a manner consistent with applicable laws and regulations.

4.5 Cumulative Impact Analysis

CEQA requires an EIR to include a discussion of cumulative effects of a project when the Recovery Project's incremental effect is "cumulatively considerable." An effect is cumulatively considerable when it is significant in connection with the effects of past projects, the effects of other current projects and the effects of future projects (CEQA Guidelines § 15065(a)(3)).

A "cumulative impact" is an impact that is created as a result of the combination of a project together with other projects causing related impacts. The first step in the cumulative analysis, therefore, is to identify each impact of the project and, in each case, consider whether there are other projects (past, current, future) that could have related impacts, and then to determine whether the project's contribution to the overall impact is "cumulatively considerable."

4.5.1 Geographic Scope of Cumulative Impact Analysis

The geographic area that is analyzed for cumulative impacts depends on the resource being analyzed. The geographic area associated with a proposed project's different environmental impacts defines the boundaries of the area used for compiling the list of past, present, and probable future projects considered in the cumulative impact analysis. The geographic area varies depending on the type of environmental resource being considered (**Table 4-1**).

4.5.2 Projects Considered in Cumulative Impact Analysis

A discussion of cumulative impacts must include either a list of past, present, and probable future projects producing related or cumulative impacts, or a summary of projections contained in adopted local, regional, or statewide plan or related planning document (CEQA Guidelines § 15130(b)). For this FEIR, both approaches were applied (**Table 4-1**).

A list of past, current, and reasonably foreseeable future projects was compiled using information provided by BVWSD, and comments received in response to the NOP. The past, present and reasonably foreseeable future projects proposed are within or directly adjacent to the Recovery Project, or the surrounding community were identified and categorized in **Table 4-2**, below. For the purposes of this discussion, these projects that may have a cumulative effect on the resources of the Recovery Project are often referred to as the "collective projects." These projects are described in **Table 4-2**.

Table 4-1. Geographic Scope of Cumulative Impact and Method Evaluation

Resource Topic	Geographic Area	Method of Evaluation[10]
Biological Resources	Immediate Recovery Project area and adjacent surrounding vicinity	Projects listed in **Table 4-2**
Cultural Resources	Immediate Recovery Project area and adjacent surrounding vicinity	Projects listed in **Table 4-2**
Hydrology and Water Quality	San Joaquin Valley Groundwater Basin - Kern County Subbasin	Projections from the C2VSimFG-Kern model for the 2020 Kern County Subbasin GSAs (**Appendix D**, Attachment D)
Geological Resources	Immediate Recovery Project area and adjacent surrounding vicinity	Projections from the C2VSimFG-Kern model for the 2020 Kern County Subbasin GSAs (**Appendix D**, Attachment D)

Notes: C2VSimFG-Kern = California Central Valley Groundwater-Surface Water Simulation Model

Table 4-2. List of Collective Past, Present, and Reasonably Anticipated Future Projects

Project	Status	In-District Location	Description
Corn Camp Groundwater Recharge Pond Project	Construction scheduled for 2021	20 miles west of Bakersfield	Construction and operation of a 50-acre recharge pond, with capacity to recharge up to 24,500 AFY
Buena Vista Pipeline and Brite Pump Station Project	Construction scheduled for 2021	Between State Route 58 and the Kern River Flood Canal	32 miles of pipeline
Belridge Pipeline Project	Construction scheduled for late 2021	Between the Aqueduct and the Kern River Flood Canal	2.2 miles of pipeline

4.5.3 Methods

The analysis below examines the cumulative impacts of the proposed project for each of the topics that are analyzed in Chapter 3.0 – Environmental Setting, Impact Analysis, and Mitigation Measures. The impacts are assessed by short term (construction) and long term (operational) impacts of the proposed project combined with the impacts of the past and planned projects listed in **Table 4-2**.

[10] Projects: the use of a list of past, present, and reasonably foreseeable projects. Projections: the use of Projections contained in relevant planning documents.

The following objectives were set forth to analyze the short-term construction and long-term operational cumulative impacts. First, there is an assessment of whether the baseline condition, when considered with the proposed project, entails a significant impact to any specific resource. Then, there is an assessment of whether the combined impacts of the proposed project and the projects listed in **Table 4-2** are cumulatively significant. Finally, there is a determination of whether the incremental effects of the proposed project would 'contribute considerably' and therefore cause a cumulatively considerable effect. If so, there is also a determination of whether mitigation is feasible.

Note: it is possible that even when the cumulative impact of multiple projects is significant, the incremental contribution of the impact for the proposed project may itself not be cumulatively considerable (CCR § 15064.H4, *Communities for Better Environment v. South Coast Air Quality Management District*). In this case, the Recovery Project's impact would not be cumulatively considerable.

Furthermore, a project's contribution is less than cumulatively considerable if the project implements mitigation measures designed to alleviate the cumulative impact (CEQA Guidelines § 15130 (a)(3)).

4.6 Cumulative Impact Analysis by Resource Area

The following resource sections have the potential to have cumulative impacts from development of the Recovery Project and collective projects.

4.6.1 Biological Resources

As indicated in the biological resources impact analysis in Chapter 3.2 – Biological Resources project operation is not anticipated to impact biological resources, because the Recovery Project would be managed to improve groundwater elevations in the long term by recharging more water than is recovered and project facilities are located within existing disturbed corridors and agricultural lands. Therefore, potential for cumulative impacts is limited to project construction.

Several species-status reptiles, birds, and mammals were determined to have potential to occur on or adjacent to the Recovery Project site and be significantly impacted by project construction. Of these, six birds and one mammal also have potential to be significantly impacted by one or more of the other projects in the vicinity (*refer to* **Table 4-2**). Therefore, simultaneous construction of the Recovery Project and nearby cumulative projects could potentially result in significant impacts on special-status wildlife, if such wildlife are present on or adjacent to any of project sites. However, mitigation measures would be implemented to reduce potential impacts of the cumulative projects to a less-than-significant level. In addition, with implementation of Mitigation Measures BIO-1, BIO-2a, BIO-2b, and BIO-3 described in Chapter 3.2 – Biological Resources, all Recovery Project impacts on special-status wildlife would be reduced to less than significant. Residual impacts of the Recovery Project and the cumulative projects would be minimal, and the combined impacts of all the projects would remain less than significant.

Because combined impacts of the projects do not constitute a significant impact and the Recovery Project would not have residual significant impacts on biological resources, the Recovery Project would not make a cumulatively considerable incremental contribution to a significant cumulative impact related to biological resources.

4.6.2 Cultural Resources

Cultural resources, specifically prehistoric archaeological resources, are not renewable, once they have been destroyed, either by inadvertent circumstances or even by archaeological excavation. It's impossible to quantify how large a loss to cultural resources the loss of a given number of resources would be because the number of cultural resources is unknown. A relative impact can be surmised, however. The Recovery Project would not result in cumulative impacts to cultural resources in the region because there are no known cultural resources that would be impacted.

It is, however, possible the Recovery Project could directly impact unanticipated cultural resources or human remains during construction. Although the project could create potentially significant impacts to undiscovered cultural resources and human remains, any such impacts would be reduced to less-than-significant with the implementation of Mitigation Measures CUL-1, CUL-2, and CUL-3. Therefore, implementation of the project would not make a cumulatively significant impact on cultural resources.

Since combined impacts of the projects do not constitute a significant impact and the Recovery Project does not entail a significant impact to cultural resources, there would not be a contribution to a cumulatively considerable impact.

4.6.3 Hydrology and Water Quantity

4.6.3.1 Hydrology Analysis Method

The Kern County Subbasin Coordination Agreement refers to the local groundwater-surface water model (C2VSimFG-Kern) as the agreed upon method for generating coordinated water budgets for the Kern County Subbasin. Appendices 2 and 4 of the Kern County Subbasin Coordination Agreement include a technical report (Maley and Brush 2020) on the development and application of C2VSimFG-Kern for these purposes. Notwithstanding some limitations, C2VSimFG-Kern is considered to be the best available information and well-suited as a planning tool to estimate the impacts of the proposed SGMA projects and management actions on groundwater conditions in the Kern County Subbasin. Additional information on C2VSimFG-Kern can be found in **Appendix D** of this FEIR.

Four different scenarios were modeled, a Baseline Scenario, a Baseline-with-SGMA Projects Scenario, a Cumulative Scenario, and a Cumulative with Deferred Recovery Scenario.

The Baseline Scenario simulates how potential future groundwater conditions in the Kern County Subbasin aquifer would respond if the recent hydrology were repeated with current expected surface water availability and current land use over a 50-year planning horizon under a range of climatic conditions, following DWR guidance.

The Baseline Scenario was then modified to include reasonably foreseeable future projects (known as proposed future SGMA projects). A listing of the proposed future SGMA projects included in the Baseline-with-SGMA Projects Scenario are described in the Kern County Subbasin GSPs (KGA 2020; Kern River Groundwater Sustainability Agency [KRGSA] 2020; HMGSA 2020). Excerpts from those GSPs describing these proposed future SGMA projects are provided in **Appendix D**, Attachment D.

The Recovery Project's recharge and recovery pumping rates were added to the C2VSimFG-Kern model's Baseline-with-SGMA Projects Scenario to produce the Cumulative Scenario. The purpose of the Cumulative Scenario is to assess the potential cumulative effects of a range of potential operational scenarios of the Recovery Project in context with the proposed future SGMA projects in complying with the SGMA MTs and MOs.

The setup of the Cumulative Scenario is limited to adding the recharge at the Palms Recharge Facility during the wet years. These wet years are equivalent to the historical hydrology years of 1998, 2006, and 2011. The Cumulative Scenario assumes 90 percent recovery, where pumping occurs at a rate of 25,000 AFY over 6 months in the years after the recharge event until the total recovery equals 90 percent of the total recharge.

The Cumulative Scenario includes recharge at different volumes. This was done primary to fit straightforward cycles of groundwater recharge followed by a complete 90 percent recovery of the recharge to provide a clear cause and effect analysis of the simulation results without consideration of the effects of recharge account carryover to later years.

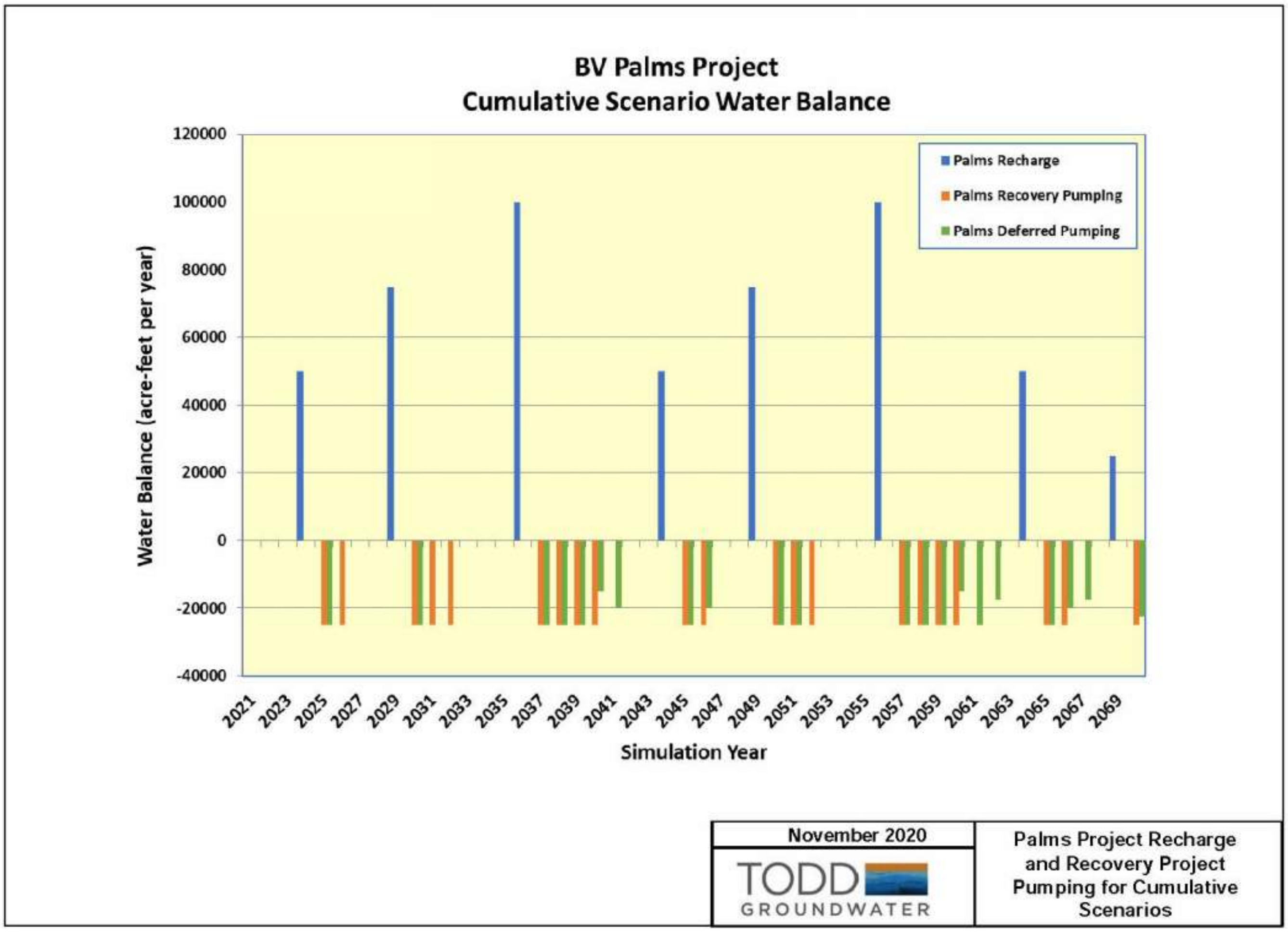
- 1998 hydrology equivalent: 100,000-AF recharge event occurred in simulation years 2036, 2056 followed by 4 years of pumping of 90% of recharge total
- 2006 hydrology equivalent: 50,000-acre-foot recharge event occurred in simulation years 2036, 2056 followed by 2 years of pumping of 90% of recharge total
- 2011 hydrology equivalent: 75,000-acre-foot recharge event occurred in simulation years 2036, 2056 followed by 3 years of pumping of 90% of recharge total
- Final 2 years of simulation: 25,000-acre-foot recharge event occurred in simulation year 2069 followed by 1 year of pumping of 90% of recharge total

This distribution is graphically displayed on **Figure 4-1**. Over the 50-year simulation, the total recharge is 525,000 AF with 472,500 AF of pumping to recover 90 percent of the Palms Project recharge. The remaining 10 percent of the recharge (52,500 AF) is left in the aquifer.

As is discussed below, the Cumulative Scenario results indicated that groundwater elevations at some representative monitoring well (RMW) locations adjacent to the Recovery Project's recovery wells may fall below their MT. Conversely, groundwater levels during the recharge events are higher than those without the Palms Projects.

For the Cumulative with Deferred Recovery Scenario, the approach was to apply the recharge following the same schedule as for the Cumulative Scenario, but to stop Recovery Project pumping prior to groundwater levels reaching their MTs at RMW locations (**Figure 4-1**). This pumping was then applied during a later period in the 50-year simulation when simulated groundwater levels were higher, thus, simulating a deferred recovery mitigation measure. As a result, the total recharge and pumping over the 50-year simulation period is the same as the Cumulative Scenario. This scenario was developed to test whether deferring the pumping to a later period would keep groundwater levels above the MTs.

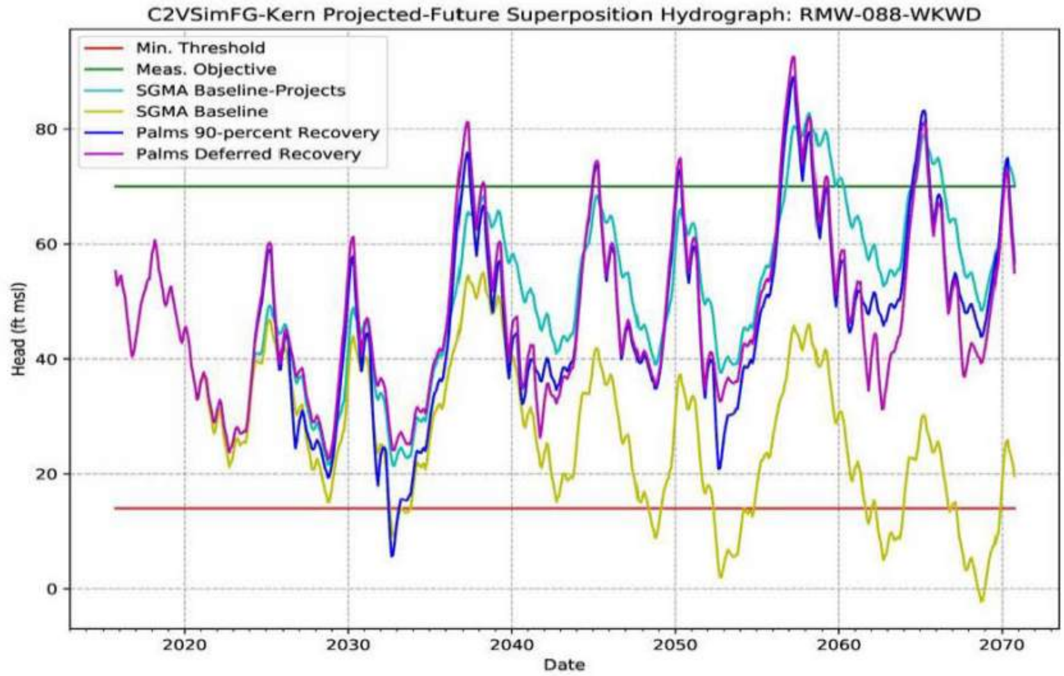
Figure 4-1. Recharge and Recovery Operations for Cumulative Scenarios

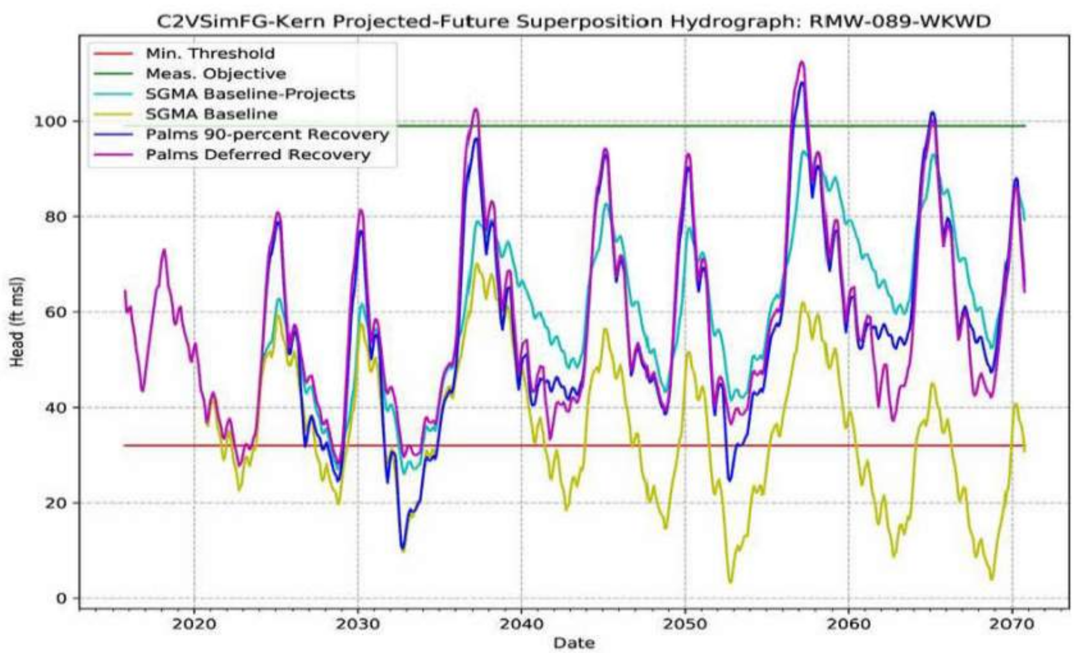


4.6.3.2 Hydrology Results

The results of the cumulative impact assessment are provided on a series of hydrographs from RMW locations in the vicinity of the Recovery Project. **Figures 4-2, 4-3, 4-4, and 4-5** provide the results of the RMW locations in the vicinity of the Recovery Project. The graphs present the MTs and MOs, two of the Sustainable Management Criteria (SMCs) established by each GSA under SGMA, for each RMW location along with the results of the modeling for each of the four scenarios.

Figure 4-2. Cumulative Scenarios WKWD North Locations





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TODD GROUNDWATER

Cumulative Scenario Hydrographs of WKWD North Locations

Figure 4-3. Cumulative Scenarios Western RRBWSD Locations

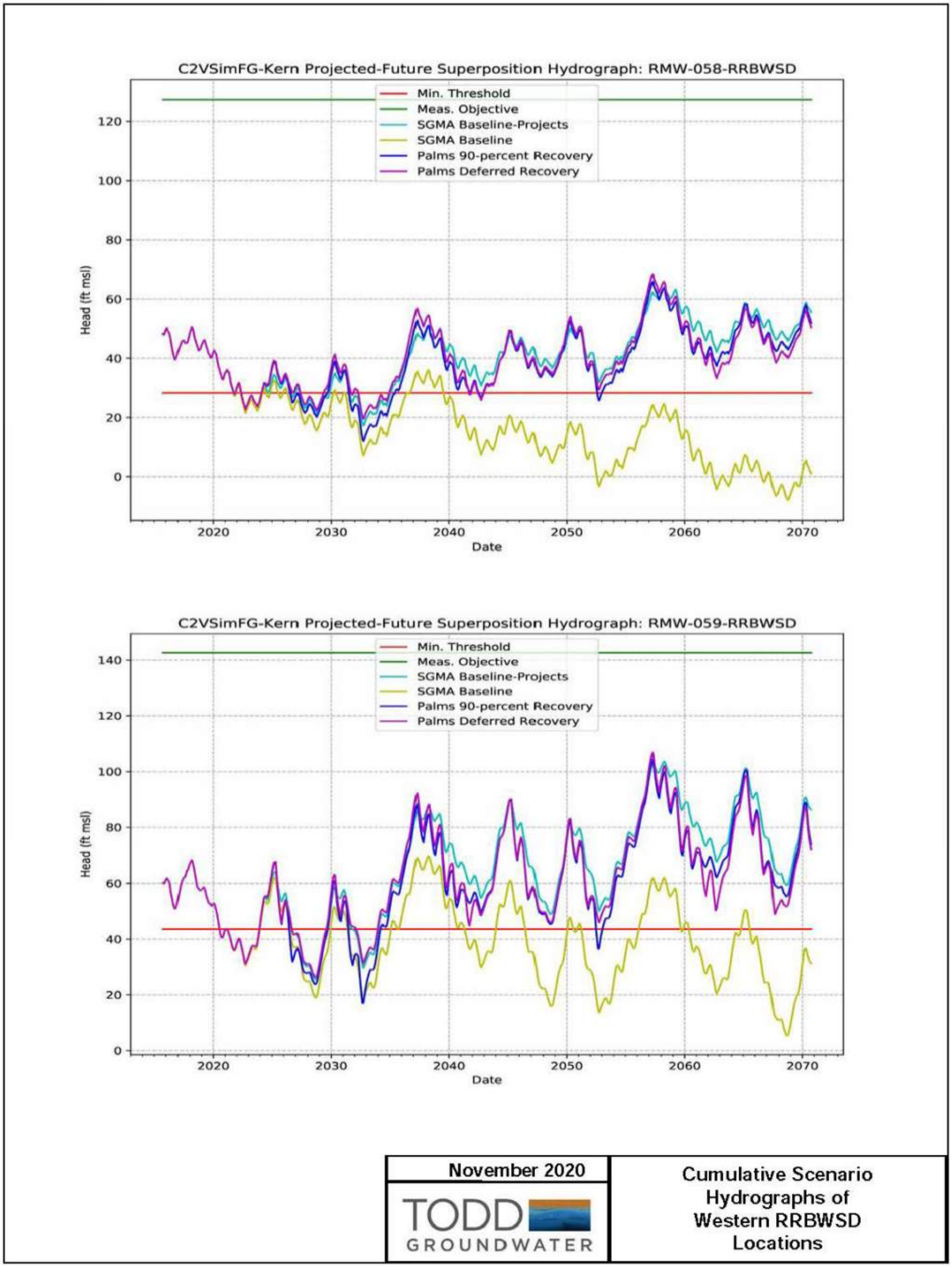


Figure 4-4 Cumulative Scenarios Distal from Recovery Project Site

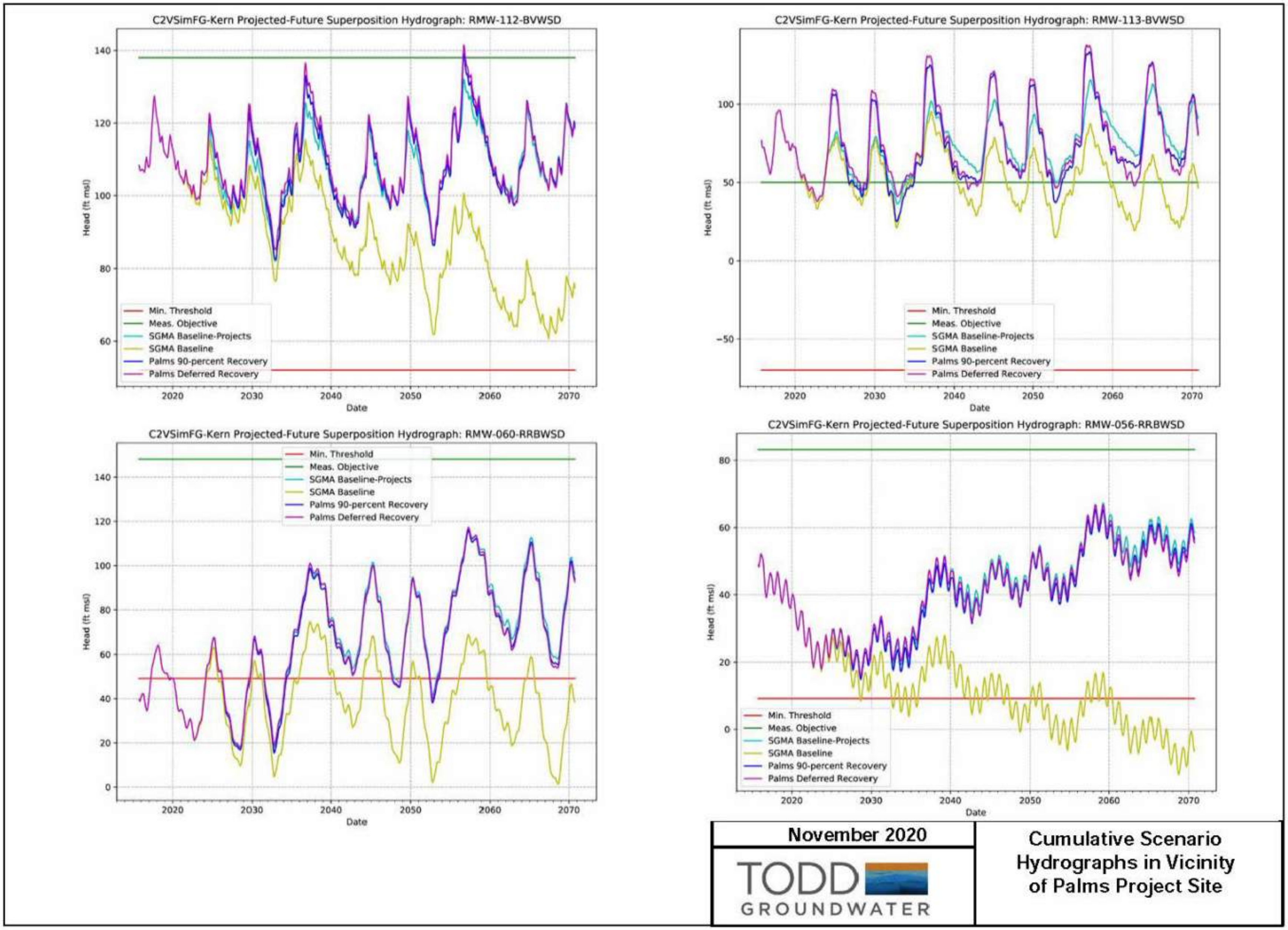
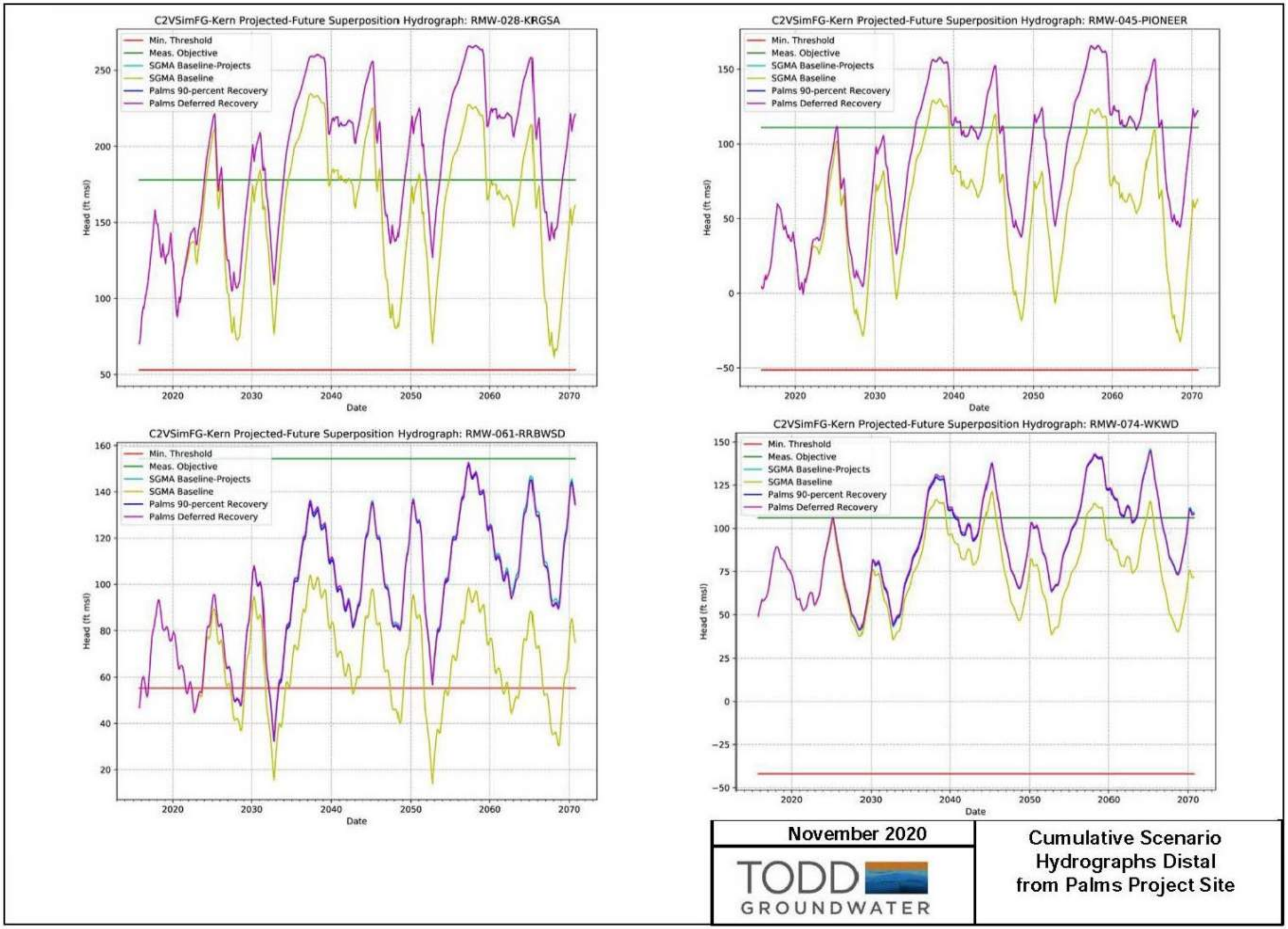


Figure 4-5. Cumulative Scenarios Vicinity of Palms Project Site



The results are presented within the context of the SGMA simulations. These results indicate the potential for pumping by the Recovery Project in the Cumulative Scenario to cause the groundwater levels at the WKWD North Wellfield (*refer to* **Figure 4-2**) and the far western areas of RRBWSD (*refer to* **Figure 4-3**) to fall below the MT during simulation years.

Conversely, groundwater levels during the recharge events are higher with the Palms Project than without. Groundwater levels exceed the MO approximately 20 years earlier, and more frequently, with the Palms Project than without.

Other RMW locations more distant from the Recovery Project in WKWD South Wellfield, RRBWSD, KRGSA (city of Bakersfield) and the Pioneer Project show negligible effects from the Recovery Project operations (*refer to* **Figures 4-4** and **4-5**). The KWBA did not include RMW locations in their GSP, so the KWBA does not have MT or MOs for assessment under the cumulative analysis. However, it can be assumed that they will show similar effects as a function of distance from the Recovery Project as seen in the other RMW locations. Therefore, there is the potential for similar effects in the western KWBA that will diminish to negligible in the central and eastern areas.

The Cumulative with Deferred Recovery Scenario shows that groundwater levels at the WKWD North Wellfield (*refer to* **Figure 4-2**) and the far western areas of RRBWSD (*refer to* **Figure 4-3**) are higher than those with the Baseline with Recovery Project Scenarios. By deferring the recovery pumping, these RMW locations still have some benefit of the Palms Project recharge. The deferred pumping occurs during a period when the simulated groundwater levels for the planned SGMA projects are sufficiently far above the MTs for the WKWD North Wellfield and the far western RRBWSD RMW locations that subsequent minimum groundwater levels reached after imposition of the pumping deferments remain above their respective MTs.

In the GSPs for the WKWD and RRBWSD, the definition of the potential undesirable results from groundwater levels falling below MTs is defined in terms of number of wells within an area and duration of the occurrence. Excerpts taken from the WKWD and RRBWSD GSPs defining undesirable results is provided below:

- West Kern Water District – An undesirable result would occur when the MT for groundwater levels is exceeded in at least three adjacent management areas that represent at least 15% of the Subbasin, or that represent greater than 30% of the Subbasin (as measured by each management area. Each GSA will set MTs for each Chapter of the GSP that participates in the KGA (WKWD 2019).
- Rosedale-Rio Bravo Water Storage District – The Rosedale Rio-Bravo Management Area (RRBMA) will seek to maintain at least two water level monitoring points for each monitoring zone. To the extent that average water levels at designated monitoring points have exceeded the MT of the monitoring zone, it will be considered an undesirable result. To the extent that two of the North, Central, and South of River zones exceed this criterion, the RRBMA will consider it an undesirable result. To the extent that either the South or East zones exceed this criterion, the RRBMA will consider it an undesirable result (RRBWSD 2019).

The operations used for the Cumulative Scenario represent a practical strategy for management of the Palms under the hydrological conditions presented over the 50-year Baseline scenario. Actual operations would be dependent upon future hydrologic conditions which would affect the availability of surface water for recharge and local water demand.

Impact CUM-1: ***Have an impact that is individually limited, but cumulatively considerable for groundwater levels.***

There is the potential for pumping by the Recovery Project in the Cumulative Scenario to cause the groundwater levels at the WKWD North Wellfield and the far western areas of RRBWSD to fall below the MT during simulation years.

The incremental contribution to the combined cumulative impact of operating the Recovery Project, when added to other closely related past, present, and reasonably foreseeable probable future projects, is **potentially significant**.

The results of the Cumulative with Deferred Recovery Scenario indicate that there are active mitigation measures that are available to reduce the potential of undesirable results resulting from the Recovery Project recovery pumping. Therefore, mitigation measure CUM-1 will be applied to reduce potentially significant cumulative impacts.

Mitigation Measure CUM-1: Recovery Project pumping will be deferred prior to groundwater levels reaching their MTs at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD. Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90 percent of the recharged amount.

Timing: During operation

Responsibility: Buena Vista Water Storage District

Significance after Mitigation: Implementing Mitigation Measure CUM-1 would reduce the potentially significant impact on groundwater levels to a **less-than-significant** level because it would minimize the potential that groundwater levels will decline below the MT.

4.6.3.3 Water Quality

The Palms Project has a potential beneficial impact on groundwater quality because the water that is recharged is high quality surface water. The Recovery Project will not have a detrimental impact on groundwater quality. Since combined impacts of the projects do not constitute a significant impact and the Recovery Project does not entail a significant impact to water quality, there would not be a contribution to a cumulatively considerable impact.

4.6.4 Geological Resources

As described in Chapter 4.6.3 – Cumulative Impacts Hydrological Resources, the Recovery Project has the potential, in the Cumulative Scenario, to cause the groundwater levels at the WKWD North Wellfield and the far western areas of RRBWSD to fall below the MT during some simulation years. However, in other locations, how the cumulative effects of operation of the Recovery Project together with implementation of other reasonably foreseeable projects would be likely to be protective against subsidence by maintaining groundwater levels above MTs and by avoiding the continuing decline of groundwater levels projected under the baseline condition.

Impact CUM-2: ***Have an impact that is individually limited, but cumulatively considerable for subsidence***

There is the potential for pumping by the Recovery Project in the Cumulative Scenario to cause the groundwater levels at the WKWD North Wellfield and the far western areas of RRBWSD to fall below the MT during simulation years which could increase the risk of subsidence/

The incremental contribution to the combined cumulative impact of operating the Recovery Project, when added to other closely related past, present, and reasonably foreseeable probable future projects, is **potentially significant**.

The results of the Cumulative with Deferred Recovery Scenario indicate that there are active mitigation measures that are available to reduce the potential of undesirable results resulting from the Recovery Project recovery pumping. Therefore, mitigation measure CUM-1 will be applied to reduce potentially significant cumulative impacts.

Mitigation Measure CUM-1: Recovery Project pumping will be deferred prior to groundwater levels reaching their MTs at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD. Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90 percent of the recharged amount.

Timing: During operation

Responsibility: Buena Vista Water Storage District

Significance after Mitigation: Implementing Mitigation Measure CUM-1 would reduce the potentially significant impact on groundwater levels to a **less-than-significant** level because it would minimize the potential that groundwater levels will decline below the MT.

5.0 Alternatives to the Proposed Project

5.1 CEQA Requirements

The CEQA Guidelines §15126.6 require consideration and discussion of alternatives of a proposed project in an EIR. The purpose of the alternatives analysis is to identify ways to mitigate or avoid the potentially significant adverse effects that may result from implementation of the proposed project. This chapter identifies and considers alternatives to the Recovery Project.

CEQA provides the following guidelines for discussing alternatives to a proposed project:

- The EIR must describe a reasonable range of alternatives to the project that 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." [CEQA Guidelines §15126.6(a)]
- The EIR must identify ways to mitigate or avoid significant effects of the project on the environment, "…the discussion of alternatives shall focus on alternatives to the project or its location which are capable of avoiding or substantially lessening any significant effects of the project, even if these alternatives would impede to some degree the attainment of the project objectives, or would be more costly." [CEQA Guidelines §15126.6(b)]
- The range of potential alternatives to the proposed Project shall include those that could feasibly accomplish most of the basic objectives of the project and those that could avoid or substantially lessen one or more of the significant adverse effects. If there is a specific proposed Project or a preferred alternative, the EIR must explain why other alternatives considered in developing the proposed Project were rejected in favor of the proposal. "The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible during the scoping process and briefly explain the reasons underlying the lead agency's determination." [CEQA Guidelines § 15126.6(c)]
- The EIR shall include sufficient information about each alternative to allow meaningful evaluation, analysis, and comparison with the proposed Project. "If an alternative would cause one or more significant effects in addition to those that would be caused by the project as proposed, the significant effects of the alternative shall be discussed, but in less detail than the significant effects of the project as proposed." [CEQA Guidelines §15126.6(d)]
- The specific alternative of "no project" "shall be evaluated along with its impact." The purpose of describing and analyzing a no project alternative is to allow, "decision-makers to compare the impacts of approving the proposed Project with the impacts of not approving the proposed Project." The CEQA Guidelines also stipulate that the "no project" analysis "shall discuss the existing conditions at the time the NOP is published...as well as what would reasonably be expected to occur in the foreseeable future if the project were not approved, based on current plans..." [CEQA Guidelines §15126.6(e)(2)]

- The CEQA Guidelines also instruct that, "If the environmentally superior alternative is the No Project Alternative, the EIR shall also identify the environmentally superior alternative among the other alternatives." [CEQA Guidelines §15126.6(e)(2)]
- Under the CEQA Guidelines §15126.6(f), the range of alternatives required in an EIR is governed by a "rule of reason" that requires an EIR to set forth only those alternatives necessary to permit a reasoned choice. "The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision making."

5.2 Overview of the Alternative Selection Process

The alternative selection process involved the following sequence of steps:

1) Identification of Recovery Project goals and objectives
2) Identification of potentially significant impacts to the proposed Recovery Project
3) Development of evaluation criteria
4) Review of a range of alternatives
5) Identification of those alternatives that meet the criteria and explanation of why alternatives were rejected as infeasible
6) Evaluation of alternatives based upon comparative environmental impact assess

5.3 Goals and Objectives of the Recovery Project

The overall purpose of the Recovery Project is to enhance groundwater management by increasing the District's ability to recharge groundwater in wet years and return that banked water in dry years. Additionally, enhanced groundwater management would benefit agriculture by providing irrigation water supplies in years with limited surface water supplies.

The Recovery Project has the following primary objectives:

- Increase conjunctive management on the west side of the County by improving the District's ability to meet demands during periods when supply of surface water is limited with previously banked water supplies
- Improve conveyance of previously stored water throughout the District and to neighboring districts
- Install recovery facilities to attract new banking partners in order to increase groundwater in the Kern Subbasin for District use
- Recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the Aqueduct

5.4 Potentially Significant Impacts of the Recovery Project

Potentially significant impacts related to implementing the Recovery Project are listed below:

- Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species
- Cause a substantial adverse change in the significance of a historical resource or an archaeological resource pursuant to CCR § 15064.5
- Disturb any human remains, including remains interred outside of dedicated cemeteries
- Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality
- Have an impact that is individually limited, but cumulatively considerable for groundwater levels
- Have an impact that is individually limited, but cumulatively considerable for subsidence risk

5.5 Alternatives Evaluation Criteria

Once identified, the alternatives were evaluated based on the following criteria. The alternative must meet the three criteria to be considered for further analysis in the DEIR.

Criterion 1: The alternative must feasibly attain most of the Recovery Project's objectives. This criterion focuses on identifying which alternatives were capable of achieving the same results as the proposed Recovery Project (i.e., meeting the goals and objectives of the Recovery Project) in a feasible manner. "Feasible" is defined in the CEQA Guidelines §15364 as: "capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors."

Criterion 2: Section 15126.6 of the CEQA Guidelines requires examination of a reasonable range of alternatives to the proposal. As part of the EIR certification process and action on the proposed project, the lead agency determines whether or not the alternatives are feasible.

Criterion 3: The alternative must avoid or substantially lessen an identified significant adverse environmental impact of the Recovery Project.

5.6 Alternatives Considered but Rejected from Detailed Analysis

This alternatives analysis is constrained in part due to the fact that alternative design elements and configurations have already been incorporated by the District as a result of findings and recommendations of technical studies conducted during the planning processes for the Recovery Project, with a goal to limit environmental impacts of the Recovery Project. The alternatives initially considered are summarized below.

5.6.1 Landowner Recovery Alternative

The District considered an alternative groundwater recovery option to provide flexibility by allowing private pumping in lieu of surface water deliveries. Under this alternative, landowners would have the option, in addition to surface water delivery, to utilize on-farm wells to pump water for irrigation needs or continue to receive surface water deliveries through the District canals and pipelines. No additional District facilities would need to be constructed for this alternative delivery option. Landowners interested in this optional delivery method would be required to sign up for the District program, and participation would be limited by the amount of water available for recovery, no more than 25,000 AFY. It was anticipated that water users south of Perral Road in the Buttonwillow Service Area would be eligible to participate in the program. The water pumped from landowner wells would be treated as recovered water, leaving a similar amount of water (SWP, Kern River, or other water) available for a different beneficial use.

This alternative delivery option would have allowed wider participation and flexibility for water users. However, this delivery option would not meet the Recovery Project objectives to improve conveyance of previously stored water throughout the District and to neighboring districts. Therefore, this alternative was not evaluated in detail because it cannot feasibly attain most of the Recovery Project's objectives.

5.6.2 Alternative Project Layouts

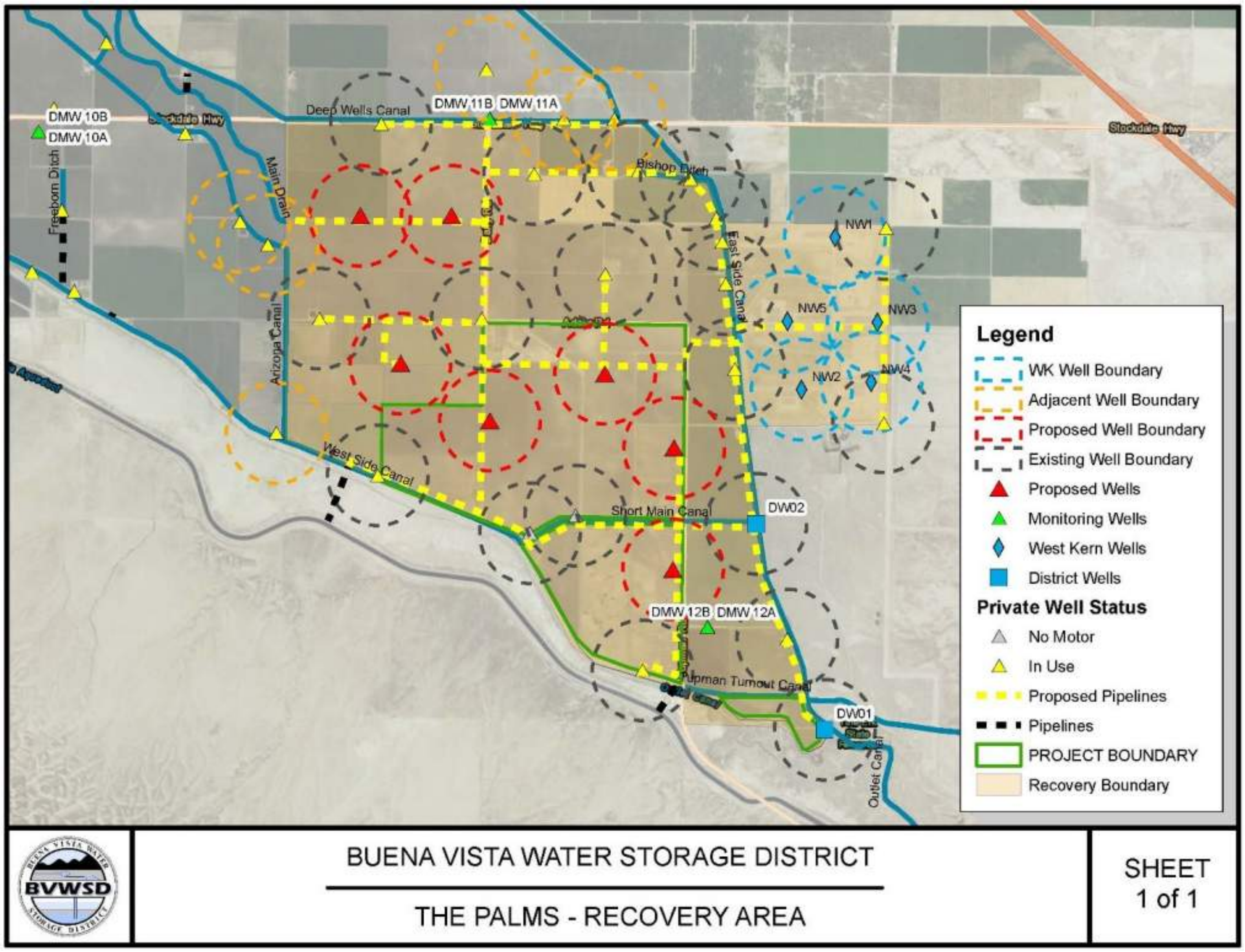
5.6.2.1 Palms Area-Only Layout

An alternative to extract banked water solely within the Palms Groundwater Bank was evaluated by the District. This alternative would utilize a suite of 34 wells: seven proposed, new wells; 17 existing private wells; two currently inactive wells on District property (to be rehabilitated); and five wells within the neighboring WKWD (**Figure 5-1**). No more than 25 of these wells would have been used for groundwater recovery in any given year. Conveyance pipes (90,000 feet) would connect new and existing wells for the Recovery Project water delivery system.

Water quality data from wells within the recharge area and outside of this area indicate that the quality of water is such that allows the water to be put to beneficial use. The addition of wells outside the recovery area provides the ability to blend water recovered from within the recharge area with water recovered from wells outside this area and thus increase the range of uses the water may serve. Therefore, the most effective use of resources available to the BVGSA is to recharge surface water in areas suited to recharge while distributing recovery facilities to produce groundwater from the array of recovery wells of a quality that will require no or minimal treatment to meet a broad range of beneficial uses. The evaluation of water quality data for wells in the Palms area found that it may not be possible to meet water quality standards for pump-in to the Aqueduct without treatment. Therefore, this alternative was not evaluated in detail because, although this alternative would produce water of suitable quality for irrigation use, it cannot feasibly attain the Recovery Project's objective of meeting water quality standards by blending, if necessary.

In addition, potential impacts to groundwater levels would be potentially greater with this alternative. Therefore, this alternative was not evaluated in detail because it did not avoid or substantially lessen an identified significant adverse environmental impact of the Recovery Project.

Figure 5-1. Alternative Recovery Project Layout - Palms Area Only



5.6.2.2 Alternative Northeastern Area Layout

An alternative layout in the northeastern area of the Recovery Project (**Figure 5-2**) included wells and pipelines immediately adjacent to bush seepweed scrub habitat that could support sensitive biological resources. Biological surveys in this area found evidence of kangaroo rat presence, possibly including two endangered species (giant kangaroo rat and Tipton kangaroo rat). Surveys also documented suitable habitat for blunt-nosed leopard lizard (state and federally endangered) and San Joaquin kit fox (state endangered and federally threatened), and burrowing owls (California species of special concern) were observed in the survey area.

In addition, the alternative pipeline alignment may impact cultural resource P-15-005984. Resource P-15-005984 is a large, prehistoric archaeological site. The site, first recorded in 1997, was described as a large lithic scatter measuring 400 meters north to south by 500 meters east to west. Identified artifacts included flakes of chert, chalcedony and basalt, a large side notched projectile point, an obsidian biface, scraper, and a shell bead. Human skulls were also reported in a plowed portion of the site.

The location of wells and pipeline in the northeastern area was revised in response to these survey results. The revised project layout, which is now the Recovery Project (*refer to* **Figure 2-2**), provides a minimum buffer of 50 feet between the anticipated construction disturbance corridor and bush seepweed scrub habitat. In addition, the pipeline route was adjusted to avoid cultural resource P-15-005984. Therefore, the alternative northeastern project layout was not evaluated in detail, because it did not avoid or substantially lessen an identified significant adverse environmental impact of the Recovery Project.

5.7 Alternatives Evaluated in Detail

5.7.1 No-Project Alternative

Under the no project alternative, the District would not construct a groundwater recovery system to recover water banked at the Palms. The District would not recover banked groundwater except with existing wells and would not have a conveyance system to deliver recovered water.

5.7.2 Reduced Recovery Alternative (also known as Scenario B)

As described in Chapter 3.4.3.4 – Groundwater Level Impact Analysis, two operational scenarios were setup and run using the Superposition Model to assess changes in groundwater conditions. The original project description (also known as Scenario A) included an assumption of 100 percent recovery of the recharged water as a worst-case scenario with respect to groundwater level impacts. The recovery pumping occurs at a rate of 25,000 AFY over a 6-month period over 4 consecutive years. This scenario was modeled as a worst-case scenario for impact analysis purposes, actual recovery would likely extend over a longer time period and therefore have less impact.

In the Reduced Recovery Alternative (also known as Scenario B), the Recovery Project would recover 90 percent of the recharged water. The simulated recovery pumping would occur at a rate of 25,000 AFY over a 6-month period over 3 consecutive years. During Year 4, the recovery pumping would occur at a rate of 15,000 AFY. The same pumping rate occurs during the first 3 months, reduced pumping occurs in the 4th month, and no pumping during the final 2 months of Year 4 of the extraction period. As described for Scenario A, this recovery schedule is anticipated to be the worst-case scenario, with actual recovery extending over a longer time period, with less impact to groundwater levels.

Under the Reduced Recovery Alternative, groundwater recovery would be limited to 90 percent of the banked groundwater supplies. Recovery would be limited to 25,000 AFY but could not exceed 90 percent of the total amount of recharged groundwater.

5.8 Comparison of Impacts of the Alternatives

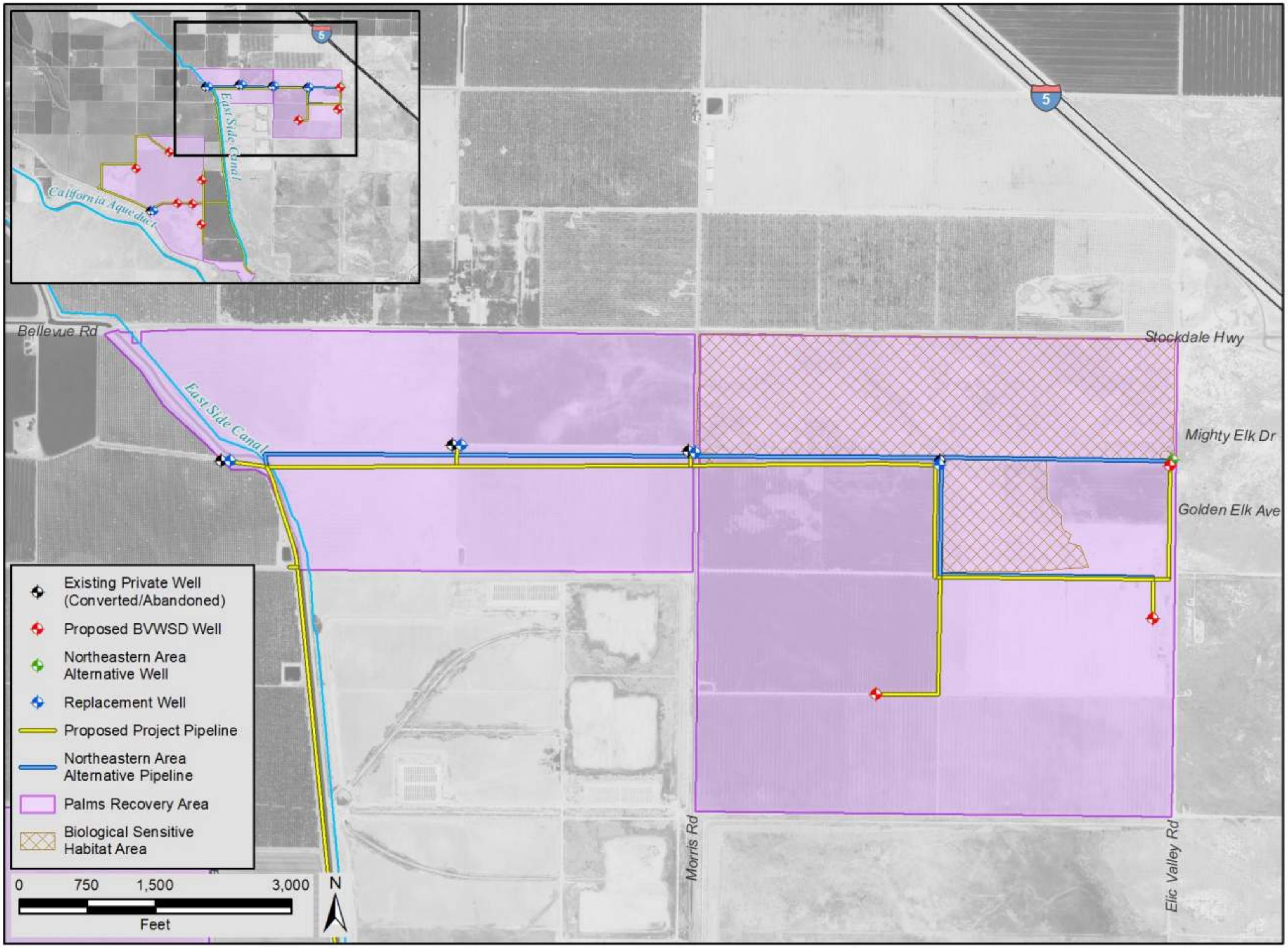
5.8.1 No-Project Alternative

The no project alternative would avoid new construction and would therefore have no impact on aesthetics, air quality, biology, cultural resources, forestry, geology, hydrology and water quality, energy, hazards and hazardous materials, land use/planning, population and housing, public services, mineral resources, noise, recreation, transportation, utilities and services, and wildfire.

The no project alternative would have a potentially significant impact on agriculture, as it would eliminate the recovery and delivery of up to 25,000 AFY of previously banked surface water for irrigation. Groundwater banked at the Palms would not be delivered to water users in dry years when there is inadequate surface supply to meet agricultural water demands.

No mitigation is available to lessen this potential impact. Therefore, this is a significant impact which cannot be mitigated to a less-than-significant level.

Figure 5-2. Alternative Recovery Project Layout – Northeastern Area



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5.8.2 Reduced Recovery Alternative

Figure 5-3 shows the distribution of the cumulative groundwater level change for the Reduced Recovery Alternative (Scenario B), which assumes 90 percent recovery of the Palms Project recharge. The contours show the maximum cumulative groundwater level change of 20 to 30 feet occurs near the recovery wells. Because groundwater pumping is reduced during Year 4 of recovery of this alternative, the cumulative groundwater level declines are 0 to 2 feet less than those in Scenario A which includes recovery of 100 percent of recharged groundwater (*refer to* **Figure 3-8**).

Figure 5-4 shows the hydrographs for the Reduced Recovery Alternative (Scenario B) at the same locations shown on **Figure 3-8**. The difference between the two alternatives (Scenarios A and B) is Year 4 of pumping during which the Reduced Recovery Alternative (Scenario B) pumps 10,000 AF less. As a result, the graphs are identical until the end of Year 4 of pumping when groundwater levels are about 2 to 3 feet higher in the Reduced Recovery Alternative due to the reduced pumping.

Figure 5-5 shows the hydrographs for the Reduced Recovery Alternative (Scenario B) at the simulated monitoring points[11]. The change after Year 4 of pumping is generally 0 to 2 feet, with the range being a function of the distance from the Recovery Project wells.

[11] Appendix D, Figure 18 shows the locations of the simulated monitoring points placed in the Superposition Model to help with understanding the spatial distribution of response to the Palms Project operations. These do not reflect actual monitoring points; however, future simulations would include monitoring points at specific locations of interest for the groundwater impacts assessment

Figure 5-3. Groundwater Level Change After Four Years of Pumping, Reduced Recovery Alternative (Scenario B)

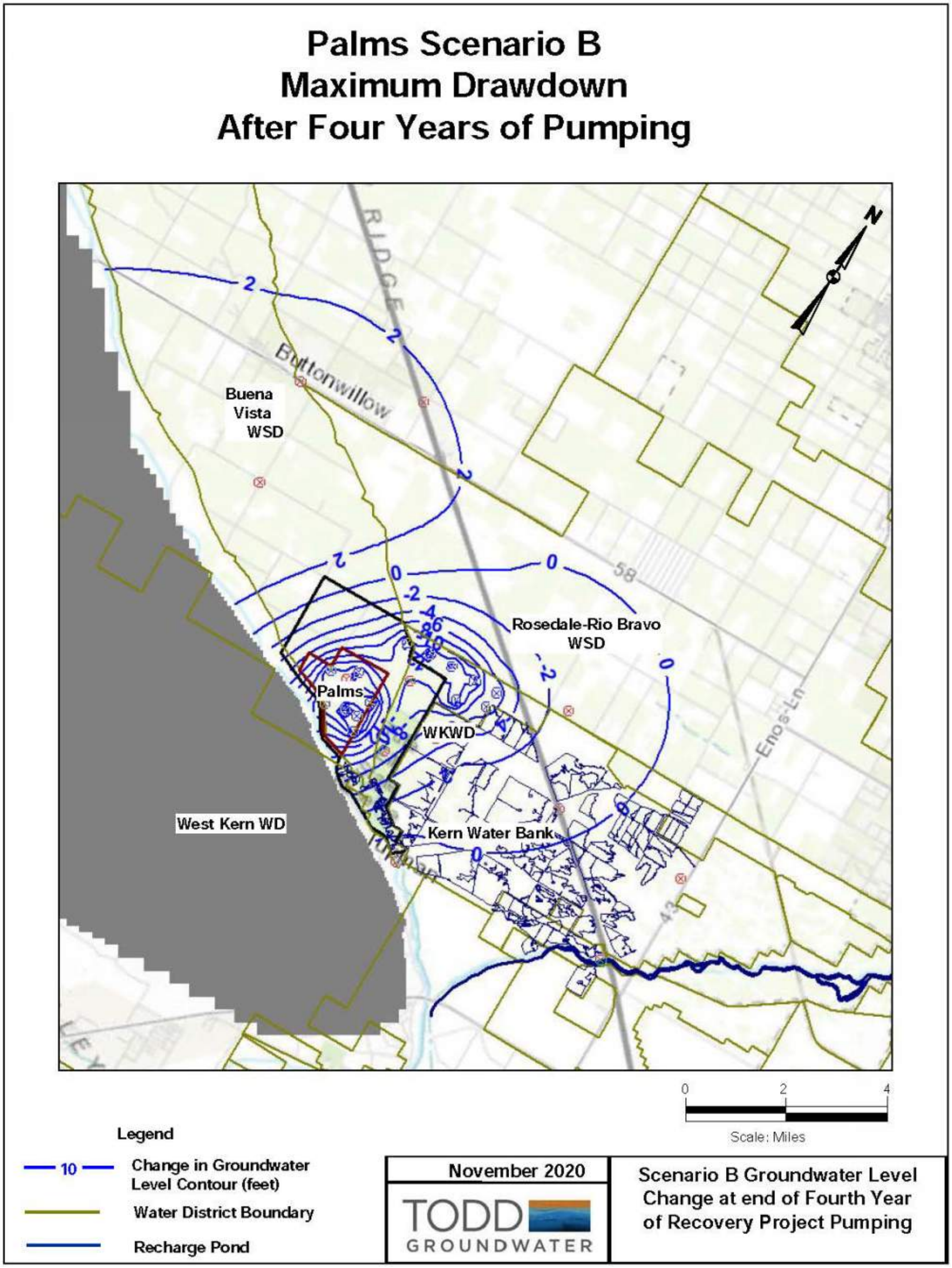


Figure 5-4. Groundwater Level Change in Recovery Project Wells, Reduced Recovery Alternative (Scenario B)

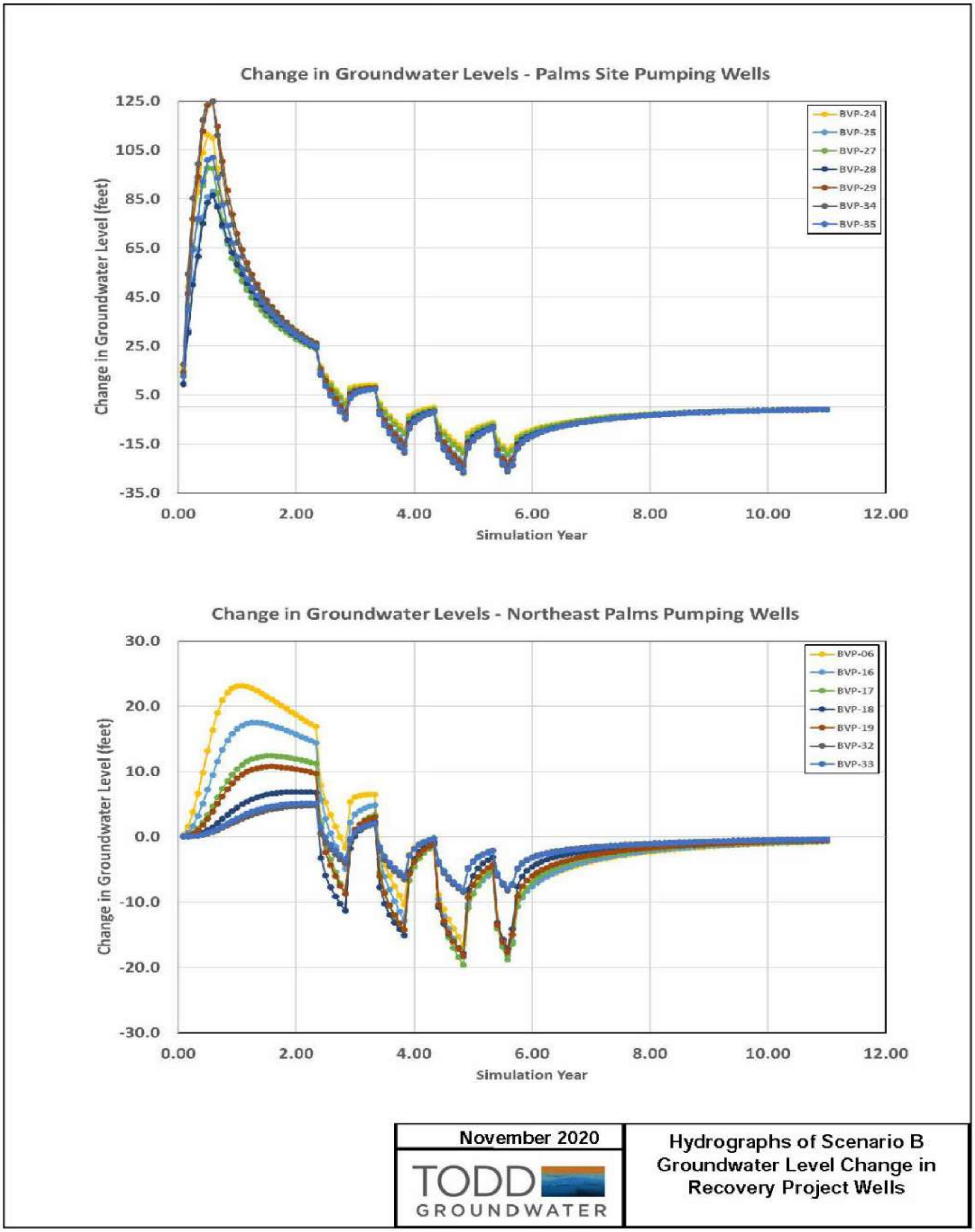
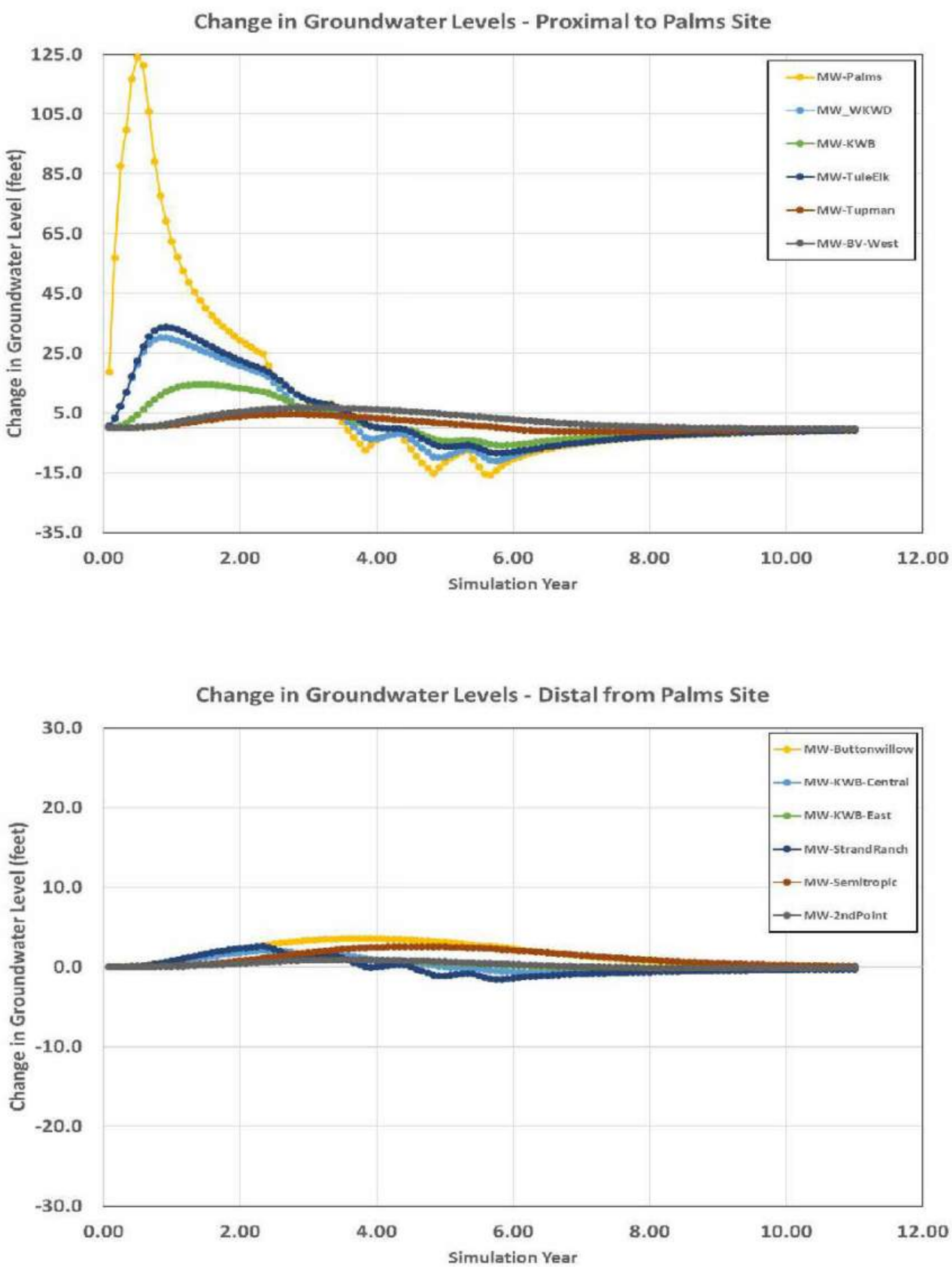


Figure 5-5. Groundwater Level Change at Specified Simulation Points, Reduced Recovery Alternative (Scenario B).



November 2020	Hydrographs of Scenario B Groundwater Level Change at Specified Simulation Points
TODD GROUNDWATER	

Reduced Recovery Alternative Superposition Hydrographs

Superposition hydrographs provide a means to assess the effect of the Recovery Project at various locations. For this analysis, the simulated groundwater elevation change is added, or superimposed, onto the measured groundwater elevation data to evaluate Recovery Project-related impacts relative to historical groundwater elevation data. This analysis evaluates the scale of the impacts of the Recovery Project compared to the historical variation in groundwater levels in the Study Area over time. The superposition hydrographs add the change in groundwater levels from the Reduced Recovery Alternative (Scenario B) to the measured historical water levels for the selected wells.

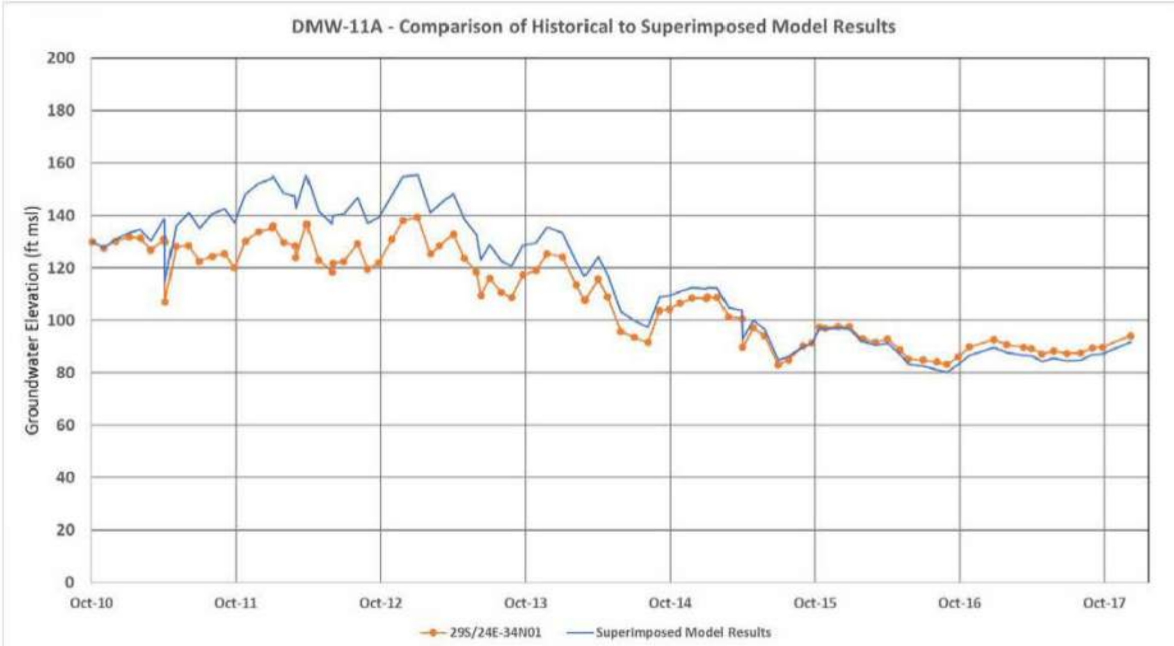
For the superposition hydrographs assessment, the recharge event is assumed to occur in 2011, which was a wet hydrologic year where water was available for potential recharge. The recovery pumping is assumed to occur during 2013 through 2016, which was a period of critically dry drought conditions. This period was selected because if represents a recent period where extreme conditions were experienced in the Kern County Subbasin.

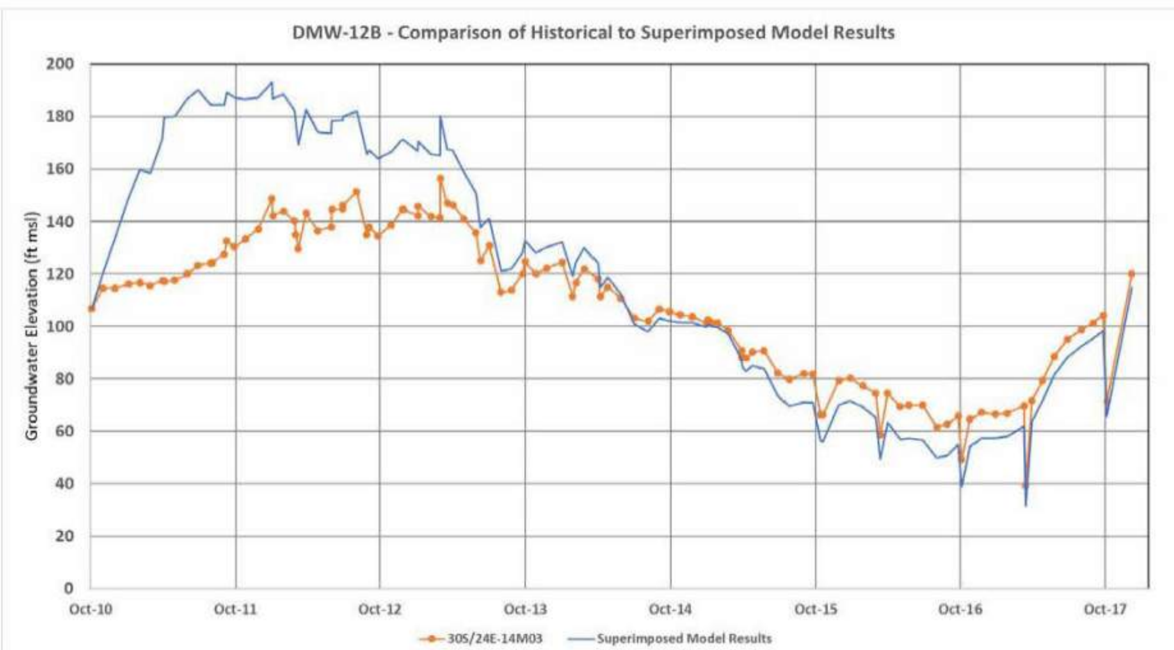
A representative selection of wells that have periods of measurements over the 2011 to 2016 period were selected to provide an assessment of the relative change resulting from the Recovery Project relative to the historical groundwater level variations observed at these locations[12]. Impacts to groundwater levels are a function of distance from the Recovery Project. Monitoring wells near to the Recovery Project show the greatest groundwater level changes, with less impact seen at greater distance from the Recovery Project. **Figure 5-5** shows hydrographs for BVWSD wells, where early mounding as a result of the recharge increases groundwater levels about 60 feet relative to the historical levels. Maximum drawdown from recovery pumping is about 10 feet at these locations. **Figure 5-6** shows monitoring wells in the Pioneer and the WKWD South wellfield. Due to the distance of the wells from the Recovery Project, the change in groundwater levels is negligible. Negligible impacts are also seen at the central RRBWSD monitoring wells, due to their distance from the Recovery Project.

Monitoring wells in the western RRBWSD near to the Recovery Project experience increased groundwater levels of about 2 to 10 feet relative to historical levels as a result of recharge. Maximum drawdown from recovery pumping ranges from about 1 to 5 feet at these locations. The KWBA monitoring wells along the western margin of KWB (nearest to the Recovery Project) show increased groundwater levels of about 5 to 20 feet relative to historical levels as a result of recharge. Maximum drawdown from recovery pumping is about 1 to 4 feet. The hydrographs for these sites can be found in **Appendix D**, Figures 23 through 26.

[12] A map of these locations can be found in Appendix D, Figure 21.

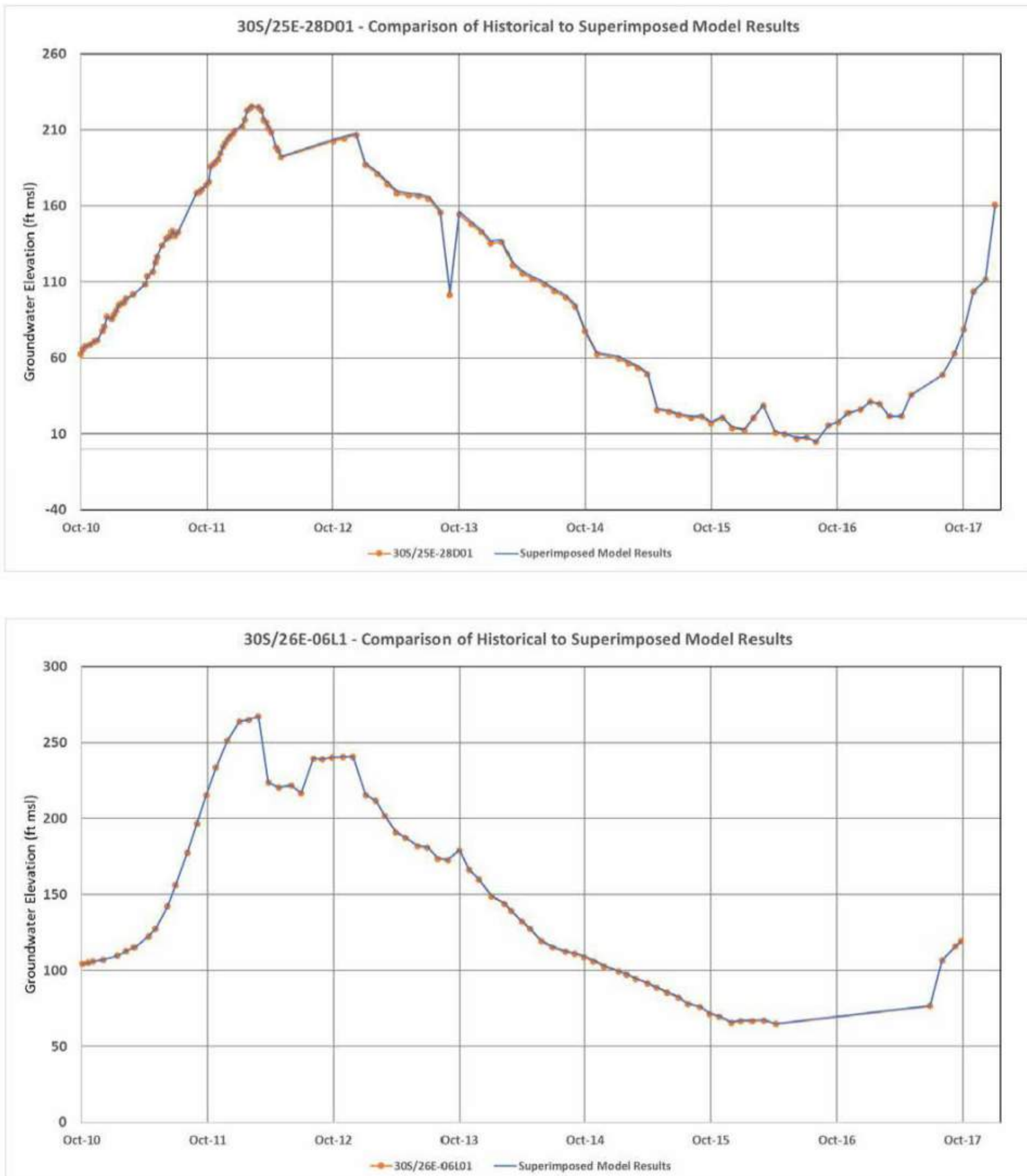
Figure 5-6. Superposition Hydrographs at BVWSD Wells





November 2020	Superposition Hydrographs of Scenario B onto Measured Water Levels at BVWSD Wells
TODD GROUNDWATER	

Figure 5-7. Superposition Hydrographs at WKWD and Pioneer Wells



November 2020	Superposition Hydrographs of Scenario B onto Measured Water Levels at WKWD and Pioneer
TODD GROUNDWATER	

5.9 Environmentally Superior Alternative

The no action alternative results in a significant impact which cannot be mitigated to less-than-significant to agricultural resources. In addition, the no action alternative does not meet any of the Recovery Project objectives.

The Reduced Recovery Alternative does not have any impacts which cannot be mitigated to a level of less-than-significant, and it meets all project objectives. Because groundwater pumping is reduced during Year 4 of recovery of this alternative, the cumulative groundwater level declines are 0 to 2 feet less than would occur with Scenario A, 100 percent recovery. In addition, at the end of Year 4 of pumping, groundwater levels are about 2 to 3 feet higher in the Recovery Project wells in Reduced Recovery Alternative, due to the reduced pumping. Therefore, the reduced recovery alternative is the environmentally superior alternative.

BVWSD intends to implement the Reduced Recovery Alternative.

6.0 Mitigation Summary

6.1 Introduction

In accordance with CEQA, the District is the Lead Agency for preparation of the EIR and the incorporated [draft] MMRP contained within this chapter (PRC §21081.6). As the Lead Agency, the District is responsible for ensuring the mitigation program is implemented.

The mitigation program has been designed to avoid, minimize, rectify, reduce, eliminate or compensate for potentially significant impacts caused by construction, operation or maintenance of the Recovery Project. (CEQA Guidelines §10597, 15126.4 & 15370). Implementation of the recommended mitigation program would reduce potentially significant impacts to a less than significant level, (*refer to* Chapter 3.0 – Environmental Setting, Impact Analysis, and Mitigation Measures and Chapter 4.0 – Other CEQA Required Sections, for complete discussion).

Potential Recovery Project impacts are listed in **Table 6-1**, by resource area. **Table 6-1** includes the level of significance prior to the implementation of mitigation, the mitigation measures proposed, and the level of significance after mitigation is incorporated. The timing of mitigation implementation and the party responsible for monitoring or reporting are also included. The FEIR will include a final MMRP designed to ensure compliance during Recovery Project implementation and will be incorporated into the District's conditions of approval for the proposed Recovery Project. **Table 6-1** includes impacts and mitigation measures described in the IS, as well as those described for resources covered in detail in this FEIR.

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Table 6-1. Summary of Project Impacts, Mitigation Program, and Residual Effect

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
Air Quality – Project construction of more than 5 acres will generate dust and particulate emissions.	Less-than-significant	**Mitigation Measure AQ-1: District Regulation VIII Fugitive PM_{10} (particulate matter less than 10 microns in diameter) Prohibitions Best Management Practices** All projects are subject to San Joaquin Valley Air Pollution Control District (S.J.V.A.P.C.D.) rules and regulations in effect at the time of construction. Control of fugitive dust is required by S.J.V.A.P.C.D. Regulation VIII. The District shall implement or require its contractor to implement all of the following measures as identified by S.J.V.A.P.C.D.: • Apply water to unpaved surfaces and areas • Use non-toxic chemical or organic dust suppressants on unpaved roads and traffic areas • Limit or reduce vehicle speed on unpaved roads and traffic areas • Maintain areas in a stabilized condition by restricting vehicle access • Install wind barriers • During high winds, cease outdoor activities that disturb the soil • Keep bulk materials sufficiently wet when handling • Store and hand material in a three-sided structure • When storing bulk material, apply water to the surface or cover the stage pile with a tarp • Don't overload haul trucks. Overlanded trucks are likely to spill bulk materials • Cover haul trucks with a tarp or other suitable cover. Or, wet the top of the load enough to limit visible dust emissions • Clean the interior of cargo compartments on emptied haul trucks prior to leaving the site • Prevent track-out by installing a track-out control device	Less-than-significant	During construction	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		• Clean up track-out at least once a day. If along a busy road or highway, clean up track-out immediately • Monitor dust-generating actives and implement appropriate measures for maximum dust control			
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species	Potentially significant	**Mitigation Measure BIO-1: Implement Measures to Educate On-site Construction Personnel and Maintain a Minimum 50-foot No-disturbance Buffer from Blunt-nosed Leopard Lizard Habitat during Project Construction**. The District will implement the following measures to minimize potential effects on blunt-nosed leopard lizard during project construction. • Before project activities begin, all on-site project personnel shall attend a Worker Environmental Awareness Program conducted by a qualified biologist. The program shall address special-status species that could occur in the project area and include a discussion of species identification, life history, general behavior, habitat, distribution and sensitivity to human activities; state and federal legal protections; and required avoidance and minimization measures. A handout containing the information provided in the training shall be provided to all personnel. Upon completion of the training, all personnel in attendance shall sign a form stating they received the training and understand all topics discussed. • Before project activities begin east of Morris Road, temporary fencing shall be installed to create and maintain a minimum 50-foot no disturbance buffer between the construction area and bush seepweed scrub habitat that supports burrows suitable for blunt-nose leopard lizard. The fencing shall be installed at least 50 feet from suitable blunt-nose leopard lizard habitat. • A qualified biologist shall determine where fencing will be installed, conduct a pre-installation survey of the fence alignment to confirm no suitable burrows for blunt-nose leopard lizard are present in or	Less than significant	Before and during construction	The District and its contractors

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		within 50 feet of the fence alignment, and be present during all fence installation and removal to ensure that no special-status species are harmed. • All project-related construction activities, construction personnel, and vehicles shall be prohibited from the bush seepweed and 50-foot no-disturbance buffer. Fencing shall be inspected and repaired, as necessary, each day before work begins adjacent to the fencing. Fencing shall be removed after all construction activities adjacent to the bush seepweed habitat are complete.			
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species	Potentially significant	**Mitigation Measure BIO-2a: Conduct Focused Surveys for Burrowing Owls and Avoid Loss of Occupied Burrows and Failure of Active Nests**. To minimize potential effects of project construction on burrowing owl, the District will ensure that the following measures are implemented, consistent with the Staff Report on Burrowing Owl Mitigation (California Department of Fish and Game [CDFG] 2012). • A burrowing owl take avoidance survey shall be conducted within 14 days before project activities begin. • If any occupied burrows are observed, protective buffers shall be established and implemented. A qualified biologist shall monitor the occupied burrows during project activities to confirm effectiveness of the buffers. The size of the buffer will depend on type and intensity of project disturbance, presence of visual buffers, and other variables that could affect susceptibility of the owls to disturbance. If it is not feasible to implement a buffer of adequate size and it is determined, in consultation with CDFW, that passive exclusion of owls from the project site is an appropriate means of minimizing impacts, an exclusion and relocation plan shall be developed and implemented in coordination with CDFW. However, passive exclusion cannot be conducted during the breeding season (February 1–August 31), unless a qualified biologist verifies through	Less than significant	Before and during construction	The District and its contractors

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		noninvasive means that either (1) the birds have not begun egg laying or (2) juveniles from the occupied burrows are foraging independently and are capable of independent survival.			
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species	Potentially significant	**Mitigation Measure BIO-2b: Conduct Focused Surveys for Other Nesting Special-status Birds and Implement Buffers Around Active Nests**. To minimize potential effects of project construction on special-status birds other than burrowing owl, the District will ensure that the following measures are implemented: • A qualified biologist shall conduct surveys of potential Swainson's hawk nesting trees within 0.25 mile of the project site. To the extent practicable, depending on timing of project initiation, surveys will be conducted in accordance with the Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley (Swainson's Hawk Technical Advisory Committee 2000). At a minimum, a survey shall be conducted within 14 days before project activities begin near suitable nest trees during the nesting season (April-August). • A qualified biologist shall conduct surveys of suitable nesting habitat for tricolored blackbird, white-tailed kite, northern harrier, and loggerhead shrike within 500 feet of project activities. Surveys shall be conducted within 14 days before project activities begin near suitable nesting habitat during the nesting season (February-August). • If any active nests are observed, protective buffers shall be established and implemented until the nests are no longer active. A qualified biologist shall monitor the nest during project activities to confirm effectiveness of the buffer. The size of the buffer will depend on type and intensity of project disturbance, presence of visual buffers, and other variables that could affect susceptibility of the nest to disturbance.	Less than significant	Before and during construction	The District and its contractors

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
Impact BIO-1: Cause a substantial adverse effect, either directly or through habitat modifications, on special-status species	Potentially significant	**Mitigation Measure BIO-3: Conduct Pre-Construction Surveys and Implement Measures during Construction to Minimize Potential Impacts on American Badger and San Joaquin Kit Fox**. To minimize potential effects of project construction on American badger and San Joaquin kit fix, the District will ensure that the following measures are implemented, consistent with the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox (USFWS 2011): • No more than 30 days before project activities begin in a given area, a qualified biologist will conduct a pre-construction survey to determine the potential for American badger or San Joaquin kit fox to occur in the area. If potential or known dens for either species are found, exclusion zones will be established and maintained, in accordance with the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox (USFWS 2011). • If project activity would occur within 50 feet of a potential den (i.e., a den that is not known to be occupied), monitoring will be conducted at the potential den for 4 consecutive days. If no badger or kit fox activity is documented, project activities can proceed. If San Joaquin kit fox activity is documented, the appropriate exclusion zone will be established and maintained, in accordance with the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox (USFWS 2011). If it is infeasible to implement the prescribed exclusion zone, USFWS will be consulted and alternative measures will be implemented to ensure impacts are adequately minimized. If American badger activity is documented during the natal denning season, an appropriate buffer shall be established by a qualified biologist and maintained until the kits are no longer dependent on the den. • To prevent entrapment during construction, all excavated, steep-walled holes or trenches more than 2 feet deep will be covered with	Less than significant	Before and during construction	The District and its contractors

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		plywood or similar material at the end of each workday. If the trenches cannot be closed, one or more escape ramps of no more than a 45-degree slope will be constructed of earthen fill or created with wooden planks. All covered or uncovered excavations will be inspected at the beginning, middle, and end of each day. Before trenches are filled, they will be inspected for trapped animals. If a trapped badger or kit fox is discovered, project activities will stop, and escape ramps or structures will be installed immediately to allow the animal to escape. • All construction pipes or similar structures with a diameter of 4 inches or greater that are stored on the ground at a construction site for one or more overnight periods will be thoroughly inspected for wildlife before the pipe is buried, capped, or otherwise used or moved in any way. Pipes laid in trenches overnight will be capped. If a potential San Joaquin kit fox is discovered inside a pipe, all project activities that could result in take will stop, a qualified biologist will be summoned to identify the species, and USFWS will be notified. If a San Joaquin kit fox is unable to escape voluntarily, USFWS will be contacted immediately to determine what actions should be taken to adequately minimize potential impacts. • All food-related trash items such as wrappers, cans, bottles or food scraps generated during project activities will be disposed of in closed containers and removed daily from the project site. No deliberate feeding of wildlife will be allowed, and no pets associated with project personnel will be permitted on the project site.			
Impact CUL-1: Cause a substantial adverse change in the significance of	Potentially significant	**Mitigation Measure CUL-1: Implement a Worker Environmental Awareness Program** (Program) Prior to project-related, ground-disturbing activities, the Program will be implemented which will include all construction personnel. Once the project begins, any new personnel will undergo the Program prior to beginning work. The Program will include information regarding what	Less than significant	Prior to construction activities	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
a historical resource or an archaeological resource pursuant to CCR Section 15064.5		constitutes cultural resources, what procedures to follow if there is an inadvertent cultural resources find, who to contact if there is an inadvertent find, brief description of applicable laws, and all participants will receive a brochure summarizing the Program with appropriate contact information. The Program may be delivered either in person, remotely *via* teleconferencing, or electronic format.			
Impact CUL-1: Cause a substantial adverse change in the significance of a historical resource or an archaeological resource pursuant to CCR Section 15064.5	Potentially significant	**Mitigation Measure CUL-2: Address Previously Undiscovered Historical, Archaeological, and Tribal Cultural Resources** BVWSD shall implement measures to reduce or avoid impacts on undiscovered historic properties, archaeological resources, and tribal cultural resources. If buried or previously unidentified historic properties or archaeological resources are discovered during project construction, all work within a 100-foot-radius of the find shall cease. BVWSD shall retain a professional archaeologist meeting the Secretary of the Interior's Professional Standards for Archaeologists to assess the discovery and recommend what, if any, further treatment or investigation is necessary for the find. Interested Native American Tribes will also be contacted. Avoidance is the preferred CEQA treatment for cultural resources. If avoidance is not possible, any necessary treatment/investigation shall be developed in coordination with interested Native American Tribes providing recommendations to BVWSD and shall be completed before project activities continue in the vicinity of the find.	Less than significant	During construction activities	District
Impact CUL-2: Disturb any human remains, including remains interred outside of	Potentially significant	**Mitigation Measure CUL-3: Avoid potential effects on undiscovered burials.** If human remains are found, BVWSD will be immediately notified. The California Health and Safety Code requires that excavation be halted in the immediate area and that the county coroner be notified to determine the nature of the remains. The coroner is required to examine all discoveries of human remains within 48 hours of receiving notice of a discovery on private or state lands (Health and Safety Code,	Less than significant	During construction activities	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
dedicated cemeteries		§ 7050.5[b]). If the coroner determines that the remains are those of a Native American, the coroner must contact the Native American Heritage Commission (NAHC) by telephone within 24 hours of making that determination (Health and Safety Code, § 7050.5[c]). Once notified by the coroner, the NAHC shall identify the person determined to be the Most Likely Descendant (MLD) of the Native American remains. With permission of the legal landowner(s), the MLD may visit the site and make recommendations regarding the treatment and disposition of the human remains and any associated grave goods. This visit should be conducted within 24 hours of the MLD's notification by the NAHC (PRC § 5097.98[a]). If a satisfactory agreement for treatment of the remains cannot be reached, any of the parties may request mediation by the NAHC (PRC § 5097.94[k]). Should mediation fail, the landowner or the landowner's representative must reinter the remains and associated items with appropriate dignity on the property in a location not subject to further subsurface disturbance (PRC § 5097.98[b]).			
Impact CUL-3: Cause a substantial adverse change in the significance of a historical resource or an archaeological resource pursuant to CCR Section 15064.5 in project areas		**Mitigation Measure CUL-4: Investigate for the presence of historical resource or an archaeological resource pursuant to CCR § 15064.5 and for the presence of human remains, including remains interred outside of dedicated cemeteries.** Prior to commencement of ground-disturbing, project-related activities, a cultural resources pedestrian survey will be conducted in all project areas that could not be accessed earlier. The records search that was originally conducted for the project covers the un-accessed areas, therefore an additional records search is not necessary. If cultural resources or human remains are identified during the pedestrian survey, then Mitigation Measures CUL-2 and CUL-3 will be implemented, as appropriate.			

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
that have not been analyzed					
Impact HYDRO-2: Violate any water quality standards or waste discharge requirements (WDRs) or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-1: Isolation aquifer zone testing or installation of nested monitoring wells will be conducted to identify aquifers with poor quality water prior to new well construction until the aquifers and water quality is better understood and then may be discontinued**.	Less than significant	During construction activities	District
Impact HYDRO-2: Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-2: If needed, patches will be installed into a constructed well to improve water quality from the well.** The depth of the pump may also be modified to improve water quality.	Less than significant	During construction activities	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
Impact HYDRO-2: Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-3: To develop the Pump-In Proposal, the District will conduct water quality sampling of all the wells quarterly for 1 year.** Sampling will include Division of Drinking Water's Title 22 constituents along with DWR's "Constituents of Concern" that are not included in Title 22.	Less than significant	During construction activities	District
Impact HYDRO-2: Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality	Potentially significant	**Mitigation Measure HYDRO-4: When water quality data becomes available on the Recovery Project's production wells (both existing and new wells), blending calculations will be updated.** The final blending scenario will be selected to ensure that the final, blended water quality, meets DWR requirements.	Less than significant	During construction activities	District
Impact HYDRO-2: Violate any water quality standards or WDRs or otherwise substantially	Potentially significant	**Mitigation Measure HYDRO-5: The District will follow the water quality monitoring and reporting requirements in the Pump-In Agreement with DWR.**	Less than significant	During project operations	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
degrade surface or ground water quality					
Impact GEO-2: Possible Damage to or Destruction of Previously Unknown Unique Paleontological Resources during Construction-Related Activities	Potentially significant	**Mitigation Measure GEO-1: Avoid Potential Effects on Paleontological Resources.** In the event that a paleontological resource is uncovered during Recovery Project implementation, all ground-disturbing work within 165 feet of the discovery shall be halted. A qualified paleontologist shall inspect the discovery and determine whether further investigation is required. If the discovery can be avoided and no further impacts will occur, no further effort shall be required. If the resource cannot be avoided and may be subject to further impact, a qualified paleontologist shall evaluate the resource and determine whether it is "unique" under CEQA, Appendix G, part VII. The determination and associated plan for protection of the resource shall be provided to the District for review and approval. If the resource is determined not to be unique, work may commence in the area. If the resource is determined to be a unique paleontological resource, work shall remain halted, and the paleontologist shall consult with the District staff regarding methods to ensure that no substantial adverse change would occur to the significance of the resource pursuant to CEQA. Preservation in place (i.e., avoidance) is the preferred method of mitigation for impacts to paleontological resources and shall be required unless there are other equally effective methods. Other methods may be used but must ensure that the fossils are recovered, prepared, identified, catalogued, and analyzed according to current professional standards under the direction of a qualified paleontologist. All recovered fossils shall be curated at an accredited and permanent scientific institution according to Society of Vertebrate Paleontology standard guidelines; typically, the Natural History Museum of Los Angeles County and University of California, Berkeley accept paleontological collections at no	Less than significant	During construction	District

Potential Environmental Impact	Level of Significance	Mitigation Program	Level of Significance After the Implementation of Mitigation	Implementation Timing	Party Responsible for Implementation of Mitigation
		cost to the donor. Work may commence upon completion of treatment, as approved by the District.			
Impact CUM-1: Have an impact that is individually limited, but cumulatively considerable for groundwater levels	Potentially significant	**Mitigation Measure CUM-1: Recovery Project pumping will be deferred prior to groundwater levels reaching their minimum thresholds (MTs) at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD.** Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90% of the recharged amount.	Less than significant	During project operation	District
Impact CUM-2: Have an impact that is individually limited, but cumulatively considerable for subsidence		**Mitigation Measure CUM-1: Recovery Project pumping will be deferred prior to groundwater levels reaching their MTs at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD.** Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90% of the recharged amount.	Less than significant	During project operation	District

7.0 Comment Letters Received on Draft EIR

Comments on the DEIR were submitted by the WKWD, KCWA, KGA, CDFW, and KWBA.

RCS

RICHARD C. SLADE & ASSOCIATES LLC
CONSULTING GROUNDWATER GEOLOGISTS

MEMORANDUM

January 18, 2021

To: Buena Vista Water Storage District
525 North Main Street
Buttonwillow, CA 93206
Attn: Tim Ashlock, Engineer-Manager
Sent via email (tim@bvh2o.com)

Cc: Mr. Greg Hammett
General Manager
West Kern Water District
Sent via email (GHammett@wkwd.org)

RCS Job No. 369-KRN22

From: Anthony Hicke and Richard Slade
Richard C. Slade & Associates LLC (RCS)

Re: Comments Regarding Draft Environnemental Impact Report (DEIR)
Palms Groundwater Recovery Project (SCH# 2020060315)
Prepared by others for Buena Vista Water Storage District
Dated December 2020
Kern County, California

Introduction

Provided herein are comments related to the basic hydrogeologic elements discussed in the referenced DEIR for the Palms Groundwater Recovery Project (Palms Project), as proposed by the Buena Vista Water Storage District (BVWSD). On behalf of West Kern Water District (WKWD), RCS reviewed the DEIR documentation and has prepared this Memorandum with hydrogeologic comments.

RCS and WKWD have previously submitted comments on the project after attending a public meeting and reviewing the Notice of Preparation (NOP) for the project. As a result of those meetings and comments, RCS provided hydrogeologic data derived from the development and testing of the WKWD North Wellfield. Page 3-72 of the DEIR discusses inclusion of the WKWD wells, and refers to the DEIR Appendices for details on how the data were included as part of the modeling work by others for the Palms Project. WKWD appreciates the use of those data by BVWSD as part of the analyses for the proposed project.

Comments

1

1. The assessment of drawdown impacts described in Section 3.4.3 of the DEIR relies on the assumption that two years of recharge operations will occur before extraction begins in year 3 (page 3-74). Then, after 4 years of pumping (simulation year 6), "The simulations results indicate that drawdowns of 0 to 10 feet would be expected at areas adjacent to

MEMORANDUM

1 (con't) BVWSD as a result of the Recovery Project recovery wells after 4 years of full recovery of a recharge volume of 100,000 AF" (page 3-84). This 10-foot water level drawdown impact is considered to be "less-than-significant" by the DEIR. It is unclear how the value was determined to be "less- than-significant". In years past, during times of drought and regional recovery operations, WKWD has had to lower pumps in its North Wellfield wells, and some of those wells cannot accommodate lower (deeper) pump settings.

2

2. Are two years of recharge required to occur before any project-related extraction occurs in order for the project to operate in accordance with the DEIR?

3

3. Page 8-84 states that "drawdowns of 0 to 10 feet would be expected at areas adjacent to BVWSD as a result of the Recovery Project recovery wells after 4 years of full recovery of a recharge volume of 100,000 AF." However, the hydrograph on Figure 3-15 shows a simulated monitoring point named (MW_WKWD), for which the simulated change in water levels at the end of year 6 reaches -15 ft. Would this be considered a significant impact because simulated impacts exceed 10 ft of water level drawdown at the WKWD property?

4

4. With respect to the assumption that recovery operations for the Palms Project begin in year three, following two years of recharge operations, do the project impacts become significant if that specific condition is not met? For example, assume recharge operations occur for two years, but recovery operations cannot begin in year three. Presumably, the mounding effect from recharge would dissipate, and the 8- to 12-foot water level rise projected for the WKWD North Wellfield (shown on DEIR Figure 3-11) may be less. The total change in water levels for the simulated MW_WKWD monitoring point on Figure 3-15 shows an absolute water level decrease of roughly 35 feet between year 2 and year 6 of the simulation (the recovery portion of the simulation). Hence, the overall impact to water levels at the WKWD could be greater than 10 feet. Would this be considered a significant impact because simulated impacts could exceed 10 ft of water level drawdown at the WKWD property in the possible scenario? Further, what mitigation could be provided if an existing pump in a WKWD well cannot be lowered any deeper than it currently is?

5a

5. The Cumulative Impact Analysis for the BVWSD Palms considers projects included as part of a prior modeling effort, as referenced in Table 4-1 of the DEIR. Appendix D, Groundwater Modeling Report, has an Attachment D, "Recovery Project Cumulative Scenario Project Lists". Attachment D lists the projects and management actions that were considered as part of the groundwater-surface water model (C2VSimFG-Kern), as referred to in the Kern County Subbasin Coordination Agreement. Table 4-1 in Attachment D lists the Rosedale Rio Bravo Management Area, Kern Fan Groundwater Storage Project (KFGSP). Based on the language in Table 4-1, the project was conceptual at the time of the creation of the C2VSimFG-Kern model. It is therefore unclear if the subject DEIR considers the modeling work presented in the recent DEIR for the Kern

MEMORANDUM

5a (con't)

Fan Groundwater Storage Project[1]. Does the cumulative analyses presented in the BVSWD Palms Project DEIR explicitly consider the effects on neighboring wells if the BVSWD Palms Project wells were to recover stored groundwater at the same time that groundwater recovery operations were occurring at: the subject Kern Fan Groundwater Storage Project (KFGSP), the nearby Rosedale Rio Bravo Drought Relief Project (DRP) and the Stockdale Integrated Banking Project?

The WKWD North Wellfield is not only bordered on the west and north by the proposed Palms Project wells, but is also determined to be in the zone of influence of the KFGSP extraction wells. Provided on the next page is an overlay drawing prepared by RCS using figures from both the subject BVWSD Palms Project DEIR and the KFGSP DEIR. The drawing illustrates the fact that the BVWSD Palms Project extraction wells surround the WKWD North Wellfield Property, and that the WKWD lies in an area of groundwater level impacts from the KFGSP (signified by the yellow-shaded area). If extraction is occurring in the BVWSD Palms project at the same time extractions are occurring at the Kern Fan Groundwater Storage Project, at the Drought Relief Project (DRP), and at the Stockdale Integrated Banking Project, the impacts to WKWD North Wellfield wells could be greater than anticipated by the modeling presented in the subject DEIR.

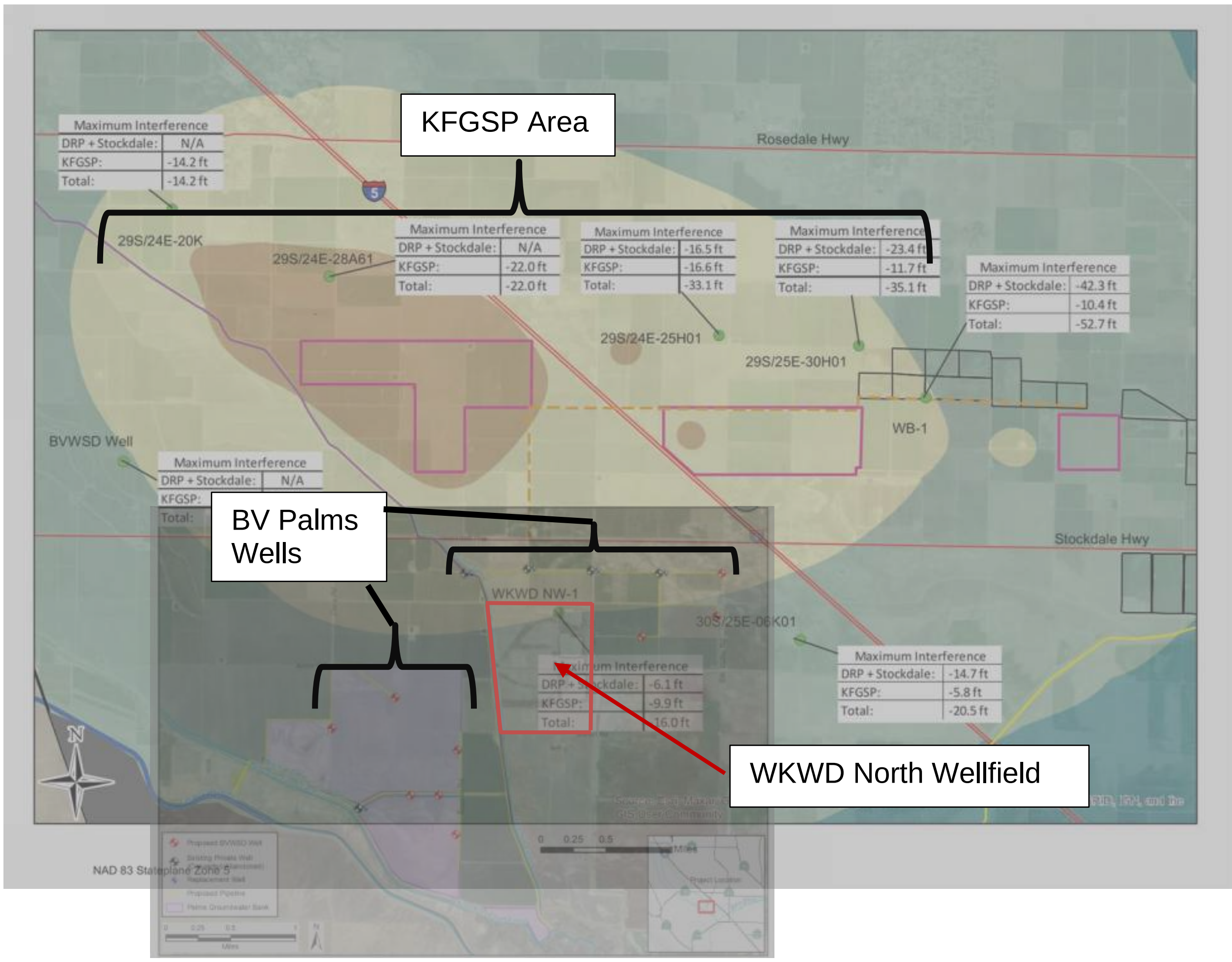
5b

The KFGSP DEIR (2020) stated in Appendix H, page 9 "Project groundwater pumping is predicted to result in up to ten feet of additional drawdown at the nearest banking project well (WKWD NW-1) and a cumulative impact of up to 16 feet of drawdown at this well when… [multiple projects] are taken into account." Further, as stated in Page 3.10-35 of the KFGSP DEIR (2020), "effects of water level drawdown would be additive when considering that multiple projects in the region could be pumping simultaneously." Hence, based on the modeling work in the two-separate project DEIRs, WKWD may experience significant water level drawdown impacts (of 26 ft or greater) if both projects were to operate at the same time.

WKWD is concerned that without clear direction in the DEIR in the case of a cumulative impact on WKWD, mitigation of a water level drawdown impact to WKWD may be drawn into a situation where the various entities that operate the four projects mentioned above may not agree on the cause of the impact on WKWD, and this may inhibit timely mitigation response(s). No mitigation efforts by BVWSD are presented Chapter 6 of the DEIR with respect to water level impacts. As discussed above, cumulative impacts to WKWD may be significant, and therefore mitigation responses with respect to water level drawdown impacts on the WKWD North wellfield should be included in the DEIR.

[1] *Draft Environmental Impact Report (DEIR), Kern Fan Groundwater Storage Project (SCH# 2020049019), Prepared for Groundwater Banking Joint Powers Authority, Dated October 2020*

MEMORANDUM



Project Overlay drawing above adapted from the subject DEIR Appendix A, Figure 1-1, and from Figure 3.10-11 Kern Fan Groundwater Storage Project DEIR[2]"

[2] *Draft Environmental Impact Report (DEIR), Kern Fan Groundwater Storage Project (SCH# 2020049019), Prepared for Groundwater Banking Joint Powers Authority, Dated October 2020*

MEMORANDUM

6

6. Section 3.1.4 describes the impacts related to energy to be “less-than-significant”, however, the DEIR does not address recovery cost impacts (i.e., energy costs) due to increased drawdown in adjacent wells (specifically those operated by WKWD) caused by operation of Project wells.

7

7. It is noted in the Impact CUM-1 described on Page 4-14 does state that a cumulative impact to WKWD is potentially significant. The proposed Mitigation Measure CUM-1 “would minimize the potential that groundwater levels will decline below the MT [WKWD SGMA GSP Minimum Threshold]”. While the mitigation minimizes the potential, hydrographs on Figure 4-2 show head values that are below the MTs even with the Palms Deferred Recovery scenario. What specific mitigations can be applied to address site-specific impacts on the WKWD operations?

8

8. The general groundwater flow direction shown on Figure 3-7 of the DEIR appears to be a reasonable interpretation based on regional data. Closer to the proposed project however, in the southern portion of the BVSWD service area, groundwater flow directions are reported to vary in response to recharge and recovery operations by WKWD, the Kern Water Bank, and other factors. Were variable groundwater flow directions considered as part of the analyses? Would groundwater flow directions other than northwest to southeast result in significantly different simulation outcomes?

9

9. Table 3-7 shows representative values of groundwater quality within the project area on the east side and west side of the East Side Canal. A February 17, 2017 Memorandum[3] prepared for the BVWSD by GEI may suggest poorer groundwater quality in the area of the Palms Project than is reflected in Table 3-7. The GEI memo (2017) states “Wells that represent the [BVWSD Palms] Project area are District wells 01 and 02, and Monitoring Wells 10 at the northern Project boundary and 12 near the southern boundary.” In the 2017 GEI memo, excessive concentrations of iron, manganese, TDS, and other constituents are presented, and these values that are higher than the values presented on DEIR Table 3-17. Wells D01 and D02, as examples, were reported to have arsenic concentrations of 13 and 13.5 ppb, respectively, in the 2017 GEI memo. Were the data presented in the 2017 GEI Memo considered as part of the preparation of Table 3-7?

10

10. Does the water quality analysis consider changes that may occur to water quality as water levels decrease? As an example, WKWD has experienced an increase in concentrations of select constituents during periods of deeper water levels. If the expected water quality parameters presented in Table 3-7 were to increase in concentration as water levels decreased over time in the area, could the Palms Project still operate as proposed?

[3] *Water Quality Review of Groundwater Wells for “The Palms” Recovery Project, GEI Project No. 1506650, prepared for BVSWD, Dated February 17, 2017.*

MEMORANDUM

11. The Project proposes to recharge high quality surface water in an area where groundwater
is documented to be of much poorer quality (see GEI 2017 memo). The DEIR states the
11 Project has a potential beneficial impact on groundwater quality… (pg 4-14). Further, the
DEIR states that a total of approximately 27,000 AF was recharged in the Project Property
during 2017 and 2019 (pg 1-2), however there is no information provided in the DEIR to
demonstrate whether that recharge improved water quality in the area.

12. Section 5.6.2 presents the “Palms Area-Only” Project Alternative in which the proposed
project wells located to the north of the WKWD North Wellfield are removed from
consideration. The DEIR states on page 5-5 that “The evaluation of water quality data for
wells in the Palms area found that it may not be possible to meet water quality standards
for pump-in to the Aqueduct without treatment.” Table 3-7 suggests that, except for
12 manganese, groundwater in wells located east of the East Side Canal has generally higher
concentrations of constituents than that in wells on the west side of the East Side canal
(where the Palms Project is located). If Table 3-7 is representative of water quality
conditions, then is manganese the only constituent that prevents the Palms Area-Only
project alternative from being feasible? If Table 3-7 is representative, wouldn’t the Palms
project wells located to the north of WKWD (east of the East Side canal) make the water
quality less desirable after blending?

13. In general, if groundwater quality conditions at the Palms Project recharge site are poor
13 and water pumped from that site can not be placed back into the aqueduct without
blending from other offsite wells, is spreading higher quality Kern River Water and State
Water Project water in the Palms Project area a reasonable use of the resource?

Phone No. (661) 634-1400

Mailing Address
3200 Rio Mirada Drive
Bakersfield, CA 93308

January 18, 2021

50 - Environmental

Mr. Tim Ashlock
Buena Vista Water Storage District
P.O. Box 756
Buttonwillow, CA 93206

Re: Draft Environmental Impact Report for the Palms Groundwater Recovery Project

Dear Mr. Ashlock:

The Kern County Water Agency (Agency) would like to thank you for the opportunity to review and comment on the Draft Environmental Impact Report (DEIR) for the Palms Groundwater Recovery Project (Project) proposed by Buena Vista Water Storage District (Buena Vista).

Intro The Agency was created by the California State Legislature in 1961 to contract with the California Department of Water Resources (DWR) for State Water Project (SWP) water. The Agency has contracts with water districts throughout Kern County to deliver SWP water. The Agency also manages and/or is a participant in multiple groundwater banking projects, including the Kern Water Bank (KWB), Pioneer Property and Berrenda Mesa banking projects. Additionally, the Agency maintains and operates the Cross Valley Canal. Therefore, the Agency is uniquely qualified to provide comments.

Comment 1: The DEIR lacks a complete and meaningful analysis of the potential water quality impacts.

1 The DEIR fails to provide a complete analysis of the potential water quality impacts that may arise from implementation of the Project. The DEIR incorrectly uses drinking water MCLs as the benchmark for water quality comparisons (pg. 3-85) when the appropriate benchmark for comparing water quality impacts of future Pump-in programs is historic California Aqueduct (Aqueduct) water quality. The Project has the potential to produce greater water quality impacts than discussed in the DEIR. In Table 3-5, several of the upstream Aqueduct water quality values appear to be high (pg. 3-52). Given the higher values, the potential impacts to water quality may be greater than what is discussed in the DEIR.

2 It is difficult to evaluate the potential impacts to Aqueduct water quality based on representative wells as the results are highly variable and the DEIR includes no additional analysis of how to minimize water quality impacts outside of the limited discussion on blending water and construction modifications (pg. 3-86). Additionally, the Project should not rely upon water banked by adjoining entities, such as the Kern Water Bank, West Kern Water District or Pioneer Project, to blend water to improve water quality.

3 The proposed Mitigation Measures may not sufficiently reduce water quality impacts to meet the requirements of the Aqueduct Pump-in program. Therefore, the DEIR should be amended to include a meaningful and complete analysis of the potential water quality impacts from the Project.

Comment 2: The DEIR fails to adequately identify and discuss the aspects and limitations of the potential future water sales.

4 The DEIR indicates water may be "sold to other industrial or municipal users" in which the district may enter into future "water contracts [with] other public water agencies" (pg. 2-6). The DEIR does not identify or discuss any anticipated aspects of future potential water sales nor does it place any limitations on the district to remain in balance before water sales could occur. There is no discussion of the amount of water, potential public water agencies or the duration of any future water contracts. The DEIR does not identify whether the industrial or municipal users would be located in Kern County or if there is potential to sell water out of Kern County. Furthermore, the DEIR makes uncorroborated claims that there would be no impact to population and housing and that the Project would not be growth inducing (pg. 3-4). Without adequate discussion on the quantity of water, potential public water agencies or contract duration there is no way to substantiate the claim of no population or growth inducing impacts. Therefore, the DEIR should be amended to identify and discuss the aspects and limitations of potential future water sales and demonstrate Buena Vista will commit to remaining in balance prior to selling any water.

Comment 3: The DEIR Discretionary Permits and Approvals Required section is incomplete.

5 The DEIR Discretionary Permits and Approvals Required section incorrectly limits the Project's approvals to the DWR (pg. 2-7). The Agency has discretionary approval over the Project and therefore, the DEIR should amend the project approvals to include the Agency for approval of agreements to modify BV8 and approval of and agreements for authorizing use of the Aqueduct to deliver, exchange and convey water.

Comment 4: The DEIR does not discuss the need for a hydraulic analysis to evaluate impacts to surface elevation in the Aqueduct.

6 The DEIR lacks a hydraulic analysis to determine the potential impacts to water surface elevations in the Aqueduct. The DEIR discusses coordination with DWR for the turn-in agreement (pg. 2-6); however, there is no discussion on the need for hydraulic analyses for the anticipated modifications to BV8. Therefore, the DEIR should be amended to include discussion of the need for hydraulic analyses and whether additional environmental documents may be prepared to analyze the results of a hydraulic analysis by DWR.

Comment 5: The Project should operate consistent with the existing Kern Fan Monitoring Committee Memorandum of Understanding.

7 Based on Figure 2-2, the Project recovery facilities are located up fan of the Palms Groundwater Banking Project facilities (pg. 2-3); it is common knowledge that all banked water is recovered down fan from the recharge area; however, the Project violates this "golden rule" of recovery. The Kern Fan Monitoring Committee (KFMC) Memorandum of Understanding (MOU) states in Section 2(b)(11) that "Recovery of banked water shall be from the project site and recovery facilities shall be located therein." The DEIR indicates that Buena Vista will join the Kern Water Bank Authority Joint Operating Committee (JOC) or amend or enter into a new MOU (pg. 2-7). Should Buena Vista be permitted to join the JOC, it will still be required to enter into a new MOU that demonstrates the Project is in the spirit of the KFMC MOU. While the KFMC MOU allows for recovery of banked water outside of the project site, it requires consent of both the KFMC and the district or entity with jurisdiction over the recovery area.

If the Project intends to rely on previously banked water through seepage from district canals or other means to justify recovery outside of the district's boundaries, the Project must maintain a positive balance and demonstrate no borrowing of water for recovery from the basin, consistent with KFMC MOU Section 2(b)(15). Therefore, the DEIR should be amended to include discussion of the KFMC MOU's provisions and how the Project will meet those requirements.

Comment 6: The DEIR's use of a superposition model is not the appropriate method for analyzing groundwater impacts.

8 The DEIR is based upon a superposition model which simplifies groundwater level impacts by determining the change in water levels. This type of modeling is not the appropriate approach to adequately assess the potential groundwater impacts, including impacts to the Aqueduct. The model fails to fully capture the potential swings in recharge and recovery and does not address subsidence along the Aqueduct or how the Project may further exasperate existing subsidence. Therefore, the DEIR should be amended to include an updated modeling approach that considers geologic factors, including local operations, water projects and Kern River hydrology.

Agency staff are available to work with Buena Vista to ensure the Agency's concerns are adequately addressed. If you have any questions, please contact Monica Tennant of my staff at (661) 634-1419.

Sincerely,

Holly Melton

Holly Melton
Water Resources Manager

KERN
GROUNDWATER AUTHORITY

January 27, 2021

Mr. Tim Ashlock
Buena Vista Water Storage District
tim@bvh2o.com

RE: Palms Groundwater Recovery Project

Introduction The Kern Groundwater Authority (KGA) reviewed Draft Environmental Impact Report (DEIR) for the Palms Groundwater Recovery Project (Proposed Project) and provides the following comments. As the comments below reflect, the KGA is concerned the Proposed Project is unlawful, violating the California Constitution and the Water Code. In addition, the DEIR is deficient for not disclosing components of the Proposed Project and not evaluating its environmental impacts. The KGA requests that Buena Vista Water Storage District (BV) revise the Proposed Project to ensure it complies with applicable law and revise and recirculate the DEIR to address the deficiencies demonstrated in the comments below.

(1) <u>Violations of the California Constitution and the Water Code</u>

(a) <u>Waste and Unreasonable Use</u>

1a Both the California Constitution and the Water Code prohibit the waste and unreasonable use of water. Article X, section 2 of the California Constitution prohibits the "waste or unreasonable use or unreasonable method of use of water." (Cal. Const., art. X, § 2.) Water Code section 100, similarly prohibits the waste and unreasonable use of water, requiring all water be put to beneficial use and that no right shall allow the waste or unreasonable use of water. (Water Code, 100.)

The Proposed Project is unlawful because it proposes to use water in a wasteful and unreasonable manner. The Proposed Project proposes to recharge high-quality surface water in an area where groundwater is documented to be of much poorer quality (see GEI 2017). If read carefully, the DEIR acknowledges that the water quality in the recharge area prevents BV from extracting water where it has been recharged. The DEIR discloses that the Palms Area-Only Layout, which was a project alternative that would extract water in the same area in which water was banked (Palms Area), was not feasible because "the evaluation of water quality data for wells in the Palms area found that it may not be possible to meet water quality standards for pump-in to the Aqueduct without treatment. Therefore, this alternative was not evaluated in detail because it cannot feasibly attain the Recovery Project's objective of meeting water quality standards by blending, if necessary." (DEIR, at ES-iv.) Therefore, the DEIR disclosed that it was not possible to extract water from the Palms Area, where water was being recharged,
1b because that water would be of such impaired quality that it could not meet the pump-in Aqueduct standards without treatment. (*Id.*) The DEIR further concluded that extraction of water in the Palms Area could not meet water quality standards by blending. (*Id.*) The DEIR acknowledges that because of these conclusions, it did not further analyze the quality of water in the Palms Area. (*Id.*)

The DEIR states that the Proposed Project must be recovered from an area of better groundwater quality (proposed wells east of the Eastside canal, aka off-site wells) and blended with project water in order to meet DWR pump-back requirements to the CA Aqueduct. (DEIR , at 3-85.) The DEIR presents a theoretical blending calculation of 50/50 (amount of recovered Project water to that recovered from off-site wells) based on historic water quality data, that fails to meet pump-back requirements for several constituents. (*Id.*) However, the DEIR does not evaluate how BV will ultimately meet the water quality requirements of the pump-back program. It follows that BV's only recourse will be to pump the off-site wells more and/or drill additional off-site wells to improve the quality of the blended water.

The recharge of groundwater is a beneficial use, only if the recharged water is later extracted and put to beneficial use. (Water Code, § 1242, 7075; *Los Angeles v. San Fernando* (1975) 14 Cal.3d 199, 260; *City of Santa Maria v. Adam* (2012) 211 Cal.App.4th 266, 302.) The DEIR does not analyze whether the water being recharged in the Palms Area is of such quality that it
1a can extracted and applied to beneficial uses. The information provided in the DEIR is limited to the issue of whether the Proposed Project is able to extract the water recharged in the Palms Area and put it to beneficial use for the Proposed Project – and the DEIR answers that question in the negative. (DEIR, ES-iv.) Without the disclosure and evaluation of data that shows the water recharged by the Proposed Project will later be extracted and put to beneficial use, the Proposed Project amounts to an unreasonable use of water. Because the DEIR does not establish that the water recharged will be or can be later extracted and put to beneficial use, the Proposed Project proposes to use water in a wasteful and unreasonable manner and the Proposed Project cannot be approved as lawful.

(b) <u>Violation of Water Code Provisions</u>

The Water Code authorizes the storage of water underground. Section 1242 of the Water Code states:

> The storing of water underground, including the diversion of streams and the flowing of
> 2 water on lands necessary to the accomplishment of such storage, constitutes a beneficial use of water if the water so stored is thereafter applied to the beneficial purposes for which the appropriation for storage was made.

In addition, Water Code section 7075 allows:

Water which has been appropriated may be turned into the channel of another stream, mingled with its water, and then reclaimed; but in reclaiming it the water already appropriated by another shall not be diminished.

The judiciary interprets the above sections to allow the storage and recapture of water from an underground aquifer. However, the quantity of water recaptured is limited to the amount of water by which the natural supply of the basin is augmented. For example, in *Los Angeles v. San Fernando* (1975) 14 Cal.3d 199, 245-55 ("*San Fernando*") the Court described the quantity of water that a banking party is allowed to recapture as the quantity "equal to the net amount by which the reservoir is augmented by such deliveries." (*San Fernando*, at 262.) The *San Fernando* court had been referring to the basin as an underground reservoir; in the quote above the word reservoir is used in the context of an underground reservoir or basin. Similarly, in *Los Angeles v. Glendale* (1943) 23 Cal.2d 68, 75-79 ("*Glendale*"), the Court provided a similar definition describing the quantity of water available for recapture. The *Glendale* Court held that there is a "right to recapture the amount by which the available conglomerated ground supply has been augmented." (*Glendale* , at 76-77.)

2 (con't)

The DEIR fails to analyze whether any of the water recharged in the Palms Area could be later extracted and put to beneficial use. As noted above, the legal basis for extracting recharged water limits the recharger to extract only the quantity of water that augments the supply. The DEIR provides no data establishing that the recharge from the Proposed Project augments the usable supply. In fact, the only data disclosed by the DEIR is that recharge from the Proposed Project does not augment the supply of useable water. Without further analysis and disclosure, the Proposed Project has not established that the proposed recharge would result in any valid right to extract groundwater outside the Palms Area.

(2) Violations of the Sustainable Groundwater Management Act

3

The Sustainable Groundwater Management Act (SGMA) requires that each subbasin develop a groundwater sustainability plan (GSP) to achieve sustainability. In empowering agencies to achieve the sustainability set forth in their respective GSPs, SGMA prohibits one agency from impacting existing conjunctive use or storage programs. (Water Code, 10726.2(b).) In the cumulative impact section of the DEIR, BV discloses that the Proposed Project will, in fact, affect existing storage programs and conjunctive use projects. (DEIR, at 4-13.) Specifically, the DEIR discloses that the Proposed Project proposes to extract water out of a neighboring groundwater sustainability agency. The Proposed Project proposes to install new wells in the KGA boundary and extract water from these wells. The DEIR discloses that this extraction may result in the violation of minimum thresholds set by KGA members and included in the KGA GSP. Because this impact is prohibited by SGMA, the Proposed Project is unlawful and cannot be approved.

(3) Violations of the California Environmental Quality Act

(a) Insufficient Project Description

The California Environmental Quality Act, Pub. Res. Code, § 21000 *et seq*. ("CEQA"), requires a governmental agency to evaluate the environmental impacts whenever it considers approval of a discretionary project. (*California Sportfishing Protection Alliance v. State Water Resources Control Bd.*) (2008) 160 Cal.App.4th 1625, 1642). The purpose of environmental review is to inform the public and its responsible officials of the environmental consequences of their decisions before they are made. Thus, environmental review protects not only the environment but also informed self-government. (*Napa Citizens for Honest Government v. Napa*
4 *County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 355.) An accurate, stable and finite project description is essential for an informative and legally sufficient environmental review. (*County of Inyo v. City of Los Angeles* (1977) 71 Cal.App.3d 185, 193.) "[O]nly through an accurate view of the project may the public and interested parties and public agencies balance the proposed project's benefits against its environmental cost, consider appropriate mitigation measures, assess the advantages of terminating the proposal and properly weigh other alternatives." (*City of Santee v. County of San Diego* (1989) 214 Cal.App.3d 1438, 1454.)

Judicial review of CEQA analyses of non-adjudicative decisions extends only to whether there was a prejudicial abuse of discretion: "an agency may abuse its discretion under CEQA either by failing to proceed in the manner CEQA provides or by reaching factual conclusions unsupported by substantial evidence." (*Save Tara v. City of West Hollywood* (2008) 45 Cal.4th 116, 131, as modified (Dec. 10, 2008) [citing Pub. Res. Code, § 21168.5].)

"[T]he ultimate decision of whether to approve a project, be that decision right or wrong, is a nullity if based upon an EIR [environmental impact report] that does not provide the decision-makers, and the public, with the information about the project that is required by CEQA. The error is prejudicial if the failure to include relevant information precludes informed decision making and informed public participation, thereby thwarting the statutory goals of the EIR process." (*Napa Citizens for Honest Government*, 91 Cal.App.4th at 355–356 (citation omitted) (internal quotation omitted); *see also California Oak Foundation v. City of Santa Clarita* (2005) 133 Cal.App.4th 1219, 1237 [citing *Concerned Citizens of Costa Mesa, Inc. v. 32nd Dist. Agricultural Assn*. (1986) 42 Cal.3d 929, 935].)

4 (con't)

The project description section of the DEIR violates CEQA because it fails to provide a accurate description of the Proposed Project such that public participation is thwarted, informed decision making is precluded, and environmental analysis cannot be supported by substantial evidence. Specifically, the portions of the Proposed Project that are deficient include:

- Failure to disclose that the Proposed Project would require the drilling of new groundwater extraction wells in the KGA service area;
- Failure to disclose that the Proposed Project will extract water in a different location from where water will be recharged;
- Failure to disclose that the recharge and extraction locations are different because the water quality is not sufficient in the Palms Area to allow extraction and use;
- Failure to identify regulatory authority and approvals for drilling new wells outside the BV jurisdictional area in the service area of a neighboring groundwater sustainability agency.

4 (con't) Because the project description fails to describe the Proposed Project in an accurate manner, it is deficient and must be revised.

(b) <u>Failure to Disclose and Analyze Environmental Impacts of Diverting Additional Surface Water</u>

CEQA requires the lead agency identify and evaluate all potential significant environmental impacts of a project prior to approving any project. (*Sierra Club v. County of Fresno* (2018) 6 Cal.5^{th} 502, 517; *Vineyard Area Citizens for Responsible Growth v. City of Rancho Cordova* (2007) 40 Cal.4^{th} 412; *In re Bay-Delta Programmatic Envt'l Impact Report Coordinated Proceedings* (2008) 43 Cal.4^{th} 1143, 1162.)

The Proposed Project proposes to recharge up to 100,000 acre feet of additional surface water per year into the Kern subbasin. The DEIR fails to identify where this water will come from and/or analyze any impacts from importing this additional water. The DEIR discloses that
5 BV obtains water from both the Kern River and from the State Water Project (SWP). (DEIR, 1-4 to 1-5.) However, the DEIR does not identify which source of water will supply the additional water that the Proposed Project will recharge. Nor does the DEIR evaluate the years or frequency in which such SWP or Kern River supply would be available. An EIR is required to identify water sources that will be used by a Proposed Project. (*Napa Citizens for Honest Gov't v. Napa County Board of Supervisors* (2001) 91 Cal.App.4^{th} 342, 371.) If a water sources is not certain, an EIR is required to examine the various sources of water available and describe the environmental consequences that would result from using each source. (*Id.*)

The DEIR does not provide the requisite information and fails to analyze the impacts of diverting increased Kern River water or importing additional water. For example, if the Proposed Project assumed the Kern River would supply the additional 100,000 acre feet of water, the DEIR would need to evaluate whether BV's diversion and storage of such supply would reduce supplies to other water users, reduce supply to environmental or instream uses, impact flood control releases, result in any seepage from increased flows in the Kern River, impact conveyance facilities, or otherwise increase likelihood of flood impacts. The DEIR did not identify the source of the additional recharge water and therefore failed to disclose or evaluate any of these environmental impacts of the Proposed Project. The KGA requests the DEIR be revised to identify the source of the additional recharge water, the anticipated years in which such water would be available, and evaluate the environmental impacts from the increased diversion to recharge.

5 (con't)

(c) Failure to Disclose and Analyze Water Quality Impacts

The DEIR section on water quality is deficient and fails to provide the public with the ability to evaluate the impacts of the Proposed Project. The DEIR fails to disclose and analyze the water quality in the different areas of the Proposed Project; specifically, the area in which water will be recharged compared to the area in which water will be extracted for use. (DEIR, at 3-59 to 3-60.) Rather, the DEIR evaluates the groundwater quality in the "Recovery Project Area" more generally.

6

In addition, the DEIR does not provide sufficient data to support its analysis. The DEIR relies on water quality data from only one well, stating that there is limited water quality data available. (DEIR, at 3-60.) However, there is a significant amount of water quality data that is available for the Recovery Project Area that the DEIR did not include or otherwise analyze. Specifically, there is a GEI water quality study performed in 2017 that includes water quality data for the Recovery Project Area. (Attached as Attachment A.) The existing data that was ignored by the DEIR indicates that the recharge area has poor water quality and extraction area has significantly better and more usable water quality. Because this data has not been disclosed, the DEIR did not sufficiently identify or evaluate the water quality impacts of the Proposed Project. The KGA requests the DEIR be revised to disclose all the water quality data and evaluate the impacts of the Proposed Project on water quality.

(d) Failure to Disclose and Analyze Subsidence Impacts

7 The DEIR's environmental analysis of the Proposed Project impact on subsidence is not sufficient. The DEIR summarily determines that the Proposed Project will have less than a significant impact on subsidence by stating:

"Future subsidence will depend on whether water levels decline below previous low levels and remain low for a considerable length of time (BVGSA 2020). The range of groundwater elevations at monitoring locations due to project operation is expected to be similar to the range of elevations that has been experienced in the past (see Figure 5-5)." (DEIR, at 3-97.)

This statement contradicts other analysis in the DEIR which discloses the Propose Project will affect groundwater elevations, even causing the violation of minimum thresholds of groundwater elevations for KGA members. (DEIR, at 4-13.) In addition, the statement is conclusory and is not supported by analysis related to the soils, geology, project design, timing of extractions, location of extraction, frequency of extraction, or other components of the Proposed Project.

The Department of Water Resources (DWR) provided a comment on the notice of preparation and initial study stating that the subsidence evaluation was inadequate and suggesting the DEIR include specific information. (DEIR, at p. 315-16 ["DWR finds the subsidence evaluation in the NOP/IS inadequate for our responsible agency purposes. DWR requests the EIR include a Geology and Soils section which includes the reports and analysis which are the basis for the conclusion that, due to the project design feature where recovery wells would not be constructed below the E-clay, the risk of subsidence in Basin 5-022 is less than significant."].) The DEIR does not include any of the information or analysis required by DWR. For this reason, the DEIR is deficient and must be revised and recirculated.

(e) Failure to Consult with Responsible Agencies

8 CEQA defines a "responsible agency" as "a public agency, other than the lead agency, which has responsibility for carrying out or approving a project." (Pub. Resources Code, § 21069; See also 14 CCR, § 15381.) Pursuant to this definition, both Kern County and the KGA

are responsible agencies because they would be required to approve and/or register extraction facilities required by the Proposed Project. (Water Code, 10725.6; 10726; 10726.4.)

As the lead agency, BV is required to solicit comments from responsible agencies regarding the choice and content of environmental documents. (Pub. Resources Code, §§

8 (con't) 21080.4(a) [requiring solicitation of comments on "the scope and content of the environmental information that is germane to the statutory responsibilities of that responsible agency" when the lead agency determines an environmental impact report is required for the proposed project]; 21104(a) [requiring consultation with, and solicitation of comments from, responsible agencies prior to completing an environmental document]; See also 14 CCR, §§ 15082(a), 15086.) Because BV failed to provide notice and solicit input from responsible agencies, it violated the requirements of CEQA. The KGA requests BV provide it and other responsible agencies with notice and an opportunity to comment prior to revising and recirculating the DEIR.

Conclusion

The KGA is committed to serving its members and achieving sustainability for the Kern subbasin. The KGA supports the development of projects and management actions consistent

9 with the subbasin's groundwater sustainability plans and looks forward to working with BV on the revision of the Proposed Project and DEIR.

Kern Groundwater Authority

Chair

State of California – Natural Resources Agency
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GAVIN NEWSOM, Governor
CHARLTON H. BONHAM, Director

January 19, 2021

Tim Ashlock, General Manager
Buena Vista Water Storage District
Post Office Box 756
Buttonwillow, California 93206
tim@bvh2o.com

Subject: Palms Groundwater Recovery Project (Project)
DRAFT ENVIRONMENTAL IMPACT REPORT (DEIR)
State Clearinghouse No. 2020060315

Dear Mr. Ashlock:

The California Department of Fish and Wildlife (CDFW) received a Notice of Availability of a DEIR from the Buena Vista Water Storage District (BVWSD), as Lead Agency, for the Project pursuant the California Environmental Quality Act (CEQA) and CEQA Guidelines.[1]

Thank you for the opportunity to provide comments and recommendations regarding those activities involved in the Project that may affect California fish and wildlife. Likewise, CDFW appreciates the opportunity to provide comments regarding those aspects of the Project that CDFW, by law, may be required to carry out or approve through the exercise of its own regulatory authority under the Fish and Game Code.

CDFW ROLE

CDFW is California's **Trustee Agency** for fish and wildlife resources and holds those resources in trust by statute for all the people of the State (Fish & G. Code, §§ 711.7, subd. (a) & 1802; Pub. Resources Code, § 21070; CEQA Guidelines § 15386, subd. (a)). CDFW, in its trustee capacity, has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species (*Id.*, § 1802). Similarly, for purposes of CEQA, CDFW is charged by law to provide, as available, biological expertise during public agency environmental review efforts, focusing specifically on projects and related activities that have the potential to adversely affect fish and wildlife resources.

CDFW is also submitting comments as a **Responsible Agency** under CEQA (Pub. Resources Code, § 21069; CEQA Guidelines, § 15381). CDFW expects that it may

[1] CEQA is codified in the California Public Resources Code in section 21000 et seq. The "CEQA Guidelines" are found in Title 14 of the California Code of Regulations, commencing with section 15000.

need to exercise regulatory authority as provided by the Fish and Game Code. As proposed, for example, the Project may be subject to CDFW's lake and streambed alteration regulatory authority (Fish & G. Code, § 1600 et seq.). Likewise, to the extent implementation of the Project as proposed may result in "take" as defined by State law of any species protected under the California Endangered Species Act (CESA) (Fish & G. Code, § 2050 et seq.), related authorization as provided by the Fish and Game Code will be required.

CDFW has jurisdiction over fully protected species of birds, mammals, amphibians and reptiles, and fish, pursuant to Fish and Game Code sections 3511, 4700, 5050, and 5515. Take of any fully protected species is prohibited and CDFW cannot authorize their incidental take.

PROJECT DESCRIPTION SUMMARY

Proponent: BVWSD is the Project applicant and CEQA Lead Agency .

Objective: The Recovery Project has the following primary objectives:

- Increase conjunctive management on the west side of Kern County by improving the BVWSD's ability to meet demands during periods when supply of surface water is limited with previously banked water supplies.
- Improve conveyance of previously stored water throughout the BVWSD area and to neighboring districts.
- Install recovery facilities to attract new banking partners in order to increase groundwater in the Kern Subbasin for District use.
- Recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the Aqueduct.

Project Description: The Project is the construction of nine new wells and replacement of 14 wells. Additionally, conveyance pipelines would be installed to connect these wells to the water delivery system. Construction activities would include excavation and trenching to install the wells, and approximately 11.9 miles of conveyance pipe. The total area of disturbance would be approximately 72 acres. The new and replacement wells would be drilled to a depth of up to 500 feet and include an 18-inch diameter casing. Staging areas for the construction equipment and materials would be adjacent to the Project area on previously disturbed land. The water pipelines will be connected to BVWSD's existing turnout at the California Aqueduct at BV8, which can be used to either input water to, or withdraw water from, the California Aqueduct.

Location: The Project is located in the BVWSD service area, approximately four miles south of the unincorporated community of Buttonwillow, Kern County, California, within Sections 2 to 5, 8 to 11, 14, and 15; Township 30 South; Range 24 East; Mount Diablo Base & Meridian.

Timeframe: Anticipated construction activities are expected to begin in the spring of 2021 and be completed within 11 months.

COMMENTS AND RECOMMENDATIONS

CDFW offers the comments and recommendations below to assist BVWSD in adequately identifying and/or mitigating the Project's significant, or potentially significant, direct and indirect impacts on fish and wildlife (biological) resources. Editorial comments or other suggestions may also be included to improve the CEQA document.

Aerial imagery of the Project boundary and its surroundings within the Project boundary shows nearby riparian corridors, riparian-lined canal corridors, large trees, Valley saltbush and Great Valley mesquite scrub habitat, upland grassland, and agricultural habitats. Tule Elk State Natural Reserve, managed by the California Department of Parks and Recreation, is located adjacent to the Project boundary. Based on a review of the Project description, a review of California Natural Diversity Database (CNDDB) records, and the surrounding habitat, several special-status species could potentially be impacted by Project activities.

Project-related construction activities within the Project boundary including but not limited to construction and operation of additional water banking facilities and introduction of surface water flows for storage could impact the following special-status plant and wildlife species and habitats known to occur in the area: the State threatened and federally endangered San Joaquin kit fox (*Vulpes macrotis mutica*); the State and federally endangered Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*); the State and federally endangered giant kangaroo rat (*Dipodomys ingens*); the State and 1
federally endangered and State fully protected blunt-nosed leopard lizard (*Gambelia sila*); the State threatened Swainson's hawk (*Buteo swainsoni*), Nelson's antelope squirrel (*Ammospermophilus nelsoni*), and tricolored blackbird (*Agelaius tricolor*); the State fully protected white-tailed kite (*Elanus leucurus*); the California Rare Plant Rank (CRPR) 1B.1 alkali-sink goldfields (*Lasthenia chrysantha*), oil nest straw (*Stylocline citroleum*), and slough thistle (*Cirsium crassicaule*); the CRPR 1B.2 recurved larkspur (*Delphinium recurvatum*); and the State species of special concern American badger (*Taxidea taxus*), Tulare grasshopper mouse (*Onychomys torridus tularensis*), San Joaquin pocket mouse (*Perognathus inornatus*), burrowing owl (*Athene cunicularia*), Le Conte's thrasher (*Toxistoma lecontei*), western pond turtle (*Emys marmorata*), San Joaquin coachwhip (*Masticophis flagellum ruddocki*), California glossy snake (*Arizona elegans occidentalis*), western spadefoot (*Spea hammondi*), and coast horned lizard (*Phrynosoma blainvillii*).

Please note that the CNDDB is populated by and records voluntary submissions of species detections. As a result, species may be present in locations not depicted in the CNDDB but where there is suitable habitat and features capable of supporting species. Therefore, a lack of an occurrence record in the CNDDB is not tantamount to a negative 2
species finding. In order to adequately assess any potential Project related impacts to

biological resources, surveys conducted by a qualified wildlife biologist/botanist during the appropriate survey period(s) and using the appropriate protocol survey methodology are warranted in order to determine whether or not any special-status species are present at or near the Project area.

CDFW recommends that the following modifications and/or edits be incorporated into the DEIR.

I. Mitigation Measure or Alternative and Related Impact Shortcoming

Would the Project 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 CDFW or the United States Fish and Wildlife Service (USFWS)?

COMMENT 1: San Joaquin Kit Fox (SJKF)

Issue: SJKF occurrences have been documented within the Project boundary (CDFW 2020). The Project has the potential to temporarily disturb and permanently alter suitable habitat for SJKF and directly impact individuals if present during construction, recharge, and other activities.

In addition to grasslands and shrublands, SJKF den in a variety of areas such as rights-of-way, agricultural and fallow or ruderal habitat, dry stream channels, and canal levees, and populations can fluctuate over time. SJKF are also capable of occupying urban environments (Cypher and Frost 1999). SJKF may be attracted to Project areas due to the type and level of ground-disturbing activities and the loose, friable soils resulting from intensive ground disturbance. In addition to grasslands and shrublands, SJKF will forage in fallow and agricultural fields and utilize streams and canals as dispersal corridors. As a result, there is potential for SJKF to occupy 3
all suitable intact habitat, agricultural lands, and urban areas within the Project boundary and surrounding area. The DEIR has determined that suitable SJKF habitat occurs within the Project area and confirmed known occurrences for SJKF within the Project and surrounding area using the CNDDB (CDFW 2020). The DEIR acknowledges the potential to temporarily disturb and permanently alter suitable habitat for special status species including SJKF, and to directly impact individuals if present during construction activities.

The DEIR Mitigation Measure (MM) BIO-3 describes monitoring to occur for four consecutive days for potential dens found within 50 feet of Project activity, and developing an exclusion zone in accordance with the Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox (USFWS 2011) if SJKF activity is documented. If it is infeasible to implement the prescribed exclusion zone, USFWS will be consulted and alternative measures will be implemented to ensure that impacts are adequately minimized. The measure also describes consultation with USFWS in the event a SJKF is found inside a pipe on the Project site and is unable to escape.

The DEIR defers identifying mitigation for impacts to SJKF until potentially after Project activity has begun, and does not specify consultation with CDFW for activities that may impact SJKF. Given the size and scope of the Project and the prevalence of SJKF adjacent to and within the Project area, CDFW has concluded it is likely that impacts to SJKF, potentially including take, may occur during all phases of the Project.

Specific impact: Without appropriate avoidance and minimization measures for SJKF, potential significant impacts associated with construction include habitat loss, den collapse, inadvertent entrapment, reduced reproductive success, reduction in health and vigor of young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss resulting from land conversion to agricultural, urban, and industrial development is the primary threat to SJKF (Cypher et al. 2013). Western Kern County supports relatively large areas of high suitability habitat and one of the largest remaining populations of SJKF (Cypher et al. 2013). The Project area is within this remaining highly suitable habitat, which is otherwise intensively managed for agriculture. Therefore, ground-disturbing activities have the potential to significantly impact local SJKF populations.

Recommended Mitigation Measure 1: SJKF Habitat Assessment
For all Project-specific components including construction and land conversion, CDFW recommends that a qualified biologist conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for SJKF.

Recommended Mitigation Measure 2: SJKF Surveys and Minimization
CDFW recommends assessing presence or absence of SJKF by having qualified biologists conducting surveys of Project areas and a 500-foot buffer of Project areas for SJKF and their sign. CDFW also recommends following the USFWS (2011) "Standardized recommendations for protection of the San Joaquin kit fox prior to and during ground disturbance".

Recommended Mitigation Measure 3: SJKF Take Authorization
SJKF detection warrants consultation with CDFW to discuss how to avoid take or, if avoidance is not feasible or likely, to acquire a State Incidental Take Permit (ITP) for SJKF prior to ground-disturbing activities, pursuant to Fish and Game Code section 2081(b).

COMMENT 2: Blunt-nosed Leopard Lizard (BNLL)

Issue: The DEIR acknowledges that BNLL have been documented in suitable habitat within and adjacent to the Project (CDFW 2020). Suitable BNLL habitat 4 includes areas of grassland and upland scrub that contain requisite habitat elements such as small mammal burrows. BNLL also use open space patches between suitable habitats, including disturbed sites, unpaved access roadways, and canals. DEIR MM BIO-1 specifies the installation of temporary exclusion fencing between the Project site and bush seepweed scrub habitat to prevent potential encroachment of small animals, including BNLL, into the Project work area during construction. The fencing would be installed within existing roads or road shoulders or agricultural fields to reduce habitat disturbance and fragmentation, and fence locations would be selected by a qualified biologist who is present during all fence installation. Fencing would be removed after all construction activities adjacent to the fenced area are complete. Fencing design, alignment, construction, and removal are not described in the DEIR, and the potential impacts of fencing are not addressed.

Specific impact: Without appropriate avoidance and minimization measures for BNLL, potentially significant impacts associated with ground-disturbing activities include habitat loss, burrow collapse, reduced reproductive success, reduced health and vigor of eggs and/or young, and direct mortality.

Evidence impact is potentially significant: Habitat loss resulting from cultivation, agricultural, urban, industrial development, petroleum and mineral extraction, and construction of communication and irrigation infrastructure is the primary threat to BNLL (ESRP 2020a). The range for BNLL now consists of scattered parcels of undeveloped land within the valley floor and the foothills of the Coast Range (USFWS 1998). Some undeveloped areas with suitable BNLL habitat occur within the Project and surrounding area; therefore, ground disturbance and conversion of suitable habitat has the potential to significantly impact local BNLL populations.

Recommended Mitigation Measure 4: BNLL Habitat Assessment
CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for BNLL.

Recommended Mitigation Measure 5: BNLL Surveys
If suitable habitat is present, then prior to initiating any vegetation- or ground-disturbance activities, including those associated with avoidance and minimization measures, CDFW recommends conducting surveys in accordance with the "Approved Survey Methodology for the Blunt-nosed Leopard Lizard" (CDFW 2019). This survey protocol, designed to optimize BNLL detectability, reasonably assures CDFW that ground disturbance will not result in take of BNLL.

CDFW advises that BNLL surveys be completed no more than one year prior to initiation of ground disturbance. Please note that protocol-level surveys must be conducted on multiple dates during late spring, summer, and fall of the same calendar year, and that within these time periods, there are specific protocol-level date, temperature, and time parameters that must be adhered to. As a result, protocol-level surveys for BNLL are not synonymous with 30-day "preconstruction surveys" often recommended for other wildlife species. In addition, the BNLL protocol specifies different survey effort requirements based on whether the disturbance results from maintenance activities or if the disturbance results in habitat removal (CDFW 2019).

Recommended Mitigation Measure 6: BNLL Take Avoidance
BNLL detection during protocol-level surveys warrants consultation with CDFW to discuss whether take of BNLL can be avoided during ground-disturbing Project activities. Incidental take of BNLL may not be authorized by CDFW.

COMMENT 3: San Joaquin Antelope Squirrel (SJAS)

Issue: SJAS have been documented to occur within areas of suitable habitat within the Project vicinity (CDFW 2020). Suitable SJAS habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows.

DEIR MM BIO-1 states that temporary exclusion fencing would be installed between the Project site and bush seepweed scrub habitat to prevent potential encroachment of small animals into the work area during construction. The DEIR does not include a description or impact analysis of the proposed exclusion fencing.

Specific impact: Without appropriate avoidance and minimization measures for SJAS, potential significant impacts include loss of habitat, burrow collapse, inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals. 5

Evidence impact is potentially significant: Habitat loss resulting from agricultural, urban, and industrial development is the primary threat to SJAS. Little suitable habitat for this species remains along the western floor of the San Joaquin Valley (ESRP 2020b). Areas of suitable habitat within the Project represent some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. As a result, ground-disturbing activities within the Project may have the potential to significantly impact local populations of SJAS.

Recommended Mitigation Measure 7: SJAS Habitat Assessment
CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for SJAS.

Recommended Mitigation Measure 8: SJAS Surveys
In areas of suitable habitat, CDFW recommends that a qualified biologist conduct focused daytime visual surveys for SJAS using line transects with 10- to 30-meter spacing of Project areas and a 50-foot buffer around those areas. CDFW further advises that these surveys be conducted between April 1 and September 20, during

daytime temperatures between 68° and 86° F (CDFG 1990a), to maximize detectability.

Recommended Mitigation Measure 9: SJAS Avoidance
If suitable habitat is present and surveys are not feasible, CDFW advises maintenance of a 50-foot minimum no-disturbance buffer around all small mammal burrow entrances until the completion of Project activities, and monitoring of Project activity by a qualified biologist.

Recommended Mitigation Measure 10: SJAS Take Authorization
SJAS detection warrants consultation with CDFW to discuss how to avoid take or, if avoidance is not feasible, to acquire a State ITP for SJAS prior to ground-disturbing activities, pursuant to Fish and Game Code section 2081(b).

COMMENT 4: Tipton Kangaroo Rat (TKR)

Issue: TKR have been documented to occur within areas of suitable habitat within and adjacent to the Project (CDFW 2020). Suitable TKR habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows.

Section 3.2 of the DEIR states that haystacks and burrows of suitable size for TKR were observed within areas of suitable habitat located adjacent to the Project boundary. DEIR MM BIO-1 specifies that temporary exclusion fencing will be installed between the project site and bush seepweed scrub habitat to prevent potential encroachment of small animals into the work area during construction. The DEIR does not include a description or impact analysis of the proposed exclusion fencing. 6

Specific impact: Without appropriate avoidance and minimization measures for TKR, potential significant impacts include loss of habitat, burrow collapse, inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss resulting from agricultural, urban, and industrial development is the primary threat to TKR. Little suitable habitat for this species remains along the western floor of the San Joaquin Valley (ESRP 2020c). Areas of suitable habitat within the Project represent some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. As a result, ground-disturbing activities within the Project may have the potential to significantly impact local populations of TKR.

Recommended Mitigation Measure 11: TKR Habitat Assessment
CDFW recommends that a qualified biologist conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for TKR.

Recommended Mitigation Measure 12: TKR Avoidance
If suitable habitat is present, CDFW advises maintenance of a 50-foot minimum no-disturbance buffer around all small mammal burrow entrances of suitable size for TKR use.

Recommended Mitigation Measure 13: TKR Surveys
If burrow avoidance is not feasible, CDFW recommends that focused protocol-level trapping surveys be conducted by a qualified wildlife biologist that is permitted to do so by both CDFW and USFWS, to determine if TKR occurs in the Project area. CDFW advises that these surveys be conducted in accordance with the USFWS (2013) "Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats," well in advance of ground-disturbing activities in order to determine whether impacts to TKR could occur.

Recommended Mitigation Measure 14: TKR Take Authorization
TKR detection warrants consultation with CDFW to discuss how to avoid take or, if avoidance is not feasible, to acquire a State ITP for TKR prior to ground-disturbing activities, pursuant to Fish and Game Code section 2081(b).

COMMENT 5: Giant Kangaroo Rat (GKR)

Issue: GKR have been documented within areas of suitable habitat adjacent to the Project area (CDFW 2020). Suitable GKR habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows.

Section 3.2 of the DEIR states that haystacks and burrows of suitable size for GKR were observed within areas of suitable habitat located adjacent to the Project boundary. DEIR MM BIO-1 specifies that temporary exclusion fencing will be installed between the project site and bush seepweed scrub habitat to prevent potential encroachment of small animals into the work area during construction. The DEIR does not include a description or impact analysis of the proposed exclusion fencing.

Specific impact: Without appropriate avoidance and minimization measures for
GKR, potential significant impacts include loss of habitat, burrow collapse, 7
inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals.

Evidence impact is potentially significant: Habitat loss resulting from agricultural and petroleum development is the primary threat to GKR. Little suitable habitat for this species remains along the western floor of the San Joaquin Valley (ESRP 2020d). Areas of suitable habitat within the Project vicinity represent some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. As a result, ground-disturbing activities within the Project may have the potential to significantly impact local populations of GKR.

Recommended Mitigation Measure 15: GKR Habitat Assessment
CDFW recommends that a qualified biologist conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its immediate vicinity contains suitable habitat for GKR.

Recommended Mitigation Measure 16: GKR Surveys
In areas of suitable habitat, CDFW recommends that a qualified biologist conduct focused daytime visual surveys for GKR using line transects with 10- to 30-meter spacing of Project areas and a 50-foot buffer around those areas. Surveys should focus on the identification of their characteristic habitat types and burrow systems (burrow openings 50 to 55 mm in diameter) (CDFW 1990b).

Recommended Mitigation Measure 17: GKR Avoidance
If suitable habitat is present and surveys are not feasible, CDFW advises maintenance of a 50-foot minimum no-disturbance buffer around all small mammal burrow entrances until the completion of Project activities.

Recommended Mitigation Measure 18: GKR Take Authorization
GKR detection or presence of characteristic habitat or burrow systems warrants consultation with CDFW to discuss how to avoid take or, if avoidance is not feasible, to acquire a State ITP for GKR prior to ground-disturbing activities, pursuant to Fish and Game Code section 2081(b).

COMMENT 6: Swainson's Hawk (SWHA) and White-Tailed Kite (WTKI)

Issue: SWHA have been documented within the Project area (CDFW 2020). Review of recent aerial imagery indicates that trees capable of supporting nesting SWHA and WTKI occur along nearby waterways and Tule Elk Reserve. Landscape trees may also provide suitable nesting habitat. In addition, grassland and agricultural land in the surrounding area provide suitable foraging habitat for SWHA, increasing the likelihood of SWHA occurrence within the vicinity.

The DEIR MM BIO-2b specifies that a qualified biologist will conduct surveys of potential Swainson's hawk nesting trees within ¼ mile of the Project site within 14 days before Project activities begin during the nesting season of April through August. Surveys for WTKI shall be conducted within a minimum 500-foot radius of the Project activities. If any active nests are observed, protective buffers will be established by a qualified biologist who will monitor the nest during project activities to confirm effectiveness of the buffer. 8

The DEIR analysis does not provide a biological basis for employing a ¼-mile survey radius for SWHA nests without a robust protocol to maximize detection, or for how no-disturbance buffers would be determined as adequate to avoid significant impacts, including but not limited to take ("take" defined pursuant to Fish & G. Code section 86) of individuals through nest failure or other means, as a result of Project implementation. SWHA nesting activity typically commences prior to April.

Specific impact: The DEIR states that SWHA and WTKI are known to the Project area and have the potential to nest in riparian habitat and other mature trees located within the Project site and within ½ mile of the Project. In addition, suitable foraging habitat for these species exists within the vicinity of the Project site; annual grassland, alfalfa or grain fields, and livestock pasture that may be used for foraging are present in the Project vicinity. Without appropriate avoidance and minimization measures for SWHA and WTKI, potential significant impacts include nest abandonment and reduced reproductive success that includes mortality of young, and reduced health and vigor of eggs and/or young.

Evidence impact would be significant: The trees and riparian habitat within the Project area represent some of the only remaining suitable nesting habitat in the local vicinity. Depending on the timing of construction, activities including noise, vibration, and movement of workers or equipment could affect nests and have the potential to result in nest abandonment, significantly impacting local nesting SWHA. In addition, agricultural cropping patterns can directly influence distribution and abundance of SWHA. For example, SWHA can forage in grasslands, pasture, hay crops, and low growing irrigated crops; however, other agricultural crops such as orchards and vineyards are incompatible with SWHA foraging (Estep 2009, Swolgaard et al. 2008).

In the San Joaquin Valley, suitable nest trees may be a limiting factor for SWHA occupation and reproduction. As a result, loss of suitable nest trees, particularly in proximity to foraging habitat, has the potential to significantly impact local SWHA (CDFW 2016). CDFW considers removal of known bird-of-prey nest trees, even outside of the nesting season, a potentially significant impact under CEQA, and, in the case of SWHA, it could also result in take under CESA during active nesting. Project activities near the nest that differ from baseline disturbance regimes in type, timing, and/or magnitude can affect adults caring for eggs and young in the nest, and can affect nestling behavior. Project activities including noise, vibration, odors, visual disturbance, and movement of workers or equipment could affect nesting individuals and have the potential to result in nest abandonment or reduced nesting success, significantly impacting local nesting SWHA and WTKI.

Recommended Mitigation Measure 19: Focused SWHA and WTKI Surveys
To reduce potential Project-related impacts to SWHA and WTKI, CDFW recommends that a qualified wildlife biologist conduct surveys for nesting birds of prey, including SWHA and WTKI, following the survey methodology developed by the SWHA Technical Advisory Committee (SWHA TAC 2000) prior to Project initiation, within the Project area and a ½-mile buffer around the Project area. In addition, if Project activities will take place during the typical breeding season (February 1 through September 15), CDFW recommends that additional preconstruction surveys for active nests be conducted by a qualified biologist no more than 10 days prior to the start of construction.

Recommended Mitigation Measure 20: SWHA and WTKI Avoidance
CDFW recommends that if Project-specific activities will take place during the SWHA nesting season (i.e., March 1 through August 31), and active SWHA nests are present, a minimum ½-mile no-disturbance buffer be delineated and maintained around each nest, regardless if when it was detected by surveys or incidentally, until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival, to prevent nest abandonment and other take of SWHA as a result of Project activities.

Recommended Mitigation Measure 21: Tree Removal
CDFW recommends that the removal of known raptor nest trees, even outside of the nesting season, be replaced with an appropriate native tree species planting at a ratio of 3:1 at or near the Project area or in another area that will be protected in perpetuity. This mitigation would offset the local and temporal impacts of nesting habitat loss.

Recommended Mitigation Measure 22: SWHA Take Authorization
If SWHA are detected and a ½-mile no-disturbance nest buffer is not feasible, consultation with CDFW is warranted to determine if the Project can avoid take. If SWHA take cannot be avoided, issuance of a State ITP for SWHA prior to Project activities is warranted to comply with CESA. Pursuant to Fish and Game Code section 3511, CDFW cannot authorize incidental take of WTKI.

COMMENT 7: Tricolored Blackbird (TRBL)

Issue: TRBL are known to occur in the Project vicinity (CDFW 2020, UC Davis 2020). Review of aerial imagery indicates that the Project boundary includes flood-irrigated agricultural land, which is an increasingly important nesting habitat type for TRBL, particularly in the San Joaquin Valley (Meese et al. 2017).

Specific impact: Without appropriate avoidance and minimization measures for TRBL, potential significant impacts associated subsequent development include 9
nesting habitat loss, nest and/or colony abandonment, reduced reproductive success, and reduced health and vigor of eggs and/or young.

Evidence impact would be significant: As mentioned above, flood-irrigated agricultural land is an increasingly important nesting habitat type for TRBL, particularly in the San Joaquin Valley (Meese et al. 2014). This nesting substrate is present within the Project vicinity. TRBL aggregate and nest colonially, forming colonies of up to 100,000 nests (Meese et al. 2014). Approximately 86% of the global population is found in the San Joaquin Valley (Kelsey 2008, Weintraub et al. 2016). In addition, TRBL have been forming larger colonies that contain progressively larger proportions of the species' total population (Kelsey 2008). In 2008, for example, 55% of the species' global population nested in only two colonies, which were located in silage fields (Kelsey 2008). Nesting can occur synchronously, with all eggs laid within one week (Orians 1961). For these reasons, depending on timing, disturbance to nesting colonies can cause nest entire colony site abandonment and loss of all unfledged nests, significantly impacting TRBL populations (Meese et al. 2014).

Recommended Mitigation Measure 23: TRBL Surveys
CDFW recommends that construction be timed to avoid the typical bird-breeding season of February 1 through September 15. If Project activity that could disrupt nesting must take place during that time, CDFW recommends that a qualified wildlife biologist conduct surveys for nesting TRBL no more than 10 days prior to the start of implementation to evaluate presence/absence of TRBL nesting colonies in proximity to Project activities and to evaluate potential Project-related impacts.

Recommended Mitigation Measure 24: TRBL Colony Avoidance
If an active TRBL nesting colony is found during preconstruction surveys, CDFW recommends implementation of a minimum 300-foot no-disturbance buffer, in accordance with CDFW's "Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015" (CDFW 2015), until the breeding season has ended or until a qualified biologist has determined that nesting has ceased and the young have fledged and are no longer reliant upon the colony or parental care for survival. It is important to note that TRBL colonies can expand over time and for this reason, CDFW recommends that an active colony be reassessed to determine its extent within 10 days prior to Project initiation.

Recommended Mitigation Measure 25: TRBL Take Authorization
In the event that a TRBL nesting colony is detected during surveys, consultation with CDFW is warranted to discuss whether the Project can avoid take; if take avoidance is not feasible, to acquire a State ITP for TRBL, pursuant to Fish and Game Code section 2081(b) prior to any Project activities.

COMMENT 8: Special-Status Plants

Issue: Special-status plant species meeting the definition of rare or endangered under CEQA section 15380 are known to occur within the Project and surrounding area. The DEIR acknowledges that alkali-sink goldfields, oil nest straw, slough thistle, and recurved larkspur, and other special-status plant taxa have been documented within the Project area. Section 3.2 of the DEIR (Biological Resources page 3-12) states that recurved larkspur and other special-status plant taxa were not 10
observed during field surveys, but surveys were conducted very late in the blooming season and it is not clear if plants that may be present were identifiable. Measures to avoid special-status plants are not included in the DEIR.

Specific impact: Without appropriate avoidance and minimization measures for special-status plants, potential significant impacts associated with subsequent construction include loss of habitat, loss or reduction of productivity, and direct mortality.

Evidence impact would be significant: Alkali-sink goldfields, oil nest straw, slough thistle, recurved larkspur, and many other special-status plant species are threatened by grazing and agricultural, urban, and energy development. Many historical occurrences of these species are presumed extirpated (CNPS 2019). Though new populations have recently been discovered, impacts to existing populations have the potential to significantly impact populations of plant species.

Recommended Mitigation Measure 26: Special-Status Plant Surveys
CDFW recommends that individual Project sites be surveyed for special-status plants by a qualified botanist following the "Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities" (CDFW 2018). This protocol, which is intended to maximize detectability, includes the identification of reference populations to facilitate the likelihood of field investigations occurring during the appropriate floristic period.

Recommended Mitigation Measure 27: Special-Status Plant Avoidance
CDFW recommends that special-status plant species be avoided whenever possible by delineating and observing a no-disturbance buffer of at least 50 feet from the outer edge of the plant population(s) or specific habitat type(s) required by special-status plant species. If buffers cannot be maintained, then consultation with CDFW may be warranted to determine appropriate minimization and mitigation measures for impacts to special-status plant species.

Recommended Mitigation Measure 28: Listed Plant Species Take Authorization
If a State-listed plant species is identified during botanical surveys, consultation with CDFW is warranted to determine if the Project can avoid take. If take cannot be avoided, take authorization is warranted. Take authorization would occur through issuance of a State ITP, pursuant to Fish and Game Code section 2081(b).

COMMENT 9: Burrowing Owl (BUOW)

Issue: BUOW occur within and in the vicinity of the Project (CDFW 2020). BUOW inhabit open grassland containing small mammal burrows, a requisite habitat feature used by BUOW for nesting and cover. Habitat both within and surrounding the Project supports grassland habitat. Therefore, there is potential for BUOW to occupy or colonize the Project. 11

Specific impact: Potentially significant direct impacts associated with subsequent activities and land conversion include habitat loss, burrow collapse, inadvertent entrapment, nest abandonment, reduced reproductive success, reduction in health and vigor of eggs and/or young, and direct mortality of individuals.

Evidence impact is potentially significant: BUOW rely on burrow habitat year-round for their survival and reproduction. Habitat loss and degradation are considered the greatest threats to BUOW in California's Central Valley (Gervais et al. 2008). The Project and surrounding area contain remnant undeveloped land but is otherwise intensively managed for agriculture; therefore, subsequent ground-disturbing activities associated with subsequent constructions have the potential to significantly impact local BUOW populations. In addition, and as described in CDFW's "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), excluding and/or evicting BUOW from their burrows is considered a potentially significant impact under CEQA.

Recommended Potentially Feasible Mitigation Measure(s) (Regarding Environmental Setting and Related Impact)
To evaluate potential impacts to BUOW associated with subsequent development, CDFW recommends conducting the following evaluation of Project areas and implementing the following mitigation measures.

Recommended Mitigation Measure 29: BUOW Habitat Assessment
CDFW recommends that a qualified biologist conduct a habitat assessment in advance of Project implementation, to determine if the Project area or its vicinity contains suitable habitat for BUOW.

Recommended Mitigation Measure 30: BUOW Surveys
If suitable habitat is present on or in the vicinity of the Project area, CDFW recommends assessing presence or absence of BUOW by having a qualified biologist conduct surveys following the California Burrowing Owl Consortium's "Burrowing Owl Survey Protocol and Mitigation Guidelines" (CBOC 1993) and the "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), which suggest three or more surveillance surveys conducted during daylight with each visit occurring at least three weeks apart during the peak breeding season (i.e., April 15 to July 15), when BUOW are most detectable. In addition, CDFW advises that surveys include a minimum 500-foot buffer area around the Project area.

Recommended Mitigation Measure 31: BUOW Avoidance
CDFW recommends that no-disturbance buffers, as outlined in the "Staff Report on Burrowing Owl Mitigation" (CDFG 2012), be implemented prior to and during any ground-disturbing activities. Specifically, CDFW's Staff Report recommends that impacts to occupied burrows be avoided in accordance with the following table unless a qualified biologist approved by CDFW verifies through non-invasive methods that either: 1) the birds have not begun egg laying and incubation; or 2) that juveniles from the occupied burrows are foraging independently and are capable of independent survival.

Location	Time of Year	Level of Disturbance		
		Low	Med	High
Nesting sites	April 1-Aug 15	200 m*	500 m	500 m
Nesting sites	Aug 16-Oct 15	200 m	200 m	500 m
Nesting sites	Oct 16-Mar 31	50 m	100 m	500 m

* meters (m)

Recommended Mitigation Measure 32: BUOW Passive Relocation and Mitigation
If BUOW are found within these recommended buffers and avoidance is not possible, it is important to note that according to the Staff Report (CDFG 2012), excluding birds from burrows is not a take avoidance, minimization, or mitigation method and is instead considered a potentially significant impact under CEQA. If it is necessary for Project implementation, CDFW recommends that burrow exclusion be conducted by qualified biologists and only during the non-breeding season, before breeding behavior is exhibited and after the burrow is confirmed empty through non-invasive methods, such as surveillance. CDFW recommends replacement of occupied burrows with artificial burrows at a ratio of one burrow collapsed to one artificial burrow constructed (1:1) to mitigate for evicting BUOW and the loss of burrows. BUOW may attempt to colonize or re-colonize an area that will be impacted; thus, CDFW recommends ongoing surveillance at a rate that is sufficient to detect BUOW if they return.

COMMENT 10: Other State Species of Special Concern

Issue: Tulare grasshopper mouse, San Joaquin pocket mouse, San Joaquin coachwhip, western spadefoot, coast horned lizard, California glossy snake, Le Conte’s thrasher, and American badger can inhabit grassland and upland scrub habitats (Shuford and Gardali 2008, Thomson et al. 2016). All the species mentioned above have been documented to occur in the vicinity of the Project, which supports requisite habitat elements for these species (CDFW 2020a).

Specific impact: Without appropriate avoidance and minimization measures for these species, potentially significant impacts associated with ground disturbance include habitat loss, nest/den/burrow abandonment, which may result in reduced health or vigor of eggs and/or young, and direct mortality. 12

Evidence impact is potentially significant: Habitat loss threatens all of the species mentioned above (Thomson et al. 2016). Habitat within and adjacent to the Project represents some of the only remaining undeveloped land in the vicinity, which is otherwise intensively managed for agriculture. As a result, ground- and vegetation-disturbing activities associated with development of the Project have the potential to significantly impact local populations of these species.

Recommended Mitigation Measure 33: Habitat Assessment
CDFW recommends that a qualified biologist conduct a habitat assessment in advance of project implementation, to determine if project areas or their immediate vicinity contain suitable habitat for the species mentioned above.

Recommended Mitigation Measure 34: Surveys
If suitable habitat is present, CDFW recommends that a qualified biologist conduct focused surveys for applicable species and their requisite habitat features to evaluate potential impacts resulting from ground and vegetation disturbance.

Recommended Mitigation Measure 35: Avoidance
Avoidance whenever possible is encouraged via delineation and observance a 50-foot no-disturbance buffer around dens of mammals like the American badger as well as the entrances of burrows that can provide refuge for small mammals, reptiles, and amphibians.

Would the Project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS?

COMMENT 11: Wetland and Riparian Habitats

Issue: The Project area is in the immediate vicinity of numerous waterways and riparian and wetland areas. Development within the Project has the potential to involve temporary and permanent impacts to these features.

Specific impact: Project activities have the potential to result in the loss of riparian and wetland vegetation, in addition to the degradation of wetland and riparian areas through grading, fill, and related development. 13

Evidence impact is potentially significant: The Project vicinity includes stream and wetland features within an agricultural landscape that also maintains undeveloped habitats. Riparian and associated floodplain and wetland areas are valuable for their ecosystem processes such as protecting water quality by filtering pollutants and transforming nutrients; stabilizing stream banks to prevent erosion and sedimentation/siltation; and dissipating flow energy during flood conditions, thereby spreading the volume of surface water, reducing peak flows downstream, and increasing the duration of low flows by slowly releasing stored water into the channel through subsurface flow. Within the San Joaquin Valley, modifications of streams to accommodate human uses has resulted in damming, canalizing, and channelizing of many streams, though some natural stream channels and small wetland or wetted areas remain (Edminster 2002). The Fish and Game Commission policy regarding wetland resources discourages development or conversion of wetlands that results in any net loss of wetland acreage or habitat value. Construction activities within these features also has the potential to impact downstream waters as a result of Project site impacts leading to erosion, scour, and changes in stream morphology.

Recommended Mitigation Measure 36: Stream and Wetland Mapping
CDFW recommends that formal stream mapping and wetland delineation be conducted by a qualified biologist or hydrologist, as warranted, to determine the baseline location, extent, and condition of streams (including any floodplain) and wetlands within and adjacent to the Project area. Please note that while there is overlap, State and Federal definitions of wetlands differ, and complete stream mapping commonly differs from delineations used by the United States (U.S.) Army Corps of Engineers specifically to identify the extent of Waters of the U.S. Therefore, it is advised that the wetland delineation identify both State and Federal wetlands in the Project area as well as the extent of all streams including floodplains, if present, within the Project area. CDFW advises that site map(s) depicting the extent of any activities that may affect wetlands, lakes, or streams be included with any Project site evaluations, to clearly identify areas where stream/riparian and wetland habitats could be impacted from Project activities.

Recommended Mitigation Measure 37: Stream and Wetland Habitat Mitigation
CDFW recommends that the potential direct and indirect impacts to stream/riparian and wetland habitat be analyzed according to each Project activity. Based on those potential impacts, CDFW recommends that the DEIR include measures to avoid, minimize, and/or mitigate those impacts. CDFW recommends that impacts to riparian habitat (i.e., biotic and abiotic features) take into account the effects to stream function and hydrology from riparian habitat loss or damage, as well as potential effects from the loss of riparian habitat to special-status species already identified herein. CDFW recommends that any losses to stream and wetland habitats be offset with corresponding riparian and wetland habitat restoration incorporating native vegetation to replace the value to fish and wildlife provided by the habitats lost from Project implementation. If on-site restoration to replace habitats is not feasible, CDFW recommends offsite mitigation by restoring or enhancing in-kind riparian or wetland habitat and providing for the long-term management and protection of the mitigation area, to ensure its persistence.

Editorial Comments and/or Suggestions

Small Mammal and BNLL Exclusion Fencing: DEIR MM BIO-1 states that temporary exclusion fencing will be installed between the project site and bush seepweed scrub habitat to prevent potential encroachment of small animals, including BNLL, into the work area during construction. The fencing will be installed within existing roads/road shoulders or agricultural fields to avoid habitat disturbance and fragmentation. A qualified biologist will determine at a later time where fencing will be installed and will be present during all fence installation to ensure that no special-status species are harmed. Fencing will be removed after all construction activities adjacent to the fenced area are complete. 14

The DEIR does not include an impact analysis or description for the ground disturbing and other activities related to the installation, maintenance, and removal of proposed exclusion fencing. It is not clear if fencing that is proposed would prevent species such as SJAS from climbing over or burrowing under the fence line to enter the Project site. It also is not clear if the Project site would be surveyed to determine whether the site is occupied by any special status species prior to fence installation. Fencing construction and other ground disturbing activity could impact underground burrow systems and result in indirect or direct impacts to special status species, including lethal take. In order for CDFW to determine whether the installation of exclusion fencing is an appropriate avoidance and minimization measure for special status species, CDFW recommends the DEIR include an adequate description and impact analysis of the proposed exclusion fencing, including details regarding its alignment, methods of install and removal, and how the design would prevent special status species from entering work areas.

Federally Listed Species: CDFW recommends consulting with USFWS regarding potential impacts to federally listed species. Take under the Federal Endangered Species Act (FESA) is more broadly defined than CESA; take under FESA also includes significant habitat modification or degradation that could result in death or injury to a listed species by interfering with essential behavioral patterns such as breeding, foraging, or nesting. Consultation with the USFWS in order to comply with FESA is advised well in advance of any Project activities. 15

Lake and Streambed Alteration: Project activities have the potential to substantially change the bed, bank, and channel of lakes, streams, and associated wetlands onsite and/or substantially extract or divert the flow of any such feature that is subject to CDFW's regulatory authority pursuant Fish and Game Code section 1600 et seq. Fish and Game Code section 1602 requires an entity to notify CDFW prior to commencing any activity that may (a) substantially divert or obstruct the natural flow of any river, stream, or lake; (b) substantially change or use any material from the bed, bank, or channel of any river, stream, or lake (including the removal of riparian vegetation): (c) deposit debris, waste or other materials that could pass into any river, stream, or lake. "Any river, stream, or lake" includes those that are ephemeral or intermittent as well as those that are perennial. 16

CDFW is required to comply with CEQA in the issuance of a Lake or Streambed Alteration Agreement (LSAA); therefore, if the CEQA document approved for the Project does not adequately describe the Project and its impacts to lakes or streams, a subsequent CEQA analysis may be necessary for LSAA issuance. For information on notification requirements, please refer to CDFW's website (https://wildlife.ca.gov/Conservation/LSA) or contact the Central Region Lake and Streambed Alteration Program at (559) 243-4593 or R4LSA@wildlife.ca.gov.

Nesting Birds: CDFW has jurisdiction over actions with potential to result in the disturbance or destruction of active nest sites or the unauthorized take of birds. Fish and Game Code sections that protect birds, their eggs and nests include sections 3503 17 (regarding unlawful take, possession or needless destruction of the nest or eggs of any bird), 3503.5 (regarding the take, possession or destruction of any birds-of-prey or their nests or eggs), and 3513 (regarding unlawful take of any migratory nongame bird).

CDFW encourages Project implementation to occur during the bird non-nesting season; however, if Project activities must occur during the breeding season (i.e., February through mid-September), the Project applicant is responsible for ensuring that implementation of the Project does not result in violation of the Migratory Bird Treaty Act or relevant Fish and Game Codes as referenced above.

To evaluate Project-related impacts on nesting birds, CDFW recommends that a qualified wildlife biologist conduct pre-activity surveys for active nests no more than 10 days prior to the start of ground disturbance to maximize the probability that nests that could potentially be impacted by the Project are detected. CDFW also recommends that surveys cover a sufficient area around the work site to identify nests and determine their status. A sufficient area means any area potentially affected by a project. In addition to direct impacts (i.e., nest destruction), noise, vibration, and movement of workers or equipment could also affect nests. Prior to initiation of construction activities, CDFW recommends that a qualified biologist conduct a survey to establish a behavioral baseline of all identified nests. Once construction begins, CDFW recommends that a qualified biologist continuously monitor nests to detect behavioral changes resulting from the project. If behavioral changes occur, CDFW recommends that the work causing that change cease and CDFW be consulted for additional avoidance and minimization measures.

If continuous monitoring of identified nests by a qualified wildlife biologist is not feasible, CDFW recommends a minimum no-disturbance buffer of 250 feet around active nests of non-listed bird species and a 500-foot no-disturbance buffer around active nests of non-listed raptors. These buffers are advised to remain in place until the breeding season has ended or until a qualified biologist has determined that the birds have fledged and are no longer reliant upon the nest or parental care for survival. Variance from these no-disturbance buffers is possible when there is compelling <u>biological or ecological</u> reason to do so, such as when the construction area would be concealed from a nest site by topography. CDFW recommends that a qualified wildlife biologist advise and support any variance from these buffers and notify CDFW in advance of implementing a variance.

ENVIRONMENTAL DATA

CEQA requires that information developed in environmental impact reports and negative declarations be incorporated into a database, which may be used to make subsequent or supplemental environmental determinations (Pub. Resources Code, § 21003, subd. (e)). Accordingly, please report any special-status species and natural communities detected during Project surveys to the CNDDB. The CNNDB field survey form can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/pdfs/CNDDB_FieldSurveyForm.pdf. The completed form can be mailed electronically to CNDDB at the following email address: CNDDB@wildlife.ca.gov. The types of information reported to CNDDB can be found at the following link: http://www.dfg.ca.gov/biogeodata/cnddb/plants_and_animals.asp.

FILING FEES

The Project, as proposed, would have an impact on fish and/or wildlife, and assessment of filing fees is necessary. Fees are payable upon filing of the Notice of Determination by the Lead Agency and serve to help defray the cost of environmental review by CDFW. Payment of the fee is required in order for the underlying project approval to be operative, vested, and final (Cal. Code Regs, tit. 14, § 753.5; Fish & G. Code, § 711.4; Pub. Resources Code, § 21089).

CONCLUSION

CDFW appreciates the opportunity to comment on the DEIR to assist BVWSD in identifying and mitigating Project impacts on biological resources.

If you have questions regarding these comments, please contact Annette Tenneboe, Senior Environmental Scientist (Specialist), at the address on this letterhead, or by email at Annette.Tenneboe@wildlife.ca.gov.

Sincerely,

DocuSigned by:
Julie Vance
FA83F09FE08945A...

Julie A. Vance
Regional Manager

Attachment

ec: Office of Planning and Research
State Clearinghouse
state.clearinghouse.opr.ca.gov

Annette Tenneboe
California Department of Fish and Wildlife

REFERENCES

California Burrowing Owl Consortium (CBOC). 1993. Burrowing owl survey protocol and mitigation guidelines. Pages 171-177 *in* Lincer, J. L. and K. Steenhof (editors). 1993. The burrowing owl, its biology and management. Raptor Research Report Number 9.

California Department of Fish and Game (CDFG). 1990a. Approved Survey Methodologies for Sensitive Species. San Joaquin Antelope Squirrel, *Ammospermophilus nelsoni*. California Department of Fish and Game, Region 4.

CDFG. 1990b. Approved Survey Methodologies for Sensitive Species. Giant Kangaroo Rat, *Dipodomys ingens* California Department of Fish and Game, Region 4.

CDFG. 2012. Staff Report on Burrowing Owl Mitigation. California Department of Fish and Game. March 7, 2012.

California Department of Fish and Wildlife (CDFW). 2015. Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015. March 19, 2015.

CDFW. 2016. Status Review on Swainson's Hawk (*Buteo swainsoni*) in California. California Department of Fish and Wildlife. April 11, 2016.

CDFW. 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. California Department of Fish and Wildlife. March 20, 2018.

CDFW. 2019. Approved Survey Methodology for the Blunt-Nosed Leopard Lizard. California Department of Fish and Wildlife, October 2019 (Revised).

CDFW. 2020. Biogeographic Information and Observation System (BIOS). https://www.wildlife.ca.gov/Data/BIOS. Accessed July 9, 2020.

California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org. July 6, 2020.

Cypher, B. and N. Frost. 1999. Condition of San Joaquin kit foxes in urban and exurban habitats. Journal of Wildlife Management 63: 930-938.

Cypher, B.L., S.E. Phillips, and P.A. Kelly. 2013. Quantity and distribution of suitable habitat for endangered San Joaquin kit foxes: conservation implications. Canid Biology & Conservation 16(7): 25-31. http://www.canids.org/CBC/16/San_Joaquin_kit_fox_habitat_suitability.pdf

Edminster, R.J. 2002. Streams of the San Joaquin. Second Edition. Quercus Publications, Los Banos, California.

Endangered Species Recovery Program (ESRP). 2020a. Blunt-nosed leopard lizard. http://esrp.csustan.edu/speciesprofiles/profile.php?sp=gasi . Accessed July 10, 2020.

ESRP. 2020b. San Joaquin antelope squirrel. http://esrp.csustan.edu/speciesprofiles/profile.php?sp=amne . Accessed July 10, 2020.

ESRP. 2020c. Tipton kangaroo rat. https://esrp.csustan.edu/speciesprofiles/profile.php?sp=dinin. Accessed July 10, 2020.

ESRP. 2020d. Giant kangaroo rat. https://esrp.csustan.edu/speciesprofiles/profile.php?sp=diin. Accessed July 9, 2020.

Estep, J. 2009. The influence of vegetation structure on Swainson's hawk (*Buteo swainsoni*) foraging habitat suitability in Yolo County, California. Prepared for the Yolo Natural Heritage Program, Woodland, CA.

Gervais, J. A., D. K. Rosenberg, and L. A. Comrack. 2008. Burrowing Owl (*Athene cunicularia*) *In* California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California (W. D. Shuford and T. Gardali, editors). Studies of Western Birds 1. Western Field Ornithologists, Camarillo, California, and California Department of Fish and Game, Sacramento.

Kelsey, R. 2008. Results of the tricolored blackbird 2008 census. Report submitted to U.S. Fish and Wildlife Service, Portland, OR, USA.

Meese, R. J., E. C. Beedy, and W. J. Hamilton, III. 2014. Tricolored blackbird (*Agelaius tricolor*), The Birds of North America (P. G. Rodewald, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America: https://birdsna-org.bnaproxy.birds.cornell.edu/Species-Account/bna/species/tribla. Accessed December 15, 2017.

Meese, R. J. 2017. Results of the 2017 Tricolored Blackbird Statewide Survey. California Department of Fish and Wildlife, Wildlife Branch, Nongame Wildlife Program Report 2017-04, Sacramento, CA. 27 pp. + appendices.

Orians, G. H. 1961. The ecology of blackbird (*Agelaius*) social systems. Ecological Monographs 31(3): 285–312.

Shuford, W. D. and T. Gardali (editors). 2008. California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California. Published by Western Field Ornithologists and California Department of Fish and Game.

Swainson's Hawk Technical Advisory Committee (SWHA TAC). 2000. Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in the Central Valley of California. Swainson's Hawk Technical Advisory Committee. May 31, 2000.

Swolgaard, C. A, K. A. Reeves, and D. A. Bell. 2008. Foraging by Swainson's Hawks in a Vineyard-Dominated Landscape. Journal of Raptor Research 42(3), 188-196. https://doi.org/10.3356/JRR-07-15.1

Thomson, R. C., A. N. Wright, and H. B. Shaffer. 2016. California Amphibian and Reptile Species of Special Concern. California Department of Fish and Wildlife and University of California Press: 84-92.

University of California, Davis (UC Davis). 2020. Tricolored blackbird portal. https://tricolor.ice.ucdavis.edu/. Accessed May 1, 2020.

United States Fish and Wildlife Service (USFWS). 1998. Blunt-nosed leopard lizard *In* Recovery Plan for Upland Species of the San Joaquin Valley, California. Region 1, Portland, OR. 319 pp.

USFWS. 2011. Standard Recommendations for the Protection of the San Joaquin Kit Fox Prior to or During Ground Disturbance. United States Fish and Wildlife Service. January 2011.

USFWS. 2013. Survey Protocol for Determining Presence of San Joaquin Kangaroo Rats. United States Fish and Wildlife Service. March 2013.

Weintraub, K., T. L. George, and S. J. Dinsmore. 2016. Nest survival of tricolored blackbirds in California's Central Valley. The Condor 118(4): 850–861.

Attachment 1

CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE
RECOMMENDED MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

PROJECT: Palms Groundwater Recovery Project
State Clearinghousehouse No.: 2020060315

RECOMMENDED MITIGATION MEASURES	STATUS/DATE/INITIALS
Before Disturbing Soil or Vegetation	
Recommended Mitigation Measure 1: SJKF Habitat Assessment	
Recommended Mitigation Measure 2: SJKF Surveys and Minimization	
Recommended Mitigation Measure 3: SJKF Take Authorization	
Recommended Mitigation Measure 4: BNLL Habitat Assessment	
Recommended Mitigation Measure 5: BNLL Surveys	
Recommended Mitigation Measure 7: SJAS Habitat Assessment	
Recommended Mitigation Measure 8: SJAS Surveys	
Recommended Mitigation Measure 10: SJAS Take Authorization	
Recommended Mitigation Measure 11: TKR Habitat Assessment	
Recommended Mitigation Measure 13: TKR Surveys	
Recommended Mitigation Measure 14: TKR Take Authorization	
Recommended Mitigation Measure 15: GKR Habitat Assessment	
Recommended Mitigation Measure 16: GKR Surveys	
Recommended Mitigation Measure 18: GKR Take Authorization	
Recommended Mitigation Measure 19: Focused SWHA and WTKI Surveys	

RECOMMENDED MITIGATION MEASURES	**STATUS/DATE/INITIALS**
Recommended Mitigation Measure 21: Tree Removal	
Recommended Mitigation Measure 22: SWHA Take Authorization	
Recommended Mitigation Measure 23: TRBL Surveys	
Recommended Mitigation Measure 25: TRBL Take Authorization	
Recommended Mitigation Measure 26: Special-Status Plant Surveys	
Recommended Mitigation Measure 28: Listed Plant Species Take Authorization	
Recommended Mitigation Measure 29: BUOW Habitat Assessment	
Recommended Mitigation Measure 30: BUOW Surveys	
Recommended Mitigation Measure 32: BUOW Passive Relocation and Mitigation	
Recommended Mitigation Measure 33: Habitat Assessment (Other Species of Special Concern)	
Recommended Mitigation Measure 34: Surveys (Other Species of Special Concern)	
Recommended Mitigation Measure 36: Stream and Wetland Mapping	
Recommended Mitigation Measure 37: Stream and Wetland Habitat Mitigation	
During Construction	
Recommended Mitigation Measure 2: SJKF Surveys and Minimization	
Recommended Mitigation Measure 6: BNLL Take Avoidance	
Recommended Mitigation Measure 9: SJAS Avoidance	
Recommended Mitigation Measure 12: TKR Avoidance	
Recommended Mitigation Measure 17: GKR Avoidance	
Recommended Mitigation Measure 20: SWHA and WTKI Avoidance	

RECOMMENDED MITIGATION MEASURES	**STATUS/DATE/INITIALS**
Recommended Mitigation Measure 24: TRBL Colony Avoidance	
Recommended Mitigation Measure 27: Special-Status Plant Avoidance	
Recommended Mitigation Measure 31: BUOW Avoidance	
Recommended Mitigation Measure 35: Avoidance (Other Species of Special Concern)	

VIA EMAIL AND FIRST CLASS MAIL

January 18, 2021

Tim Ashlock, Engineer Manager
Buena Vista Water Storage District
P.O. Box 756
Buttonwillow, CA 93206
Email: tim@bvh2o.com

Re: Kern Water Bank Authority's Comments on Palms Groundwater Recovery Project Draft Environmental Impact Report;
State Clearinghouse #2020060315

Dear Mr. Ashlock,

1. INTRODUCTION AND SUMMARY.

The Kern Water Bank Authority ("KWBA") submits the following comments on the Draft Environmental Impact Report ("DEIR") for the Palms Groundwater Recovery Project ("Project") (SCH No. 2020060315) proposed by the Buena Vista Water Storage District ("Buena Vista" or "BV"). The DEIR fails to comply with the California Environmental Quality Act ("CEQA") for multiple, independent reasons. KWBA objects to certification of the EIR and the approval of the Project based on the legal and factual errors identified in this letter and attachments.

The purpose of the DEIR is to serve as an informational document for the public and for the decision maker by providing both quantitative and qualitative analysis of a proposed project's impacts on the environment.[1] An EIR that complies with CEQA allows the public to understand the basis on which the lead agency approved or rejected an environmentally significant action, so that the public, being duly informed, can respond accordingly to an action with which it disagrees.[2] An EIR that fails to provide sufficient information subverts the purposes of CEQA where it omits the material necessary to informed decision making and informed public participation.[3]

The DEIR is fundamentally flawed and violates CEQA informational standards. The inadequacies in the DEIR infect nearly every section of the document, including the Project description, alternatives, hydrology and water quality, biological resources, and the cumulative effects analysis.

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1 Pub. Resources Code, § 21061; Cal. Code Regs., tit. 14 ("CEQA Guidelines"), § 15003, subds. (b)-(e).

2 *Sierra Club v. County of Fresno* (2018) 6 Cal.5th 502, 515.

3 *Id.*

The DEIR's fatal defects include, but are not limited to, the following:

- The DEIR presents a misleading evaluation of the direct, indirect and cumulative effects of the Project because DEIR does not evaluate the entire "project" as required by CEQA;

- Buena Vista has engaged in a classic invalid "piecemealing" analysis of Project effects. It first analyzed and evaluated recharge ponds using a negative declaration. It is those recharge ponds that Buena Vista relies on in this Project to supply the groundwater that would be extracted by this Project using recovery wells. This separates the analysis of the groundwater recharge ponds from the recovery wells, analyzing the two components entirely separately in violation of CEQA;

- The Project purpose includes attracting additional, yet-to-be defined partners; mixing water to meet the California Department of Water Resources' ("DWR") water quality standards for pump-in of non-State Water Project water, e.g., groundwater, into DWR's California Aqueduct ("Aqueduct") for the State Water Project ("SWP"); moving water through the Aqueduct but does not identify the purposes for which the water is being moved; and vaguely describes the sources of water recharge that the Project will rely on.

- The evaluation of the Project's water quality effects is misleading and uninformative because it is based on incorrect and incomplete water quality data, and there is no degradation or other adequate analysis of cumulative effects of the pump-in of poorer quality Project groundwater into the Aqueduct or whether Project pump-ins will impact other existing or future reasonably foreseeable banking projects' ability to meet DWR's standards;

- Because the Project will not recharge water in the lands outside the District, it will result in a significant and unreasonable reduction in groundwater storage within the Kern Groundwater Authority GSA ("KGAGSA") and West Kern Water District GSA ("WKGSA");

- The water quality impact analysis *does not consider* the environmental impacts of removing better quality groundwater located outside the BV District and Buena Vista GSA ("BVGSA") and within another GSA, without replenishment or replacement, or the impacts of blending such mined water with the poorer quality groundwater that will be recovered within the District where recharge occurs;

- The DEIR does not evaluate a reasonable range of alternatives including: alternative locations and configurations of the Project; an alternative that limits use of the Project water to the District; and alternative Project operations to minimize potential effects on groundwater, water quality, and biological resources;

- The DEIR fails to evaluate the significance of the effects of the Project as compared against valid CEQA existing condition and future baselines;

- The DEIR fails to include quantitative data on impacts to biological resources derived from protocol survey methodologies established by state and federal wildlife agencies;

- The DEIR does not include adequate mitigation and avoidance measures, and defers adequate definition of mitigation measures to the results of future studies;

- The DEIR does not disclose material assumptions in the groundwater model used for the Project which render the model fundamentally misleading and uninformative; and

- The DEIR improperly constrains cumulative impacts analysis to include only three other projects, and excludes the impacts of other past, present, and reasonably foreseeable future projects including, but not limited to, the Kern Fan Groundwater Storage Project and associated final EIR (State Clearinghouse #2020049019) approved and certified by the Groundwater Banking Joint Powers Authority on or about December 28, 2020.

These and other significant and fatal defects of the DEIR are described in further detail, below and in the attachments to this letter.

2. THE PROJECT DESCRIPTION IS INADEQUATE, INCONSISTENT AND INDEFINITE.

A. "Piecemealing" of the Project Description.

CEQA prohibits an agency from "piecemealing" the analysis of potential effects by dividing a larger project into smaller units. CEQA defines the term "project" to include the "whole of the action" being undertaken.[4] Here, the "whole of the action" includes: the construction, operation, and maintenance of the recharge ponds; the construction, operation, and
1 maintenance of recovery facilities; the annexation of lands outside of the District, the sources of Project water, transmission of water within and outside the District, and uses of water surface and groundwater stored and recovered by the Project; and all ancillary facilities and activities.[5]

An "accurate, stable and finite project description, [which] is the *sine qua non* of an informative and legally sufficient EIR.'"[6] "A project description that gives conflicting signals to decision makers and the public about the nature of the project is fundamentally inadequate and

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[4] CEQA Guidelines, §§ 15124, 15126.6.

[5] CEQA Guidelines, § 15124.

[6] *South of Market Community Action Network v. City and County of San Francisco* (2019) 33 Cal.App.5th 321, 332, citation omitted.

misleading." [7] The Project description provided by the DEIR is inadequate for multiple separate and independent reasons.

1 (con't) The description of the Project violates CEQA because it does not describe and evaluate the "whole of the action." Buena Vista first analyzed and evaluated the Palm's recharge ponds (not including any groundwater recharge via BV's existing canal system) using a negative declaration.[8] It is those recharge ponds that Buena Vista relies on in this Project to supply the groundwater that would be extracted by this Project using recovery wells. This separates the analysis of the effects of the groundwater recharge ponds from the recovery wells, analyzing the two components entirely separately in violation of CEQA. To the extent the DEIR is adding a third component – recharge via BV's existing canal system, in addition to such component not being adequately described or evaluated in the DEIR, there is a further segmentation problem since that component of recharge was not described or evaluated as part of the Palm's recharge in the negative declaration. Such a change would represent a substantial change and/or significant new information with respect to the project or circumstances described therein and would necessitate that recharge to be evaluated in this DEIR.

2 In the DEIR, the project description provides an uncertain and shifting description of the sources of banked water. The DEIR does not provide any description whatsoever of the participants in this banking and recovery project. The Project is designed to attract unidentified partners, and to transfer water outside of the District and outside of Kern County. The DEIR, however, does not identify or evaluate the uses, and effects of the uses, of the water outside of the District and Kern County. The DEIR does not include detail on the sources of Project water sufficient to allow for a detailed analysis of the effects on the water sources. (DEIR, p. 2-5.)

3 The DEIR fails entirely to describe the groundwater mixing elements of the Project. There is no description of the mixing facilities, process, or the location at which mixing would occur. The DEIR states that the purpose for the mixing is to allow the Project water to meet DWR's standards applicable to pump-in of non-SWP water into and movement through the Aqueduct. (DEIR, pp. ES-i, ES-ii, 2-5.) The Project description must identify the location of any facilities at which water would be mixed, and the ultimate destination and uses of the mixed water, so that the effects of the Project are analyzed and mitigated.

4 The DEIR indicates that parties other than Buena Vista may participate in the Project, but fails to identify who those parties would be, what the nature of their involvement would be, and whether the involvement of these third parties would alter Project operations or result in impacts resulting from such parties' use of banked supplies for growth or otherwise. (DEIR, p. 2-5 [identifies a Project objective as "Install recovery facilities to attract new banking partners in order to increase the groundwater in the Kern Subbasin for District use"].) As this is both an objective of the Project and is identified as part of the Project itself, the DEIR must identify, evaluate, and

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[7] *Ibid.*

[8] SCH #2020060092, Corn Camp Groundwater Recharge Pond Project (Mitigated Negative Declaration Approved June 3, 2020).

4 (con't) disclose any environmental impacts this might have, including disclosing the foreseeable use of Project water provided by the unidentified "partners."[9]

The Project description fails to describe the recovery capacity of the extraction wells that
5 the Project would rely on. Rather, the Project description relies on a bare identification of the number of new and existing wells that would be used, and their approximate locations to satisfy CEQA's requirements. (DEIR, p. 2-6.)

The Project Description does not clearly identify that at least half of Project recovery will occur outside the BVGSA and within the KGAGSA. Neither the text nor Figure 2-2 identify the
6 District boundary or the locations of the BVGSA, the West Kern Water District Banking project or GSA, the Kern Water Bank, or the KGAGSA.[10] All of these facilities/agencies are directly adjacent to the Project and significant stakeholders in the groundwater basin where that portion of the recovery project outside the District is located.

Section 2.3.2 (Operation) includes the following statement: "Available surplus water supply will continue to be recharged at the Palms Project during wet years. The District anticipates recharging up to 100,000 AFY through the Palms Project when surplus water supply is available. *The District also recharges groundwater through their existing canal system during*
7 *wet years, a District practice for many decades*." [Emphasis added] Historic canal seepage in the District is not part of a bona fide groundwater banking program that has not undergone public review under CEQA. This water cannot be included in the Palms Project bank account without CEQA analysis. The canal system with the District extends over 20 miles to the north-northwest from the project area, and the DEIR includes no evaluation of using canal seepage to support the Project.

B. Inaccurate, Incomplete, and Unstable Description of Water Sources.

The Project description is inaccurate, incomplete, and unstable, particularly with regard to Buena Vista's description of the source of the water to be diverted for use by the Project and the nature and extent of Buena Vista's rights to divert and use such water. Water rights are economic entitlements or rights that, when exercised, have physical effects. CEQA requires the
8 description and analysis of the physical effects associated with the exercise of claimed water rights.

Buena Vista asserts that it "controls an average entitlement of approximately 150,000 acre-feet per year (AFY) of surface water from the Kern River, based on the Miller-Haggin Agreement of 1888." (DEIR, p. 3-50.) It further asserts that it "has a net irrigated acreage maximum of about 40,000 acres." (DEIR, p. 1-6.) Buena Vista further asserts that this Kern River supply, in conjunction with its State Water Project ("SWP") supply, is sufficient to meet its water demand: "Conjunctive management within the District begins with deliveries of surface

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[9] *Laurel Heights Improvement Assn. v. Regents of the Univ. of California* (1988) 47 Cal.3d 376, 394 n. 6 [finding that the failure to accurately describe the extent and cumulative impact of anticipated future plans rendered the project description inadequate, and rendered the EIR's discussion of future environmental effects inadequate].

[10] See Attachment N [Annotated DEIR Figure 2-2].

water from the Kern River and the Aqueduct with these two sources generating an average annual supply sufficient to meet District-wide demands." (DEIR at 2-1.)

The DEIR states that Buena Vista will divert and recharge up to 100,000 AFY of water when "surplus water" is available. (DEIR at Appendix D, Groundwater Model Report, at 3 ["The District anticipates recharging up to 100,000 AFY when *surplus water supply is available* through the Palms Project and their existing canal system during wet years, a District practice for many decades."].) It further states that Buena Vista will use this water "to partner with others to help meet their water supply needs." (DEIR, p. ES-ii.) The DEIR, however, contains no description or
8 (con't) analysis of the basis for Buena Vista's claimed right to "surplus water," or the physical impacts associated with the diversion and use of "surplus water" on other water right holders and the environment.

The Project description fails to quantify Buena Vista's Kern River water supply, including the specific quantity that Buena Visa is relying on under its alleged right and any limitations thereon. In fact, the Project description contains no description of the Kern River water supply that the Project relies upon. (DEIR, pp. 2-5 to 2-6.) Instead, the Project description characterizes the water that would supply the Project as only that which is already banked. As this is a fundamental delimiter on the amount of recharged or banked water that would be available to the Project, it is integral to the Project description. Accordingly, the DEIR must be revised to properly identify the sources of the water for the Project (including water recharge that is subject to Buena Vista's Kern River water rights and any limitations thereon) in order to comply with CEQA.

C. Incomplete and Inaccurate Description of Water Rights.

The DEIR fails to disclose that Buena Vista lacks a water right for diversion of water to the Project. The DEIR asserts the right to divert "surplus water" from the Kern River. This claim is unsupported by water rights on the Kern River and California water rights law and is contrary to recent water rights orders of the State Water Resources Control Board.

The U.S. Army Corps of Engineers constructed the Kern River-California Aqueduct
9 Intertie ("Intertie") as a flood control project in 1977. On October 2, 2008, the Water Board recognized that water was diverted "through the Intertie in six different years between 1978 and 1988, in 1997 and 1998, and again in 2006."[11] On these grounds, the Water Board determined that:

> [D]iversion of water to the California Aqueduct via the intertie on numerous occasions since its construction in 1977 confirms that there has been a change in circumstances since D1196. Kern River flows in excess of the established uses of historical water

[11] Attachment A [Memorandum from V. Whitney, Chief Division of Water Rights at State Water Resources Control Board to Katherine Mrowka, Chief Watershed Unit 3, Division of Water Rights, State Water Resources Control Board Re Petitions to Revise Status of Kern River on State Water Board Fully Appropriated Streams List, October 2, 2008].

> right holders have been available, and excess water has been put to beneficial use through the SWP.[12]

As a result of these changed circumstances, the Water Board found there was "sufficient information" to conduct a hearing on whether the Kern River's Fully Appropriated Stream designation should be lifted.[13] The Water Board held an evidentiary hearing on October 26 and 27, 2009, on the issue of whether Kern River water was in fact available for appropriation and the Water Board ultimately lifted the Kern River Fully Appropriated Stream Declaration. In so deciding, the Water Board cited, among other things, the following evidence presented by the "North Kern Petitioners," a group comprised of the Kern Water Bank Authority, Buena Vista Water Storage District, North Kern Water Storage District, Kern County Water Agency and the City of Shafter.

Likewise, the North Kern Petitioners presented a graph; exhibit JE 67, showing Kern River water "undistributed to existing entitlements" in several years. Daniel Easton, witness for the North Kern Petitioners, explained in his written and oral testimony that there was what he calls "undistributed release" water in at least eight months since 1964. Mr. Easton testified <u>that water diverted into the Intertie is in excess of traditionally held and exercised rights and claims of right to Kern River water, and that whenever water has been released into the Intertie in the past, all Kern River water right claims had already been satisfied</u>. This water is, by definition, unappropriated water. (Emphasis added.)[14]

9 (con't)

This finding was based on evidence of "water diversions via the Kern River/California Aqueduct Intertie" which showed "Kern River water being diverted into the Intertie in nine separate years since 1978." (*Id.*) The State Water Board concluded, based on evidence presented during an evidentiary hearing, that Kern River water that reached and flowed past Second Point to the Intertie is available for appropriation.

Following the adjudicatory hearing that culminated in Water Board Order WR 2010-0010, certain parties filed petitions for reconsideration. In the Water Board's order on reconsideration, the Board re-analyzed the evidence supporting its finding that water is available for appropriation on the Kern River.[15] The Board affirmed that Kern River water is available for appropriation. (*Id.* ["the agreement [between DWR, the Kern County Water Agency and other water districts asserting water rights on the Kern River] limits Intertie diversions to flood flows *in excess of the needs of the districts claiming water rights on the Kern River*. Evidence presented at the hearing…directly supports this conclusion."].)

Orders WR 2010-0010 and WR 2010-0016 were challenged in the Kern County Superior Court. The trial court ruled that there was substantial evidence in the record to support the

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[12] *Id.*

[13] *Id.*

[14] Attachment B [Order WR-2010-0010: Order Amending Declaration of Fully Appropriated Streams to Remove Designation of the Kern River as Fully Appropriated].

[15] Attachment C [Order WR-2010-0016: Order Denying Reconsideration].

Water Board's finding that there may be unappropriated water in the Kern River.[16] The trial court's ruling was subsequently challenged in the Fifth District Court of Appeal. Orders WR 2010-0010 and 2010-0016 were affirmed on appeal, with that court noting:

> The evidence was clear, and essentially uncontroverted, that during occasional flood years water that is unappropriated—not physically claimed by any entity with a right to the water—has been diverted into the California Aqueduct….[17]

9 (con't) The Water Board's Orders 2010-0010 and 2010-0016, the Kern County Superior Court ruling, and the Fifth District Court of Appeal opinion all confirm that unappropriated water exists on the Kern River, as evidenced by water being diverted into the Intertie and in excess of the needs of the districts claiming water rights on the Kern River, including Buena Vista. Buena Vista does not have a water right to all Kern River water that reaches Second Point of Measurement, and Buena Vista is not entitled to rely upon such claimed flows for the project as discussed in the DEIR. This concern is more fully expressed in the KWBA's water rights Complaint against Buena Vista filed on August 8, 2019, with the Water Board, enclosed as Attachment F. That Buena Vista lacks a right to unappropriated water Kern River water is not disclosed, discussed, or evaluated in the DEIR. This constitutes a violation of CEQA.

D. Failure to Disclose that Buena Vista is Seeking—But has not obtained—a Water Right to Surplus Water the Project Relies Upon.

The DEIR fails to disclose that Buena Vista is seeking—but has not yet obtained—a water right to the Surplus Water it relies on for the Project. In 2007, following the State Water Board's determination that water is available for appropriation on the Kern River, Buena Vista filed Application No. A031675 with the State Water Resources Control Board to appropriate surplus Kern River water. This application seeks a permit to appropriate 180,000 acre-feet annually of Kern River Water by direct diversion and 520,000 acre-feet annually of water for
10 collection to storage, for a total maximum combined diversion amount of 700,000 acre-feet in any year.[18]

To date, Buena Vista has not secured this right or any other right to surplus Kern River water, which is subject to the law and procedures of the State Water Resources Control Board governing the appropriation of water in California. The DEIR fails to disclose, discuss or evaluate Application A031675 or the environmental effects of the increased Kern River diversions contemplated by that application. This constitutes a violation of CEQA.

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[16] Attachment D [*North Kern Water Storage District v. State Water Resources Control Board*, Case No. S-1500-CV 270613 NFT, Judgment Denying Petition for Writ of Administrative Mandate (July 21, 2011)].

[17] Attachment E [*North Kern Water Storage District v. State Water Resources Control Board*, F063989, Opinion (April 18, 2013)].

[18] Attachments G-1, G-2 [Application No. A0301675 of the Buena Vista Water Storage District to the State Water Resources Control Board.

3. THE HYDROLOGY/WATER QUALITY ANALYSIS IS MISLEADING AND INADEQUATE.

The Palms Groundwater Recovery Project as described in the DEIR fails to disclose critical data regarding both groundwater levels and quality, is poorly conceived, and may in fact be infeasible.[19] The primary objective of the project is to "Recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the California Aqueduct (Aqueduct)." (DEIR p. ES-I and 2-5.) Recharge for the Palms Project only occurs in recharge ponds within the District (and the Buena Vista Groundwater Sustainability Agency (BVGSA)). However, in order to meet the stated objective, the District intends to recover better quality water from lands outside the District and within the Kern Groundwater Authority GSA (KGAGSA) to blend with the poorer quality water recovered within the District. Importantly, there is no intent to recharge water on the lands outside the District or replace the good quality groundwater extracted by the Project from KGAGSAS's portion of the
11 groundwater subbasin. The Project, by its very design, will result in both significant environmental impacts to water resources and lead to undesirable results as defined by the Sustainable Groundwater Management Act, Water Code section 10720 *et seq.* ("SGMA").

A. Utilization of Limited and/or Incorrect Data and Nondisclosure of Existing Critical Data

Much of the analysis for the Project is conducted with limited and/or incorrect data and without disclosure of substantial existing data.[20] These data sets include water level and flow direction information, groundwater quality information within the District, and water quality information within the California Aqueduct. Concealment of relevant data from the public and decision makers is contrary to CEQA's full disclosure requirements and precludes informed decision making.

(i) Groundwater Level and Flow Directions

With respect to groundwater levels and flow directions, the DEIR describes flow directions as generally in a southeasterly direction using data from a single map from January 2015. Abundant groundwater data for the area is available but is not disclosed in the DEIR. For example, a discussion of groundwater flow directions provided in the Negative Declaration for the Palms Project Recharge Phase, but not disclosed or referenced in the DEIR, stated:

12 > "Local groundwater flow direction near the Palms Project appears to be in a westerly direction and may indicate that the canal east of the project is currently providing recharge to the area. Three nearby wells with good records of groundwater level measurements were analyzed to determine the local flow direction (W-1, W-2, and DMW-12B). The three wells had 44

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[19] Attachment H, Dr. E. John List, Technical Memorandum, p. 1.

[20] *Id.,* p. 1 ["there is a paucity of data describing in detail the water quality issues that will be associated with the project."]

12 (con't)

> measurements that were taken simultaneously between 1994 and 2013, and the direction and gradient of the groundwater surface was calculated. Figure 12 shows the range of flow directions and the average flow direction to the west-southwest. The average gradient was 0.017 ft vertically/ft horizontally."[21]

Importantly, Figures 11 and 12 in IS/MND Assessment of Potential Groundwater Impacts clearly shows groundwater flow away from the proposed out-of-District recovery wells.

(ii) Groundwater Quality Information

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The description of groundwater quality in the Project Area is misleading and does not disclose available information. (DEIR p.3-59 to 3-60). The discussion divided the area into a west and east area with the East Side Canal (the District boundary) serving as a dividing line. Table 3-6 is a list of wells in each area and is captioned "Wells used in Water Quality Analysis." Ten wells are listed for the area west of the East Side Canal. However, the text then states that, due to limited data, only one well is used as a "representative well." The text then goes on to state: "For *wells* located west of the East Side Canal, sulfate and TDS slightly exceeded the drinking water standards." (Emphasis added.) The DEIR also states "…the west side does not have arsenic…"

Table 3-7 (DEIR p. 3-60) lists water quality for the "representative well" located west of the Eastside Canal and the wells located east of the Eastside Canal. The water quality shown for most constituents is comparable in the two areas, and in fact for some, the water quality shown is better in the western area (e.g. for arsenic).[22] However, contrary to the information for the "representative well", GEI in 2017[23] conducted an evaluation of groundwater in the District "to provide California Environmental Quality Act (CEQA) compliance support services for the Palms Groundwater Bank – Recovery Phase (Project)." This evaluation (not included in the DEIR) documents groundwater quality in several wells west of the Eastside Canal, and these wells have concentrations of TDS, arsenic, and other constituents that are far greater than the limited data presented in the DEIR (e.g. TDS concentrations in well DMW12A and B reached 9,200 and 4,760 ppm, respectively). Yet the information from this study was not disclosed or referenced in the DEIR. Rather, the much more limited data from the "representative well" was provided.[24]

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[21] Attachment K [Initial Study/Mitigated Negative Declaration, Assessment of Potential Groundwater].

[22] At face value, this data brings into question one of the primary objectives of the Project: "Recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the California Aqueduct (Aqueduct)." If the water quality in both areas is comparable, it would seem there is no need to recover water east of the Eastside Canal (and outside the BVGSA) and induce or create the environmental impacts identified in these comments. This would also indicate that the Palms Area-Only Layout would be the far superior Alternative (DEIR p. 5-4).

[23] Attachment J [GEI, Water Quality Review of Groundwater Wells for the "Palms" Recovery Project, Feb. 17, 2017.]

[24] Attachment H [Dr. E. John List, Technical Memorandum, p. 1 (January 14, 2021)].

(iii) California Aqueduct Water Quality

Table 3-5 (DEIR p. 3-52) lists purported average and maximum concentrations of Total Dissolved Solids ("TDS") and other constituents in the Aqueduct upstream and downstream of the Project. For example, the concentration of TDS is listed as 416 ppm and 436 ppm upstream and 263 ppm and 434 ppm downstream, respectively, for average and maximum values. The
14 upstream average is clearly erroneous. The background value used for current recovery programs is 239 ppm. The DEIR references the DWR Pump-in Policy which also lists upstream TDS values. None of these values approach 416 ppm. The clearly incorrect values for TDS and other constituents in the DEIR results in an incorrect blending evaluation later in the document (DEIR p. 3-85) and a DEIR that does not comply with CEQA standards as an informational document.

In summation, the DEIR must be revised to disclose all available water level and quality data and provide a thorough evaluation of that data, so that the public and decisions makers can understand the potential impacts of the Project.

B. Impact Analysis

The impact analysis was conducted with the limited and/or incorrect data discussed above. As a result, the analysis cannot reliably predict the environmental impacts of the Project.

(i) Groundwater Levels

A superposition groundwater model was used to evaluate groundwater level changes expected from the Project. The model is intended to simulate the impacts of the project. However, there are several weaknesses in the application of this type of model for this Project.

- Use of a superposition model should be limited to a linear aquifer system with relatively uniform thickness and linear boundary conditions (such as aquifer pumping tests). Use of a superposition model with non-linear boundary conditions such as transient recharge and recovery operations at many locations surrounding the Project may yield unreliable results.

- The Palms Project MODFLOW model was derived from the USGS Central Valley
15 Hydrologic Model (CVHM) and is re-districitized to a refined model grid with fewer model layers and averaged hydraulic properties. It is a completely new MODFLOW model that should be calibrated to existing site conditions and hydraulic stresses prior to use for predictive simulations. This did not occur.

- During model "validation" it became apparent that the Palms Project superposition model could not simulate historical long-term changes in head associated with recharge and recovery pumping without adding the significant operations of nearby water banking projects. This demonstrates that the boundary conditions are non-linear, and simulation results are dependent on activities located away from the Palms Project site.

15 (con't)
- The Palms Project Recovery Scenarios A & B were then simulated using the superposition model without including the other water banking projects in the area. As such these results may overestimate recharge mounding and underestimate recovery drawdown.

A detailed review of the model is provided in Attachment L.

In addition to the listed weaknesses, the groundwater modeling report incorporates the inaccurate southeasterly flow directions described above, instead of relying on the more robust data provided in the Negative Declaration for the Palms Project Recharge Phase, which indicates a westerly flow direction. The operational scenario used to evaluate groundwater level changes is also unrealistic. It assumes the recharge of 100,000 AF of water in 8 months in the Palms recharge ponds. The recharge rate to accommodate the modeled scenario, 0.36 feet/day,
16 is too high for this area. The lower recharge rates that would be expected for the area are indicated by the much more limited volumes of water historically recharged in the ponds: 14,164 AF in 2017 and 13,002 AF in 2019. With respect to the modeling results, an exaggerated recharge volume overestimates the extent of the predicted groundwater mound, which then underestimates the extent of the ensuing drawdown during Project pumping. Incorporating this overstated recharge mound, the DEIR states that the maximum drawdown adjacent to the Project is no more than 10 feet after four years of pumping the 100,000 AF recharge volume. However, the actual absolute drawdown reaches at least 35 feet. The DEIR also lacks a survey
17 of wells in the area. A thorough evaluation of the likelihood of impacts to adjacent well owners cannot be conducted without this information. The DEIR should correct the deficiencies in the model discussed above, complete a survey of wells in the area, and then conduct more realistic banking scenarios.

(ii) Water Quality

The groundwater analysis does not consider the environmental impacts of recovering better quality groundwater outside the District and BVGSA, without replenishment, to blend with the poorer quality groundwater that will be recovered within the District where recharge occurs. As stated earlier, the District intends to recover water from lands within the KGAGSA in an area where no water has been or will be recharged or replaced by the District. Contrary to the limited
18 data provided in the DEIR, the groundwater quality in the area outside the District is much better quality that that within the District where the recharge for the project occurs (GEI, 2017 [Attachment J]). The Project, by pumping groundwater outside the District without replenishment or replacement, will essentially be mining good quality groundwater in an effort to make the project feasible. This aspect of the project will clearly create significant and unmitigated environmental impacts and contribute to undesirable results in conflict with SGMA.

(a) SGMA Considerations

SGMA regulations identify six sustainability indicators that Groundwater Sustainability Plans ("GSP") must consider. They are groundwater-level declines, groundwater storage reductions, water quality degradation, land subsidence, interconnected surface-water depletions, and seawater intrusion. The undesirable results pertinent to this Project are one or more of the following effects related to these indicators:

1. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon. Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods;

2. Significant and unreasonable reduction of groundwater storage;

3. Significant and unreasonable degraded water quality, including the migration of
19 contaminant plumes that impair water supplies.

Because the Project will not replenish groundwater by recharging water on the lands outside the District where Project recovery will occur, it will result in a significant and unmitigated reduction in groundwater storage within the KGAGSA and West Kern Water District GSA ("WKGSA"). This reduction in storage is reflected in the hydrographs developed for the cumulative impact analysis for the Project. Water levels is wells RMW-89-WKWD, RMW-58-RRWSD, and RMW-059-RRWSD are all projected to drop below established Minimum Thresholds (DEIR Figures 4-2 and 4-3, p. 4-9 and 4-10) It should be noted that the recovery portion of the project within the KGAGSA is immediately adjacent to the Kern Water Bank and West Kern Water District recharge basins (DEIR, Figures 2-1 and 3-9, p. 2-2 and 3-71). Absent these facilities, the water level impacts from the Project would be even greater. The Project will also deplete good quality groundwater without replenishment. Even if this will not degrade groundwater quality within the KGSGSA and WKGSA, the Project will reduce the volume of good quality water available for beneficial uses within the KGAGSA and WKGSA.

The Project proponents may claim that the water they are recharging within the District will migrate into the recovery area outside the District thereby sustaining groundwater storage. However, if this were to occur, clearly the Project would be inducing the migration of poor-quality groundwater within the District into an area of better-quality groundwater outside the District, another significant and unmitigated environmental impact and an undesirable result under SGMA regulations.

(b) Surface Water Impacts

20 The potential for impacts resulting from the discharge of Project water into the California Aqueduct are described under Impact HYDRO-2, which states: “The Recovery Project could have impacts to the water quality of the Aqueduct, if drinking water standards are not met.” This statement is misleading and incorrect. The standard for discharges to the Aqueduct include degradation standards. That is, discharges to the Aqueduct must not degrade the existing quality of water in the Aqueduct if unmitigated. For most, if not all constituents, these values are lower than drinking water standards. (For example, the background concentration of arsenic in the Aqueduct is typically 2 ppb, whereas the drinking water standard is 10 ppb). Under no circumstances are discharges to exceed drinking water standards.

21 With respect to the analysis of potential impacts to surface water in the Aqueduct, the results of blending calculations were used to determine the expected quality of delivered water. The calculations used the quality data from the “representative well” (Table 3.9. p 3-85) for water recovered west of the Eastside Canal. As stated earlier, several wells in the area west of the Eastside Canal exhibit much poorer water quality than the “representative well.” As a result, the calculations significantly underestimate the resultant water quality. The blended Project water was then compared to upstream values in the Aqueduct. Because Project water exceeded the upstream values in the Aqueduct (incorrectly) reported in the DEIR, the following five (5) mitigation measures were proposed.

MM HYDRO-1 states: “Isolation aquifer zone testing or installation of nested monitoring wells will be conducted to identify aquifers with poor quality water prior to new well construction until the aquifers and water quality is better understood and then may be discontinued.”

MM HYDRO-2 states: “If needed, patches will be installed into a constructed well to improve water quality from the well. The depth of the pump may also be modified to improve water quality.”

MM HYDRO 3 through 5 consist of groundwater quality monitoring, updating blending calculations, and following monitoring and reporting requirements in DWR’s pump-in policy. Note that MM HYDRO-2 is the only mitigation measure that has the potential to improve the quality of recovered Project water, but lacks performance standards. In addition, Project operations will alter groundwater conditions through time. As such, Project monitoring must not be discontinued. Notably, ongoing groundwater monitoring is a key facet of all the banking programs in Kern County.

22 There are several problems related to the analysis completed for this environmental impact. First, the blending calculations used the quality data from a single “representative well,” which does not reflect the significantly worse quality conditions in the area. Second, the analysis assumes drinking water standards rather than more restrictive degradation standards apply. Third, Project water is compared to incorrect values for upstream Aqueduct quality. The result of these compounding errors is intended to suggest that the project is feasible with the mitigation measures listed above. However, an analysis using the water quality from most of the wells west

22 (con't) of the Eastside Canal indicates the TDS of the resultant blend would be nearly 1,000 ppm and the sulfate concentration would be over 300 ppm. Both of these high contaminant values exceed the respective drinking water standards for these constituents and would preclude the delivery of Project water to the Aqueduct. These compounding errors must be corrected and the analysis for this impact re-evaluated, taking into consideration relevant and representative quantitative data, to determine if the Project is even feasible, in addition to being necessary to adequately evaluate the Project's environmental effects, and to identify specific and enforceable mitigation measures that comply with CEQA standards.

23 Finally, the data revealed in the GEI memo indicates very high concentrations of TDS underlying a portion of the Palms recharge basins. Recharging very good quality water from the Kern River and SWP may actually be a waste and unreasonable use under California water law in violation of Article X, Section 2 of the California Constitution, and SGMA. It should also be noted that groundwater pumping in the Palms Recharge Basin area could also induce the migration of extremely poor-quality western water to the east, another significant environmental impact not evaluated in the DEIR.

A detailed review of the DEIR regarding water quality impacts is provided in Attachment H, prepared by Dr. E. John List, Ph.D., P.E.

C. Memorandum of Understanding and Operating Plans

24 The District executed a *Memorandum of Understanding Regarding Operation and Monitoring of the Buena Vista Water Storage District Groundwater Banking Program* on January 1, 2003 (MOU). The MOU applies to planned banking facilities within the District, but specifically excludes wells located outside the District boundary.[25] The MOU also clearly states that: "Recovery of banked water shall be from the Project Site and recovery facilities shall be located therein. Recovery from outside the Project Site may be allowed with the consent of the District or entity having jurisdiction over the area from which the recovery will occur and upon review by the Monitoring Committee."[26] The Palms Project recovery wells located outside the District have not been reviewed or approved by the KGAGSA.

The MOU also prescribes minimum operating criteria, mitigation measures, and project monitoring requirements. Measures to prevent significant adverse impacts from occurring may include: (1) spreading out recovery areas; (2) providing buffer areas between recovery wells and neighboring overlying users; (3) limiting the monthly, seasonal, and/or annual recovery rate; (4) providing sufficient recovery wells to allow rotation of recovery wells or the use of alternate wells; (5) providing adequate well spacing; (6) adjusting pumping rates or terminate pumping to reduce impacts; and (7) imposing time restrictions between storage and extraction to allow for downward percolation of water to the aquifer. The MOU also stipulates water quality is to be at least maintained and, where possible, enhanced. Some of the measures prescribed in the MOU to protect water quality include: 1) giving storage priority to the best quality water available,

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[25] Attachment M, ¶ 1.

[26] *Id.* ¶ 2(b)(11).

2) removing more salts than are stored, 3) controlling the migration of poor quality water, and
24 4) extracting poorer quality groundwater where practicable (and where blending with excellent quality water from elsewhere in the project results in the water quality objectives of downstream
(con't) users being met). None of these requirements have been described in the DEIR or evaluated for their effectiveness in eliminating significant impacts or consistency with the Project.

The Kern Water Bank, Pioneer and Rosedale water banking projects on the Kern Fan in the Project vicinity have also developed an Operating Plan that provides mitigation measures for impacts to landowner wells. The Plan designates measures to prevent, eliminate or mitigate significant adverse impacts resulting from water banking project recovery operations. The Plan includes, in part, the following components:

1. Formation of a Joint Operating Committee (JOC): The JOC consists of representatives of each of the banking projects and meets as needed during recovery years to evaluate groundwater conditions, model results, landowner claims, and any other topics of concern. The JOC evaluates all claims and approves or rejects such claims.

2. Evaluation of Groundwater Conditions: Groundwater models are used to evaluate With Project versus Without Project groundwater levels and predict potential groundwater impacts to nearby wells. The models are updated regularly and compared to actual conditions during years in which recovery occurs. The models are used to: 1) forecast with-project and without-project groundwater levels at the outset of recovery programs; 2) forecast any localized areas for special attention and/or monitoring; 3) attempt to identify
25 domestic wells at risk of impacts; and 4) determine if mitigation triggers (thresholds) have been met.

3. Mitigation measures: The mitigation measures, if warranted, will include one or more of the following:

    a. Providing a short-term emergency water supply to domestic well owners. Short-term emergency supplies shall be provided as soon as reasonably possible, but in all cases within 14 days of notification to the JOC of such needs;

    b. Providing funds to lower a well pump;

    c. Providing funds to complete a connection to an M&I water provider;

    d. Supplying an equivalent water supply from an alternate source;

    e. Providing funds to replace the affected well with a deeper well that meets Kern County well ordinance standards;

f. Reducing or adjusting recovery pumping as necessary to avoid the impact; or

25 (con't) g. With the consent of the affected landowner, providing other acceptable mitigation.

None of these requirements have been described in the DEIR or evaluated for impact mitigation or consistency with the Project.

4. INADEQUATE DESCRIPTION OF PROJECT BASELINES.

A fundamental goal of an EIR is to inform decision makers and the public of any significant impacts that a project is likely to have on the physical environment, as it exists at the time of the preparation of the DEIR, without the proposed project. In order to do so, an EIR must delineate in sufficient detail the environmental conditions that actually exist at the time of the preparation of the DEIR.

The EIR must define an existing conditions "baseline" against which project impacts can be described and quantified.[27] The physical conditions that exist at the time of the notice of preparation of the DEIR normally constitute the required environmental baseline against which the project's impacts are described and evaluated. In certain narrow conditions (e.g. where the physical conditions at the time of the notice of preparation for the DEIR would provide a
26 misleading analysis), the DEIR may also evaluate the effects of the projects against another, alternative baseline that would provide the public with an adequate evaluation of the project's effects against actual, and not hypothetical, conditions. Where the lead agency chooses an environmental baseline that does not reflect existing physical conditions, the lead agency must explain why the selected baseline is appropriate, and why an existing conditions baseline would not be appropriate or would be misleading.[28]

The DEIR here fails to describe the environmental baseline for each of the resource categories it addresses. In some cases this failure includes omission of any description of the relevant physical conditions at the time of the filing of the Notice of Preparation for the DEIR on June 16, 2020.

(i) The Biological Resources Baseline is Inadequate.

The biological resources section describes the environmental setting in terms of vegetation cover types, and listed observations of special status species and plant communities in the Project vicinity, as shown on state regulatory agency databases, and then summarily
27 indicates that "existing conditions" are the baseline. However, in doing so, the biological resources section fails to include any surveys that are at a sufficient level of detail to determine the actual presence or absence of threatened, endangered and other special status species in the Project vicinity. Rather, the DEIR relies on limited biological resource surveys, performed at

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[27] CEQA Guidelines, § 15125.

[28] *Id.;* see also *Neighbors for Smart Rail v. Exposition Metro Line Construction Auth.* (2013) 57 Cal.4th 439, 447-448.

27 (con't) a time of the year which is not relevant to all of the potential species of concern, and fails to describe the survey methods at all.

Accordingly, the "existing conditions" are not adequately described in the DEIR. In the absence of adequate and complete biological surveys, the DEIR is unable to describe adequately actual conditions, or evaluate effects on biological resources. Rather they represent the theoretical conditions, assuming the data in state regulatory agency databases is sufficiently specific to derive conclusions regarding the exact Project location.

A review of biological resources portions of the DEIR by Biologist James W., Jones, Jr., dated January 11, 2021, is attached (Attachment O).

(ii) The Hydrology Baseline is Inadequate.

28 The DEIR does not appear to use conditions at the time of the Notice of Preparation for the DEIR on June 16, 2020. The DEIR addresses only the Buena Vista Groundwater Sustainability Agency's GSP, but acknowledges that there are no less than four others that affect the groundwater levels in the Kern Subbasin. As the Project is proposed in the Kern Subbasin, it is clear that any actions impacting the portion of the basin covered by the BVGSA's GSP, will also influence the groundwater levels in areas under the authority of other Groundwater Sustainability Agencies and Groundwater Sustainability Plans. Yet, the DEIR does not describe, let alone analyze, the Project's groundwater impacts in the context of those other agencies and plans.

The Project proposes to recover and distribute water that is "banked" within the groundwater aquifer, thereby having an inherent effect on the groundwater levels within the Kern Subbasin. Because the DEIR describes the baseline as including only the portion of the Kern Subbasin under the authority of the BVGSA, the baseline provides an improper and artificially truncated geographic scope of the groundwater environmental baseline. Moreover, the Project proposes to extract water outside of the BVGSA, and within the jurisdiction of the KGAGSA. The DEIR must therefore discuss not only the BVGSA, but at a minimum must also discuss the KGAGSA, its current status and properly analyze any impacts the Project may have on achievement of SGMA standards within the KGAGSA.

29 The DEIR also fails to describe why it is reasonable for groundwater quality to limit the baseline to conditions between Stockdale Highway on the north, BVWSD southern boundary on the south, Dunford Road on the west, and Morris Road on the east. While the DEIR recognizes that the groundwater aquifer can be effectively delineated into three discrete areas, but neither correlates those delineations with the chosen boundaries for groundwater quality analysis nor identifies whether those boundaries are reasonable on their own.

30 The baseline for the evaluation of impacts on hydrology and water quality should include the identification of all landowner wells within the potential area of hydrologic influence of the Project. As BV is aware, the recovery of banked water has the potential to lower groundwater levels and impact the operation of individual domestic and agricultural wells. In the absence of

30 (con't) an identification of landowner wells, the DEIR is not able to evaluate adequately the potential impacts of the Project on domestic and agricultural water supplies.

In addition to a comparison of project effects against the existing conditions baseline, CEQA requires an evaluation of project impacts against a "no project" baseline. The no project baseline is required to be based on "what would be reasonably expected to occur in the foreseeable future if the project is not approved."[29] In evaluating the potential future impacts of the Project, the DEIR assumed a continuation of current surface water availability over a 50-year planning horizon under a range of climatic conditions." (DEIR, pp. 4- 6.). The assumption of continuation of current surface water availability over the next 50 years is unreasonable and
31 misleading.

The DWR estimates that "[b]y the end of this century, California's Sierra Nevada snowpack is projected to experience a 48-65% loss from the historical April 1 average." (https://water.ca.gov/Programs/All-Programs/Climate-Change-Program/Climate-Change-and-Water [visited 4.29.20].) Reductions in the Sierra Nevada snowpack, and increasingly stringent environmental restrictions on State Water Project exports are projected to reduce materially the reliability of water deliveries from the State Water Project.

As is extensively documented in the 2010 Final EIR and 2016 Revised Final EIR[30] regarding the Monterey Amendments to the State Water Project water supply contracts, future additional water supplies from the SWP and CVP 33 are constrained significantly by environmental regulations. SWP Table A water allocations have been restricted materially over the last decade. State Water Project contractors are requesting an allocation of their full Table A amounts. The 2010 and 2016 Revised Monterey Amendment EIRs projected that Article 21 water supplies will be increasingly limited because of environmental restrictions, climate change impacts, and because SWP contractors are now requesting all of their Table A water.

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There is intense competition for Article 21 water when it is available. There are similarly material limitations on additional Kern River supplies. As Buena Vista is aware, there are multiple pending applications pending before the State Water Resources Control Board for the appropriation of unappropriated Kern River water. The CEQA documents for some of these applications describe the impacts of the use of Kern River water on the environment. The DEIR ignores this information in its unreasonable assumption that surface water supplies relied upon by the Project will remain unchanged for the next 50 years. The DEIR is required to describe a realistic no project baseline that takes into consideration project impacts on climate change and other limitations on surface water supplies projected to occur over the life of the Project.

5. THE RANGE OF ALTERNATIVES IS INADEQUATE.

33 An EIR must "describe a range of reasonable alternatives to the project . . . which would feasibly attain most of the basic objectives of the project but would avoid or substantially lessen

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29 CEQA Guidelines, § 15126.6, subd. (e)(2).

30 The 2010 Monterey Plus EIR and the 2016 Revised Monterey Plus EIR are provided under separate cover.

33 (con't) any of the significant effects of the project . . . ."[31] The DEIR includes a no project alternative, which appears to include water banking without a method for recovery in perpetuity, the preferred alternative, and a single variation on the pumping amounts contemplated by the preferred alternative (the so-called Reduced Recovery Alternative). No other alternatives were carried forward for detailed study in the DEIR. The DEIR asserts that this is because other alternatives that were considered but rejected would either have greater significant impacts on the environment or because they were found to be infeasible.[32]

34 Specifically, the DEIR considered, and rejected three other alternatives, without evaluating the alternatives in detail.[33] These alternatives considered a recovery alternative that would allow private landowners to take control of the recovery pumping, but was rejected primarily because it wouldn't include constructing new District-controlled water distribution infrastructure. The DEIR does not indicate any reason that infrastructure for pumping recovered water could not have been incorporated into this alternative, and offers no reason other than the absence of that infrastructure for its rejection.

The DEIR does not justify adequately its decision to summarily dismiss the Landowner Recovery Alternative or the Palms Area-Only Alternative, and the DEIR therefore fails to evaluate a reasonable range of alternatives. For the Palms Area-Only Layout, the DEIR only evaluated a layout of 34 recovery wells, without considering reduced recovery variations for this alternative or fewer recovery wells. The DEIR concludes without adequate analysis on the grounds that the groundwater quality would not be sufficient for blending and then transportation through the Aqueduct.

Even if the alternatives do not accomplish all of a project's goals and objectives, CEQA requires that alternatives be evaluated and compared against the proposed Project.[34] One of an EIR's major functions "is to ensure that *all reasonable alternatives* to proposed projects are thoroughly assessed by the responsible official."[35] Similar to the discussion of alternatives that the California Supreme Court found inadequate in *Laurel Heights Improvement Association*, the DEIR's discussion of these alternatives is cursory and does not reflect an adequate discussion of alternatives as CEQA requires.

35 As documented above, proposal to recharge water on the west side in an area of poor quality, and to recovery water on the east side in an area of good water quality, has significant and adverse water quality and hydrological impacts. Buena Vista's only justification for mixing water of differing quality is so the Project water meets Aqueduct water quality standards so that the water can be transferred to undefined "partners" in southern California. There is an obvious

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31 CEQA Guidelines, § 15126.6, subd. (a).

32 DEIR, pp. 5-3 through 5-6.

33 *Id.*

34 CEQA Guidelines, § 15126, subd. (d)(3); *Laurel Heights Improvement Assn. v. Regents of University of California* (1988) 47 Cal.3d 376, 400

35 *Laurel Heights Improvement Assn. v. Regents of University of California, supra*, 47 Cal.3d at p. 400, citing *Wildlife Alive v. Chickering* (1976) 18 Cal.3d 190, 197, emphasis added.

alternative to avoid and minimize these water quality and hydrology impacts – an alternative that
does not require moving recovered water to the Aqueduct for sale to southern California.

35 The first stated objective of the Project is to "increase conjunctive management on the
(con't) west side of the county by improving the District's ability to meet demands during periods when
water supply is limited. (DEIR, p. 2-5.) The second stated objective is to "improve the
conveyance of water throughout the District. *Id.* Because this objective may be achieved
without sending water to southern California, the DEIR is required to evaluate an alternative that
restricts use of Project water to landowners within the District – avoiding the need to mix water to
meet Aqueduct water quality standards.

The DEIR also does not evaluate an alternative that includes recharge on the off-District
36 lands. Such an alternative may reduce the many environmental impacts the project currently
causes.

The DEIR does not evaluate any alternative to the operation of the recharge ponds. The
37 Kern Water Bank is located immediately to the east of the Project. The Kern Water Bank
provides a real-life, successful, example of a feasible alternative to the Project that would
minimize and mitigate the potential effects of the Project – on groundwater, water quality and
biological resources. The DEIR should be revised to include a water banking operation including
the enforceable commitments to the protection of the biological resources included in the Kern
Water Bank HCP/NCCP. The commitments should include a detailed description of (i) the
38 biological resource objectives of the Project, (ii) enforceable standards for minimizing and
mitigating the impacts of Project operations on listed and special status species, and (iii)
conveyance of conservation easements to the California Department of Fish and Wildlife that
provide long-term conservation protection for listed species.

The Project's highly-engineered recharge ponds are devoid of vegetation, and they will
be aggressively managed to eliminate vegetation. The highly-engineered recharge ponds will
have none of the environmental values provided by the mosaic of seasonal wetland and upland
39 habitat conserved by the Kern Water Bank HCP/NCCP.[36] Instead, the highly-engineered
recharged ponds shown in the DEIR create the risk of creating a biological sink by attracting
migratory birds and other species, but without food, cover, buffers and other elements necessary
to conserve these populations. The DEIR is devoid of any analysis of this risk.

6. THE DEIR'S EVALUATION OF THE PROJECT'S EFFECTS DOES NOT COMPLY WITH CEQA'S INFORMATIONAL STANDARDS.

The DEIR addresses only four resource areas with direct impacts – biological resources,
40 cultural resources, hydrology and water quality, and geological resources. This truncated direct
impacts discussion and analysis fails to comply with CEQA's directives. CEQA requires a
discussion of all of a proposed action's impacts on the environment -- both direct, indirect, and

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[36] A detailed descriptions of the environmental values and requirements of the Kern Water Bank HCP/NCCP is included in the 2016 Revised Monterey Amendment included in the Authority's files.

40 (con't) cumulative.[37] Here, the DEIR summarily states that all of the effects in each resource area that is not discussed in the DEIR were found to not be significant (e.g., air quality, GHG, etc.).[38]

With respect to air quality and greenhouse gases (GHG) specifically, the DEIR's reasoning is that the construction impacts would be minimal and temporary, but does not include any real analysis of the Project's potential impacts during operation. For example, the DEIR does not specify the type of recovery pump that would be used nor does it specify that the recovery pumps would be monitored for their efficiency and level of GHG emissions.

41 With respect to energy, the DEIR fails to substantially consider the Project's potential impacts. The DEIR states only that the "Recovery Project would be limited to the recovery of previously banked water at generally higher groundwater levels which would result in lower energy usage."[39] However, what the Project proposes is a use that would not exist in the absence of the Project, and energy use required to operate the recovery wells that would not exist absent the Project. This impact should be discussed in sufficient detail for the public and decision makers to understand why the Project's energy use would be "less than significant."

42 With respect to air quality, the DEIR acknowledges that part of the basis for the Project is the change from row crops to permanent crops. The District has a gross irrigable acreage of about 50,000 acres. The DEIR states about half the District lands are planted with permanent crops, as growers migrate away from row crops. The DEIR estimates that the conversion to permanent crops may increase the water demand by 1 acre-foot per acre. The DEIR does not, however, analyze potential air quality impacts associated with the projected indirect effect of conversions from row crops to tree crops. The DEIR also does not analyze the potential water supply impacts of increasing demand associated with changes in crop patterns that could be attributable to the Project.

The failure of the DEIR to provide an adequate analysis of the Project's impacts on hydrology and water quality is discussed above in Section 2. The DEIR's evaluation of other effects also does not comply with CEQA informational standards.

(i) Agricultural Impacts.

43 While the DEIR discloses that the primary beneficiaries of any additional or more reliable water capacity that is generated by the Project would be the agricultural operations in the area, there is no separate discussion of the Project's potential impacts on agriculture. In fact, there is no discussion of agricultural impacts at all.[40] Moreover, the DEIR's section on cumulative impacts and growth inducing impacts does not at all acknowledge that the presence of a more

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[37] CEQA Guidelines, § 15126.2; see also *Napa Citizens for Honest Government v. Napa County Bd. of Supervisors* (2001) 91 Cal.App.4th 342, 367-370.

[38] DEIR, p. 3-1 through 3-5.

[39] DEIR, p. 3-3.

[40] *Stanislaus National Heritage v. County of Stanislaus* (1996) 48 Cal.App.4th 182 [an EIR is required to evaluate impacts on sources of water].

43 (con't) reliable or greater water supply might cause alterations to the patterns of agricultural uses in the area.

The Notice of Preparation for the DEIR indicates that "[t]he EIR will also explain why other effects were determined to not be potentially significant and were not discussed in detail in the EIR. For example, the Recovery Project site is in an agricultural area, would not damage scenic resources, or produce light and glare, therefore no significant aesthetic impacts are anticipated . . . . Impacts to air quality, agriculture and forestry resources, geology, hazards and hazardous materials, population and housing, mineral resources, and wildfire are also expected to be less than significant, or less than significant with mitigation incorporated …" However, the DEIR does not contain any of this discussion or explanation. Rather, the DEIR simply summarily
44 states that these impacts are expected to be less than significant. The only discussion of the basis for these conclusions is set forth in the Initial Study that was circulated along with the District's Notice of Preparation. This, too, provides only cursory explanation as to why the increase in reliability and stability of the agricultural water supply would not alter agricultural use patterns in the vicinity of the Project.

The DEIR should include evaluation of changes in agricultural production, which the DEIR acknowledges are ongoing, and the effects of that agricultural production. The 2016 Monterey Amendment EIR provides an example of a feasible approach to the analysis of potential indirect effects from change in agricultural patterns related to the Project.

(ii) Biological Resources.

The DEIR acknowledges that Project construction, in particular, could have a potentially significant impact to a number of different, sensitive species, some of which are listed under the California Endangered Species Act, federal Endangered Species Act, or are identified as fully protected species under California law. Specifically, the DEIR indicates that two state fully protected species have a moderate likelihood of occurring in the Project area – the blunt-nosed
45 leopard lizard, and the white-tailed kite.

The DEIR includes no material evaluation of the Project's impacts on the blunt-nosed leopard lizard or the white-tailed kite. Nor does the DEIR include analysis of the feasibility of avoiding take of the lizard or kite. Instead, the DEIR defers the evaluation of impacts to the blunt-nosed leopard lizard to pre-construction surveys. Deferral of the analysis of effects violates CEQA.[41]

The DEIR concludes that there will be no waters of the U.S. impacted, but does not
46 document the basis for this conclusion. The DEIR does not include a delineation of potential waters of the U.S. prepared in accordance in federal standards and procedures.[42]

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41 *Vineyard Area Citizens for Responsible Growth, Inc. v. City of Rancho Cordova* (2017) 40 Cal.4th 412, 441 [invalidating EIR for long-range development plan that deferred water supply analysis].

42 If one exists, it has not been disclosed to the public.

Blunt-Nosed Leopard Lizard. The DEIR notes that special status wildlife could be substantially adversely affected by construction activities, and that this is considered a potentially significant impact, but concludes that the limited extent of Project construction activities would sufficiently guard against impacts and therefore no mitigation is required. Notably, this does not account for potential construction impacts to blunt-nosed leopard lizard habitat that occurs in the northwestern portion of the Project area.

The mitigation measure specific to blunt-nosed leopard lizard indicates that temporary exclusion fencing would be placed at the direction of a qualified biologist, but does not indicate that a pre-construction survey would be conducted to verify that no blunt-nosed leopard lizard are within the project area that would not be fenced off by the exclusion fencing. This raises the likelihood that blunt-nosed leopard lizards may be within the construction area. Because the blunt-nosed leopard lizard is a fully protected species, any impact to the species is a significant impact, as there is no authorization for incidental take of fully protected species.

47

The July 2020 comment letter of the California Department of Fish and Wildlife ("CDFW") on the Project makes this point. Indicating that the Project should include appropriate protocol surveys for the blunt-nosed leopard lizard in the DEIR and prior to any ground-disturbing or vegetation-disturbing activities. The DEIR does not contain any of these measures. The DEIR asserts that the pre-construction installation of exclusionary fencing will be sufficient. However, as noted by CDFW, the protocol surveys are designed to optimize the detectability of blunt-nosed leopard lizard in a way that simple installation of exclusionary fencing does not. The DEIR should be revised to include the results of protocol-level surveys of this species. Protocol-level surveys conducted as part of the DEIR will also allow for the consideration of alternative Project configurations that avoid incidental take of this fully-protected spaces – before the EIR is certified and the Project is approved.

White-Tailed Kite. The white-tailed kite is a fully-protected species under California law, and no take of the species outside of very limited exceptions that do not apply to the Project can be authorized.[43] The DEIR notes the potential for white-tailed kite to occur within the construction area, and specifically within the laydown yard, but indicates that a more generalized
48 pre-construction survey for special status bird and raptor species will be sufficient to mitigate and avoid any impacts to the white-tailed kite.

As there is no method for permitting incidental take of this species under California law, the DEIR should provide a more detailed description as to why this non-specific mitigation measure is sufficient to avoid take of the kite.

San Joaquin Antelope Squirrel. The San Joaquin Antelope Squirrel (also known as the
49 Nelson's antelope squirrel) is listed as a threatened species under the California Endangered Species Act.[44] As CDFW notes, the species is known to occur in the area of the Project, and the Project contains suitable habitat that represents some of the "only remaining undeveloped land in

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43 Fish & Game Code, § 3511.

44 https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=109405&inline.

49 (con't) the vicinity, which is otherwise intensively managed for agriculture." It does not appear that the District performed any assessments to determine whether the squirrel actually occurs within the Project area or to determine if the Project is likely to impact the squirrel.

The DEIR fails to include mitigation measures to avoid or mitigate the potential impacts of the Project on the squirrel. These failures are compounded by the fact that the DEIR does not data from any detailed biological surveys, nor does the DEIR include any data from the "reconnaissance" level surveys. The DEIR fails to properly identify, assess, and disclose the Project's potential impacts on the San Joaquin antelope squirrel.

A review of biological resources portions of the DEIR by Biologist James W., Jones, Jr., dated January 11, 2021, is attached (Attachment O).

B. The DEIR Fails To Properly Analyze Indirect and Cumulative Impacts.

50 The evaluation of cumulative effects in the DEIR violates CEQA informational standards.[45] CEQA requires the evaluation of the cumulative impacts of the project when added to the impacts of past, present, and reasonably foreseeable future projects.[46] The term "cumulative impacts" refers to two or more individual effects, which, when considered together, are considerable or which could compound or increase other environmental impacts.[47]

The DEIR identifies three other projects that it includes as part of the cumulative impacts analysis. The DEIR limits the scope of the projects considered as part of the cumulative impacts analysis to other groundwater recovery projects. No other types of projects are included in the DEIR's analysis or are even identified. Significantly, the DEIR includes only projects that are currently scheduled for construction, omitting any other projects that are currently under consideration or which may be approved before the Final EIR is adopted for this Project.

51 This DEIR omits any evaluation of the projects that have undergone or are currently undergoing their own CEQA evaluation including the Kern Fan Groundwater Storage Project, the Onyx Ranch South Fork Valley Water Project, the Stockdale Integrated Banking Project, and the McAllister Ranch Groundwater Banking Project.[48] These are just a handful of examples of projects occurring in the area immediately adjacent to the proposed Project that are not mentioned, discussed, or included in the DEIR's cumulative impacts analysis. As each and every one of these projects has the potential to impact groundwater supplies, overall water

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45 *Bakersfield Citizens for Local Control v. City of Bakersfield* (2004) 124 Cal.App.4th 1184, 1213-1214; see also *San Franciscans for Reasonable Growth v. City and County of San Francisco* (1984) 151 Cal.App.3d 61, 72-73.

46 CEQA Guidelines, § 15355, subd. (b).

47 *San Joaquin Raptor/Wildlife Rescue Center v. County of Stanislaus* (1994) 27 Cal.App.4th 713, 739; CEQA Guidelines, § 15130, subd. (a)(1).

48 https:/ceqanet.opr.ca.gov/Project/2020049019 [Kern Fan Groundwater Storage Project]; https:/ceqanet.opr.ca.gov/Project/2018021061 [Onyx Ranch]; https:/ceqanet.opr.ca.gov/Project/2013091076 [Stockdale Integrated]; https:/ceqanet.opr.ca.gov/2020060267/2 [James and McAllister Ranch, BV applicant]. The EIRs for the recently approved Kern Fan Groundwater Storage Project are provided under separate cover.

availability and quality, as well as the potential to impact biological resources, cultural resources, and a variety of other resources.

52 The DEIR reasons that because there are no significant water quality impacts[49], there would be no cumulative impacts. As discussed above, the DEIR's analysis of direct water quality impacts is faulty and therefore the DEIR lacks substantial evidence for its conclusion that there would be no significant water quality impacts. The DEIR analyzes the Project's water quality impacts in a vacuum, fails to evaluate the cumulative water quality impacts of multiple banking projects pumping non-project water or groundwater into the Aqueduct. It does not evaluate the hydrology and water quality effects of extracting higher quality groundwater from one area of the basin without recharging it, while relying on water deposited in an entirely different part of the basin. The failure to analyze the Project's impacts on groundwater at its point of extraction is a substantial error and cannot serve as the basis to summarily conclude that there are no cumulative impacts to water quality.

53 The DEIR fails to evaluate the potential indirect impacts of the operation and maintenance of the Project on the biological resources for the adjacent Kern Water Bank Habitat Conservation Plan/Natural Communities Conservation Plan ("HCP/NCCP"). There is no disclosure of whether the Project may disrupt the frequency of intermittent wetland habitat at the Kern Water Bank HCP/NCCP by reducing water to the HCP/NCCP lands from the State Water Project or from the Kern River.

54 Finally, the DEIR fails to analyze the Project's potential impacts on private wells, including landowner wells both inside and outside of Buena Vista's service area. There is no analysis regarding whether the proposed extraction for the Project would render landowner wells unusable or require them to be deepened or relocated entirely.

C. The DEIR Improperly Defers Mitigation of Various Project Impacts.

55 While CEQA allows mitigation to be deferred in certain instances, it requires that enforceable performance standards in order to render deferred mitigation permissible.[50] Mitigation Measure CUM-1 fails to sufficiently address the potential cumulative impacts of the Project and does not at all address the Project's impacts to groundwater quality and levels within the KGAGSA. Here, the issue is not that the mitigation is deferred, it is that there is no mitigation at all.

The DEIR acknowledges that other banking projects in the area have adopted operating plans with specific and enforceable performance standards to minimize the potential impact of recovery operation on private domestic and agricultural wells. The Project has the same potential to impact domestic and agricultural wells. The DEIR does not describe or commit to achieve specific performance standards similar to the performance standards adopted by other banking projects.

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[49] A conclusion that is itself faulty, for the reasons described, supra, in section 3.

[50] *Sacramento Old City Assn. v. City Council* (1991) 229 Cal.App.3d 1011, 1029.

56 The DEIR defers species specific surveys to determine presence or absence until pre-construction, and defers any survey for Swainson's Hawk until some undisclosed point in time, up to 14 days prior to construction activities.[51]

57 With respect to the blunt-nosed leopard lizard, the deferred mitigation fails to even provide for appropriate surveys. Mitigation Measure BIO-1 provides that there will be temporary exclusion fencing installed prior to construction activities, but does not provide for any pre-construction protocol surveys to identify the presence of the blunt-nosed leopard lizard. Because this is a fully protected species, the failure to provide a specific and enforceable mitigation measure violates CEQA. The DEIR must be revised to provide for specific and enforceable mitigation for the Project's potential impacts to blunt-nosed leopard lizard.

7. OTHER COMMENTS.

58 For all of the reasons described above including in sections 2 and 3, the Project as described fails to adequately evaluate the Project's compliance with the California law regarding reasonable and beneficial use of water and the management of groundwater resources in compliance with the SGMA. SGMA prohibits one agency within a basin from impacting existing conjunctive use or storage programs within the basin.[52] The Project described in the DEIR will impact existing storage and conjunctive use programs within the Kern basin.[53] This is because it proposes to extract groundwater out of the area under the jurisdiction of a neighboring groundwater sustainability agency.[54]

The KGAGSA has jurisdiction over the area in which the Project proposes to install new extraction wells. The water extracted from those wells would then be pumped out of the KGAGSA's jurisdiction, in violation of the standards set by the KGAGSA's members and the adopted GSP. The DEIR is required to evaluate the potential conflict with SGMA and the KGAGSA's GSP.

59 CEQA requires that an EIR include a list of all agencies that are expected to use the EIR in their decision making.[55] These are the responsible agencies under CEQA.[56] Here, while the DEIR identifies one agency that would rely on the DEIR for subsequent decision making, it fails entirely to identify the entities that would be required to use or rely on the DEIR to authorize the proposed extractions of water.[57]

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[51] DEIR, p. 6-5, Mitigation Measure BIO-2b.

[52] Water Code, § 10726.2, subd. (b).

[53] DEIR, at p. 4-13.

[54] We incorporate by reference the comments of the KGAGSA on the DEIR.

[55] CEQA Guidelines, § 15124, subd. (d)(1)(A) [requiring "[a] list of the agencies that are expected to use the EIR in their decision-making . . . ."].

[56] CEQA Guidelines, § 15381; Pub. Resources Code, § 21069; see also *RiverWatch v. Olivenhain Municipal Water Dist.* (2009) 170 Cal.App.4th 1186, 1205-1206.

[57] DEIR, § 2.3, p. 2-7 [identifying the California Department of Fish and Wildlife as the only responsible or trustee agency expected to use the EIR].

The DEIR fails to identify the following responsible agencies: KGAGSA; Kern County Local Agency Formation Commission (LAFCO); California Department of Water Resources; State Water Resources Control Board; Regional Water Quality Control Board; the Kern Water Bank Authority; and the Rosedale-Rio Bravo Water Storage District.

59 (con't)

For over four decades the California courts have held that annexation approvals by a LAFCO are an action that is subject to CEQA. The proposed annexation is part of the Project, and the LAFCO is prohibited from approving any annexation regarding the Project prior to the certification of a Final EIR that evaluates all of the direct, indirect, and cumulative effects of the Project. CEQA prohibits LAFCO's approval of the annexation application prior to the certification of a final EIR for the Project, a determination by the LAFCO that the final EIR is adequate for its use, and that LAFCO makes the findings required by CEQA.[58]

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The DWR is a responsible agency because it has the authority to review, comment on, and approve groundwater sustainability plans and any amendments or changes thereto including GSA boundary adjustments. If any changes to either the GSA for the KGAGSA, or for the neighboring BVGSA, and/or their respective boundaries, are required in order to implement the Project, the Department of Water Resources will necessarily be responsible for reviewing, commenting on, and approving those changes. The Project would additionally require approval of DWR in order to use the Aqueduct including for non-project water pump-in and conveyance to Southern California purchasers, banking partners or others.[59] The Kern Water Bank Authority and the Rosedale-Rio Bravo Water Storage District are responsible agencies because the Project will require the approval by these agencies of amended memoranda of understanding concerning operating plans to minimize impacts on local groundwater supplies.

8. CONCLUSION.

The DEIR violates CEQA. KWBA objects to the certification of the Palms Groundwater Recovery DEIR and approval of the Palms Groundwater Recovery Project. CEQA requires Buena Vista to complete the additional analyses described in this letter, revise the DEIR to incorporate the additional analysis, and to circulate a revised DEIR for additional public review and comment.

[58] CEQA Guidelines, § 15096, subd. (e), (h).

[59] CEQA separately requires the lead agency to provide notice to and solicit comments from responsible agencies. (CEQA Guidelines, §§ 15082, 15086, 15124; Pub. Resources Code, §§ 21080.4, 21104.) It is KWBA's understanding that these additional responsible agencies were not provided notice nor were comments solicited from them. The DEIR additionally violates CEQA for this reason.

Very truly yours,

Jonathan Parker
General Manager
Kern Water Bank Authority

RDT:snc

ATTACHMENTS

Attachment A	Memorandum from V. Whitney, Chief Division of Water Rights at State Water Resources Control Board to Katherine Mrowka, Chief Watershed Unit 3, Division of Water Rights, State Water Resources Control Board Re Petitions to Revise Status of Kern River on State Water Board Fully Appropriated Streams List (October 2, 2008)
Attachment B	State Water Resources Control Board, Order WR-2010-0010: Order Amending Declaration of Fully Appropriated Streams to Remove Designation of the Kern River as Fully Appropriated
Attachment C	State Water Resources Control Board, Order WR-2010-0016: Order Denying Reconsideration
Attachment D	*North Kern Water Storage District v. State Water Resources Control Board*, Case No. S-1500-CV 270613 NFT, Judgment Denying Petition for Writ of Administrative Mandate (July 21, 2011
Attachment E	*North Kern Water Storage District v. State Water Resources Control Board*, F063989, Opinion (April 18, 2013)
Attachment F	Kern Water Bank Authority v. Buena Vista Water Storage District, Complaint Before State Water Resources Control Board
Attachment G	Application No. A031675 of the Buena Vista Water Storage District
Attachment H	Dr. E John List, Technical Memorandum, January 14, 2021
Attachment I	*Curriculum Vitae* of Dr. E John List
Attachment J	GEI, Water Quality Review of Groundwater Wells for the “Palms” Recovery Project, Feb. 17, 2017
Attachment K	Initial Study/Mitigated Negative Declaration, Assessment of Potential Groundwater Impacts for the Palms
Attachment K-1	Initial Study/Mitigated Negative Declaration, Figure 12

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ATTACHMENTS

Attachment L	Wood Environmental & Infrastructure Solutions, Review of Draft EIR for the Palms Groundwater Recovery Project (January 15, 2021)
Attachment M	Memorandum of Understanding Regarding Operation and Monitoring of the Buena Vista Water Storage District Groundwater Banking Program (January 1, 2003)
Attachment N	Annotated DEIR Figure 2-2.
Attachment O	Comments of Biologist, James W. Jones, Jr.)

svb

January 11, 2021

Jonathan Parker
Kern Water Bank Authority
1620 Mill Rock Way, Suite 500
Bakersfield, California 93311

RE: Comments on the Draft Environmental Impact Report for the Palms Groundwater Recovery Project - SCH# 2020060315

Dear Mr. Parker:

South Valley Biology has reviewed the subject Draft Environmental Impact Report (DEIR). Please see the following observations/comments.

Section 3.2. Biological Resources:

Table 3-1:

1) Horn's milkvetch (*Astragalus hornii* var. *hornii*) on or adjacent to the project site should include the Outlet Canal and other periodically flooded areas. This species is known from occurrences in
1 the Outlet Canal just south of the project site and also from some of the recharge basins and water conveyances on the KWB.
2) Lesser saltscale (*Atriplex minuscula*) is known to occur in the bush seepweed habitat adjacent to the northeast portion of the project site.

Table 3-2:

1) The table indicates that there is no habitat for coast horned lizard (*Phrynosoma blainvillii*) on or adjacent to the project site; however, the bush seepweed habitat adjacent to the northeast portion of the project site provides suitable habitat for this species.
2 2) The table indicates that Tulare grasshopper mouse (*Onychomys torridus* ssp. *tularensis*) is not known to occur at the KWB. This is incorrect. This species has been identified in several areas at KWB, including trapping grids, the Cheng Property, and the saltbush scrub habitat portion of the Nikkel Property.

3-21 Special-status Birds: In paragraph 3, the DEIR correctly indicates that Swainson's hawks (*Buteo swainsoni*) are known to nest at the nearby Tule Elk Reserve; however, this species also regularly nests at the KWB as well.

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3-22 Special-status Birds: In paragraph 4, the DEIR states that "…No suitable nesting habitat for tricolored blackbird (*Agelaius tricolor*) is currently present on or adjacent to the project site…". However, this species has nested on occasion at the Tule Elk Reserve and frequently nests at the KWB.

south valley biology consulting llc : 4605 buena vista road : suite 600-814 : bakersfield : california : 93311 : 661.742.0912

3 (con't) The DEIR concludes the same for yellow-headed blackbird (*Xanthocephalus xanthocephalus*). This species also is known to nest at the KWB.

4

3-23 Special-status Mammals: In paragraph 2, the DEIR states that the Tulare grasshopper mouse nearest known occurrence is approximately 10 miles away from the project site. This species is known to occur in several areas at KWB, including trapping grids, the Cheng Property, and the saltbush scrub habitat portion of the Nikkel Property.

3-24 Special-status Mammals: In paragraph 1 on that page, the DEIR states "…No evidence of kit fox presence in the Biological Study Area was observed during focused field surveys…". Although I do not doubt this statement in any way, kit foxes are nevertheless known to occur in the surrounding area and the individuals can be wide ranging in their foraging habits. Therefore, it should be expected that this species is likely present at least time to time within the Biological Study Area.

5 3-31 Impact BIO-1: Horn's milkvetch should also be included in the Special-status Plants that are listed here, as it is also known to occur nearby within the Outlet Canal, similar to slough thistle.

6

3-32 Mitigation Measure BIO -1: Our experience has been that unless blunt-nosed leopard lizard surveys consistent with the 2019 CDFW protocols or some other CDFW-approved methodology are conducted, it is unlikely that fencing will be allowed to be installed. CDFW typically requires a very detailed fencing plan be prepared and approved prior to installing any exclusionary/barrier fencing. Additionally, CDFW does not normally approve fence installation within 50 feet of burrows that could be used by species such as Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*) or San Joaquin antelope squirrel (*Ammospermophilus nelsoni*) unless it can be demonstrated through an approved investigative trapping effort or other agreed upon method that these species are not present.

7

3-32 and 3-33 Special-status Birds: While I do not necessarily disagree with most of the statements and conclusions in these paragraphs, based on comments by CDFW in regard to Swainson's hawks they stated that …"The trees within the Project represent some of the only remaining suitable nesting habitat in the local vicinity". Hence, it seems that CDFW may view impacting a total of 10 acres of foraging habitat for this species as a significant impact. Swainson's hawks are definitely known to nest in the area nearby the project site and likely forage in some portions of the project site from time to time.

3-34 Mitigation Measure BIO 2b: The DEIR is proposing that a nest survey for potential Swainson's hawk nesting trees be conducted within 0.25 mile of the project site. From my experience, CDFW will typically require a nest tree survey for a minimum of 0.5 mile surrounding the project.

If you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

James W. Jones, Jr.

James W. Jones, Jr.
President and Senior Biologist III

Environmental Defense Sciences

202 S. Lake Ave., Ste. 294, Pasadena, CA 91101 Tel: 626-744-1766 Fax: 626-304-9427

TECHNICAL MEMORANDUM

REGISTERED PROFESSIONAL ENGINEER
E. JOHN LIST
No. 36791
Exp: 6/30/22
CIVIL
STATE OF CALIFORNIA

Date: January 14, 2021

To: Jonathan Parker
Kern Water Bank Authority

From: E. John List, Ph.D., P.E.
Principal Consultant

Subject : Draft Environmental Impact Report for the Palms Groundwater Recovery Project
State Clearinghouse Number 2020060315
FSI E217003

This memorandum will present the results of my review of the subject DEIR for the Palms Groundwater Recovery Project proposed by Buena Vista Water Storage District (BVWSD). The memorandum is in two parts: Part I presents my analysis of perceived deficiencies in the DEIR; Part II describes what in my professional opinion are problems with the proposed project as described and evaluated in the DEIR. I discuss the additional information and analysis that should be developed in order for the DEIR to inform the public of the water quality effects of the project.

Part I - Deficiencies in the DEIR Regarding Water Quality

The primary problem with the project description in the DEIR is that there is a paucity of data describing in detail the water quality issues that will be associated with the project. It is clear that the groundwater quality on the western side of the East Side Canal differs significantly from that on the east of the Canal, and this is acknowledged in the DEIR in general terms. However, the DEIR does not include any of the detailed, but still somewhat limited, presentation of data available in the GEI 2017 memorandum:

GEI Consultants, Inc. 2017. Memorandum: Water Quality Review of Groundwater Wells for “The Palms” Recovery Project, to Buena Vista Water Storage District, February 17.

This document describes significant problems with water quality, including arsenic, nitrate
1 hardness, gross alpha activity and high levels of iron and manganese and concluded that:

> “ Iron and manganese are issues in a majority of the BVWSD wells. All sample results for well 23B are extremely high: average iron is 14,082 ppb and manganese is 2,610 ppb. Since the sample results are consistently high, this data is considered representative of the aquifer. With the levels this high, it is unlikely that blending will provide adequate contaminant reduction and therefore will not be an acceptable treatment method.”

The DEIR not only provides no discussion of these potential problems for the project, but on page 3-84 goes so far as to state:

"Overall, the water quality of the well locations in the Recovery Project area meets drinking water standards. However, monitoring wells that represent the shallow aquifer, generally less than 300 feet below ground surface (bgs) and the deeper aquifer, generally greater than 500 feet bgs show some constituents with exceedances. Constituents in the shallow and deeper aquifers tend to exceed chloride, conductivity, total dissolved solids, and sulfate. Table 3-8 presents the water quality constituents that were evaluated. These constituents either had noticeable detections or are part of the DWR's constituents of concern for non-SWP water that is pumped into the Aqueduct."

Table 3-8. Water Quality Constituents Evaluated

Antimony	Iron
Arsenic	Manganese
Boron	Nitrate
Bromide	Sodium
Chloride	Sulfate
Conductivity	Total Dissolved Solids
Gross Alpha	Total Organic Carbon
Hardness	Uranium

1 (con't)

"To further evaluate the potential impacts of the Recovery Project water when it enters the Aqueduct, the average theoretical blend values were compared against the average values observed in the Aqueduct near the Recovery Project Area. Table 3-10 depicts the comparison between the two types of water. It is anticipated that the following mitigation measures identified will reduce these constituents that exceed the quality of the Aqueduct."

Table 3-10 was apparently derived from Table 3-5, which purports to describe the SWP Aqueduct water quality upstream and downstream of the project. The data in Table 3-5 are clearly incorrect. It simply would not be possible to reduce the arsenic, chloride, sodium, sulfate and TDS concentrations in the Aqueduct water between the upstream and downstream measurement locations. It is likely that it is the upstream measurements in the table that are incorrect, but it is not clear. The data from Table 3-5 are transcribed into Table 3-10, so that the upstream data in Table 3-10 are also incorrect.

A further problem with the data in Table 3-10 is that the "Project Water" projection is based upon a blend of waters from west and east of the East Side Canal with the west side waters represented by a single well in the west, as is discussed further below.

Table 3-5. Summary of Aqueduct Water Quality Upstream and Downstream of Project Area

Constituent	Drinking Water Standard	Upstream		Downstream	
		Average	Max	Average	Max
Antimony (ppb)	MCL = 6	0		0	
Arsenic (ppb)	MCL = 10	14	18	3.5	11
Boron (ppm)	NL = 1	0.1		0.2	0.4
Bromide (ppm)	N/A	No data		No data	
Chloride (ppm)	SMCL = 250	120	131	70	127
Conductivity (µS/cm)	SMCL = 900	736	758	465	740
Gross Alpha (pCi/L)	MCL = 15	No data		No data	
Hardness (ppm)	Very Hard > 181	74.5	77	107	141
Iron (ppb)	SMCL = 300	3	6	17	63
Manganese (ppb)	SMCL = 50	0		2	220*
Nitrate as N (ppm)	MCL = 10	1.3	1.4	2.6	5.3
Sodium (ppm)	DWR = 200	106	112	53	97
Sulfate (ppm)	SMCL = 250	96	103	40	121
Total Dissolved Solids (ppm)	SMCL = 500	416	436	263	434
Total Organic Carbon (ppm)	N/A	No data		No data	
Uranium (pCi/L)	MCL = 20	No data		No data	

1 (con't)

*Indicates that result is over the drinking water standard
* parts per billion

Table 3-10. Comparison of Average Project Water and Aqueduct Water Quality

Constituent	Aqueduct Upstream	Project Water	Aqueduct Downstream
Antimony (ppb)	0	0.4	0
Arsenic (ppb)	14	1.5	3.5
Boron (ppm)	0.1	0.1	0.2
Bromide (ppm)	No data	0.75	No data
Chloride (ppm)	120	65	70
Conductivity (µS/cm)	736	905	465
Gross Alpha (pCi/L)	No data	6.2	No data
Hardness (ppm)	74.5	209	107
Iron (ppb)	3	63	17
Manganese (ppb)	0	28	2
Nitrate as N (ppm)	1.3	2.6	2.6
Sodium (ppm)	106	103	53
Sulfate (ppm)	96	281	40
Total Dissolved Solids (ppm)	416	613	263
Uranium (pCi/L)	No data	8.5	No data

Presuming that it is the downstream numbers in Table 3-10 that are correct it is difficult to see how the levels of iron, manganese, sulfate and total dissolved solids can be reduced by blending to meet a non-degradation standard for pumping into the Aqueduct. The required blend water would have to be of an even higher quality. i.e., lower concentrations, than the Aqueduct water. The only water seemingly available to accomplish the blending goals is the Kern River water (see Table 3-3 and the discussion in Part II below).

Table 3-3. Water Quality in the Kern River

Constituent	MCL	Minimum	Average	Maximum	Units
Chloride[2]	250	2.2	6.4	10	mg/L
Sodium[2]		4.5	15	30	mg/L
TDS[3]	500	40	129	227	mg/L
Arsenic[2]	10	ND	ND	ND	ug/L
Nitrate (as NO_3)[3]	45	ND	0.7	1.8	mg/L

[2] Source RWQCB 2015
[3] Source: Kern County Water Agency Water Supply Reports (2010; 2011, 2012; 2013)

The blending calculations offered in the DEIR have elected to use the analysis from a single monitoring well, DMW-13 Middle, but as is made clear in the foregoing analysis by GEI this single well is not representative of the wells in the project area west of the East Side Canal listed in Table 3-6. Even so the blending calculations do produce water exceeding drinking water standards. From page 3-60 of the DEIR:

1 (con't)

> "In general, most constituents meet drinking water standards (Table 3-7). Due to limited water quality data for most of the wells west of the East Side Canal, BVWSD monitoring well 13 – middle zone, was used as a representative well. For wells located to the east of the East Side Canal, conductivity, sulfate, and TDS were exceeded. For wells located west of the East Side Canal, sulfate and TDS slightly exceeded the drinking water standards. Even though most constituents are below drinking water limits, it was observed that each side had varying constituent levels. For example, the west side does not have arsenic, however on the east side, the concentrations are about half the MCL at 5.6 parts per billion (ppb)."

Table 3-7. Water Quality of Wells in and Around Project Area

Constituent	Drinking Water Standard	West of East Side Canal	East of East Side Canal	
			Average	Max
Antimony (ppb)	MCL = 6	0	0.7	5
Arsenic (ppb)	MCL = 10	0	2.7	5.6
Boron (ppm)	NL = 1	0.1	0.2	0.5
Bromide (ppm)	N/A	No data	0.09	0.1
Chloride (ppm)	SMCL = 250	54	75	95
Conductivity (µS/cm)	SMCL = 900	922	891	976*
Gross Alpha (pCi/L)	MCL = 15	0	11.6	14.6
Hardness (ppm)	Very Hard > 181	243	179	289
Iron (ppb)	SMCL = 300	44	80	240
Manganese (ppb)	SMCL = 50	49	11	25
Nitrate as N (ppm)	MCL = 10	0.1	4.7	6.8
Sodium (ppm)	DWR = 200	107	99	123
Sulfate (ppm)	SMCL = 250	310*	257*	334*
Total Dissolved Solids (ppm)	SMCL = 500	641*	589*	808*
Total Organic Carbon (ppm)	N/A	No data	0.6	0.8
Uranium (pCi/L)	MCL = 20	5.5	11	15

*Indicates that result is over the drinking water MCL

Table 3-6. Wells used in Water Quality Analysis

West of East Side Canal	East of East Side Canal
BVWSD Production Well	BVWSD Private Landowner Well
DW01	D04
DW02	Kern Water Bank
BVWSD Monitoring Well	13D01, 13D02, 13D03
DMW 11A & 11B	West Kern Water District
DMW 12A & 12B	NW-1
DMW 13-Shallow, 13-Middle, 13-Deep	NW-2
BVWSD Private Landowner Well	NW-3
D15	NW-4
	NW-5

The blending analysis is therefore significantly biased in that despite Table 3-6 list of "Wells used in Water Quality Analysis" only the data from DMW-13 Middle was actually used and as is made clear in the GEI 2017 Memorandum the other wells west of East Side Canal have some serious contaminant problems.

Part II – Feasibility of the Project and Cumulative Impacts

As is apparent from the water quality and blending analysis, it will be extremely difficult for
the Project to meet the State Water Project (SWP) standards for pumping groundwater
production into the California Aqueduct, and additionally there is no evaluation of cumulative
water quality impacts of the Project along with other banking projects' pumping non-SWP
water into the Aqueduct and having to meet SWP water quality standards. The only water
2 available for blending that would likely enable the water quality standards to be met is Kern
River water. However, at a time when groundwater is being withdrawn from storage it is
extremely unlikely that Kern River water would be available for blending, which highlights
another major deficiency of the DEIR.

The DEIR assumes that the project would add 100,000 acre.ft to the aquifers in eight (8) months and 25,000 acre.ft/year would be recovered in a six month window for each of four years in a time of drought, but the analysis is very rudimentary. A more appropriate approach would have been to use the Kern River monthly flow rate record, for however long a period as is available, as a surrogate for climate and perform a series of simulations that would enable the most productive operating scenario to be developed that recognizes the ephemeral nature of Kern River flows. These simulation techniques are widely used in designing facilities that are dependent upon river flows that vary significantly. For example, Sacramento Regional Sanitation has used simulations to optimize the design of their wastewater treatment and storage because the ability to discharge to the Sacramento River is controlled by the river flows, which are not predictable, but for which a long record is available.

The DEIR for the Palms project has no discussion at all about the variability of the Kern River
3 flow or the return frequency of possible recharge opportunities. The infiltration project and
its associated wetlands will be very dependent upon the river flow and yet there is no
discussion of the impact of the frequency of sustained drought on the constructed wetland.
The issue is not even discussed in the DEIR.

Given that the only water available for use in blending of BVWSD water to meet water quality standards required for SWP pump in is only available during times of water surplus, it is not at all clear that the proposed project is even viable.

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January 15, 2021
Project 8101

Jonathan Parker
Kern Water Bank Authority
1620 Mill Rock Way, Suite 500
Bakersfield, CA 93311

Subject: Review of DRAFT EIR for the Palms Groundwater Recovery Project
Kern County, California

Dear Mr. Parker:

Wood Environment & Infrastructure Solutions, Inc. (Wood), has prepared this review of the December 2020 *Draft Environmental Impact Report for the Palms Groundwater Recovery Project* (DEIR) prepared by GEI Consultants on behalf of the Buena Vista Water Storage District (BVWSD). The focus of this review is on the numerical modelling effort conducted on behalf of BVWSD by Todd Groundwater (Todd) in support of the DEIR. Specifically, this review evaluates the efficacy of the numerical modelling effort to effectively simulate potential impacts to groundwater related to the proposed Palms Groundwater Recovery Project (Palms Project). As explained below, the Palms Project numerical model was not calibrated to site conditions and is otherwise insufficient in several respects.

Numerical Modeling Review

The numerical model effort for the Palms Project is presented as a memorandum by Todd in Appendix D of the DEIR. Appendix D presents a summary of the proposed project, regional setting, geology, groundwater conditions (elevations and quality), and the development of a superposition model to evaluation potential groundwater impacts of the Palms Project. The development, validation, and use of the superposition model are discussed in the following sections. Each section contains a summary of the Todd memorandum followed by Wood's opinion on the text in italics.

Superposition Model Concept

Superposition models rely on Darcy's Law equation for groundwater flow and the principal of superposition. When applied to a groundwater system, the changes in an aquifer system affected by multiple hydraulic stresses (i.e. recharge and pumping) are equal to the sum of the individual hydraulic stresses applied to the aquifer system. Simply put, if Project A causes a 2-foot change in groundwater elevation (head) at some observation point, and Project B causes a 1-foot change in head at the same observation point, then Projects A and B together will result in a 3-foot change in head at the observation point. The results of a superposition modeling are calculated as a change in head, not absolute groundwater elevations. Therefore, the starting groundwater elevations simulated are irrelevant and can be set to zero. Because the impacts of multiple hydraulic stresses on the aquifer system are additive, only the stresses of the project under evaluation are simulated. The resulting simulated change in head is intended to be a direct reflection of the impacts of the project.

Inherent in the principal of superposition is that the model used to calculate the change in head is well calibrated to site conditions and can accurately reproduce the observed change in head at known observations points to known hydraulic stresses. Superposition is strictly applicable to linear aquifer system problems only, that is, constant aquifer saturated thickness and linear boundary conditions. If the aquifer system is relatively linear, for example, the saturated thickness does not change by a significant portion, superposition can still provide reasonably accurate answers. If the aquifer system is non-linear (i.e. boundary conditions such as recharge and pumping are highly transient), then superposition models may yield unreliable results. Currently, superposition is used primarily in the simulation of aquifer tests, in that only changes due to the imposed change in stress (that is, the well discharge) are simulated, initial drawdowns are specified as zero, and boundary conditions are relatively constant.

Superposition Model Development

The superposition model for the Palms Project was developed using United States Geological Survey (USGS) numerical model code MODFLOW. MODFLOW is the defacto standard for numerical groundwater models and has been used world-wide for over 40 years. Development of the Palm Project MODFLOW model is documented in Appendix D, Attachment B.

The Palms Project model was derived from the 2009 USGS Central Valley Hydrologic Model (CVHM), a basin scale model of the entire Central Valley of California. The CVHM simulates the period 1962 through 2003, consists of 10 model layers using a relatively coarse model grid of 1-square mile, and simulates the Central Valley leaky aquifer system from ground surface to the base of fresh groundwater. Significantly, the CVHM does not include the extensive water banking recharge and recovery operations on the Kern River alluvial fan.

The Palms Project model is a subset of the CVHM, extending from slightly north of the Kern County line to the Tehachapi Mountains. In the vicinity of the proposed Palms Project, the model grid was refined from 1-square mile (640 acres) to about 40 acres. In addition, the Palms Project model combined several of the CVHM layer together to yield a 4-layer model. As a result, the hydraulic properties (horizontal and vertical hydraulic conductivity, storage coefficients, and specific yield) had to be averaged and re-districitized to the new Palms Model grid.

The model developed for the Palms Project is a subset of the CVHM that has been averaged and re-districitized to a refined model grid with fewer model layers. The Palms Project model is essentially a completely new MODFLOW model that should be calibrated to existing site conditions and hydraulic stresses prior to use for predictive simulations.

Superposition Model Validation

Following development, the Palms Project MODFLOW model was “validated” to three groundwater scenarios: 1) 2011 West Kern Water District (WKWD) Aquifer Test, 2) WKWD wellfield recovery from October 2012 through December 2014, and 3) Kern Water Bank recharge and recovery from 1993 through 1998 (see Appendix D, Attachment A). These are discussed in the following sections.

The term “validation” is mis-used here. Model calibration is the iterative process of comparing the model simulated response to a stress with the real aquifer system response to a stress, revising the model if necessary, and comparing again until the model results closely match the real aquifer system response. Model validation is the process of comparing the model and its behavior to the real aquifer system and its behavior to known stresses. Typically, model validation is conducted by taking a calibrated model and testing how well it can reproduce a unique set of stresses and observations that were not used to calibrate the model. For example, say Model A is calibrated to stresses and observed heads for the period 1980 to 2010. If Model A can then simulate the stresses and observed heads for period 2010 to 2020, without any recalibration of model hydraulic parameters, then Model A can be considered validated.

Superposition Model Validation Scenario 1

The Palms Project model was “validated” against the results of a 2-dimensional analytical element *WinFlow* model developed in 2009 to simulate a series of 24-hour aquifer pumping tests of five groundwater extraction wells located at the WKWD North Well Field. Observations of the change in head (drawdown) were recorded in up to six nearby monitoring wells during each 24-hour test. The 2009 WKWD *WinFlow* model was calibrated to simulate the drawdown observed at the end of each 24-hour test.

The WKWD *WinFlow* model was modified to simulate the hypothetical pumping of nine wells located around the WKWD North project. Each well was pumped at 2,000 gallons per minute (gpm) for 300 days. The Palms Project model was modified to simulate the same pumping scenario of the WKWD extraction wells. A comparison of the WKWD *WinFlow* model and Palms Project model simulated drawdown showed the Palms Project model under predicted drawdown at the well field. The Palms Project model was then modified (i.e. calibrated) to improve the match to the estimated drawdown by the WKWD *WinFlow* model. The drawdown simulated by the calibrated Palms Project model approximated the WKWD *WinFlow* model simulated drawdown at day 300 of pumping in the vicinity of the pumping wells (near-field), but under predicted drawdown further away from the pumping wells (far-field).

Numerical models (MODFLOW) are typically compared to an analytical model (WinFlow) to demonstrate that the numerical code can accurately reproduce the analytical solution. This is done using identical model construction (grid, layers) and hydraulic properties so the models are as similar as possible. This was not the case for the Scenario 1 simulations. The WKWD WinFlow model consists of a single uniform layer with homogeneous hydraulic properties. The Palms Project MODFLOW model consists of four layers with heterogenous hydraulic properties. Furthermore, the Palms Project model had to be calibrated to approximate the WKWD WinFlow solution after 300 days of pumping; and did not do so very well. It would be more appropriate to calibrate the Palms Project model to the drawdown observations (actual data) from the 24-hour pumping tests of the WKWD well field which were used to develop the WKWD WinFlow model.

Superposition Model Validation Scenario 2

The Palms Project model was also "validated" by simulating the recovery pumping of approximately 18,730 acre-feet (AF) of groundwater from five wells in the WKWD wellfield from October 2012 through December 2014. Preliminary simulation results indicated it was necessary to include the recovery pumping of approximately 1.8 million AF (MAF) from the Kern River Alluvial Fan Water Banking Projects (Kern River Projects) during this same period. The Palms Project model simulated drawdown was compared to observed drawdown in 11 observation wells around the WKWD well field. Hydrographs of observed and simulated drawdown showed that the Palms Project model simulated drawdown was more or less on trend with the observed drawdown in the pumping wells but did not reproduce the large changes in head due to well inefficiencies. The observed and simulated drawdown in nearby observation wells shows a poorer fit.

The need to include the Kern River Projects with the Palms Project model to approximate the observed drawdown in the WKWD well field from 2012 through 2014 demonstrates the underlying assumptions for use of a superposition model are not valid in the Palms Project area. The recharge and recovery operations of the Kern River Projects overwhelm the stresses induced by the recovery from WKWD wells. Furthermore, the Palms Project model did not evaluate the simulated drawdown in the numerous wells on and around the Kern River Projects. These data are readily available and could have made the Palms Project model calibration more robust.

Superposition Model Validation Scenario 3

The Palms Project model was also "validated" by simulating groundwater mounding associated with the Kern River Projectss from 1993 through 1998 when approximately 3.1 MAF of water were recharged. Monthly recharge volumes for each water banking project were imported at the approximate location of the recharge basins. The Palms Project simulated change in head was compared to observed change in head at 26 monitoring wells scattered across the Kern River Projects. Hydrographs of observed and simulated change in head were provided for only for 4 of the 26 wells used for "validation." The hydrographs show that the Palms Project model simulated change in head is generally on trend with the observed change in head; however, the model over predicts the change in head in the vicinity of the Palms Project and under predicts the change in head near the northern edge of the Kern Water Bank.

Again, the need to include the Kern River Projects with the Palms Project model to approximate the change in head resulting from the water banking recharge from 1993 to 1998 demonstrates the underlying assumptions for use of a superposition model are not valid in the Palms Project area. The recharge and recovery operations of the Kern River Projects will likely overwhelm the change in head induced by recharge and recovery stresses at the Palms Project. In addition, there is a significant amount of data generated by the Palms Project model (i.e. hydrographs) that were not presented for review. Furthermore, since it became necessary to simulate both recharge and recovery operations of the Kern River Projects, why wasn't a single, comprehensive model prepared simulating the entire history of water banking operations in the area?

Palms Project Recovery Scenarios A and B

The Palms Project model described above was then utilized to evaluate two hypothetical recharge and recovery scenarios at the Palms Project facility. Both scenarios were assumed to start in 2011, a period when the Kern River Projects were all recovering groundwater. The Palms Project recovery scenario assumptions are shown below:

- 2011 – 100,00 AF recharge over 8 months
- 2012 – Idle
- 2013 – Year 1 recovery of 25,000 AF over 6 months
- 2014 – Year 2 recovery of 25,000 AF over 6 months
- 2015 – Year 3 recovery of 25,000 AF over 6 months
- 2016 – Year 4 recovery of 25,000 AF over 6 months
- 2017-2020 - Idle

The only difference between Scenario A and B is that Scenario B recovers only 15,000 AF in year four, leaving approximately 10 percent of the recharged water behind. Recovery pumping was assumed to be by 14 wells pumping approximately 2,200 gpm for 6 months. As stated in the Todd memorandum: “Because this is a superposition model, only the combined Palms {recharge} and Recovery Project operations were simulated.”

As clearly shown by “validation” scenarios 2 and 3 described above, it was necessary to add the recharge and recovery operations of the Kern River Projects to the Palms Project model to obtain a reasonable fit to the observed change in heads during recharge and recovery periods. As such, there is no justification to remove the historical water bank recovery operation during the 2011 to 2020 simulation period from the Palm Project model. The Palms Project model simulated mounding during recharge and drawdown during recovery may underestimate mounding (because there was recharge by others during 2011) and underestimate drawdown during recovery (because there was also recovery by others during 2011 to 2019).

Summary and Opinion

Inherent in the principal of superposition is that the model used to calculate the change in head is well calibrated to site conditions and can accurately reproduce the observed change in head at known observations points to known hydraulic stresses. Superposition is strictly applicable to linear aquifer system problems only, with constant aquifer saturated thickness and linear boundary conditions. Non-linear boundary conditions, such as large-scale recharge and recovery operations, may result in unrealistic simulation results. The Palms Project superposition model derived from the USGS CVHM has a refined grid and fewer layers and utilizes averaged hydraulic properties. As such, the Palms Project model is a completely new model that should have been calibrated to historical site conditions.

The Palms Project model was “validated” by comparing simulated change in heads (drawdown) to drawdown calculated with an analytical *WinFlow* model using a hypothetical pumping scenario. The results did not match well, requiring further calibration of the Palms Project model. Rather than calibrate the Palms Project model to hypothetical drawdown results, the Palms Project model should have been calibrated to the actual observed drawdown during the 24-hour pumping tests used to develop and calibrate the analytical *WinFlow* model.

The Palms Project model could not simulate long-term change in head associated with recovery pumping from the WKWD well field from 2011 to 2014 without adding the recovery operation of the Kern River Projects. Likewise, the Palms Project model could not simulate the long-term change in head associated with recharge operation from 1993 to 1998 without adding the recharge operation of the Kern River Projects. This demonstrates that the boundary conditions are non-linear, and simulation results are dependent on activities located away from the Palms Project site. The Palms Project model needs to include and be calibrated to the nearby recharge and recovery operations of the Kern River Projects.

It has been a pleasure to be of professional service to you. Please contact us if you have any questions or if we can be of further assistance.

Sincerely,
Wood Environment & Infrastructure Solutions, Inc.

David M. Bean

David M. Bean, PG, CHg
Principal Hydrogeologist

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(Submitted Electronically)

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8.0 Response to Comments

This chapter includes a brief summary of the comments submitted, with the District's response. The full text of the comments is found in Chapter 7.

8.1 West Kern Water District

WKWD-1*: How was it determined that up to 10 feet of anticipated drawdown would be a less than significant impact? At times of drought and regional recovery operations, WKWD has had to lower pumps in its North Wellfield wells, and some of these wells cannot accommodate lower (deeper) pump settings.*

Response: Drawdown would be considered a significant impact if it could result in groundwater levels falling below MTs. For the WKWD's North and South Management Areas, the two management areas where production wells are located, MTs for chronic lowering of groundwater levels are defined based on historic maximum and minimum levels observed at each well. At each well 20 percent of the difference between these elevations was calculated, and then subtracted from the minimum historical value to obtain the numerical MT value (WKWD GSA 2020). An undesirable result would occur when the MT for groundwater levels are exceeded in at least three adjacent management areas that represent at least 15 percent of the Subbasin, or that represent greater than 30 percent of the Subbasin (as measured by each management area).

The modeled scenario was intended to reflect a worst-case scenario, where recovery pumping would occur over 4 consecutive years, starting 1 year following the associated recharge. The maximum drawdown under this scenario is shown on Figure 3-13 of the DEIR. This impact was determined to be less-than-significant because the drawdown is expected to be at this level or less and will be temporary, with recovery occurring during periods of recharge.

The drought and regional recovery operations were considered under the cumulative analysis. The cumulative analysis did find that the drawdown from the Project, in conjunction with other regional projects, may cause a potentially significant impact to the groundwater levels at the WKWD North Wellfield. Under Mitigation Measure CUM-1, recovery Project pumping will be deferred prior to groundwater levels reaching their MTs at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD. Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90 percent of the recharged amount.

WKWD-2: *Are two years of recharge required to occur before any project-related extraction occurs?*

Response: Two years of recharge has already occurred at the Palms. To date, the District has recharged approximately 27,166 AF in the Palms Project, 14,164 AF in 2017 and 13,002 AF in 2019. The District has selected the Reduced Recovery Alternative (Scenario B) as the preferred alternative. Under this alternative, recovery will be limited to 90 percent of the amount recharged.

WKWD-3*: On Figure 3-15, the simulated monitoring point named MW_WKWD shows the change in water level at the end of year 6 reaches -15 ft. Would this be considered a significant impact?*

Response: The hydrological analysis concluded that drawdowns from the Recovery Project alone would not produce a drawdown that would be considered a significant impact. However, the cumulative analysis found that drawdown from the Recovery Project, in conjunction with other regional projects, could result in groundwater levels falling below MTs resulting in a potentially significant impact to the groundwater levels at the WKWD North Wellfield. Mitigation Measure CUM-1 is proposed reduce the impact to less-than-significant by deferring Project pumping to later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs.

For the WKWD's North and South Management Areas, the two management areas where production wells are located, MTs for chronic lowering of groundwater levels are defined based on historic maximum and minimum levels observed at each well. At each well 20 percent of the difference between these elevations was calculated, and then subtracted from the minimum historical value to obtain the numerical MT value (WKWD GSA 2020). An undesirable result would occur when the MT for groundwater levels are exceeded in at least three adjacent management areas that represent at least 15 percent of the Subbasin, or that represent greater than 30 percent of the Subbasin (as measured by each management area).

WKWD-4: *Would a change in timeline for recovery operations lead to a potentially significant impact? If a delayed timeline where to occur, would the overall impact to water levels at the WKWD be greater than 10 feet and would this be considered a significant impact? What mitigation could be provided if any existing pump in a WKWD well cannot be lowered any deeper than it currently is?*

Response: The modeled scenario was intended to reflect a worst-case scenario, where recovery pumping would occur over 4 consecutive years, starting 1 year following the associated recharge. Under the selected alternative, the Recovery Project would recover 90 percent of the recharged water. The simulated recovery pumping would occur at a rate of 25,000 AFY over a 6-month period over 3 consecutive years. During Year 4, the recovery pumping would occur at a rate of 15,000 AFY. The same pumping rate occurs during the first 3 months, reduced pumping occurs in the 4th month, and no pumping during the final 2 months of Year 4 of the extraction period. As described for Scenario A, this recovery schedule is anticipated to be the worst-case scenario, with actual recovery extending over a longer time period, with less impact to groundwater levels.

The modeling performed for the DEIR was designed to inform decision making with respect to well placement, well construction and project operation and has provided insights useful in supporting these decisions. With respect to project operations, it is the monitoring program and mitigation measures that will govern. As noted in clarifications made to the project description in the EIR, the District will follow the monitoring standards and the mitigation measures established in the BVGSA. In the event the District joins the JOC, then those monitoring standards would be controlling for the Palms Project. Thus, the mitigation provided if groundwater recovery in the Palms should be demonstrated to impact operation of a well in WKWD or within the boundaries of other JOC members would be determined by the JOC's measures for mitigating such a condition.

WKWD-5a: *Does the BVWSD Palms Project DEIR using the groundwater-surface water modeling (C2VSimFG-Kern) consider work presented in the recent Kern Fan Groundwater Storage Project DEIR?*

Additionally, does the cumulative analyses presented in the BVWSD Palms Project DEIR consider the effects on neighboring wells if the BVWSD Palms Project wells were to recover stored groundwater at the same time that groundwater recovery operations were to occur at the Kern Fan Groundwater Storage Project, the Rosedale Rio Bravo Drought Relief Project, and the Stockdale Integrated Banking Project?

Response: The cumulative simulation for the cumulative analysis is based on the C2VSimFG-Kern model projected-future Baseline Scenario used to support the Kern County Subbasin GSPs submitted to DWR in 2020. The Kern Fan Groundwater Storage Project and the Stockdale Integrated Banking Project are listed in Table 4-1 of Attachment D of Appendix D of the DEIR as projects included in the Baseline scenario by the RRBWSD Management Area. The RRBWSD Drought Relief Project is represented as part of the projected groundwater bank recovery for the Irvine Ranch projects. These projects, and many others, were considered in the cumulative impact analysis in the DEIR.

The modeling for the Kern Fan Groundwater Storage Project DEIR was conducted concurrently with the modeling work performed for the proposed Project DEIR. During this period (April 2020), BVWSD held meetings with RRBWSD, WKWD and KWBA to discuss the Palms Recharge Project and presented the modeling approach and preliminary results of the Palms Recharge Project. No reciprocal exchange of modeling information was provided for the Kern Fan Groundwater Storage Project.

WKWD-5b: *If extraction is occurring in the BVWSD Palms Project at the same time as extractions are occurring at the Kern Fan Groundwater Storage Project, the Drought Relief Project, and the Stockdale Integrated Banking Project, would the impacts to WKWD North Wellfield wells be greater than anticipated by the modeling presented in the BVWSD Palms Project DEIR? If cumulative impacts to WKWD are significant mitigation responses with respect to water level drawdown impacts on the WKWD North Wellfield should be included in the DEIR.*

Response: As noted in Section 2.3.3 of the DEIR, BVWSD entered into a MOU with the KWBA and its Member Entities (including WKWD), which provides that, "…any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU…" In subsequent years, a JOC has been formed among these parties, which utilizes multiple groundwater models to assess impacts to groundwater from banking and recovery operations. BVWSD will either amend the existing MOU, develop a new MOU, or join the JOC, to address the operation and monitoring of the Recovery Project. Therefore, the intent is to use this mechanism to address issues such as the one outlined in the comment.

WKWD-6: *The BVWSD Palms Project DEIR does not address energy recovery cost due to increased drawdown in adjacent wells (specifically those operated by WKWD) caused by operation of Palms Project wells.*

Response: It is anticipated that increased cost of pumping during times of recovery would be countered by reduced cost of pumping during recharge.

WKWD-7: *What specific mitigation measures can be applied to address site-specific impacts on WKWD operations?*

Response: **Mitigation Measure CUM-1** has been proposed to mitigate potentially significant impacts to WKWD. This mitigation measure states that Recovery Project pumping will be deferred prior to groundwater levels reaching their MTs at RMW-088-WKWD, RMW-089- WKWD, RMW-058-RRBWSD, and RMW-059-RRBWSD. Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90 percent of the recharged amount.

WKWD-8*: Were variable groundwater flow directions considered as part of the analyses? Would groundwater flow directions other than northwest to southeast result in significantly different stimulated outcomes?*

Response: Yes, the analysis does consider variable groundwater flow directions including the range of likely groundwater flow directions in the area around the proposed Project. The Superposition Model results are presented in terms of change in groundwater levels rather than in absolute values of groundwater elevations. The groundwater level change maps based on the Superposition Model are the equivalent of the difference map generated by subtracting a Project Scenario from a Baseline Scenario when using a traditional groundwater model. The superposition hydrographs show the simulated groundwater level change added, or superimposed, onto historical conditions to illustrate the extent of groundwater level change that would have resulted if the proposed Project had occurred as simulated in the past. Therefore, the analysis includes an assessment of the variable groundwater flow directions that have occurred historically.

The Cumulative Impact Analysis is based on the C2VSimFG-Kern model projected-future Baseline Scenario used to support the Kern County Subbasin GSPs submitted to DWR in 2020. The C2VSimFG-Kern model is based on the DWR C2VSimFG model developed for the Central Valley. For the Kern County Subbasin GSPs, the DWR version of the model was enhanced by including data from the local water agencies with the Subbasin, with an emphasis on recharge and groundwater pumping. C2VSimFG-Kern model is a conventional groundwater model in that it provides a complete representation of the groundwater sources and sinks within the model domain. As such, the C2VSimFG-Kern model directly simulates the variable groundwater flow directions for the projected-future conditions.

WKWD-9: *Was the data presented in the 2017 GEI memo considered as part of the preparation of Table 3-7?*

Response: *See* Master Response #3 – Water Quality Data. Regarding the arsenic data comment, arsenic data from DW01 and DW02 were prior collected to 2008 with only one result. More recent data from BVWSD's Monitoring Well 13 was used in the DEIR analysis as it is considered to be more representative of Project area conditions.

WKWD-10*: Does the water quality analysis consider changes that may occur to water quality as water levels decrease? If the expected water quality parameters presented in Table 3-7 were to increase in concentration as water levels decrease over time in the area, could the Palms Project still operate as proposed?*

Response: Water quality analysis included use of maximum and average available results from 2008-2019. This would capture changes in water quality within the last 10 years, which includes the last major extended drought from 2012 to 2016, resulting in deeper groundwater levels. However, without available consistent monitoring over time, trending analysis against groundwater levels was not conducted.

There is limited value to continue collecting data within the existing monitoring well network. Only one monitoring well is within the Project area and other wells outside the Project area are not constructed to depths representative of the proposed new wells. Once the new wells are constructed, they will be added to BVWSD's existing monitoring well network for continued monitoring. As noted in clarifications made to the project description in the EIR, the District will follow the monitoring standards and the mitigation measures established in the BVGSA. In the event the District joins the JOC, then those monitoring standards would be controlling for the Palms Project.

WKWD-11*: The Palms Project DEIR states a potential beneficial impact on water quality. Additionally, the Palms Project DEIR states that a total of 27,000 AF was recharged in the Palms Project property during 2017 and 2019. However, there is no information provided in the Palms Project DEIR to demonstrate if that recharged water improved water quality in the area.*

Response: The purpose of BVWSD's monitoring wells is to continue groundwater quality monitoring. The District expects, over time, for groundwater quality to be consistent with recharge water quality. Since the quality of the surface water being recharged is than the current groundwater quality, recharge with the surface water will, over time, result in improved groundwater quality in the Project area. Elevated constituents in the groundwater such as total dissolved solids are expected to drop in response to recharge over time. Changes to the groundwater quality are beneficial to existing and potential future users of the groundwater resource.

WKWD-12: *Is Manganese the only constituent that prevents the Palm Area-Only project alternative from being feasible? If Table 3-7 is representative, wouldn't the Palms Project wells located to the north of WKWD make the water quality less desirable after blending?*

Response: Manganese is not the only constituent preventing the Palm Area-Only project alternative from being feasible. Other constituents such as conductivity, hardness, sodium, sulfate, and total dissolved solids are slightly elevated compared to average groundwater results east of East Side Canal. In addition, there are some constituents where levels are higher than west of East Side Canal. Based on the theoretical blending calculations summarized in Table 3-9, blending of the two types of groundwater balances out the water quality to meet state and federal drinking water standards. As mentioned in Master Response #4, the theoretical blending calculations were conducted based on the best available data at the time. The proposed mitigation measures HYDRO 1 through HYDRO 5 will be implemented with anticipation the new production wells will yield better water quality than the wells used in this evaluation.

WKWD-13: *If water quality conditions at the Palms Project recharge site are poor and water pumped from the site cannot be placed back into the aqueduct without blending from offsite wells, is spreading higher quality Kern River Water and State Water Project water in the Palms Project area a reasonable use of resources?*

Response: *See* response Master Response # 9 – Clarification of Recovery Project Description. Comments regarding the impacts of recharging water in the Palms Project Area are not relevant to this Recovery

Project. The Recovery Project only seeks to construct and operate recovery facilities to supplement the District's existing recovery of previously banked water.

Groundwater quality in the region is variable and depends on the quality of the recharge water [DEIR 3-59]. As can be seen in the environmental documents for existing groundwater recharge projects within the District, which are all public record, surface water recharged is of better quality than groundwater and thus, generally improves groundwater quality. Groundwater quality is suitable for beneficial use, so recovered water will be applied to beneficial use. *See* Master Response #4 – Water Quality #2 and Master Response # 8 – Beneficial Use of Recovered Groundwater.

8.2 Kern County Water Agency

KCWA- Introduction: *The Kern County Water Agency (KCWA) contracts with DWS for SWP water and manages or participates in multiple groundwater banking project and is therefore uniquely qualified to provide comments.*

Response:

The District appreciates the feedback from the KCWA and we hope to resolve your concerns regarding the Recovery Project.

KCWA-1: *The Palms Project DEIR incorrectly uses drinking water MCLs as the benchmark for water quality comparisons when the appropriate benchmark for comparing water quality impacts of future Pump-in programs is historic California Aqueduct water quality. Additionally, in Table 3-5, several of the upstream Aqueduct water quality values appear to be high. Given the higher values, the potential impacts to water quality may be greater than what is discussed in the Palms Project DEIR.*

Response: DWR's 2012 Pump-In Policy (Policy) states that "both historical and current [State Water Project] SWP water quality levels shall be considered" when evaluating baseline water quality. The Policy also states future Non-Project (NP) projects should have water quality meeting primary drinking water standards and to show that the water shall be treated or blended before it enters the SWP to prevent water quality impacts. Although it's acknowledged both historical and current SWP water quality levels are to be considered, the focus of this evaluation was on the antidegradation of SWP water quality. To understand the impacts Palms Project water would have on the SWP, it was necessary to evaluate water quality upstream and downstream on the Aqueduct near the potential turnout. This data is more current than the historical values presented in DWR's 2012 Policy and more currently reflects the Aqueduct's water quality. DWR requires a new PIP to provide historical data that is no more than 3 years old. Once the new wells are constructed, sampling will need to be conducted to meet DWR's requirement. The EIR presents mitigation measures specifically to address this concern. Mitigation measure HYDRO-3: To develop the PIP, the District will conduct water quality sampling of all the wells quarterly for 1 year. Sampling will include Division of Drinking Water's Title 22 constituents along with DWR's "Constituents of Concern" that are not included in Title 22. Mitigation measure HYDRO-4: When water quality data becomes available on the Recovery Project's production wells (both existing and new wells), blending calculations will be updated. The final blending scenario will be selected to ensure that the final, blended water quality, meets DWR requirements. Mitigation measure HYDRO-5: The District will follow the water quality monitoring and reporting requirements in the Pump-In Agreement with DWR.

In response to the comment regarding the data used in the DEIR to characterize Aqueduct water quality, a request was made to KCWA to see if they have any current data on the Aqueduct. We were directed to Improvement District No. 4 2020 Annual Report on Water Conditions, Table 13, which provided water quality data for four sources of water they receive. The Aqueduct source was collected at Tupman and is representative of the Aqueduct, near the Palms Project. For this reason, Tables 3-4 and 3-5 of the FEIR have been updated. Also *see* Master Response #4 – Water Quality Impact Analysis.

KCWA-2: *It is difficult to evaluate the potential impacts to Aqueduct water quality based on representative wells as the results are highly variable and the DEIR includes no additional analysis of how to minimize water quality impacts outside of the limited discussion on blending water and construction modifications. Additionally, the Project should not rely upon water banked by adjoining entities, such as the Kern Water Bank, West Kem Water District or Pioneer Project, to blend water to improve water quality.*

Response: *See* Master Response #4 – Water Quality Impact Analysis and Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis. The Recovery Project does not rely on using water banked by adjoining entities to improve water quality by blending. Available water quality data from neighboring entities were used solely to help understand and characterize the groundwater quality east of the East Side Canal, where some new production wells would be constructed. Theoretical blending calculations were performed to evaluate if blending water from new production wells from both sides of the East Side Canal would be feasible for subsequent development of the PIP to DWR.

KCWA-3: The Palms Project DEIR may not have sufficient mitigation measures to reduce water quality impacts to meet the requirements of the Aqueduct Pump-in program. The Palms Project DEIR should be amended to include a complete analysis of potential water quality impacts from the Palms Project.

Response: *See* Master Response #4 – Water Quality Impact Analysis.

KCWA-4: *The Palms DEIR makes uncorroborated claims that there would be no impact to population and housing and that the Project would not be growth inducing. Without adequate discussion on the quantity of water, potential public water agencies or contract duration of potential water that may be sold to other industrial or municipal users, there is no way to substantiate the claim of no population or growth inducing impacts. Therefore, the DEIR should be amended to identify and discuss the aspects and limitations of potential future water sales and demonstrate BVWSD will commit to remaining in balance prior to selling any water.*

Response: The DEIR acknowledges that other parties may participate in the Project through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers. However, the identity of potential partners and the extent of their involvement is currently unknown and any analysis of such would be unduly speculative. Agreements would be made, as necessary, in advance of any water exchanges or transfers and if required additional compliance with CEQA would be completed at the appropriate time. The project description includes all the information required by CEQA to comprise an adequate description of the project without supplying extensive detail beyond that needed for evaluation and review of the environmental impacts (*CEQA Guidelines* §15124). It is the intent of the DEIR to evaluate impacts of recovering previously banked water from all such sources to the extent that they are reasonably foreseeable.

Since the Recovery Project recovers a maximum of 90 percent of the recharged water, the recovery pumping is in volumetric water balance with the existing recharge operations.

KCWA-5: *The Palms Project DEIR should amend the project approvals to include KCWA for approval of agreements to modify BV8 and approval of the agreements for authorizing use of the Aqueduct to deliver, exchange and covey water.*

Response: The requested edits have been made to Section 2.4 of the EIR.

KCWA-6: *The DEIR lacks a hydraulic analysis to determine the potential impacts to water surface elevations in the Aqueduct. The DEIR should be amended to include discussion of the need for hydraulic analyses and whether additional environmental documents may be prepared to analyze the results of a hydraulic analysis by DWR.*

Response: Sections 2.3.1 and 2.4 of the EIR has been revised to note the potential need for a hydraulic analysis to evaluate water surface elevations in the Aqueduct. If the results of that hydraulic analysis should trigger a need for additional environmental documentation, the additional environmental documents will be completed. The appropriate level of analysis will be determined at that time.

KCWA-*7: Based on Figure 2-2, the Project recovery facilities are located up fan of the Palms Groundwater Banking Project facilities, however, it is common knowledge that all banked water is recovered down fan from the recharge area. The DEIR indicates that Buena Vista will join the Kem Water Bank Authority Joint Operating Committee (JOC) or amend or enter into a new MOU. Should Buena Vista be permitted to join the JOC, it will still be required to enter into a new MOU that demonstrates the Project is in the spirit of the KFMC MOU. While the KFMC MOU allows for recovery of banked water outside of the project site, it requires consent of both the KFMC and the district or entity with jurisdiction over the recovery area. Therefore, the DEIR should be amended to include discussion of the KFMC MOU's provisions and how the Project will meet those requirements.*

Response: The recovery facilities shown on Figure 2-2 of the DEIR are distributed between facilities up fan of the recharge facilities and facilities located down fan within the recharge area. The recovery facilities located up fan of the recharge areas are separated from the recovery facilities because this area is not well-suited to groundwater recharge. As described in Master Response #7- Regional Groundwater Level Contour Mapping and Flow Analysis, groundwater flow direction is generally to the southeast in this area. meaning groundwater recharged at the Palms flows towards the eastern recovery wells. Thus, the distribution of recharge and recovery facilities is designed to achieve the project purpose by placing the recharge facilities in the area best suited for recharge while recovery facilities are located to produce a water supply that will minimize requirements for treating recovered water and to spread the recovery operations over an area sufficiently broad to minimize well interference, breaches of MTs and other impacts of concentrated pumping.

The Recovery Project intends to maintain a positive balance between project recharge and recovery to demonstrate no borrowing of recovered water from the basin. The project will be operated in a manner consistent with the requirements of the Kern Fan Monitoring Committee's (KFMC) MOU.

KCWA-8: *The superposition model is not the appropriate approach to adequately assess the potential groundwater impacts, including impacts to the Aqueduct. the DEIR should be amended to include an updated modeling approach that considers geologic factors, including local operations, water projects and Kern River hydrology.*

Response: *See* Master Response #1 – Suitability and Validation of Superposition Model.

8.3 Kern Groundwater Authority

KGA – Introduction: KGA is concerned the Proposed Project is unlawful, violating the California Constitution and the Water Code. In addition, the DEIR is deficient for not disclosing components of the Proposed Project and not evaluating its environmental impacts. The KGA requests that BVWSD revise the Proposed Project to ensure it complies with applicable law and revise and recirculate the DEIR to address the deficiencies demonstrated in the comments below.

Response: *See* responses to detailed comments in KGA-1 through KGA-9, below, for explanation of the District's conclusion that the Proposed Project is lawful and the EIR complies with applicable law. The DEIR has been revised in response to the comments received to clarify, amplify, and make insignificant modifications to an adequate DEIR. Recirculation is not required (CEQA Guidelines Section 15088.5(b)).

KGA-1a: *The DEIR does not analyze whether the water being recharged in the Palms Area is of such quality that it can be extracted and applied to beneficial uses. Without disclosure and evaluation of data that shows the water recharged by the Proposed Project will later be extracted and put to beneficial use, the Proposed Project amounts to an unreasonable use of water. Because the DEIR does not establish that the water recharged will be or can be later extracted and put to beneficial use, the Proposed Project proposes to use water in a wasteful and unreasonable manner and the Proposed Project cannot be approved as lawful.*

Response: *See* Master Response #8 – Beneficial Use of Recovered Groundwater.

KGA-1b: *The Proposed Project proposes to recharge high-quality surface water in an area where groundwater is documented to be of much poorer quality. If read carefully, the DEIR acknowledges that the water quality in the recharge area prevents BV [BVWSD] from extracting water where it has been recharged…the DEIR does not evaluate how BV will ultimately meet the water quality requirements of the pump-back program.*

KGA-1b:
This comment raises concerns with the Project's proposals to recover water from two different sites (both east and west of the Eastside Canal) and the DEIR's evaluation of water quality in order to meet DWR's pump-back requirements to the CA Aqueduct. The comment implies that the water recovered within the "Recovery Project Area" is native groundwater. This is not accurate. The Project will recover water previously banked by the District.

The Project proposes 14 recovery wells, half of which will be located on the property west of the Eastside Canal in the location of the existing Palms Project area, where the recharge facilities are located, with the other half on the to the east [DEIR Fig. 2.2]. As described in Chapter 3.4, the water quality in both locations meets the standards for beneficial use. All of the proposed wells will recover water that was previously banked by the District under existing projects. This includes the Palms Project, as well as District canals, laterals, etc. [DEIR Sec. 2.31 & 2.3.2].

Water recharged in the District generally flows in a southeasterly direction [DEIR 3-55]. This is similar to how West Kern operates their project. Most of their banking is in BVWSD. All of their recovery is outside the District. BVWSD is only installing half of its wells in the area just outside the current District boundary, and much closer to its recharge facilities than the West Kern recovery wells are to its banking locations. For a more detailed explanation of this conclusion, please *see* the discussion of the direction of groundwater flow in Master Response #7- Regional Groundwater Level Contour Mapping and Flow Analysis. As such, the proposed recovery wells are situated to capture water previously recharged by the District.

In is incorrect to state that the DEIR did not evaluate how the District will meet the water quality requirements of the Aqueduct. Chapter 3.4.3 of the DEIR discloses that since the Recovery Project involves the construction of new wells, the District conducted an evaluation of the water quality data of existing groundwater wells in the area to gain a general understanding of constituent concentrations at certain depths of the aquifer. However, the water quality of the new production wells may vary from the water quality of the existing wells. As water quality varies by depth, it is possible to screen the new wells to produce more favorable water quality. Aquifers with favorable water quality will be identified prior to construction of the wells. Well design will include considerations to allow, if necessary, modification of the wells after construction to improve water quality.

Prior to well construction, either aquifer isolation zone testing, which is common water quality testing method used by the scientific and well drilling communities, will be conducted or alternatively, nested monitoring wells will be constructed. In either scenario, water quality sampling will be conducted at varying depths to determine the appropriate well screen interval for the production wells. The production wells will then be designed to just collect water from aquifers with favorable water quality.

During well construction, strong well screens will be used, which will allow patches to be placed over them to prevent poorer quality water from entering the well once it is constructed. Bentonite clay seals will again be placed along with the gravel pack to isolate aquifers so that if patches are installed the poor-quality water does not move vertically within the gravel pack and enter the well through another well screen. The water quality may also be able to be adjusted by changing the pump intake depth.

To further reduce unfavorable levels of constituents identified earlier, treatment by blending will be conducted in a transmission pipeline. All wells will be blended in the pipeline prior to discharge into the Aqueduct *via* a turnout. Five mitigation measures are proposed to mitigate for the potentially significant impact that the Recovery Project could have impacts to the water quality of the Aqueduct, if discharges degrade the Aqueduct's existing water quality. These mitigation measures reduce the Recovery Project potential impacts to a less-than-significant level. Ultimately, the District will not pump into the Aqueduct until the water quality is approved by DWR.

KGA-2: *The DEIR fails to analyze whether any of the water recharged in the Palms Area could be later extracted and put to beneficial use. The DEIR provides no data establishing that the recharge from the Proposed Project augments the usable supply. Without further analysis disclosure, the Proposed Project* *has not established that the proposed recharge would result in any valid right to extract groundwater outside the Palms Area.*

Response: *See* Master Response # 8 – Beneficial Use of Recovered Groundwater.

KGA-3: *In the cumulative impact section of the Palms Project DEIR, BVWSD discloses that the Proposed Project will, in fact, affect existing storage programs and conjunctive use projects. Because this impact is prohibited by SGMA, the Proposed Project is unlawful and cannot be approved.*

Response: As stated in the DWR draft BMP 6 (BMP 6 Sustainable Management Practices – Draft. California DWR. 2017) and stated in Section 3.3 of the KGA GSP, occasional, localized exceedances of MTs do not constitute impacts prohibited by SGMA and therefore are not violations of SGMA, *see* also Master Response #5 – SGMA.

Modeling results presented in the EIR indicate negligible effects from the Recovery Project operations in the Cumulative Scenario RMW locations in WKWD South Wellfield, RRBWSD, KRGSA (city of Bakersfield) and the Pioneer Project show (Figures 4-4 and 4-5 of the DEIR). The cumulative impacts modeling does indicate that recovery operations may result in water levels lower than those shown in the SGMA Baseline – Projects scenario at wells the WKWD North Wellfield (Figure 4-2 of the DEIR) and the far western areas of RRBWSD (Figure 4-3). However, modeling of cumulative impacts shows only sporadic breaches of MTs at the above locations, with breaches shown in modeling of the Palms – 90 percent Recovery Scenario being eliminated in the scenario selected as the environmentally preferred alternative for implementation, the Palms – Deferred Recovery Scenario. This impact (groundwater levels at the WKWD North Wellfield and the far western areas of RRBWSD to fall below the MT during simulation years) is disclosed in the EIR and described as potentially significant.

The results of the Cumulative with Deferred Recovery Scenario indicate that there are active mitigation measures that are available to reduce the potential of undesirable results resulting from the Recovery Project recovery pumping. Therefore, mitigation measure CUM-1 "Recovery Project pumping will be deferred prior to groundwater levels reaching their MTs at RMW locations RMW-088-WKWD, RMW-089-WKWD, RMW-058-RRBWSD, or RMW-059-RRBWSD. Deferred pumping will occur in later years, when groundwater levels are sufficiently high that deferment will protect against breach of MTs. The total amount of recovery will remain the same, at a maximum of 90 percent of the recharged amount." will be applied to reduce potentially significant cumulative impacts.

Implementing Mitigation Measure CUM-1 would reduce the potentially significant impact on groundwater levels to a less-than-significant level because it would minimize the potential that groundwater levels will decline below the MT.

In addition to Mitigation Measure CUM-1, should operation of wells that are part of the Recovery Project be demonstrated to be impacting operation of other wells within the BVGSA or in neighboring GSAs, Section 7.4.1.1 of the BVGSA GSP includes the following provisions regarding curtailment of pumping in response to adverse conditions:

- Curtailment of pumping is the third adaptive management action included in the GSA's program. Of the suite of actions, this is the action best suited to quickly correcting adverse conditions observed at representative monitoring sites.
- Minimum thresholds have been set at all wells in the GSA's groundwater level monitoring network that are used to monitor two important sustainability indicators:
    - Chronic lowering of groundwater levels
    - Reduction of groundwater storage

Should groundwater levels drop below the MT at any well in this network, and it can be determined that the decline can be attributed to extraction occurring within the BVGSA, the GSA will curtail pumping through the following series of steps to be taken after notification that groundwater levels have breached a MT:

1. Verification measurements will be made within 72 hours, after ensuring that no nearby wells are actively pumping.
2. If the verification measurement is still below the established MT, groundwater levels at nearby monitoring wells in the BVGSA and neighboring GSAs will be checked to confirm that the breach is the result of localized extraction and is not due to extraction from neighboring areas.
3. If determined that the breach is primarily due to localized pumping, a curtailment notice will be sent to all agricultural and industrial well operators within a 1-mile-radius of the relevant monitoring site. Wells subject to curtailment will be identified through GIS software and known locations of production wells.
4. Weekly groundwater level measurements will be taken at the affected monitoring site to observe the impact of the curtailment.
5. Pumping will be allowed to resume if the water level rises above the established MT and is sustained for 2 consecutive weeks. The volume of pumping may be limited by the BVGSA based on trends in groundwater levels observed prior to and after implementation of the curtailment.
6. If groundwater levels continue to decline or are unchanged after imposition of a 1-mile-radius pumping restriction, the radius of the restriction will be increased to a distance the BVGSA determines adequate based on assessment of regional groundwater elevations and modeling of the likely impacts of extending or prolonging the restriction.
7. Pumping restrictions are enforceable through monitoring of the magnetic flow meters now installed on all production wells in the BVGSA.

Depending upon the cause of the reduction in groundwater levels that trigger a pumping curtailment, the BVGSA may choose to combine the curtailment with actions to make supplemental surface water available to the affected area to substitute for the reduced access to groundwater.

As well as the curtailment measures that could be implemented in response to conditions observed at RMWs, the GSP includes the following sequence of measures for remediation of any wells that have lost production due to chronic lowering of groundwater levels.

1. Losses in well production believed to result from lowering of groundwater levels will be reported to the BVSGA.
2. Within 5 business days, a representative of the GSA will meet with the claimant to develop a full understanding of the basis for the reported impact.
3. The GSA, and, if necessary, a technical specialist, will investigate the reported impact to assess the extent of the impact and determine whether the impact is the result of lowered groundwater elevations or other factors unrelated to groundwater elevations such as deterioration of the well, pump and motor. This investigation will include analysis of groundwater elevations, pumping data, and inspection of the well.
4. Based on the results of the investigation, if the reduction in pumping capacity is confirmed to have been caused by lowered groundwater levels, remediation measures will be developed and promptly implemented. These measures may include deepening or replacement of the well; lowering of pump bowls; and other corrective measures. During the period of discussion, investigation and remediation, the owner of the affected well may receive deliveries of water from other sources, or other measures necessary to relieve the reduction in pumping capacity. Mitigation measures will be developed through consultation with the claimant and will be approved by the GSA and the County of Kern. The BVGSA will strive to develop and implement the agreed upon mitigation measures as quickly as reasonably possible.
5. Implementation of remediation measures will be confirmed, and the results of the implementation program will be monitored.

The BVGSA will maintain adequate financial resources to cover impact assessment studies, well repairs and other reasonably anticipated remediation needs.

As noted in clarifications made to the project description in the EIR, the District will follow the monitoring standards and the mitigation measures established in the BVGSA for wells located within the BVGSA. For wells located outside of the BVGSA, the monitoring standards and mitigation measures of the KGA will apply. In the event the District joins the JOC, then those monitoring standards would be controlling for the entire Palms Project.

Adoption of mitigation measure CUM-1, in addition to mitigation measures and adaptive management actions already being implemented through the BVGSA GSP, will enable the Recovery Project to be operated in a manner that will not impact operation of existing conjunctive management or storage projects.

KGA-4a: *The project description fails to describe the Proposed Project in an accurate manner, it is deficient and must be revised.*

Response: The specified deficiencies reflect an incomplete and inaccurate understanding of the Recovery Project as described in the project description and applicable law. Based on the language of the KGA GSP and the owner of the Recovery Project property, these lands will eventually be incorporated into the BVGSA boundaries as there is not existing agreement giving the KGA or any of its members authority. Notwithstanding, as stated in Master Response #2, the KGA does not have discretionary authority over the new wells proposed by the Recovery Project. *See* Master Response #2 – Boundaries of the GSA for more information.

Figure 2-2 of the DEIR and this FEIR clearly displays the location of the recharge facilities and the recovery facilities. The DEIR fully discloses the location of the wells that will extract water and that some of this extraction will take place at locations different from where the Palms Recharge project is now operating.

The DEIR clearly describes the objective of the Proposed Project to recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the Aqueduct. *See* Chapter 5.6 of the DEIR and this FEIR for an explanation of why the Palms-only Recovery Alternative was not evaluated in detail. It is incorrect to state that water quality is not sufficient in the Palms area to allow extraction and use, *see* Master Response #8 – Beneficial Use of Recovered Groundwater.

The final EIR has been modified to clarify the following reasons for the separation of some of the recovery wells from the site of the Palms Recharge Project:

- The area where recovery wells are located outside the footprint of the recharge project was not proposed for location of recharge facilities because the land is not suited to groundwater recharge.
- Water quality data from wells within the recharge area and outside of this area indicate that the quality of water recovered from each site is of sufficient quality for the intended purpose. However, while water from each of the project wells is of a quality that allows the water to be put to beneficial use, the ability to blend water recovered from within the recharge area with water recovered from wells outside this area will increase the range of uses the water may serve. Therefore, the most effective use of resources available to the BVGSA is to recharge surface water in areas suited to recharge while distributing recovery facilities to produce groundwater from the array of recovery wells of a quality that will require no or minimal treatment to meet a broad range of beneficial uses.

KGA-5: *The Proposed Project proposes to recharge up to 100,000 acre feet of additional surface water per year into the Kem subbasin… The DEIR did not identify the source of the additional recharge water and therefore failed to disclose or evaluate any of these environmental impacts of the Proposed Project. The KGA requests the Palms Project DEIR be revised to identify the source of the additional recharge water, the anticipated years in which such water would be available and evaluate the environmental impacts from the increased diversion to recharge.*

Response: The Project does not propose to recharge any water, let alone an additional 100,000 acre-feet, *see* Master Response #9 – Clarification of Project Description.

KGA-6: *The DEIR fails to disclose and analyze the water quality in the different areas of the Proposed Project; specifically, the area in which water will be recharged compared to the area in which water will be extracted for use. The KGA requests the DEIR be revised to disclose all the water quality data and evaluate the impacts of the Proposed Project on water quality.*

Response: *See* Master Response #3 – Water Quality Data.

KGA-7: *The DEIR's environmental analysis of the Proposed Project impact on subsidence is not sufficient. Additionally, the DEIR does not include any of the information or analysis required by DWR. For this reason, the DEIR is deficient and must be revised and recirculated.*

Response: Subsidence is one of six SGMA sustainability criteria and is defined as, "Significant and unreasonable land subsidence that substantially interferes with surface land uses" (DWR draft Best Management Practices for the Sustainable Management of Groundwater – Sustainable Management Practices, 2017 p. 5). The GSAs within the Kern County Subbasin have agreed to further refine the term "significant and unreasonable subsidence" as meaning, "The point at which significant and unreasonable impacts, as determined by a subsidence rate and extent in the basin, that affects the surface land uses or critical infrastructure. This is determined when subsidence results in significant and unreasonable impacts to critical infrastructure as indicated by monitoring points established by a basin wide coordinated GSP subsidence monitoring plan." (KGAGSP 2020b).

The KGAGSP describes the subsidence monitoring program to be implemented by all GSAs in the Subbasin as follows:

> As detailed in the monitoring plan, the KGA along with the other GSAs in the Subbasin will develop a joint subsidence monitoring program to better understand the cause and impacts of subsidence. The intent of the KGA and the other GSAs in the Subbasin is to develop MTs for subsidence for inclusion in the 2025 GSP update. The Monitoring Network section of this GSP provides a description of the proposed basin-wide land subsidence monitoring strategy that has been adopted by the KGA and all other GSAs in the Subbasin." (KGAGSP, 2020a)

Direct monitoring of subsidence is important in the Kern Fan area because past measurements of ground surface elevations and groundwater levels do not suggest that groundwater elevations and subsidence are correlated in a way that would make measurement of changes in groundwater elevations a reliable proxy for measurement of changes in ground surface elevations. This is noted in the BVGSAGSP and in GSPs developed for other GSAs overlying the Kern Fan. For example:

> Subsidence monitoring at the KWB extensometer indicates both upward and downward changes (of at most 0.1 ft/yr) have occurred within an overall upward trend of inflation (Figure 15). As of June 2018, the land surface was 0.27 feet higher than the land surface in June 1994. The data indicate subsidence has not resulted from KWB recovery operations during extended droughts, where groundwater elevations have fluctuated as much as 250 feet. The KWB extensometer monitors subsidence with the aquifer to depths of ~800feet. InSAR data monitors the land surface regardless of the depth of the sediments. That data indicates the lands where stored water is recovered in the eastern portion of the KWB have risen as much as 0.16 feet and lands in the western portion of the KWB have dropped as much as 0.16 feet for the 2015-2018 period (Figure 16). This data is not in conflict with the extensometer data discussed above. Subsidence of up to 0.36 feet is indicated in the most southeasterly portion of the KWB where stored water is not recovered. (KWBAGSP 2020, Section 2.2.2.11 Historic Subsidence Monitoring, p.27)

> Historic KWB operations during four significant storage cycles and two significant recovery cycles, where water levels have fluctuated over 250 feet, have actually resulted in a cumulative land surface rise of about 0.27 feet, providing incontrovertible evidence that the Kern Fan Aquifer is not susceptible to subsidence due to stored-water recovery (see Section 2.2.2.11). DWR also reviewed the geology of the KWB aquifer and the extensometer data and concluded that potential impacts related to both historic and future operations would be less than significant (DWR 2016, page 7.8-11). The extensometer will continue to be monitored and the results will be reported to DWR in annual KGAGSP reports. (KWBAGSP 2020, Section 3.2.4 Land Subsidence, p.34)
>
> Inelastic subsidence has not occurred in over twenty years of KWB operations. DWR has also concluded that subsidence is not likely to occur as the result of future operations. Monitoring will continue, and if significant subsidence begins to develop appropriate mitigation measures will be developed. (KWBAGSP 2020, Section 4.2.4 Subsidence, p.37)
>
> Although groundwater pumping has caused subsidence elsewhere in the southern San Joaquin Valley, data indicate that the Kern Fan aquifer behaves elastically in response to groundwater banking operations. Figures 2-27 and 2-28 in the Umbrella GSP show Subbasin subsidence rates from 2007 to 2011, and from 2015 to 2016 respectively. The data show the impact of subsidence due to groundwater pumping on ground surface elevation in the GSA area has been minimal, and over time, the average land surface elevation has risen approximately 0.8 feet. (KWBA 2018. KWBA Conservation and Storage Project Environmental Impact Report. Cited in WKWDGSP. 2019, Section 3.6 Land Subsidence, p. 3-14.)

Based on the above passages, information presented in BVWSD's DEIR is consistent with analyses presented in the BVGSA's GSP as well as in documents prepared by neighboring GSAs in concluding that operation of the Recovery Project is unlikely to result in subsidence. Thus, the DEIR concluded that inelastic subsidence is unlikely to become a problem in the Project area.

In addition, since a correlation between groundwater elevations and subsidence has not been established in or near the project area, it is unclear that the few instances where the cumulative effects analysis indicates groundwater elevations may briefly drop below local MTs are relevant to an evaluation of subsidence. The analyses noted above regarding operation of nearby water banking facilities located in the Kern Fan are believed to address the substance of DWR's request that reports and analyses be cited to support the conclusion that the risk of subsidence in Basin 5-022 is **less-than-significant**.

KGA-8: *Because BV failed to provide notice and solicit input from responsible agencies, it violated the requirements of CEQA. The KGA requests BVWSD provide it and other responsible agencies with notice and an opportunity to comment prior to revising and recirculating the DEIR.*

Response: All notice requirements and solicitations for input were adequately made to the appropriate responsible agency(ies) [DEIR Sec. 1.3]. It is understood that this comment is made on the mistaken belief that the KGA is a responsible agency. The KGA does not have discretionary approval power over the

Recovery Project, and is therefore not a responsible agency, *see* Master Response #2, Boundaries of the BVGSA.

Kern County does not have discretionary approval power over the project and is therefore not a responsible agency for the Recovery Project as defined in the CEQA Guidelines Section 15381.

KGA-9: *The KGA is committed to serving its members and achieving sustainability for the Kern sub basin. The KGA supports the development of projects and management actions consistent with the subbasin's groundwater sustainability plans and looks forward to working with BV on the revision of the Proposed Project and DEIR.*

Response: The District also supports the development of projects and management actions consistent with the subbasin's groundwater sustainability plans, and looks forward to working with the KGA on cooperative development of the Proposed Project.

8.4 California Department of Fish and Wildlife

CDFW-1: *Aerial imagery of the Project area shows various habitats, including riparian, scrub, grassland, and agricultural. Tule Elk Reserve is adjacent to the Project boundary. Based on review of the Project description, California Natural Diversity Database (CNDDB) records, and the surrounding habitat, several special-status species could potentially be impacted by Project activities.*

Response: Pages 3-6 to 3-10 of the DEIR provide maps and descriptions of habitat and other cover types on and within 200 feet of the project site. The DEIR also acknowledges the Tule Elk Reserve location, and that special-status species could be impacted by Project activities. The DEIR evaluated potential for special-status species to occur on or adjacent to the project site and be impacted by Project implementation.

CDFW-2: *Species may be present in locations not depicted in the CNDDB but where there is suitable habitat and features capable of supporting species. In order to adequately assess potential Project impacts, surveys conducted by a qualified wildlife biologist/botanist during the appropriate survey period(s) and using the appropriate protocol survey methodology are warranted in order to determine whether or not any special-status species are present at or near the Project area.*

Response: Determinations made in the DEIR regarding potential for special-status species to occur on or adjacent to the project site were made based on habitat conditions observed during the field surveys and the species' range. The CNDDB was reviewed for specific information on documented species occurrences in the project vicinity, but the lack of occurrences was not used to assume species absence. As described in Master Response # 6 – Biology and the DEIR and FEIR, field surveys were conducted by qualified biologists to assess suitability of habitat on and adjacent to the project site for special-status species, to search for evidence of special-status species occurrence, and to determine presence or absence of San Joaquin antelope squirrel. Protocol surveys for blunt-nosed leopard lizard and trapping for Tipton kangaroo rat and giant kangaroo rat are not required, because no suitable habitat for these species occurs within 50 feet of the project footprint, including fence installation.

CDFW-3: *The Project has the potential to temporarily disturb and permanently alter suitable habitat for San Joaquin kit fox and directly impact individuals if present during construction, recharge, and other activities. The DEIR defers identifying mitigation for impacts to San Joaquin kit fox until potentially after Project activity has begun, and does not specify consultation with CDFW for activities that may impact San Joaquin kit fox. Recommended mitigation measures include conducting a habitat assessment and surveys to assess presence or absence, implementing U.S. Fish and Wildlife Service (USFWS) 2011 standardized recommendations for protection of San Joaquin kit fox, and avoiding take or acquiring an incidental take permit.*

Response: As recommended by CDFW and described in Master Response #6 - Biology and the FEIR, a San Joaquin kit fox habitat assessment of the project site and adjacent areas was conducted by qualified biologists, and focused surveys for potential dens and evidence of kit fox presence were conducted in native scrub within 500 feet of the northeast portion of the project site. Also as recommended by CDFW, Mitigation Measure BIO-3 includes implementing the USFWS standardized recommendations for protection of San Joaquin kit fox (USFWS 2011). Mitigation is not deferred until potentially after Project construction has begun, because surveys for potential dens and establishment of USFWS standard avoidance buffers or alternative avoidance measures would occur before construction activities begin and would require take avoidance. Mitigation Measure BIO-3 in the FEIR has been augmented to specify the timing for establishing exclusion zones and conducting agency consultation (if required to develop alternative take avoidance measures) and that the District will also consult with CDFW (in addition to USFWS). Because take of San Joaquin kit fox would be avoided, an incidental take permit is not required.

Regarding potential impacts of recharge to San Joaquin kit fox, environmental review for the Palms Project, where recharge occurs, was completed in 2016 (Palms Project IS / Mitigated Negative Declaration (SCH # 2015121030)). Mitigation measures in that IS/MND were developed to reduce potential impacts to kit fox to less-than-significant level.

CDFW-4: *Suitable blunt-nosed leopard lizard habitat includes areas of grassland and upland scrub that contain requisite habitat elements such as small mammal burrows. Individuals also use open space patches between suitable habitats, including disturbed sites, unpaved access roadways, and canals. DEIR Mitigation Measure BIO-1 specifies the installation of temporary exclusion fencing between the Project site and bush seepweed scrub habitat to prevent potential encroachment of small animals, including blunt-nosed leopard lizard, into the Project work area during construction. Fencing design, alignment, construction, and removal are not described in the DEIR, and the potential impacts of fencing are not addressed. Without appropriate avoidance and minimization measures, potentially significant impacts associated with ground-disturbing activities include blunt-nosed leopard lizard habitat loss, burrow collapse, reduced reproductive success, reduced health and vigor of eggs and/or young, and direct mortality. Recommended mitigation measures include conducting a habitat assessment and protocol-level surveys and avoiding take.*

Response: As recommended by CDFW and described in Master Response #6 – Biology, a blunt-nosed leopard lizard habitat assessment of the project site and adjacent areas was conducted by qualified biologists. The project footprint was adjusted based on results of this assessment to provide a minimum 50-foot no-disturbance buffer between the project site and suitable habitat for blunt-nosed leopard lizard. Therefore, no impacts on suitable habitat for blunt-nosed leopard lizard would occur. Mitigation Measure

BIO-1 has been augmented in the FEIR to specify that fencing will be placed outside the minimum 50-foot no-disturbance buffer and therefore will not impact suitable habitat for blunt-nosed leopard lizard. Because impacts on this species and its habitat would be avoided, protocol-level surveys and additional take avoidance measures are not required.

CDFW-5: *Suitable San Joaquin antelope squirrel habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows. Without appropriate avoidance and minimization measures for San Joaquin antelope squirrel, potential significant impacts include loss of habitat, burrow collapse, inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals. Recommended mitigation measures include conducting a habitat assessment and focused daytime visual surveys, implementing a 50-foot minimum no-disturbance buffer around small mammal burrow entrances if suitable habitat is present and surveys are not feasible, and acquiring an incidental take permit if avoidance is not feasible.*

Response: As recommended by CDFW and described in Master Response #6 – Biology, focused daytime visual surveys of potentially suitable habitat for San Joaquin antelope squirrel within 50 feet of the project site were conducted. Qualified biologists walked appropriately-spaced transects at the appropriate time of year and during the appropriate temperatures. Because no San Joaquin antelope squirrels were observed, the species is assumed to be absent from native scrub habitat adjacent to the northeast portion of the project site. In addition, a 50-foot minimum no-disturbance buffer between the project site and small mammal burrow entrances in suitable habitat for special-status mammals would be implemented, as recommended by CDFW and specified in the revised Mitigation Measure BIO-1. Because San Joaquin antelope squirrel does not occur in native scrub habitat adjacent to the northwest portion of the project site, and the recommended 50-foot minimum no-disturbance buffer would be implemented throughout the project site, take of San Joaquin antelope squirrel would be avoided and an incidental take permit is not required.

CDFW-6: *Suitable Tipton kangaroo rat habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows. Without appropriate avoidance and minimization measures for Tipton kangaroo rat, potential significant impacts include loss of habitat, burrow collapse, inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals. Recommended mitigation measures include conducting a habitat assessment, implementing a 50-foot minimum no-disturbance buffer around small mammal burrow entrances if suitable habitat is present, conducting focused trapping surveys if burrow avoidance is not feasible, and acquiring an incidental take permit if the species is detected and avoidance is not feasible.*

Response: *See* Response to CDFW-7.

CDFW-7: *Suitable giant kangaroo rat habitat includes areas of grassland, upland scrub, and alkali sink habitats that contain requisite habitat elements, such as small mammal burrows. Without appropriate avoidance and minimization measures for giant kangaroo rat, potential significant impacts include loss of habitat, burrow collapse, inadvertent entrapment of individuals, reduced reproductive success such as reduced health or vigor of young, and direct mortality of individuals. Recommended mitigation measures include conducting a habitat assessment and focused daytime visual surveys, implementing a 50-foot* *minimum no-disturbance buffer around small mammal burrow entrances if suitable habitat is present and surveys are not feasible, and acquiring an incidental take permit if avoidance is not feasible.*

Response: As recommended by CDFW and described in Master Response #6 – Biology, habitat assessments and focused daytime visual surveys in suitable habitat for Tipton kangaroo rat and giant kangaroo rat were conducted by qualified biologists. The project footprint was adjusted based on results of this assessment to provide a minimum 50-foot no-disturbance buffer between the project site and small mammal burrow entrances in suitable habitat for these species. Therefore, no impacts on Tipton or giant kangaroo rat burrows would occur. Mitigation Measure BIO-1 has been augmented in the FEIR to specify that fencing will be placed outside the minimum 50-foot no-disturbance buffer and therefore will not impact suitable habitat for Tipton kangaroo rat or giant kangaroo rat. Because the CDFW-recommended 50-foot no-disturbance buffer would be implemented, protocol-level trapping surveys and an incidental take permit are not required.

CDFW-8: The DEIR analysis does not provide a biological basis for employing a 0.25-mile survey radius for Swainson's hawk nests without a robust protocol to maximize detection or for how no-disturbance buffers would be determined as adequate to avoid significant impacts, including but not limited to take of individuals through nest failure or other means, as a result of Project implementation. Without appropriate avoidance and minimization measures for Swainson's hawk and white-tailed kite, potential significant impacts include nest abandonment and reduced reproductive success that includes mortality of young and reduced health and vigor of eggs and/or young. Recommended mitigation measures include conducting surveys for active nests within 0.5 mile of the project site, implementing a 0.5-mile no-disturbance buffer around active nests, replacing nest trees removed by the Project, and acquiring an incidental take permit if avoidance is not feasible.

Response: The DEIR indicates on page 3-33 that the project site is subject to regular disturbance from agricultural activities similar to disturbance levels anticipated during project construction. Because of this regular disturbance associated with ongoing agricultural activities, Swainson's hawks nesting more than 0.25 mile from the project site are extremely unlikely to be disturbed by project activities. Nonetheless, Mitigation Measure BIO-2b has been revised in the FEIR, based on CDFW recommendations, to expand the survey area for active nests of Swainson's hawk and white-tailed kite to within 0.5 mile of the project site and to require a survey within 10 days before construction begins. As indicated in the DEIR, Mitigation Measure BIO-2b requires a qualified biologist to monitor active nests to ensure buffers established around active nests are effective. This measure has been augmented to specify that the qualified biologist will determine appropriate buffers and adjustment buffers, if necessary, to ensure significant project-related impacts are avoided. This project-specific approach to establishing buffers and avoiding project-related nest disturbance has been proven effective by GEI biologists on multiple projects with nearby active Swainson's hawk nests and in situations which much lower levels of existing disturbance. Finally, no raptor nest trees would be removed by the Project. Because take of Swainson's hawk would be avoided, an incidental take permit is not required.

CDFW-9: *Review of aerial imagery indicates that the Project boundary includes flood-irrigated agricultural land, which is an increasingly important nesting habitat type for tri-colored blackbird. Without appropriate avoidance and minimization measures, potential significant impacts include nesting habitat loss, nest and/or colony abandonment, reduced reproductive success, and reduced health and* *vigor of eggs and/or young. Recommended mitigation measures include conducting focused surveys for tricolored blackbird nest colonies, implementing a 300-foot no-disturbance buffer around active nest colonies, and acquiring an incidental take permit if avoidance is not feasible.*

Response: As indicated on page 3-22 of the DEIR, no suitable nesting habitat for tricolored blackbird is currently present on or adjacent to the project site. Agricultural lands at the time the 2020 fields surveys were conducted supported pistachio and almond orchards, fallow fields, cotton, and alfalfa. In addition, the Project would not result in loss of nesting habitat. In response to CDFW recommendations, Mitigation Measure BIO-2b has been augmented to specify that the pre-construction survey for tricolored blackbird nest colonies will be conducted within 10 days before construction begins and minimum 300-foot no-disturbance buffers will be implemented around active nest colonies, in compliance with *Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015* (CDFW 2015). Because the recommended no-disturbance buffer would be implemented, an incidental take permit is not required.

CDFW-10: *The DEIR states that recurved larkspur and other special-status plant taxa were not observed during field surveys, but surveys were conducted very late in the blooming season and it is not clear if plants that may be present were identifiable. Measures to avoid special-status plants are not included in the DEIR. Without appropriate avoidance and minimization measures for special-status plants, potential significant impacts associated with subsequent construction include loss of habitat, loss or reduction of productivity, and direct mortality. Recommended mitigation measures include conducting focused surveys, implementing a 50-foot no-disturbance buffer, and acquiring an incidental take permit if avoidance is not feasible.*

Response: As described in Master Response #6 - Biology, habitat assessments for special-status plants were conducted by qualified biologists on and adjacent to the project site. Adjustments to the project footprint were made based on results of special-status species habitat assessments and focused surveys to provide a minimum 50-foot no-disturbance buffer between the project site and suitable habitat for special-status plants. Because the CDFW-recommended 50-foot no-disturbance buffer would be implemented, protocol-level surveys and an incidental take permit are not required.

CDFW-11: *The Project and surrounding area contain remnant undeveloped land but is otherwise intensively managed for agriculture; therefore, subsequent ground-disturbing activities associated with subsequent constructions have the potential to significantly impact local burrowing owl populations. In addition, and as described in CDFW's Staff Report on Burrowing Owl Mitigation (CDFG 2012), excluding and/or evicting burrowing owls from their burrows is considered a potentially significant impact under CEQA. Recommended mitigation measures include conducting a habitat assessment and focused surveys, avoiding occupied burrows, and replacing occupied burrows that are destroyed.*

Response: As recommended by CDFW and described in Master Response #6 – Biology, a burrowing owl habitat assessment of the project site and adjacent areas was conducted by qualified biologists. As described on page 3-21 of the DEIR, burrowing owls were observed adjacent to the northeast and southwest portions of the project site, and they have potential to occur elsewhere on and adjacent to the project site. Mitigation Measure BIO-2a requires measures consistent with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012) be implemented, as recommended by CDFW. This mitigation measure has been augmented, based on CDFW recommendations, to include replacement of occupied burrows with artificial burrows at a ratio of one burrow collapsed to one artificial burrow constructed if passive relocation and destruction of occupied burrows is required.

CDFW-12: *Tulare grasshopper mouse, San Joaquin pocket mouse, San Joaquin coachwhip, western spadefoot, coast horned lizard, California glossy snake, Le Conte's thrasher, and American badger have been documented in the vicinity of the Project, which supports requisite habitat elements for these species. Recommended mitigation measures include conducting habitat assessments and focused surveys and implementing 50-foot no-disturbance buffers around mammal dens and burrows that can provide refuge for special-status wildlife.*

Response: As recommended by CDFW and described in Master Response #6 – Biology, habitat assessments for all special-status species that have been documented in the project vicinity were conducted by qualified biologists on and adjacent to the project site. San Joaquin pocket mouse is not addressed as a special-status species in the DEIR, because it is not designated by CDFW as a California species of special concern, is not fully protected by the CDFG and is not listed or proposed or a candidate for listing as threatened or endangered under federal or state endangered species acts. In addition, as indicated in Table 3-2 of the DEIR, no suitable habitat for western spadefoot or typical habitat for Le Conte's thrasher occurs on or adjacent to the project site. As described in Master Response #6 – Biology, the current project footprint provides the CDFW-recommended minimum 50-foot no-disturbance buffer around mammal dens and burrows.

CDFW-13: *The Project area is in the immediate vicinity of numerous waterways and riparian and wetland areas. Development within the Project has the potential to involve temporary and permanent impacts to these features. Recommended mitigation measures include stream and wetland mapping impact mitigation.*

Response: The proposed Project will cross several man-made features, such as the West Side Canal, East Side Canal, and unnamed canals, as discussed in the Biological Resources Section of the DEIR. The proposed Project does not have the potential to temporarily or permanently impact non-manmade waterways and wetland areas. Wetlands have been mapped (per the National Wetland Inventory) on the Tule Elk State Natural Reserve and undeveloped (i.e., annexed) lands in the northeast; however, the reserve is situated on the opposite bank of the East Side Canal where work will not occur and the proposed Project has been modified (i.e., pipeline rerouted) to avoid the wetlands on the northeast undeveloped lands. Consequently, stream and wetland mapping and stream and wetland habitat mitigation are not required.

CDFW-14: *The DEIR does not include an impact analysis or description for the ground disturbing and other activities related to the installation, maintenance, and removal of proposed exclusion fencing. CDFW recommends the DEIR include an adequate description and impact analysis of the proposed exclusion fencing, including details regarding its alignment, methods of installation and removal, and how the design would prevent special-status species from entering work areas.*

Response: As described in Master Response #6 – Biology, fencing would be installed a minimum of 50 feet from suitable habitat for special-status reptiles or mammals. Mitigation Measure BIO-1 has been augmented to specify that fencing will be placed outside the minimum 50-foot no-disturbance buffer and therefore will not impact suitable habitat for blunt-nosed leopard lizard, Tipton kangaroo rat, giant kangaroo rat, or other special-status reptiles and small mammals.

CDFW-15: *CDFW recommends consulting with USFWS regarding potential impacts to federally listed species.*

Response: As described in the DEIR, impacts associated with the Project would be temporary and do not include substantial modification or degradation of suitable habitat for federally listed species. Project implementation, including proposed mitigation measures, would not interfere with essential behavior patterns of federally listed species to the extent that injury or death could occur. USFWS would be consulted if unanticipated project-related circumstances develop that have potential for take of federally listed species.

CDFW-16: *Project activities have the potential to substantially change the bed, bank, and channel of lakes, streams, and associated wetlands onsite and/or substantially extract or divert the flow of any such feature that is subject to CDFW's regulatory authority pursuant Fish and Game Code section 1600 et seq.*

Response: The Recovery Project would neither substantially change the bed, bank, and channel of any lake stream, or associated wetland nor substantially extract or divert the flow of any such feature. The Recovery Project will cross several man-made features, such as the West Side Canal, East Side Canal, and unnamed canals, as discussed in the Biological Resources Section of the DEIR. First, these man-made features would not be substantially impacted because they would be restored to pre-project conditions and contours. Second, construction activities would only occur in the dry and flow would be restored postconstruction. Thirdly, these man-made conveyances are not subject to FGC section 1600 et seq.

CDFW-17: *Fish and Game Code sections that protect birds, their eggs and nests include sections 3503, 3503.5, and 3513. CDFW encourages Project implementation to occur during the bird non-nesting season; however, if Project activities must occur during the breeding season (i.e., February through mid-September), the Project applicant is responsible for ensuring that implementation of the Project does not result in violation of the Migratory Bird Treaty Act or relevant Fish and Game Codes as referenced above.*

Response: The District specifically acknowledges on page 3-30 of the DEIR that it is responsible for ensuring project implementation does not violate the MBTA or FGC.

8.5 Kern Water Bank Authority

Note: Attachments to the Kern Water Bank Authority Comment Letter are found in Appendix E.

KWBA – Introduction and Summary: *KWBA objects to certification of the EIR and the approval of the Project based on legal and factual errors identified in this letter and attachments.*

Response: The EIR is sufficiently detailed and accurate and forms the sound basis for decision making and public disclosure. A response to the summary section of the KWBA is not required as a complete response to each of the issues raised follows.

KWBA-1: *The description of the Project violates CEQA because it does not describe and evaluate the "whole of the action."*

Response: This comment wrongly assumes that the subject project includes construction, operation, and maintenance of recharge ponds and is based on the mistaken belief that the subject Project is part of a previously approved and implemented recharge project known as the "Palms Project." *See* Master Response # 9 – Clarification of Recovery Project Description.

This comment wrongly claims annexation of the eastern parcels in the Recovery Project Area is a component of this Project. This Project is not dependent on whether the eastern parcels of the Recovery Project area is annexed into the District. With or without such annexation, this Project can be constructed and operated. Projects are not legally required to be within the boundaries of the proposing public agency. Local Agency Formation Commission (LAFCo) has no discretionary authority over whether the Recovery Project is approved. The District is pursuing annexation of those lands for reasons unrelated to this Project and would seek such annexation into the District even if the Project is not implemented. While the District honestly revealed the intended use of the subject property, the annexation of these lands into the District has zero bearing on the Recovery Project. Accordingly, a Notice of Exemption was properly approved and filed for the annexation. The annexation is not part of the whole of the action because the annexation is not necessary for the approval of the Recovery Project, *see Simi Valley Recreation & Park Dist. v. Local Agency Formation Com.* (1975) 51 Cal.App.3d 648.

KWBA-2*: In the DEIR, the project description provides an uncertain and shifting description of the sources of banked water. The DEIR does not include detail on the sources of Project water sufficient to allow for a detailed analysis of the effects on the water sources.*

Response: The comment fails to identify any omissions and errors, significant or otherwise, and is not supported by substantial evidence. The project description in the DEIR includes all the information required by CEQA to comprise an adequate description of the project without supplying extensive detail beyond that needed for evaluation and review of the environmental impacts (*CEQA Guidelines* §15124). The sources of water that may be recovered in connection with the proposed Project are identified as the District's Pre-1914 Kern River Right and the State Water Project supply which is recharged into the basin *via* existing facilities [DEIR, Sec. 2.1] and whatever is recharged by the District under existing projects [DEIR Sec. 2.3]. The DEIR discusses in greater detail those sources of supply deemed reasonably foreseeable, namely the SWP water, and Kern River water in the Hydrology and Water Quality section of the DEIR [DEIR Sec. 3.4.1]. The Project does not propose to divert, or recharge water, and thus does not require a new water supply.

See Master Response # 9 – Clarification of Recovery Project Description clarifying that the Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures. Water is currently, and will in the future, be banked at the existing Palms Project, which went through its own environmental review (*see* IS / Mitigated Negative Declaration [SCH # 2015121030] and the Notice of Determination filed in January 2016). This is just one of the many existing water recharge facilities within the District [DEIR 2.6]. Accordingly, the project description in the DEIR includes all of the information necessary for the complete and adequate review under CEQA.

The DEIR acknowledges that other parties may participate in the Project through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers. However, the identity of potential partners and the extent of their involvement is currently unknown and any analysis of such would be unduly speculative. Agreements would be made, as necessary, in advance of any water exchanges or transfers and if required, additional compliance with CEQA would be completed at the appropriate time. The project description includes all the information required by CEQA to comprise an adequate description of the project without supplying extensive detail beyond that needed for evaluation and review of the environmental impacts (CEQA Guidelines §15124). It is the intent of the DEIR to evaluate impacts associated with the recovery of previously banked water from all such sources to the extent that they are reasonably foreseeable.

KWBA-3*: The DEIR fails entirely to describe the groundwater mixing elements of the Project. The Project description must identify the location of any facilities at which water would be mixed, and the ultimate destination and uses of the mixed water, so that the effects of the Project are analyzed and mitigated.*

Response: Blending of groundwater from the new production wells would occur in piping and blending would be achieved through pipe turbulence. Also *see* Master Response #4 – Water Quality Impact Analysis.

KWBA-4: *The DEIR indicates that parties other than BVWSD may participate in the Project, but fails to identify who those parties would be, what the nature of their involvement would be, and whether the involvement of these third parties would alter Project operations or result in impacts resulting from such parties' use of banked supplies for growth or otherwise. The DEIR must identify, evaluate, and disclose any environmental impacts this might have, including disclosing the foreseeable use of Project water provided by the unidentified partners.*

Response: The DEIR acknowledges that other parties may participate in the Project through transfers, balanced and unbalanced water exchange agreements, water purchases or temporary transfers. However, the identity of potential partners and the extent of their involvement is currently unknown and any analysis of such would be unduly speculative. Agreements would be made, as necessary, in advance of any water exchanges or transfers and if required additional compliance with CEQA would be completed at the appropriate time. The project description includes all the information required by CEQA to comprise an adequate description of the project without supplying extensive detail beyond that needed for evaluation and review of the environmental impacts (*CEQA Guidelines* §15124). It is the intent of the DEIR to evaluate impacts of recovery of previously banked water from all such sources to the extent that they are reasonably foreseeable.

KWBA-5*: The Project description fails to describe the recovery capacity of the extraction wells that the Project would rely on.*

Response: The Project description provides a general description for the recovery wells that is appropriate to provide the necessary capacity for the proposed Project. The new and replacement wells will be designed accordingly within the Project description parameters to meet local conditions.

KWBA-6*: Neither the text nor Figure 2-2 identify the District boundary or the locations of the BVGSA, the WKWD Banking project or GSA, the Kern Water Bank, or the KGAGSA. All of these facilities/agencies are directly adjacent to the Project and significant stakeholders in the groundwater basin where that portion of the recovery project outside the District is located.*

Response: Figure 2-3 has been added to this FEIR to depict the District boundaries and boundaries of GSAs in the area. Figure 3-9 of the DEIR displays the location of banking operations, operated by others, in the area of the Recovery Project. *See* also Master Response #7 - Regional Groundwater Level Contour Mapping and Flow Analysis, which provides maps of the neighboring GSAs.

KWBA-7*: Historic canal seepage in the District is not part of a bona fide groundwater banking program that has not undergone public review under CEQA. This water cannot be included in the Palms Project bank account without CEQA analysis.*

Response: The District has been recharging water in its canal system during wet years for later recovery in dry years since the inception of the District in 1927, a practice initiated by the District's predecessor-in-interest. This is not a new component of the project. This existing activity pre-dates CEQA.

For purposes of this FEIR the District took the very conservative approach and did not include canal seepage. All of analysis of potential Recovery Project impacts on groundwater in the EIR was based on the assumption that the Recovery Project will only recover groundwater banked at the Palms Recharge ponds. None of the recharge from canal seepage was included in the estimated recovery.

KWBA-8: *The DEIR must be revised to properly identify the sources of the water for the Project (including water recharge that is subject to BVWSD Kern River water rights and any limitations thereon) in order to comply with CEQA.*

Response: The Recovery Project does not propose to divert water, deliver water, or recharge water. The project description includes all the information required by CEQA to comprise an adequate description of the project without supplying extensive detail beyond that needed for evaluation and review of the environmental impacts (CEQA Guidelines §15124). *See* Master Response # 9 – Clarification of Recovery Project Description, clarifying that the Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures.

KWBA-9: *The DEIR fails to disclose that Buena Vista lacks a water right for diversion of water to the Project. The DEIR asserts the right to divert "surplus water" from the Kern River. This claim is unsupported by water rights on the Kern River and California water rights law and is contrary to recent water rights orders of the State Water Resources Control Board.*

Response: The Recovery Project does not propose to divert, deliver or recharge water, and thus does not require a new water supply. *See* Master Response # 9 – Clarification of Recovery Project Description, clarifying that the Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures.

A discussion regarding the District's Pre-1914 Kern River rights, in excess of the description provided in the DEIR is not required by CEQA. The August 8, 2019, complaint filed by the KWBA is not only irrelevant to the Project but was also dismissed by the State Water Board on December 21, 2020. Accordingly, the project description in the DEIR includes all of the information necessary for the complete and adequate review under CEQA.

KWBA-10: *The DEIR fails to disclose, discuss, or evaluate Application A0316Y5 or the environmental effects of the increased Kern River diversions contemplated by that application.*

Response: The Recovery Project will not result in increased Kern River diversions. The Recovery Project does not propose to divert, deliver or recharge any water, and does not require a new water supply. *See* Master Response # 9 – Clarification of Recovery Project Description, clarifying that the Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures.

Applications before the State Board to appropriate excess Kern River water that would otherwise flow into the Intertie are not relevant to this project.

The Recovery Project only seeks to supplement District facilities to allow for the more efficient recovery of water recharged by existing District projects. The DEIR states that this Project will only recover water banked in the District; will be limited to 25,000 AF in any given year; will leave behind 10 percent of the water recharged; and will be managed so that groundwater elevations will, in the long term, improve from those observed historically [DEIR, 2-6].

KWBA-11: *The Palms Project as described in the DEIR fails to disclose critical data regarding both groundwater levels and quality, is poorly conceived, and may in fact be infeasible. The Project, by its very design, will result in both significant environmental impacts to water resources and lead to undesirable results as defined by the Sustainable Groundwater Management Act, Water Code section 10720 et seq. ("SGMA").*

Response: This comment fails to provide sufficient information to support the claim that the project will lead to undesirable results as defined by SGMA. The EIR sets forth that the Recovery Project will not recover more water than is recharged by the District and mitigation measures have been implemented to prevent undesirable results, *see* Master Response #5. Additionally, the EIR provides water quality data sufficient to satisfy CEQA, *see* Master Response #4. The Recovery Project is subject to SGMA and will comply with the applicable Groundwater Sustainability Plan.

Mitigation measures have been proposed to prevent undesirable results, as defined by SGMA. *See* Mitigation Measure CUM-1 in the EIR, and Master Response #5 – SGMA.

The District expects, over time, for groundwater quality to be consistent with recharge water quality. Since the surface water quality is of better quality than the groundwater quality, recharge with the surface water will, over time, result in improved groundwater quality in the Project area. Elevated constituents in the groundwater such as total dissolved solids are expected to drop in response to recharge in the area over time. Changes to the groundwater quality are beneficial to existing and potential users of the groundwater resource.

The water quality evaluation conducted for this DEIR meets the Standards of Adequacy of an EIR, as specified in the CEQA Guidelines Section 15151, "An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes into account of environmental consequences. An evaluation of environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible…" Further, the EIR meets the requirement to be based on Substantial Evidence, as defined in the CEQA Guidelines Section 15384, "Substantial evidence as used in these guidelines means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached…". For further response, *see* Master Response # 3 – Water Quality Data and Master Response # 4 – Water Quality Impact Analysis.

KWBA-12: *With respect to groundwater levels and flow directions, the DEIR describes flow directions as generally in a southeasterly direction using data from a single map from January 2015. Abundant groundwater data for the area is available but is not disclosed in the DEIR.*

Response: In response to this comment, and other similar comments from others, the District undertook additional data gathering and analysis for a regional review of groundwater flow direction. The results are presented in Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis. The results of this analysis confirmed the information presented in the DEIR regarding general groundwater levels and flow directions across the district are consistent with data provided in the BVWSD GSA GSP issued in January 2020 and with data presented by other agencies in the area including Semitropic Monitoring Committee, KGA GSP and the KFMC.

KWBA-13: *The description of groundwater quality in the Project Area is misleading and does not disclose available information. Table 3-6 is a list of wells in each area and is captioned "Wells used in Water Quality Analysis." Ten wells are listed for the area west of the East Side Canal, however, the text then states that, due to limited data, only one well is used as a "representative well." In 2017, GEI conducted an evaluation of groundwater in the District "to provide California Environmental Quality Act (CEQA) compliance support services for the Palms Groundwater Bank- Recovery Phase (Project)." The information from this study was not disclosed or referenced in the DEIR, rather, the much more limited data from the "representative well" was provided.*

Response: *See* Master Response #3 – Water Quality Data.

KWBA-14: *The incorrect values for TDS and other constituents in the DEIR results in an incorrect blending evaluation later in the document and a DEIR that does not comply with CEQA standards as informational. The DEIR must be revised to disclose all available water level and quality data and provide a thorough evaluation of that data, so that the public and decisions makers can understand the potential impacts of the Project document.*

Response: In response to this comment, additional water quality data was collected, and the EIR revised. For details, please *see* Master Response #4 – Water Quality Impact Analysis.

KWBA-15: *A superposition groundwater model was used to evaluate groundwater level changes expected from the Project. However, there are several weaknesses in the application of this type of model for this Project.*

Response: *See* Master Response #1- Suitability and Validation of Superposition Model.

KWBA-16: *The groundwater modeling report incorporates the inaccurate southeasterly flow directions, instead of relying on the more robust data provided in the Negative Declaration for the Palms Project Recharge Phase, which indicates a westerly flow direction. The operational scenario used to evaluate groundwater level changes is also unrealistic. With respect to the modeling results, an exaggerated recharge volume overestimates the extent of the predicted groundwater mound, which then underestimates the extent of the ensuing drawdown during Project pumping.*

Response: Detailed information on groundwater flow directions is found in Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis.

With respect to the comment on groundwater mounding, the simulation of groundwater mounding and drawdown are both governed by Darcy's Law and the Conversation of Mass. Since we assume consistent aquifer properties in the area of the Recovery Project, the Superposition Model solves each phenomenon in the same manner. Therefore, the model cannot simultaneously overestimate mounding and underestimate drawdown. If the mounding is over-estimated, then the drawdown is also being comparably overestimated, and vice versa.

The effect that is described in the comment is due to the setup of the groundwater impact scenario that was intended to reflect a maximum-case, or worst-case, scenario. As part of this maximum-case, or worst-case, scenario, the groundwater recharge was applied only as the existing Palms Recharge Project rather than distributed over the various BVWSD recharge locations. This was considered a conservative assumption by concentrating the recharge in one location further from the BVWSD district boundary. Consideration of the groundwater mound is an essential part of evaluating the groundwater impacts of the Recovery Project. In this scenario, the full recharge occurs during 1 year at one location which results in high mounding. The Recovery Project recovers 90 percent of the recharge water by pumping over a larger area (14 well locations over 2 wellfields) over a period of 4 years. The setup of the recovery is part of the Recovery Project design to distribute drawdown over a larger area to minimize groundwater impacts.

KWBA-17: *The DEIR also lacks a survey of wells in the area. A thorough evaluation of the likelihood of impacts to adjacent well owners cannot be conducted without this information. The DEIR should correct the deficiencies in the model discussed above, complete a survey of wells in the area, and then conduct more realistic banking scenarios.*

Response: In the DEIR, a general analysis was performed to assess potential impacts to groundwater levels and water quality. The groundwater impacts assessment evaluated the impacts on groundwater levels of the Recovery Project in conjunction with the existing Palms Recharge Project. This analysis is considered to address potential impacts to private wells, including landowner wells both inside and outside of Buena Vista's service area. Should issues arise, they would be addressed by Mitigation Measure CUM-1 and management actions under the BVWSD GSA GSP.

See Master Response #1 – Suitability and Validation of Superposition Model for discussion of comments regarding the modeling used to support the groundwater impacts analysis.

KWBA-18: *The Project, by pumping groundwater outside the District without replenishment or replacement, will essentially be mining good quality groundwater in an effort to make the project feasible.*

Response: Half of the recovery wells proposed are within the District. The other half, while outside the District are located generally down gradient of the Palms to capture the recharged water, as described in Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis, the Recovery Project will recover groundwater recharged within the District, and does not "mine" groundwater without replenishment. As described in Master Response #8 – Beneficial Use of Recovered Groundwater, groundwater in the Palms area is of suitable quality for beneficial use. The EIR proposes mitigation measure CUM-1 to maintain groundwater levels above MTs. The existing Recharge Project as well as the proposed Recovery Project are all within the same hydrogeologic zone. Thus, the Recovery Project will not, as the commentors contend, create significant and unmitigated environmental impacts and create undesirable results in conflict with SGMA.

KWBA-19: *Because the Project will not replenish groundwater by recharging water on the lands outside the District where Project recovery will occur, it will result in a significant and unmitigated reduction in groundwater storage within the KGA GSA and West Kern Water District GSA ("WKGSA"). The Project would be inducing the migration of poor-quality groundwater within the District into an area of better-quality groundwater outside the District, another significant and unmitigated environmental impact and undesirable result under SGMA regulations.*

Response: Under the existing Recharge Project, groundwater recharge occurs along the southeastern boundary of the district and recharges the same Kern County Subbasin utilized by the BVGSA, KGAGSA and WKGSA. The Recovery Project recovers 90 percent of the recharge volume, therefore, there is a net benefit to groundwater storage in the Kern County Subbasin. The results of both the Superposition Model and the C2VSimFG-Kern Project scenarios illustrate that groundwater levels will rise during operation of the Palms Recharge Project over a large area that includes adjacent areas of the KGAGSA and WKGSA. Half of the recovery wells proposed are within the District while the other half are outside the District but down gradient of the Palms to capture the recharged water, as described in Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis. The Recovery Project will only recover groundwater recharged.

With respect to migration of poor-quality groundwater, groundwater quality in the vicinity of the proposed Project has long been used for beneficial use for agriculture use, domestic water use and municipal water supply at Buttonwillow. The water quality data in the DEIR demonstrate that water quality differs with respect to concentrations of individual constituents but that both areas meet existing water quality for beneficial use within the local area. Furthermore, even if there were groundwater quality concerns about migration of poor-quality groundwater from the west, the implementation of the Recovery Project would intercept groundwater flow from the west from reaching KGAGSA and WKGSA.

The grouping of recovery wells presented in the DEIR is purposeful.

Seven of the proposed 14 recovery wells lie within the footprint of the Palms Recharge Project. Although this is the area where recovery activity is expected to begin, clustering all of the project's recovery capacity within this footprint would create a localized cone of depression that would jeopardize the efficiency and flexibility of the recovery program, risk violation of MTs established by the BVGSA and adjacent GSAs and have the potential to impact other well owners in the area.

The second group of seven recovery wells is located to the northeast of the recharge facilities. Locating half of the recovery wells in this area achieves the spacing between wells needed to allow efficient operation of the recovery project and to minimize impacts to other well owners within the project area and in neighboring areas. Further, the wells outside of the recharge area are situated to capture the subsurface flow running from the recharge area (Palms Project area) to the east.

In addition to providing the recovery project an acceptable level of spacing between recovery wells, analyses of water quality indicate that groundwater recovered outside the recharge area will be of different quality than groundwater recovered from within the recharge area footprint. While water recovered from the recharge area has a history of being applied for beneficial uses, this difference in water quality introduces the possibility that water recovered from the recharge area that does not meet the standards required for pump-in to the California Aqueduct could be blended with water from the northeastern area to satisfy those standards.

The cumulative effects scenarios modeled for the DEIR for RMW-089 WKWD, RMW-058 RRWSD, RMW-059-RRWSD are presented for the following four scenarios:

- SGMA Baseline Scenario: represents projected water levels for existing banking and recovery operations
- SGMA Baseline - Projects Scenario: represents projected water levels for existing banking and recovery operations plus projects proposed for implementation by GSAs under SGMA
- Palms 90-percent Recovery Scenario: combines SGMA Baseline – Projects Scenario with operation of the Recovery Project constrained to recover 90% of recharged water
- Palms Deferred Recovery Scenario: represents SGMA Baseline – Projects Scenario plus operation of the Recovery Project with timing of recovery deferred to alleviate exceedance of MTs.

Figures 4-2 through 5-2 of the DEIR Modeling Report are hydrographs that show the degree to which the projects introduced by each of the latter three scenarios improve upon the SGMA Baseline Scenario. The hydrographs display instances where groundwater elevations drop below MTs and also display how adjustments in operations such as the Palms Deferred Recovery scenario can be introduced to minimize such breaches. The most important point illustrated in the hydrographs is the similarity in water levels modeled for the SGMA Baseline and the two Palms scenarios, similarities that indicate the impacts resulting from operation of projects in the Kern Fan can be anticipated and minimized or mitigated as conditions require.

The operations of the existing recharge and recovery facilities of the KWBA and of the WKWD are included in the modeling each of the four scenarios including the SGMA Baseline Scenario. Therefore, their contributions to groundwater levels at each of the locations included in the cumulative impact analysis influence each of the hydrographs.

As the groundwater modeling performed for the DEIR demonstrates, Kern River water recharged by Palms Groundwater Recharge Project will migrate beyond the footprint of the recharge facilities and boundaries of the BVGSA. Due to the high quality of the Kern River water recharged at the Palms, the contention that pumping by the Recovery Project would induce migration of poor-quality groundwater into areas having better-quality groundwater overlooks one of the Project's objectives, which is that continued operation of the recharge facilities will progressively improve the quality of groundwater migrating from the recharge area to the benefit of all users.

KWBA-20: *The potential for impacts resulting from the discharge of Project water into the California Aqueduct are described under Impact HYDRO-2, which states: "The Recovery Project could have impacts to the water quality of the Aqueduct, if drinking water standards are not met." This statement is misleading and incorrect. The standard for discharges to the Aqueduct include degradation standards. That is, discharges to the Aqueduct must not degrade the existing quality of water in the Aqueduct if unmitigated.*

Response: *See* Master Response #4 – Water Quality Impact Analysis. The sentence "The Recovery Project could have impacts to the water quality of the Aqueduct, if drinking water standards are not met" has been revised for clarity in the DEIR.

KWBA-21: *Because Project water exceeded the upstream values in the Aqueduct (incorrectly) reported in the DEIR, the five mitigation measures were proposed, however, only one mitigation measure (HYDRO-2) has the potential to improve the quality of recovered Project water, but lacks performance standards. In addition, Project operations will alter groundwater conditions through time. As such, Project monitoring must not be discontinued.*

Response: *See* Master Response #4 – Water Quality Impact Analysis. The District concurs that groundwater monitoring is a key facet of all groundwater banking programs in Kern County. Groundwater monitoring protocols for the District are specified in the BVGSA's BVGSP (Section 4.4.3.6 Monitoring Protocols, 2020). The District has no intention of discontinuing groundwater monitoring and has revised the DEIR to clarify the District has operated, and will continue to operate, a groundwater monitoring program.

KWBA-22: *There are several problems related to the analysis completed for this environmental impact. First, the blending calculations used the quality data from a single "representative well," which does not reflect the significantly worse quality conditions in the area. Second, the analysis assumes drinking water standards rather than more restrictive degradation standards apply. Third, Project water is compared to incorrect values for upstream Aqueduct quality. These compounding errors must be corrected and the analysis for this impact re-evaluated, taking into consideration relevant and representative quantitative data, to determine if the Project is even feasible, in addition to being necessary to adequately evaluate the Project's environmental effects, and to identify specific and enforceable mitigation measures that comply with CEQA standards.*

Response: *See* Master Responses #3 and #4 – Water Quality Data and Water Quality Impact Analysis.

KWBA-23: *Recharging very good quality water from the Kern River and SWP may actually be a waste and unreasonable use under California water law in violation of Article X, Section 2 of the California Constitution, and SGMA. It should also be noted that groundwater pumping in the Palms Recharge Basin area could also induce the migration of extremely poor-quality western water to the east, another significant environmental impact not evaluated in the DEIR.*

Response: Comments regarding the impacts of recharging water are not relevant to the Recovery Project. The Recovery Project only seeks to construct and operate recovery facilities to supplement the District's existing recovery of previously banked water. *See* Master Response # 9 – Clarification of Recovery Project Description.

However, BVWSD has been conducting managed groundwater recharge in the vicinity of the proposed Project for many decades from unlined canals using primarily Kern River water and the KWB has been in operation since 1995. Groundwater quality in BVWSD remains highly suitable for beneficial use for agriculture, domestic water supply and municipal water supply by the Community of Buttonwillow, uses which it has served for many years. The long history of recharge in BVWSD clearly demonstrates that recharging Kern River water in this area has not resulted in waste and unreasonable use under California water law. *See* Master Response #8 – Beneficial Use of Recovered Groundwater

The water quality analysis shows no indication of migration of the high salinity water from the far western reaches of the Kern County Subbasin. Since the Recovery Project recovers 90 percent of the recharge water over a period of 4 years, the recovery pumping is in volumetric water balance with the existing recharge operations.

KWBA-24: *The Palms Project recovery wells located outside the District have not been reviewed or approved by the KGAGSA as required in the Memorandum of Understanding Regarding Operation and Monitoring of the Buena Vista Water Storage District Groundwater Banking Program (MOU). The MOU also prescribes minimum operating criteria, mitigation measures, and project monitoring requirements. However, none of these requirements have been described in the DEIR or evaluated for their effectiveness in eliminating significant impacts or consistency with the Project.*

Response: As noted, the MOU Regarding Operation and Monitoring of the BVWSD Groundwater Banking Program states that: "Recovery of banked water shall be from the Project Site and recovery facilities shall be located therein. Recovery from outside the Project Site may be allowed with the consent of the District or entity having jurisdiction over the area from which the recovery will occur and upon review by the Monitoring Committee." The Recovery Project area is not within the jurisdiction of any signatory to the MOU. The eastern portion of the Recovery Project area are "whitelands" and do not have any contract with a member of the KGA for coverage by the KGA GSP. The KGA does not have discretionary approval over the Recovery Project, *see* Master Response #2, GSA Jurisdiction.

The minimum operating criteria described in the MOU were considered in the DEIR. To more clearly demonstrate this, the language of the DEIR has been revised to affirm Buena Vista's intent to comply with the provisions of the MOU and to clarify the correspondence between language of the DEIR and provision of the MOU as follows:

1. One of the purposes of installing recovery facilities both within the footprint of the Palms Groundwater Recharge Project and in a location within the BVGSA to the northeast of the recharge facilities is to spread out recovery facilities for the reasons suggested by this comment.
2. The spacing of recovery wells is intended to provide a buffer between these wells and neighboring groundwater users as suggested in the comment.

3. The project recovery rate and the location of wells that will be operated at any given time will be adjusted in response to groundwater levels and other conditions and to conform with operational constraints such as those described in this comment. One of the reasons for the number and location of wells presented in the DEIR is to provide the operational flexibility needed to enable recovery to take place under a broad range of operating conditions. As noted in the cumulative impact analysis and other sections of the DEIR, the project will be operated to satisfy leave-behind requirements and deferred recovery has been assessed as a mechanism to minimize impacts.
4. A purpose of the number, location and spacing of recovery wells presented in the DEIR is to allow rotation among recovery wells and to enable recovery to be distributed within the Project area as conditions dictate.
5. The superposition model was run with the grouping of wells presented in the DEIR to confirm that the spacing among the wells was sufficient to minimize interference under a range of operating scenarios.
6. As the DEIR's analysis of a deferred recovery scenario indicates, BVWSD is aware that the recovery program will need to be managed flexibly to respond to groundwater conditions and to avoid impacts to other water users determined to have resulted from recovery operations at the Palms.
7. The superposition modeling used to analyze the relative impacts of the recovery operations assumes a 1-year lag between recharge cycles and the beginning of subsequent recovery activities. In addition, the Palms Recharge Project has been used to recharge Kern River water in 2017 and 2019 without any of the recharged water having been recovered. Given these two periods of recharge, and the possibility of other recharge events occurring prior to completion of recovery facilities, groundwater will be available for recovery upon completion of these facilities. Thus, the 1-year allowance made in project planning to provide time for recharged surface water to reach underlying aquifers has already been exceeded.

The water users in the Kern County Subbasin will benefit from high quality of water recharged at the Palms.

1. The Palms Recharge Project is designed with the principal source of water for storage being the Kern River, a high quality source of surface water.
2. Because the salt load introduced by recharge of Kern River water is lower than that of groundwater recovered at any location in the Kern Fan, the Recovery Project will remove more salts than are being stored. As noted in the IS/MND for the Recharge Project, the concentration of salts introduced by the Recharge Project to the underlying aquifer is considerably lower than that introduced by the previous land use, irrigated agriculture.
3. Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis provides additional analysis of groundwater flow directions and additional impacts analyses showing the simulated drawdown of the Recovery Project in context with regional groundwater flow. Drawdown resulting from the full operation of the Palms recovery wells extends over the southern areas of BVWSD and some adjacent areas. The areas of the major drawdown and the designated wellfield sources areas do not extend to areas of poor water quality in the northern areas of BVWSD. This drawdown does not significantly change the groundwater gradient north of 7th

Standard Road; therefore, the operation of the Recovery Project wells would not change to the regional groundwater gradient that would affect the movement and distribution of poor-quality groundwater observed in the northern areas of BVWSD.

4. As described in the DEIR, the purpose of the blending options made possible by the distribution of recovery sites over the project area is to enable water recovered at various locations to be blended to meet the water quality requirements of downstream users. Recovery of high-quality water will be targeted to users having stringent water quality standards.

KWBA-25: *The KWBA, Pioneer and Rosedale water banking projects on the Kern Fan in the Project vicinity have also developed an Operating Plan that provides mitigation measures for impacts to landowner wells. None of these requirements have been described in the DEIR or evaluated for impact mitigation or consistency with the Project.*

Response: The District held meetings with the JOC to discuss the project, to share modeling results and to request data from JOC members to improve Buena Vista's modeling of the impact of operation of the Project on JOC members. The District has also made clear the need to coordinate with the JOC and has expressed an interest in becoming a member of the JOC.

The DEIR has been revised to note the mitigation measures included in the BVGSA's GSP which address many of the conditions covered by the mitigation measures developed by the JOC.

As discussed with JOC members, Buena Vista would welcome the opportunity to explore membership in the JOC and adoption of a shared approach to modeling. As noted in clarifications made to the project description in the EIR, the District will follow the monitoring standards and the mitigation measures established in the BVGSA. In the event the District joins the JOC, then those monitoring standards would be controlling for the Palms Project.

KWBA-26: *The DEIR here fails to describe the environmental baseline for each of the resource categories it addresses. In some cases, this failure includes omission of any description of the relevant physical conditions at the time of the filing of the Notice of Preparation for the DEIR on June 16, 2020.*

Response: The DEIR describes the conditions on site at the time of the Notice of Preparation. This description was based upon on-site evaluations of habitat conditions, as described in Section 3.2.1. Hydrologic conditions were evaluated based on extensive data and two types of groundwater models, as described in Section 3.4.1.

KWBA-27: *The biological resources section fails to include any surveys that are at a sufficient level of detail to determine the actual presence or absence of threatened, endangered and other special status species in the Project vicinity. In the absence of adequate and complete biological surveys, the DEIR is unable to describe adequately actual conditions, or evaluate effects on biological resources.*

Response: As described in Master Response #6 - Biology, field-based habitat assessments and focused surveys were conducted for special-status species. These surveys, in combination with consideration of cover types in the Biological Study Area and species occurrence information obtained from resource databases and inventories, inform the existing conditions in the project area. The primary purpose of the field surveys was to evaluate potential for special-status species to occur on or adjacent to the project site, based on habitat conditions and physical evidence of potential species presence. Survey methods are summarized in Master Response #6 – Biology and were adequate to identify species and habitats that could be affected by the proposed project and species for which there is no suitable habitat and no potential for adverse effects. It is not necessary to confirm species presence in order to adequately address potential effects under CEQA, and it is appropriate to assume absence of species for which no suitable habitat occurs on or adjacent to the project site or for which surveys were adequate to determine absence, such as San Joaquin antelope squirrel. No species were assumed to be absent from the project area based solely on lack of known occurrences in the project area.

KWBA-28: *The DEIR must discuss not only the BVGSA, but at a minimum must also discuss the KGAGSA, its current status and properly analyze any impacts the Project may have on achievement of SGMA standards within the KGAGSA.*

Response: The DEIR states that the BVGSA is bordered by the Kern River GSA and the KGA GSA [DEIR, 3-53]. The DEIR describes the regulatory framework of SGMA [DEIR, 3-63 – 3-64]. The groundwater model used to analyze potential impacts to the groundwater basin was not restricted by the jurisdiction of the BVGSA or any other GSA. Rather, all potential impacts resulting from the Project were analyzed [DEIR, 3-68 – 3-83]. The DEIR concluded that the Project, as proposed, would create a less-than-significant impact [DEIR, 3-84]. This conclusion is not limited to the BVGSA boundaries, but also includes the identified GSAs in the area surrounding the Project location. As SGMA requires coordination between the GSA's to achieve basin wide sustainability, this is appropriate.

See also Master Response #2 – GSA Jurisdiction & Master Response #5 – SGMA.

KWBA-29: The DEIR also fails to describe why it is reasonable for groundwater quality to limit the baseline to conditions between Stockdale Highway on the north, BVWSD southern boundary on the south, Dunford Road on the west, and Mo*rris Road on the east.*

Response: The area used for the groundwater quality evaluation are consistent with the source areas defined for the Recovery Project wells as described in Master Response #7 – Regional Groundwater Level Contour Mapping and Flow Analysis. The source areas illustrate the general areas of the aquifer where groundwater pumped by the Palms recovery wells is derived. Therefore, the data within this area provides a representative data set for the water quality analysis.

KWBA-30: *The baseline for the evaluation of impacts on hydrology and water quality should include the identification of all landowner wells within the potential area of hydrologic influence of the Project. Without identifying landowner wells, the DEIR is not able to evaluate adequately the potential impacts of the Project on domestic and agricultural water supplies.*

Response: The water quality analysis indicates that the water quality in the proposed Project area is currently suitable or all beneficial use for agriculture use, domestic water use and municipal water supply. The water quality analysis in Section 3.4 of the DEIR identifies only total dissolved solids, conductivity and sulfate as exceeding secondary MCLs. This general analysis did not find major water quality issues with the continued beneficial use of groundwater for landowner wells in the area. *See* Master Response #8 – Beneficial Use of Recovered Groundwater.

KWBA-31: *In regard to the No Project Impact analysis, the assumption of continuation of current surface water availability over the next 50 years is unreasonable and misleading*.

Response: As noted in the BVWSD GSA GSP, the district has a long-standing water rights to the Kern River water based on the historic Miller-Haggin Agreement of July 1888. This agreement, as amended, continues to serve as the basis by which the flow of the Kern River is allocated among "First and Second Point" interests. BVWSD has an average entitlement of 156,000 AF/yr delivered by First Point interests to the Second Point of Measurement, undiminished by delivery losses. Buena Vista's entitlement is 96.044 percent of this flow or 149,828 AF/yr.

However, as described in Master Response # 9 – Clarification of Recovery Project Description, the Recovery Project does not propose to recharge any water. The Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures.

KWBA-32: *The DEIR is required to describe a realistic no project baseline that takes into consideration project impacts on climate change and other limitations on surface water supplies projected to occur over the life of the Project.*

Response: As described in Master Response # 9 – Clarification of Recovery Project Description, the Recovery Project does not propose to recharge any water. The Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures. Therefore, a discussion of climate change and other limitations on surface water supplies is not an appropriate analysis for the Recovery Project. The Recovery Project is limited to recovering 90 percent of water recharged at the Palms Recharge Project. If future water supplies are reduced, the amount of recovery will be reduced proportionally.

KWBA-33: *The DEIR includes a no project alternative, which appears to include water banking without a method for recovery in perpetuity, the preferred alternative, and a single variation on the pumping amounts contemplated by the preferred alternative (the so-called Reduced Recovery Alternative). No other alternatives were carried forward for detailed study in the DEIR. The DEIR asserts that this is because other alternatives that were considered but rejected would either have greater significant impacts on the environment or because they were found to be infeasible.*

Response: Section 5.6 of the DEIR meets the requirements of CEQA because it describes the alternatives considered and the reasons they were rejected in sufficient detail to enable meaningful participation and criticism by the public. The two alternatives carried forward for detailed evaluation (Section 5.7 of the DEIR) were evaluated in considerable detail. The Reduced Recovery Alternative was specifically developed to reduce potential impacts to groundwater resources. The modeling analysis of that alternative demonstrated it was effective at reducing potential impacts and was thus selected by the District as the environmentally preferred alternative. The District intends to propose adoption of this alternative.

KWBA-34: *The DElR does not justify adequately its decision to summarily dismiss the Landowner Recovery Alternative or the Palms Area-Only Alternative, and the DEIR therefore fails to evaluate a reasonable range of alternatives. For the Palms Area-Only Layout, the DEIR concludes without adequate* *analysis on the grounds that the groundwater-quality would not be sufficient for blending and then transportation through the Aqueduct.*

Response: As stated in §15126.6(a) of the CEQA Guidelines, "The EIR must describe a reasonable range of alternatives to the project that 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."

As explained in Section 5.6.1 of the DEIR, the landowner delivery option would provide growers direct access for recovery of banked groundwater, this water would serve only a single beneficial use therefore limiting the Recovery Project from attaining of its stated objective of improving conveyance of previously stored water throughout the District and to neighboring districts. Therefore, this alternative was not evaluated in detail because it cannot feasibly attain most of the Recovery Project's objectives.

KWBA-35: *Because this objective may be achieved without sending water to southern California, the DEIR is required to evaluate an alternative that restricts use of Project water to landowners within the District - avoiding the need to mix water to meet Aqueduct water quality standards.*

Response: As described in Section 2.2 of the DEIR, the Recovery Project has the following primary objectives (emphasis added):

- Increase conjunctive management on the west side of the County by improving the District's ability to meet demands during periods when supply of surface water is limited with previously banked water supplies.
- Improve conveyance of previously stored water throughout the District and to neighboring districts.
- Install recovery facilities to attract new banking partners in order to increase groundwater in the Kern Subbasin for District use
- Recover banked groundwater of suitable water quality that can be blended, as needed, to meet water quality standards for pump-in to the Aqueduct.

The District's stated objectives will not be met by limiting the use of recovered water to service areas that can be reached without transfer of water in the Aqueduct. The KWBA may prefer the District modify their objectives, but they may not dictate to the District what their project objectives may be.

KWBA-36: *The DEIR does not evaluate an alternative that includes recharge on the off-District lands. Such an alternative may reduce the many environmental impacts the project currently causes.*

Response: Recharging water is not a component of the Project, *see* Master Response # 9 – Clarification of Recovery Project Description. The off-District lands are not proposed for recharge because those lands are not suitable for groundwater recharge. This is similar to the strategy employed by the WKWD, as well as KWBA members.

KWBA-37: *The DEIR does not evaluate any alternative to the operation of the recharge ponds.*

Response: The purpose of the DEIR is to analyze the impacts of the construction and operation of the Palms Groundwater Recovery Project. The operation of the recharge ponds is a project of independent utility which has been in operation since 2017, *see* Master Response # 9 – Clarification of Recovery Project Description.

KWBA-38: *The DEIR should be revised to include a water banking operation including the enforceable commitments to the protection of the biological resources included in the Kern Water Bank Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP).*

Response: The proposed Project is not required to be operated in the same manner as the KWB and associated HCP/NCCP. The Project does not have biological resource objectives and is not required to do so. Project operations would not result in significant impacts on special-status species and the Project does not require authorization for take of state or federally listed species or establishment of conservation easements.

KWBA-39: *The highly engineered recharge ponds shown in the DEIR create the risk of creating a biological sink by attracting migratory birds and other species, but without food, cover, buffers, and other elements necessary to conserve these populations. The DEIR is devoid of any analysis of this risk.*

Response: As described in Master Response # 9 – Clarification of Recovery Project Description, the Recovery Project does not propose to recharge any water. The Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures. Therefore, environmental review of potential impacts of recharge is not part of the EIR for the Recovery Project.

Environmental review for the Palms Project was completed in 2016 (Palms Project IS / Mitigated Negative Declaration (SCH # 2015121030)). No issues were raised during that environmental review regarding risks of creating a biological sink, probably because the assertion that recharge ponds would act as a sink for migratory birds and other species is highly speculative. The recharge areas are not highly engineered, devoid of vegetation, or managed to eliminate vegetation; they are a mosaic of aquatic and vegetated upland habitat that provides food and cover for a variety of wildlife species. It is extremely unlikely that attraction of migratory birds and other species to the recharge areas would meet the level of significance under CEQA by causing a wildlife population to drop below self-sustaining levels, threatening to eliminate an animal community, or substantially reducing the number of an endangered, rare, or threatened species.

KWBA-40: *With respect to air quality and greenhouse gases (GHG) specifically, the DEIR does not include any real analysis of the Project's potential impacts during operation. For example, the DEIR does not specify the type of recovery pump that would he used nor does it specify that the recovery pumps would be monitored for their efficiency and level of GHG emissions.*

Response: Assuming recovery of no more than 25,000 AFY with 14 recovery wells that would be pumped at a rate of no more than 5 cubic feet per second, the District would run the recovery wells a maximum of 60,500 hours per year. As stated in this FEIR (Chapter 3.1.4), the recovery wells would be equipped with new, energy-efficient pumps up to 250 horsepower. The recovery wells would be connected to existing PG&E electrical powerlines and maintained pursuant to the District's standard operating procedures. Operating the recovery wells would not result in GHG emissions.

The Air Quality analysis regarding potential impacts from construction activities associated with the Recovery Project was updated using the S.J.V.A.P.C.D. Guidance for Assessing and Mitigating Air Quality Impacts (GAMAQI). The S.J.V.A.P.C.D.'s SPAL for Ambient Air Quality Analysis – Combustion Exhaust Emissions was used to determine if construction of the Recovery Project would exceed the construction significance threshold for criteria pollutants. This additional analysis confirmed the conclusion of the DEIR. Please *see* Chapter 3.1.3, "Air Quality" in this FEIR for the updated analysis regarding construction-related air quality impacts.

KWBA-41: *With respect to energy, the DEIR fails to substantially consider the Project's potential impacts. This impact should be discussed in sufficient detail for the public and decision makers to understand why the Project's energy use would be less than significant.*

Response: The District's mission, in part, is to convey and deliver water supplies and beneficially manage groundwater resources. As stated in the DEIR, the purpose of the Recovery Project is to manage the District's water supply in a manner that ensures full production of permanent crops regardless of the current years water supply. With regards to energy resources, the Recovery Project is not wasteful, inefficient, or unnecessary because it helps fulfill the District's mission. Moreover, the Recovery Project would not conflict with a local plan for renewable energy or energy efficiency because one has not been adopted by Kern County. These are the only two energy-related questions in the CEQA checklist.

KWBA-42: *The DEIR does not analyze potential air quality impacts associated with the projected indirect effect of conversions from row crops to tree crops. The DEIR also does not analyze the potential water supply impacts of increasing demand associated with changes in crop patterns that could be attributable to the Project.*

Response: The DEIR does acknowledge that the "conversion to permanent crops may increase the water demand by 1 AF per acre." The DEIR, however, also goes on to state, "In the short term, this conversion typically reduces demand, as a pistachio tree will not reach full demand for water until about the 12th year, with the 1st year being as low as 0.25 AF per acre. The Recovery Project will allow for the highs and lows of the District's water supply to be managed in a manner that ensures full production of permanent crops regardless of the current years water supply." The Recovery Project is about managing existing (not expanding) water supply. Moreover, a landowner's decision to convert row crops to tree crops is independent of the Recovery Project (*see* response to KWBA-44 for additional information). Therefore, analyzing the potential air quality impacts associated with the indirect effect of conversions from row crops to tree crops is outside the scope of CEQA.

The Air Quality analysis regarding potential impacts from construction activities associated with the Recovery Project was updated using the S.J.V.A.P.C.D. GAMAQI. The S.J.V.A.P.C.D.'s SPAL for Ambient Air Quality Analysis – Combustion Exhaust Emissions was used to determine if construction of the Recovery Project would exceed the construction significance threshold for criteria pollutants. This additional analysis confirmed the conclusion of the DEIR. Please *see* Chapter 3.1.3, "Air Quality" in this FEIR for the updated analysis regarding construction related air quality impacts.

KWBA-43: *The DEIR's section on cumulative impacts and growth inducing impacts does not at all acknowledge that the presence of a more reliable or greater water supply might cause alterations to the patterns of agricultural uses in the area.*

Response: As mentioned in the preceding responses, a landowner's decision to convert row crops to tree crops is independent of the Recovery Project which is about managing existing (not expanding) water supply. The Initial Study did analyze the CEQA checklist questions pertaining to agriculture, including (2-a) conversion of Prime or Unique Farmland or Farmland of Statewide Importance to non-agricultural use, (2-b) conflict with existing zoning for agricultural use or Williamson Act contract, and (2-e) involve other changes in the existing environment which could result in conversion of Farmland to non-agricultural use. For agricultural resources, the CEQA checklist requires an analysis of conversion from an agricultural use to a non-agricultural; conversely, the CEQA checklist for agricultural resources does not require an analysis of conversion from one agricultural use to another agricultural use. Based on the analysis in the Initial Study, the Recovery Project would have no impact on agricultural resources.

KWBA-44: *The Notice of Preparation for the DEIR indicates that "[t]he EIR will also explain why other effects were determined to not be potentially significant and were not discussed in detail in the EIR. The only discussion of the basis for these conclusions is set forth in the Initial Study that was circulated along with the District's Notice of Preparation. This provides only cursory explanations as to why the increase in reliability and stability of the agricultural water supply would not alter agricultural use patterns in the vicinity of the Project.*

Response: The District determined that additional information was not warranted in the DEIR for potential impacts to air quality, agriculture and forestry resources, geology, hazards and hazardous materials, population and housing, mineral resources, and wildfire. According to CEQA checklist, the Initial Study sufficiently analyzed these resource areas.

The District agrees with the conclusion on page 4-8 of the Monterey Plus Final Revised EIR which provides, "…numerous factors are causing the increase in permanent crops in Kern County and the shift is not due to KWB activities." As succinctly detailed in the Monterey Plus Final Revised EIR (pages 4-1 – 4-8), the factors include world commodity price increases, state policy to increase agricultural irrigation efficiency, and reliance on groundwater pumping. For these same reasons, the increase in permanent crops in Kern County is a regional trend and is unrelated to District activities.

KWBA-45: *The DEIR includes no material evaluation of the Project's impacts on the blunt-nosed leopard lizard or the white-tailed kite. Nor does the DEIR include analysis of the feasibility of avoiding take of the lizard or kite. Instead, the DEIR defers the evaluation of impacts to the blunt-nosed leopard lizard to pre-construction surveys.*

Response: The DEIR evaluates potential Project impacts on blunt-nosed leopard lizard on page 3-31 and does not defer analysis of effects on this species. As stated in the DEIR and discussed in Master Response #6 – Biology, no suitable habitat for blunt-nosed leopard lizard occurs within 50 feet of the project footprint. Despite this lack of suitable habitat in the immediate vicinity, the DEIR acknowledges that potential for blunt-nosed leopard lizard to wander into the project footprint cannot be completely discounted and discloses that such individuals would be vulnerable to injury or death. Mitigation Measure BIO-1 has been augmented in the FEIR to specify that fencing will be placed outside the minimum 50-foot no-disturbance buffer and therefore will not impact suitable habitat for blunt-nosed leopard lizard. Implementing Mitigation Measure BIO-1 is a feasible means of avoiding take of this fully protected species.

The DEIR evaluates potential Project impacts on white-tailed kite on pages 3-32 and 3-33 and does not defer analysis of effects on this species. The DEIR describes the means by which Project activities could result in take (nest abandonment, reduced care of eggs or young, or premature fledging), if active nests occur near project activities. Implementing Mitigation Measure BIO-2b would avoid take by conducting pre-construction surveys and implementing buffers adequate to avoid take, as confirmed by monitoring by a qualified biologist. This is a feasible means of avoiding take of this fully protected species.

KWBA-46: *The DEIR concludes that there will be no waters of the U.S. impacted, but does not document the basis for this conclusion. The DEIR does not include a delineation of potential waters of the U.S. prepared in accordance in federal standards and procedures.*

Response: Various sources, including the National Wetland Inventory and Google Earth imagery have been reviewed and confirmed during the biological reconnaissance-level survey. The Recovery Project will cross several man-made features, such as the West Side Canal, East Side Canal, and unnamed canals, as discussed in the Biological Resources Section of the DEIR. Wetlands have been mapped on the Tule Elk State Natural Reserve and undeveloped (i.e., annexed) lands in the northeast; however, the reserve is situated on the opposite bank of the East Side Canal where work will not occur and the Recovery Project has been modified (i.e., pipeline rerouted) to avoid the wetlands on the northeast undeveloped lands. Consequently, completion of a wetland delineation to federal standards is not warranted.

KWBA-47: *The mitigation measure specific to blunt-nosed leopard lizard indicates that temporary exclusion fencing would be placed at the direction of a qualified biologist, but does not indicate that a pre-construction survey would be conducted to verify that no blunt-nosed leopard lizard are within the project area that would not be fenced off by the exclusion fencing. Additionally, the DEIR should be revised to include the results of protocol-level surveys of this species.*

Response: CDFW comments on the NOP recommended a habitat assessment be conducted to determine if the Project site or immediate vicinity contain suitable habitat for blunt-nosed leopard lizard. As described in Master Response #6 – Biology and on page 5-5 or the DEIR, the project footprint was adjusted based on results of this assessment to provide a minimum 50-foot no-disturbance buffer between the project site and suitable habitat for blunt-nosed leopard lizard. Therefore, the CDFW recommendation to conduct focused surveys in suitable habitat on or in the immediate vicinity of the project site is not relevant. In addition, CDFW recommends surveys be implemented as a mitigation measure, not before the EIR is certified, as suggested by KWBA. Because impacts on this species and its habitat would be avoided, protocol-level surveys and additional take avoidance measures are not required. Mitigation Measure BIO-1 has been augmented in the FEIR to specify that fencing will be placed outside the minimum 50-foot no-disturbance buffer and to provide additional information on measures that would be implemented to avoid impacts on blunt-nosed leopard lizard during fence installation and removal.

KWBA-48: *As there is no method for permitting incidental take of white-tailed kite under California law, the DEIR should provide a more detailed description as to why this non-specific mitigation measure is sufficient to avoid take of the kite.*

Response: As indicated in the response to KWBA-45, implementing Mitigation Measure BIO-2b would avoid take by conducting pre-construction surveys and implementing buffers adequate to avoid take, as confirmed by monitoring by a qualified biologist. This is a feasible means of avoiding take of this fully protected species.

KWBA-49: *The DEIR fails to include mitigation measures to avoid or mitigate the potential impacts of the Project on the San Joaquin antelope squirrel. These failures are compounded by the fact that the DEIR does not include data from any detailed biological surveys, nor does the DEIR include any data from the "reconnaissance" level surveys. The DEIR fails to properly identify, assess, and disclose the Project's potential impacts on the San Joaquin antelope squirrel.*

Response: Table 3-2 of the DEIR indicates that no San Joaquin antelope squirrels were observed during focused surveys. As described in Master Response #6 - Biology, focused surveys of potentially suitable habitat within 500 feet of the northeastern portion of the project site were adequate to confirm absence of this species. Surveys were conducted during the time period and temperatures recommended by CDFW and no individuals were observed. Therefore, mitigation measures to avoid impacts on this species are not required.

KWBA-50: *The DEIR limits the scope of the projects considered as part of the cumulative impact analysis to other groundwater recovery projects. No other types of projects are included in the analysis or are even identified. Significantly, the DEIR includes only projects that are currently scheduled for construction. Omitting any other projects that are currently under consideration or which may be approved before the Final EIR is adopted for this Project.*

Response: The comment is incorrect. The cumulative impact analysis of the DEIR was not limited to an evaluation of only three projects. The complete list of projects considered for the cumulative impact analysis for groundwater and geological impacts is listed in Appendix D Attachment D of the DEIR. The project list was taken from these Groundwater Sustainability Plans:

- Kern Groundwater Authority Groundwater Sustainability Plan, January 2020
- Final Groundwater Sustainability Plan, Kern River Groundwater Sustainability Agency, January 2020
- Henry Miller Water District Groundwater Sustainability Plan, Kern County Subbasin, January 2019

These projects were included in the Projected-Future Baseline with SGMA Projects Scenario.

KWBA-51: *This DEIR omits any evaluation of the projects that have undergone or are currently undergoing their own CEQA evaluation, some examples being the Kern Fan Groundwater Storage Project, the Onyx Ranch South Fork Valley Water Project, the Stockdale Integrated Banking Project, and the McAllister Ranch Groundwater Banking Project, and more. The projects occurring in the area immediately adjacent to the proposed Project should be discussed in the DEIR's cumulative impacts analysis.*

Response: The comment is incorrect. The complete list of projects considered for the cumulative impact analysis for groundwater and geological impacts is listed in Appendix D Attachment D of the DEIR. The Kern Fan Groundwater Storage Project, the Onyx Ranch South Fork Valley Water Project, the Stockdale Integrated Banking Project, and the McAllister Ranch Groundwater Banking Project (aka, the James

Groundwater Storage and Recovery Project), are all explicitly listed in Table 4-1 of Attachment D of Appendix D of the DEIR. These projects, and many others, were considered in the cumulative impact analysis in the DEIR.

KWBA-52: *The DEIR analyzes the Project's water quality impacts in a vacuum, fails to evaluate the cumulative water quality impacts of multiple banking projects pumping non-project water or groundwater into the Aqueduct. The failure to analyze the Project's impacts on groundwater at its point of extraction is a substantial error and cannot serve as the basis to summarily conclude that there are no cumulative impacts to water quality.*

Response: It would be unduly speculative and unreasonable to assess cumulative impacts of future groundwater banking projects pumping non-project water into the Aqueduct on water quality. The District has no basis for determining that future pump in of non-project water by other groundwater banking projects is a probable future project. Therefore, an analysis of future water banking projects potential impacts on water quality is unknown, and unknowable at this time.

However, it is clear that any pump in of non-project water into the Aqueduct will be carefully evaluated by DWR prior to authorization. Pump-in proposals must be prepared and will not be approved until DWR can conclude that the proposal will not have a detrimental impact on Aqueduct water quality.

KWBA-53: *The DEIR fails to evaluate the potential indirect impacts of the operation and maintenance of the Project on the biological resources for the adjacent Kern Water Bank Habitat Conservation Plan/Natural Communities Conservation Plan ("HCP/NCCP").*

Response: The Project will have no impact on wetlands because the wetlands are supported by surface water in the KWBA's recharge ponds, not groundwater. The groundwater levels are substantially below the root zones of plants and are too deep to support vegetation. In addition, the groundwater modeling does not indicate significant declines in groundwater levels from the project. The Proposed Project will have no impact on surface water deliveries to the KWB from the State Water Project or from the Kern River.

KWBA-54: *The DEIR fails to analyze the Project's potential impacts on private wells, including landowner wells both inside and outside of Buena Vista's service area. There is no analysis regarding whether the proposed extraction for the Project would render landowner wells unusable or require them to be deepened or relocated entirely.*

Response: In the DEIR, a general analysis was performed to assess potential impacts to groundwater levels and water quality. The groundwater impacts assessment evaluated the impacts on groundwater levels of the Recovery Project in conjunction with the existing Palms Recharge Project. This analysis is considered to address potential impacts to private wells, including landowner wells both inside and outside of Buena Vista's service area. Should issues arise, they would be addressed by MM CUM-1 and management actions under the BVWSD GSA GSP.

Likewise, the water analysis did not find major water quality issues with the continued beneficial use of groundwater for landowner wells in the area. The potential water quality issue may occur delivering groundwater from the recovery wells to the California Aqueduct due to their more stringent water quality requirements. *See* Master Responses # 3 and #4- Water Quality Data and Water Quality Impact Analysis for information on the water quality.

Minimum Thresholds presented in the BVWSD GSP were established to be protective of domestic wells, generally the shallowest of the wells found in the BVGSA (BVGSA 2020a). In addition, the mitigation measures established in the GSP are designed to remedy instances where the performance of individual wells within the GSA is found to have been impacted by operation of other wells. The DEIR has been clarified to describe how operation of all recovery wells will be governed by the mitigation measures contained in the BVGSA GSP (BVGSA 2020b). Similarly, in instances where operation of wells in neighboring GSAs can be demonstrated to have been impacted by operation of recovery wells, the mitigation measures prescribed by the GSAs of the affected wells will be applied.

As noted elsewhere, Buena Vista agrees to adopt the mitigation measures of the JOC for operation of the Palms. Adoption of these measures and implementation of the adaptive management actions presented in the BVGSA's GSP will be used to remedy conditions where operation of recovery wells is shown to have impacted wells with the jurisdiction of other JOC members but beyond the boundaries of the BVGSA where the mitigation measures of the BVGSA would continue to govern.

KWBA-55: *Mitigation Measure CUM-1 fails to sufficiently address the potential cumulative impacts of the Project and does not at all address the Project's impacts to groundwater quality and levels within the KGAGSA. Additionally, the DEIR does not describe or commit to achieve specific performance standards similar to the performance standards adopted by other banking projects.*

Response: As noted in Section 2.3.3 of the DEIR, BVWSD entered into a MOU with the KWBA and its Member Entities, which provides that, "…any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU…" In subsequent years, a JOC has been formed among these parties, which utilizes multiple groundwater models to assess impacts to groundwater from banking and recovery operations. BVWSD will either amend the existing MOU, develop a new MOU, or join the JOC, to address the operation and monitoring of the Recovery Project. Therefore, the intent is to use this mechanism to address issues such as the one outlined in the comment.

It should also be noted that the mitigation measures laid out in the BVWSD GSP are active throughout the BVGSA and are designed to minimize the impacts of well operation on the performance of neighboring wells. These measures, together with the MTs, are intended to protect shallow domestic wells from being impacted by deeper wells operating nearby. While governing the entire BVGSA rather than being specific to operation of the Project, the BVGSA's mitigation measures function as performance standards for the Recovery Project. As well as mitigation measures adopted by the JOC and the BVGSA, Mitigation Measure CUM-1 presented in the DEIR was formulated specifically to defer recovery pumping prior to groundwater levels reaching the MTs established at the RMWs in WKWD and RRBWSD designated by the proposed mitigation measure.

KWBA-56: *The DEIR defers species specific surveys to determine presence or absence until pre-construction, and defers any survey for Swainson's Hawk until some undisclosed point in time up to 14 days prior to construction activities.*

Response: As described in Master Response #6 – Biology, species-specific surveys were conducted to support the DEIR, including habitat assessments and focused surveys for evidence of species presence. Surveys to determine presence or absence are not required to adequately evaluate potential impacts of the project on species evaluated in the DEIR. The DEIR does not assume absence of any species for which absence could not be confirmed and evaluated potential project-related impacts on species for which absence could not be confirmed.

KWBA-57: *With respect to the blunt-nosed leopard lizard, the deferred mitigation fails to even provide for appropriate surveys. The DEIR must be revised to provide for specific and enforceable mitigation for the Project's potential impacts to blunt-nosed leopard lizard.*

Response: Protocol surveys for blunt-nosed leopard lizard are not required, because construction activities would not occur within 50 feet of suitable habitat for this species. Mitigation Measure BIO-1 has been augmented in the FEIR to specify that fencing will be placed outside the minimum 50-foot no-disturbance buffer and to describe measures that would be implemented to avoid impacts on blunt-nosed leopard lizard during fence installation and removal.

KWBA-58: *For all of the reasons described above including in sections 2 and 3, the Project as described fails to adequately evaluate the Project's compliance with the California law regarding reasonable and beneficial use of water and the management of groundwater resources in compliance with the SGMA. The DEIR is required to evaluate the potential conflict with SGMA and the KGAGSA's GSP.*

Response: *See* Master Response #8 – Beneficial Use of Recovered Groundwater.

KWBA-59: *CEQA requires that an EIR include a list of all agencies that are expected to use the EIR in their decision making. The DEIR fails to identify the following responsible agencies: KGAGSA; Kern County Local Agency Formation Commission (LAFCO); California Department of Water Resources; State Water Resources Control Board; Regional Water Quality Control Board; the Kern Water Bank Authority; and the Rosedale-Rio Bravo Water Storage District. The proposed annexation is part of the Project, and the LAFCO is prohibited from approving any annexations regarding the Project prior to the certification of a Final EIR that evaluates all of the direct, indirect, and cumulative impacts of the Project.*

Response: Chapter 2.4 of this FEIR has been modified to include KCWA. The other agencies listed in the comment are not responsible agencies for the Recovery Project because they have no discretionary approval authority, *see* 14 Cal. Code Regs. §15381. The Recovery Project is not subject to LAFCo approval or annexation of the lands. There is no legal authority requiring a project to be within the jurisdictional boundaries of the proposing public agency. The annexation of the Recovery Project lands is unrelated to the Recovery Project and can be approved with or without the Recovery Project's approval. The KGA has no authority to approve or disapprove the Recovery Project and is thus not a responsible agency, *see* Master Response #2 – Boundaries of the BVGSA.

KWBA-60: *The DWR is a responsible agency because it has the authority to review, comment on, and approve groundwater sustainability plans and any amendments or changes thereto including GSA boundary adjustments.*

Response: Chapters 2.4 and 2.5 of this FEIR has been modified to clarify DWR's role. However, the Recovery Project is not dependent upon GSA boundary adjustments and can proceed without any adjustments.

8.6 Kern Water Bank Authority, South Valley Biological Consulting

SVBC-1: *Table 3-1 of the DEIR should be edited to indicate Horn's milkvetch (Astragalus hornii var. hornii) occurs in the Outlet Canal and periodically flooded areas at the KWB and lesser saltscale (Atriplex minuscula) occurs in bush seepweed habitat adjacent to the northeast portion of the project site.*

Response: This information has been added to relevant text from Chapter 3.2 – Biological Resources, as shown in this FEIR. This information does not change the DEIR conclusion that impacts on special-status plants would be less than significant.

SVBC-1: *Table 3-2 of the DEIR incorrectly indicates there is no suitable habitat for coast horned lizard (Phrynosoma blainvillii) on or adjacent to the project site and that Tulare grasshopper mouse (Onychomys torridus ssp. tularensis) is not known to occur at the KWB.*

Response: Page 3-21 of the DEIR indicates that suitable habitat for coast horned lizard occurs adjacent to the northeast portion of the project site. Edits have been made to Table 3-2 (now Table 3-3 in this FEIR) and other relevant text from Chapter 3.2 – Biological Resources, as shown in this FEIR. Supplemental information on Tulare grasshopper mouse occurrences at KWB, which range from approximately 6 to 10 miles from the Recovery Project site, has also been included in this FEIR. This information does not change the DEIR conclusions that impacts on coast horned lizard and Tulare grasshopper mouse would be less than significant.

SVBC-3: *The DEIR correctly indicates that Swainson's hawks (Buteo swainsoni) are known to nest at the nearby Tule Elk Reserve; however, this species also regularly nests at the KWB as well.*

Response: This information has been added to relevant text from Chapter 3.2 – Biological Resources, as shown in this FEIR. This information does not change the DEIR analysis of potential impacts on Swainson's hawk.

SVBC-4: *The DEIR states that "…No suitable nesting habitat for tricolored blackbird (Agelaius tricolor) is currently present on or adjacent to the project site…". However, this species has nested on occasion at the Tule Elk Reserve and frequently nests at the KWB. The DEIR concludes the same for yellow-headed blackbird (Xanthocephalus xanthocephalus). This species also is known to nest at the KWB.*

Response: This FEIR acknowledges in Table 3-3 that tricolored blackbird is known to nest at Tule Elk Reserve. These nesting locations are nearly 0.5 mile from the project site at their closest point and are therefore not considered adjacent to the site. Supplemental information on tricolored blackbird and yellow-headed blackbird nesting at KWBA has been added to relevant text from Chapter 3.2 – Biological Resources, as shown in this FEIR. Suitable nesting habitat for these species at KWB also is not considered adjacent to the project site, and this information does not change the DEIR analysis of potential impacts on tricolored blackbird or yellow-headed blackbird.

SVBC-4: *The DEIR states that the Tulare grasshopper mouse nearest known occurrence is approximately 10 miles away from the project site. This species is known to occur in several areas at KWB. The DEIR states "…No evidence of kit fox presence in the Biological Study Area was observed during focused field surveys…". Although I do not doubt this statement in any way, kit foxes are nevertheless known to occur in the surrounding area and the individuals can be wide ranging in their foraging habits. Therefore, it should be expected that this species is likely present at least time to time within the Biological Study Area.*

Response: Supplemental information on Tulare grasshopper mouse occurrences at KWB, which range from approximately 6 to 10 miles from the project site, has been included in this FEIR. Consistent with the commentor's conclusion, the FEIR states in Table 3-3 that San Joaquin kit fox has moderate potential to occur on or adjacent to the project site and acknowledges that potential dens occur adjacent to the project site. Therefore, the impact evaluation assumes the species could be present and potentially impacted by the proposed project, and Mitigation Measure Bio-3 is included to minimize potential project-related impacts on San Joaquin kit fox.

SVBC-5: *Horn's milkvetch should also be included in the Special-status Plants addressed on page 3-31, as it is also known to occur nearby within the Outlet Canal, similar to slough thistle.*

Response: Horn's milkvetch has been added to the discussion of potential impacts on special-status plants, as shown in the FEIR. This information does not change the DEIR conclusion that impacts on special-status plants would be less than significant.

SVBC-6: *Our experience has been that unless blunt-nosed leopard lizard surveys consistent with the 2019 CDFW protocols or some other CDFW-approved methodology are conducted, it is unlikely that fencing will be allowed to be installed. Additionally, CDFW does not normally approve fence installation within 50 feet of burrows that could be used by species such as Tipton kangaroo rat (Dipodomys nitratoides nitratoides) or San Joaquin antelope squirrel (Ammospermophilus nelsoni) unless it can be demonstrated through an approved investigative trapping effort or other agreed upon method that these species are not present.*

Response: As stated in the DEIR and described further in Master Response #6 – Biology, no suitable habitat for blunt-nosed leopard lizard, Tipton kangaroo rat, or giant kangaroo rat occurs within 50 feet of the project footprint. In addition, focused surveys confirmed San Joaquin antelope squirrel does not occur adjacent to the area where fencing would be installed. Mitigation Measure BIO-1 has been augmented in this FEIR to specify that fencing will be placed outside the minimum 50-foot no-disturbance buffer and therefore will not impact suitable habitat for blunt-nosed leopard lizard, Tipton kangaroo rat, or giant kangaroo rat. Protocol surveys for blunt-nosed leopard lizard and mammal trapping are not required, because suitable habitat would be avoided.

SVBC-7: *The trees within the Project represent some of the only remaining suitable nesting habitat in the local vicinity. Hence, it seems that CDFW may view impacting a total of 10 acres of foraging habitat for this species as a significant impact. Swainson's hawks are definitely known to nest in the area nearby the project site and likely forage in some portions of the project site from time to time. The DEIR is proposing that a nest survey for potential Swainson's hawk nesting trees be conducted within 0.25 mile of the project site. From my experience, CDFW will typically require a nest tree survey for a minimum of 0.5 mile surrounding the project.*

Response: As indicated in Chapter 3.2.3 of this FEIR, foraging habitat disturbance would be temporary, and only a small proportion of the overall habitat on the project site would be disturbed at any one time. Because pipeline would be installed sequentially and project construction is anticipated to be completed within approximately 11 months, the amount of potential Swainson's hawk foraging habitat that would be disturbed during the breeding would be small and very unlikely to result in a significant impact. Notably, CDFW did not comment on this issue in their letter regarding the DEIR. Because most of the project area is subject to regular disturbance associated with ongoing agricultural activities, Swainson's hawks nesting further that 0.25 mile from the project site are extremely unlikely to be disturbed by project activities. However, Mitigation Measure BIO-2b has been revised in this FEIR to expand the survey area to within 0.5 mile of the project site.

8.7 Kern Water Bank Authority, Environmental Defense Sciences

EDS-1*: The blending analysis is significantly biased in that despite Table 3-6 list of "Wells used in Water Quality Analysis" only the data from DMW-13 Middle was actually used and as is made clear in the GEI 2017 Memorandum the other wells west of East Side Canal have some serious contaminant problems.*

Response: *See* Master Responses #3 and #4 – Water Quality Data and Water Quality Impact Analysis and response to KCWA-1.

EDS-2: *As is apparent from the water quality and blending analysis, it will be extremely difficult for the Project to meet the State Water Project (SWP) standards for pumping groundwater production into the California Aqueduct, and additionally there is no evaluation of cumulative water quality impacts of the Project along with other banking projects' pumping non-SWP water into the Aqueduct and having to meet SWP water quality standards.*

Response: The comment on project and cumulative impacts with respect to the quality of recovered water pumped into the California Aqueduct does not account for the fact that no water can be introduced from outside sources that does not meet the standards for pump-in water established by the DWR and the State Water Project. As is now taking place with 123-TCP, DWR and project contractors set pump-in standards that are protective of the quality of water delivered to SWP customers and water users. Therefore, water will not be pumped in from the Recovery Project or any other existing or proposed water bank that does not satisfy the standards for pump-in water in force at the time of the activity. *See* Master Responses #3 and #4 – Water Quality 1 and 2 for more information on the water quality.

EDS-3*: The DEIR for the Palms project has no discussion at all about the variability of the Kern River flow or the return frequency of possible recharge opportunities. The infiltration project and its associated wetlands will be dependent on river flow. No discussion of impacts of sustained drought on the constructed wetland.*

Response: This comment pertains to the Palms Recharge Project (*see* Master Response # 9 – Clarification of Recovery Project Description) and should have been introduced during the comment period for the IS/MND for that project.

The Chapter 2.3.2 – Operations, states that, "Available water supply will continue to be recharged through seepage in District-owned facilities **in wet years**. This includes the existing Palms Project where it is anticipated that up to 100,000 AFY can be recharged. The District will also continue to recharge surface water through their canal system, a District practice for many decades" (emphasis added). Therefore, the intermittent nature of recharge is clear, as this can only occur during wet years, when water is available.

As described in Section 3.2.1 of the DEIR, there are no wetlands on the project site. The Palms recharge ponds are not managed as constructed wetland. Wetlands at the KWB and Tule Elk Reserve will not be impacted by the project, because the project will have no impact on water diversions to those areas. *See* also response to KWBA #53.

8.8 Kern Water Bank Authority, Wood Environment and Infrastructure

See Master Response#1- Suitability and Validation of Superposition Model.

9.0 Master Responses to Comments

The DEIR was released for public comment on December 4, 2020, the 45-day comment period closed on January 19, 2021. Timely comments were submitted by the WKWD, KCWA, KGA, CDFW, and the KWBA. The comment letters themselves are found in Chapter 7.

Each comment letter was also responded to individually. A summary of each comment, and the District's responses to those comments, is found in Chapter 8.

In some cases, multiple commenters submitted comments with a common theme. Master responses have been prepared to address comments related to the suitability and validation of the superposition model (Chapter 9.1), the boundaries of the BVGSA (Chapter 9.2), Water Quality Data (Chapter 9.3), Water Quality Impact Analysis (Chapter 9.4), compliance with SGMA (Chapter 9.5), Biology (Chapter 9.6), Regional Groundwater Level Contour Mapping and Flow Analysis (Chapter 9.7), Beneficial Use of Recovered Groundwater (Chapter 9.8), and Clarification of Recovery Project Description (Chapter 9.9).

9.1 Master Response #1 – Suitability and validation of superposition model

Several commenters included comments with a common theme related to suitability and implementation of a superposition model for the groundwater impacts assessment in the DEIR. This master response is intended to address these comments.

9.1.1 Superposition Model Concept – Application for Numerical Models

The Principle of Superposition is applicable to both analytical and numerical groundwater flow models. The technique to develop a numerical model using the Principle of Superposition is described in two reports from the USGS:

- Reilly, T.E., Franke, O.L., and Bennett, G.D. 1984. The Principle of Superposition and Its Application in Ground-water Hydraulics: USGS Open-File Report 84-459, 43 p.
- Reilly, T.E., Franke, O.L., and Bennett, G.D. 1987. The Principle of Superposition and Its Application in Ground-Water Hydraulics, USGS, Techniques of Water-Resources Investigations, Book 3, Chapter B6, 28p., http://pubs.usgs.gov/twri/twri3-b6/pdf/twri_3-B6_a.pdf.

In brief, the Principle of Superposition states that solutions can be added together to obtain a composite solution. Reilly, Franke and Bennett (1984, 1987) note that this is a powerful mathematical technique routinely used for analyzing certain complex problems in many areas of science and technology. In their reports, Reilly, Franke and Bennett (1984, 1987) demonstrate that this approach has important applications in groundwater modeling. Superposition modeling enables the groundwater impacts analysis to assess the effects of the Recovery Project on the groundwater system in isolation from other acting stresses (e.g., pumping, recharge, etc.) without having to obtain data of non-project related stresses to simulate the

Recovery Project. Using a superposition model, calculation of groundwater impacts is inherently precise because flow quantities other than Recovery Project-related components are set to zero (Leake 2011).

Thus, superposition modeling techniques allow for the formulation of the Recovery Project scenarios, and simulation of the Recovery Project-related changes, in a manner that incorporates all of the details of the Recovery Project while reducing the need to collect non-project-related data that may not be obtainable.

9.1.2 Superposition Model Concept - Handling of Nonlinearities

With respect to comments that a superposition model should be limited to a linear aquifer system, we included in the DEIR an assessment of non-linearities in Section A.4.2 in Appendix D (pdf document page number 419). In this documentation, we cited several references from the USGS and peer-reviewed journals for additional methods for handling more complex nonlinearities in groundwater modeling. These reports include Reilly and Harbaugh (2004), Durbin et al. (2008), Leake (2011), Takahashi and Peralta (1995), among others, who summarize practices to address complex nonlinearities in superposition models. We followed the standard practices advanced by these authors for handling nonlinearities in groundwater modeling for the Recovery Project.

We further noted that it is always best-practice to evaluate the likely degree and significance of any nonlinearities on a project-specific basis (Reilly et al. 1987; Reilly and Harbaugh, 2004). Therefore, our approach is consistent with guidelines from the USGS (Reilly et al. 1987) and other scientific organizations.

For the Superposition Model the likely effects of the following potential sources of nonlinearity on model results include the following:

- Groundwater-surface water interactions – This relationship becomes nonlinear if groundwater levels cross the riverbed elevation (point of discontinuity) during the simulation periods causing the calculation of the rate of seepage to change from a continuous equation to a constant value. If groundwater levels remain consistently above or below the riverbed elevation, the relationship remains linear. In the Superposition Model, the Kern River and other simulated streams are consistently disconnected from the aquifer; as a result, this condition does not constitute a source of nonlinearity.
- Aquifer parameters – Where the aquifer is unconfined, aquifer transmissivity changes over time as groundwater levels change. If groundwater level changes are small relative to the total aquifer thickness (typically less than 10 to 20%), the error associated with this nonlinearity is acceptably small (Reilly et al., 1987; Morrison, 2006). For the simulations, the maximum drawdowns resulting from the Recovery Project are within 10 to 20% of the Model Layer 1 thickness and between 1 and 5% of the total aquifer thickness at the pumping locations. Therefore, the effects of unconfined aquifer conditions are within the acceptable range of nonlinearity.

The effects of nonlinearity are considered to be within an acceptable range that allow for use of the Superposition Model as a quantitative tool to support the groundwater impacts analysis for the Recovery Project.

9.1.3 Superposition Model Concept - Applicability

Several comments questioned the suitability of the superposition approach in evaluating groundwater impacts. The use and application of the Principle of Superposition to develop numerical groundwater flow models for real-world projects is well documented in the DEIR (in Appendix D, Attachment A, Table A-1). Table A-1 provides a representative list of 26 reports documenting the use of a superposition models that are publicly available using an internet search.

The use of superposition models has been increasing in recent years with applications for complex projects. The advantage of the superposition models being that the issue being addressed can be evaluated without having to update every other data input in the basin. A brief summary of some major projects listed on Table A-1 that are of similar scale and complexity include:

- The New Mexico Office of the State Engineer utilizes for assessing water rights administration in the adjudicated Taos Groundwater Basin and groundwater-surface water interactions in the Rio Grande Rift Zone for the city of Albuquerque.
- The Idaho DWR uses a superposition model for development of a comprehensive Aquifer Management Plan for the Eastern Snake River Plain.
- Monterey County Water Resources Agency for long-term water resources management planning in Salinas Valley, California.
- Groundwater impacts analysis for the Sacramento River Settlement Contracts for the US Bureau of Reclamation.
- The USGS has used this technique for studies of impacts of groundwater pumping on flows in the adjudicated Colorado River in Arizona and California.

In most cases these models are derived from a regional groundwater model that has been modified to evaluate a specific issue. The report for the Salinas Valley project noted that utilizing the superposition approach removed noted deficiencies noted in the USGS's regional North Marina Groundwater MODFLOW Model of concern for the analysis of their project.

As demonstrated by this representative project list, the superposition approach for numerical modeling has become a well-established method for evaluating complex issues of groundwater impacts, supporting groundwater management, and providing regulatory compliance. The projects also handled nonlinearities of similar or greater complexity in a comparable manner as used for the Recovery Project. The projects listed in Table A-1 demonstrate that the application of the Superposition Model for numerical modeling is now a standard method of evaluating complex conditions similar to those associated with the Recovery Project.

9.1.4 Superposition Model Development

Comments were received that questioned development of the superposition model. The development of a superposition model is typically based on modification of an existing, calibrated, historical groundwater model. The advantage of this approach is that the superposition model incorporates the aquifer basin structure, hydrostratigraphy, and parameter values determined through calibration of the pre-existing model.

The Superposition Model used for the Recovery Project is based on the USGS CVHM. The CVHM is a three-dimensional computer model developed by the USGS to simulate surface water and groundwater flow across the entire Central Valley (Faunt 2009). The geologic framework and aquifer properties of CVHM were developed based on a comprehensive geologic analysis including the USGS Sediment Texture Analysis (Faunt, Hanson, and Belitz 2009).

In adapting the CVHM model grid, layering and aquifer properties from the regional scale to the local scale used for the Superposition Model, we applied standard methods for upscaling data from a regional to a local model to preserve the characteristics of CVHM. Therefore, the Superposition Model is not a completely new MODFLOW model of the area, but is a local model derived from the calibrated regional CVHM model.

Modifications to the CVHM model are described in the DEIR and include the following.

- The increase in the resolution of the grid does not alter the overall representation of the conceptual model but provides additional calculation points within the model's domain to provide greater resolution in solving for the drawdown from the pumping wells. The approach uses the Telescopic Mesh Refinement approach that is documented in the USGS report "Procedures and Computer Programs for Telescopic Mesh Refinement Using MODFLOW" (Leake and Claar 1999) and is incorporated as a feature within the Groundwater Vistas (ESI 2020) an industry-standard MODFLOW interface.
- The final aquifer properties used for the CVHM were extracted and applied to the Superposition Model in a manner to preserve their hydraulic characteristics. To correlate the aquifer properties from multiple CVHM Model Layers to the model layers for the superposition model used, standard techniques were applied for calculating aquifer properties in layered aquifer systems following standard techniques. The approach is described in detail in **Appendix D**, Attachment B, Section B.2.4 of the DEIR. Along with the descriptions are references to standard groundwater textbooks by Todd and Mays (2004); Bear and Verruijt (1987); Freeze and Cherry (1979) and Bouwer (1978).

By following these standard procedures, the superposition modeling approach as implemented for the Recovery Project incorporates detailed information about the hydrostratigraphy and distributions of stresses throughout the basin-wide groundwater system.

9.1.5 Superposition Model Validation

One comment expressed concern about the use of the term "validation" and claims mis-use of the term by describing a very narrow application of model validation. It should be noted that the term "validation" has been the subject of literature debate over the past several decades. Recently, discussion has focused less on semantics and more on the process of confidence building by developing procedures to improve the models and the quality of decisions based on those models. This process of evaluation of a model's representativeness is generally referred to as model "validation" (Law and Kelton, 2000, p. 264).

For this report, we subscribe to this more general definition that model validation is a process to test of the suitability of a model for its given purpose by comparing model results to an independent data set. Rather than the narrow definition expressed in the comments, our approach to "validation" is more consistent with that of the American Society for Testing and Materials (ASTM) D-5981 (*Standard Guide for Calibrating a Ground-Water Flow Model Application)* definition of *"application verification"* defined as follows:

> …using the set of parameter values and boundary conditions from a calibrated model to approximate acceptably a second set of field data measured under similar hydrologic conditions.

No set rule can determine whether application of superposition will provide acceptable answers in a given instance; each problem must be judged individually. Developing an appropriate validation scenario is challenging in a heavily operated groundwater basin because validation requires simulating a set of historical groundwater stresses that show a clear cause and effect relationship. The overall approach was to assess the ability of the model to simulate historical change in groundwater levels for different aspects of the groundwater issues being addressed in the DEIR in a manner consistent with the application of a screening-level model assessment. For this we developed the following set of scenarios based on available data.

9.1.5.1 Superposition Model Validation Scenario 1

Comments were received that questioned the applicability of comparing the Superposition Model to a previous analytical model used for assessing the potential impacts of the WKWD North Wellfield groundwater extraction wells and recharge basins to local groundwater levels and adjacent wells. This modeling work in documented in Appendix F of the FEIR for the WKWD North Wellfield (ESA 2010). Once again, the comment describes one instance of the comparison of numerical and analytical models but infers that this is the only application. However, the process of multi-model analysis is well documented, and modeling procedures with a much wider range of applications are described in the scientific literature. Our approach for Validation Scenario #1 is consistent with this scientific literature and our definition of model validation above.

The comment further questioned the applicability of Validation Scenario #1. First, we considered the comparing the results of the Superposition Model to the model results presented in Appendix F of the FEIR for the WKWD North Wellfield (ESA 2010) as an appropriate means to assess consistency of results between the WKWD modeling and the Recovery Project modeling.

A second comment questions the quality of the scenario results. A review of the Validation Scenario #1 results (in **Appendix D**, Attachment C, Figure C-2) clearly shows good agreement of the local drawdown at the WKWD wellfield where the maximum drawdown is occurring. Further away from the WKWD wellfield, the Superposition Model simulates greater drawdown than the WKWD model, indicating that the Superposition Model would tend to over-estimate drawdown. Therefore, for the purposes of the groundwater impacts analysis, the drawdown simulated by the Superposition Model provides a conservative assessment of groundwater impacts by simulating drawdowns that range from similar to greater than those from a comparable analysis at one of the areas of interest for this DEIR.

9.1.5.2 Superposition Model Validation Scenario 2

Comments were received that questioned the applicability of Validation Scenario #2. Validation Scenario #2 was done at the request of WKWD and is based on data provided by WKWD in June 2020 from October 2012 through December 2014. In the WKWD comment letter Introduction, WKWD notes their appreciation that those data were used as part of the analysis of the Recovery Project.

A second comment questions the quality of the scenario results. As noted in the DEIR, it became clear that the groundwater level declines at the WKWD North Wellfield were greater than might be predicted by WKWD pumping alone based on data in **Appendix D**, Attachment C, Section C.2.1. Since we could not reasonably separate drawdown from WKWD from other basin pumping in the measured groundwater level data, we took the course of adding the additional pumping. Therefore, approximately 2.1 million AF of regional groundwater banking recovery pumping from the Kern County Subbasin banks was added to the scenario over the 3-year period from 2012 through 2014.

Once this was done, the Superposition Model was able to simulate the change in groundwater levels in the WKWD North Wellfield. The results show that even with this degree of pumping, the relative difference between simulated and measured data was about 14 percent. As discussed in the DEIR, this represents a reasonable level of model accuracy, and also demonstrates that effects of nonlinearities are not significantly affecting model results.

In the comments, one commenter, in trying to criticize the Superposition Model, succinctly stated the following observation:

> The recharge and recovery operations of the Kern River Projects will likely overwhelm the change in head induced by recharge and recovery stresses at the Palms Project

We agree that Validation Scenario #2 demonstrates the accuracy of the above observation. In the scenario, pumping from the WKWD North Wellfield averages 18,728 AFY over an area of about 480 acres. The maximum observed drawdowns at the WKWD North Wellfield ranged from 70 to 180 feet. For the Recovery Project, maximum recovery pumping is 25,000 AFY distributed equally between two wellfields of approximately 1,150 acres. Since the Recovery Project has about 33 percent greater pumping volume distributed over an area three times larger, the drawdown from the Recovery Project would also be overwhelmed by the pumping at the Kern River Projects. This provides additional qualitative support that the groundwater impact analysis results are representative.

9.1.5.3 Superposition Model Validation Scenario 3

The comment received concerning Validation Scenario #3 appears to misunderstand the scenario setup. For Validation Scenario #3, we are only simulating recharge from the Kern River Projects from 1993 to 1998 to provide an assessment of the ability of the Superposition model to simulate groundwater conditions at the Kern River Projects located to the east of the Recovery Project. As noted in the DEIR, developing an appropriate validation scenario is challenging in a heavily operated groundwater basin because validation requires simulating a set of historical groundwater stresses that show a clear cause and effect relationship. In reviewing available data, we found that the data from the early recharge events from 1993 to 1998 in the Kern Fan Projects provided such an opportunity.

As noted again by the commenter, the recharge and recovery operations at the Kern Fan Projects would overwhelm the change in head induced by the recharge and recovery stresses at the Recovery Project and existing Recharge Project. Therefore, simulating the large recharge operations that occurred during 1993 to 1998 provides a maximum stress scenario. This analysis of the “extreme case” is a useful and time-honored procedure in scientific and engineering investigations.

In the DEIR, we provide a statistical summary of the difference between the measured and simulated change in groundwater levels. The residual mean of -3.8 feet in context of the overall range of measurements of 204 feet represents a relative percentage difference of about 2 percent. For the absolute residual mean of 19.8 feet, the average percentage difference is 9.7 percent, and the median percentage difference is 15 percent. Based on these results, this validation scenario demonstrates that the Superposition Model is able to simulate the relative change in groundwater levels.

9.1.6 Recovery Project Scenarios A and B

In the comments received concerning Recovery Project Scenarios A and B, the comments claim there is no justification to remove the historical banking operations during the 2011 to 2020 simulation period. The commenter appears to misunderstand the scenario setup. Recovery Project Scenarios A and B are projected future conditions that include recharge from the existing Palms Project along with the Recovery Project. These are not historical simulations, so the above comment is not relevant to the scenario.

With respect to the comment on groundwater mounding, the simulation of groundwater mounding and drawdown are both governed by Darcy’s Law and the Conversation of Mass. Since we assume consistent aquifer properties in the area of the Recovery Project, the Superposition Model solves each phenomenon in the same manner. Therefore, the model cannot simultaneously overestimate mounding and underestimate drawdown. If the commenter believes we are overestimating mounding, then we are also overestimating drawdown, and vice versa.

The effect that is described in the comment is due to the setup of the groundwater impact scenario that was intended to reflect a maximum-case, or worst-case, scenario. Since the Recovery Project represents the recovery phase of the existing Palms Project recharge project, consideration of the groundwater mound is an essential part of evaluating the groundwater impacts of the recovery phase. In this scenario, the full recharge occurs during 1 year at one location which results in high mounding. The Recovery Project recovers 90 percent of the recharge water by pumping over a larger area (14 well locations over 2 wellfields) over a period of 4 years. The setup of the recovery is part of the Recovery Project design to distribute drawdown from the Recovery Project over a larger area to minimize groundwater impacts.

9.1.7 Summary and Opinion

In the above master response to comments concerning the Superposition Modeling, we believe we have demonstrated that the modeling was done in accordance with existing published modeling standards. The validation scenarios provide a basis for assessing the relative accuracy of the model results and show the superposition model results were within 15 percent of the measured data for a range of recharge and pumping conditions both in the vicinity of the Recovery Project and in the area of the Kern River Projects. Furthermore, the validation scenarios suggest that the Superposition Model provides a conservative assessment of groundwater impacts by simulating drawdowns that range from similar to greater than those from a similar analysis at one of the areas of interest for this DEIR.

As noted in Section 2.3.3 of the DEIR, BVWSD entered into a MOU with the KWBA and its Member Entities (including WKWD), which provides that, "…any future project within the Kern Fan Area, the Parties hereto shall use good faith efforts to negotiate an agreement substantially similar in substance to this MOU…" In subsequent years, a JOC has been formed among these parties, which utilizes multiple groundwater models to assess impacts to groundwater from banking and recovery operations. BVWSD will either amend the existing MOU, develop a new MOU, or join the JOC, to address the operation and monitoring of the Recovery Project. Therefore, the intent is to use this mechanism to address issues such as the one outlined in the comment. As part of this process, BVWSD would be willing to consider conforming to the JOC Operations Plan of using the two existing models.

9.2 Master Response #2 – GSA Jurisdiction

Several commenters made comments relating to the GSA jurisdiction for the eastern portion of the Recovery Project Area. Comments argue that the KGA has discretionary approval and authority over the Project. This is not accurate. Figure 2-3 of this FEIR identifies the relevant GSAs in the area surrounding the Project. The DEIR describes the regulatory framework of SGMA [DEIR 3-63 – 3-64]. The groundwater model used to analyze potential impacts to the groundwater basin was not restricted by the jurisdiction of the BVGSA or any other GSA. Rather, all potential impacts resulting from the Project were analyzed [DEIR 3-68 – 3-83]. The DEIR concluded that the Project, as proposed, would create a less-than-significant impact [DEIR, 3-84]. This conclusion is not limited to the BVGSA boundaries, but also includes the identified GSAs in the Project vicinity. As SGMA requires coordination between the GSAs to achieve basin wide sustainability, this is appropriate.

The KGA does not have discretionary approval authority over the Project. Pursuant to the Second Amended and Restated Joint Powers Agreement effective July 22, 2019 (KGA JPA 2019), the KGA, "shall have no power to control, limit or empower a Member's rights and authorities over its own Water Supply Matters." [KGA JPA Sec. 2.04]. Likewise, the KGA shall have no power to interfere with the rights of individual landowners to apply, store, or otherwise use surface or groundwater [KGA JPA Sec.2.04]. Similarly, the KGA GSP does not provide the KGA with discretionary authority over projects proposed by public entities. Finally, the Project Area lands will be removed from the KGA as soon as DWR begins to process GSA boundary modifications. The Project Area lands are "Whitelands" not within the boundary of any water District. Two of the parcels within the Project Area (APNs 159-010-06 & 159-020-04) were initially included within the KGA *via* a contract with RRBWSD. However, by way of letter dated April 22, 2019, the owner of those parcels withdrew from that agreement and from the KGA and elected to be included in the BVGSA. The landowner of the two other parcels in the Project Area (APNs 159-020-14 & 159-030-09) never entered into a "Whitelands Agreement" to be covered in the KGA's GSP. Pursuant to the KGA's own Groundwater Sustainability Plan, non-districted lands, such as those making up the Project Area would be removed from the KGA absent a contract with a KGA member. As these lands are not under contract with a KGA member, they are not under the jurisdiction of the KGA. It is acknowledged in the KGA GSP that the boundaries of the KGA, as submitted to DWR, need to be updated and that absent a contract, any non-district lands (such as the Project Area) will be omitted from the KGA, *see* KGA's GSP stating:

> At the inception of the KGA, Kern County was a member of the KGA to represent lands within the Subbasin and outside of the jurisdiction of a local agency participating in a GSA in the Subbasin – non-districted lands. However, in

> December 2018, Kern County supervisors elected to withdraw from the KGA and from that action, approximately 440,950 acres of non-districted lands became not covered by a GSA (Figure 1-3). At the December 19, 2018 KGA Board meeting, the direction provided by the Board was to reach out to the non-districted landowners and extend coverage; however, those non-districted landowners who are not wanting to participate will be eventually removed from the KGA GSA boundary and will then be required to report directly to the State Water Resources Control Board (State Water Board). The KGA reached out to those landowners via a mass mail-out to advise of the County's decision and extended the opportunity to participate in SGMA through the member agencies of the KGA. The coverage to the non-districted lands was handled by the landowners entering into agreements with the KGA member agencies, including associate members, for SGMA coverage under the KGA members' respective management area plans. Assistance from Kern County Water Agency made this coverage possible by lending its jurisdiction under SGMA to the KGA members who have agreements with those non-districted landowners. Through the efforts by the member agencies of the KGA, approximately 242,180 acres of the non-districted lands will be covered and will be compliant with SGMA. The remaining 198,770 acres not covered are typically grazing lands or lands associated with oil production where minimal or no groundwater usage exists (Figure 1-4). The decision to extend SGMA coverage and to revise the KGA GSA boundary to remove non-districted lands not participating with KGA member agencies has been presented and discussed openly at public KGA board meetings since the initial discussion at the December 2018 board meeting.
>
> For those non-districted lands not covered by a member of the KGA, the five Subbasin GSAs have coordinated to cover all those non-districted lands in the water modeling effort for the historic, baseline, and future projections. [KGA GSP Sec. 1.4.1]

Accordingly, the Project Area lands will be removed from the KGA when DWR begins to process boundary modification for GSA's. Notwithstanding, the KGA currently has no discretionary approval over the Project and is not a Responsible Agency for CEQA purposes. The DEIR accurately identified and described the role of the surrounding GSA's and considered the Project's potential impacts to the groundwater basin without limiting consideration to certain GSA's jurisdictional boundaries.

9.3 Master Response # 3 – Water Quality Data

GEI was contracted by BVWSD to provide an evaluation of existing groundwater quality in the Palms Project area to determine if groundwater in the Palms Project area meets the water quality requirements for discharge into the Aqueduct, as defined in the DWR Policy, and to develop a water treatment plan for constituents that don't meet standards. The 2017 GEI memo concluded, "[t]his preliminary water quality assessment provides insight towards potential water quality issues BVWSD may face in developing a PIP. While the data represents a much larger geographic area than the Palms Project, increased awareness of potential issues enable the Recovery Project team to develop a comprehensive water quality study." When evaluating DWR's Pump-In Policy using BVWSD's historical groundwater results, findings were, "…water quality data is only available for a limited number of District and Landowner wells, the majority of which are outside of the Palms Project area, and the number of samples from each well vary substantially." The memo acknowledged the quantity and quality of available data were limiting factors to conduct a thorough analysis. It was recommended that BVWSD develop and coordinate a comprehensive water quality sampling program in order to develop a PIP for submission for DWR approval.

While some of the data presented in the 2017 GEI memo was also included in the DEIR evaluation, some was excluded because it was not representative of the Recovery Project. For the most recent water quality evaluation, presented in the DEIR and FEIR, BVWSD's STORM database was used in addition to obtaining more water quality data from surrounding water agencies and districts. A data request was made to KCWA since BVWSD's Monitoring Wells 11 and 12 are part of the Kern Fan Monitoring Network. To further understand some anomalies in the water quality data, GEI consulted with Maegan Allen at KCWA (personal communication September 24, 2019, and October 2, 2019). BVWSD's STORM database indicated elevated iron and manganese, as noted in the 2017 GEI memo. Ms. Allen mentioned results prior to 2012 should not be used since they are not representative of the aquifer. Prior to 2012, samples were analyzed for total metals. Collected samples often had high turbidity and elevated iron and manganese levels most likely are a result of sloughing from the well casing, not the aquifer. Samples after 2012 were tested for dissolved iron and manganese and these water quality results better represent the aquifer. While results from samples taken after 2012 were used in the DEIR evaluation, the 2017 GEI Memo was completed prior to the communications with Maegan Allen and presented results based on the full period of record. This discrepancy explains the differences in the results for iron and manganese presented in the two documents.

In addition, to explain the rationale in the paragraph between Tables 3-6 and 3-7 of the DEIR, why BVWSD Monitoring Well 13 – middle zone was used as a representative well, the water quality evaluation conducted for this DEIR focused on water quality results which would be most representative of the current groundwater conditions. Therefore, available water quality data from 2008 to 2019 were used in the DEIR versus all historical data that were evaluated in the 2017 GEI memo. Initial water quality evaluation included all wells listed in DEIR Table 3-6. However, during the evaluation, it was determined the newly constructed wells would pump water from the middle portion of the aquifer, which is anticipated to be consistent with BVWSD's Monitoring Well 13 – middle zone. With this understanding, where available, well construction details were reviewed, water quality data representative of the middle portion of the aquifer were used. By contrast, water quality data were not used for wells where construction data were not available or where the wells were screened in multiple zones. **Table 9-1** details the wells used in the DEIR, this FEIR, and the 2017 GEI Memo. The more detailed analysis described here was conducted for the DEIR and not in the 2017 GEI memo, which explains the difference in water quality discussions. Since more current data were available, which focused on the specific Recovery Project area and anticipated aquifer zones where the new wells would pump from, the evaluation conducted for the DEIR and this FEIR supersedes the 2017 GEI memo.

Table 9-1. Comparison of Wells used in the DEIR and FEIR Water Quality Analysis and 2017 GEI Memo

West of East Side Canal	East of East Side Canal
BVWSD Production Well	BVWSD Private Landowner Well
DW01	D04
DW02	Kern Water Bank
BVWSD Monitoring Well	13D01, **13D02, 13D03**
DMW 11A & 11B	West Kern Water District
DMW 12A & 12B	**NW-1**
DMW 13-Shallow, **13-Middle**, 13-Deep	**NW-2**
BVWSD Private Landowner Well	**NW-3**
D15	**NW-4**
	NW-5

Notes: Bold indicates wells used in DEIR and FEIR; all wells were used for the 2017 GEI Memo except DMW-13.

9.4 Master Response # 4 – Water Quality Impact Analysis

As mentioned in Master Response #3 – Water Quality Data, it is acknowledged that the water quality evaluation conducted is based on the best available data from BVWSD's STORM database, DDW's Drinking Water Watch, and Kern Fan Monitoring Network. Existing water quality data in the area were used to characterize groundwater conditions. Based on the available data, and because of the potential uncertainties, Impact HYDRO-2: "Violate any water quality standards or WDRs or otherwise substantially degrade surface or ground water quality" was found to be potentially significant. Section 3.4.3 of this FEIR discusses the Water Quality Impact Analysis and mitigation measures to be taken. Mitigation measures HYDRO 1 through HYDRO 5 were proposed to mitigate the potentially significant impact to a level of less-than-significant.

It is understood and acknowledged that the blending calculations were conducted to evaluate a treatment alternative, if needed, for a pump-in project. Analyses are based on the best available data of groundwater quality in the Recovery Project area. The Recovery Project proposes to construct several new wells, which will be designed to extract groundwater from the middle zone of the aquifer and water quality is expected to be suitable for all proposed beneficial uses. Until the new production wells are constructed and sampled, as indicated in MM HYDRO-3, there is uncertainty on the final water quality of the new production wells. Existing water quality data will be used a reference for implementing mitigation measures HYDRO 1 through HYDRO 5 and for designing the new production wells. The proposed mitigation measures are anticipated to result in better water quality in the new production wells than in the existing monitoring wells. MM HYDRO-1 through MM HYDRO-4 will be implemented during Recovery Project construction. MM HYDRO-5 will be implemented during Recovery Project operation.

Once the new production wells are constructed, the stated mitigation measures need to be followed to develop a PIP for DWR's review and approval. DWR requires a potential Pump-In Entity to demonstrate water quality will not adversely impact the Aqueduct when submitting a proposal to DWR. If water quality does not meet DWR requirements, DWR will not permit the PIP. Therefore, there is no risk to the water quality of the Aqueduct, because the water quality must meet DWR's requirements prior to being approved for pump in. Once the PIP is approved by DWR, MM-HYDRO-5 will be followed, and the District will follow the water quality monitoring and reporting requirements in the Pump-In Agreement with DWR.

By following the mitigation measures outlined in the DEIR, the impact to HYDRO-2 will be less-than-significant due to the PIP and Pump-In Agreement that needs to be approved and complied with. The PIP will be developed and based on water quality of the new production wells and will follow DWR's most current PIP Policy.

As described in Chapter 3.4.3.5 – Water Quality Impact Analysis of this FEIR, water quality of groundwater in the Recovery Project area is suitable for agricultural use without treatment.

The water quality evaluation conducted for this FEIR meets the Standards of Adequacy of an EIR, as specified in the CEQA Guidelines Section 15151, "An EIR should be prepared with a sufficient degree of analysis to provide decision makers with information which enables them to make a decision which intelligently takes environmental consequences into account. An evaluation of environmental effects of a proposed project need not be exhaustive, but the sufficiency of an EIR is to be reviewed in light of what is reasonably feasible…" Further, the EIR meets the requirement to be based on Substantial Evidence, as defined in the CEQA Guidelines Section 15384, "Substantial evidence as used in these guidelines means enough relevant information and reasonable inferences from this information that a fair argument can be made to support a conclusion, even though other conclusions might also be reached…".

9.5 Master Response #5 - SGMA

The Recovery Project is among the projects and management actions presented in Section 7 of the BVGSA's BVGSP. The Recovery Project's inclusion in the BVGSP signifies its importance to BVWSD's plan to continue to sustainably manage groundwater in the BVGSA and to contribute to the sustainability of the Kern County Subbasin.

The Project's potential impacts were examined on a basin wide basis without limitation to certain jurisdictional boundaries of surrounding GSAs. Based on the groundwater modeling, the DEIR concluded that the Project, as proposed, would create a less-than-significant impact [DEIR, 3-84]. While currently included within the boundaries of the KGA GSA, the Project Area lands are "Whitelands" and do not have a contract for SGMA coverage with a member of the KGA. Therefore, the Project Area lands will eventually be removed from the KGA and included in the BVGSA. [*see* Master Response #2 and KGA GSP Sec. 1.4.1] As a result, the BVGSP submitted by the BVGSA in January 2020 in conformance with DWR's regulations for preparation of GSPs provides specifics on how the provisions of SGMA would be implemented by the BVGSA and applied to development and operation of the Project facilities. The Project as proposed will comply with all relevant portions of SGMA.

9.5.1 General SGMA Provisions

On September 16, 2014, Governor Jerry Brown signed into law a three-bill legislative package, composed of AB 1739 Dickinson, SB 1168 (Pavley), and SB 1319 (Pavley) collectively known as the SGMA. This act lists six sustainability indicators to be used to warn of groundwater conditions occurring throughout a subbasin that, when significant and unreasonable, lead to undesirable results. The six indicators are:

1. Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued
2. Significant and unreasonable reduction of groundwater storage

3. Significant and unreasonable seawater intrusion
4. Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies
5. Significant and unreasonable land subsidence that substantially interferes with surface land uses
6. Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water

In the BVGSA, undesirable results are associated with four of these sustainability indicators. Significant and unreasonable seawater intrusion is not relevant given the GSA's inland location, and the potential for depletions of interconnected surface waters is not considered given the absence of streams flowing into or through the GSA.

To avoid the occurrence of undesirable results, the BVGSA followed the provisions of SGMA by establishing two SMCs, 1) MTs and 2) MOs as metrics to be observed at representative monitoring sites identified throughout the GSA to guide on-going compliance with SGMA.

Monitoring of these SMCs will inform the GSA as to whether implementation of the BVGSP is meeting the sustainability goals set forth in the plan and to warn about the development of conditions that could lead to undesirable results that would compromise sustainable groundwater management in the Kern County Subbasin. The third SMC, 3) Interim Milestones, is of less importance for management of the BVGSA as the GSA is now being sustainably managed. Thus, the task of the BVGSA is to maintain sustainable management under future conditions, rather than to correct a currently unsustainable condition through a series of actions with progress determined by success in meeting Interim Milestones.

SGMA requires all GSPs in a groundwater basin to be coordinated to achieve basin wide sustainable groundwater management. Accordingly, BVGSA has entered into a coordination agreement with the other GSAs in the Kern County Subbasin. The GSAs in the Kern County Subbasin will continue to work to achieve a coordinated sustainable Kern County Subbasin in compliance with SGMA and acceptable to DWR.

9.5.2 Projects and Management Actions

In addition to presenting detailed descriptions of the SMCs and of the networks of monitoring wells to be used for monitoring groundwater levels, groundwater storage and groundwater quality, the BVWSD GSP also includes a number of Projects and Management Actions designed to enable the BVGSA to remain sustainable in anticipation of the effects of future conditions expected to include:

- Climate change
- Reduced availability of water from the Delta
- Altered timing of flows in the Kern River
- Changes in farming and water management practices

9.5.2.1 Projects

To maintain an effective conjunctive management program needed to sustainably manage groundwater, two types of projects are featured in the BVWSD GSP:

- Replacement of unlined distribution ditches with pipelines to improve BVWSD's ability to serve growers, and
- Construction of dedicated recharge and recovery projects, such as the Palms, to compensate for recharge forgone by pipelining of laterals and to increase BVWSD's capacity to recharge flood flows available through BVWSD's rights to the Kern River and allocations of Article 21 water from the SWP.

As well as supporting groundwater levels and groundwater storage, recharge of high-quality Kern River water is also expected to improve the quality of groundwater stored in the underlying aquifer system. Groundwater recharge will also avoid conditions during prolonged droughts, where withdrawing water from beneath the E-clay would be contemplated, as this step that would reduce the quality of recovered water and threaten to induce subsidence. Therefore, the Palms and other components of the suite of projects proposed in the BVWSD GSP are expected to help the BVGSA sustainably manage groundwater with respect to each of the four relevant sustainability indicators.

9.5.2.2 Management Actions

Management actions presented in the BVWSD GSP include an array of measures that can implemented in the event MTs are breached at RMWs or the productivity of wells in or near the GSA is impacted by lowering of water levels in instances where no breach of MTs takes place. These measures range from gradual reductions in groundwater demand such as land fallowing programs, to rapid responses including curtailment of pumping and well deepening or rehabilitation. Depending upon the cause of the reduction in groundwater levels that triggers a pumping curtailment, the BVGSA may choose to make supplemental surface water available to the affected area to substitute for the reduced access to groundwater. Although not presented in the BVGSA's GSP, another measure aimed at maintaining compliance with SGMA is Mitigation Measure CUM-1 of the DEIR. This measure would defer groundwater recovery prior to groundwater levels reaching their MTs at RMW locations outside of the BVGSA in WKWD and RRBWSD.

A further provision of the BVWSD GSP relevant to operation of the Palms is the language on adaptive management. This language reads as follows,

> As uncertainties and data gaps are reduced with information and insights obtained from the GSA's monitoring networks and from assessment of the performance of newly implemented projects, management actions will be amended accordingly. Furthermore, if in the future DWR mandates certain corrective actions, the GSP will be adjusted to accommodate those new requirements in the Sustainable Groundwater Management Program, GSP Emergency Regulations Guide, p. 4 (DWR, 2016). In this way, projects and management actions can be pursued which reflect the evolving condition of groundwater management within the GSA and the Subbasin, and the current status of SGMA regulations.

Together, these measures are expected to be important for protection of private domestic wells because, as described in Section 5 of the BVWSD GSP – Minimum Thresholds, Measurable Objectives, and Interim Milestones, domestic wells tend to be shallower than other categories of wells and therefore are more vulnerable to interference from the operation of nearby wells. Further, as shown in Section 5 of the BVGSP – Minimum Thresholds, MTs have been set at most representative monitoring sites at levels protective of the operation of nearby production wells. However, due to the greater depth to groundwater in the vicinity of the Project, some wells have been identified where operations would be jeopardized as groundwater elevations approach MTs. Thus, while the cumulative impact modeling presented in the DEIR's Modeling Report indicates groundwater levels at the locations of RMWs RMW-113 and RMW-112 would remain well above the MTs set at these wells, the mitigation measures presented in the BVWSD GSP would be available should production at neighboring wells be affected.

9.5.2.3 Subsidence

As presented in Section 5.7 of the BVWSD GSP – Subsidence, no infrastructure within BVWSD has been observed to have been damaged by subsidence. Thus, while monitoring of land surface elevations described in the BVWSD GSP has detected small levels of subsidence, there is insufficient evidence presented in the BVGSA GSP or in GSPs and other studies developed in neighboring areas to offer a correlation between land surface elevations and groundwater elevations sufficient to allow groundwater levels to serve as a proxy for ongoing or incipient inelastic subsidence.

Given these uncertainties, the BVGSA will join the other GSAs in the Subbasin "to develop a joint subsidence monitoring program to better understand the cause and impacts of subsidence. The intent of the KGA and the other GSAs in the Subbasin is to develop MTs for subsidence for inclusion in the 2025 GSP update." (KGAGSP 2020).

9.5.3 Monitoring and Mitigation

As noted in clarifications made to the Recovery Project description in this FEIR, in areas where the project lies within the boundaries of the BVGSA, the project will adhere to the monitoring and mitigation measures established by the BVGSA GSP. In areas that now lie outside of the BVGSA, the monitoring measures and mitigation measures of the KGA GSA will apply. In the event the District joins the JOC, then the monitoring standards and mitigation measures applicable to facilities operated under the oversight of the JOC would be applied uniformly for the Palms Project. Mitigation measures should be applied recognizing that, as shown in the DWR draft BMP 6 (DWR 2017) and stated in Section 3.3 of the KGA GSP, occasional, localized exceedances of MTs—especially when occurring early in the GSP implementation period or during prolonged droughts—are acceptable and are not violations of SGMA.

9.6 Master Response # 6 – Biology

Several comments related to biological resources indicated the DEIR description of field surveys that were conducted for the proposed Project was inadequate and suggested that the surveys themselves were inadequate for evaluating Project-related impacts on special-status species. The comments also recommended conducting focused surveys for special-status species. As indicated in Section 3.2.1 of the DEIR, multiple biological field surveys were conducted in 2019 and 2020. Additional information about the scope and focus of these surveys is provided below and has been added to this FEIR (Chapter 3.2.1).

As recommended in the CDFW comment letter regarding the NOP, habitat suitability assessments and/or focused species surveys were conducted for special-status plants and animals in the anticipated project footprint and suitable habitat within 50 to 500 feet, depending on the species, habitat conditions, and access.

The most recent and intensive survey effort occurred in early September 2020 and included walking transects in remnant native habitat within 500 feet of the northeast portion of the Recovery Project site anticipated at the time these surveys were conducted (i.e., the Alternative Northeastern Area Layout shown in Section 5.6.2 of the DEIR). Qualified biologists searched for San Joaquin (Nelson's) antelope squirrels (*Ammospermophilus nelsoni*) and physical sign (e.g., suitable burrows/dens, tail drag, tracks, scat, etc.) indicating potential presence of blunt-nosed leopard lizard (*Gambelia sila*), Tipton kangaroo rat (*Dipodomys nitratoides nitratoides*), giant kangaroo rat (*Dipodomys ingens*), San Joaquin kit fox (*Vulpes macrotis mutica*), and American badger (Taxidea taxus). Vehicle-based surveys were conducted in the remaining portions of the Recovery Project site and adjacent areas, which are dominated by existing roadways and other disturbed land cover, agricultural crops, and existing recharge areas. These surveys were conducted by slowly driving the pipeline alignments and searching for potential features (e.g., burrows and dens) associated with special-status wildlife such as San Joaquin kit fox and western burrowing owl (*Athene cunicularia*), which can occur in human-altered habitats.

Potential San Joaquin kit fox dens were observed within 500 feet of the Alternative Northeastern Area Layout; there was no sign indicating active use of these potential dens by kit fox, but potential for future use was acknowledged. Suitable burrows for both Tipton and giant kangaroo rats were also observed in the survey area, including within 50 feet of this alternative project footprint; however, hay stacking was only observed at burrows farther than 50 feet from the footprint. This portion of the survey area also was identified as suitable habitat for blunt-nosed leopard lizard. In contrast, no San Joaquin antelope squirrels were observed during the field surveys. Because visual detection surveys for this species were consistent with CDFW recommendations regarding timing and temperature, it was determined that this species is absent from suitable habitat adjacent to the northeast portion of the Recovery Project site.

As indicated in Figure 5-2 of the DEIR, the location of wells and pipeline in the northeastern portion of the Recovery Project area was revised for the proposed Project to provide a minimum buffer of 50 feet between the construction footprint and native scrub habitat. Therefore, no suitable habitat for species such as blunt-nosed leopard lizard, Tipton kangaroo rat, or giant kangaroo rat occurs within 50 feet of the Project footprint evaluated in the DEIR, including where protective fencing would be installed as described in Mitigation Measure BIO-1. This mitigation measure has been augmented in this FEIR (*see* Chapter 3.2.3) to clarify that no ground disturbance related to fence installation, maintenance, or removal would occur within 50 feet of suitable habitat for blunt-nosed leopard lizard. Because Tipton kangaroo rat and giant kangaroo rat occur in similar habitat, impacts on suitable habitat for these species also would be avoided.

9.7 Master Response #7 – Regional Groundwater Elevation Contour Mapping and Flow Analysis

Several comments relate to the general description of groundwater levels and flow direction in the vicinity of the Recovery Project. To address these comments, this master response is subdivided into four sections. A brief summary of the content and findings for each of these sections is provided below.

For the "Regional Groundwater Elevation Contour Mapping and Flow Analysis" section, a series of contour maps of measured groundwater elevations were developed to address comments regarding the groundwater flow direction. These maps cover BVWSD and adjacent areas including the KWB, RRBWSD, Semitropic Water Storage District (SWSD), and WKWD as shown on **Figure 9-1**. The groundwater elevation data was compiled from multiple sources including the BVWSD, KFMC and Semitropic Monitoring Committee. Five mapping periods were selected to assess recent groundwater flow patterns under varying hydrologic conditions.

The findings of this analysis are consistent with the interpretation presented in the DEIR. The analysis shows that the Upper Zone groundwater flow across much of BVWSD is southeastward. Furthermore, groundwater flow patterns within the Upper and Lower Zones are distinctly different in areas where the E-clay is more highly developed. In the vicinity of the Recovery Project, groundwater generally flows generally eastward to southeastward. During periods of intensive recharge at the groundwater banks, a more complex local pattern develops where groundwater that inflows into BVWSD from the adjacent banking areas then outflows into western RRBWSD.

In Chapter 9.7.2 – Evaluation of Modeling Results in Context with Regional Groundwater Level Contour Maps, the simulated drawdown from the Recovery Project wells based on the DEIR groundwater modeling results is superimposed onto the groundwater elevation contour maps using the Principle of Superposition (Reilly, Franke and Bennett 1984, 1987). This analysis delineates the estimated area of influence for the Recovery Project wells to better illustrate the areas affected by Project pumping. The findings of this analysis indicate that the groundwater pumped by the Recovery Project under a range of hydrologic conditions is primarily derived from within BVWSD but does extend into the WKWD North Wellfield and the far western areas of RRBWSD.

For Chapter 9.7.3 – Comparison to Other Groundwater Elevation Maps section, groundwater level contour maps of the Recovery Project area were compiled from multiple sources and compared to those prepared for this master response to address comments requesting additional historical groundwater data. The findings demonstrate that the regional groundwater flow in BVWSD, including the general southeasterly groundwater gradient across the southern BVWSD, has been previously documented on groundwater contour maps developed by several agencies, including the commenting agencies, in a manner consistent with the analysis provided in the DEIR.

Chapter 9.7.3 – Hydrogeological Conceptual Model section summarizes the relevant hydrogeological data and interpretations for the western Kern County Subbasin based on readily available documents. This summary demonstrates that the underlying hydrogeological conceptual model incorporated into the technical analysis for the groundwater impacts assessment in the DEIR and this master response are based on well-established technical analyses developed over a period of decades by the USGS, local agencies and others.

The following sections provide a more detailed discussion of the analyses summarized above. The general conclusion of this additional analyses presented here supports the conclusion of the DEIR groundwater impacts analysis that the Recovery Project may cause a potentially significant impact to the groundwater levels at the WKWD North Wellfield and the far western areas of RRBWSD that require the DEIR to include mitigation measures.

9.7.1 Regional Groundwater Elevation Contour Mapping and Flow Analysis

For this master response, a series of groundwater elevation contour maps were developed using measured data from BVWSD and other adjacent water agencies to evaluate recent groundwater flow conditions under varying hydrologic conditions.

9.7.1.1 Definition of Aquifer Zones

The regional aquifer system in the Kern County Subbasin is typically subdivided into an Upper and Lower Zone based on the presence of clays, primarily the E-Clay (also referred to as the Corcoran Clay) or its equivalent, that act as local aquitards with differing zones of confined, semiconfined, or unconfined groundwater conditions. These aquifer zone designations are consistent with the aquifer descriptions in the KGA GSP (KGA 2020) and other GSPs in the Kern County Subbasin (**Figure 9-2**). Groundwater elevation contour maps were developed for the zones are defined as follows:

- The Upper Zone is defined as groundwater occurring above the E-clay, or its equivalent. This is consistent with the "Upper Zone" in SWSD defined by Ken Schmidt and Associates (KSA 2020). In the BVGSA, this Upper Zone is referred to as Deep Aquifer zone (*see* Nomenclature of Aquifer Zones in the BVGSA, below). The Recovery Project proposes pumping to occur only in the Upper Zone. The location of Upper Zone wells used in contouring the Upper Zone are shown on **Figure 9-3**.
- The Lower Zone is the primary aquifer zone or "main production zone" which is generally confined below the E-clay and unconfined to semiconfined outside the extent of the E-clay that extends over most of the Kern County Subbasin (**Figure 9-5**). This is consistent with the "Forebay Area and Lower Zone" in SWSD defined by KSA (2020). In BVWSD, the Lower Zone maps include the BVWSD "*Deeper Confined Aquifer*" (*see* Nomenclature of Aquifer Zones in the BVGSA). The location of wells used in contouring the Lower Zone are shown on **Figure 9-4**.

In the Kern Fan area in the RRBWSD and KWB area, the E-clay is not considered to be present (KWBA 2019); however, there are numerous discontinuous clay layers that locally restrict vertical flow. Based on several monitoring well clusters in the banking area, these clay layers create a separation between a shallow unconfined and deeper, semi-confined zones within the regional aquifer (RRBWSD 2020). For this analysis, these zones are mapped with the Upper Zone and Lower Zone, respectively.

The BVGSA's has developed a separate nomenclature for naming the various aquifer zones due to the presence of multiple shallower groundwater zones within their district. Because of this, these designations may have resulted in some confusion on the correlation of these different aquifer zones. For this analysis, the BVWSD aquifer zone "*Deep Aquifer*" is included in the Upper Zone maps and the "*Deeper Confined Aquifer*" are included in the Lower Zone maps.

9.7.1.2 Data Sources Used in Analysis

Groundwater elevation data for each zone were compiled from local groundwater level monitoring data. Due to the proximity of these various monitoring programs, several monitoring locations are including in two or more of these data sources. These data sources include:

- BVWSD Monitoring Program – BVWSD measures groundwater levels for their groundwater management program from 22 District-owned wells and 57 grower wells (BVWSD 2014). Of these wells, four wells are completed in the Lower Zone and the rest are completed in the Upper Zone. Thirteen of the District-owned are included in BVGSA's SGMA monitoring network (BVGSA 2020). In addition, BVWSD collects data from an additional 80 piezometers, but these are for a local perched aquifer above the Upper Zone and are not included on these maps.
- SWSD Water Banking Project Monitoring Program – A monitoring committee was established to develop, review, and oversee a groundwater monitoring program of the SWSD water banking project. SWSD collects water level measurements from numerous water supply and dedicated monitoring wells within SWSD and compiles additional measurements from surrounding agencies. These data are reported in biennial groundwater monitoring reports (SWSD GSA 2020, KSA 2020).
- Kern Fan Monitoring Committee – The KFMC monitors groundwater levels from over 50 monitoring wells, including several nested well locations that monitor multiple vertical zones, in the lower Kern River or Kern Fan area (Todd Groundwater 2018; KFMC 2021). The Kern Fan Monitoring Plan describes frequencies for water level measurements in both monitoring wells and recovery wells (KWBA 2019).
- Kern County Subbasin SGMA Monitoring – To meet the ongoing requirements of SGMA, semi-annual groundwater level measurements from a basin-wide network of over 200 monitoring wells were documented in the Kern County Subbasin GSA's annual report (Todd Groundwater 2021). This document was submitted to the DWR to satisfy the Department's SGMA reporting requirements.

9.7.1.3 Approach

The mapping data set was developed for the period from 2015 through 2019. This period represents a range of recent seasonal and operational conditions, including severe drought, high rainfall years, and active groundwater banking operations. The mapping data was not extended beyond 2019 because a complete data set for 2020 was not available at the time of this analysis. Groundwater elevations in this discussion are provided in feet relative to msl with positive values being above msl and negative values being below msl. Separate groundwater elevation contour maps were constructed of the Upper and Lower Zones for five different periods from 2015 to 2019 to represent differing hydrologic conditions.

Aquifer zone assignments for monitoring well data remained consistent with the zone designations from the original data source. The contouring of these data was conducted using the SURFER geologic mapping software by Golden Software by applying the kriging gridding method. Groundwater elevation contour maps were prepared using the available data from each of the above-listed groundwater monitoring programs.

Groundwater flow is also influenced by the local geology. **Figure 9-5** illustrates important geologic structures and the approximate extent of the continuous layer of E-Clay based on mapped interpretation by Croft (1972), Page (1986) and PGA (1991). Additional information on the definition of the aquifer zones, distribution of the E-clay, and the structural geology is provided in the sections entitled *Hydrogeological Conceptual Model*.

9.7.1.4 Upper Zone Groundwater Elevation Contour Maps

Upper Zone groundwater elevation contour maps were developed for the following five periods, and are shown on the following figures:

- **Figure 9-6** – Spring 2015
- **Figure 9-7** – Fall 2016
- **Figure 9-8** – Spring 2017
- **Figure 9-9** – Spring 2018
- **Figure 9-10** – Spring 2019

The Upper Zone maps (**Figures 9-6 – 9-10**) shows some general trends. The highest groundwater elevations typically occur the northern areas of BVWSD and SWSD with groundwater elevations as high as 210 feet msl. Groundwater levels in the south, primarily in the Kern Fan area (KWB and RRBWSD), are highly affected by groundwater banking operations. Groundwater flow is primarily southward except near the groundwater banks.

In the far northern areas of SWSD, Upper Zone groundwater flow is generally towards the southeast from an area of high groundwater levels in the vicinity of the Kern Wildlife Refuge. In areas of BVWSD and SWSD where the E-clay is a thick, continuous clay layer, it forms an effective hydraulic barrier to vertical groundwater flow (BVWSD 2014, BVGSA 2020, SWSD GSA 2020, KSA 2020). In the southern areas of SWSD, few to no contours are shown because of a lack of Upper Zone wells. In this area, the E-clay is interpreted to become increasingly discontinuous towards the south and southeast (**Figure 9-5**) resulting in limited areas of Upper Zone groundwater (SWSD GSA 2020, KSA 2020)**.**

A persistent area of high groundwater elevations occurs in the far northern areas of BVWSD. From this area, groundwater flow bifurcates with a northeastward flow component towards SWSD and a southeastward component through the central areas of BVWSD (**Figures 9-6 – 9-10**). This bifurcation appears related to the adjacent geologic structure of the Buttonwillow Anticline. Across the southern BVWSD area, groundwater flow is generally towards the southeast. Groundwater from BVWSD generally flows into RRBWSD and KWB areas south of the Bowerbank Anticline.

In the KWB and RRBWSD areas, groundwater levels are highly affected by groundwater banking operations. In 2015, significant groundwater pumping occurred to recover banked water. As a result, the Upper Zone groundwater elevations are as low as 30 feet msl (**Figure 9-6**). In 2016 and early 2017, there was less groundwater recovery but limited recharge. During these times, the lowest groundwater elevations (50 feet msl) occurred in the KWB (**Figures 9-7**, **9-8**). In Spring 2017 (**Figure 9-8**), higher groundwater elevations along the Kern River reflect increased recharge from the river due to high seasonal rainfall that year. However, this map is based on data collected early to the initiation of major recharge operations at the groundwater banks, so the Spring 2017 map does not show the development of a groundwater mound in those areas.

During 2018 and 2019, groundwater elevations in the KWB and RRBWSD of over 200 feet msl occur as a result of significant recharge in prior years. During these periods, the lowest groundwater elevations (less than 90 feet msl) occurred in the RRBWSD (**Figures 9-9**, **9-10**). The low groundwater levels in this area reflect the absence of an effective E-Clay which allows for increased vertical groundwater flow from the Upper Zone to the Lower Zone that contributes to a depression in the Upper Zone groundwater elevations seen in this area.

In the vicinity of the Recovery Project, groundwater flow in the Upper Zone is highly variable due to operations of the major Kern Fan groundwater banking projects. When groundwater recovery is occurring, groundwater flow continues southeastward from BVWSD towards the major Kern Fan groundwater banking projects (**Figures 9-6**, **9-7**, **9-8**).

During periods of significant groundwater recharge by the Kern Fan groundwater banking projects, groundwater flows radially away from the major recharge locations. At these times, groundwater flow near the Recovery Project area has a local northerly or westerly component. Where this westerly groundwater flow from the Kern Fan groundwater banks meets the southeasterly flow from the northern areas of BVWSD, the groundwater gradient curls around to the northeast so that groundwater flows into far western areas of RRBWSD south of the Bowerbank Anticline (**Figures 9-9**, **9-10**).

9.7.1.5 Lower Zone Groundwater Flow Discussion

Lower Zone groundwater elevation contour maps were developed for the following five periods and are shown on the following figures:

- **Figure 9-11** – Spring 2015
- **Figure 9-12** – Fall 2016
- **Figure 9-13** – Spring 2017
- **Figure 9-14** – Spring 2018
- **Figure 9-15** – Spring 2019

The Lower Zone maps (**Figures 9-11 – 9-15**) also shows some general trends. The highest groundwater elevations typically occur the southern areas whereas the lowest groundwater elevations occur in the north. The Lower Zone, the lowest groundwater elevations occur in northern SWSD where groundwater elevations ranging from -60 to -100 feet msl (note: these are below sea level). The highest groundwater elevations in the Lower Zone occur in the RRBWSD and KWB in the southern parts of the mapped area; however, the groundwater elevations in this area are highly variable due to ongoing groundwater banking operations.

Groundwater flow in the Lower Zone in generally northward and appears unaffected by the presence of geologic structures. This is interpreted to represent that below the E-Clay, the stratigraphic sequence is thick and generally permeable with no major clay layers that affect either vertical or horizontal groundwater movement within the Lower Zone. Therefore, the groundwater elevation contours typically show a more continuous flow pattern in the Lower Zone than in the Upper Zone.

In BVWSD, the Lower Zone groundwater flow direction is generally from west to northwest towards the area of lowest groundwater in SWSD. As noted above, groundwater flow in the Lower Zone is not affected by the presence of geologic structures. In the vicinity of the Recovery Project, groundwater flow in the Lower Zone is also affected by the major nearby groundwater banking projects; however, the Lower Zone groundwater flow near the Recovery Project is generally northward.

During 2015, significant pumping in the Kern Fan area resulted in groundwater elevations of as much as 20 feet below sea level in the KWB (**Figure 9-11**), whereas the highest 2015 groundwater elevations occurred in RRBWSD with groundwater elevations above 60 feet msl. Groundwater flow near the Recovery Project in 2015 had an eastward component towards the KWB in addition to the general northerly groundwater flow direction (**Figure 9-11**).

In 2016 and early 2017, less groundwater recovery occurred, and some limited groundwater recharge occurred. During these years, the highest groundwater levels of over 60 feet msl occurred along the Kern River (**Figures 9-12, 9-13**). Groundwater flow in the Lower Zone near the Recovery Project was primarily to the north and northeast.

In 2018 and 2019, during periods of significant groundwater recharge by the Kern Fan groundwater banking projects, groundwater flowed radially away from these major recharge locations. During this time, the highest groundwater elevations reached over 200 feet msl in the KWB due to the groundwater recharge (**Figures 9-14**, **9-15**). In 2018 and 2019, the Project area received local groundwater inflow from the KWB; however, this flow shifts around to a more northerly direction to the north of the Recovery Project area (**Figures 9-14**, **9-15**).

9.7.1.6 Summary

Regionally, the groundwater maps show distinct differences between the Upper and Lower Zone (**Figures 9-6 – 9-15**). Groundwater flow in the Upper Zone is generally southward, except near the groundwater banks where it is highly variable, whereas groundwater flow in the Lower Zone is generally northward. Groundwater flow in the Lower Zone appears unaffected by the presence of geologic structures and the groundwater flow shows a more continuous pattern than in the Upper Zone.

The groundwater elevations are highly influenced by the character of the E-Clay (**Figure 9-5**). Where the E-clay is a continuous confining layer, groundwater elevations and flow directions in the Upper Zone are distinct from those in the Lower Zone. In BVWSD and SWSD, the E-Clay forms an effective hydraulic barrier to vertical groundwater flow that separates the Upper Zone from the Lower Zone (**Figure 9-2**). In this area, the difference in groundwater elevations between the Upper and Lower Zones is up to 200 to 300 feet, whereas in the south, where the E-clay is discontinuous or absent, the difference is in the tens of feet or less.

Upper Zone groundwater flow in this area is also affected the geologic structures, especially the northwest-southeast oriented anticlines and synclines (**Figures 9-5**; **9-6** – **9-10**). The E-Clay is interpreted as being deposited prior to the deformation that formed these geologic structures (Croft 1972, Bartow 1991). In areas where the elevation of the E-Clay over the Buttonwillow, Bowerbank and Semitropic Anticlines is higher than the measured groundwater elevations, the anticlines form a barrier to groundwater flow in the Upper Zone. In these areas, groundwater typically flows along the axis of the adjacent syncline but not over the anticline (Wood and Davis 1959, Croft 1972, Page 1986). Additional discussion of the geologic influences on groundwater flow is provided in the section titled "*Hydrogeological Conceptual Model*".

In the Recovery Project area, these groundwater contours and flow directions for the Upper Zone (**Figures 9-6 – 9-10**) show a general southeasterly groundwater flow direction across BVWSD. During periods of intensive recharge at the Kern Fan groundwater banking operations, groundwater flow from this area affects the southern areas of BVWSD causing a local westward groundwater flow along the boundary with BVWSD that then curls around to the northeast and flows into western areas of RRBWSD. A similar phenomenon is observed in the Lower Zone; however, groundwater flow in the Lower Zone away from the Kern Fan groundwater banking operations shows a more consistent northward flow direction (**Figures 9-11 – 9-15**).

9.7.2 Evaluation of Modeling Results in Context with Regional Groundwater Level Contour Maps

One advantage of the superposition modeling approach used in the DEIR is that the model results can be applied to measured data to evaluate the scale of the simulated change in groundwater levels relative to measured data at the equivalent time. The purpose of this analysis is to evaluate the potential drawdown from the Recovery Project in the context of regional groundwater flows to address concerns that pumping by the Recovery Project would affect the water supply in areas outside of BVWSD.

Figure 9-16 shows the total drawdown that occurred during the 1st year of the Operational Scenario A as described in **Appendix D** of this FEIR. The 1st-year drawdown was calculated by subtracting the simulated groundwater elevations from the month prior to pumping from those from the last month of pumping. Under this scenario, a total of 25,000 AF of pumping is evenly distributed among the 14 Recovery Project wells. By applying the 1-year drawdown without including the effects of the associated recharge is a conservative assumption for this analysis. Using the SURFER geologic mapping software, the calculated 1-year drawdown from the superposition model is applied to the appropriate Upper Zone groundwater elevation map (**Figures 9-6 – 9-10**). Five maps were developed that include:

- **Figure 9-17** – Superposition model results applied to the Upper Zone Spring 2015 groundwater elevation contour map
- **Figure 9-18** – Superposition model results applied to the Upper Zone Fall 2016 groundwater contour map
- **Figure 9-19** – Superposition model results applied to the Upper Zone Spring 2017 groundwater contour map
- **Figure 9-20** – Superposition model results applied to the Upper Zone Spring 2018 groundwater contour map
- **Figure 9-21** – Superposition model results applied to the Upper Zone Spring 2019 groundwater contour map

The results of this assessment show that the drawdown from the Recovery Project does not significantly change the regional groundwater flow directions. Comparing **Figures 9-17** through **9-21** to **Figures 9-6** through **9-10** shows that only the contours in the immediate vicinity of the Recovery Project are affected while the regional groundwater flow patterns remain the same. In addition, the estimated area of influence for the Recovery Project wells is shown as the shaded areas on **Figures 9-17** through **9-21**. The estimated areas of influence are hand-drawn based on applying standard groundwater flow line analysis for defining the estimated area of influence for the Recovery Project wellfield by extending it upgradient within the area of calculated drawdown. This analysis shows the effect of varying groundwater conditions in the Kern Fan Area on the potential source areas for the Palms Recovery wellfield. The estimated areas of influence on all five maps (**Figures 9-17 – 9-21**) are located primarily within BVWSD but extend into adjacent areas near the WKWD North Wellfield and western RRBWSD.

To evaluate the potential impacts from multi-year pumping, a similar approach was applied using the results of Operational Scenario B (**Appendix D** of this FEIR) including the recharge event. In Operational Scenario B, the simulated groundwater banking operations represent a maximum scenario where the recovery pumping is applied in 4 consecutive years. This scenario follows the sequence described below:

- 1-year of groundwater recharge (100,000 AFY) within BVWSD
- A gap year with no Project recharge or pumping
- 4 years of pumping at the Recovery Project wells to recover 90% of the Project recharge (90,000 AF) with the remaining 10% (10,000 AF) representing a planned leave-behind of recharge water for the benefit of the basin

The drawdown at the end of the 4th year of groundwater pumping (**Figure 14**, **Appendix D** of DEIR) is applied to the Fall 2016 Upper Zone groundwater elevation contour map (**Figure 9-7**). The Fall 2016 groundwater elevation map provides a realistic hydrologic background condition for operation of the Recovery Project during a severe drought. The groundwater contour map for Fall 2016 already incorporates the effects of the existing groundwater banking operations. The sequence is equivalent to recharge applying recharge in BVWSD in 2011, which was a wet year, followed by pumping occurring at the Recovery Project during the drought years of 2013 through 2016.

The resulting groundwater elevations and areas of influence of applying the simulated drawdown after 4 years of pumping applied to the Fall 2016 map are shown on **Figure 9-22**. Overall, the drawdown associated with the pumping is distributed over a wider area. The estimated area of influence is distributed over southern areas of BVWSD and extends into some adjacent areas with a pattern similar to that shown on **Figure 9-18**.

The purpose of this analysis is to address comments that the Recovery Project would affect the overall water supply in areas outside of BVWSD. The analysis shows the estimated area of influence is located primarily within BVWSD; however, it does extend into adjacent areas primarily in the WKWD North Wellfield and adjacent areas of RRBWSD. The result of this analysis is, therefore, consistent with the DEIR conclusion that the Recovery Project may cause a potentially significant impact to the groundwater levels at the WKWD North Wellfield and the far western areas of RRBWSD that required the DEIR to include mitigation measures.

9.7.3 Comparison to Other Groundwater Elevation Maps

Groundwater elevation contour maps have been developed by other monitoring programs. These maps are provided here for comparison to the groundwater elevation maps developed herein. In general, these maps are based on comparable data sets and demonstrate that the groundwater flow in the Upper and Lower Zones in and around the BVWSD Palms Recovery Site has been consistently mapped by various local agencies over time.

9.7.3.1 BVWSD Monitoring Program

BVWSD has a monitoring network of over 50 wells that is used to develop groundwater elevation contour maps over the entire district (BVWSD 2014, BVGSA 2020). BVWSD refers to these as the "deep aquifer" maps, which corresponds to the Upper Zone as defined in this master response (*see* "*Nomenclature of Aquifer Zones in the BVGSA"* below). The following figures provide Upper Zone groundwater elevation contour maps developed by BVWSD as part of their ongoing groundwater monitoring program. These maps include:

- **Figure 9-23** – Upper Zone for Spring 2013
- **Figure 9-24** – Upper Zone for Spring 2014
- **Figure 9-25** – Upper Zone for January 2015
- **Figure 9-26** – Upper Zone for October 2019
- **Figure 9-27** – Upper Zone for March 2020

Figure 9-23 through **9-27** show a series of maps from 2013 through 2020. These maps show a consistent southeasterly groundwater flow direction in the Upper Zone across the central and southern areas of BVWSD. This general southeasterly groundwater flow in BVWSD conforms with interpretations of groundwater outflow along the southeastern margin of BVWSD described by Sierra Scientific Services (2013).

Along the southeastern margin of the BVWSD, groundwater flow directions are more variable as they are strongly influenced by the intensive groundwater recharge projects at the KWB and other banking projects. During periods of high rates of recovery at the groundwater banks, the groundwater flow direction remains southeastward across the Recovery Project area due to the extensive drawdown at the groundwater banks (**Figures 9-23, 9-24, 9-25**). However, during periods of high recharge, groundwater flow directions in southern areas of BVWSD shift to a northwestward direction in response to groundwater mounding in the Kern Fan area (**Figures 9-26, 9-27**). Where this westerly groundwater flow from the Kern Fan groundwater banks meets the southeasterly flow from the northern areas of BVWSD, the groundwater contours show the formation of a small depression, but groundwater may also flow into far western areas of RRBWSD.

9.7.3.2 SWSD Water Banking Project Monitoring Program

The SWSD Water Banking Project Monitoring Program was established to 1994 to monitor the effects of water banking operations based on groundwater levels in areas within and adjacent to SWSD. Biennial groundwater monitoring reports provide annual groundwater elevation contour maps of spring groundwater conditions. These reports are provided to members of the monitoring committee representing the SWSD and five adjoining districts, the SWSD banking partners, the KCWA, and other interested parties who participate in committee activities (SWSD GSA 2020, KSA 2020).

The recent Biennial Report (KSA 2020) contained groundwater elevation contour maps for Spring 2017, 2018 and 2019 for both the Upper and Lower Zones. The following figures provide the portion of these groundwater elevation contour maps that most closely corresponds to the mapped area shown in **Figures 9-6** through **9-15** to provide a more direct comparison of the maps. These maps include:

- **Figure 9-28** – Upper Zone for Spring 2017
- **Figure 9-29** – Upper Zone for Fall 2018
- **Figure 9-30** – Upper Zone for Spring 2019
- **Figure 9-31** – Lower Zone for Spring 2017
- **Figure 9-32** – Lower Zone for Spring 2018
- **Figure 9-33** – Lower Zone for Spring 2019

The area covered by **Figures 9-28** through **9-33** does not extend beyond the southern boundary of the SWSD. However, these maps do overlap a large part of the Upper and Lower Zones included in this master response (**Figures 9-6 – 9-15**). Overall, the Upper Zone groundwater contours and flow directions from the SWSD maps (**Figures 9-28, 9-29, 9-30**) show a strong correlation to the master response Upper Zones maps (**Figures 9-8, 9-9, 9-10**). There are some minor discrepancies in contouring in the Upper Zone on how groundwater flow is mapped in the vicinity of the Buttonwillow, Bowerbank, and Semitropic Anticlines (**Figure 9-5**). With respect to groundwater flow in the Upper Zone within BVWSD, these maps show a general southeasterly groundwater flow direction that is consistent with the groundwater flow shown on **Figures 9-8, 9-9,** and **9-10** and as described in the DEIR.

Similarly, the Lower Zone groundwater contours and flow directions on the SWSD maps (**Figures 9-31, 9-32, 9-33**) show a general northward groundwater flow direction consistent with the master response Lower Zones maps (**Figures 9-13, 9-14, 9-15**).

9.7.3.3 Kern Groundwater Authority Umbrella GSP

For the KGA GSP (KGA 2020), groundwater elevation contour maps were developed for Spring 2015 for both the Upper and Lower Zones (**Figure 9-2**). The following figures provide the portion of these groundwater elevation contour maps that correspond to the mapped area shown in **Figures 9-6** through **9-15** to provide a more direct comparison of the maps. These maps include:

- **Figure 9-34** – Upper Zone for Spring 2015
- **Figure 9-35** – Lower Zone for Spring 2015

The master response groundwater elevation contour map for Spring 2015 (**Figure 9-6**) is consistent with on the KGA map for this same time period (**Figure 9-34**). Groundwater elevations during Spring 2015 in the Upper Zone in the north central part of the Subbasin ranged from 220 ft msl to 160 ft msl (KGA 2020). In the northern half of the mapped area, groundwater in the Upper Zone flows northeasterly. Within the southern half of the mapped area, groundwater flows southeasterly; however, locally this flow may be affected by the Buttonwillow, Bowerbank, and Semitropic Anticlines (**Figure 9-5**).

The master response groundwater elevation contour map for Spring 2015 (**Figure 9-11**) is consistent with the KGA map for this same time period (**Figure 9-35**). Groundwater elevations during Spring 2015 in the Lower Zone (main production zone) of the aquifer system ranged from less than -100 ft msl in the north-central part of the Subbasin to greater than 300 ft msl in the eastern and southeastern part of the Subbasin. In general, groundwater flow directions reported are consistent with historical trends. Groundwater north of the Kern River generally flows to the north toward concentrations of groundwater pumping wells in the north.

9.7.3.4 Kern Fan Monitoring Committee

The KFMC monitors groundwater levels from numerous monitoring wells and recovery wells in the lower Kern River area following the Kern Fan Monitoring Plan (Todd Groundwater 2018, KWBA 2019). There was a period when the KFMC produced groundwater elevation contour maps for the Kern Fan Area; however, more recent maps are unavailable. The following figures show groundwater elevation contours for the following periods:

- **Figure 9-36** – Middle Zone for Spring 2007
- **Figure 9-37** – Middle Zone for Spring 2008
- **Figure 9-38** – Middle Zone for Spring 2009
- **Figure 9-39** – Middle Zone for Spring 2010

On all four of these maps, the area under BVWSD is mapped as a separate area with the note "*Contours in this area represent shallow groundwater*." This area shows a consistent southeasterly groundwater flow direction on all four maps. The area is outlined by a dashed line, and the contours to the east do not correspond to those in the BVWSD area. Groundwater flow in this area in consistently to the north on all four maps. The Middle Zone used for these maps is generally consistent with the Upper Zone defined for this master response; however, the northern area of this map appears to represent a transition between the Upper and Lower Zones.

Figures 9-36 and **9-37** represent a period following extensive groundwater recharge in the Kern Fan area. As a result, groundwater elevations over 300 feet msl are noted in Spring 2007 (**Figure 9-36**); however, these decline to a maximum of about 220 feet msl in Spring 2008 (**Figure 9-37**). **Figures 9-38** and **9-39** represent a period of extensive groundwater recovery in the Kern Fan area. Groundwater levels below 100 feet msl are noted in Spring 2009 (**Figure 9-38**); however, these declined to below 60 feet msl in Spring 2010 (**Figure 9-39**).

In the Recovery Project Area, the groundwater flow patterns are consistent with those observed on the 2015 to 2019 maps (**Figures 9-6 – 9-15**) as discussed above. During periods of extensive groundwater recharge, the direction of groundwater flow in the Recovery Project area has a local north and west component. In the southern areas of BVWSD, the flow from the Kern Fan groundwater banks meets the general southeasterly flow from the northern areas of BVWSD. Where water from these two sources meet, the groundwater gradient curls around to the north and northeast. During periods of groundwater recovery in the Kern Fan area, groundwater flow continues southeastward from BVWSD towards the major Kern Fan groundwater banking projects.

9.7.3.5 Summary

Overall, the groundwater contours and flow directions shown on **Figures 9-23** through **9-39** that were produced by several different monitoring programs show a strong correlation to the groundwater contours and flow directions shown on **Figures 9-6** through **9-15**. In the Upper Zone, these maps show a general southeasterly groundwater flow direction in the central and southern BVWSD area that is consistent with the direction of groundwater flow shown on **Figures 9-6** through **9-10** and as described in the DEIR. This compilation of maps demonstrates that the groundwater flow directions described in the DEIR are consistent with the accepted interpretations of groundwater gradients and flow made by multiple water agencies in the area.

9.7.4 Hydrogeological Conceptual Model

The groundwater elevation contour maps, primarily for the Upper Zone, took into consideration the influences of distribution of the E-Clay and geologic structures shown on **Figure 9-5**. The following provides some additional information on the local hydrogeology.

9.7.4.1 Nomenclature of Aquifer Zones in the BVGSA

Within the BVGSA, the Tulare Formation is subdivided by three clay layers (A, C, and E-clay layers) that form distinct groundwater zones within the District and are described below:

- The Perched Aquifer is above the uppermost of the clay layers, the A-clay that is found throughout the northern portion of the BVGSA. The A-clay occurs 20-30 feet bgs and is the cause of the shallow, perched groundwater identified in piezometers throughout the northern part of the BVGSA.
- The shallow aquifer is between the A- and C-clays. The C-clay is about 30 feet thick and occurs at a depth of about 200 feet bgs. The C-clay is laterally discontinuous and has little influence on regional groundwater flow.
- The deep aquifer is between the C- and E-clays. The E-clay occurs at depths ranging from 300-450 feet bgs and is a known barrier to vertical flow of groundwater. This zone provides the primary groundwater supply within BVWSD and is mapped as the Upper Zone for this master response.
- The deeper confined aquifer occurs below the E-clay. Monitoring wells completed in this zone are located in the southernmost areas of BVWSD and this zone is not used for groundwater production because of concerns regarding water quality and the risk of inducing subsidence. This zone is mapped as the Lower Zone for this master response.

Shallow groundwater occurs locally above the A-Clay or C-Clay in both BVWSD and SWSD (BVWSD 2014, BVGSA 2020, SWSD GSA 2020, KSA 2020). However, groundwater occurring above the A-Clay or C-Clay forms localized perched zones that do not result in consistent regional patterns of groundwater flow due to the lateral discontinuity of these clay units (KGA 2020). Therefore, these shallow perched zones are not included in the groundwater maps presented in this master response.

9.7.4.2 Geologic History Overview

A key factor affecting the regional aquifers is the geologic deformation associated with the development of the Valley. **Figure 9-5** shows the location of the major geologic structures termed anticlines and synclines in the area. Anticlines are folds that form a ridge where the limbs of the fold dip away from the crest. Synclines are folds that form a trough where the limbs of the fold dip towards the trough. These geologic structures influence the occurrence and movement of ground water in western Kern County (Wood and Davis 1959, Wood and Dale 1964, Bartow 1991, Page 1986).

The primary geologic structure is the San Joaquin Valley Syncline. Throughout the Late Jurassic, Cretaceous, and early Tertiary Periods of geologic time, the greater Valley was a large marine basin which was being filled with marine sediments shed into the region from the rising Sierra Nevada (Bartow 1991). These sediments formed a thick accumulation of sandstones, siltstones, and shales referred to as the Great Valley Sequence (Page 1986). Formation of the basin created a large, asymmetrical, northwestward-trending syncline along the western side of the Valley. Locally within Kern County, the San Joaquin Valley Syncline is referred to as the Buttonwillow Syncline (BVGSA 2020) or the Buena Vista Slough (Croft 1972).

During Pliocene and Pleistocene times, the Valley was filled with a thick sequence of continental sediments (Page 1986, Croft 1972, Wood and Dale 1964). Two formations are defined that are generally differentiated based on the source area of the sediments. The Tulare Formation occurs in western Kern County Subbasin and contains up to 2,200 feet of interbedded sand and, clay layers derived primarily from Coast Range sources. The Kern River Formation includes from 500 to 2,000 feet of poorly sorted, lenticular deposits of clay, silt, sand, and gravel derived from the Sierra Nevada. The combined Tulare and Kern River Formations for the primary Principal Aquifer for the Kern County Subbasin (KGA GSA 2020).

A major feature of the Pleistocene paleogeography was the large lake, the Corcoran Lake, that occupied nearly the whole valley for a brief interval near the middle of the Pleistocene (Bartow 1991). Six clay tongues, representing deposits formed from this lake formed the southwestern Valley area. These are designated in descending order by the letters A through F (Croft 1972). The E-Clay layer is identified as a regional aquitard in western Kern County that divides the Tulare Formation into upper and lower aquifer zones (KGA GSA 2020). During the deposition of the E-Clay, the topographically low San Joaquin Valley Syncline (**Figure 9-5**) was inundated by the Pleistocene Corcoran Lake and that led to the distribution of the E-Clay in BVWSD and SWSD (Croft 1972).

The westside fold belt extends along the southwest side of the valley syncline in the southwesternmost Valley and Temblor Ranges (Wood and Davis 1959, Wood and Dale 1964, Bartow, 1991). This area is characterized by Cenozoic folds and faults that formed by compressional stress associated with the San Andreas fault system and development of the Coast Ranges. These features trend, for the most part, along a northwest-southeast direction. The first folds in the Temblor Range date from the late early Miocene, whereas the easternmost anticlines in the fold belt (Buttonwillow, Bowerbank, and Semitropic anticlines) are entirely Pleistocene in age (Bartow 1991).

The E-Clay was deposited prior to the deformation of the westside fold-belt; therefore, the E-Clay was originally deposited as an essentially flat layer. However, it was later deformed during the development of the westside fold belt. As a result, the E-Clay occurs at varying depths that are higher over the anticlines and lower within the synclines (Bartow 1991; Croft 1972).

Over the Buttonwillow, Bowerbank and Semitropic Anticlines, there appear to be areas where the elevation of the base of the E-Clay is topographically higher than the Upper Zone groundwater elevations. Where this occurs, the anticlines form barriers to groundwater flow across the anticlines. As are result, Upper Zone groundwater in the area of these folds tends to flow parallel to occur within the synclines between the anticlines. Thus, the Upper Zone ground water is interrupted or deflected in several places by these southeastward-trending anticlinal structures (Bartow 1991; Wood and Davis 1959; Croft 1972; Page 1986). The contours on **Figure 9-40** show that the bottom of the E-Clay has lower elevations in the synclines and higher elevations over the anticlines as a result of the deformation that took place during the development of the westside fold belt (PGA 1991).

9.7.4.3 Distribution of the E-Clay

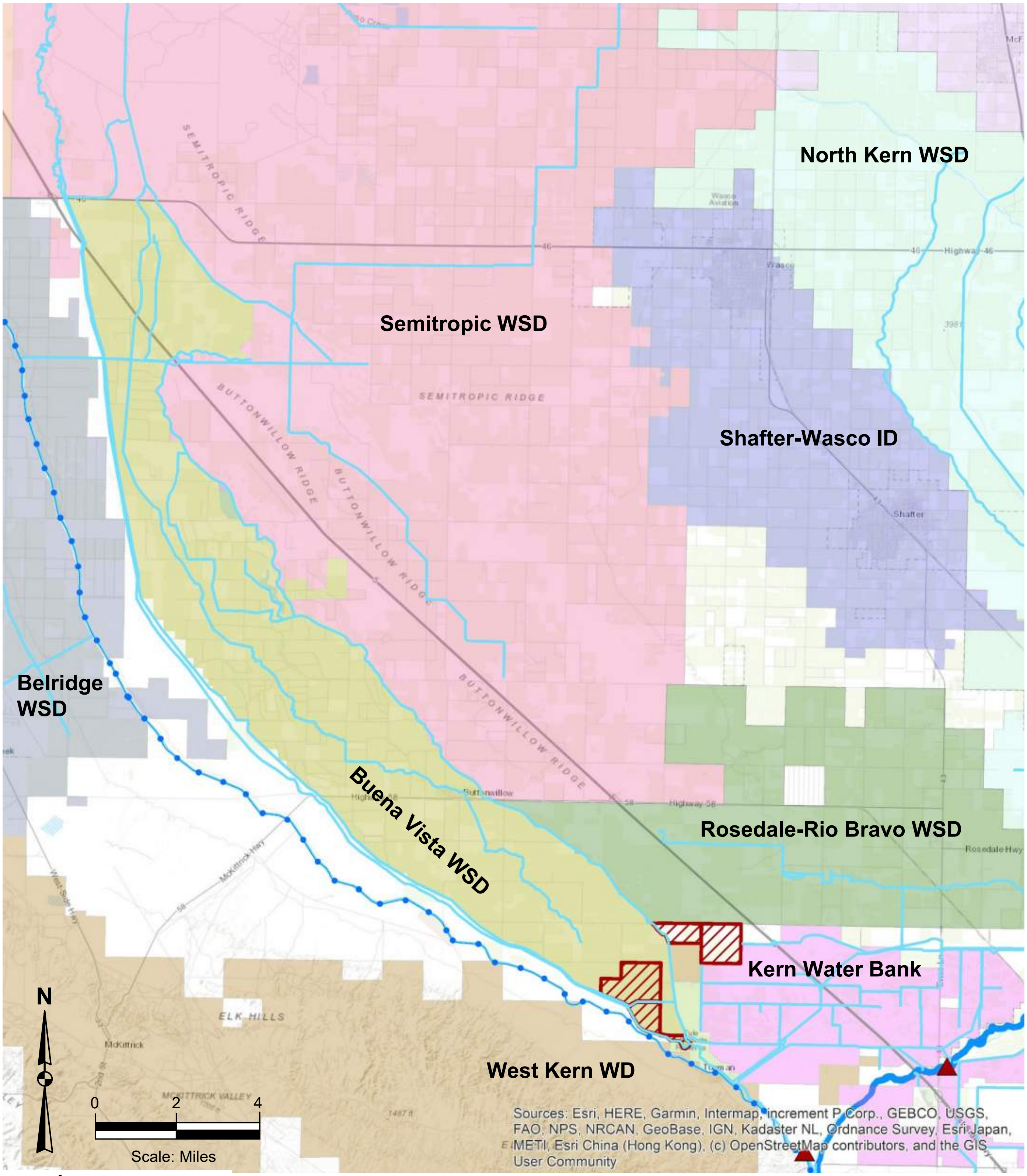
Within the Tulare Formation, several distinct clay layers, or members, are defined using letter designations with the A-clay being the shallowest and the E-Clay, the deepest. The most significant clay layer with respect to groundwater is the E-Clay. As described previously, where the E-Clay is present (**Figure 9-5**), the aquifer system is typically defined as a deeper confined zone (Lower Zone) and an upper unconfined zone (Upper Zone). **Figure 9-40** shows the extent and elevation of the E-Clay based on the 1991 KCWA report (PGA 1991).

The E-Clay ranges from 20 to 100 feet in thickness and ranges in depth from 300 feet 450 (bgs) (Faunt et al, 2009 SWSD GSA 2020, KSA, 2020). The E-clay is present under much of BVWSD and SWSD but becomes discontinuous to absent in areas to the south. Marginally, the E clay bifurcates into multiple layers that probably represents fluctuating lake levels of the Pleistocene Corcoran Lake during deposition, thus making the margin of the E-clay is difficult to identify in this area (Croft 1972; Bartow 1991).

Several different interpretations of the extent of the E-clay have been defined by the USGS and others (Croft 1972; Page 1983, 1986; PGA 1991) as shown on **Figure 9-5**. In general, these interpretations generally agree except along the margins. In the vicinity of the Recovery Project, these interpretations have some differences. The Page (1986) interpretation defines the E-clay as underlying the western KWB and the Project area, whereas the PGA (1991) ends the E-clay north of the KWB and Project area. The Croft (1972) includes a narrow band of E-clay along the Elk Hills that underlies the Project area but does not extend under the KWB.

In most of the area south of Seventh Standard Road and east of Wasco (**Figures 9-5, 9-40**), the E-Clay layer is discontinuous or absent and the aquifer system is typically described as a single aquifer (KSA 2020). The fine-grained strata present in this area within the interval correlated to the E-Clay are assumed to not function as effective confining beds. As a result, groundwater levels in shallow and deep water-producing strata in the forebay area tend to be at about the same depth at most locations during periods of minimal pumping. However, even in these areas, the presence of local discontinuous clay layers restricts vertical flow creating a separation between a shallow unconfined aquifer and a deeper semi-confined aquifer that results in the groundwater elevation differences observed in nested monitoring wells.

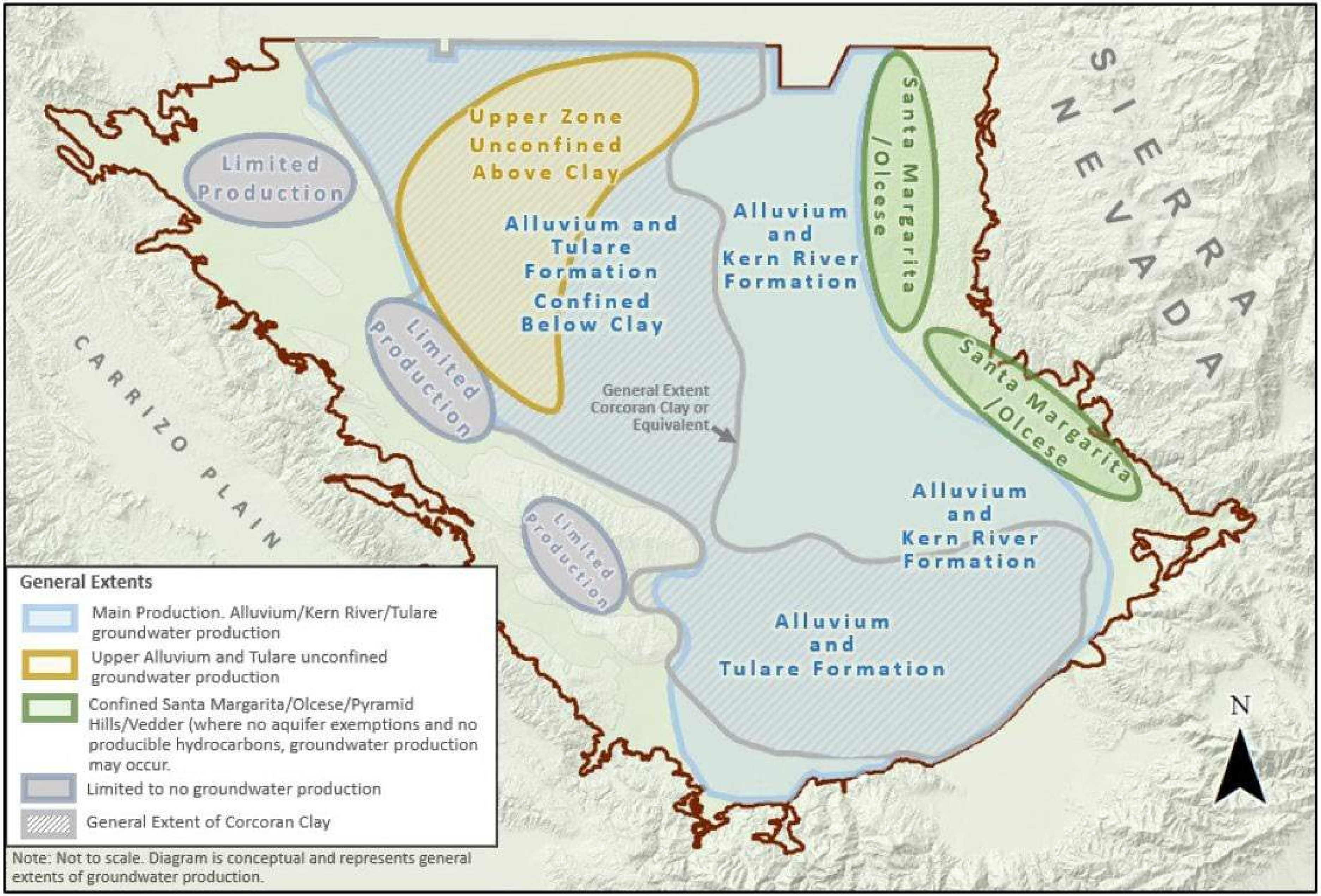
9.7.5 Figures for Master Response #7



Legend

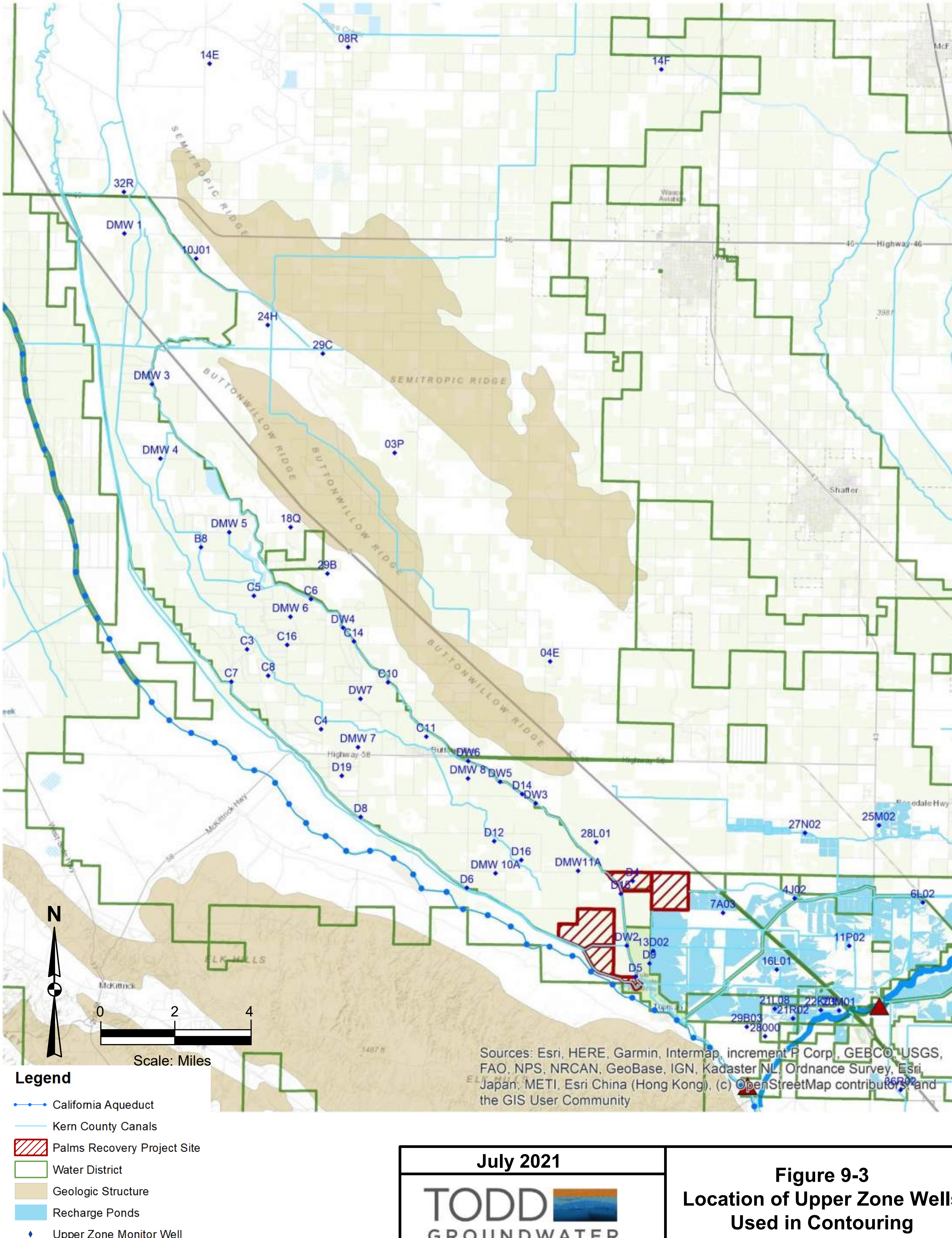
- Kern River Gauge
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Geologic Structure
- Kern River

July 2021	Figure 9-1 Location Map
TODD GROUNDWATER	



Source: Figure 2-22 from the KGA Groundwater Sustainability Plan (KGA, 2020)

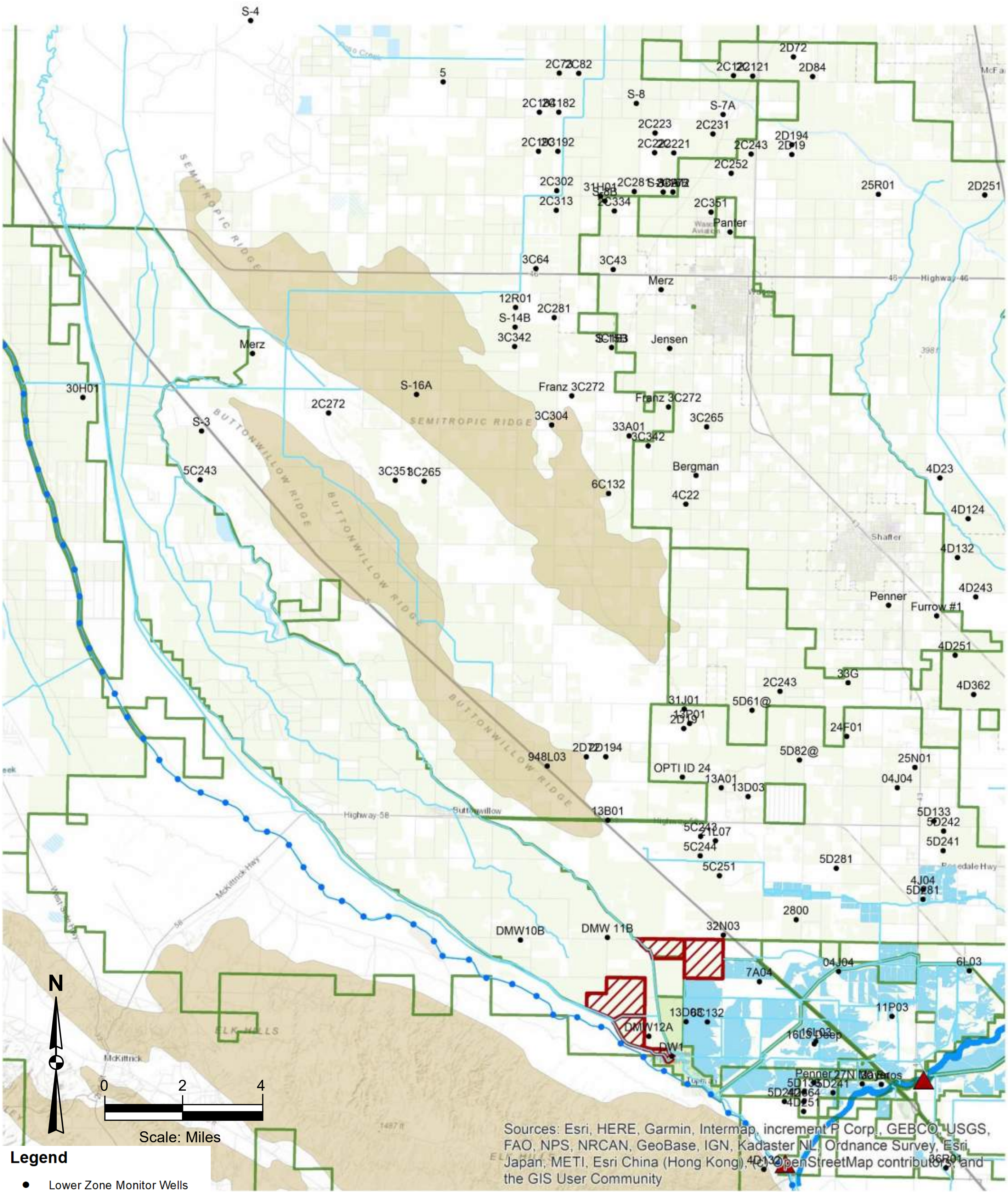
July 2021	**Figure 9-2**
TODD GROUNDWATER	**General Distribution of Kern County Subbasin Principal Aquifers**



July 2021

TODD GROUNDWATER

Figure 9-3
Location of Upper Zone Wells Used in Contouring



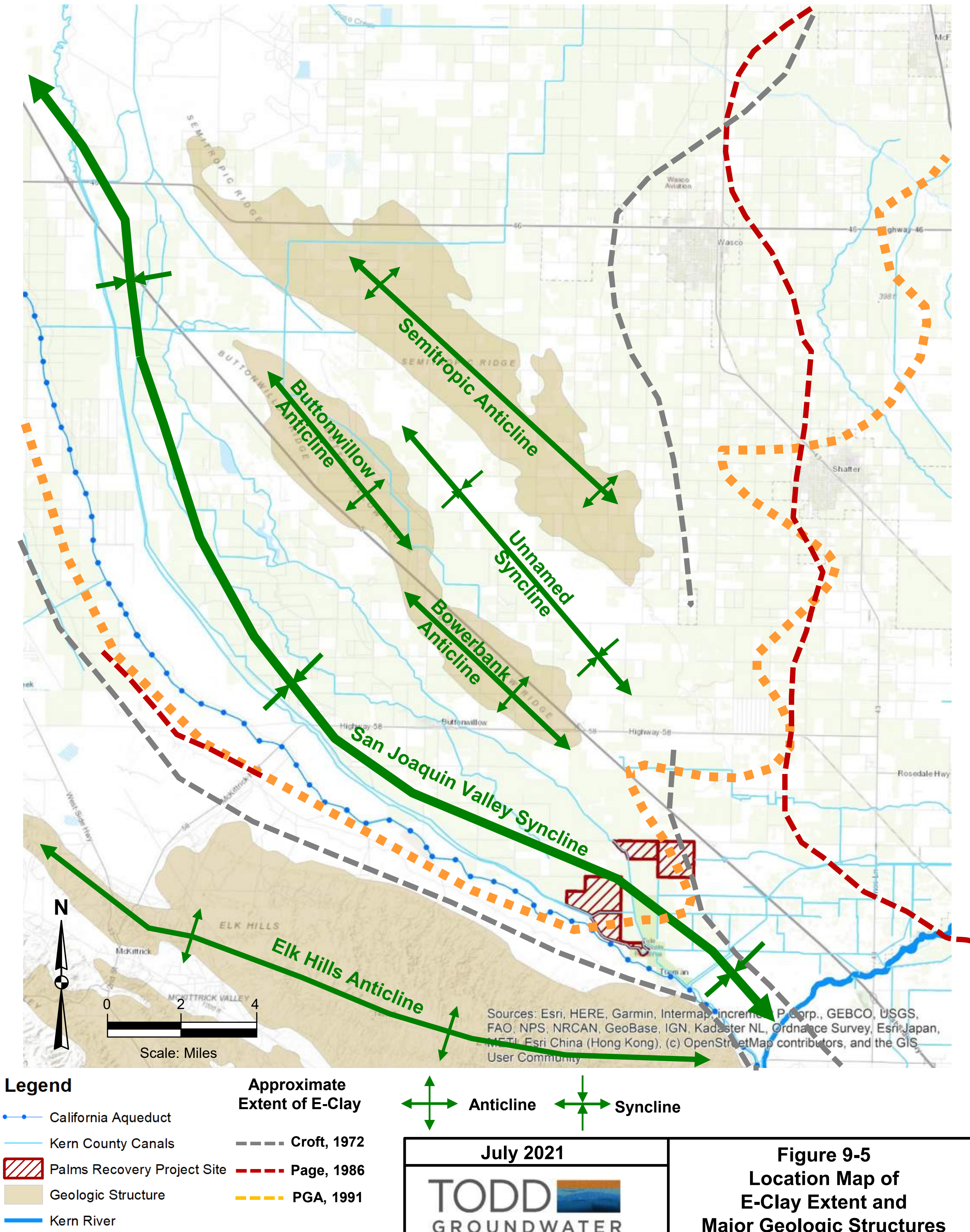
Legend

- Lower Zone Monitor Wells
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds

July 2021

TODD GROUNDWATER

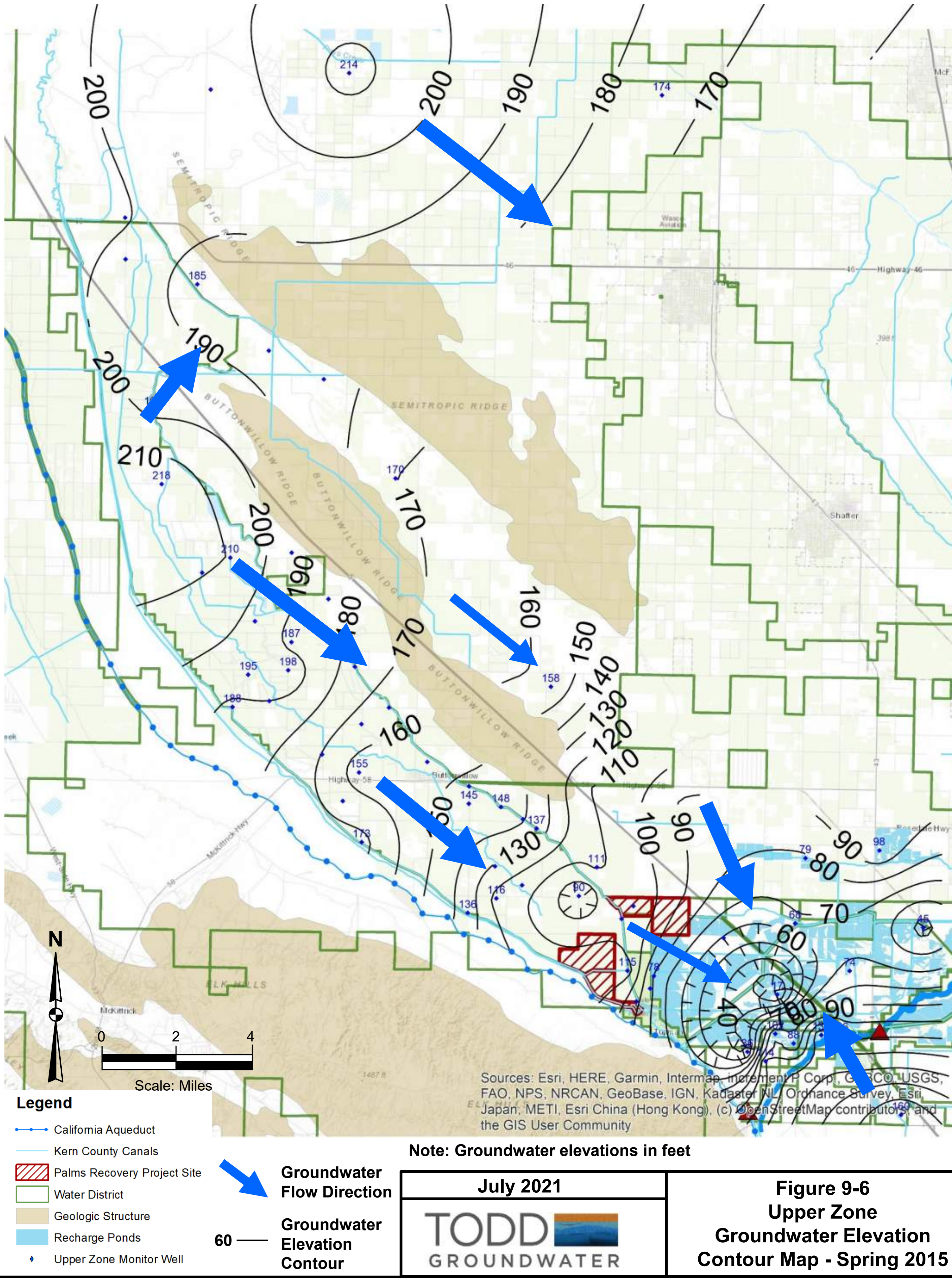
Figure 9-4
Location of Lower Zone Wells Used in Contouring



July 2021

TODD GROUNDWATER

Figure 9-5
Location Map of E-Clay Extent and Major Geologic Structures

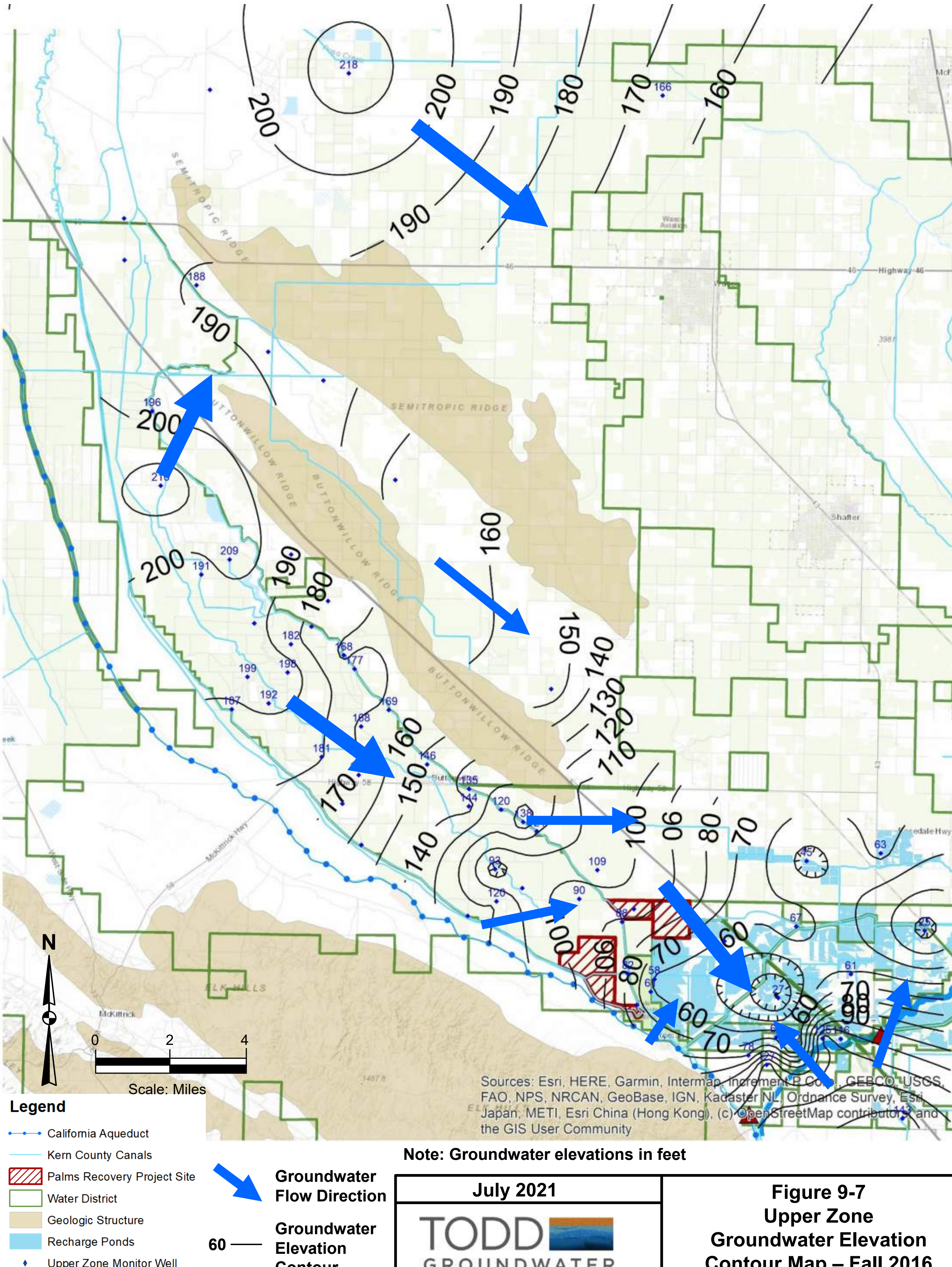


Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-6
Upper Zone Groundwater Elevation Contour Map - Spring 2015

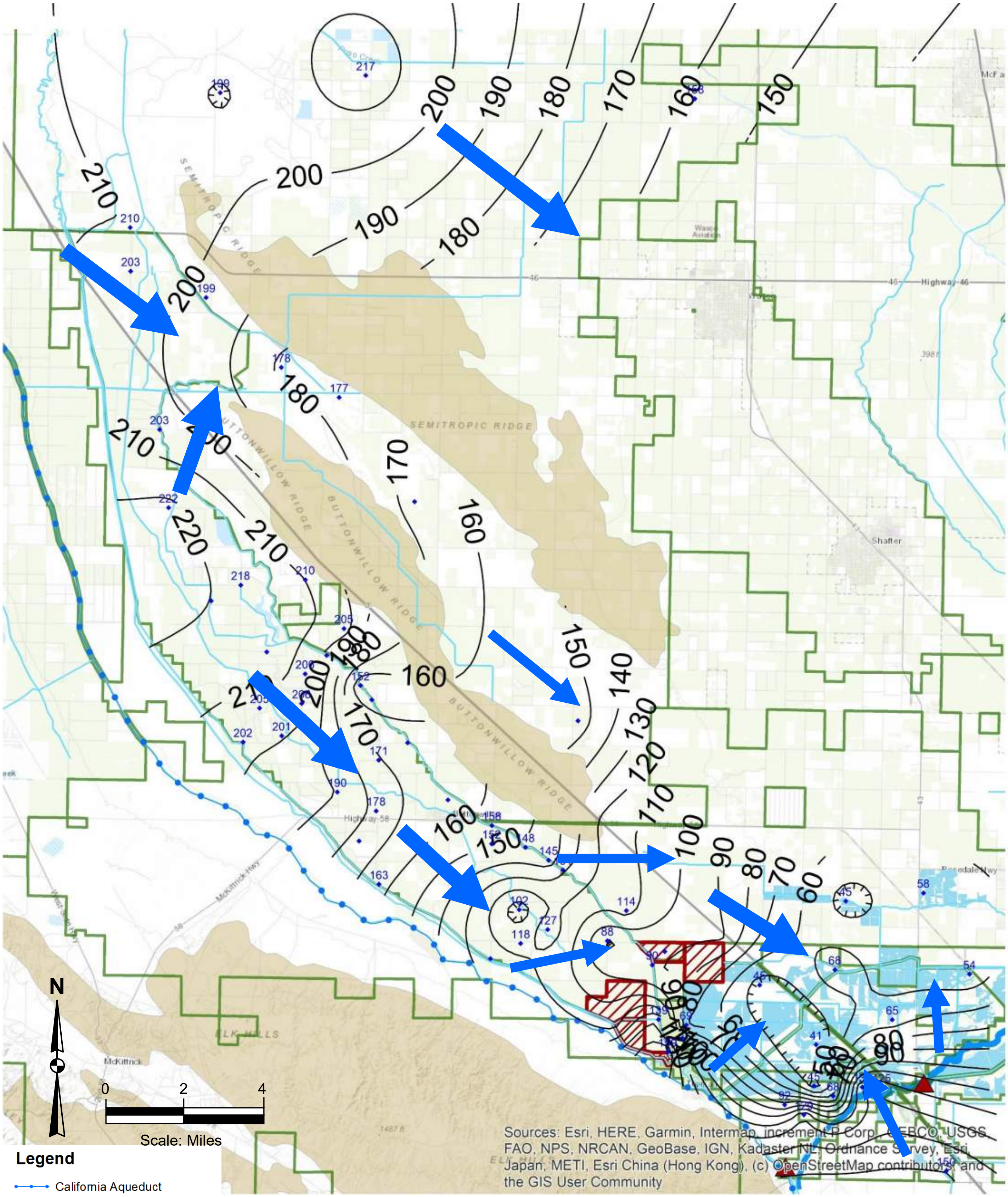


Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-7
Upper Zone Groundwater Elevation Contour Map – Fall 2016



Legend

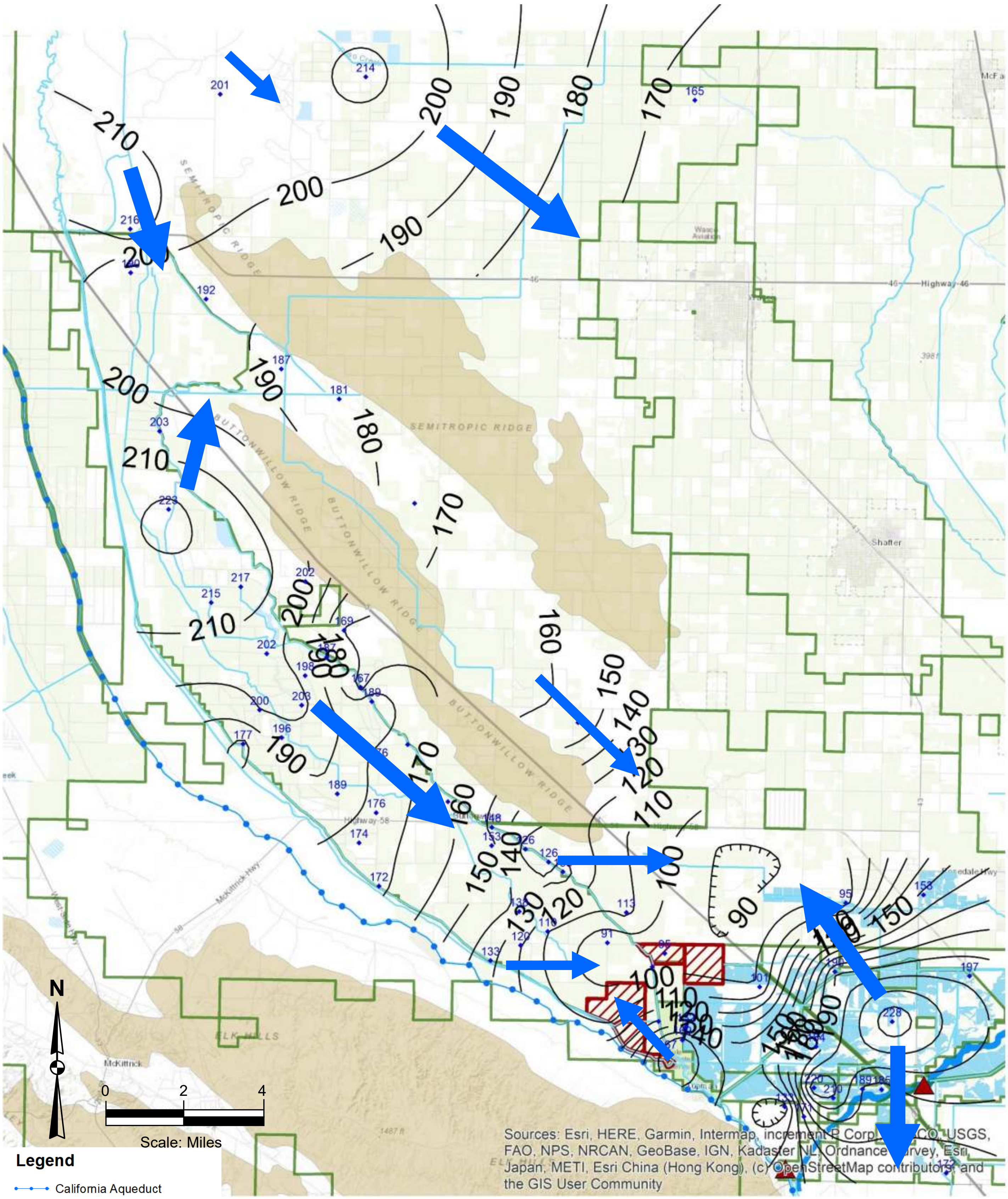
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well

Groundwater Flow Direction

60 —— Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021	Figure 9-8 Upper Zone Groundwater Elevation Contour Map - Spring 2017
TODD GROUNDWATER	

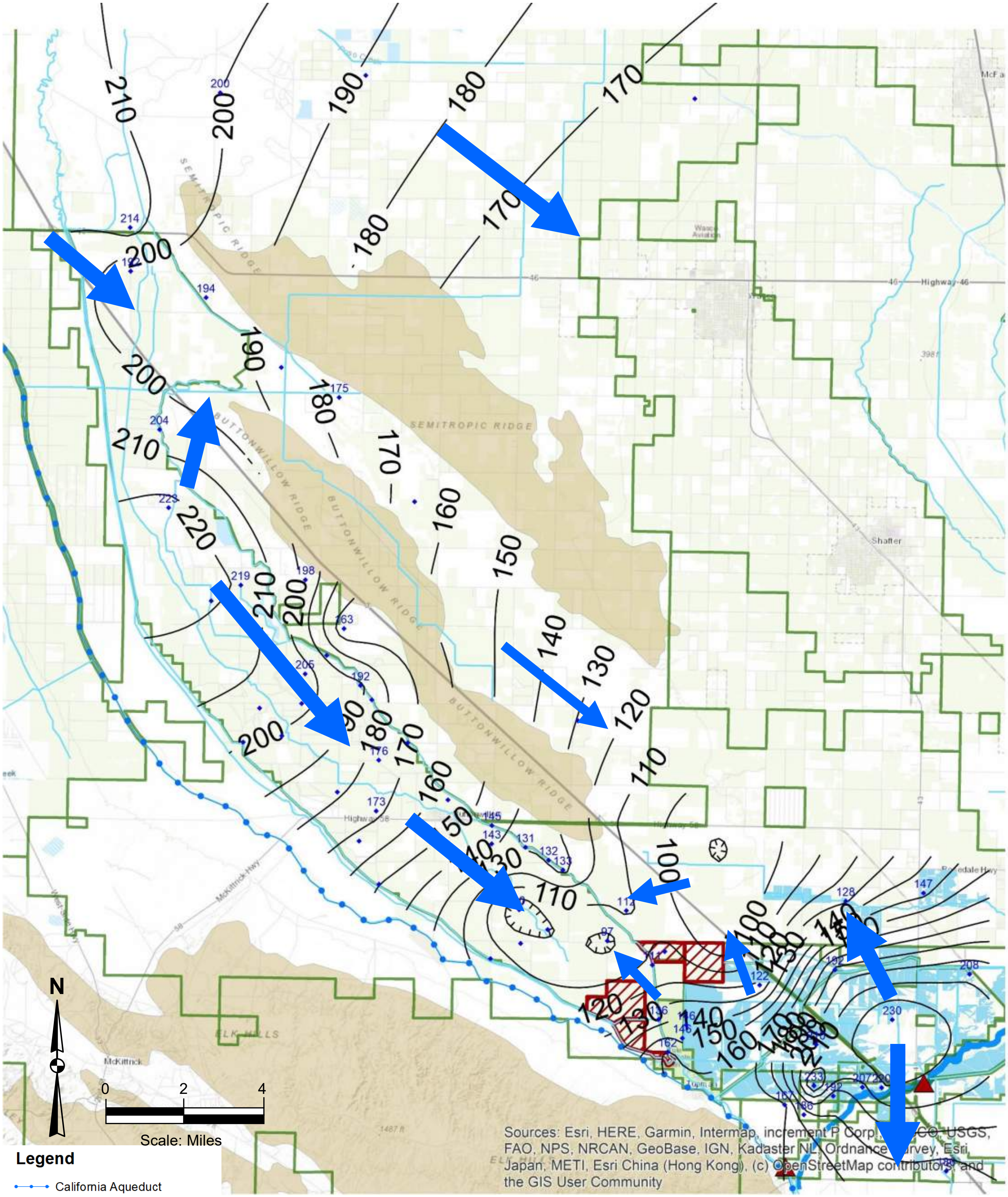


Legend

- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well
- Groundwater Flow Direction
- 60 Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021	Figure 9-9 Upper Zone Groundwater Elevation Contour Map - Spring 2018
TODD GROUNDWATER	



Legend

- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well

Groundwater Flow Direction

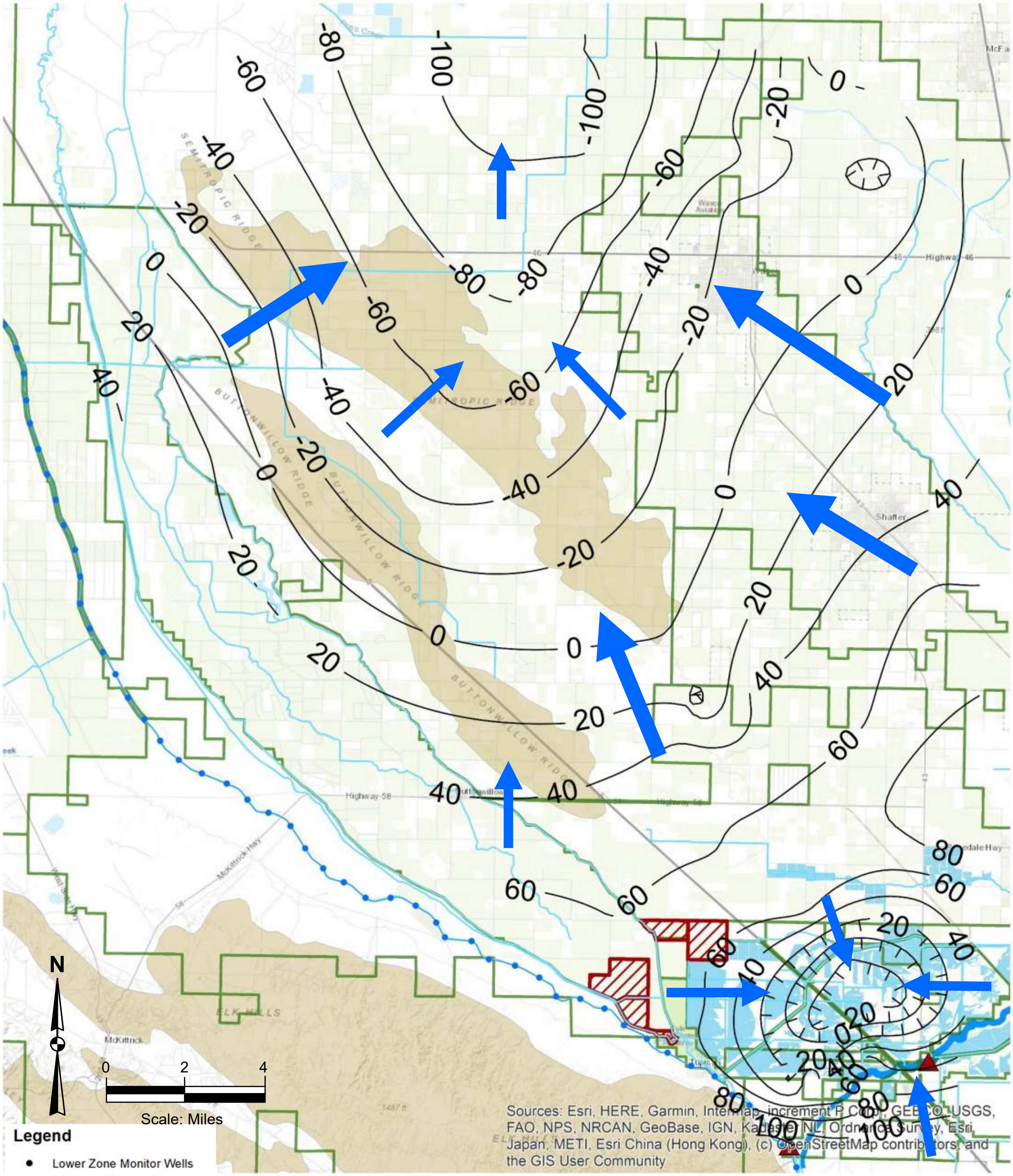
60 —— Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-10
Upper Zone Groundwater Elevation Contour Map - Spring 2019



Legend

- Lower Zone Monitor Wells
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds

Groundwater Flow Direction

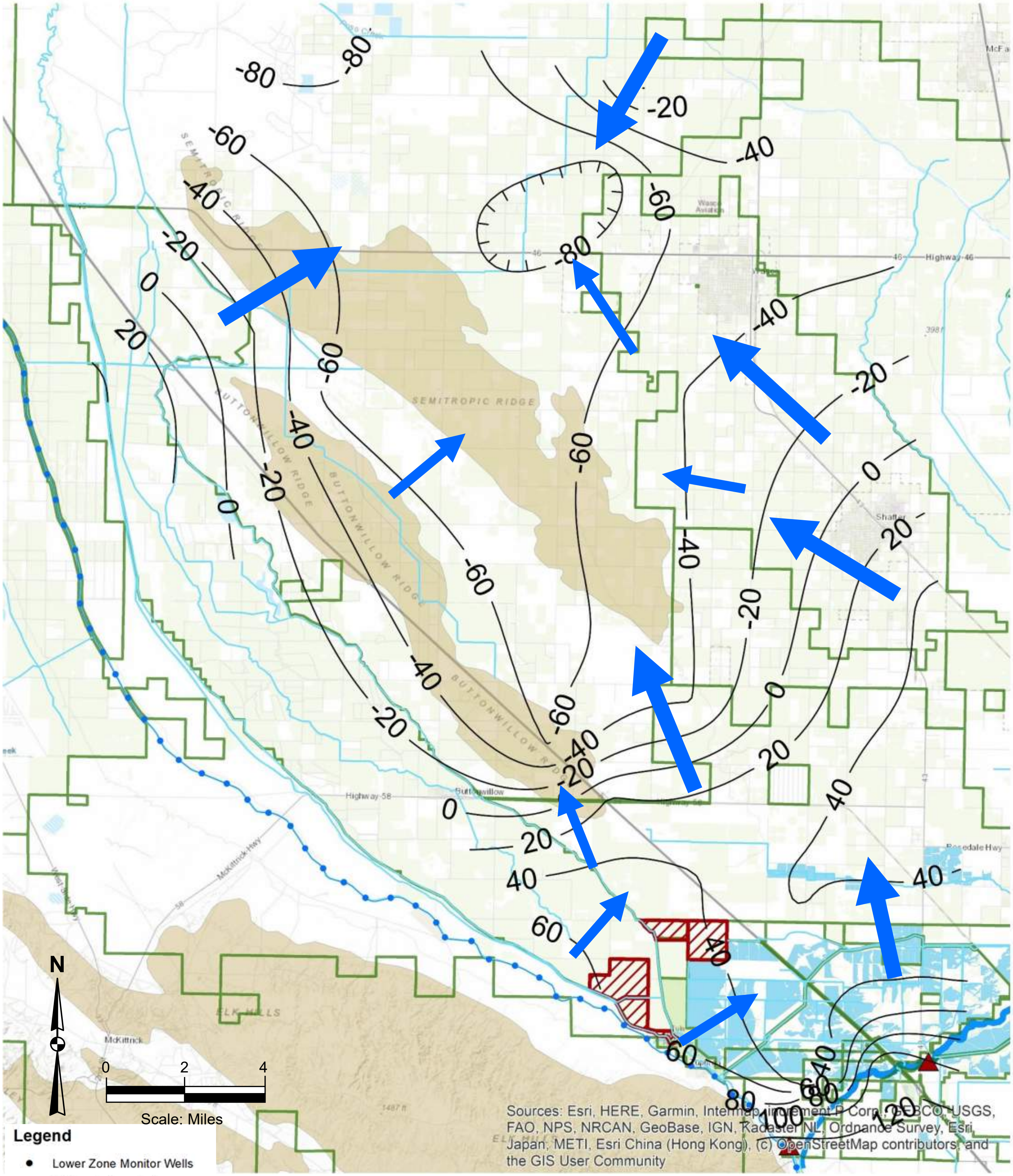
60 — Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-11
Lower Zone
Groundwater Elevation
Contour Map - Spring 2015



Legend

- Lower Zone Monitor Wells
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds

Groundwater Flow Direction

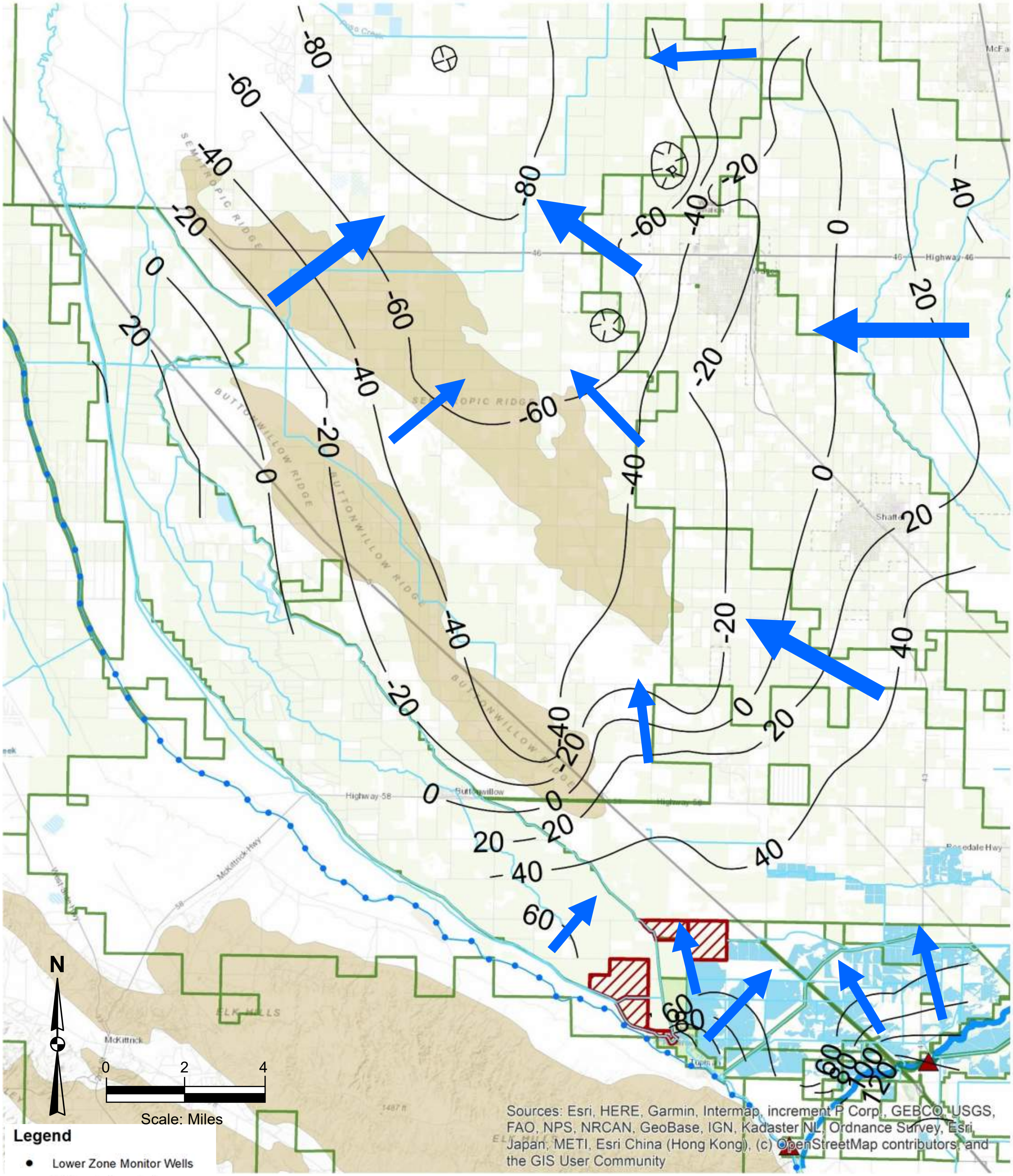
60 — Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-12
Lower Zone Groundwater Elevation Contour Map – Fall 2016

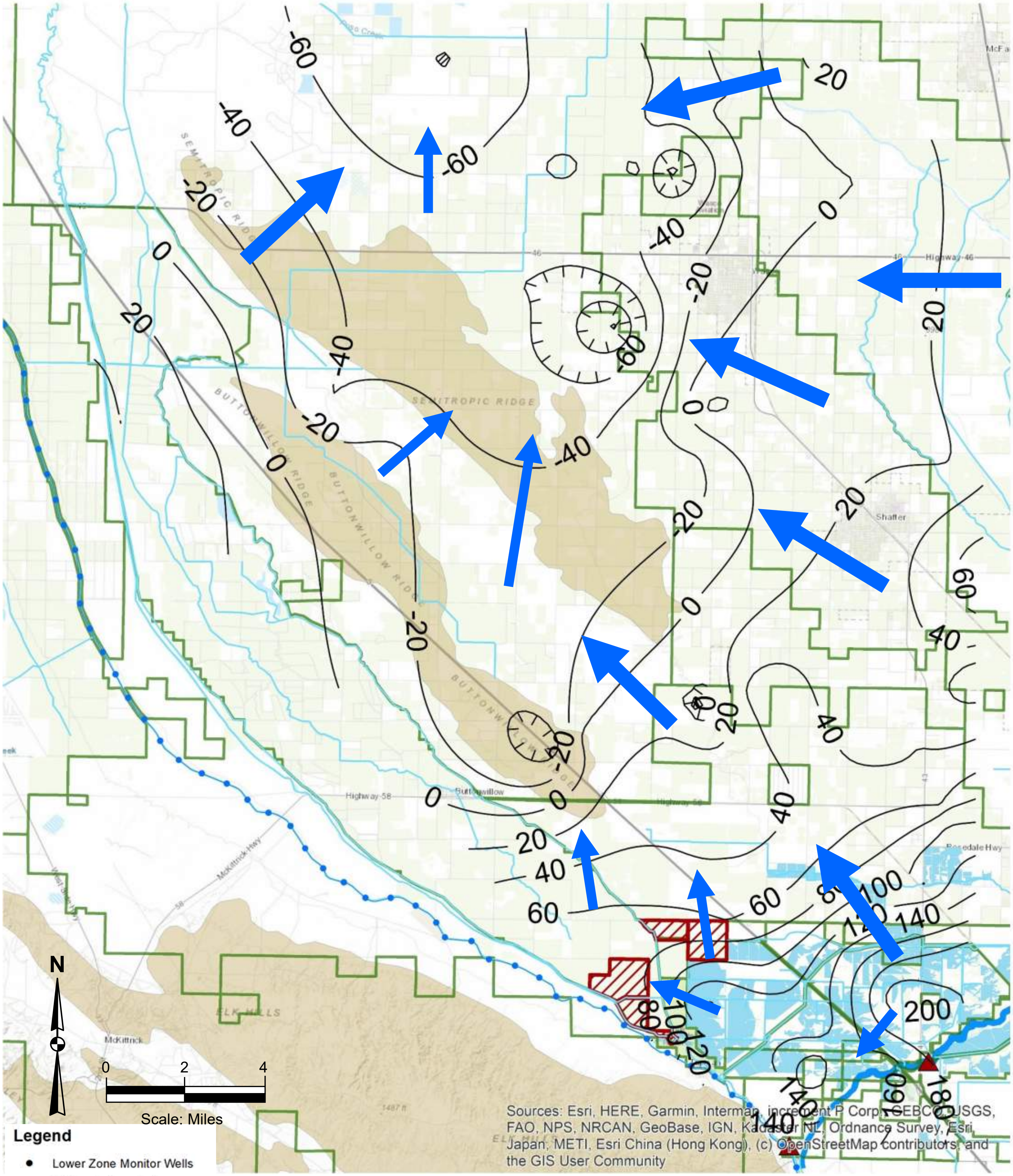


Legend

- Lower Zone Monitor Wells
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Groundwater Flow Direction
- 60 — Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021	Figure 9-13 Lower Zone Groundwater Elevation Contour Map – Spring 2017
TODD GROUNDWATER	



Legend

- Lower Zone Monitor Wells
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds

Groundwater Flow Direction

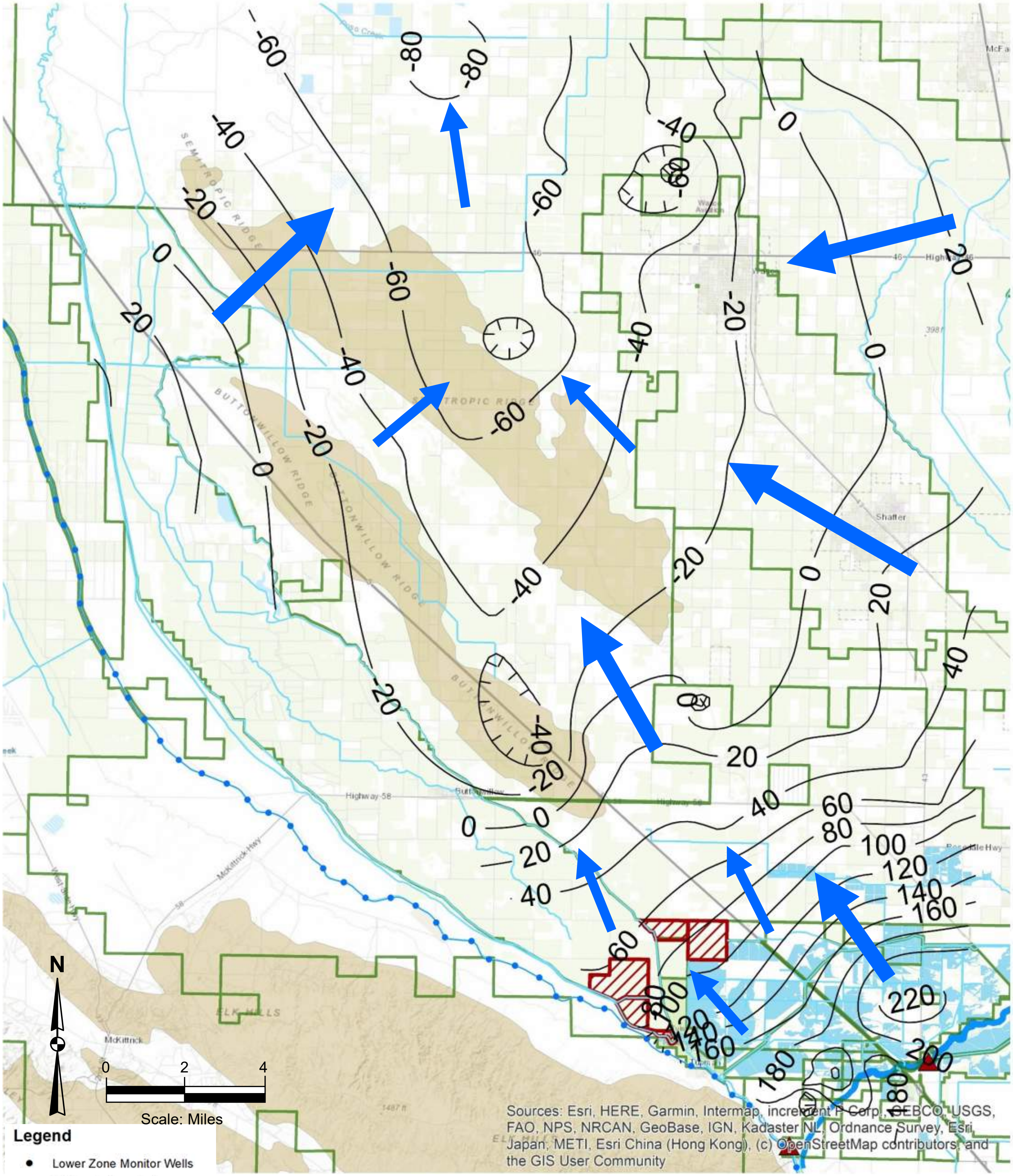
60 — **Groundwater Elevation Contour**

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-14
Lower Zone
Groundwater Elevation
Contour Map - Spring 2018



Legend

- Lower Zone Monitor Wells
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds

Groundwater Flow Direction

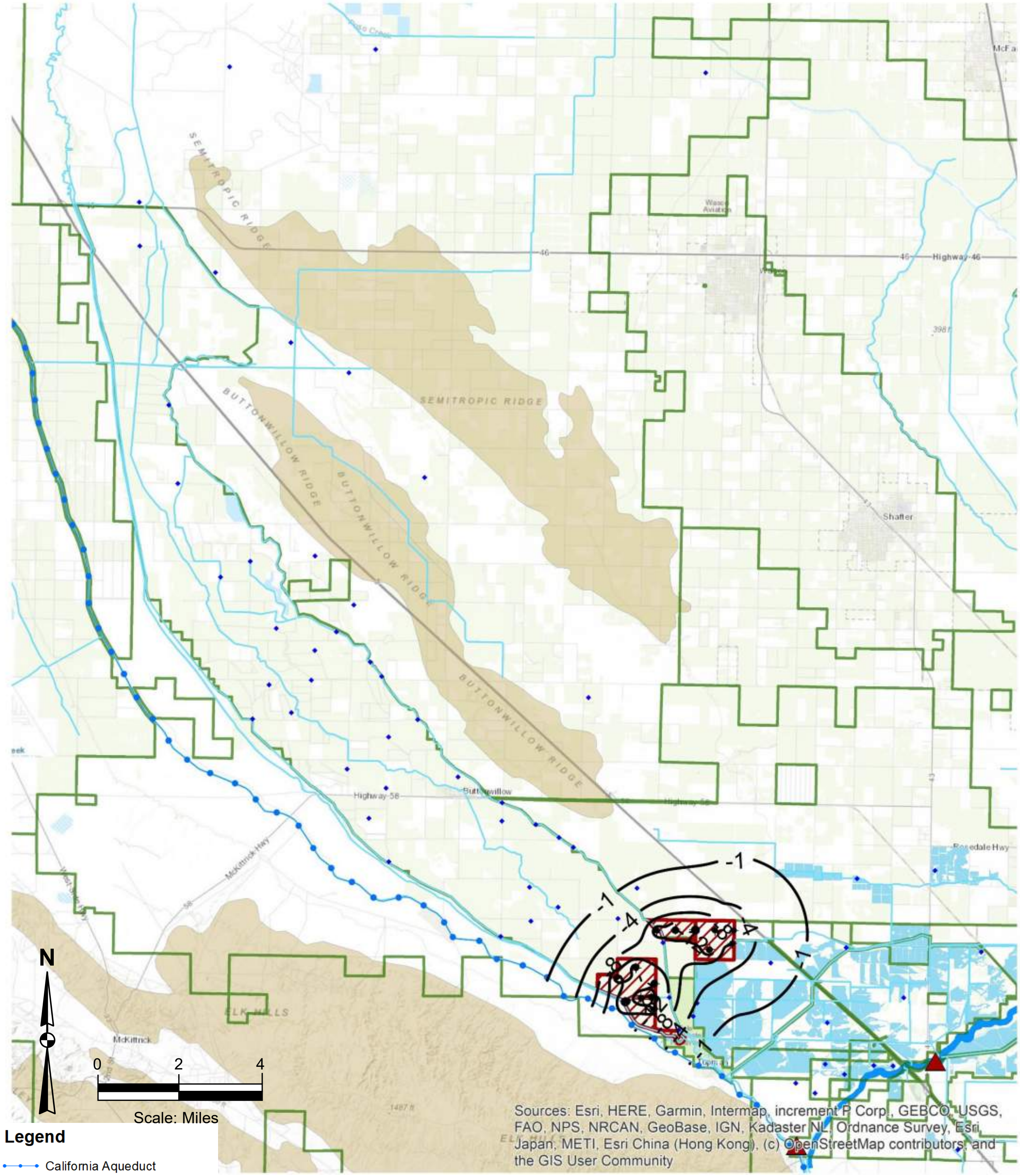
60 — Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-15
Lower Zone Groundwater Elevation Contour Map - Spring 2019

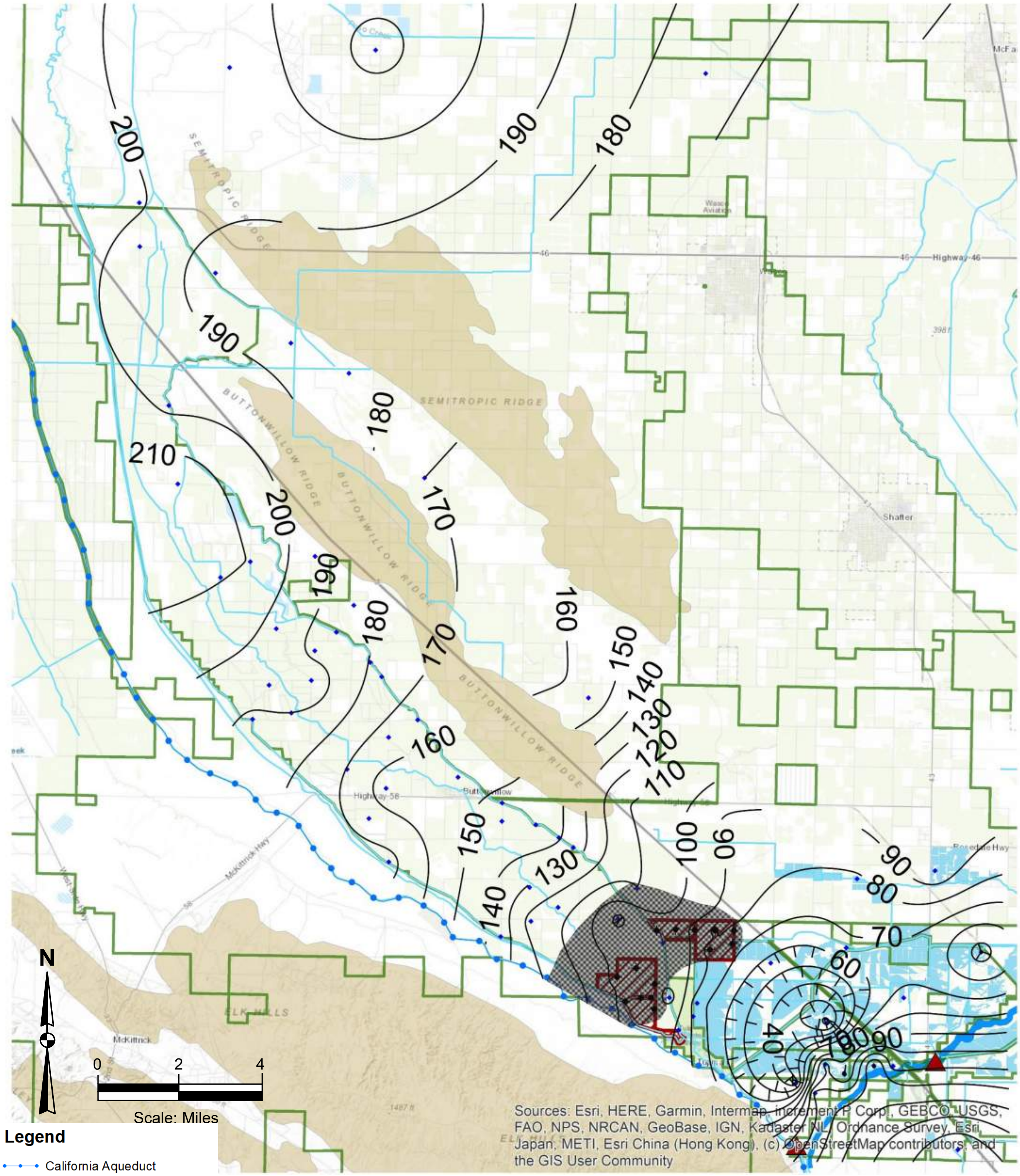


Legend

- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well
- -4 —— Simulated Drawdown Contour

Note: Groundwater elevations in feet

July 2021	Figure 9-16 Superposition Model Results Palms Recovery Project One-Year Drawdown
TODD GROUNDWATER	



Legend

- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well

Estimated Recovery Well Area of Influence

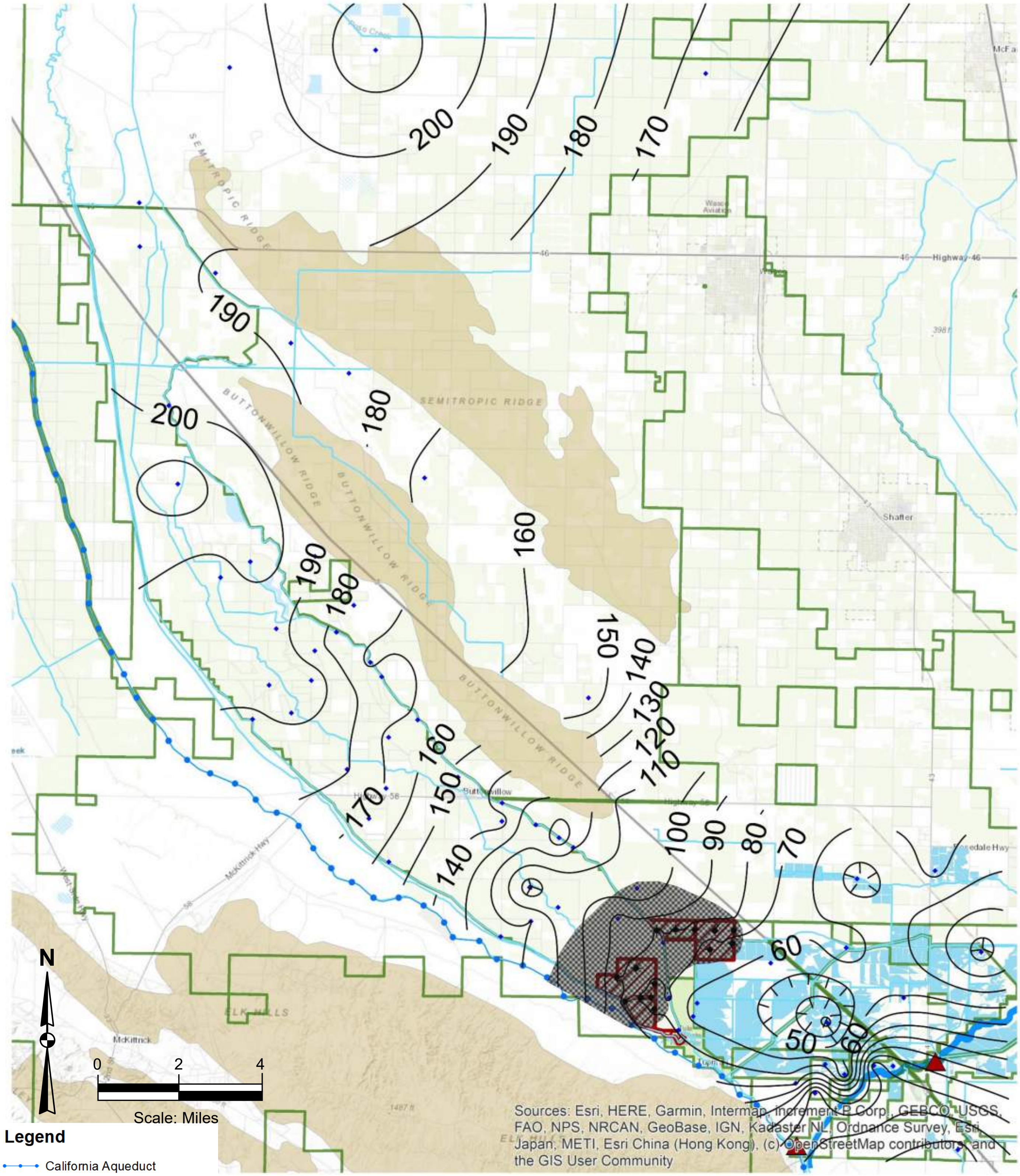
60 — **Groundwater Elevation Contour**

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-17
Simulated One Year Drawdown Added to Spring 2015 Groundwater Elevations



Legend

- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well

Estimated Recovery Well Area of Influence

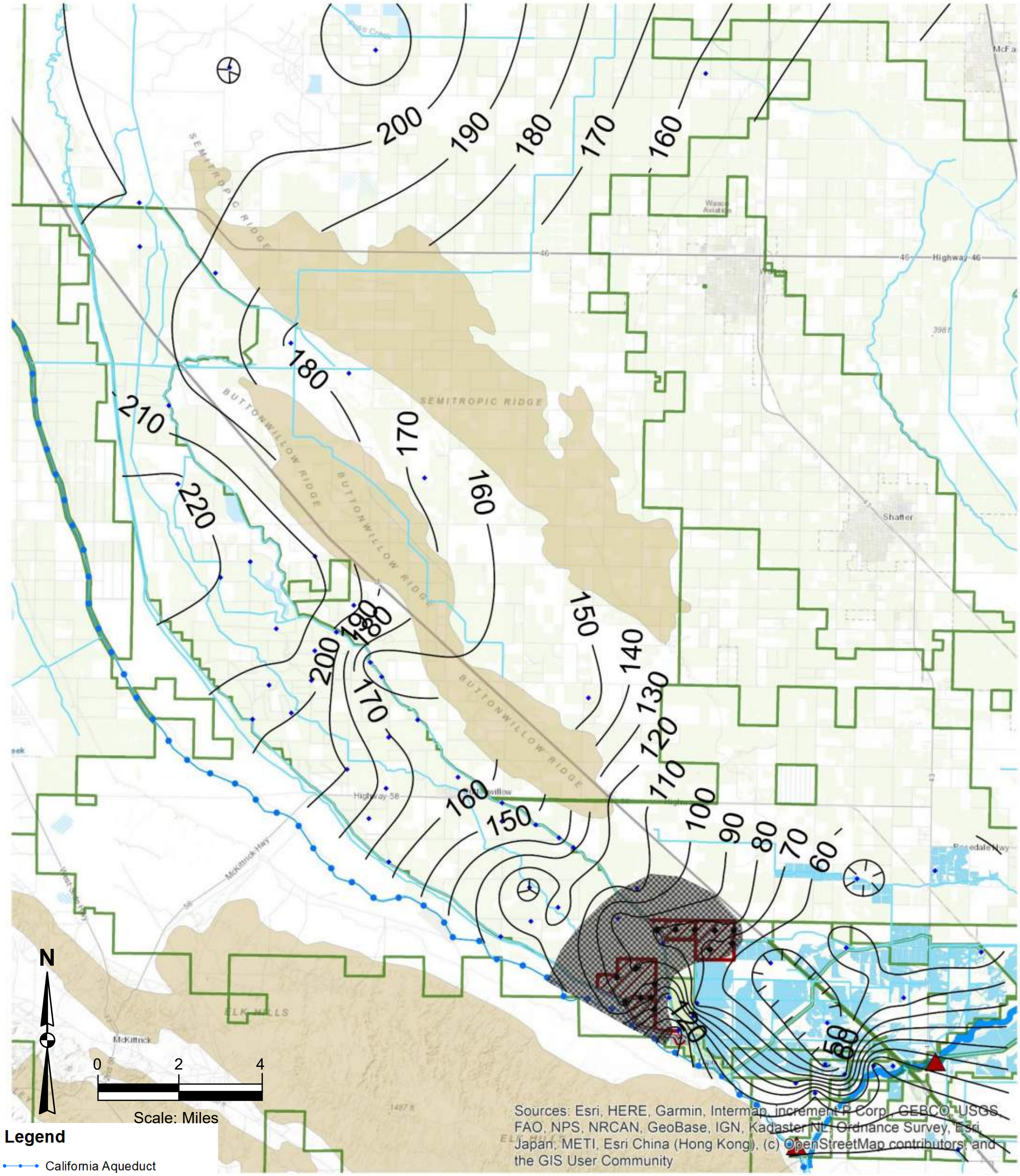
60 —— **Groundwater Elevation Contour**

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-18
Simulated One Year Drawdown Added to Fall 2016 Groundwater Elevations



Legend

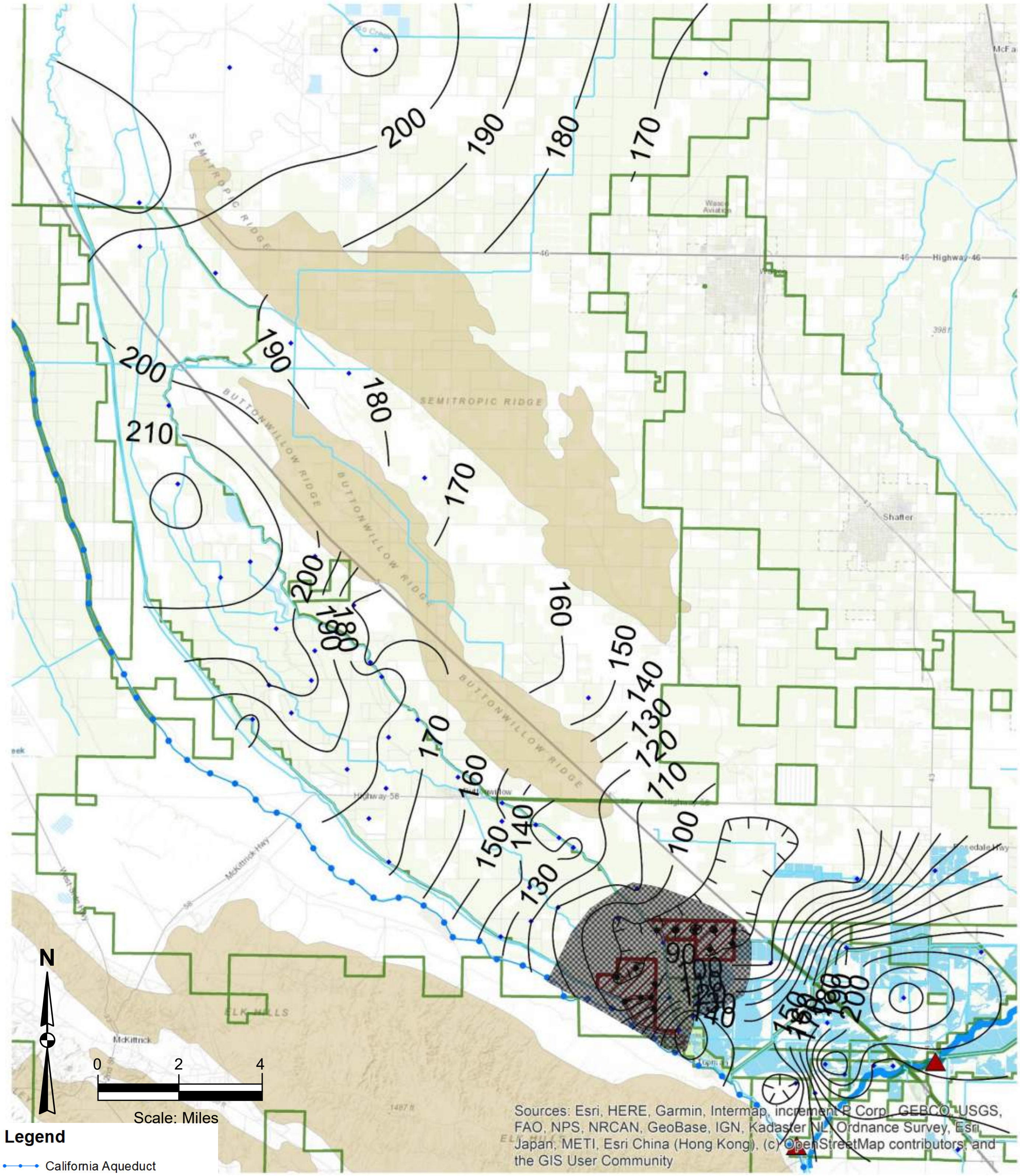
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well
- Estimated Recovery Well Area of Influence
- 60 — Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-19
Simulated One Year Drawdown Added to Spring 2017 Groundwater Elevations



Legend

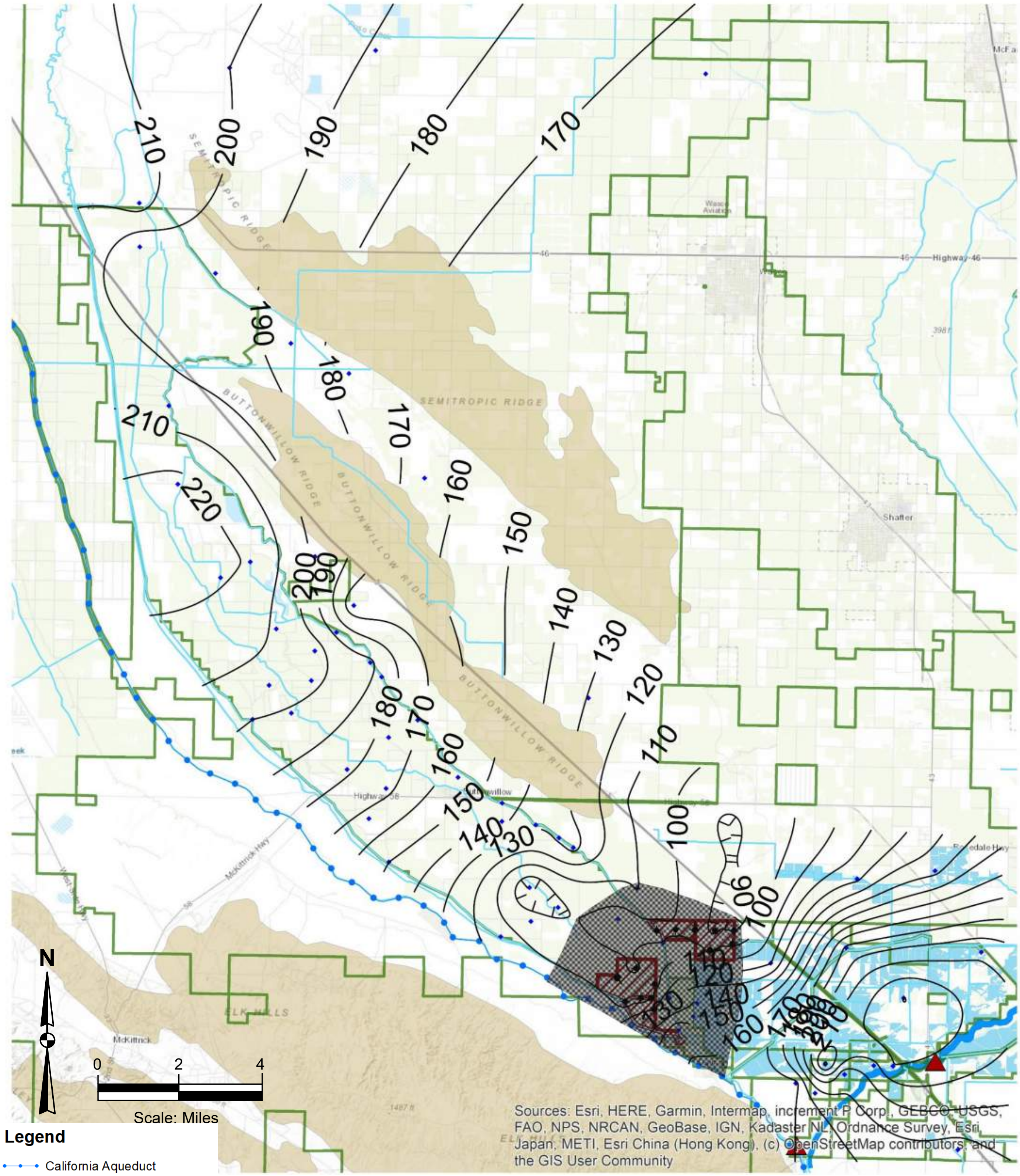
- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well
- Estimated Recovery Well Area of Influence
- 60 —— Groundwater Elevation Contour

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-20
Simulated One Year Drawdown Added to Spring 2018 Groundwater Elevations



Legend

- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well

Estimated Recovery Well Area of Influence

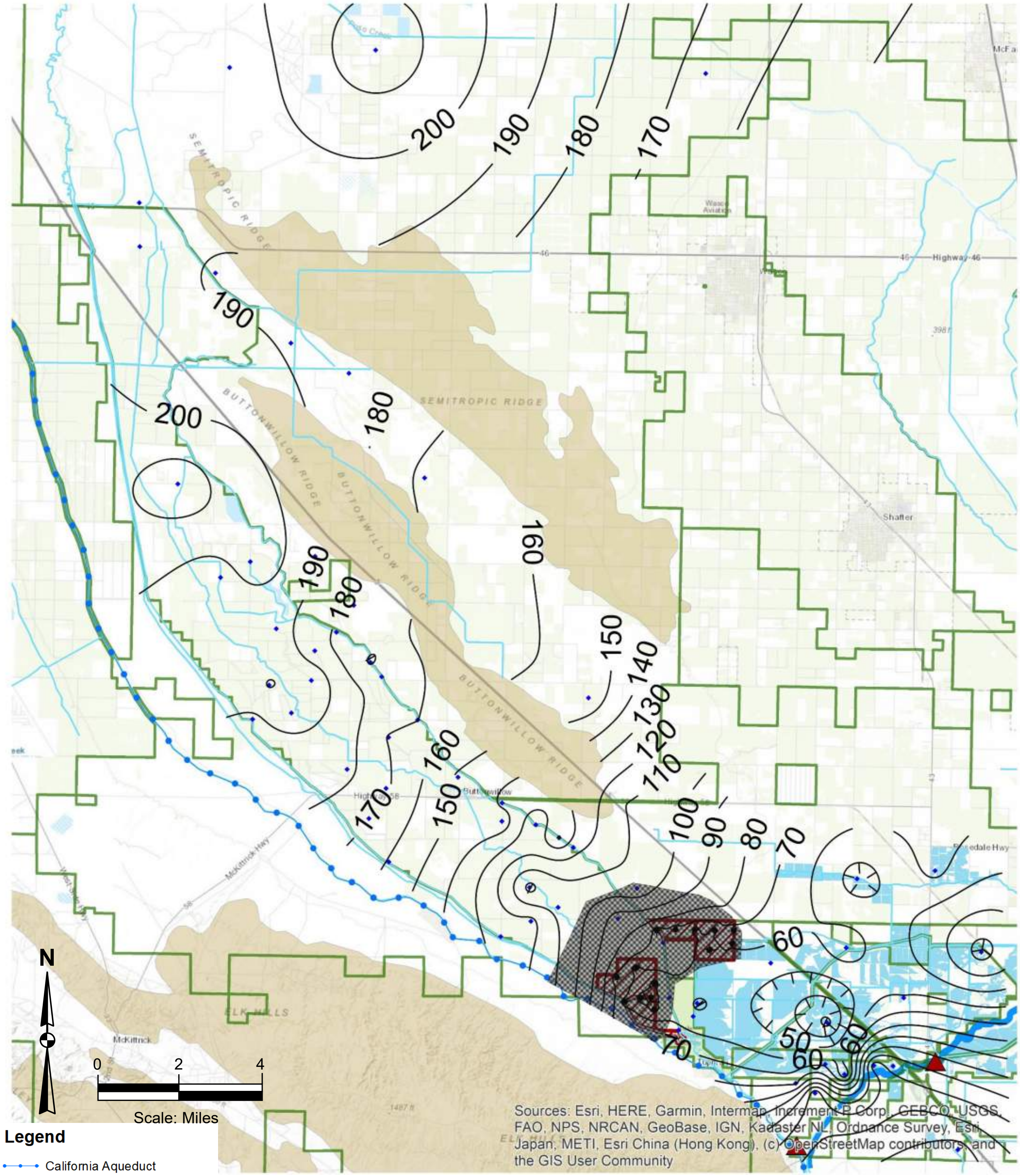
60 — **Groundwater Elevation Contour**

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-21
Simulated One Year Drawdown Added to Spring 2019 Groundwater Elevations



Legend

- California Aqueduct
- Kern County Canals
- Palms Recovery Project Site
- Water District
- Geologic Structure
- Recharge Ponds
- Upper Zone Monitor Well

Estimated Recovery Well Area of Influence

60 —— **Groundwater Elevation Contour**

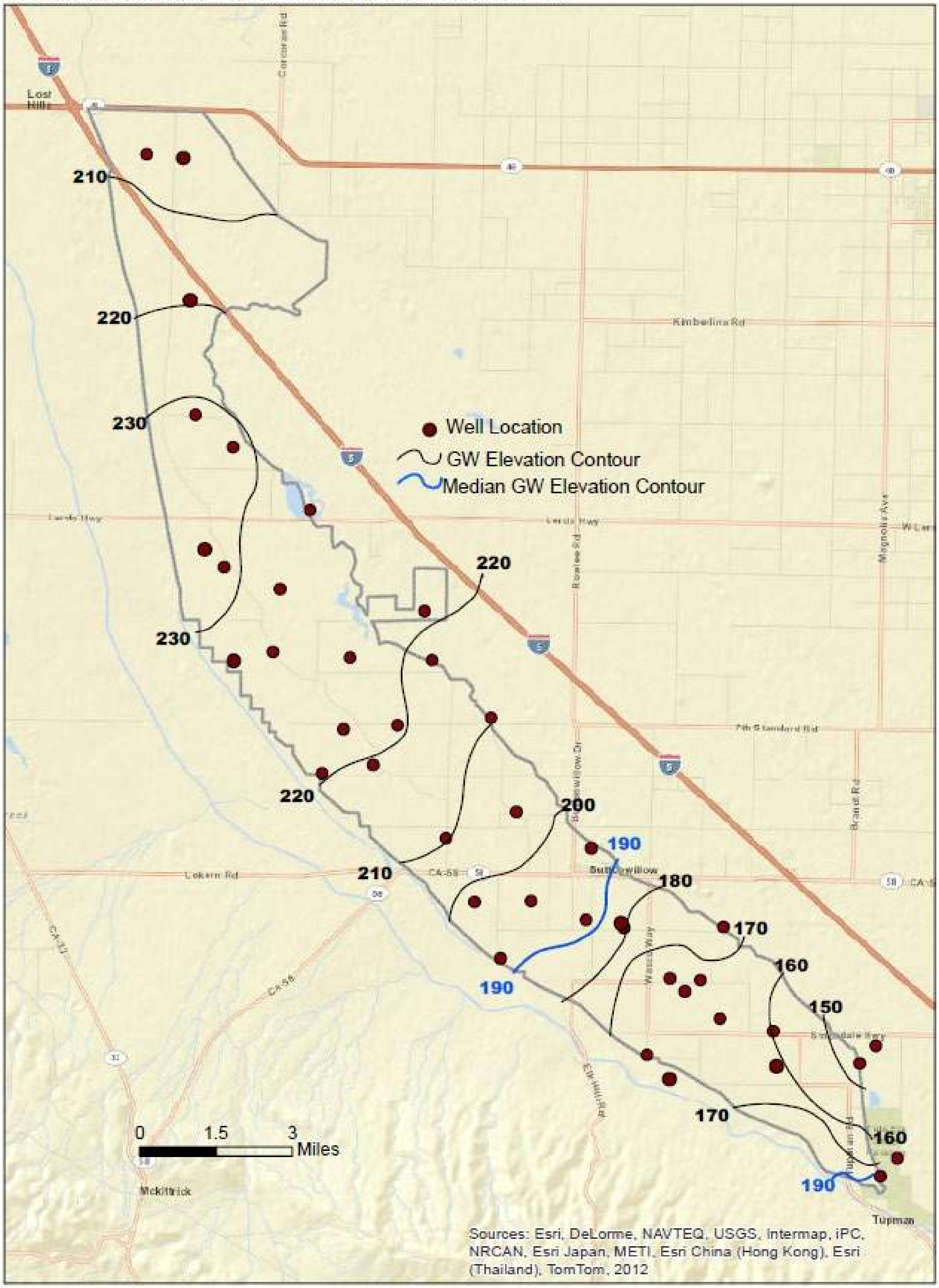
Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-22
Simulated Four Year Drawdown Added to Fall 2016 Groundwater Elevations

Groundwater Elevation Contour Map (Spring 2013) in ft AMSL



Source: Map provided by BVWSD

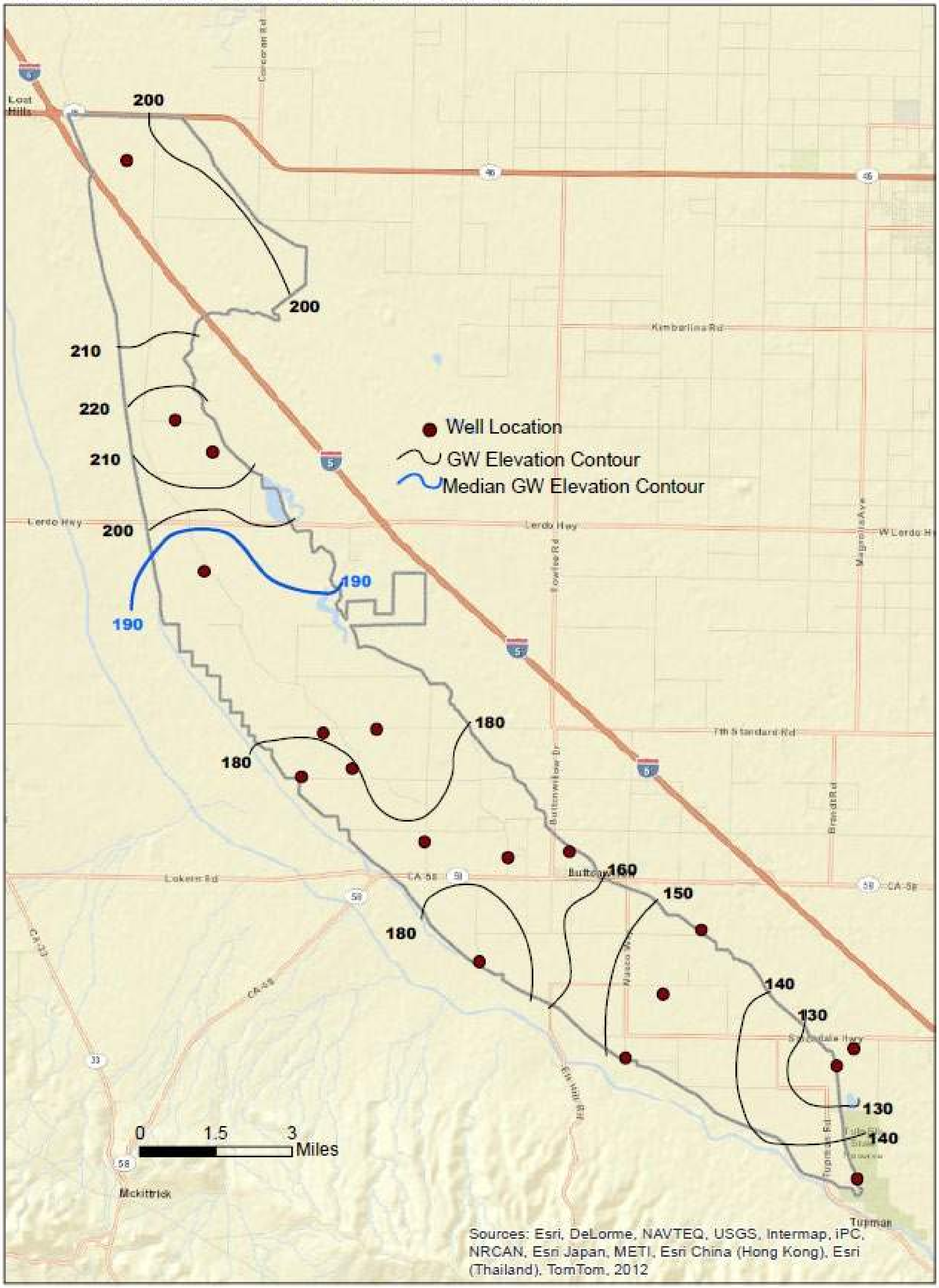
Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-23
BVWSD Upper Zone Groundwater Elevation Contour Map Spring 2013

Groundwater Elevation Contour Map (Spring 2014) in ft AMSL

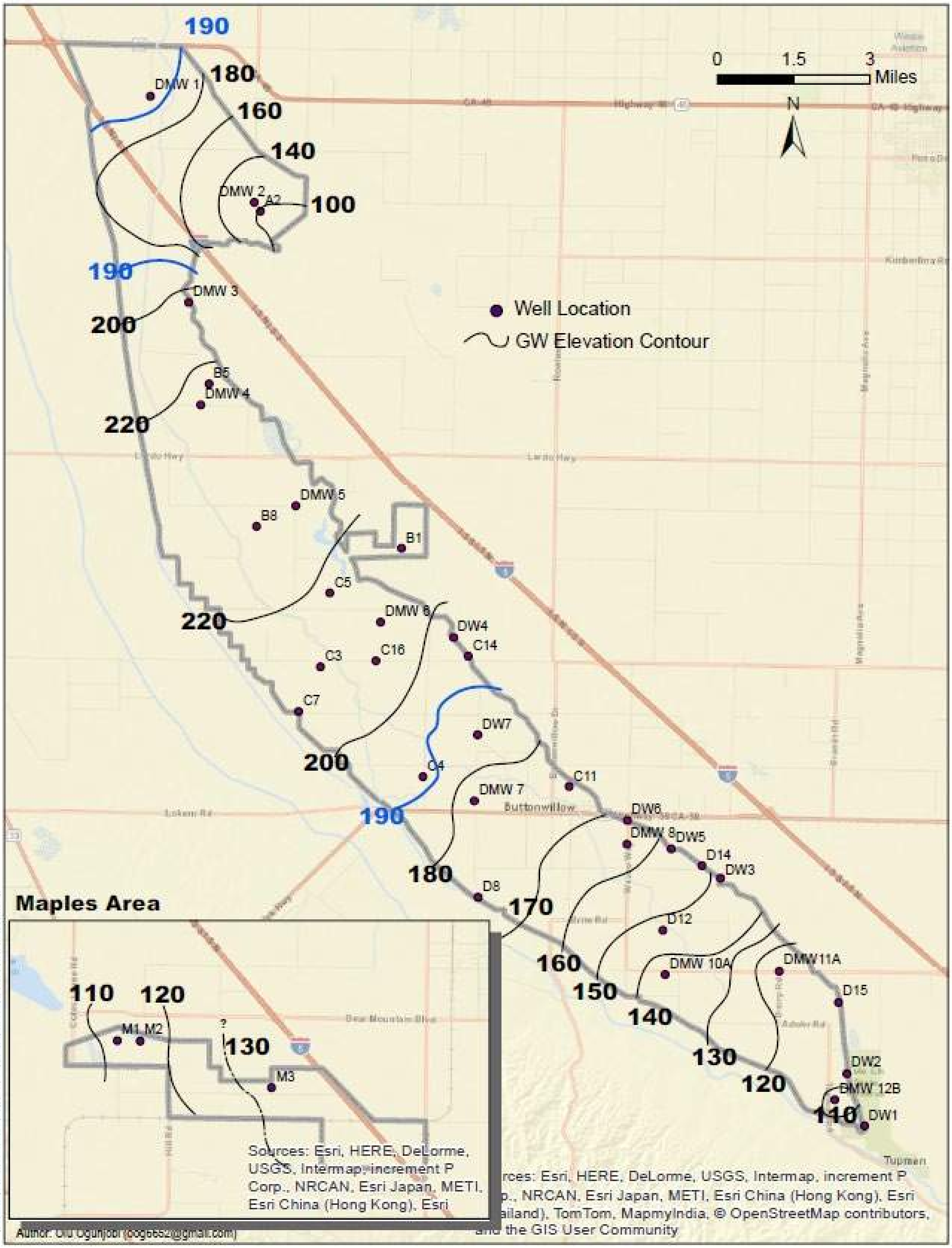


Source: Map provided by BVWSD

Note: Groundwater elevations in feet

July 2021	Figure 9-24
TODD GROUNDWATER	**BVWSD Upper Zone Groundwater Elevation Contour Map Spring 2014**

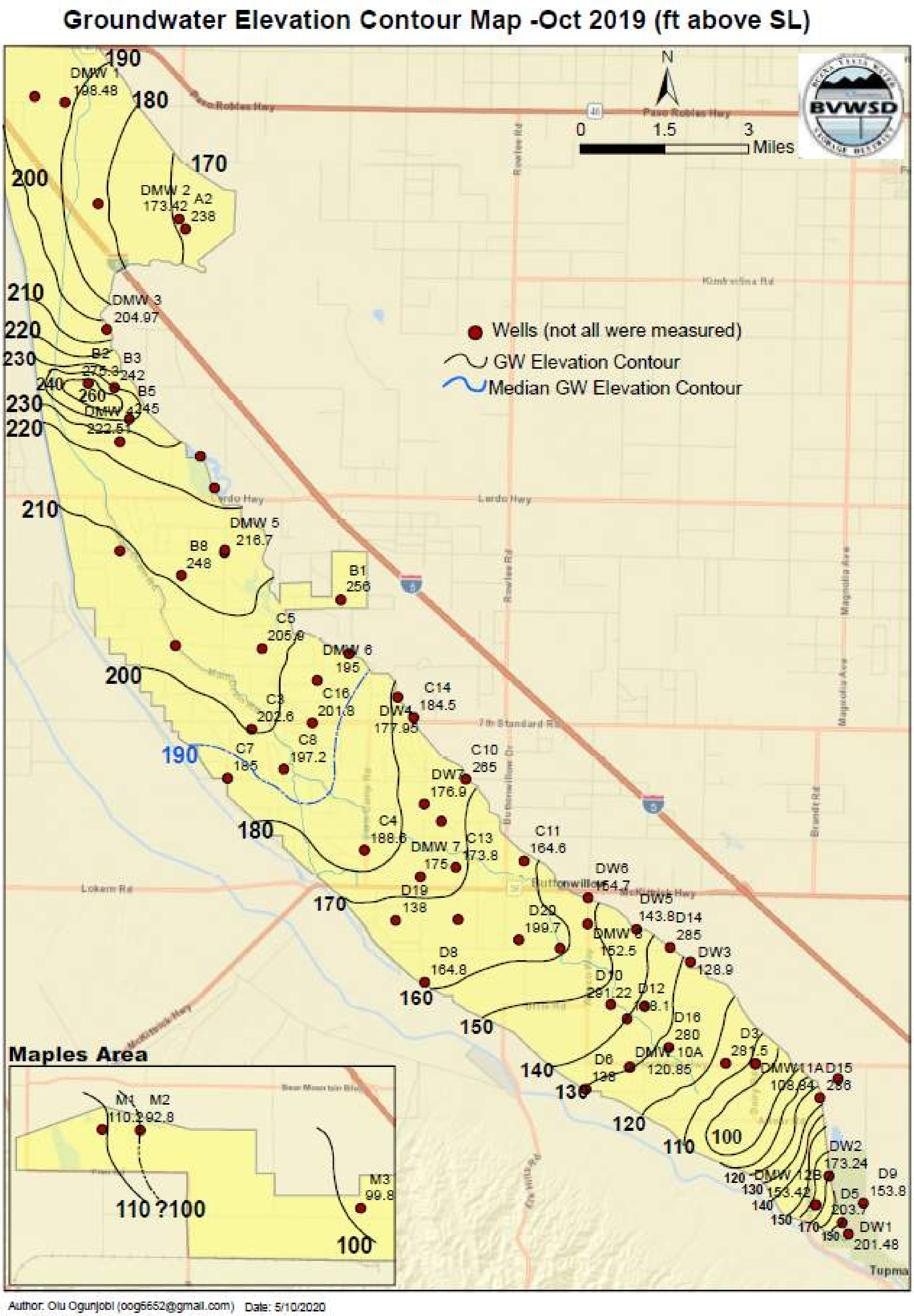
Groundwater Elevation Contour Map- Jan 2015 (ft AMSL)



Source: Map provided by BVWSD

Note: Groundwater elevations in feet

July 2021	Figure 9-25 BVWSD Upper Zone Groundwater Elevation Contour Map January 2015
TODD GROUNDWATER	

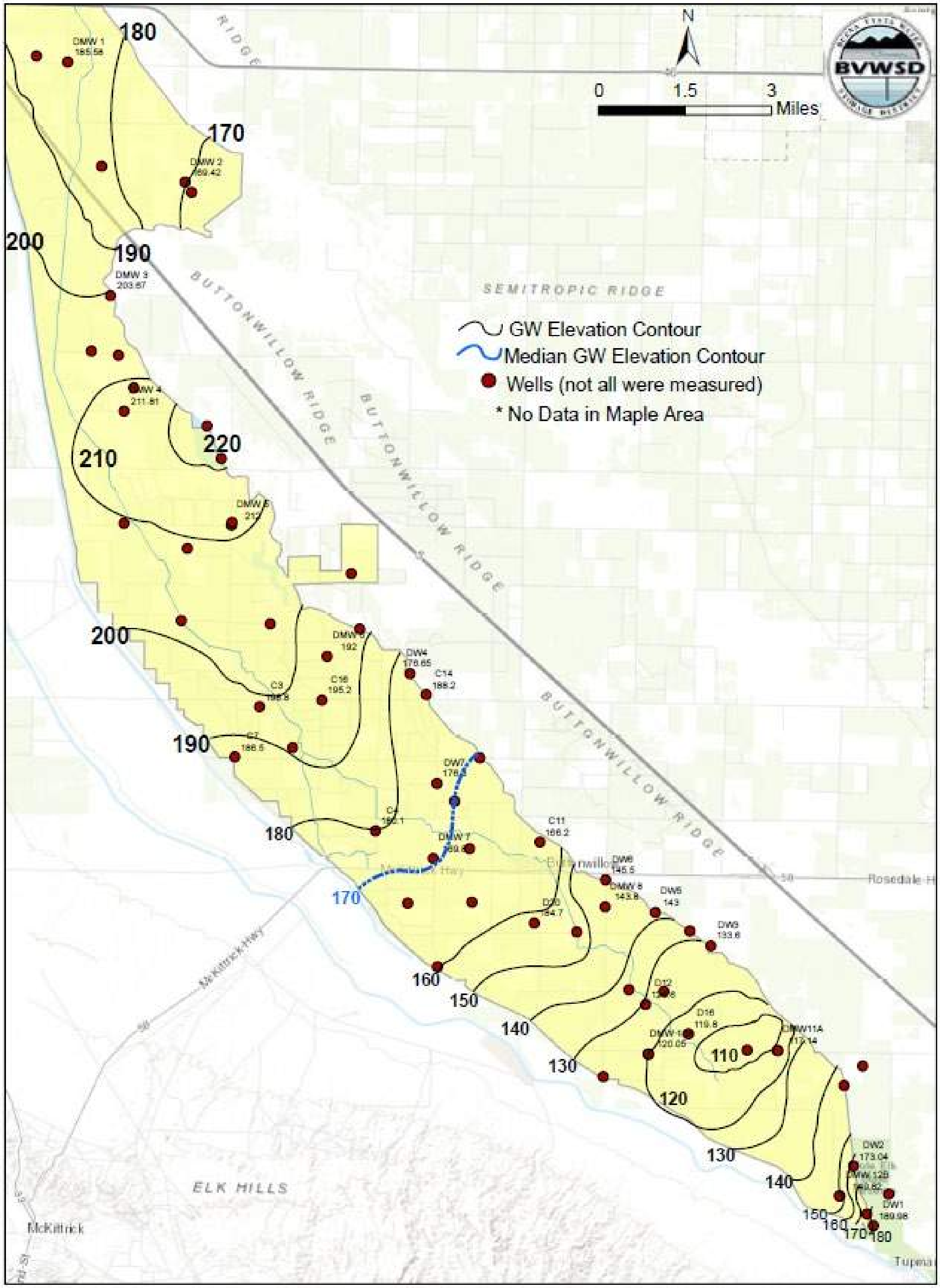


Source: Map provided by BVWSD

Note: Groundwater elevations in feet

July 2021	Figure 9-26 BVWSD Upper Zone Groundwater Elevation Contour Map October 2019
TODD GROUNDWATER	

Groundwater Elevation Contour Map -March 2020 (ft Above SL)



Author: Olu Ogunjobi (oog6652@gmail.com) Date: 8/3/2020

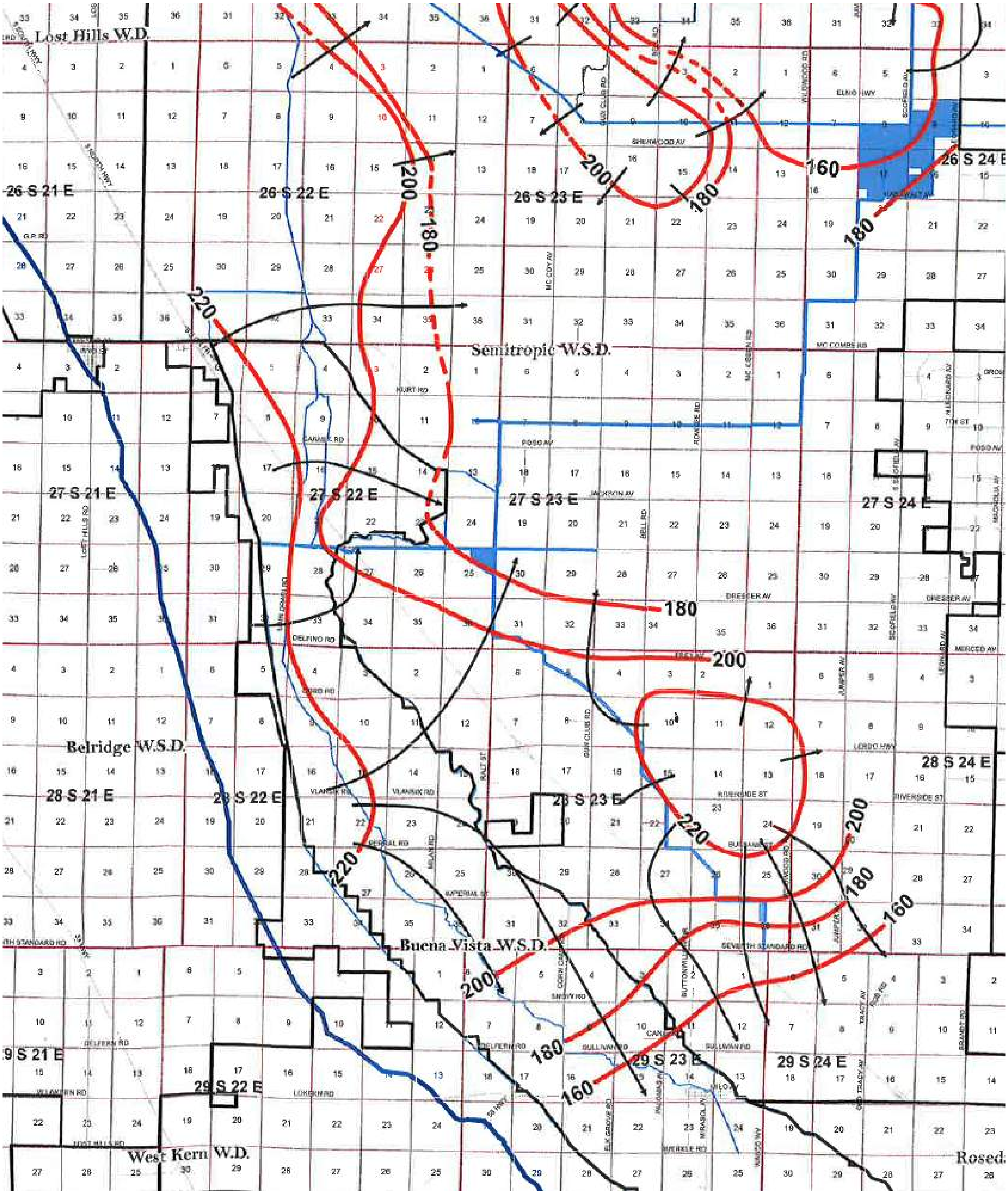
Source: Map provided by BVWSD

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

Figure 9-27
BVWSD Upper Zone Groundwater Elevation Contour Map March 2020



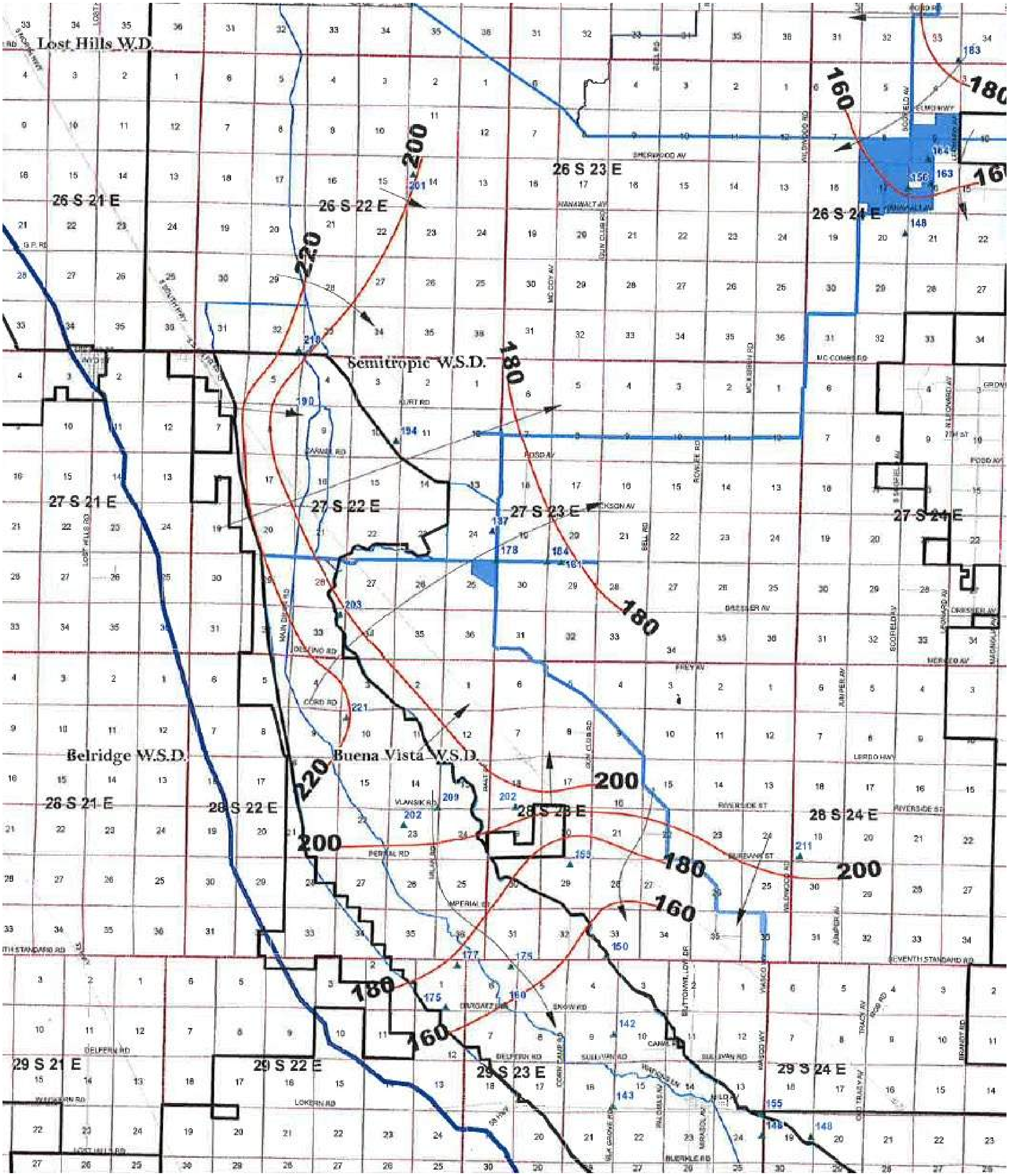
Source: 2020 Biennial Report (Schmidt, 2020)

Note: Groundwater elevations in feet

July 2021

TODD GROUNDWATER

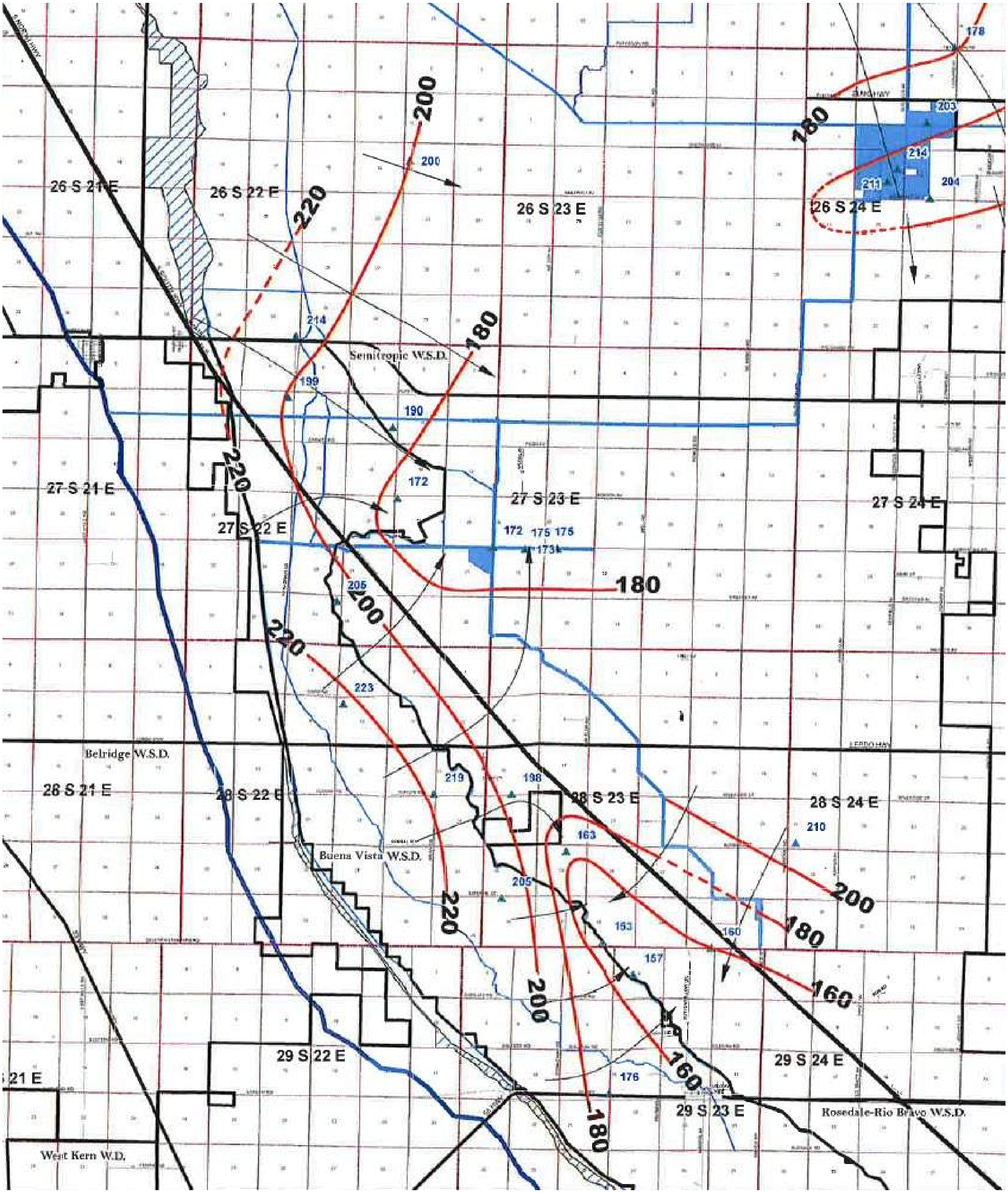
Figure 9-28
SWSD Monitoring Report
Upper Zone GW Elevations
Spring 2017



Source: 2020 Biennial Report (Schmidt, 2020)

Note: Groundwater elevations in feet

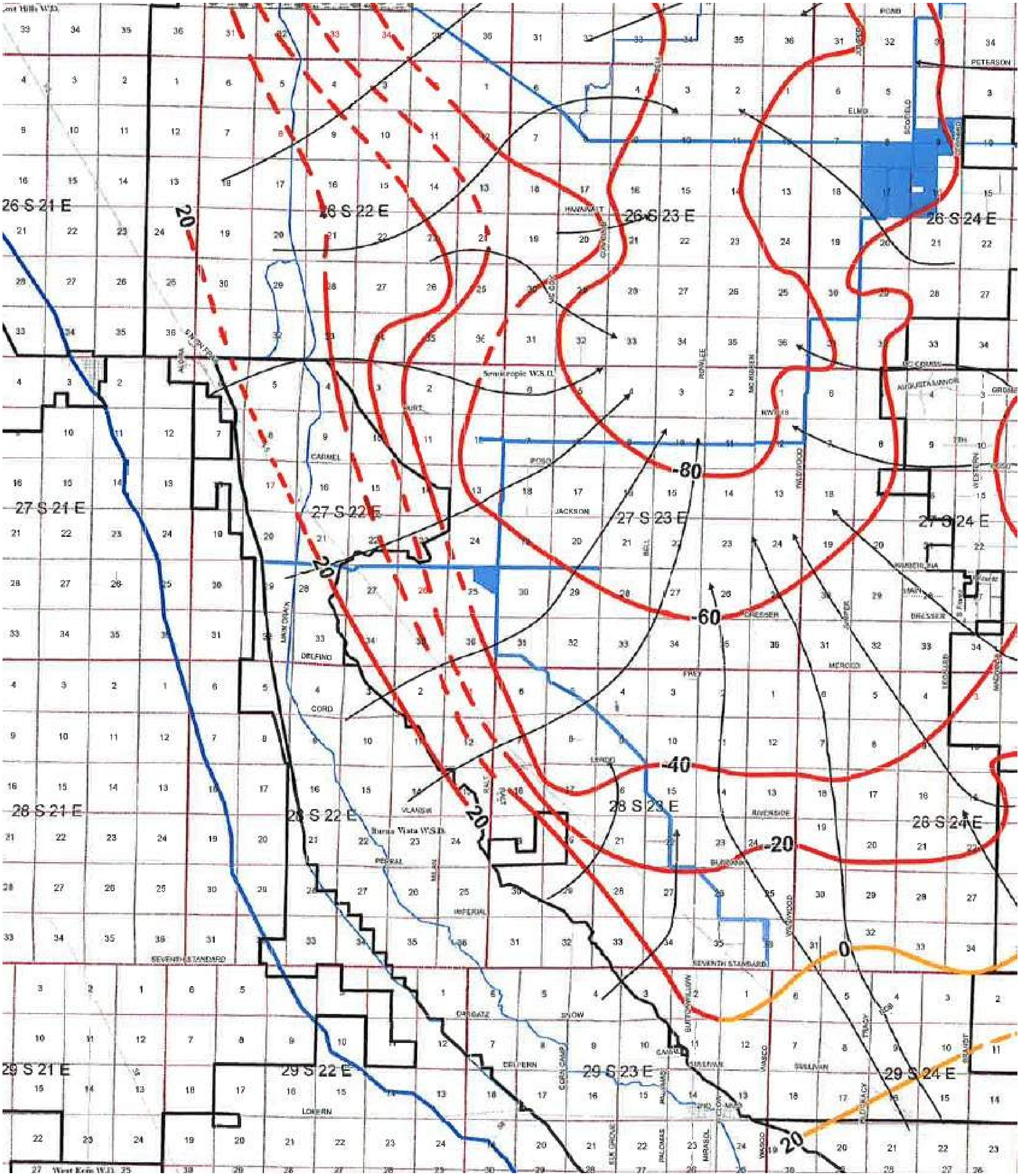
July 2021	Figure 9-29
TODD GROUNDWATER	SWSD Monitoring Report Upper Zone GW Elevations Spring 2018



Source: 2020 Biennial Report (Schmidt, 2020)

Note: Groundwater elevations in feet

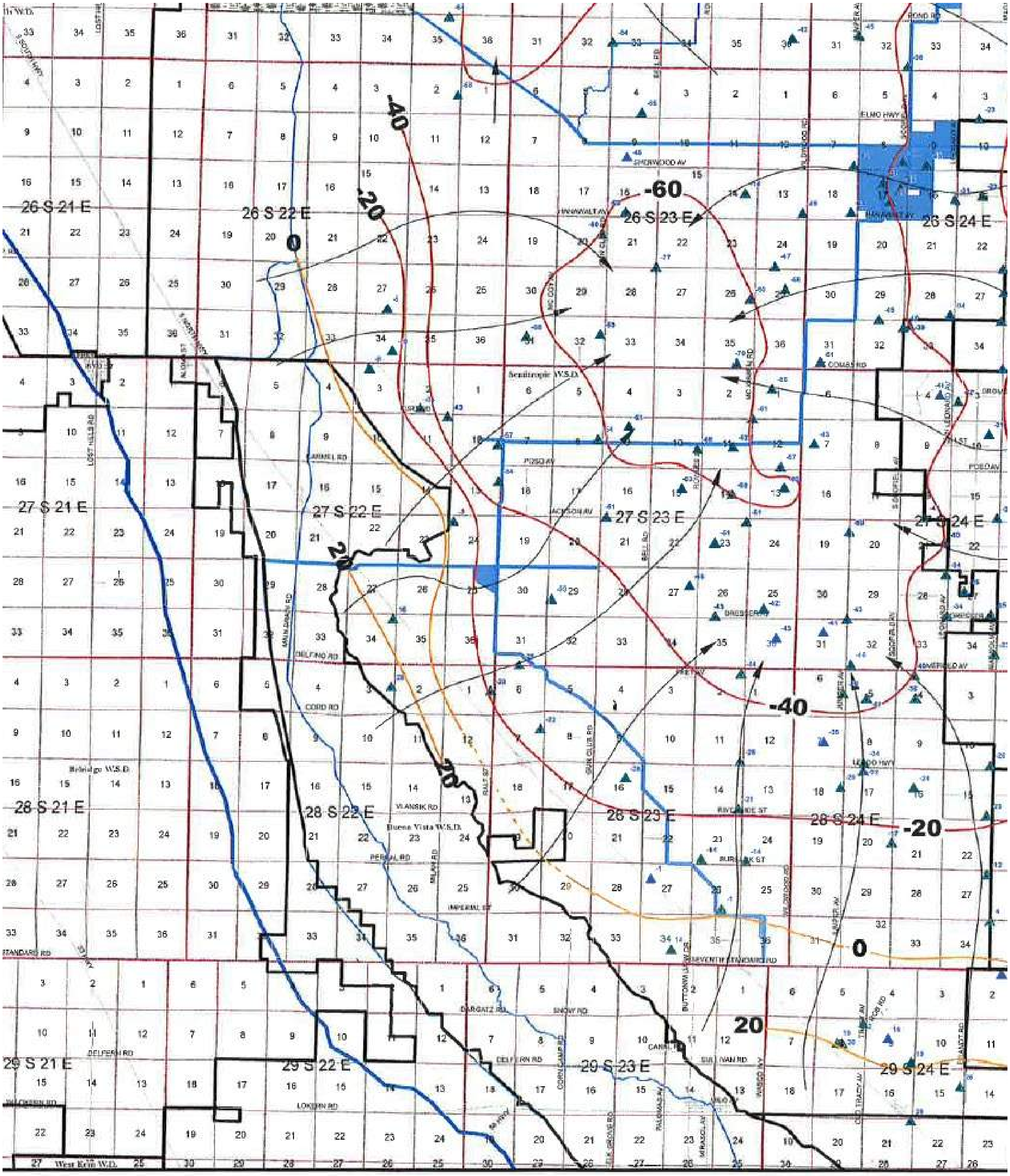
July 2021	Figure 9-30 SWSD Monitoring Report Upper Zone GW Elevations Spring 2019
TODD GROUNDWATER	



Source: 2020 Biennial Report (Schmidt, 2020)

Note: Groundwater elevations in feet

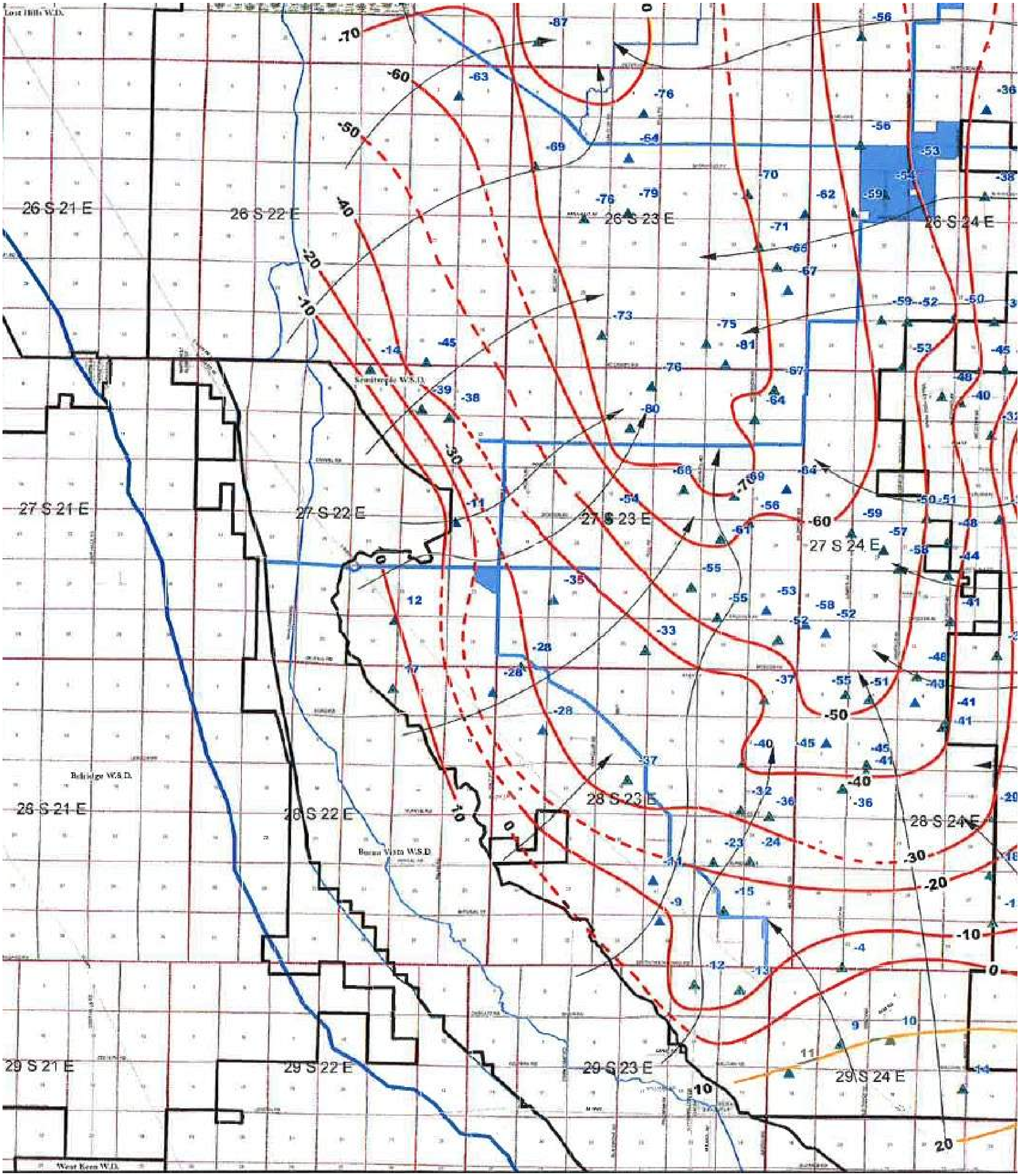
July 2021	Figure 9-31 SWSD Monitoring Report Lower Zone GW Elevations Spring 2018
TODD GROUNDWATER	



Source: 2020 Biennial Report (Schmidt, 2020)

Note: Groundwater elevations in feet

July 2021	Figure 9-32
TODD GROUNDWATER	SWSD Monitoring Report Lower Zone GW Elevations Spring 2018



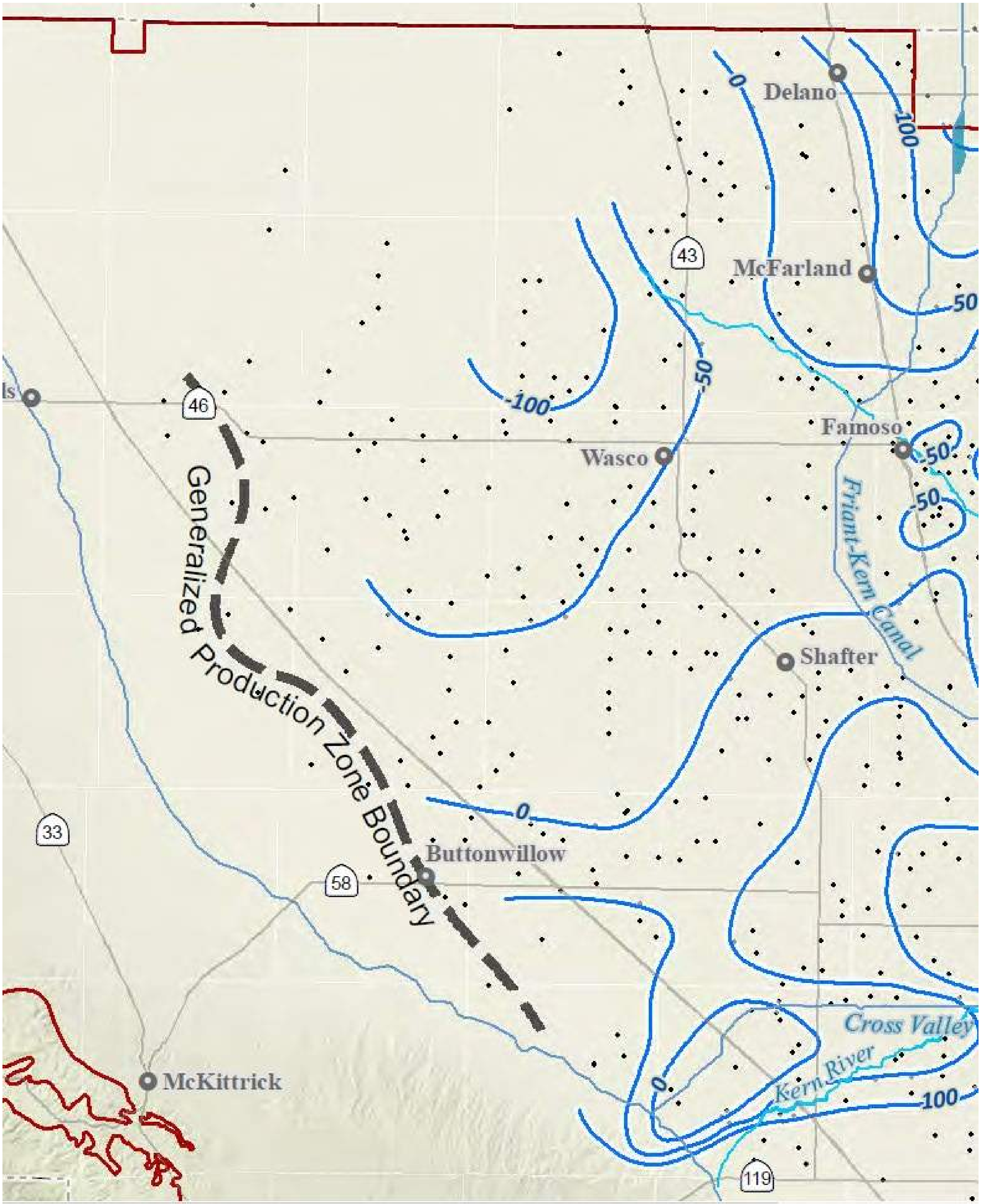
Source: 2020 Biennial Report (Schmidt, 2020)

Note: Groundwater elevations in feet

July 2021	Figure 9-33 SWSD Monitoring Report Lower Zone GW Elevations Spring 2019
TODD GROUNDWATER	

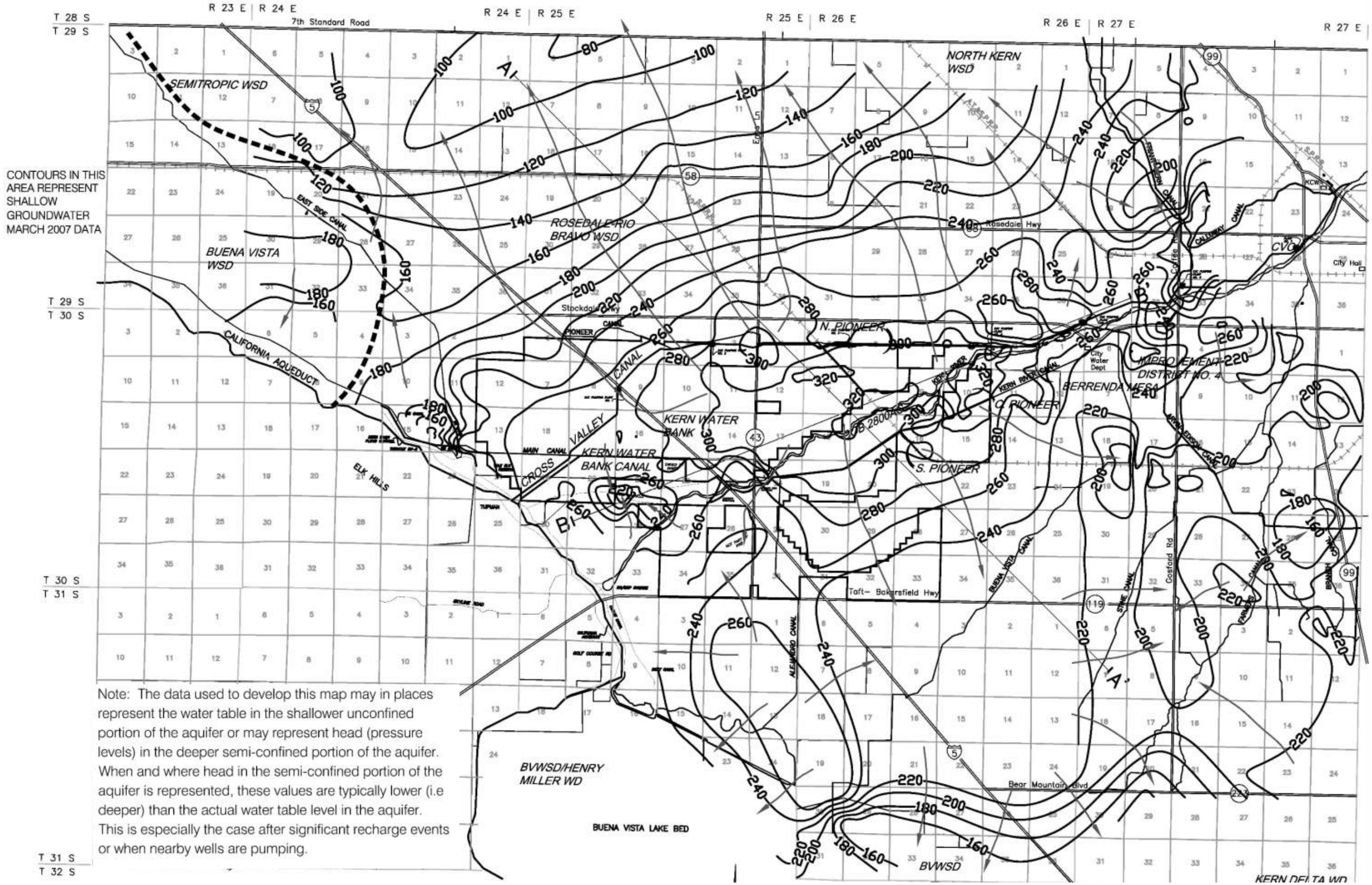
Source: Excerpt from **Figure 2-32 -** *SPRING 2015 UPPER ZONE GROUNDWATER ELEVATIONS – from KGA Umbrella GSP, January 2020 (KGA, 2020)*

July 2021	**Figure 9-34**
TODD GROUNDWATER	**KGA GSP – Upper Aquifer Groundwater Elevation Contour Map - Spring 2015**



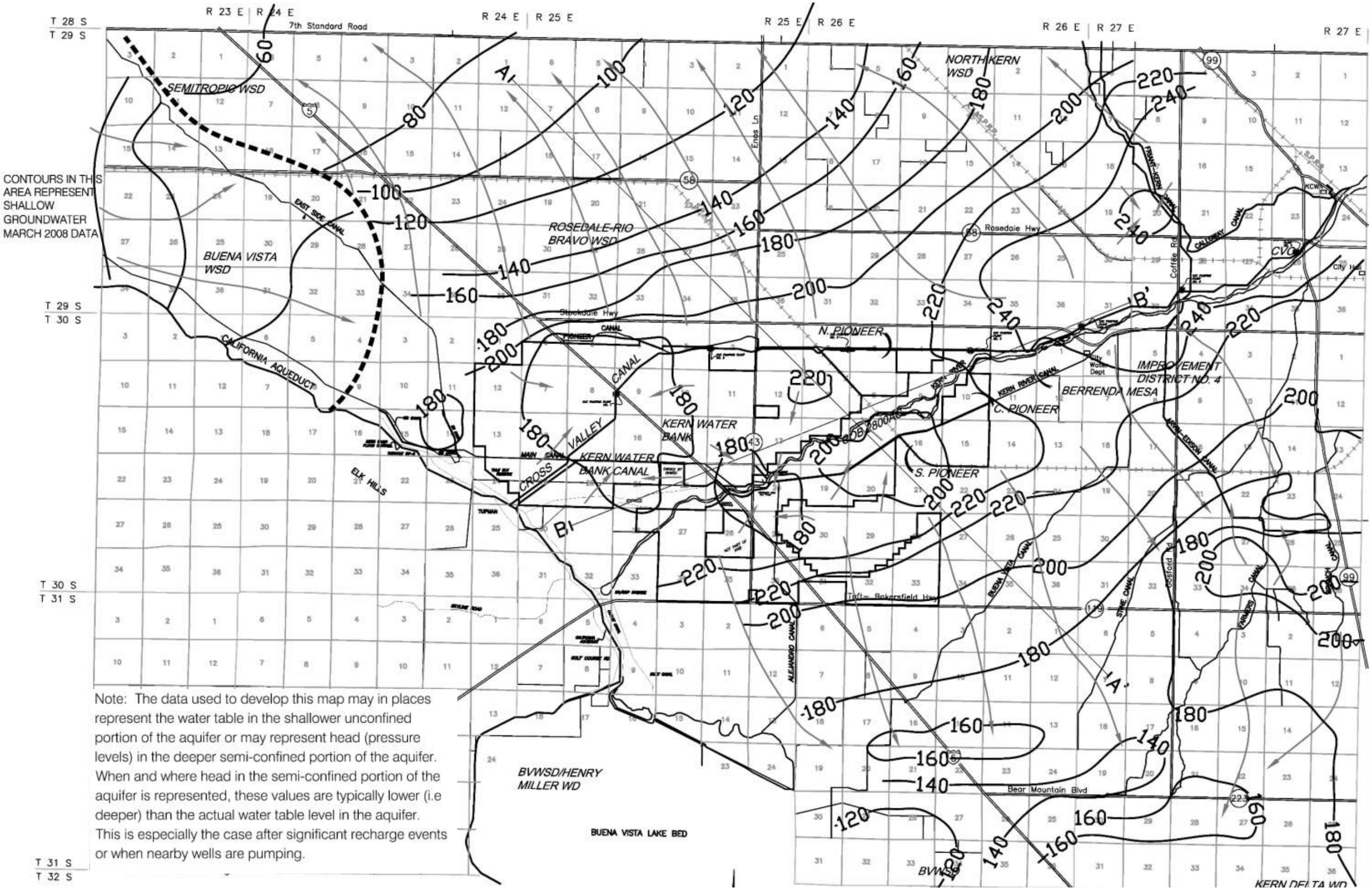
Source: Excerpt from **Figure 2-31 -** *SPRING 2015 REGIONAL GROUNDWATER ELEVATIONS – from KGA Umbrella GSP, January 2020 (KGA, 2020)*

July 2021	Figure 9-35
TODD GROUNDWATER	KGA GSP - Regional Aquifer Groundwater Elevation Contour Map - Spring 2015



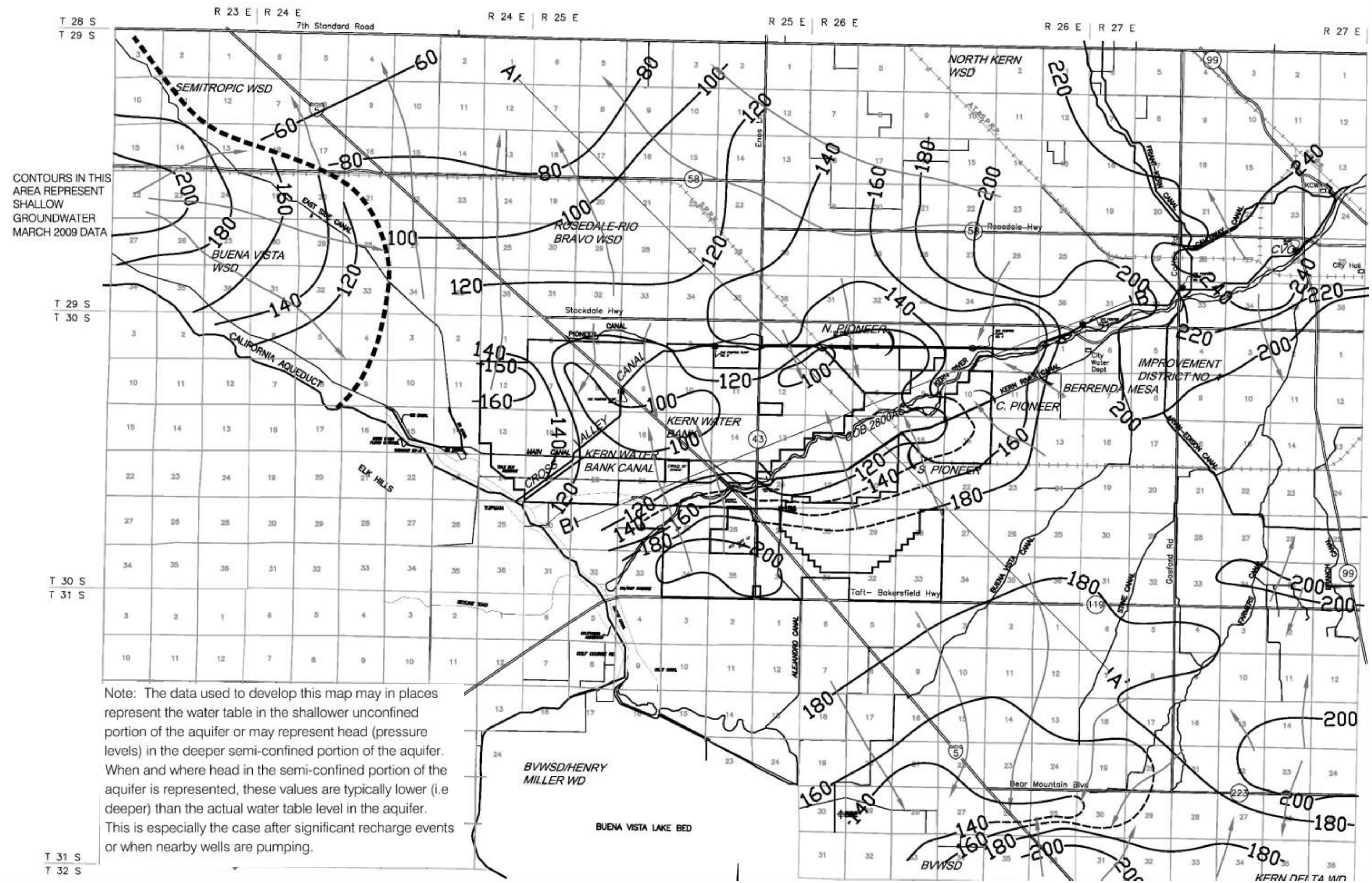
Source: ***"Elevation of Potentiometric Surface Direction of Groundwater Flow Middle Zone Spring 2007",*** **Figure by K.D. Schmidt to the Kern Fan Monitoring Committee, October 2007**

July 2021	Figure 9-36 Kern Fan Monitoring Committee Middle Zone GW Elevations Spring 2007
TODD GROUNDWATER	



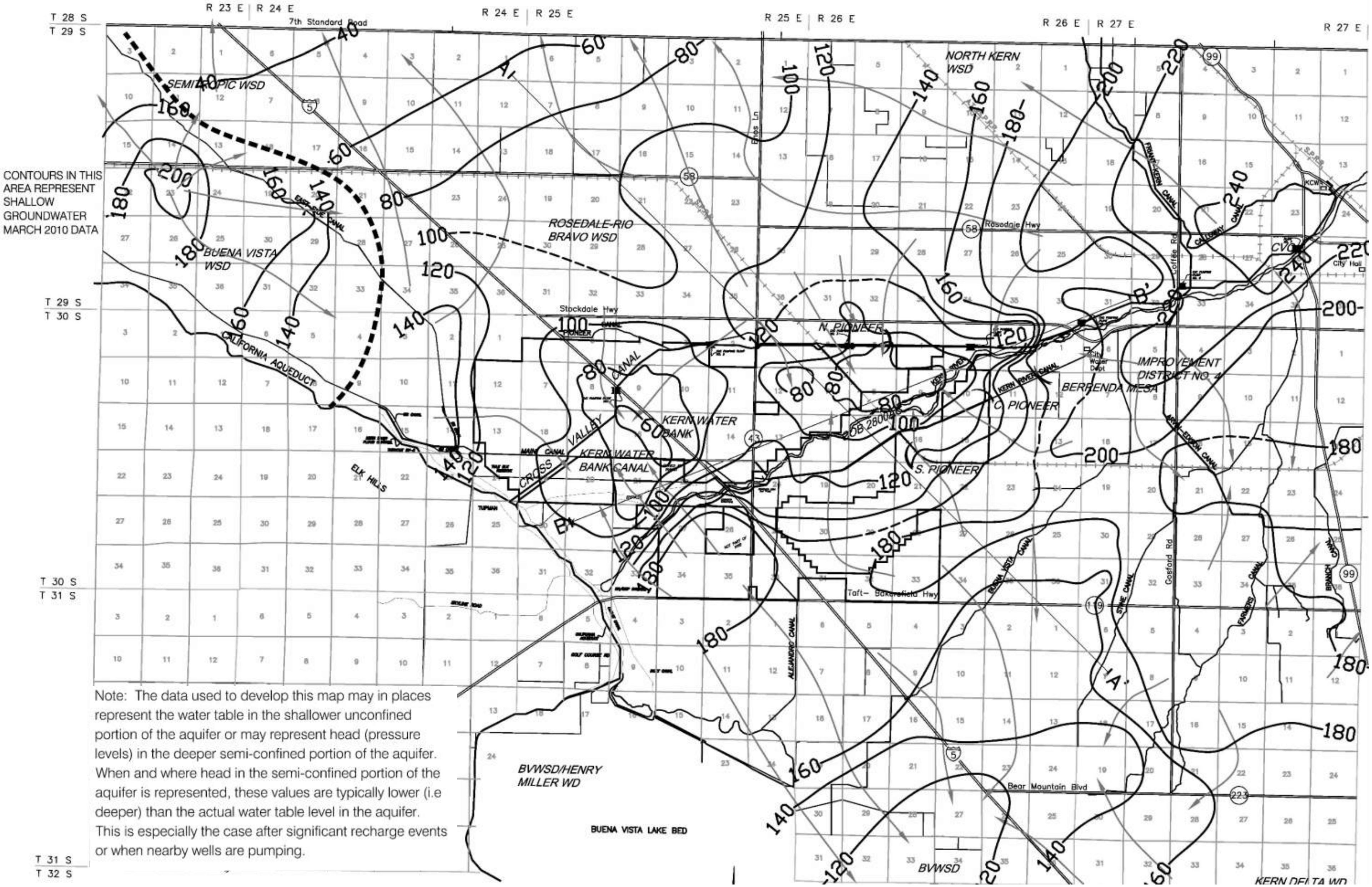
Source: ***"Elevation of Potentiometric Surface Direction of Groundwater Flow Middle Zone Spring 2008",*** **Figure by K.D. Schmidt to the Kern Fan Monitoring Committee, May 21, 2009**

July 2021	Figure 9-37
TODD GROUNDWATER	Kern Fan Monitoring Committee Middle Zone GW Elevations Spring 2008



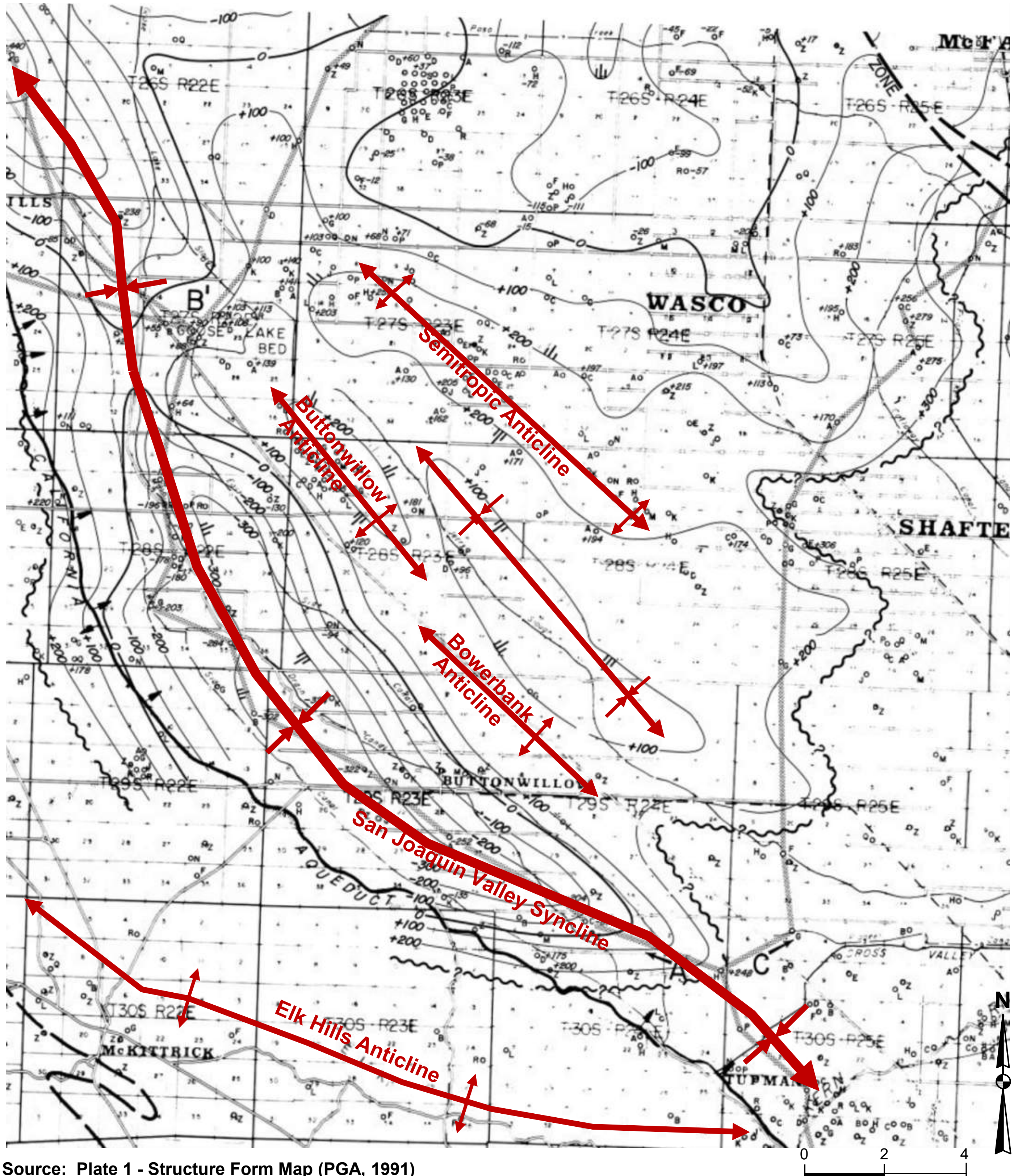
Source: ***"Elevation of Potentiometric Surface Direction of Groundwater Flow Middle Zone Spring 2009",*** **Figure by K.D. Schmidt to the Kern Fan Monitoring Committee, June 27, 2009**

July 2021	Figure 9-38 Kern Fan Monitoring Committee Middle Zone GW Elevations Spring 2009
TODD GROUNDWATER	



Source: ***"Elevation of Potentiometric Surface Direction of Groundwater Flow Middle Zone Spring 2010",*** **Figure by K.D. Schmidt to the Kern Fan Monitoring Committee, June 17, 2010**

July 2021	Figure 9-39 Kern Fan Monitoring Committee Middle Zone GW Elevations Spring 2010
TODD GROUNDWATER	



Source: Plate 1 - Structure Form Map (PGA, 1991)

Note: Contour elevations to base of E-Clay in feet

July 2021	Figure 9-40 Geologic Structure Map of the Base of the E-Clay or Equivalent
TODD GROUNDWATER	

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9.8 Master Response #8 – Beneficial Use of Recovered Groundwater

Several commenters expressed concern about the potential for beneficial use of groundwater recovered by the Proposed Project. The comments claim the proposed project is unlawful because, without disclosure and evaluation of data showing that the water recharged by the Proposed Project will later be extracted and put to beneficial use, it uses water in a wasteful and unreasonable manner. To support this claim, the comments allege that the Project proposes to recharge high-quality surface water in an area where groundwater is documented to be of much poorer quality. It is also alleged that the DEIR concludes that extraction of water in the Palms Area could not meet water quality standards.

As a point of clarification, the Recovery Project does not propose to recharge water. The Recovery Project proposes to supplement the District recovery facilities by adding up to 14 recovery wells. The DEIR provides the sources and quality of the water recharged under existing projects and analyzes the quality of water to be recovered under this Recovery Project. [DEIR Sec. 3.4.1]. The DEIR also states the beneficial uses for which the recovered water will be used [DEIR Sec 2.2.2]. After analysis, the DEIR concludes that the previously recharged water recovered by the Recovery Project and water recharged in the future will be of sufficient quality to put to beneficial use [DEIR 3-59 – 3-60].

The claim that recharging surface water in the groundwater basin for later recovery and use is, "waste and unreasonable use" is not supported by law or fact, *see* California Water Code §1242. An accepted definition of the term "waste", as applied to the use of water, is said to be: "To use needlessly or without valuable result; to employ prodigally or without any considerable return or effect, and to use without serving a purpose." [Meridian, Limited *v.* City and County of San Francisco (1939) 13 Cal.2d 424, 447]. This Recovery Project seeks to supplement existing facilities to recover and utilize previously stored water. This practice is widely accepted as beneficial, as acknowledged in the KGA's Groundwater Sustainability Plan which states:

> In the Kern Subbasin, conjunctive use plays a vital role for all beneficial users to coordinate the use of surface water and groundwater to improve the overall reliability of water supply. Whether it be water used to irrigate crops or to service communities for drinking water purposes, all users benefit from conjunctive use programs throughout the Subbasin. Conjunctive use programs in the Subbasin have been developed to capture and transport wet year surface water for the purpose of groundwater recharge and offset use of groundwater pumping. In turn, this prepares the basin for dry periods when groundwater may be limited. Projects such as interties, pipelines, and recharge basins have been developed, financed, and implemented by districts within the Kern Subbasin to deliver, bank, and return surface water, as well as replenish aquifers to better prepare for and manage during times of dry periods when beneficial users are more reliant on groundwater. …
>
> The majority of the KGA member agencies partake in groundwater banking and recharge programs. The purpose of these programs is to bring surface water into the Subbasin to recharge groundwater levels and better prepare for and manage water during times of dry periods or in wet periods where water is of excess. Groundwater banking refers to recharging specific amounts of water in a

groundwater basin that can later be withdrawn and used by the entity that deposited the water. [**KGA GSP Sec. 2.1.4.2]**

Notwithstanding the clear benefit of recharging and recovery of surface water, this comment is predicated on the false assumption that the subject Recovery Project proposes to recharge water. The DEIR is clear that the Recovery Project proposes to supplement District recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures [DEIR Sec. 2.3.1 & Fig. 2.2]. Seven of the proposed recovery wells will be located on the existing Palms Project, with the remaining wells located on the nearby Recovery Area [DEIR Fig. 2.2].

The Recovery Project will recover water previously banked by the District under existing projects. The environmental impacts of recharging that water was reviewed at the time those various recharge projects were approved, to the extent required by law. As this Recovery Project does not seek to recharge water, concerns raised about the environmental impacts that may be associated with recharge of surface water are not appropriate or relevant for this Recovery Project and further response is not required. Notwithstanding, the claims that the groundwater under the Palms area is of poor quality is not supported by the data presented in this FEIR. Water quality of groundwater in the Recovery Project area is suitable for beneficial uses in its current condition (**Table 9-2**).

We further note that since the surface water quality is of better quality than the groundwater quality (**Table 9-2**), recharge with the surface water will, over time, result in lowering salinity concentrations in the Project area. Since surface water is typically of better quality than native groundwater, quality typically improves with recharge operations. This is commonly the case at recharge operations throughout Kern County. Elevated constituents in the groundwater such as total dissolved solids and sulfate are expected to decrease in the area over time. Changes to the groundwater quality are beneficial to existing and potential uses and users of the groundwater resource.

Table 9-2. Water Quality of Surface Water Used for Recharge and Groundwater in the Recovery Project Area.

Constituent	Drinking Water Standard	CA Aqueduct	Kern River	DMW-13 Middle (Recharge and Recovery Area) - Average	DMW-13 Middle (Recharge and Recovery Area) - Max	East of East Side Canal (Recovery Area) - Average	East of East Side Canal (Recovery Area) - Max
Boron (ppm)	NL = 1	ND – 0.15	ND – 0.13	0.15 Average	0.24 Max	0.2 Average	0.5 Max
Chloride (ppm)	250 - 500	30 – 47	3 – 4	56 Average	62 Max	75 Average	95 Max
Conductivity (μS/cm)	900 – 1,600	246 – 396	119 – 185	981 Average	1100 Max	891 Average	976 Max
Hardness (ppm)	Very Hard > 181	58 – 82	38 – 54	268 Average	320 Max	179 Average	289 Max
Sodium (ppm)	DWR = 200	23 – 44	9 – 17	108 Average	120 Max	99 Average	123 Max
Sulfate (ppm)	250 - 500	22 – 37	8 – 16	330 Average	370 Max	257 Average	334 Max
TDS (ppm)	500 – 1,000	140 – 238	90 – 113	677 Average	750 Max	589 Average	808 Max

Notes: ppm = parts per million; μS/cm = microSiemens per centimeter; NL= notification level; DWR = California Department of Water Resources; TDS = total dissolved solids.

Further, the claim that the Recovery Project cannot extract water from the Palms Area is also not accurate as half of the proposed recovery wells under the Recovery Project will be located on the Palms Project

Area (existing recharge area) [DEIR Fig. 2.2], and water recovered from the recharge area will be suitable for beneficial use with or without blending with water from other sources.

According to BVWSD's Groundwater Sustainability Plan dated January 2020, Section 2.2.4.7 – Primary Use of the Principal Aquifer System, Buena Vista Groundwater Sustainability Agency is almost entirely irrigated farmland with Community of Buttonwillow being the only municipality. Although a large proportion of agricultural demand is supplied by surface water, the Community of Buttonwillow and individual domestic and industrial users rely solely on groundwater, with agricultural operations recharging surface water diverted from the Kern River and SWP. Groundwater users typically rely on shallow unconfined and semi-confined aquifer zones above the Corcoran Clay.

The Water Quality Control Plan for Tulare Lake Basin (Basin Plan), Third Edition (RWQCB 2018) states beneficial uses for the Kern County basin designates all groundwater to be MUN unless specifically exempted by Regional Board. In addition, all groundwater in the Tulare Lake Basin is considered suitable or potentially suitable for MUN and AGR. According to the Basin Plan, the Recovery Project is located in Hydrologic Units 257 and 258, and designated beneficial uses are MUN, AGR, IND and PRO (and REC-1 in Unit 258). Although the blended water quality analysis evaluated the potential use of groundwater for a PIP into the Aqueduct, if it is not approved by DWR, groundwater in the Recovery Project is also suitable for irrigation. As shown in **Table 3-6** of this FEIR, groundwater underlying the Palms Project area meets all primary drinking water standards; a few secondary drinking water standards fall within the range of the recommended and upper limits. Water quality requirements for a PIP are stricter than requirements for irrigation purposes.

The water quality analysis in Section 3.4 of the DEIR identifies only total dissolved solids, conductivity and sulfate as exceeding secondary MCLs. This general analysis did not find major water quality issues with the continued beneficial use of groundwater from landowner wells in the area.

Water has been pumped from wells located within the Palms Recharge area for many years, and this water has been and continues to be suitable for beneficial use. Given the history of beneficial use of water pumped from within the footprint of the recharge area, there are no grounds for the assertion that water pumped from this area is not suitable for beneficial use.

9.9 Master Response # 9 – Clarification of Recovery Project Description

Several commentors wrongly assumed that the subject project includes construction, operation, and maintenance of recharge ponds, based on the mistaken belief that the subject Recovery Project is part of a previously approved and implemented recharge project known as the "Palms (Recharge) Project." The Recovery Project does not propose to recharge any water. The Recovery Project only supplements the District's recovery facilities by adding nine new recovery wells and refurbishing five replacement wells in addition to related conveyance structures.

It should be noted that the Palms Project is just one of the many existing water recharge facilities within the District [DEIR 2.6]. The Palms Project is one of the identified recharge facilities. Environmental review for the Palms Project was completed in 2016 (Palms Project IS / Mitigated Negative Declaration (SCH # 2015121030)) and construction began in 2016. The Palms Project has been in operation since that time and was utilized to recharge water in 2017 and 2019. Water recharged in the Palms Project can be recovered by existing facilities. At the time the Palms Project environmental review was completed, the District did not own the eastern parcels in the Recovery Project Area, nor was it reasonably foreseeable that the District would obtain ownership of those parcels several years later. Including review of the subject Recovery Project with the Palms Project environmental review would have been beyond speculative in 2016 and would not have been appropriate under CEQA.

The environmental impacts of recharging water at the Palms Project were reviewed at the time the project was approved, to the extent required by law. As the Recovery Project does not seek to recharge water, concerns raised about the environmental impacts that may be associated with recharge of surface water are not appropriate or relevant for the Recovery Project environmental documentation. CEQA does not require a re-review of an existing project approved and constructed 5 years prior. Under CEQA, project segmentation may be appropriate when future development is unspecified and uncertain, since "no purpose can be served by requiring an EIR to engage in such speculation as to future environmental consequences." Similarly, when two projects, although physically connected, are neither interdependent nor functionally linked to one another, the Lead Agency may evaluate them in separate CEQA documents, and such treatment would not be considered as inappropriate segmenting.

The Palms Project is a distinct and separate project from the Project that is the subject of the DEIR. The Palms Project has 'independent utility', as clearly demonstrated by the fact that it has been constructed and in operation since 2017. To date, the District has recharged approximately 27,166 AF of water in the Palms Project, 14,164 AF in 2017 and 13,002 AF in 2019. Because the Palms Recharge Project is operated independently and has been implemented separately from the Recovery Project, the two projects are not a single project. The fact that both projects will be utilized by the District to conjunctively manage and use water supplies, does not imply that they are one project for purposes of CEQA.

As described in the DEIR, this Project will be used to recover water from various existing recharge facilities, not just the Palms Project [DEIR ES-iii]. This Recovery Project does not seek to construct additional recharge facilities or recharge water. The project description in the DEIR adequately describes all of the elements associated with this Recovery Project. The potential cumulative impacts associated with this Project and existing projects, such as the Palms Project, are discussed and analyzed in the Cumulative Impact section of the DEIR [DEIR Sec. 4-6].

KWBA Comment #1 also misstates that the Project is "adding a third component – recharge *via* BVWSD's Existing canal system." The District has been recharging water in its canal system for later recovery since the inception of the District in 1927. This is not a new component, and this existing activity pre-dates CEQA.

The District has developed other recharge facilities as well, that are also standalone projects. The District recently completed construction of the Corn Camp Recharge Pond and Daley Ranch Recharge Pond. These are examples of recharge facilities that have been developed without specific recovery facilities, as recovery will be performed with grower's private wells.

The following changes have been made to the DEIR so it is abundantly clear that this Recovery Project is not recharging water, but rather supplementing existing District recovery facilities:

ES-3

A high proportion of recharge in the District takes place through seepage in District-owned facilities, including canals, laterals and recharge basins. In January 2016, the District approved construction of the Palms Project in the southern portion of the Buttonwillow Service Area. The existing Palms Project is a groundwater replenishment and water banking project that covers approximately 1,150 acres and includes features needed to apply surface water for groundwater recharge. Available water supply will continue to be recharged at the Palms Project during wet years. As stated in the Palms Project 2016 Initial Study / Mitigated Negative Declaration (SCH # 2015121030), the District anticipates recharging up to 100,000 acre-feet per year (AFY) through the Palms Project when water supply is available.

This Recovery Project seeks to supplement existing recovery facilities for the recovery of water banked in the District in existing facilities/projects. The District manages recovery so that no more than 90 percent of water banked is recovered. Water recovered by the District will be distributed to District water users or exchanged with other districts or sold to other industrial or municipal users. This Recovery Project may also discharge into the Aqueduct to satisfy existing and future water contracts between the District and other public water agencies.

Sec. 2.3.2

Available water supply will continue to be recharged through seepage in District-owned facilities in wet years. This includes the existing ~~at the~~ Palms Project, where it is anticipated that up to 100,000 AFY can be recharged ~~during wet years~~. ~~The District is anticipated that s recharging up to 100,000 AFY can be recharged through the Palms Project when water supply is available~~. The District will also continue to recharge~~s~~ groundwater through their existing canal system ~~during wet years~~, a District practice for many decades.

As is the current practice, water recovered by the District is distributed to District water users, ~~or~~ exchanged with other districts, or sold to industrial or municipal users. Recovery does not exceed 90 percent of the volume recharged. The Recovery Project will provide additional facilities to continue this practice and will also discharge into the Aqueduct to satisfy existing and future water contracts between the District and other public water agencies.

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11.0 References

References from the Executive Summary

California Department of Fish and Game (CDFG). 2012. Staff Report on Burrowing Owl Mitigation. State of California Natural Resources Agency, Sacramento, CA.

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley*. Available at https://nrm.dfg. ca.gov/FileHandler.ashx?DocumentID=83990&inline. Accessed October 12, 2020.

U.S. Fish and Wildlife Service (USFWS). 2011. Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Sacramento Fish and Wildlife Office, Sacramento, CA.

References from Chapter 1.0 Introduction

No references cited.

References from Chapter 2.0 Project Description

No references cited.

References from Chapter 3.0 Environmental Analysis

No references cited.

References from Chapter 3.2 Biological Resources

Beedy, E. C. 2008. Tricolored Blackbird (Agelaius tricolor). In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, ed. W. D. Shuford and T. Gardali, 437–443. Studies of Western Birds No. 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

California Department of Fish and Game (CDFG). 2007. *California Swainson's Hawk Inventory: 2005–2006. Resource Assessment Program, Final Report*. P0485902. Sacramento, CA. Prepared by UC Davis Wildlife Health Center, Davis, CA.

_____. 2012. *Staff Report on Burrowing Owl Mitigation*. State of California Natural Resources Agency, Sacramento, CA.

California Department of Fish and Wildlife (CDFW). 2015. California Department of Fish and Wildlife (Department) Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015. Available at file:///C:/Users/aking/Downloads/TRBL%20Avoidance%20Measures_Final_2015March20.pdf. Accessed March 31, 2021.

_____. 2020a. Results of electronic database search for sensitive species occurrences. Version 5. Biogeographic Data Branch. Available at https://www.wildlife.ca.gov/Data/CNDDB/Maps-and-Data. Accessed August 31, 2020.

_____. 2020b. *California Sensitive Natural Communities*. Available at https://wildlife.ca.gov/Data/ VegCAMP/Natural-Communities/List#sensitive%20natural%20 communities. Accessed October 23, 2020.

California Natural Diversity Database (CNDDB). 2021. https://wildlife.ca.gov/Data/CNDDB

California Native Plant Society (CNPS). 2020. *Inventory of Rare and Endangered Plants*. Online edition, v8-03 0.38. Sacramento, CA. Available at http://www.rareplants.cnps.org. Accessed August 31, 2020.

Davis, J. N., and C. N. Niemla. 2008. Northern Harrier (Circus cyaneus). In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, ed. W. D. Shuford and T. Gardali, 149–155. Studies of Western Birds No. 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

Endangered Species Recovery Program (ESRP). 2020. Tulare Grasshopper Mouse. Available at https://esrp.csustan.edu/speciesprofiles/profile.php?sp=onto. Accessed October 23, 2020.

GEI Consultants, Inc. (GEI). 2019. File data collected during field reviews of Recovery Project area, 2019.

_____. 2020. File data collected during field reviews of Recovery Project area, 2020.

Gervais, J. A., D. K. Rosenberg, and L. A. Comrack. 2008. Burrowing Owl (Athene cunicularia). In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, ed. W. D. Shuford and T. Gardali, 218–226. Studies of Western Birds No. 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

Humple, D. 2008. Loggerhead Shrike (Lanius ludovicianus). In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, ed. W. D. Shuford and T. Gardali, 271–277. Studies of Western Birds No. 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

Jaramillo, A. 2008. Yellow-headed Blackbird (Xanthocephalus xanthocephalus). In California Bird Species of Special Concern: A Ranked Assessment of Species, Subspecies, and Distinct Populations of Birds of Immediate Conservation Concern in California, ed. W. D. Shuford and T. Gardali, 444–450. Studies of Western Birds No. 1. Western Field Ornithologists, Camarillo, CA, and California Department of Fish and Game, Sacramento, CA.

Kern County. 2009. *General Plan*. Available: https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP_Complete.pdf Accessed: October 2, 2020.

Kern County Planning Department. 2004. Revised Update of the Kern County General Plan and Amendment of the Kern County and Incorporated Cities Integrated Waste Management Plan Siting Element Volume I Recirculated Draft Program Environmental Impact Report. Bakersfield, CA.

_____. 2006. First Public Draft, Kern County Valley Floor Habitat Conservation Plan. Prepared by Garcia and Associates, Lompoc, CA.

Kern Water Bank (KWB). 2019. Kern Water Bank Storage Project within the Kern Groundwater Authority Groundwater Sustainability Plan, January.

McCormick Biological, Inc. 2020. Buena Vista Water Storage District Stockdale Highway Pipelines and Water Wells. Results from Reconnaissance Field Surveys, file report. Russell Sweet, October 27, 2020.

Moore, J. 2000. White-tailed Kite (*Elanus leucurus*). Focal Species Account for the CalPIF Grassland Bird Conservation Plan. Available: http://www.prbo.org/calpif/htmldocs/species/grassland/ wtkiacct.html. Accessed October 23, 2020.

Quinn, J.H. 2008. The ecology of the American badger Taxidea taxus in California: assessing conservation needs on multiple scales. PhD dissertation. University of California, Davis.

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley*. Available at https://nrm.dfg. ca.gov/FileHandler.ashx?DocumentID=83990&inline. Accessed October 12, 2020.

South Valley Biology Consulting, LLC. 2020. *2019 Annual Wildlife Monitoring Report for the Kern Water Bank*. Bakersfield, CA.

_____. 2021 (January 11). Comments on the Draft Environmental Impact Report for the Palms Groundwater Recovery Project - SCH# 2020060315. Prepared by James Jones, Jr.

Sterling Wildlife Biology. 2019. Kern Water Bank Waterbird, Raptor and Upland Bird Survey Report: August 2012 – May 2019. Woodland, CA.

U.S. Fish and Wildlife Service (USFWS). 2010. Tipton kangaroo rat (Dipodomys nitratoides nitratoides) 5-year Review: Summary and Evaluation. Sacramento Fish and Wildlife Office, Sacramento, CA.

_____. 2011. Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Sacramento Fish and Wildlife Office, Sacramento, CA.

_____. 2020a. *IPAC Resource List*. Generated at https://ecos.fws.gov/ipac/. Accessed October 23, 2020.

_____. 2020b. Critical Habitat for Threatened and Endangered Species. Available at: https://fws.maps.arcgis.com/home/webmap/viewer.html?webmap=9d8de5e265ad4fe09893cf75b8dbfb77. Accessed October 23, 2020.

_____. 2020c. *Species Status Assessment for the Blunt-nosed leopard lizard (*Gambelia sila*)*. Version 1.0. Region 10, Sacramento, CA.

_____. 2020d. Species Status Assessment Report for the Giant Kangaroo Rat (Dipodomys ingens). Version 1.0.

_____. 2020e. Species Status Assessment Report for the San Joaquin kit fox (Vulpes macrotis mutica). Version 1.0.

Williams, D. F. 1986. Mammalian species of special concern in California. California Dept. Fish and Game, Wildl. Manag. Div. Admin. Rep. 86-1, Sacramento, 112 pp.

References from Chapter 3.3 Cultural Resources

Bonte, Harmon S. 1930. Bulletin No. 37: Financial and General Data Pertaining to Irrigation, Reclamation Financing and Refinancing Commission. California Division of Water Resources, Sacramento, CA.

Cook, S.F. 1955. The Aboriginal Population of the San Joaquin Valley, California. *Anthropological Papers* 16(2). University of California Press, Berkeley and Los Angeles, CA.

Fredrickson, David A. 1974. Cultural Diversity in Early Central California: A View from the North Coast Ranges. *The Journal of California Anthropology* 1 (1):41-53.

_____. 1994. Spatial and Cultural Units in Central California Archaeology. In *Toward a New Taxonomic Framework for Central California Archaeology: Essays by James A. Bennyhoff and David A. Fredrickson*, edited by Richard E. Hughes, 25-47. Contributions of the University of California Archaeological Research Facility, No. 52. Berkeley: University of California Press.

Galloway, Devin and Francis S. Riley. 1999. "San Joaquin Valley, California: Largest Human Alteration of the Earth's Surface. In *Areas Susceptible to Irrigation-Induced Selenium Contamination of Water and Biota in the Western United States*. U.S. Geological Survey Circular 1180, U.S. Department of the Interior, U.S. Geological Survey, Washington, D.C. Available at https://books.google.com/books?id=If4kAQAAIAAJ&pg=RA2-PA23&lpg=RA2-PA23&dq=Devin+Galloway+and+Francis+S.+Riley&source=bl&ots=-Owuz42zFQ&sig=JHB9zYHXt6MjXYJ0km1GCRnBCC0&hl=en&sa=X&ei=4KNlUcD5DeL1iwK5zoHACg&ved=0CEMQ6AEwAw#v=onepage&q=Devin%20Galloway%20and%20Francis%20S.%20Riley&f=false, accessed October 13, 2020.

Gayton, A.H. 1948. Northern Foothill Yokuts and Western Mono. *Anthropological Records* 10(1).

Giefer, Gerald J., ed. 1967. *Sidney T. Harding: A Life in Western Water Development*. Statewide Water Resources Center and Regional Oral History Office, Bancroft Library, University of California Berkeley, Berkeley, CA.

Hoover, Mildred Brooke and Douglas E. Kyle. 1990. *Historic Spots in California*. Stanford University Press, Stanford, CA.

Hundley, Jr., Norris. 1992. *The Great Thirst: Californians and Water, 1770s-1990s*. University of California Press, Berkeley and Los Angeles, CA.

Kern County Centennial Observance Committee. 1966. *Kern County Centennial Almanac*. Kern County Centennial Observance Committee, Bakersfield, CA

Kern County. 2009. *General Plan*. Available: https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP_Complete.pdf Accessed: October 2, 2020.

Moratto, Michael J. 1984. *California Archaeology*. Academic Press, Inc., San Francisco, CA. National Resource Conservation Service.

Morgan, Wallace M., 1914. *History of Kern County*. California. Historic Record Company, Los Angeles, CA.

Rosenthal, Jeffrey S., Gregory G. White, and Mark Q. Sutton. 2007. The Central Valley: A View from the Catbird's Seat. In *California Prehistory: Colonization, Culture, and Complexity*, edited by Terry L. Jones and Kathryn A. Klar, 147-164. New York, NY: Altamira Press.

Wallace, William J. 1978. Southern Valley Yokuts. In Handbook of North American Indians, Vol. 8, edited by Robert F. Heizer, 448-461. Washington, D.C.: Smithsonian Institution.

References from Chapter 3.4 Hydrology and Water Quality

Ayers, R. S. and D. W. Westcot, Water Quality for Agriculture, Food and Agriculture Organization of the United Nations - Irrigation and Drainage Paper No. 29, Rev. 1, Rome (1985) http://www.fao.org/DOCREP/003/T0234E/T0234E00.htm.

Buena Vista Water Storage District (BVWSD). 2014. Groundwater Management Plan Revised May.

_____. 2016. 2015 Agricultural Water Management Plan. Buttonwillow, CA.

Buena Vista Water Storage District Groundwater Sustainability Agency (BVGSA). 2020. Buena Vista Water Storage District GSA Final Groundwater Sustainability Plan, January.

_____. 2016. 2015 Agricultural Water Management Plan. Buttonwillow, CA.

California Department of Water Resources (DWR). 2016.California's Groundwater, Working Toward Sustainability. Bulletin 118, 2016 Interim Update. https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118

_____. 2019. 2018 Critically Overdrafted Basins Map and List. https://water.ca.gov/Programs/Groundwater-Management/Bulletin-118/Critically-Overdrafted-Basins

_____. 2020. SGMA Basin Prioritization Dashboard. Available: https://gis.water.ca.gov/app/bp-dashboard/final/ Accessed: September 24, 2020.

_____. 2020a. Dam Breach Inundation Map Publisher. https://fmds.water.ca.gov/webgis/?appid=dam_prototype_v2

Central Valley Regional Water Quality Control Board (RWQCB). 1986. Tulare Lake Hydrologic Region Planning Area. https://www.waterboards.ca.gov/rwqcb5/water_issues/basin_plans/tlb_figII_1.pdf Accessed January 29, 2022.

_____. 2018. Water Quality Control Plan for the Tulare Lake Basin Third Edition. Available: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/tlbp_201805.pdf Accessed: October 8, 2020.

Dale, R.H., French, J.J., and Gordon, C.V., 1966. Ground-Water Geology and Hydrology of the Kern River Alluvial-Fan Area, California, USGS Open-File Report.

Endangered Species Act (ESA). 2017. Kern River Water Allocation Plan Draft Supplemental Environmental Impact Report (SCH# 2011041082), prepared for Kern Delta Water District, August 2017.

Environmental Sciences Associates (ESA). 2010. Groundwater Banking Project Environmental Impact Report. Prepared for West Kern Water District. March 2010.

Faunt, C. ed, 2009. Groundwater Availability of the Central Valley, California, USGS Professional Paper 1766.

Faunt, C.C., R.T. Hanson, and K. Belitz. 2009. Development of a Three-Dimensional Model of Sedimentary Texture in Valley-Fill Deposits of Central Valley, California, USA, Hydrogeology Journal (2010) 18: 625–649.

Federal Emergency Management Agency (FEMA). 2011. FEMA Flood Map Service Center. Available: https://msc.fema.gov/portal/search?%20AddressQuery=231%20silva%20avenue%2C%20marysville#searchresultsanchor Accessed: October 8, 2020.

GEI Consultants, Inc. 2017. Memorandum: Water Quality Review of Groundwater Wells for “The Palms” Recovery Project, to Buena Vista Water Storage District, February 17.

Kern County. 2009. *General Plan*. Available: https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP_Complete.pdf Accessed: October 2, 2020.

Kern County Water Agency (KCWA). 2010-2013. Water Supply Reports.

Kern County Water Agency. (KCWA). 2017, 2019, and 2020. Improvement District No. 4, Report on Water Conditions. https://www.kcwa.com/wp-content/uploads/2021/02/ROWC2020_FINAL.pdf Accessed January 2022.

Leake, S. A. 2011. Capture—Rates and Directions of Groundwater Flow Don't Matter!, Ground Water, 49: 456–458.

Reilly, T.E., O.L. Franke, and G.D. Bennett. 1987. The Principle of Superposition and Its Application in Ground-Water Hydraulics, U.S. Geological Survey, Techniques of Water-Resources Investigations, Book 3, Chapter B6.

Todd Groundwater. 2017. Final Groundwater Impacts Assessment Report Kern River Water Allocation Plan, as Appendix D in Supplemental Environmental Impact Report for Kern River Water Allocation Plan, SCH# 2011041082, July, 1,345 pp.

References from Chapter 3.5 Geological Resources

Buena Vista Groundwater Sustainability Agency (BVGSA). 2020. Final Groundwater Sustainability Plan. Kern County Groundwater Subbasin. Buttonwillow, CA.

California Department of Water Resources (DWR). 2016. Monterey Plus Draft Revised EIR – Kern Water Bank Development and Continued Use and Operation. 2016, page 7.8-11.

California Geologic Survey (CGS). 2002. California Geomorphic Provinces, Note 36. Available: https://www.conservation.ca.gov/cgs/Documents/Publications/CGS-Notes/CGS-Note-36.pdf Accessed: October 1, 2020.

_____. 2010. Geologic Map of California. California Geologic Data Map Series. https://maps.conservation.ca.gov/geology/

_____. 2020a. Earthquake Zones of Required Investigation. Available: https://maps.conservation.ca.gov/cgs/EQZApp/app/ Accessed: October 1, 2020.

_____. 2020b. Fault Activity Map of California. Available: https://maps.conservation.ca.gov/cgs/fam/ Accessed: October 1, 2020.

_____. 2020c. CGS Information Warehouse: Landslides. Available: https://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps Accessed: October 1, 2020.

Department of Conservation (DOC). 1964. Geologic Map of California, Bakersfield Sheet. Available: https://www.conservation.ca.gov/cgs/Documents/Publications/Geologic-Atlas-Maps/GAM_002-Map.pdf Accessed: October 2, 2020.

Kern County. 2009. General Plan. Available: https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP_Complete.pdf Accessed: October 2, 2020.

Kern Groundwater Authority Groundwater Sustainability Plan (KGAGSP). 2020. Section 3.2.5 Undesirable Result for Land Subsidence p. 173.

Natural Resources Conservation Service (NRCS). 2020. Custom Soil Resource Report for Kern County, California, Northwestern Part. Available: https://websoilsurvey.sc.egov.usda.gov/WssProduct/4nvqzr1akew50zcuzjmcz3rh/GN_00000/20201002_12562612205_57_Soil_Report.pdf Accessed: October 2, 2020.

Society of Vertebrate Paleontology. 1995. Assessment and Mitigation of Adverse Impacts to Paleontological Resources: Standard Guidelines. SVP News Bulletin 163.

_____. 2010. Standard Procedures for the Assessment and Mitigation of Adverse Impacts to Paleontological Resources. Society of Vertebrate Paleontology, p. 1-11

References from Chapter 4.0 Other CEQA Required Sections

Henry Miller Groundwater Sustainability Agency (HMGSA). 2020. Henry Miller Water District Groundwater Sustainability Plan, Kern County Subbasin, January.

Kern County. 2009. *General Plan*. Available: https://psbweb.co.kern.ca.us/planning/pdfs/kcgp/KCGP_Complete.pdf Accessed: October 2, 2020.

Kern Groundwater Authority (KGA). 2020. Kern Groundwater Authority Groundwater Sustainability Plan, January.

Kern River Groundwater Sustainability Agency (KRGSA). 2020. Final Groundwater Sustainability Plan, Kern River Groundwater Sustainability Agency, January.

Maley, M. and C. Brush. 2020. SGMA Water Budget Development using C2VSimFG-Kern in support of the Kern County Subbasin Groundwater Sustainability Plans, included as Appendices 2 and 4 in the Kern County Subbasin Coordination Agreement. Available at: https://sgma.water.ca.gov/portal/gsp/coordagreement/preview/11.

Rosedale-Rio Bravo Water Storage District (RRBWSD). 2019. Groundwater Sustainability Plan chapter for the Rosedale-Rio Bravo Management Area (for inclusion in the Kern Groundwater Authority Groundwater Sustainability Plan), December.

West Kern Water District (WKWD). 2019. Chapter Groundwater Sustainability Plan (for inclusion in the Kern Groundwater Authority Groundwater Sustainability Plan), December.

References from Chapter 5. Alternatives to the Proposed Project

No references cited.

References from Chapter 6. Mitigation Summary

California Department of Fish and Game (CDFG). 2012. Staff Report on Burrowing Owl Mitigation. State of California Natural Resources Agency, Sacramento, CA.

Swainson's Hawk Technical Advisory Committee. 2000. *Recommended Timing and Methodology for Swainson's Hawk Nesting Surveys in California's Central Valley*. Available at https://nrm.dfg. ca.gov/FileHandler.ashx?DocumentID=83990&inline. Accessed October 12, 2020.

U.S. Fish and Wildlife Service (USFWS). 2011. Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Sacramento Fish and Wildlife Office, Sacramento, CA.

References from Chapter 7. Comment Letters Received on Draft EIR

No references cited.

References from Chapter 8. Response to Comments

Buena Vista Water Storage District Groundwater Sustainability Agency (BVGSA). 2020a. Buena Vista Water Storage District GSA Final Groundwater Sustainability Plan, January. Section 5 – Minimum Thresholds, Measurable Objectives, and Interim Milestones.

_____. 2020b. Section 7.4 – Adaptive Management Actions Planned as Part of GSP.

California Department of Fish and Game (CDFG). 2012. Staff Report on Burrowing Owl Mitigation. State of California Natural Resources Agency, Sacramento, CA.

California Department of Fish and Wildlife (CDFW). 2015. California Department of Fish and Wildlife (Department) Staff Guidance Regarding Avoidance of Impacts to Tricolored Blackbird Breeding Colonies on Agricultural Fields in 2015. Available at file:///C:/Users/aking/Downloads/TRBL%20Avoidance%20Measures_Final_2015March20.pdf. Accessed March 31, 2021.

_____. 2017. Draft Best Management Practices for the Sustainable Management of Groundwater – Sustainable Management Practices, 2017 p. 5.

California Department of Water Resources (DWR). 2016. Monterey Plus Draft Revised EIR – Kern Water Bank Development and Continued Use and Operation. 2016, page 7.8-11.

GEI Consultants, Inc. 2017. Memorandum: Water Quality Review of Groundwater Wells for "The Palms" Recovery Project, to Buena Vista Water Storage District, February 17.

GEI Consultants, Inc. (GEI). 2020. Draft Environmental Impact Report for the Palms Groundwater Recovery Project State Clearinghouse Number 2020060315. Prepared for Buena Vista Water Storage District, Buttonwillow, CA.

Kern Groundwater Authority Groundwater Sustainability Plan (KGAGSP). 2020a. Section 3.2.5 Undesirable Result for Land Subsidence p. 173.

_____. 2020b. Section 3.2.5 Undesirable Result for Land Subsidence p. 174.

Kern Water Bank Authority (KWBA). 2019. Groundwater Sustainability Plan. Section 4.2.4 Subsidence, p.37; Section 2.2.2.11 Historic Subsidence Monitoring, p.27; Section 3.2.4 Land Subsidence, p.34.

U.S. Fish and Wildlife Service (USFWS). 2011. Standardized Recommendations for Protection of the Endangered San Joaquin Kit Fox Prior to or During Ground Disturbance. Sacramento Fish and Wildlife Office, Sacramento, CA.

West Kern Water District (WKWD). 2019. Chapter Groundwater Sustainability Plan (for inclusion in the Kern Groundwater Authority Groundwater Sustainability Plan), December.

References from Chapter 9. Master Responses to Comments

Bartow, J.A, 1991, The Cenozoic Evolution of the San Joaquin Valley, California, U.S. Geological Survey Professional Paper 1501.

Bear, J. and A. Verruijt. 1987. Modeling Groundwater Flow and Pollution (Theory and Applications of Transport in Porous Media, 2). D. Riedel Publishing Company, Dordrecht, Holland.

Bouwer, H. 1978. Groundwater Hydrology, McGraw-Hill Book, New York, 480.

Buena Vista Water Storage District (BVWSD), 2014, Groundwater Management Plan, report prepared by Provost & Pritchard Consulting Group, Revised May 2014.

Buena Vista Water Storage District Groundwater Sustainability Agency (BVGSA), 2020, Buena Vista Water Storage District GSA Final Groundwater Sustainability Plan, January 2020.

California Department of Water Resources (DWR). 2017. BMP 6 Sustainable Management Practices – Draft. https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-6-Sustainable-Management-Criteria-DRAFT_ay_19.pdf

Central Valley Regional Water Quality Control Board (RWQCB). 2018. Water Quality Control Plan for the Tulare Lake Basin Third Edition. Available: https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/tlbp_201805.pdf Accessed: October 8, 2020.

Croft, M.G. 1972. Subsurface Geology of the Later Tertiary and Quaternary Water-Bearing Deposits of the Southern Part of the San Joaquin Valley, California. U.S. Geological Survey Water-Supply Paper 1999-H.

Durbin et al. 2008. Durbin, T., D. Delemos, and A. Rajagopal-Durbin. 2008. Application of Superposition with Nonlinear Head-Dependent Fluxes. Ground water. 46. 251-8. 10.1111/j.1745-6584.2007.00408.x.

Environmental Sciences Associates (ESA). 2010. Groundwater Banking Project Environmental Impact Report. Prepared for West Kern Water District. March 2010.

Environmental Simulations, Inc. (ESI). 2020. Groundwater Vistas. Groundwater Modeling Software. https://www.groundwatermodels.com/ESI_Software.php

Faunt, C. ed, 2009. Groundwater Availability of the Central Valley, California, USGS Professional Paper 1766.

Faunt, C., R.T. Hanson, K. Belitz, W. Schmid, S. Predmore, D. L. Rewis, and K. McPherson, 2009, Groundwater availability of the Central Valley Aquifer, California. USGS Professional Paper 1766. Reston, Va.: United States Department of the Interior, Geological Survey.

Freeze. R. A. and J. A. Cherry. 1979. Groundwater. Prentice-Hall, Englewood Cliffs, New Jersey.

GEI Consultants, Inc. 2017. Memorandum: Water Quality Review of Groundwater Wells for "The Palms" Recovery Project, to Buena Vista Water Storage District, February 17.

GEI Consultants, Inc. (GEI). 2020. Draft Environmental Impact Report for the Palms Groundwater Recovery Project State Clearinghouse Number 2020060315. Prepared for Buena Vista Water Storage District, Buttonwillow, CA.

Kenneth D. Schmidt and Associates (Schmidt), 2020, Biennial Groundwater Monitoring Report For The Semitropic Water Storage District Water Banking Project (2017-2018), report by Kenneth D. Schmidt and Associates to Semitropic Water Bank Monitoring Committee, May 2020.

Kern Fan Monitoring Committee (KFMC), 2021, Kern Fan Monitoring Committee Hydrographs, interactive PowerPoint file distributed by Kern County Water Agency, April 2021.

Kern Groundwater Authority (KGA JPA). 2019. Second Amended and Restated Joint Powers Agreement for the Tulare Lake Basin Portions of Kern County, effective July 22, 2019.

Kern Groundwater Authority (KGA), 2020, Groundwater Sustainability Plan, Kern County Subbasin, January 2020.

Kern Water Bank Authority (KWBA), 2019, Kern Water Bank Storage Project Within the Kern Groundwater Authority Groundwater Sustainability Plan, report to DWR, December 13, 2019.

Law, A.M. and W.D. Kelton. 2000. Simulation Modeling and Analysis. McGraw-Hill, Boston.

Leake, S. A. 2011. Capture—Rates and Directions of Groundwater Flow Don't Matter!, Ground Water, 49: 456–458.

Leake, S.A. and D.V. Claar. 1999. Procedures and Computer Programs for Telescopic Mesh Refinement Using MODFLOW. U.S. Geological Survey Open File Report 99-238. Tucson, Arizona.

Morrison. T. 2006. Basic Groundwater Hydrology and Evaluation Procedures. Training Manual. Prepared for the New Mexico Office of the State Engineer.

Pacific Geotechnical Associates, Inc. (PGA). 1991. Study of the Regional Geologic Structure Related to Groundwater Aquifers in the Southern San Joaquin Valley Groundwater Basin, Kern County, California. Prepared for Kern County Water Agency. September

Page, R.W. 1983. Geology of the Tulare Formation and Other Continental Deposits, Kettleman City Area, San Joaquin Valley, California, with a Section on Groundwater Management Considerations and Use of Texture Maps. USGS Water Resources Investigations Report 83-4000.

Page, R.W. 1986. Geology of the Fresh Groundwater Basin of the Central Valley, California with Texture Maps and Cross Sections. Professional Paper 1401-C.

Reilly, T.E., Franke, O.L., and Bennett, G.D., 1984, The Principle of Superposition and Its Application in Ground-water Hydraulics: U.S. Geological Survey Open-File Report 84-459, 43 p

Reilly, T.E., O.L. Franke, and G.D. Bennett, 1987. The Principle of Superposition and Its Application in Ground-Water Hydraulics, U.S. Geological Survey, Techniques of Water-Resources Investigations, Book 3, Chapter B6, 28p., http://pubs.usgs.gov/twri/twri3-b6/pdf/twri_3-B6_a.pdf.

Reilly, T.E., and Harbaugh, A.W., 2004, Guidelines for evaluating ground-water flow models: U.S. Geological Survey Scientific Investigations Report 2004-5038, 30 p.

Rosedale-Rio Bravo Water Storage District (RRBWSD). 2019. Groundwater Sustainability Plan chapter for the Rosedale-Rio Bravo Management Area (for inclusion in the Kern Groundwater Authority Groundwater Sustainability Plan), December.

Semitropic Water Storage District Groundwater Sustainability Agency (SWSD GSA), 2020, Semitropic Water Storage District Groundwater Sustainability Agency 2020 Groundwater Sustainability Plan Kern County, CA, January 2020.

Sierra Scientific Services, 2013, The Geology and Groundwater Hydrology of the Buena Vista Water Storage District, Buttonwillow, CA, including Descriptions of Relevant Facilities and Operations.

Takahashi, S. and R.C. Peralta. 1995.Optimal perennial yield planning for complex non-linear aquifers: Methods and examples. Advances in Water Resources 18:49-62.

Todd, D.K., and L. W. Mays. 2004. Groundwater Hydrology, 3rd Edition. Wiley.

Todd Groundwater, 2018, Kern Fan Model Final Report, report to Kern Fan Monitoring Committee, February 2018.

_____.2020. Kern County Subbasin Groundwater Sustainability Plans (GSPs) Second Annual Report Water Year 2020, report to DWR, April 1, 2021.

Wood, P.R. and G. H. Davis, 1959. Geological Survey Water Supply Paper 1457, Ground-water conditions in the Avenal-McKittrick area, Kings and Kern Counties, California. Prepared in coordination with the California Department of Water Resources

Wood, P.R. and R.H. Dale, 1964, Geology and Ground-Water Features of the Edison-Maricopa Area, Kern County, California, USGS Water-Supply Paper 1656

Wood, P.R. and R.H. Dale, 1964, Geology and Ground-Water Features of the Edison-Maricopa Area, Kern County, California, USGS Water-Supply Paper 1656

Wood, P.R. and G. H. Davis, 1959. Geological Survey Water Supply Paper 1457, Ground-water conditions in the Avenal-McKittrick area, Kings and Kern counties, California. Prepared in coordination with the California Department of Water Resources

References from Chapter 10. Report Preparers and Reviewers

No references cited.