

LOCKE ROAD
CANNABIS FARM PROJECT
BIOLOGICAL MEMORANDUM



JULY 2020

PREPARED FOR:

NRC Equity Fund 1
12470 Locke Road
Lockeford, CA 95237

PREPARED BY:

Analytical Environmental Services
1801 7th Street, Suite 100
Sacramento, CA 95811
(916) 447-3479
www.analyticalcorp.com



LOCKE ROAD
CANNABIS FARM PROJECT
BIOLOGICAL MEMORANDUM

JULY 2020

PREPARED FOR:

NRC Equity Fund 1
12470 Locke Road
Lockeford, CA 95237

PREPARED BY:

Analytical Environmental Services
1801 7th Street, Suite 100
Sacramento, CA 95811
(916) 447-3479
www.analyticalcorp.com



TABLE OF CONTENTS

BIOLOGICAL RESOURCES ASSESSMENT LOCKE ROAD CANNABIS FARM PROJECT

1.0	INTRODUCTION	1
2.0	METHODOLOGY	1
3.0	ENVIRONMENTAL SETTING	1
4.0	RESULTS.....	6
5.0	CONCLUSIONS	7
6.0	REFERENCES	7

FIGURES

Figure 1	Regional Location	2
Figure 2	Site and Vicinity	3
Figure 3	Aerial Photograph	4

ATTACHMENTS

Attachment 1	CNDDDB List
Attachment 2	CNPS List
Attachment 3	IPaC List
Attachment 4	NRCS Soils Report

1.0 INTRODUCTION

This memorandum has been prepared to address proposed development of a cannabis cultivation facility (Proposed Project) located at 12470 East Locke Road (APN 051-320-120; Subject Property), in San Joaquin County, California (**Figure 1**). The Subject Property consists of approximately 23.61 acres of disturbed land on the USGS 7.5-minute Lockeford quadrangle (**Figure 2**), and is zoned by San Joaquin County as Industrial – General (San Joaquin County, 2016). The purpose of this assessment is to identify sensitive biological resources that may be located on or near the Subject Property.

2.0 METHODOLOGY

The following information was obtained and reviewed:

- Aerial photographs of the Subject Property and surrounding area;
- California Natural Diversity Database list, updated June 23, 2020 (**Attachment 1**);
- California Native Plant Society list, updated June 23, 2020 (**Attachment 2**);
- U.S. Fish and Wildlife Service Information for Planning and Conservation list, updated June 23, 2020 (**Attachment 3**);
- U.S. Department of Agriculture NRCS Soils Report, updated July 1, 2020 (**Attachment 4**);
- The National Wetlands Inventory, updated June 23, 2020 (USFWS, 2020).

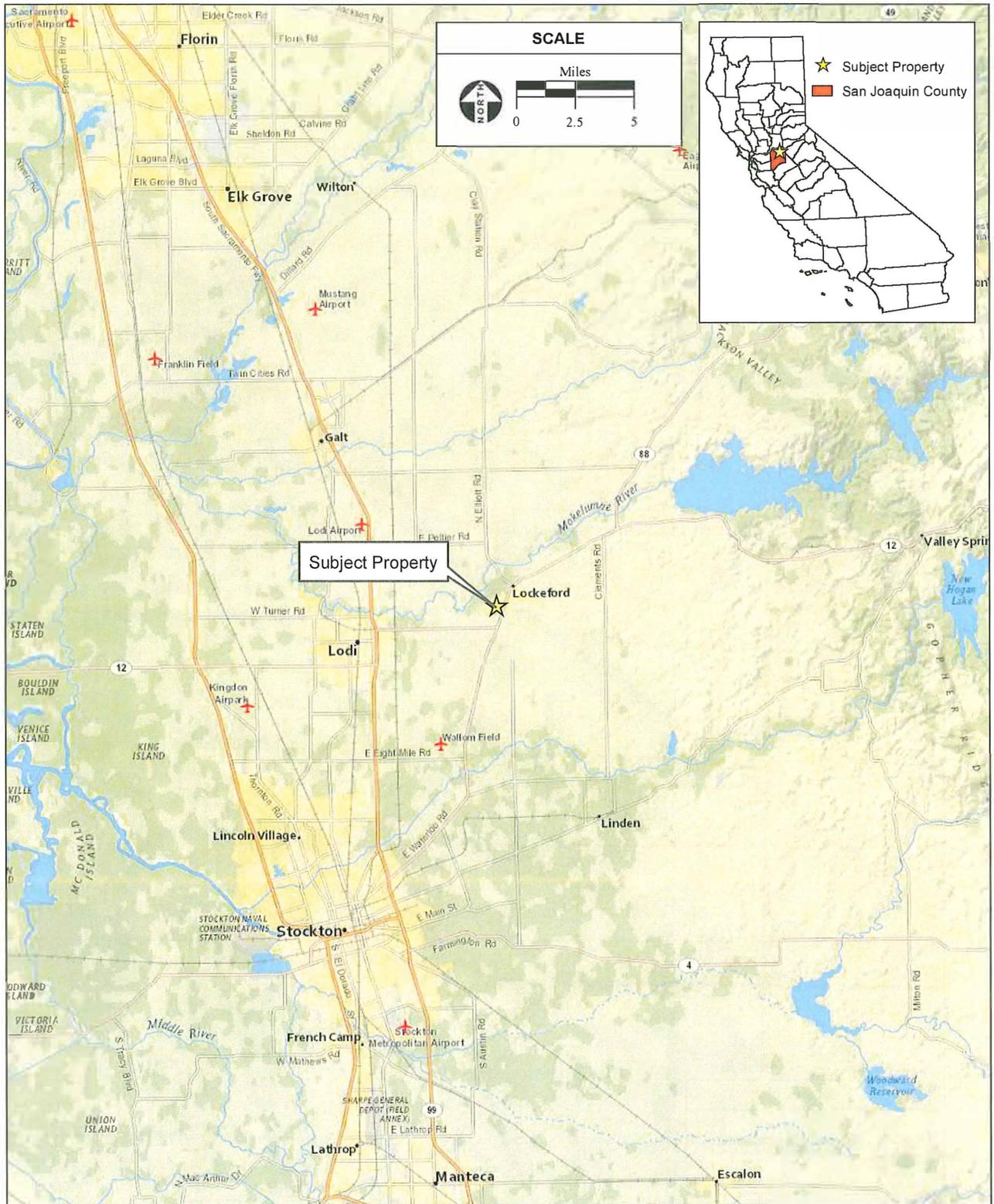
A biological resources survey was conducted on the Subject Property on June 25, 2020. The survey was conducted by walking throughout and around the Subject Property. Survey goals consisted of identifying habitat types and potentially occurring sensitive habitats, wetlands and waters of the U.S, and special-status species. Sensitive habitats include those that are designated by CDFW, considered by local experts to be communities of limited distribution, or likely to be waters of the U.S. or State by the appropriate regulatory agencies. Habitat requirements of special-status species were compared to habitats observed, which were determined based on aerial photographs, observation, and background data review.

3.0 ENVIRONMENTAL SETTING

HABITAT TYPES

The Vino Piazza Winery occurs on the northern portion of the Subject Property, and several small supporting structures occur in the southern portion (**Figure 3**). A 1.02-acre detention basin occurs in the northeast corner of the Subject Property. The detention basin receives stormwater runoff from the Subject Property. The remainder of the Subject Property consists of ruderal disturbance. Two unpaved access roads occur on the Subject Property, and open areas contain nonnative ruderal vegetation that is mowed and managed. Adjacent properties are used for industrial land uses and include Kellogg Garden Products to the east and the Jensen Precast Storage Yard to the west. On-site elevations range from 26 to 30 meters (m) above mean sea level. Habitat on the Subject Property is low quality due to development, management, and limited resources.

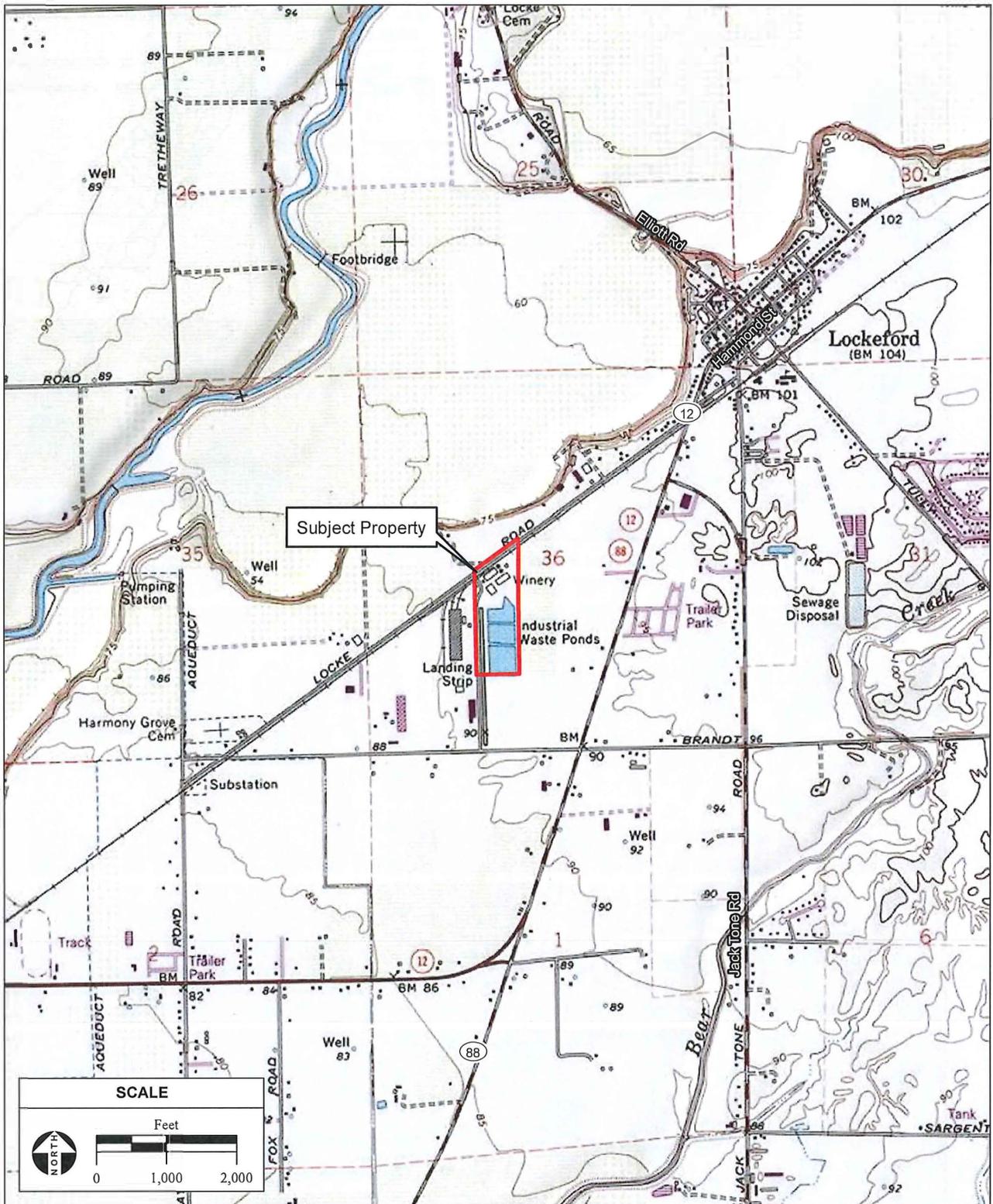
The NWI lists the Subject Property as containing 8.46 acres of PUSAx freshwater pond habitat (USFWS 2020). PUSAx freshwater pond habitats are temporarily flooded palustrine systems with unconsolidated shorelines that are formed through excavation. This designation is accurate for the detention basin as it was designed to catch stormwater runoff from adjacent fields. However, based on survey observations, this designation is not accurate for the remaining 7.44 acres of land classified as PUSAx due to the lack of necessary wetland vegetation cover, hydrology, and hydric soil characteristics.



SOURCE: NatGeo 2020; AES, 7/1/2020

Locke Road Cannabis Farm Biological Memo / 220525 ■

Figure 1
Regional Location



SOURCE: "Lockeford, CA" USGS 7.5 Minute Topographic Quadrangle, T4N, R7E, Section 36, Mt. Diablo Baseline & Meridian; AES, 7/1/2020

Locke Road Cannabis Farm Biological Memo / 220525 ■

Figure 2
Site and Vicinity

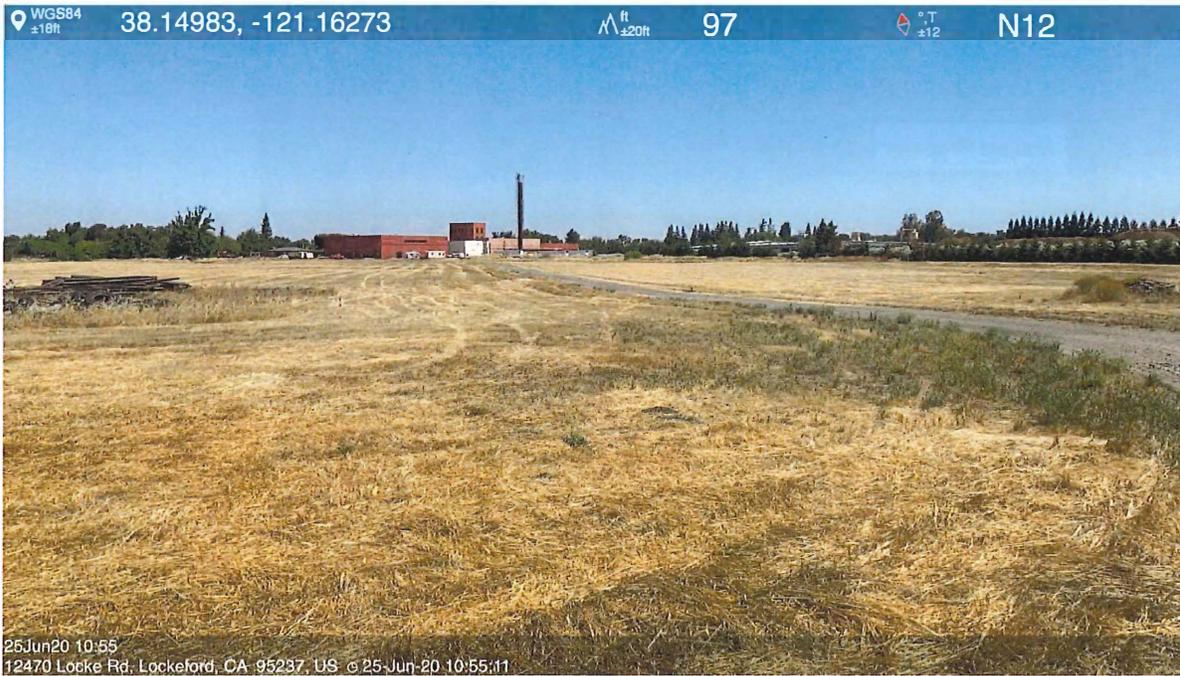


SOURCE: Maxar/Vivid Aerial Photograph, 8/2018; AES, 7/1/2020

Locke Road Cannabis Farm Biological Memo / 220525 ■

Figure 3
Aerial Photograph

Site Photographs of the Subject Property are included below.



View of the Subject Property from the southern border looking north.



View of the Subject Property from the northern border looking south.

SPECIES OBSERVED

Plants observed on the Subject Property during the survey include oats (*Avena spp.*), wild radish (*Raphanus sativus*), foxtail barley (*Horedum murinum*), prickly lettuce (*Lactuca serriola*), field bindweed (*Convolvulus arvensis*), California grape (*Vitis californica*), wild mustard (*Hirschfeldia incana*), ripgut brome (*Bromus diandrus*), orchard grass (*Dactylis glomerata*), ribwort plantain (*Plantago lanceolata*), and Italian rye grass (*Festuca perennis*). The detention basin was dominated by curly dock (*Rumex crispus*), tall flatsedge (*Cyperus eragrostis*), prostrate knotweed (*Polygonum aviculare*), fringed willow herb (*Epilobium ciliatum*), Italian rye grass (*Festuca perennis*), and Italian thistle (*Carduus pycnocephalus*). A Fremont poplar (*Populus fremontii*) was observed growing in the southwestern corner of the detention basin. A row of redwoods (*Sequoia sempervirens*) were observed along the eastern border of the Subject Property and are irrigated to maintain continual growth. Several trees grow along the western border and include species such as blue oak (*Quercus douglasii*), interior live oak (*Quercus wislizeni*), and northern California black walnut (*Juglans hindsii*). Ornamental landscaping shrubs and trees occur throughout the northern section of the Subject Property around the winery.

SPECIAL-STATUS SPECIES

Data review and special-status species searches identified 2 special-status plant species and 11 special-status wildlife species with the potential to occur in the region of the Subject Property (**Attachments 1 - 3**). Special-status species were ruled out based on lack of suitable habitat, soils, elevation, and necessary substrate. Based on habitat observed and habitat requirements for potentially occurring special-status species, the Subject Property does not contain suitable habitat to support special-status plant or wildlife species.

CRITICAL HABITAT

No designated critical habitat occurs on the Subject Property.

4.0 RESULTS

SENSITIVE HABITAT

The Subject Property consists of ruderal disturbed and developed habitat. Ruderal disturbed areas are routinely mowed and managed. An existing winery and detention basin occur in the northern portion of the Subject Property, and small supporting structures occur in the southern portion. Sensitive habitats do not occur on the Subject Property.

SPECIAL-STATUS SPECIES

Based on survey observations and site characteristics, the Subject Property does not contain suitable habitat to support special-status plant and animal species.

NESTING MIGRATORY BIRDS

Migratory birds and their nests are protected from “take” by the Migratory Bird Treaty Act (16 U.S.C. 703-711), which makes it unlawful to “...pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess or any part, nest, or egg of any such bird...” (50 CFR 10). Nesting migratory birds within 500 feet of the Subject Property could be affected if vegetation removal or loud noise-producing activities associated with construction occur during the general nesting season (February 15 through September 15). No nesting migratory birds were identified in the vicinity of the Subject Property during the survey.

Implementation of **Mitigation Measure 1** would reduce potential impacts to nesting migratory birds.

Mitigation Measure 1

- Should construction activities associated with the Proposed Project occur during the general nesting season (February 15 to September 15), a preconstruction nesting bird survey shall be conducted no more than 7 days prior to the start of ground disturbing activities. Areas within 500 feet of construction shall be surveyed for active nests.
- Should an active nest be identified, an avoidance buffer shall be established by a qualified biologist based on the needs of the species identified. Avoidance buffers may vary in size depending on habitat characteristics, project-related activities, and disturbance levels.
- Avoidance buffers shall remain in place until the end of the general nesting season or upon determination by a qualified biologist that young have fledged or the nest has failed.
- Should work activity cease for 7 days or greater during the breeding season, surveys shall be repeated to ensure birds have not established nests during inactivity.

5.0 CONCLUSIONS

Based on review of background information, relevant databases, and results of the survey, sensitive biological resources do not occur on the Subject Property. Should future development occur on the Subject Property during the general nesting season for migratory birds (February 15 – September 15), a preconstruction nesting bird survey would need to be conducted on the Subject Property and areas within 500 feet of construction prior to ground disturbance.

6.0 REFERENCES

San Joaquin County, 2016. San Joaquin General Plan 2035. Available online at:

[https://www.sjgov.org/commdev/cgi-](https://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General%20Plan%202035/GENERAL%20PLAN%202035.pdf)

[bin/cdyn.exe/file/Planning/General%20Plan%202035/GENERAL%20PLAN%202035.pdf](https://www.sjgov.org/commdev/cgi-bin/cdyn.exe/file/Planning/General%20Plan%202035/GENERAL%20PLAN%202035.pdf).

Accessed June 23, 2020

US Fish and Wildlife Service (USFWS) 2020. National Wetlands Inventory. Available online at:

<https://www.fws.gov/wetlands/Data/Mapper.html>. Accessed June 23, 2020

ATTACHMENT 1

CNDDDB LIST



Selected Elements by Scientific Name
California Department of Fish and Wildlife
California Natural Diversity Database



Query Criteria: QuadIS (Lockeford (3812122))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
<i>Agelaius tricolor</i> tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
<i>Ambystoma californiense</i> California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
<i>Branchinecta lynchi</i> vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
<i>Branchinecta mesoamericana</i> midvalley fairy shrimp	ICBRA03150	None	None	G2	S2S3	
<i>Buteo swainsoni</i> Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
<i>Castilleja campestris</i> var. <i>succulenta</i> succulent owl's-clover	PDSCROD3Z1	Threatened	Endangered	G4?T2T3	S2S3	1B.2
<i>Desmocerus californicus dimorphus</i> valley elderberry longhorn beetle	IICOL48011	Threatened	None	G3T2	S2	
<i>Emys marmorata</i> western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
<i>Lepidurus packardii</i> vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G4	S3S4	
Northern Hardpan Vernal Pool Northern Hardpan Vernal Pool	CTT44110CA	None	None	G3	S3.1	
<i>Oncorhynchus mykiss irideus</i> pop. 11 steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
<i>Sagittaria sanfordii</i> Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2
<i>Setophaga petechia</i> yellow warbler	ABPBX03010	None	None	G5	S3S4	SSC

Record Count: 13

ATTACHMENT 2

CNPS LIST



*The database used to provide updates to the Online Inventory is under construction. [View updates and changes made since May 2019 here.](#)

Plant List

2 matches found. [Click on scientific name for details](#)

Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B, 3, 4], FESA is one of [Endangered, Threatened, Candidate], CESA is one of [Endangered, Threatened, Rare], Found in Quads 3812133, 3812132, 3812131, 3812123, 3812122, 3812121, 3812113, 3812112 and 3812111;
Lifeform is one of [Tree, Shrub, Leaf succulent, Herb, Vine, Stem succulent, Lichen, Moss, Liverwort],
Duration is one of [ann, per, ephem]

[Modify Search Criteria](#) [Export to Excel](#) [Modify Columns](#) [Modify Sort](#) [Display Photos](#)

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Castilleja campestris var. succulenta	succulent owl's-clover	Orobanchaceae	annual herb (hemiparasitic)	(Mar)Apr-May	1B.2	S2S3	G4? T2T3
Orcuttia viscida	Sacramento Orcutt grass	Poaceae	annual herb	Apr-Jul(Sep)	1B.1	S1	G1

Suggested Citation

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website <http://www.rareplants.cnps.org> [accessed 23 June 2020].

Search the Inventory

[Simple Search](#)

[Advanced Search](#)

[Glossary](#)

Information

[About the Inventory](#)

[About the Rare Plant Program](#)

[CNPS Home Page](#)

[About CNPS](#)

[Join CNPS](#)

Contributors

[The Calflora Database](#)

[The California Lichen Society](#)

[California Natural Diversity Database](#)

[The Jepson Flora Project](#)

[The Consortium of California Herbaria](#)

[CalPhotos](#)

Questions and Comments

rareplants@cnps.org

© Copyright 2010-2018 California Native Plant Society. All rights reserved.

ATTACHMENT 3

IPAC LIST



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713



In Reply Refer To:
Consultation Code: 08ESMF00-2020-SLI-2240
Event Code: 08ESMF00-2020-E-06899
Project Name: Locke Road Cannabis Cultivation

June 23, 2020

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2) (c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

<http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF>

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (<http://www.fws.gov/windenergy/>) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm>; <http://www.towerkill.com>; and <http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html>.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office

Federal Building

2800 Cottage Way, Room W-2605

Sacramento, CA 95825-1846

(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2020-SLI-2240

Event Code: 08ESMF00-2020-E-06899

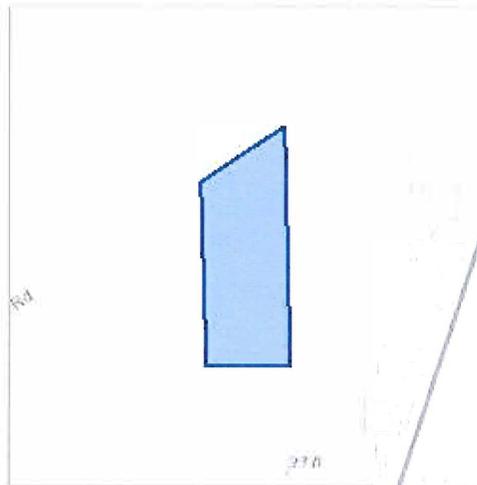
Project Name: Locke Road Cannabis Cultivation

Project Type: Guidance

Project Description: Development of guidance document

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/38.152098904095475N121.1627899835126W>



Counties: San Joaquin, CA

Endangered Species Act Species

There is a total of 10 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

NAME	STATUS
Riparian Brush Rabbit <i>Sylvilagus bachmani riparius</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6189	Endangered

Reptiles

NAME	STATUS
Giant Garter Snake <i>Thamnophis gigas</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog <i>Rana draytonii</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2891 Species survey guidelines: https://ecos.fws.gov/ipac/guideline/survey/population/205/office/11420.pdf	Threatened
California Tiger Salamander <i>Ambystoma californiense</i> Population: U.S.A. (Central CA DPS) There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt <i>Hypomesus transpacificus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Valley Elderberry Longhorn Beetle <i>Desmocerus californicus dimorphus</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850 Habitat assessment guidelines: https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp <i>Branchinecta conservatio</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp <i>Branchinecta lynchi</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp <i>Lepidurus packardii</i> There is final critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Fleshy Owl's-clover <i>Castilleja campestris ssp. succulenta</i>	Threatened

There is **final** critical habitat for this species. Your location is outside the critical habitat.

Species profile: <https://ecos.fws.gov/ecp/species/8095>

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

ATTACHMENT 4

NRCS SOILS REPORT



United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

A product of the National
Cooperative Soil Survey,
a joint effort of the United
States Department of
Agriculture and other
Federal agencies, State
agencies including the
Agricultural Experiment
Stations, and local
participants

Custom Soil Resource Report for San Joaquin County, California



Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (<http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/>) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (<https://offices.sc.egov.usda.gov/locator/app?agency=nrcs>) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface	2
How Soil Surveys Are Made	5
Soil Map	8
Soil Map.....	9
Legend.....	10
Map Unit Legend.....	11
Map Unit Descriptions.....	11
San Joaquin County, California.....	13
189—Kingdon fine sandy loam, 0 to 2 percent slopes.....	13
240—San Joaquin loam, thick surface, 0 to 2 percent slopes.....	14
256—Tokay fine sandy loam, 0 to 2 percent slopes.....	15
References	18

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

Custom Soil Resource Report

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

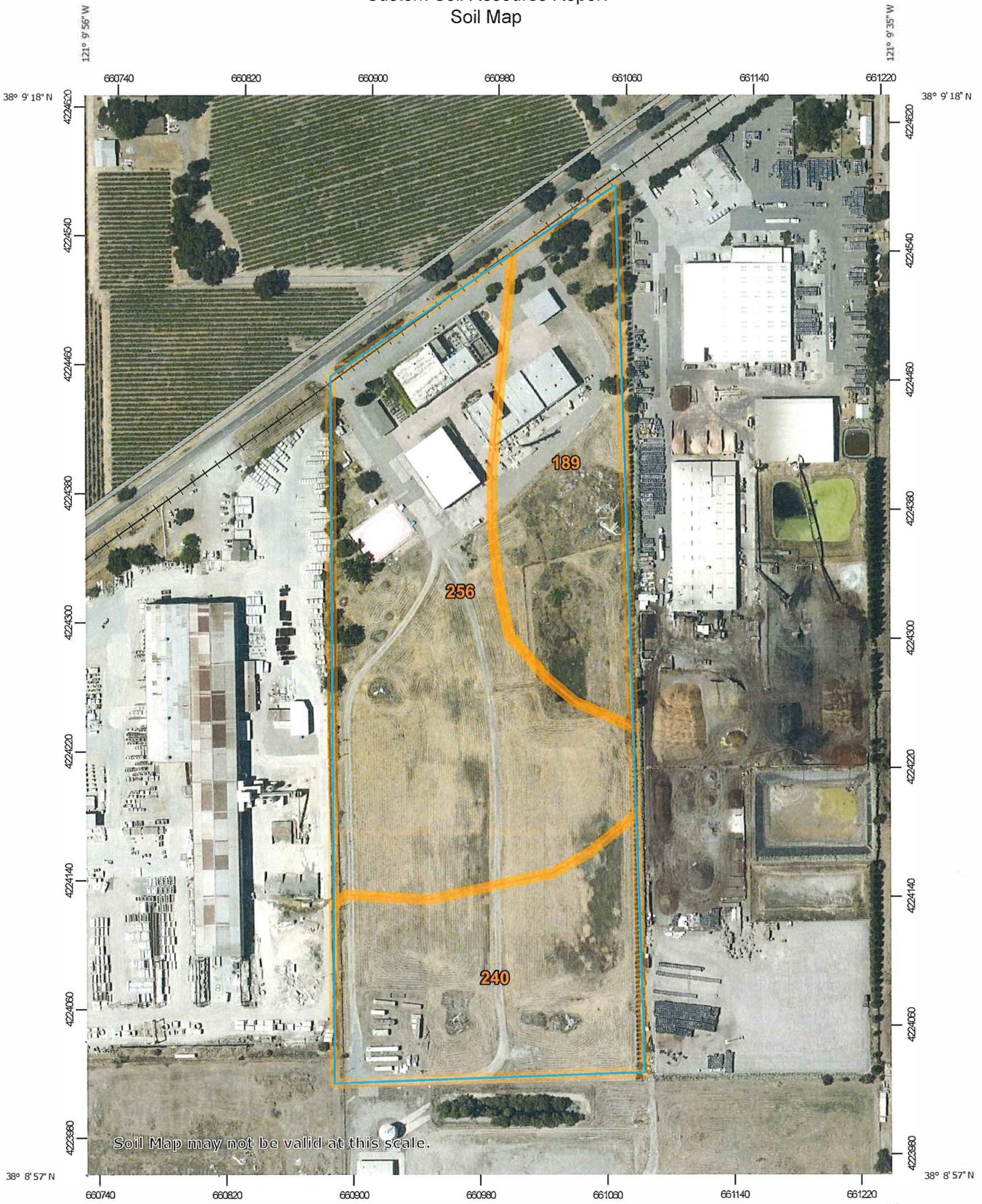
Custom Soil Resource Report

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report Soil Map



Map Scale: 1:3,270 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

Custom Soil Resource Report

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features

 Blowout

 Borrow Pit

 Clay Spot

 Closed Depression

 Gravel Pit

 Gravelly Spot

 Landfill

 Lava Flow

 Marsh or swamp

 Mine or Quarry

 Miscellaneous Water

 Perennial Water

 Rock Outcrop

 Saline Spot

 Sandy Spot

 Severely Eroded Spot

 Sinkhole

 Slide or Slip

 Sodic Spot

 Spoil Area

 Stony Spot

 Very Stony Spot

 Wet Spot

 Other

 Special Line Features

Water Features

 Streams and Canals

Transportation

 Rails

 Interstate Highways

 US Routes

 Major Roads

 Local Roads

Background

 Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: San Joaquin County, California
Survey Area Data: Version 14, May 29, 2020

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Data not available.

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
189	Kingdon fine sandy loam, 0 to 2 percent slopes	5.6	24.1%
240	San Joaquin loam, thick surface, 0 to 2 percent slopes	5.9	25.7%
256	Tokay fine sandy loam, 0 to 2 percent slopes	11.6	50.2%
Totals for Area of Interest		23.1	100.0%

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or

Custom Soil Resource Report

landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

San Joaquin County, California

189—Kingdon fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hhtv
Elevation: 10 to 100 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 260 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Kingdon and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Kingdon

Setting

Landform: Fan terraces
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granitic rock sources

Typical profile

Ap1 - 0 to 5 inches: fine sandy loam
Ap2 - 5 to 14 inches: fine sandy loam
Bt - 14 to 28 inches: fine sandy loam
Bt - 28 to 42 inches: fine sandy loam
C - 42 to 61 inches: fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: About 60 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 8.2 inches)

Interpretive groups

Land capability classification (irrigated): 1
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Hydric soil rating: No

Custom Soil Resource Report

Minor Components

Devries

Percent of map unit: 4 percent

Landform: Rims

Hydric soil rating: Yes

Acampo

Percent of map unit: 4 percent

Hydric soil rating: No

Tujunga

Percent of map unit: 3 percent

Hydric soil rating: No

Tokay

Percent of map unit: 2 percent

Hydric soil rating: No

Unnamed, texture subsoils

Percent of map unit: 2 percent

Hydric soil rating: No

240—San Joaquin loam, thick surface, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hhwh

Elevation: 20 to 110 feet

Mean annual precipitation: 16 inches

Mean annual air temperature: 61 degrees F

Frost-free period: 275 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

San joaquin and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of San Joaquin

Setting

Landform: Terraces

Landform position (two-dimensional): Shoulder

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from granitic rock sources

Typical profile

Ap - 0 to 12 inches: loam

Bt - 12 to 26 inches: sandy clay loam

Custom Soil Resource Report

2Bt - 26 to 35 inches: clay
2Bqm - 35 to 60 inches: indurated

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: About 26 inches to abrupt textural change; 20 to 40 inches to duripan
Natural drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Low (about 4.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Ecological site: LOAMY CLAYPAN (R017XE104CA)
Hydric soil rating: Yes

Minor Components

Bruella

Percent of map unit: 5 percent
Hydric soil rating: No

Exeter

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, steeper slopes

Percent of map unit: 3 percent
Hydric soil rating: No

Unnamed, ponded

Percent of map unit: 3 percent
Landform: Depressions
Hydric soil rating: Yes

256—Tokay fine sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hhx0
Elevation: 10 to 120 feet
Mean annual precipitation: 15 inches
Mean annual air temperature: 61 degrees F
Frost-free period: 260 days
Farmland classification: Prime farmland if irrigated

Custom Soil Resource Report

Map Unit Composition

Tokay and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tokay

Setting

Landform: Fan skirts

Landform position (two-dimensional): Footslope

Landform position (three-dimensional): Tread

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Alluvium derived from granitic rock sources

Typical profile

A - 0 to 19 inches: fine sandy loam

Bt - 19 to 45 inches: fine sandy loam

C - 45 to 60 inches: sandy loam

Properties and qualities

Slope: 0 to 2 percent

Depth to restrictive feature: More than 80 inches

Natural drainage class: Well drained

Runoff class: Very low

Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 1

Land capability classification (nonirrigated): 4c

Hydrologic Soil Group: A

Hydric soil rating: No

Minor Components

Devries

Percent of map unit: 4 percent

Landform: Valley floors

Hydric soil rating: Yes

Tujung

Percent of map unit: 4 percent

Hydric soil rating: No

Acampo

Percent of map unit: 4 percent

Hydric soil rating: No

Kingdon

Percent of map unit: 3 percent

Custom Soil Resource Report

Hydric soil rating: No

References

- American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.
- American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.
- Federal Register. July 13, 1994. Changes in hydric soils of the United States.
- Federal Register. September 18, 2002. Hydric soils of the United States.
- Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.
- National Research Council. 1995. Wetlands: Characteristics and boundaries.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577
- Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580
- Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
- United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374
- United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. <http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084>

Custom Soil Resource Report

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

