

City of Turlock: Well No. 38 Arsenic Treatment Project

Biological Evaluation



Prepared by:
Brooke Fletcher, Wildlife Biologist



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1 Introduction

The City of Turlock serves drinking water to its residents through 18 active groundwater wells and approximately 18,500 service connections. Well No. 38 is was constructed in 2003 and has been inactive since February 2011 when the carcinogenic naturally occurring contaminant arsenic was detected at levels higher than the maximum contaminant level (MCL). Well rehabilitation was attempted in 2017 but based on the results of this work, it was determined that rehabilitation of the well was not feasible, and that wellhead treatment was the only viable alternative for returning the well to service.

The City is proposing the use of iron-assisted coagulation filtration to treat the groundwater at Well 38. Turlock is entirely groundwater dependent, and implementation of the Project will allow the City to meet drinking water demands.

The following technical report, prepared by Provost & Pritchard Consulting Group (Provost & Pritchard) is prepared in compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) and includes a description of the biological resources present or with potential to occur within the Project site and surrounding areas and evaluates potential Project-related impacts to those resources.

1.1 Project Description

The City of Turlock proposes implementing an iron-assisted coagulation filtration plant to treat the water contaminated with arsenic at Well 38. This system will include chemical pretreatment, pressure vessels with filter media, an equalization tank, and possibly a backup generator. There will also be a chemical building constructed at the site composed of a concrete pad, chain link fence, and a metal roof.

1.2 Report Objectives

Construction activities such as ground disturbance associated with the installation of water system improvements could potentially damage biological resources or modify habitats that are crucial for sensitive plant and wildlife species. In cases such as these, development may be regulated by state or federal agencies, subject to provisions of CEQA, and/or NEPA, and/or addressed by local regulatory agencies.

This report addresses issues related to the following:

- 1) The presence of sensitive biological resources onsite, or with the potential to occur onsite.
- 2) The federal, state, and local regulations regarding these resources.
- 3) Mitigation measures that may be required to reduce the magnitude of anticipated impacts and/or comply with permit requirements of state and federal resource agencies.

Therefore, the objectives of this report are:

- 1) Summarize all site-specific information related to existing biological resources.
- 2) Make reasonable inferences about the biological resources that could occur onsite based on habitat suitability and the proximity of the site to a species' known range.
- 3) Summarize all state and federal natural resource protection laws that may be relevant to the Project.
- 4) Identify and discuss Project impacts to biological resources likely to occur onsite within the context of CEQA or state or federal laws.

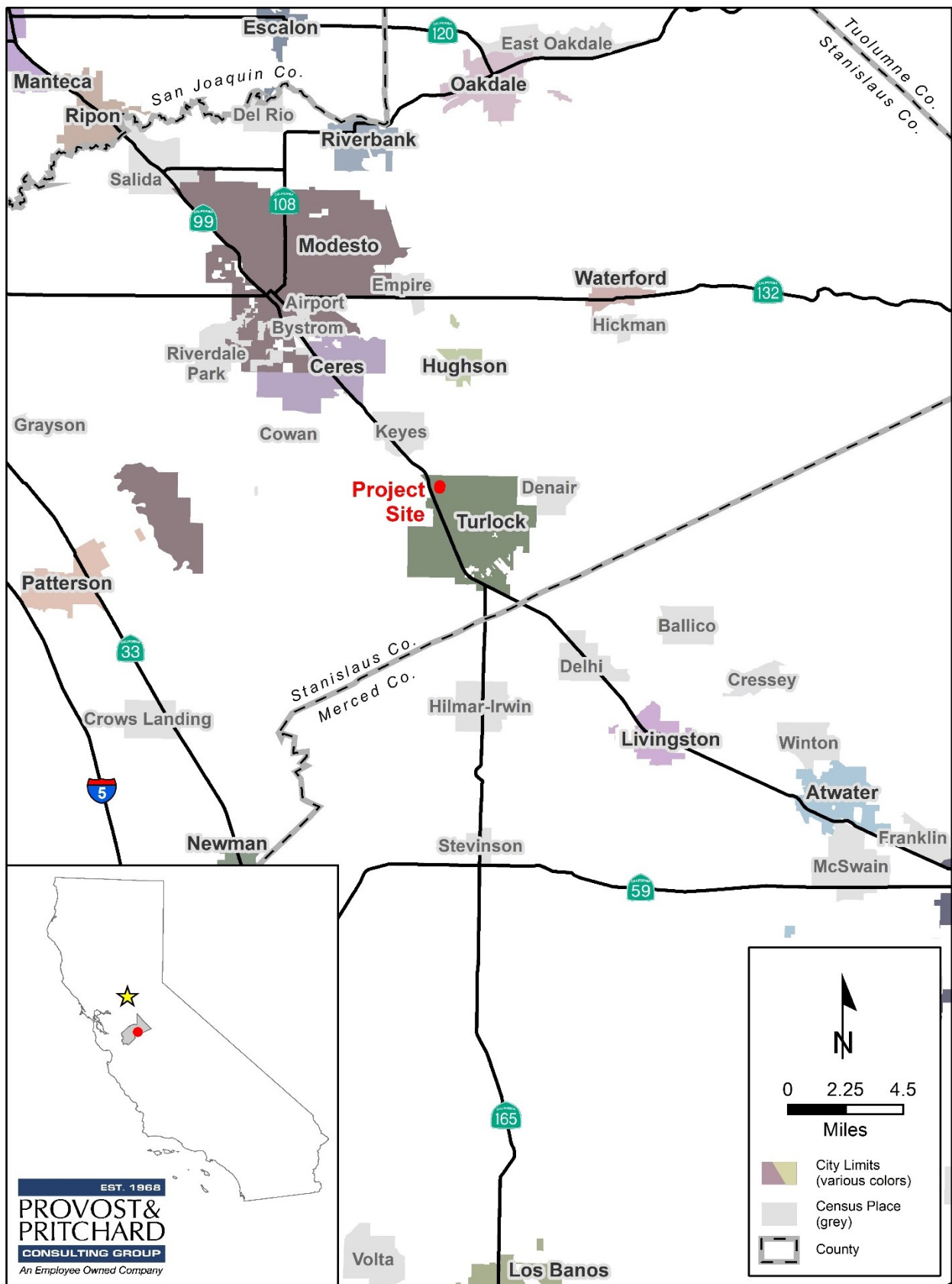
- 5) Identify and publish a set of avoidance and mitigation measures that would reduce impacts to a less-than-significant level (as identified by CEQA) and are generally consistent with recommendations of the resource agencies for affected biological resources.

1.3 Study Methodology

A reconnaissance-level field survey of the Project site and surrounding area was conducted on October 18, 2019 by Provost & Pritchard. The survey consisted of walking through the Project area while identifying and noting land uses, biological habitats and communities, and plant and animal species encountered. Furthermore, the site and surrounding areas were assessed for suitable habitats of various wildlife species.

The biologist conducted an analysis of potential Project-related impacts to biological resources based on the resources known to exist or with potential to exist within the Project site and surrounding areas. Sources of information used in preparation of this analysis included: the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB); the U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) system; the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants of California; CalFlora's online database of California native plants; the Jepson Herbarium online database (Jepson eFlora); U.S. Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS); the NatureServe Explorer online database; the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Plants Database; the California Department of Fish and Wildlife (CDFW) California Wildlife Habitat Relationships (CWHHR) database; the California Herps online database; and various manuals, reports, and references related to plants and animals of the San Joaquin Valley region.

The field investigation did not include a wetland delineation or focused surveys for special status species. The field survey conducted included an appropriate level of detail to assess the significance of potential impacts to sensitive biological resources resulting from the Project. Furthermore, the field survey was sufficient to generally describe those features of the Project that could be subject to the jurisdiction of federal and/or State agencies, such as the U.S. Army Corps of Engineers (USACE), CDFW, Regional Water Quality Control Board (RWQCB) and State Water Resources Control Board (SWRCB) .



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Figure 1. Regional Location Map

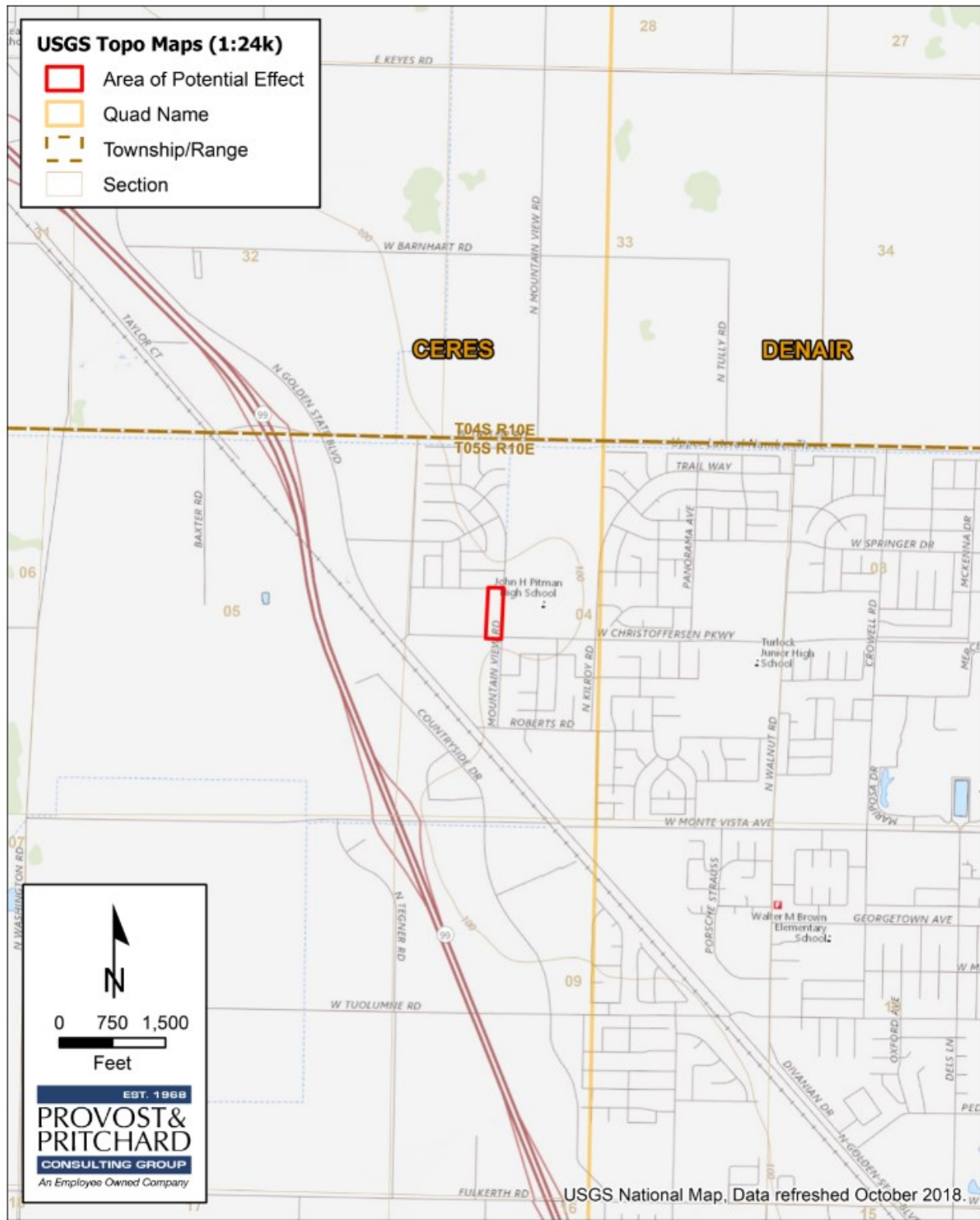


Figure 2. Topographic Quadangle Map



Figure 3. Area of Potential Effect (APE) Map

2 Existing Conditions

2.1 Regional Setting

The Project site is located in the northeastern portion of the City of Turlock in Stanislaus County within the upper San Joaquin Valley (See **Figure 1**). The Valley is bordered by the Sierra Nevada Mountain Ranges to the east, the Coast Ranges to the west, the Klamath Mountains and Cascade Range to the north, and the Transverse Ranges and Mojave Desert to the south.

Like most of California, the San Joaquin Valley experiences a Mediterranean climate. Warm, dry summers are followed by cool, moist winters. Summer temperatures often reach above 90 degrees Fahrenheit, and the humidity is generally low. Winter temperatures are often below 60 degrees Fahrenheit during the day and rarely exceed 70 degrees. On average, the Central Valley receives approximately 12 inches of precipitation in the form of rainfall yearly, most of which occurs between October and March.

The Project is located within the Lake Ramona-San Joaquin River watershed; Hydrologic Unit Code (HUC): 180400020403 (EPA, 2019). The northern portion of the San Joaquin Valley drains toward the Delta by the San Joaquin Valley and its tributaries, the Fresno, Merced, Tuolumne, and Stanislaus Rivers. The Project lies approximately 13 miles east of the San Joaquin River, 6 miles south of the Tuolumne River, and 12 miles north of the Merced River.

The Project lies entirely within the Turlock Groundwater Subbasin of the San Joaquin Valley Groundwater Basin. (DWR, 2019), and within the boundaries of the West Turlock Subbasin Groundwater Sustainability Agency (GSA).

2.2 Project Site

2.3 Biological Communities

Two biological communities were identified within the Project area: developed and ruderal. Surrounding land uses consist of paved roads and development in the form of a school and residential homes. Project areas are accessible by paved and pre-compacted dirt roads. The habitats of the Project area and surrounding lands are developed and subject to frequent disturbance associated with operation and maintenance activities, and therefore of relatively low quality for most native wildlife species.

2.3.1 Developed

At the time of the biological survey, the southern portion of the APE was developed. This area was enclosed with chain-link fencing, the majority of the substrate was paved, and the remainder was compacted dirt. Two permanent buildings were present. One of the buildings was an aged, barn-like structure with metal siding that was being used as a storage shed for equipment by City parks and recreation staff. The second building was constructed of cinderblock and appeared to be more recently constructed. This second building contained the existing water supply infrastructure and equipment.

The fenced, developed portion of the APE is unsuitable for most native wildlife species. Several feral cats were observed throughout the surveyed areas. Avian species observed within this portion of the site were limited to a colony of invasive European starlings (*Sturnus vulgaris*). Inactive nests were observed within the rain gutter on the northern side of the cinder block building. Avian species expected to occur onsite would be limited to disturbance tolerant species associated with urban development such as the aforementioned European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), California scrub jay (*Aphelocoma californica*),

house finch (*Haemorhous mexicanus*), American crow (*Corvus brachyrhynchos*), and mourning dove (*Zenaida macroura*). The only vegetation present in this area was a strip of well-manicured mulch and ornamental shrubs (*Nerium oleander*) along the western fence line. The barn-like building did contain crevices and openings beneath the roof overhang which could potentially serve as roosting habitat for some native bat species; however, at the time of the survey, no bat individuals or sign (staining or guano) were observed and no audible vocalizations were detected. Furthermore, the site does not provide typical suitable foraging habitat. At most, a few moths could be attracted to nighttime security lighting. Furthermore, the ongoing disturbance associated with maintenance activities onsite would likely deter bats roosting in this location. The cinderblock building did not contain any crevices or openings which could be used by roosting bats. Although not observed at the time of the field survey, some additional species with potential to occur within this developed habitat include northwestern fence lizard (*Sclerophorus occidentalis occidentalis*), Virginia opossum (*Didelphis virginiana*), California ground squirrel (*Otospermophilus beecheyi*), Botta's pocket gopher (*Thomomys bottae*), and a variety of murid rodents such as the Norway rat (*Rattus norvegicus*), roof rat (*Rattus rattus*), deer mouse (*Peromyscus maniculatus*), and house mouse (*Mus musculus*). However, the potential presence of rodent populations onsite would be dictated largely by the use of rodenticides or other pest control techniques.

2.3.2 Ruderal

Ruderal habitats are characterized by a high level of human disturbance and absence of vegetation or dominated by non-native plant species. At the time of the field survey, the northern portion of the APE consisted of a ruderal, vacant lot of land on the southwest corner of Sandstone Street and Mountain View Road.

At the time of the field survey, the unpaved vacant lot contained piles of soil, cement, and rock, and it appeared to have been used as a staging area for adjacent development projects. The substrate had the appearance of ruderal land that had been graded, disked, compacted, or otherwise subject to years of ground-disturbance. Native vegetation was essentially absent. Instead, the groundcover onsite was dominated by tumbleweed (*Amaranthus albus*), pigweed (*Amaranthus spp.*), mustard (*Brassica rapa*), ripgut brome (*Bromus diandrus*), foxtail chess (*Bromus madritensis*), prostrate knotweed (*Polygonum aviculare*), and Russian thistle (*Salsola tragus*). There were no trees within Project area, but adjacent developments contained ornamental trees and shrubs commonly associated with landscaping.

Inspection of the piles of dirt and materials onsite revealed an absence of burrows or any sign of burrowing mammals. Throughout the entire APE, only a few potential burrows were observed; all were located along the compacted dirt right-of-way, were less than two inches in diameter, and appeared to be of murid rodent origin. Upon the arrival of the biologist onsite, two domestic cats were observed running away. Inspection of the area they were occupying revealed the presence of feathers and three sets of bird remains. Avian species observed during the survey of the ruderal portion of the APE included: American crow (*Corvus brachyrhynchos*), European starling (*Sturnus vulgaris*), rock pigeon (*Columba livia*), and California scrub jay (*Aphelcoma californica*). Mammal tracks and sign observed included domestic dog and domestic cat. Additional species expected to occur within this ruderal habitat are the same as those listed above for the developed portion of the APE and will not be restated here.

2.4 Soils

One soil mapping unit representing one soil series was identified within the Project area: Dinuba sandy loam, 0 to 1 percent slopes. This is not classified as a hydric soil. Hydric soils are defined as soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions such that under sufficiently wet conditions hydrophytic vegetation is supported.

Dinuba sandy loam comprises 100 percent of the mapped Project area. The Dinuba soil series consists of consists of moderately well drained Non-calcic brown soils developed from moderately coarse textured

dominantly granitic alluvium. These soils are used mainly for irrigated field crops, alfalfa, pasture, and grapes. Orchard crops and other deep-rooted crops are generally not grown in these soils.

The complete Natural Resources Conservation Service (NRCS) Web Soil Survey report is available in **Appendix E** at the end of this document.

2.5 Natural Communities of Special Concern

Natural communities of special concern are those that are of limited distribution, distinguished by significant biological diversity, or home to special status species. CDFW is responsible for the classification and mapping of all-natural communities in California. Just like the special status plant and animal species, these natural communities of special concern can be found within the CNDDDB.

According to CNDDDB, there are no recorded observations of natural communities of special concern with potential to occur within the Project area or immediate vicinity. Additionally, no natural communities of special concern were observed during the biological survey.

2.6 Designated Critical Habitat

The USFWS often designates areas of “Critical Habitat” when it lists species as threatened or endangered. Critical Habitat is a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection.

According to CNDDDB and IPaC, designated critical habitat is absent from the Project area and vicinity.

2.7 Wildlife Movement Corridors

Wildlife movement corridors are routes that animals regularly and predictably follow during seasonal migration, dispersal from native ranges, daily travel within home ranges, and inter-population movements. Movement corridors in California are typically associated with valleys, ridgelines, and rivers and creeks supporting riparian vegetation.

The Project site, which consists of a fenced, developed well site and adjacent paved roads does not contain any features that could serve as a wildlife movement corridor. Furthermore, the Project is located within the City of Turlock in an area surrounded by urban development and cultivated agricultural lands subject to frequent disturbance which would discourage dispersal and migration.

2.8 Special Status Plants and Animals

California contains several “rare” plant and animal species. In this context, “rare” is defined as species known to have low populations or limited distributions. As the human population grows, resulting in urban expansion which encroaches on the already limited suitable habitat, these sensitive species become increasingly more vulnerable to extirpation. State and Federal regulations have provided the CDFW and the U.S. Fish and Wildlife Service (USFWS) with a mechanism for conserving and protecting the diversity of plant and animal species native to California. Numerous native plants and animals have been formally designated as “threatened” or “endangered” under state and federal endangered species legislation. Other formal designations include “candidate” for listing or “species of special concern” by CDFW. The California Native Plant Society (CNPS) has its list of native plants considered rare, threatened, or endangered. Collectively these plants and animals are referred to as “special status species.”

A thorough search of the CNDDB for published accounts of special status plant and animal species was conducted for the *Ceres* 7.5-minute quadrangle that contains the Project site in its entirety, and for the 8 surrounding quadrangles: *Salida*, *Riverbank*, *Waterford*, *Brush Lake*, *Denair*, *Crows Landing*, *Hatch*, and *Turlock*. These species, and their potential to occur within the Project area are listed in **Table 1** and **Table 2** on the following pages. Raw data obtained from CNDDB is available in **Appendix B** at the end of this document. Other sources of information utilized in the preparation of this analysis included the California Native Plant Society (CNPS) Online Inventory of Rare and Endangered Vascular Plants of California, CalFlora's online database of California native plants, the Jepson Herbarium online database (Jepson eFlora), U.S. Fish and Wildlife Service (USFWS) Environmental Conservation Online System (ECOS), the NatureServe Explorer online database, the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Plants Database, the California Department of Fish and Wildlife (CDFW) California Wildlife Habitat Relationships (CWHR) database, ebird.org, and the California Herps online database. **Figure 2** shows the Project's 7.5-minute quadrangle, according to USGS Topographic Maps.

Table 1. List of Special Status Animals with Potential to Occur Onsite and/or in the Vicinity

Species	Status	Habitat	Occurrence on Project Site
burrowing owl (<i>Athene cunicularia</i>)	CSC	Resides in open, dry annual or perennial grasslands, deserts, and scrublands with low growing vegetation. Nests underground in existing burrows created by mammals, most often ground squirrels.	Absent. Suitable nesting, foraging, and wintering habitat is absent from the Project site and the surrounding lands. The nearest recorded occurrence of this species was reported in 1994 approximately 13 miles north of the Project area.
cackling (=Aleutian Canada) goose (<i>Branta hutchinsii leucopareia</i>)	CWL	Inhabits areas withstanding water, including lakes, reservoirs, and ponds, while foraging on natural pasture and cultivated grain fields. Winters on lakes and inland prairies.	Unlikely. Open water and suitable feeding areas are absent from the Project site and surrounding lands. At most, this species could potentially fly over the site.
California red-legged frog (<i>Rana draytonii</i>)	FT, CSC	Inhabits perennial rivers, creeks, and stock ponds with vegetative cover within the Coast Range and northern Sierra foothills.	Absent. Suitable habitat is absent from the Project area, and the Project is located outside of the accepted current distribution range of this species.
California tiger salamander (<i>Ambystoma californiense</i>)	FT, CT, CWL	Requires vernal pools or seasonal ponds for breeding and small mammal burrows for aestivation. Generally found in grassland and oak savannah plant communities in central California from sea level to 1500 feet in elevation.	Absent. Suitable habitat is absent from the Project area and there are no known extant recorded occurrences of this species in the vicinity.
Crotch humble bee (<i>Bombus crotchii</i>)	CCE	Occurs throughout coastal California, as well as east to the Sierra-Cascade crest, and south in to Mexico. Food plant genera include <i>Antirrhinum</i> , <i>Phacelia</i> , <i>Clarkia</i> , <i>Dendromecon</i> , <i>Eschscholzia</i> , and <i>Eriogonum</i> .	Absent. Suitable habitat is absent from the Project area.
Delta smelt (<i>Hypomesus transpacificus</i>)	FT, CE	This pelagic and euryhaline species is Endemic to the Sacramento-San Joaquin River Delta, upstream through Contra Costa, Sacramento, San Joaquin, and Solano Counties.	Absent. Suitable habitat is absent from the Project area, and the Project is located outside of the accepted current distribution range of this species.
hardhead (<i>Mylopharodon conocephalus</i>)	CSC	Occurs in low- to mid-elevation streams in the Sacramento-San Joaquin drainage. Clear, deep pools with sand-gravel-boulder bottoms and slow-moving water is required. This species is often sympatric with Sacramento pikeminnow and Sacramento sucker. Hardhead are typically absent from streams occupied by centrarchids and from heavily altered habitats.	Absent. Suitable perennial aquatic habitat is absent from the Project area.

Species	Status	Habitat	Occurrence on Project Site
least Bell's vireo (<i>Vireo bellii pusillus</i>)	FE, CE	This migratory species breeds in southern California. Breeding habitat consists of dense, low, shrubby, riparian vegetation in the vicinity of water or dry river bottoms. By the early 1980s, this species was extirpated from most of its historic range in California, including the Central Valley. This species now occurs exclusively along the coast of southern California (USFWS, 1998).	Absent. Suitable habitat is absent, and the Project area is located outside of the current accepted distribution range of this species.
northern California legless lizard (<i>Anniella pulchra</i>)	CSC	Found primarily underground, burrowing in loose, sandy soil. Forages in loose soil and leaf litter during the day. Occasionally observed on the surface at dusk and night. Prefers soil with a high moisture content.	Absent. The compacted soils and developed nature of the Project area are unsuitable for this species.
Sacramento splittail (<i>Pogonichthys macrolepidotus</i>)	CSC	Endemic to the lakes and rivers of the Central Valley, but now confined to the Delta, Suisun Bay and associated marshes. Occupies slow moving river sections, dead end sloughs. Requires flooded vegetation for spawning and foraging for young.	Absent. Suitable perennial aquatic habitat is absent from the Project area.
Steelhead – Central Valley DPS (<i>Oncorhynchus mykiss irideus pop.11</i>)	FT	This winter-run fish begins migration to fresh water during peak flows during December and February. Spawning season is typically from February to April. After hatching, fry move to deeper, mid-channel habitats in late summer and fall. In general, both juveniles and adults prefer complex habitat boulders, submerged clay and undercut banks, and large woody debris.	Absent. Suitable perennial aquatic habitat is absent from the Project area.
Swainson's hawk (<i>Buteo swainsoni</i>)	CT	Nests in large trees in open areas adjacent to grasslands, grain or alfalfa fields, or livestock pastures suitable for supporting rodent populations.	Possible. Although potential nest trees and suitable foraging habitat is absent from the Project site, this species could nest within large trees in the vicinity and could pass over the well site during foraging or dispersal movements. There is a recorded occurrence of a nest tree approximately 0.8 miles southwest of the Project area.

Species	Status	Habitat	Occurrence on Project Site
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	CSC	Occurs in a variety of habitats, but prefers cool, dark roost sites, and are often found in caves and mines. They roost in the open, hanging from walls and ceilings. Western populations typically forage on moths in areas of dense foliage.	Unlikely. Typical roosting and foraging habitat is absent from the Project area. The roof overhang of the shed onsite could potentially be considered marginal, at best for roosting bats. However, no bat individuals or sign were observed during the field survey, and the ongoing disturbance would likely deter bats from roosting onsite, especially a species known to be intolerant of disturbance such as the Townsend's big-eared bat.
tricolored blackbird (<i>Agelaius tricolor</i>)	CCE, CSC	Nests colonially near fresh water in dense cattails or tules, or in thickets of riparian shrubs. Forages in grassland and cropland. Large colonies are often found on dairy farm forage fields.	Unlikely. Suitable nesting and foraging habitat is absent from the Project site and surrounding lands.
valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	FT	Lives in mature elderberry shrubs of the Central Valley and foothills. Adults are active March to June.	Absent. Suitable elderberry habitat is absent from the Project area.
vernal pool fairy shrimp (<i>Branchinecta lynchi</i>)	FT	Occupies vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	Absent. Suitable vernal pool habitat is absent from the Project area.
vernal pool tadpole shrimp (<i>Lepidurus packardii</i>)	FE	Occurs in vernal pools, clear to tea-colored water, in grass or mud-bottomed swales, and basalt depression pools.	Absent. Suitable vernal pool habitat is absent from the Project area.
western pond turtle (<i>Emys marmorata</i>)	CSC	An aquatic turtle of ponds, marshes, slow-moving rivers, streams, and irrigation ditches with riparian vegetation. Requires adequate basking sites and sandy banks or grassy open fields to deposit eggs.	Absent. Suitable aquatic or upland habitat is absent from the Project area.

Table 2. List of Special Status Plants with Potential to Occur Onsite and/or in the Vicinity

Species	Status	Habitat	Occurrence on Project Site
alkali milk-vetch (<i>Astragalus tener</i> var. <i>tener</i>)	CNPS 1B	Found growing in alkali soils in the San Joaquin Valley and throughout the Delta-Bay region of California in low and flooded areas at elevation below 196 feet. Blooms March – June.	Absent. Suitable habitat is absent from the Project area.
beaked clarkia (<i>Clarkia rostrata</i>)	CNPS 1B	Found in woodlands and valley foothill grasslands on the west slope of the Sierra Nevada range, around 1,640 feet in elevation. Blooms April – May.	Absent. Suitable habitat is absent from the Project area.
California alkali grass (<i>Puccinellia simplex</i>)	CNPS 1B	Found in the San Joaquin Valley and other parts of California in saline flats and mineral springs within valley grassland and wetland-riparian communities at elevations below 3,000 feet. Blooms March – May.	Absent. Suitable habitat is absent from the Project area.
Colusa grass (<i>Neostapfia colusana</i>)	FT, CE, CNPS 1B	Found in vernal pools in the San Joaquin Valley at elevations below 410 feet. Blooms May – August.	Absent. Suitable habitat is absent from the Project area.
Delta button-celery (<i>Eryngium racemosum</i>)	CE, CNPS 1B	Found in riparian scrublands in floodplains near the California Delta at elevations between 10 and 100 feet. Blooms June – August.	Absent. Suitable habitat is absent from the Project area.
Greene's tuctoria (<i>Tuctoria greenei</i>)	FE, CR, CNPS 1B	Found in the San Joaquin Valley and other parts of California in vernal pools within valley grassland, wetland, and riparian communities at elevations below 3500 feet. Blooms May – September.	Absent. Suitable habitat is absent from the Project area.
heartscale (<i>Atriplex cordulata</i> var. <i>cordulata</i>)	CNPS 1B	Found in the San Joaquin Valley and Sacramento Valley in saline or alkaline soils within shadescale scrub, valley grassland, and wetland-riparian communities at elevations	Absent. Suitable habitat is absent from the Project area.

Species	Status	Habitat	Occurrence on Project Site
		below 230 feet. Blooms June – July.	
lesser saltscale (<i>Atriplex minuscula</i>)	CNPS 1B	Found in the San Joaquin Valley in playas; sandy, alkaline soils in shadescale scrub, valley grassland, and alkali sink communities at elevations below 300 feet. Blooms April – October.	Absent. Suitable habitat is absent from the Project area.
Merced monardella (<i>Monardella leucocephala</i>)	CNPS 1A	Found in the San Joaquin Valley, associated with valley and foothill grasslands. Grows along rivers in moist, sandy soils at elevations between 164 feet and 328 feet. Blooms May – July.	Absent. Suitable habitat is absent from the Project area.
prairie wedge grass (<i>Sphenopholis obtusata</i>)	CNPS 2B	Found in a variety of regions in California, but primarily in the Sierra Nevada mountains. Grows in moist areas in woodlands, meadows, seeps, as well as wetlands, at elevations between 240 feet and 9,416 feet. Blooms April – June.	Absent. Suitable habitat is absent from the Project area.
San Joaquin Valley Orcutt grass (<i>Orcuttia inaequalis</i>)	FT, CE, CNPS 1B	Found in the eastern San Joaquin Valley and the Sierra Nevada foothills in vernal pools within valley grassland, freshwater wetland, and wetland-riparian communities at elevations below 2600 feet. Blooms April – September.	Absent. Suitable habitat is absent from the Project area.
subtle orache (<i>Atriplex subtilis</i>)	CNPS 1B	Found in the San Joaquin Valley in saline depressions at elevations below 230 feet. Blooms June – October.	Absent. Suitable habitat is absent from the Project area.
vernal pool smallscale (<i>Atriplex persistens</i>)	CNPS 1B	Found in alkaline vernal pools throughout the San Joaquin Valley at elevations between 10-377 feet. Blooms June – September.	Absent. Suitable habitat is absent from the Project area.

EXPLANATION OF OCCURRENCE DESIGNATIONS AND STATUS CODES

Present:	Species observed on the site at time of field surveys or during recent past
Likely:	Species not observed on the site, but it may reasonably be expected to occur there on a regular basis
Possible:	Species not observed on the site, but it could occur there from time to time
Unlikely:	Species not observed on the site, and would not be expected to occur there except, perhaps, as a transient
Absent:	Species not observed on the site, and precluded from occurring there due to absence of suitable habitat

STATUS CODES

FE	Federally Endangered	CE	California Endangered
FT	Federally Threatened	CT	California Threatened
FPE	Federally Endangered (Proposed)	CCT	California Threatened (Candidate)
FPT	Federally Threatened (Proposed)	CFP	California Fully Protected
FC	Federal Candidate	CSC	California Species of Concern
		CWL	California Watch List
		CCE	California Endangered (Candidate)
		CR	California Rare

CNPS LISTING

1A	Plants Presumed Extinct in California	2	Plants Rare, Threatened, or Endangered in
1B	Plants Rare, Threatened, or Endangered in California and elsewhere		California, but more common elsewhere

3 Impacts and Mitigation

3.1 Significance Criteria

3.1.1 CEQA

General plans, area plans, and specific projects are subject to the provisions of CEQA. The purpose of CEQA is to assess the impacts of proposed projects on the environment prior to project implementation. Impacts to biological resources are just one type of environmental impact assessed under CEQA and vary from project to project in terms of scope and magnitude. Projects requiring removal of vegetation may result in the mortality or displacement of animals associated with this vegetation. Animals adapted to humans, roads, buildings, and pets may replace those species formerly occurring on a site. Plants and animals that are state and/or federally listed as threatened or endangered may be destroyed or displaced. Sensitive habitats such as wetlands and riparian woodlands may be altered or destroyed. Such impacts may be considered either “significant” or “less than significant” under CEQA. According to the CEQA Guidelines, “significant effect on the environment” means a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic interest. Specific project impacts to biological resources may be considered “significant” if they would:

- Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFW or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (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 native wildlife nursery sites;
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance; or
- Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

Furthermore, CEQA Guidelines Section 15065(a) states that a project may trigger the requirement to make a “mandatory finding of significance” if the project has the potential to:

“Substantially degrade the quality of the environment, 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, reduce the number or restrict the range of an endangered, rare or threatened

species, or eliminate important examples of the major periods of California history or prehistory.”

3.1.2 NEPA

Federal projects are subject to the provisions of NEPA. The purpose of NEPA is to assess the effects of a proposed action on the human environment, assess the significance of those effects, and recommend measures that if implemented would mitigate those effects. As used in NEPA, a determination that certain effects on the human environment are “significant” requires considerations of both context and intensity (CFR 1508.27).

Context means that the significance of an action must be analyzed in terms of the affected environment in which a proposed action would occur. For the purposes of assessing effects of an action on biological resources, the relevant context is often local, which means the analysis requires a comparison of the action area’s biological resources to the biological resources of the local area. However, the analysis may also require a comparison of the action area’s biological resources with the biological resources of an entire region.

Intensity refers to the severity of impact. In considering intensity of impact to biological resources, it is necessary to address the unique qualities of wetlands and ecologically critical areas that may be affected, the degree to which the action will be controversial, the degree to which the effects will be controversial, the degree to which the effects will be uncertain, the degree to which the action will establish a precedent for future actions with potentially significant effects, and the potential for the action to result in cumulatively significant effects.

The effects of an action on some biological resources are generally considered to be “significant.” An action that adversely affects federally listed threatened or endangered species, waters of the United States, or migratory movements of fish and wildlife are some examples of significant effects.

NEPA requires disclosure of feasible mitigation measures for the effects of an action on the environment. Suitable measures include the following:

- a) Avoidance of the effect by not taking a certain action or parts of an action.
- b) Mitigation of the effect by limiting the degree or magnitude of the action and its implementation.
- c) Rectifying the effect by repairing, rehabilitating, or restoring the affected environment.
- d) Reducing or eliminating the effect over time by preservation and maintenance operations throughout the life of the action.
- e) Compensating for the effect by replacing or providing substitute resources or environments.

This report identifies likely effects of an action, identifies those that may be considered significant pursuant to the provisions of NEPA, and provides mitigation measures to avoid adverse effects to biological resources.

3.2 Relevant Goals, Policies, and Laws

3.2.1 Turlock General Plan

The Turlock General Plan contains the following policies regarding conservation of biological resources which have potential relevance to the Project’s environmental review:

Guiding Policies

7.4-a Increase Biological Diversity. Make efforts to enhance the diversity of Turlock’s flora and fauna, including street trees.

Implementing Policies

7.4-b Sensitive Site Planning. Protect mature trees and natural vegetation and features wherever feasible in new development areas.

7.4-c Urban Trees. Protect and expand Turlock's urban forest through public education, sensitive maintenance practices, and a long-term financial commitment adequate to protect these resources. Continue to require the planting of appropriately spaced street trees in new development areas.

7.4-d Special Review if New Information Becomes Available. Establish environmental review procedures, such as site reconnaissance and certification by a biologist, as part of the project development application process if new information to support existence of a Special Status species becomes available.

7.4-e Identify and protect nesting habitat. Projects on greenfield sites proposing to commence construction or other ground-disturbing activities during the typical nesting season (February through mid-September) shall be required to conduct a survey by a qualified biologist no more than 10 days prior to the start of disturbance activities. If nests are found, no-disturbance buffers around active nests shall be established as follows until the breeding season has ended or until a qualified biologist determines that the birds have fledged and are no longer dependent on the nest for survival:

- 250 feet for non-listed bird species
- 500 feet for migratory bird species; and
- One-half mile for listed species and fully protected species.

7.4-f Swainson's Hawk protection. If Swainson's Hawks are found foraging in an agricultural area prior to or during construction, project proponents shall consult a qualified biologist for recommended proper action, and incorporate appropriate mitigation measures. If specific project activities on sites where suitable nesting habitat may exist are to take place during the normal breeding season (February through mid-September), project proponents shall be required to conduct a survey by a qualified biologist for nesting raptors in all potentially suitable trees no more than 10 days prior to the start of disturbance activities. If an active Swainson's Hawk nest is found, appropriate mitigation measures may include, but are not limited to:

- Establishing a one-half mile buffer around the nest until the breeding season has ended or until a qualified biologist determines that the birds have fledged and are no longer dependent on the nest for survival
- Mitigating habitat loss within a 10-mile radius of known nest sites as follows:
 - Providing a minimum of one acre of habitat management land for each acre of development for projects within one mile of an active nest tree
 - Providing a minimum of 0.75 acres of habitat management land for each acre of development for projects within between one and five miles of an active nest tree
 - Providing a minimum of 0.5 acres of habitat management land for each acre of development for projects within between five and 10 miles of an active nest tree

3.2.2 Threatened and Endangered Species

Permits may be required from the USFWS and/or CDFW if activities associated with a Project have the potential to result in the "take" of a species listed as threatened or endangered under the federal and/or state

Endangered Species Acts. “Take” is defined by the state of California as “to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture or kill” (California Fish and Game Code, Section 86). “Take” is more broadly defined by the federal Endangered Species Act to include “harm” (16 USC, Section 1532(19), 50 CFR, Section 17.3). The CDFW and the USFWS are responding agencies under CEQA. Both agencies review CEQA documents in order to determine the adequacy of their treatment of endangered species issues and to make project-specific recommendations for their conservation.

3.2.3 Designated Critical Habitat

When species are listed as threatened or endangered, the USFWS often designates areas of “Critical Habitat” as defined by section 3(5)(A) of the federal Endangered Species Act (ESA). Critical Habitat is a term defined in the ESA as a specific geographic area that contains features essential for the conservation of a threatened or endangered species and that may require special management and protection. Critical Habitat is a tool that supports the continued conservation of imperiled species by guiding cooperation with the federal government. Designations only affect federal agency actions or federally funded or permitted activities. Critical Habitat does not prevent activities that occur within the designated area. Only activities that involve a federal permit, license, or funding and are likely to destroy or adversely modify Critical Habitat will be affected.

3.2.4 Migratory Birds

The Federal Migratory Bird Treaty Act (MBTA: 16 USC 703-712) prohibits killing, possessing, or trading in any bird species covered in one of four international conventions to which the United States is a party, except in accordance with regulations prescribed by the Secretary of the Interior. The name of the act is misleading, as it actually covers almost all bird’s native to the United States, even those that are non-migratory. The MBTA encompasses whole birds, parts of birds, and bird nests and eggs. Additionally, California Fish and Game Code makes it unlawful to take or possess any non-game bird covered by the MBTA (Section 3513), as well as any other native non-game bird (Section 3800).

3.2.5 Birds of Prey

Birds of prey are protected in California under provisions of Fish and Game Code (Section 3503.5), which states that it is unlawful to take, possess, or destroy any birds in the order Falconiformes (hawks and eagles) or Strigiformes (owls), as well as their nests and eggs. The bald eagle and golden eagle are afforded additional protection under the federal Bald and Golden Eagle Protection Act (16 USC 668), which makes it unlawful to kill birds or their eggs.

3.2.6 Nesting Birds

In California, protection is afforded to the nests and eggs of all birds. California Fish and Game Code (Section 3503) states that it is “unlawful to take, possess, or needlessly destroy the nest or eggs of any bird except as otherwise provided by this code or any regulation adopted pursuant thereto.” Breeding-season disturbance that causes nest abandonment and/or loss of reproductive effort is considered a form of “take” by the CDFW.

3.2.7 Wetlands and other “Jurisdictional Waters”

The U.S. Army Corps of Engineers (USACE) regulates the filling or grading of Waters of the United States (Waters of the U.S.) under the authority of Section 404 of the Clean Water Act. Natural drainage channels and adjacent wetlands may be considered Waters of the U.S. or “jurisdictional waters” subject to the

jurisdiction of the USACE. The extent of jurisdiction has been defined in the Code of Federal Regulations (CFR) and clarified by federal courts.

On June 29, 2015 the U.S. Environmental Protection Agency (EPA) and USACE jointly issued the Clean Water Rule (33 CFR 328.3) as a synthesis of statute, science, and U.S. Supreme Court decisions. The Clean Water Rule (33 CFR 328.3) defines Waters of the U.S. to include the following:

- 1) All waters used in interstate or foreign commerce (also known as “traditional navigable waters”), including all waters subject to the ebb and flow of the tide;
- 2) All interstate waters including interstate wetlands;
- 3) The territorial seas;
- 4) All impoundments of Waters of the U.S.;
- 5) All tributaries of waters defined in Nos. 1 through 4 above, where “tributary” refers to a water (natural or constructed) that contributes flow to another water and is characterized by the physical indicators of a bed and bank and an Ordinary High-Water Mark (OHWM);
- 6) Adjacent waters, defined as either (a) located in whole or in part within 100 feet of the OHWM of waters defined in Nos. 1 through 5 above, or (b) located in whole or in part within the 100-year floodplain and within 1,500 feet of the OHWM of waters defined in Nos. 1 through 5 above;
- 7) Western vernal pools, prairie potholes, Carolina bays and Delmarva bays, pocosins, and Texas coastal prairie wetlands, if determined on a case-specific basis to have a significant nexus to waters defined in Nos. 1 through 3 above;
- 8) Waters that do not meet the definition of adjacency, but are determined on a case-specific basis to have a significant nexus to waters defined in Nos. 1 through 3 above, and are either (a) located in whole or in part within the 100-year floodplain of waters defined in Nos. 1 through 3 above, or (b) located within 4,000 feet of the OHWM of waters defined in Nos. 1 through 5 above.

The 2015 rule also redefines exclusions from jurisdiction, which include:

- 1) Waste treatment systems;
- 2) Prior converted cropland;
- 3) Artificially irrigated areas that would revert to dry land should application of irrigation water to the area cease;
- 4) Groundwater;
- 5) Stormwater control features constructed to convey treat or store stormwater created in dry land; and
- 6) Three types of ditches: (a) ditches with ephemeral flow that are not a relocated or excavated tributary, (b) ditches with intermittent flow that are not a relocated or excavated tributary or that do not drain wetlands, and (c) ditches that do not flow, either directly or through another water, to a traditional navigable water.

A ditch may be a Water of the U.S. only if it meets the definition of “tributary” and is not otherwise excluded under the provision.

As determined by the United States Supreme Court in its 2001 *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers (SWANCC)* decision, channels and wetlands isolated from other jurisdictional waters cannot be considered jurisdictional on the basis of their use, hypothetical or observed, by migratory birds. Similarly, in its 2006 consolidated *Carabell/Rapanos* decision, the U.S. Supreme Court ruled that a significant nexus between a wetland and other navigable waters must exist for the wetland itself to be considered a navigable and therefore jurisdictional water. Furthermore, the Supreme Court clarified that the

Environmental Protection Agency (EPA) and the USACE will not assert jurisdiction over ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water.

The USACE regulates the filling or grading of Waters of the U.S. under the authority of Section 404 of the Clean Water Act. The extent of jurisdiction within drainage channels is defined by “ordinary high-water marks” on opposing channel banks. All activities that involve the discharge of dredge or fill material into Waters of the U.S. are subject to the permit requirements of the USACE. Such permits are typically issued on the condition that the applicant agrees to provide mitigation that result in no net loss of wetland functions or values. No permit can be issued until the RWQCB issues a Section 401 Water Quality Certification (or waiver of such certification) verifying that the proposed activity will meet state water quality standards.

Under the Porter-Cologne Water Quality Control Act of 1969, the State Water Resources Control Board has regulatory authority to protect the water quality of all surface water and groundwater in the State of California (“Waters of the State”). Nine RWQCBs oversee water quality at the local and regional level. The RWQCB for a given region regulates discharges of fill or pollutants into Waters of the State through the issuance of various permits and orders. Discharges into Waters of the State that are also Waters of the U.S. require a Section 401 Water Quality Certification from the RWQCB as a prerequisite to obtaining certain federal permits, such as a Section 404 Clean Water Act permit. Discharges into all Waters of the State, even those that are not also Waters of the U.S., require Waste Discharge Requirements (WDRs), or waivers of WDRs, from the RWQCB. The RWQCB also administers the Construction Storm Water Program and the federal National Pollution Discharge Elimination System (NPDES) program. Projects that disturb one or more acres of soil must obtain a Construction General Permit under the Construction Storm Water Program. A prerequisite for this permit is the development of a Storm Water Pollution Prevention Plan (SWPPP) by a certified Qualified SWPPP Developer. Projects that discharge wastewater, storm water, or other pollutants into a Water of the U.S. may require a NPDES permit.

CDFW has jurisdiction over the bed and bank of natural drainages and lakes according to provisions of Section 1601 and 1602 of the California Fish and Game Code. Activities that may substantially modify such waters through the diversion or obstruction of their natural flow, change or use of any material from their bed or bank, or the deposition of debris require a Notification of Lake or Streambed Alteration. If CDFW determines that the activity may adversely affect fish and wildlife resources, a Lake or Streambed Alteration Agreement will be prepared. Such an agreement typically stipulates that certain measures will be implemented to protect the habitat values of the lake or drainage in question.

3.3 Potentially Significant Project-Related Impacts and Mitigation

As discussed in **Section 1**, the Project includes the development of a water treatment system to an existing well site within the City of Turlock.

Species identified as candidate, sensitive, or special status species in local or regional plans policies or regulations by CDFW or the USFWS that have the potential to be impacted by the construction phase of the Project are identified below with corresponding mitigation measures.

3.3.1 Project-Related Mortality and/or Disturbance of Nesting Raptors, Migratory Birds, and Special Status Birds (Including Swainson’s Hawk)

At the time of the field survey, habitats of the Project area appeared to be of low quality to most native avian species. The site does not contain any trees or native shrubs. The lack of native vegetation and rodents makes the site generally unsuitable for foraging raptors. However, inactive nests were observed within the rain gutters of one of the onsite buildings at the time of the field survey, and avian species tolerant of disturbance could potentially occur onsite. Furthermore, adjacent landscaping associated with residences and a public

school did contain trees which could serve as suitable nesting habitat for a variety of avian species, including raptors like the special status Swainson's hawk (*Buteo swainsoni*).

Swainson's hawks are relatively common in the Central Valley, and there is at least one known nest tree within one mile of the Project site. In the absence of preferred habitat, especially within the Central Valley, Swainson's hawks often nest within eucalyptus trees lining highways, and several raptor species nest within ornamental Mexican fan palms. Although nesting habitat onsite and in the vicinity is not ideal due to the absence of native riparian trees, and foraging habitat is suboptimal, raptors, such as the special status Swainson's hawk could conceivably nest or forage near Project areas. In the unlikely event that a Swainson's hawk or other avian species is foraging within the Project site during construction activities, the individual would be expected to fly away from disturbance they encounter, subsequently eliminating the risk of injury or mortality. Although the Project does not include the removal of any trees or shrubs, raptors and migratory birds occurring within the Project site could be injured or killed by Project activities. Furthermore, construction activities could disturb birds nesting within or adjacent to work areas, resulting in nest abandonment. Project construction activities that adversely affect the nesting success of raptors and migratory birds or result in the mortality of individual birds constitutes a violation of State and federal laws and is considered a significant impact under CEQA.

The Project does not involve the removal of any trees or shrubs, and habitats onsite are suboptimal for foraging and nesting. A swath of superior nesting and foraging habitat in the vicinity is available in the form of agricultural fields just outside of the City's boundaries. For these reasons, loss of nesting and/or foraging habitat would not be considered a potentially significant impact under CEQA.

Nesting bird season is generally accepted as February 1 through August 31; however, Swainson's hawk nesting season is generally accepted as March 1 through September 15. For simplicity, these timeframes have been combined.

Implementation of the following measures will reduce potential impacts to nesting raptors, migratory birds, and special status birds, including Swainson's hawk to a less than significant level under CEQA, and will ensure compliance with State and federal laws protecting these avian species.

Mitigation. The following measures will be implemented during or prior to the start of construction:

Mitigation Measure 3.3.1a (Avoidance): The Project's construction activities shall occur, if feasible, between September 16 and January 31 (outside of nesting bird season) in an effort to avoid impacts to nesting birds.

Mitigation Measure 3.3.1b (Pre-construction Survey): If activities must occur within nesting bird season (February 1 to September 15), a qualified biologist shall conduct pre-construction surveys for active nests within 30 days prior to the start of construction. The survey shall include the proposed work area and surrounding lands within 0.5 mile. If no active nests are observed, no further mitigation is required. Raptor nests are considered "active" upon the nest-building stage.

Mitigation Measure 3.3.1c (Establish Buffers): On discovery of any active nests near work areas, the biologist shall determine appropriate construction setback distances based on applicable CDFW and/or USFWS guidelines and/or the biology of the species in question. Construction buffers shall be identified with flagging, fencing, or other easily visible means, and shall be maintained until the biologist has determined that the nestlings have fledged.

3.4 Less Than Significant Project-Related Impacts

3.4.1 Project-Related Impacts to Special Status Plant Species

13 special status plant species have been documented in the Project vicinity, including alkali milk-vetch (*Astragalus tener* var. *tener*), beaked clarkia (*Clarkia rostrata*), California alkali grass (*Puccinellia simplex*), Colusa grass (*Neostapfia colusana*), Delta button-celery (*Eryngium racemosum*), Greene's tuctoria (*Tuctoria greenii*), heartscale (*Atriplex cordulata* var. *cordulata*), lesser saltscale (*Atriplex miniscula*), Merced monardella (*Monardella leucophala*), prairie wedge grass (*Sphenopholis obtusata*), San Joaquin Valley orcutt grass (*Orcuttia inequalis*), subtle orache (*Atriplex subtilis*), and vernal pool smallscale (*Atriplex persistens*). As explained in **Table 2**, all of the aforementioned plant species are absent from the Project area due to past and ongoing disturbance and/or the absence of suitable habitat. Therefore, the implementation of the Project will have no effect on individual plants or regional populations of these special status plant species. Mitigation measures are not warranted.

3.4.2 Project-Related Impacts to Special Status Animal Species Absent From, or Unlikely to Occur on, the Project Site

Of the 18 regionally occurring special status species, 17 are considered absent or unlikely to occur within the Project area due to past or ongoing disturbance and/or absence of suitable habitat. As explained in **Table 1**, the following 14 species were deemed absent from the Project area: burrowing owl (*Athene cunicularia*), California red-legged frog (*Rana draytonii*), California tiger salamander (*Ambystoma californiense*), Crotch bumble bee (*Bombus crotchii*), Delta smelt (*Hypomesus transpacificus*), hardhead (*Mylopharodon conocephalus*), least Bell's vireo (*Vireo bellii pusillus*), northern California legless lizard (*Anniella pulchra*), Sacramento spittail (*Pogonichthys macrolepidotus*), Steelhead-Central Valley DPS (*Oncorhynchus mykiss irideus* pop.11), valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*), vernal pool fairy shrimp (*Branchinecta lynchi*), vernal pool tadpole shrimp (*Lepidurus packardii*), and western pond turtle (*Emys marmorata*). The following 3 species were deemed unlikely to occur within the Project area: cackling (=Aleutian Canada) goose (*Branta hutchinsii leucopareia*), Townsend's big-eared bat (*Corynorhinus townsendii*), and tricolored blackbird (*Agelaius tricolor*). Since it is highly unlikely that these species would occur onsite, implementation of the Project should have no impact on these special status species through construction mortality, disturbance, or loss of habitat. Mitigation measures are not warranted.

3.4.3 Project-Related Impacts to Jurisdictional Waters, Wetlands, Navigable Waters, Wild and Scenic Rivers, or other Water Features, and Riparian Habitat

Aquatic features and riparian vegetation are absent within the Project area. Traditional navigable waters, relatively permanent waters, wetlands, wild and scenic rivers, and riparian habitat are absent from the Project area and surrounding lands. Therefore, implementation of the Project will have no impact on the aforementioned biological resources. Furthermore, the Project will not impact any bodies of water and will not require compliance with the Fish and Wildlife Coordination Act. Mitigation measures are not warranted.

3.4.4 Project-Related Impacts to Wildlife Movement Corridors or Native Nursery Sites

As discussed in Section 2.7, the Project site does not contain features likely to serve as a wildlife movement corridor. Therefore, the Project will not impact wildlife movement corridors or impede the movement of any wildlife species. If the Project were to negatively affect the success of a native bat maternity roost, this would be considered a potentially significant impact under CEQA and/or NEPA. However, as discussed in

Sections 2.3.1 and 2.3.2, the developed and ruderal habitats of the site are generally unsuitable for roosting bats due to ongoing disturbance. Furthermore, the site does not provide typical suitable foraging habitat and no bat sign was observed during the survey. Therefore, bats would not be expected to roost onsite or in the vicinity and would likely be deterred from forming maternity roosts in areas subject to frequent human disturbance. No burrows or evidence of burrowing mammals was observed during the biological survey, and therefore the Project would not be expected to impact natal dens or any other type of native nursery site. Potential impacts to migratory and/or spawning fish are discussed in **Section 3.4.8** below. Potential impacts to nesting and migratory birds have been discussed in **Section 3.3.1** and implementation of the recommended mitigation measures should reduce said impacts to a less than significant level. Additional mitigation regarding potential impacts to wildlife movement corridors and/or native wildlife nursery sites is not warranted.

3.4.5 Project-Related Impacts to Critical Habitat

Designated critical habitat is absent from the Project area and surrounding lands. Therefore, there will be no impact to critical habitat, and mitigation is not warranted.

3.4.6 Local Policies or Habitat Conservation Plans

The Project appears to be consistent with all of the policies geared towards the conservation of biological resources set forth by the Turlock General Plan, and there are no adopted habitat conservation plans in the vicinity. Mitigation is not warranted.

3.4.7 Coastal Zone and Coastal Barriers Resources Act

The Project is not located within the coastal zone. The Project will not impact or be located within or near the Coastal Barrier Resources System or its adjacent wetlands, marshes, estuaries, inlets, and near-shore waters. Mitigation is not warranted.

3.4.8 Project-Related Impact to Essential Fish Habitat

Essential Fish Habitat (EFH) means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. National Oceanic and Atmospheric Administration (NOAA) provides a spatial representation of EFH for species, delineated by watersheds. Any federal agency that takes an action that could adversely affect EFH by reducing the quantity or quality of habitat must work with National Marine Fisheries Service (NMFS) to identify impacts and steps for conserving the habitat and reducing potential project-related impacts.

The Project is located within the Lower San Joaquin River Watershed (HUC:18040002) which is considered EFH for Chinook salmon; however, there are no aquatic features onsite which could serve as suitable habitat for salmon or serve as a tributary to suitable habitat. Habitat Areas of Particular Concern (HAPC) and Essential Fish Habitat Areas Protected from Fishing (EFHA) are absent from the Project area, and the Project does not involve activities which could result in degradation of aquatic resources or fish habitat. Therefore, the Project will have no impact to special status fish, EFH, or an HAPC, and consultation with NMFS will not be required.

Query results of the NOAA EHF Mapper can be found in **Appendix D** at the end of this document. Mitigation is not warranted.

3.5 Section 7 Determination

In addition to the effects analysis performed in Sections 2 and 3 of this document, Error! Reference source not found. summarizes Project effect determinations for Federally Listed Species found on the USFWS IPaC list generated on October 3, 2019 (**Appendix C**), in accordance with Section 7 of the Endangered Species Act.

Table 3. Section 7 Determinations

Species	Determination	Rationale for Determination
California red-legged frog (<i>Rana draytonii</i>)	No effect	Habitat absent. Project area is outside of the known distribution range of this species.
California tiger salamander (<i>Ambystoma californiense</i>)	No effect	Habitat absent. No known extant recorded occurrences in the Project vicinity.
Delta smelt (<i>Hypomesus transpacificus</i>)	No effect	Habitat absent. Project area is outside of the known distribution range of this species. Water features are absent from the Project area and the vicinity. Therefore, there is no potential for indirect downstream effects.
giant gartersnake (<i>Thamnophis gigas</i>)	No effect	Habitat absent. No known recorded occurrences in the Project vicinity.
valley elderberry longhorn beetle (<i>Desmocerus californicus dimorphus</i>)	No effect	Habitat absent.
vernal pool fairy shrimp (<i>Branchinecta lynchi</i>)	No effect	Habitat absent.
vernal pool tadpole shrimp (<i>Lepidurus packardii</i>)	No effect	Habitat absent.

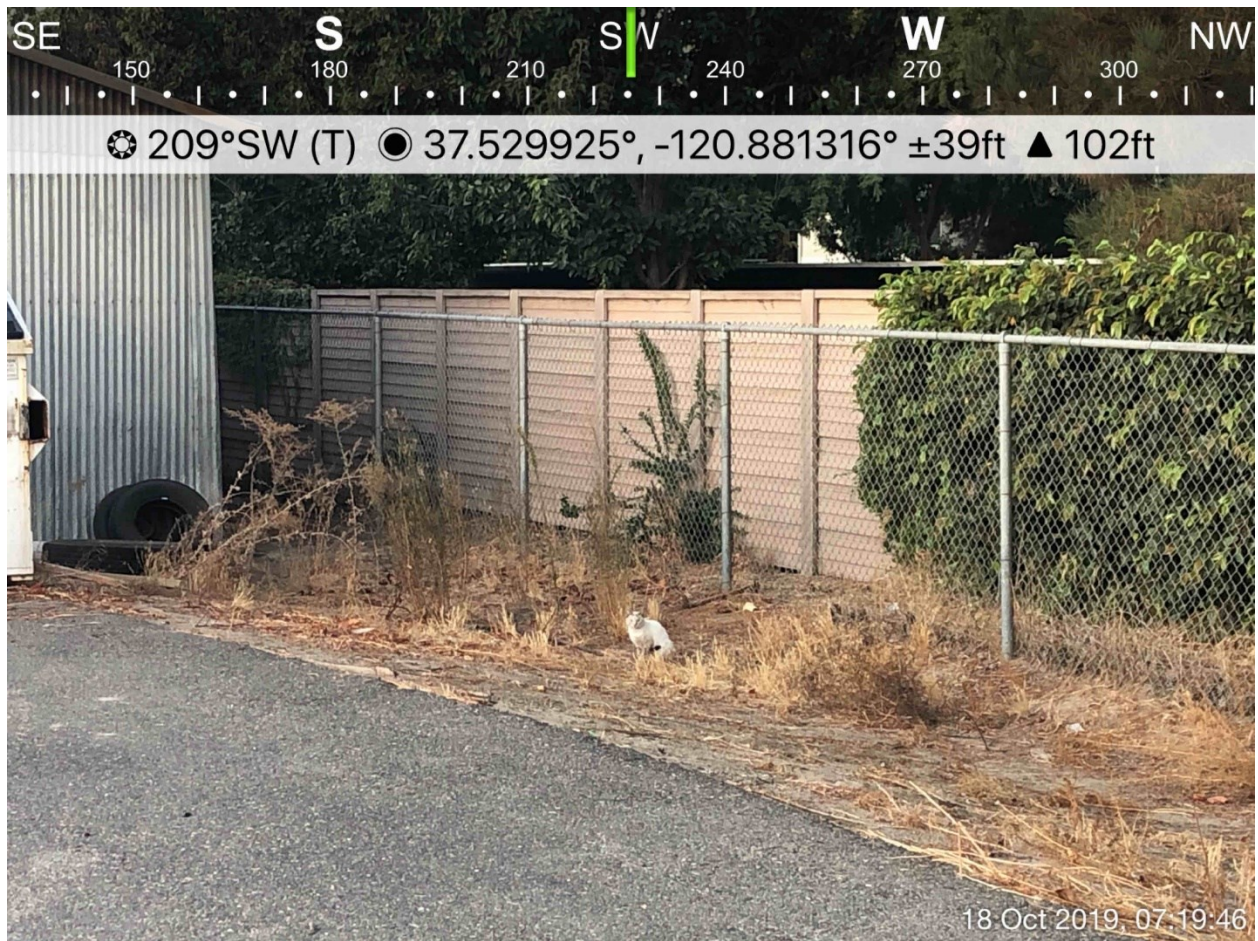
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Appendix A. Selected Photographs of the Project Site



Photograph 1: Prey remains observed within the ruderal portion of the APE. Domestic cats were observed in this area.



Photograph 2: One of the many domestic cats observed onsite during the field survey.



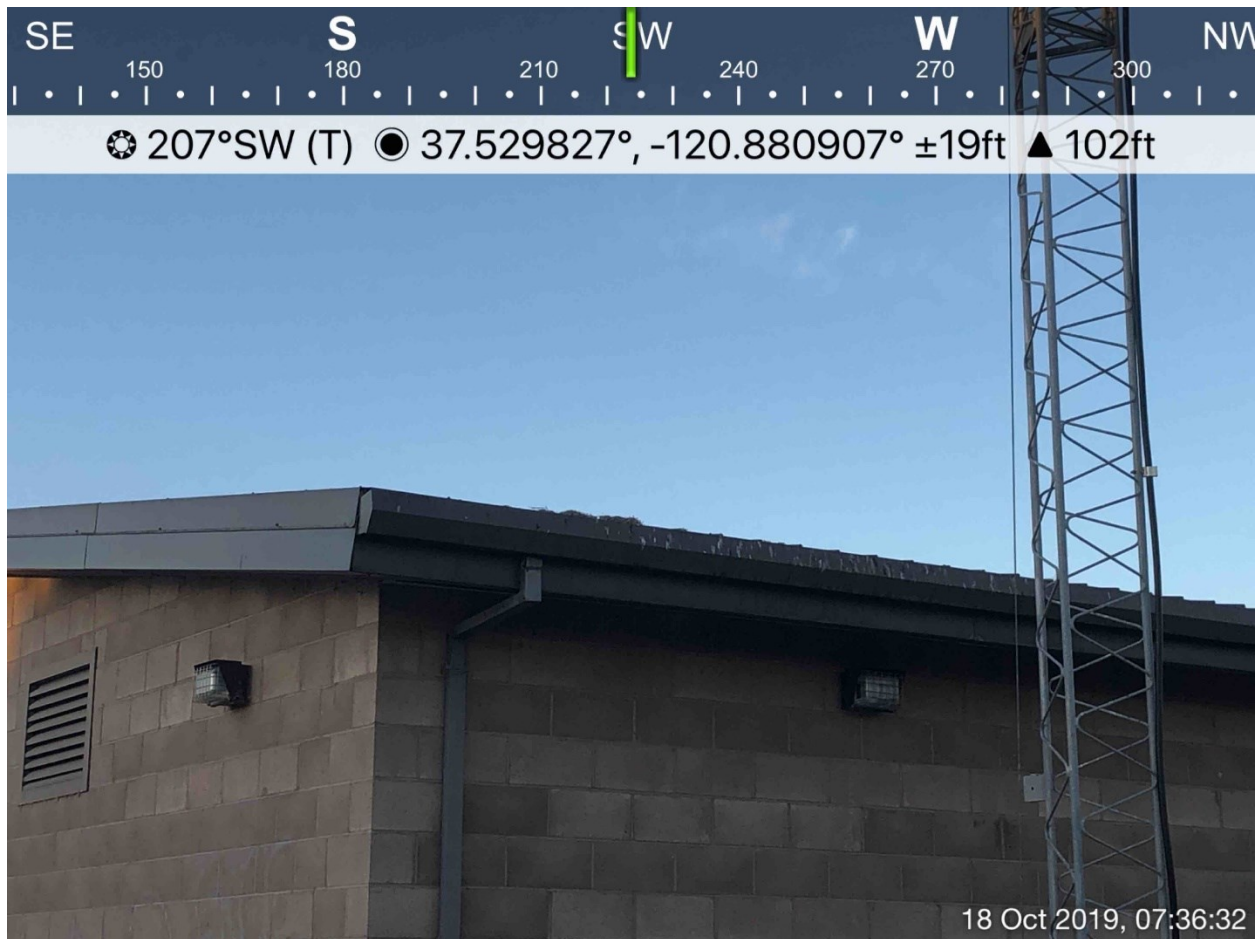
Photograph 3: Openings on the roof overhang of the shed onsite that could potentially be used by bats. No bat individuals or sign (staining or guano) were observed, and no audible vocalizations were heard at the time of the field survey.



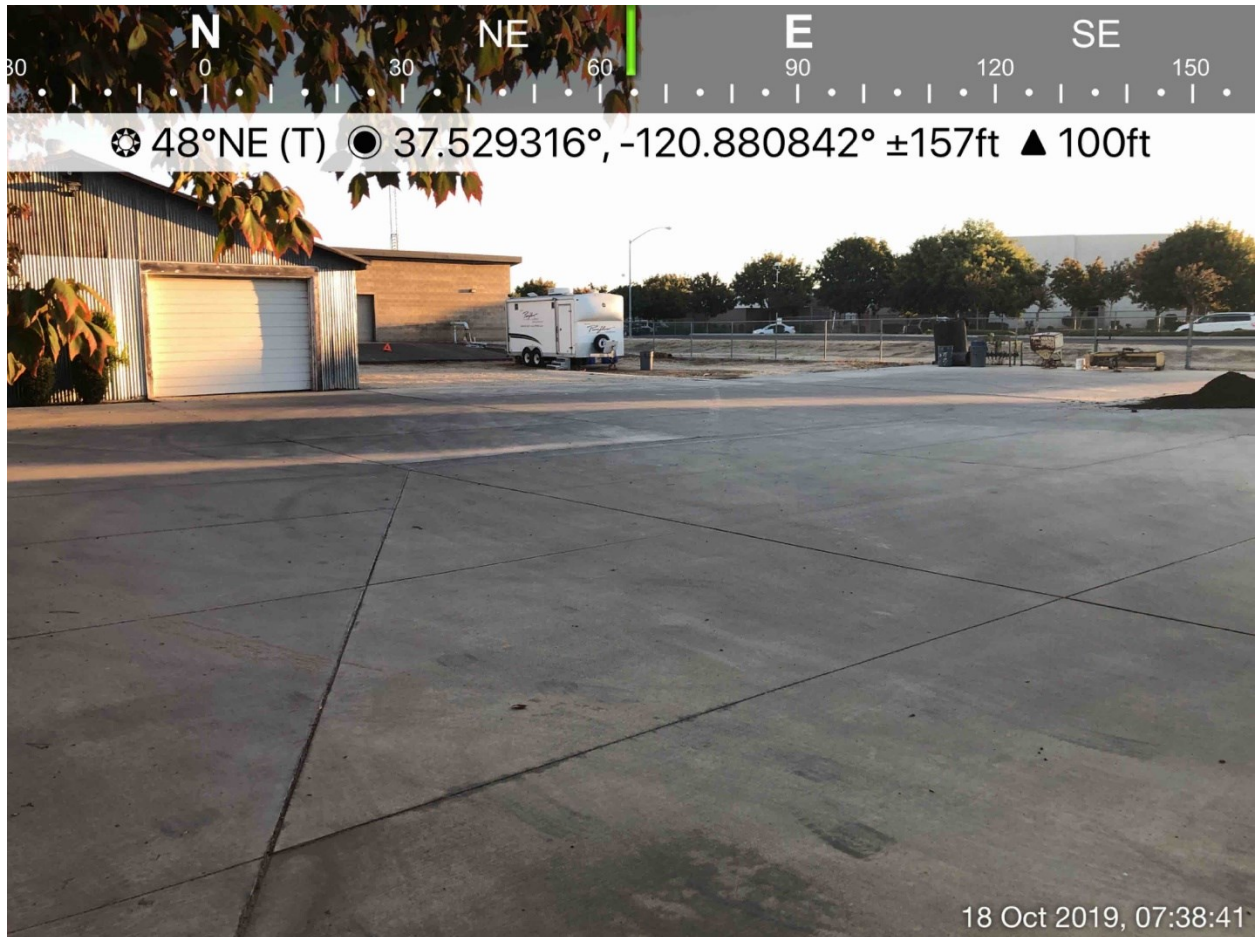
Photograph 4: The newer, cinder block building did not contain any openings, crevices, or projections which could serve as potential bat roosts.



Photograph 5: Open pipes in the yard were inspected and showed no signs of habitation. All of the pipes were filled with a dense layer of cobwebs.



Photograph 6: Inactive nests were observed within the rain gutter on the north side of the cinder block building. European starlings were perched on the tower visible in this photo.



Photograph 7: Overview of the developed portion of the site from the inside of the fence near the southwest corner of the APE.



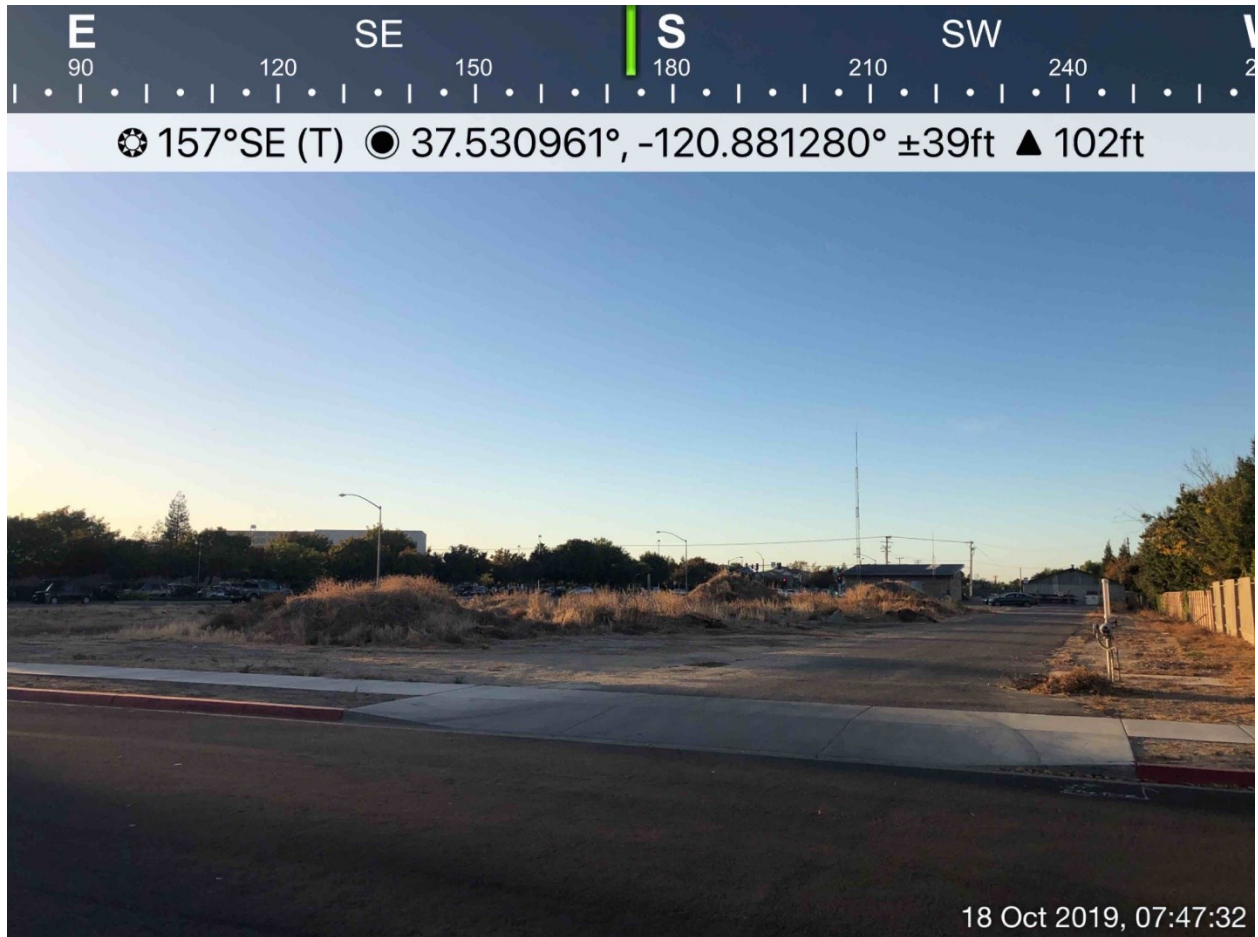
Photograph 8: Overview of the southern boundary of the APE. Adjacent development and landscaping associated with residences are visible in this photograph.



Photograph 9: Overview of the Project area from the southeast corner of the APE.



Photograph 10: Piles of sand, rock, gravel, cement, and potting soil were present within the ruderal, northern portion of the APE.



Photograph 11: Overview of the Project area from the northwest corner of the APE.



Photograph 12: Overview of the Project area from the northeast corner of the APE.



Photograph 13: Overview of the ruderal, northern portion of the APE.

Appendix B. CNDDB Query Results



Selected Elements by Common Name

California Department of Fish and Wildlife

California Natural Diversity Database



Query Criteria: Quad< IS (Ceres (3712058) OR Riverbank (3712068) OR Waterford (3712067) OR Denair (3712057) OR Turlock (3712047) OR Hatch (3712048) OR Crows Landing (3712141) OR Brush Lake (3712151) OR Salida (3712161))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
alkali milk-vetch <i>Astragalus tener</i> var. <i>tener</i>	PDFAB0F8R1	None	None	G2T1	S1	1B.2
beaked clarkia <i>Clarkia rostrata</i>	PDONA050Y0	None	None	G2G3	S2S3	1B.3
burrowing owl <i>Athene cunicularia</i>	ABNSB10010	None	None	G4	S3	SSC
cackling (=Aleutian Canada) goose <i>Branta hutchinsii leucopareia</i>	ABNJB05035	Delisted	None	G5T3	S3	WL
California alkali grass <i>Puccinellia simplex</i>	PMPOA53110	None	None	G3	S2	1B.2
California tiger salamander <i>Ambystoma californiense</i>	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Colusa grass <i>Neostapfia colusana</i>	PMPOA4C010	Threatened	Endangered	G1	S1	1B.1
Crotch bumble bee <i>Bombus crotchii</i>	IIHYM24480	None	Candidate Endangered	G3G4	S1S2	
Delta button-celery <i>Eryngium racemosum</i>	PDAP10Z0S0	None	Endangered	G1	S1	1B.1
great blue heron <i>Ardea herodias</i>	ABNGA04010	None	None	G5	S4	
Greene's tuctoria <i>Tuctoria greenei</i>	PMPOA6N010	Endangered	Rare	G1	S1	1B.1
hardhead <i>Mylopharodon conocephalus</i>	AFCJB25010	None	None	G3	S3	SSC
heartscale <i>Atriplex cordulata</i> var. <i>cordulata</i>	PDCHE040B0	None	None	G3T2	S2	1B.2
hoary bat <i>Lasiurus cinereus</i>	AMACC05030	None	None	G5	S4	
least Bell's vireo <i>Vireo bellii pusillus</i>	ABPBW01114	Endangered	Endangered	G5T2	S2	
lesser saltscale <i>Atriplex minuscula</i>	PDCHE042M0	None	None	G2	S2	1B.1
Merced kangaroo rat <i>Dipodomys heermanni dixonii</i>	AMAFD03062	None	None	G3G4T2T3	S2S3	
Merced monardella <i>Monardella leucocephala</i>	PDLAM180C0	None	None	GH	SH	1A
moestan blister beetle <i>Lytta moesta</i>	IICOL4C020	None	None	G2	S2	



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



Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
northern California legless lizard <i>Anniella pulchra</i>	ARACC01020	None	None	G3	S3	SSC
obscure bumble bee <i>Bombus caliginosus</i>	IIHYM24380	None	None	G4?	S1S2	
prairie wedge grass <i>Sphenopholis obtusata</i>	PMPOA5T030	None	None	G5	S2	2B.2
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	AFCJB34020	None	None	GNR	S3	SSC
San Joaquin Valley Orcutt grass <i>Orcuttia inaequalis</i>	PMPOA4G060	Threatened	Endangered	G1	S1	1B.1
snowy egret <i>Egretta thula</i>	ABNGA06030	None	None	G5	S4	
steelhead - Central Valley DPS <i>Oncorhynchus mykiss irideus pop. 11</i>	AFCHA0209K	Threatened	None	G5T2Q	S2	
subtle orache <i>Atriplex subtilis</i>	PDCHE042T0	None	None	G1	S1	1B.2
Swainson's hawk <i>Buteo swainsoni</i>	ABNKC19070	None	Threatened	G5	S3	
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	AMACC08010	None	None	G3G4	S2	SSC
tricolored blackbird <i>Agelaius tricolor</i>	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
valley elderberry longhorn beetle <i>Desmoceris californicus dimorphus</i>	IICOL48011	Threatened	None	G3T2	S2	
vernal pool fairy shrimp <i>Branchinecta lynchi</i>	ICBRA03030	Threatened	None	G3	S3	
vernal pool smallscale <i>Atriplex persistens</i>	PDCHE042P0	None	None	G2	S2	1B.2
vernal pool tadpole shrimp <i>Lepidurus packardii</i>	ICBRA10010	Endangered	None	G4	S3S4	
western pond turtle <i>Emys marmorata</i>	ARAAD02030	None	None	G3G4	S3	SSC

Record Count: 35

Appendix C. USFWS Species 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:

October 03, 2019

Consultation Code: 08ESMF00-2020-SLI-0031

Event Code: 08ESMF00-2020-E-00092

Project Name: City of Turlock: Well No. 38 Arsenic Treatment Project

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-0031

Event Code: 08ESMF00-2020-E-00092

Project Name: City of Turlock: Well No. 38 Arsenic Treatment Project

Project Type: WATER QUALITY MODIFICATION

Project Description: The City of Turlock will install an arsenic water treatment system at Well 38. The system will include an iron-assisted coagulation filtration plant, chemical building, pressure vessels, an equalization tank, and possibly a backup generator. The chemical building will consist of a thick concrete pad, metal roof, and chain link fence.

Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/place/37.53003451963329N120.88099676915559W>



Counties: Stanislaus, CA

Endangered Species Act Species

There is a total of 7 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.

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
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

Critical habitats

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

Appendix D. NOAA EFH Mapping Query Results

EFH Data Notice: Essential Fish Habitat (EFH) is defined by textual descriptions contained in the fishery management plans developed by the regional Fishery Management Councils. In most cases mapping data can not fully represent the complexity of the habitats that make up EFH. This report should be used for general interest queries only and should not be interpreted as a definitive evaluation of EFH at this location. A location-specific evaluation of EFH for any official purposes must be performed by a regional expert. Please refer to the following links for the appropriate regional resources.



West Coast Regional Office
Alaska Regional Office

Query Results

Degrees, Minutes, Seconds: Latitude = 37°31'48" N, Longitude = 121°07'11" W
Decimal Degrees: Latitude = 37.53, Longitude = -120.88

The query location intersects with spatial data representing EFH and/or HAPCs for the following species/management units.

EFH

Show	Link	HUC Name	Species/Management Unit	Lifestage(s) Found at Location	Management Council	FMP
		Lower San Joaquin River	Chinook Salmon	All	Pacific	Pacific Coast Salmon Plan

HAPCs

No Habitat Areas of Particular Concern (HAPC) were identified at the report location.

EFH Areas Protected from Fishing

No EFH Areas Protected from Fishing (EFHA) were identified at the report location.

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**

Spatial data does not currently exist for all the managed species in this area. The following is a list of species or management units for which there is no spatial data.

****For links to all EFH text descriptions see the complete data inventory: open data inventory -->**

Pacific Coastal Pelagic Species,

Jack Mackerel,

Pacific (Chub) Mackerel,

Pacific Sardine,

Northern Anchovy - Central Subpopulation,

Northern Anchovy - Northern Subpopulation,

Pacific Highly Migratory Species,

Bigeye Thresher Shark - North Pacific,

Bluefin Tuna - Pacific,

Dolphinfish (Dorado or Mahimahi) - Pacific,

Pelagic Thresher Shark - North Pacific,

Swordfish - North Pacific,

West Coast Salmon,

All species and stocks

EFH View Tool | Data Query Tool

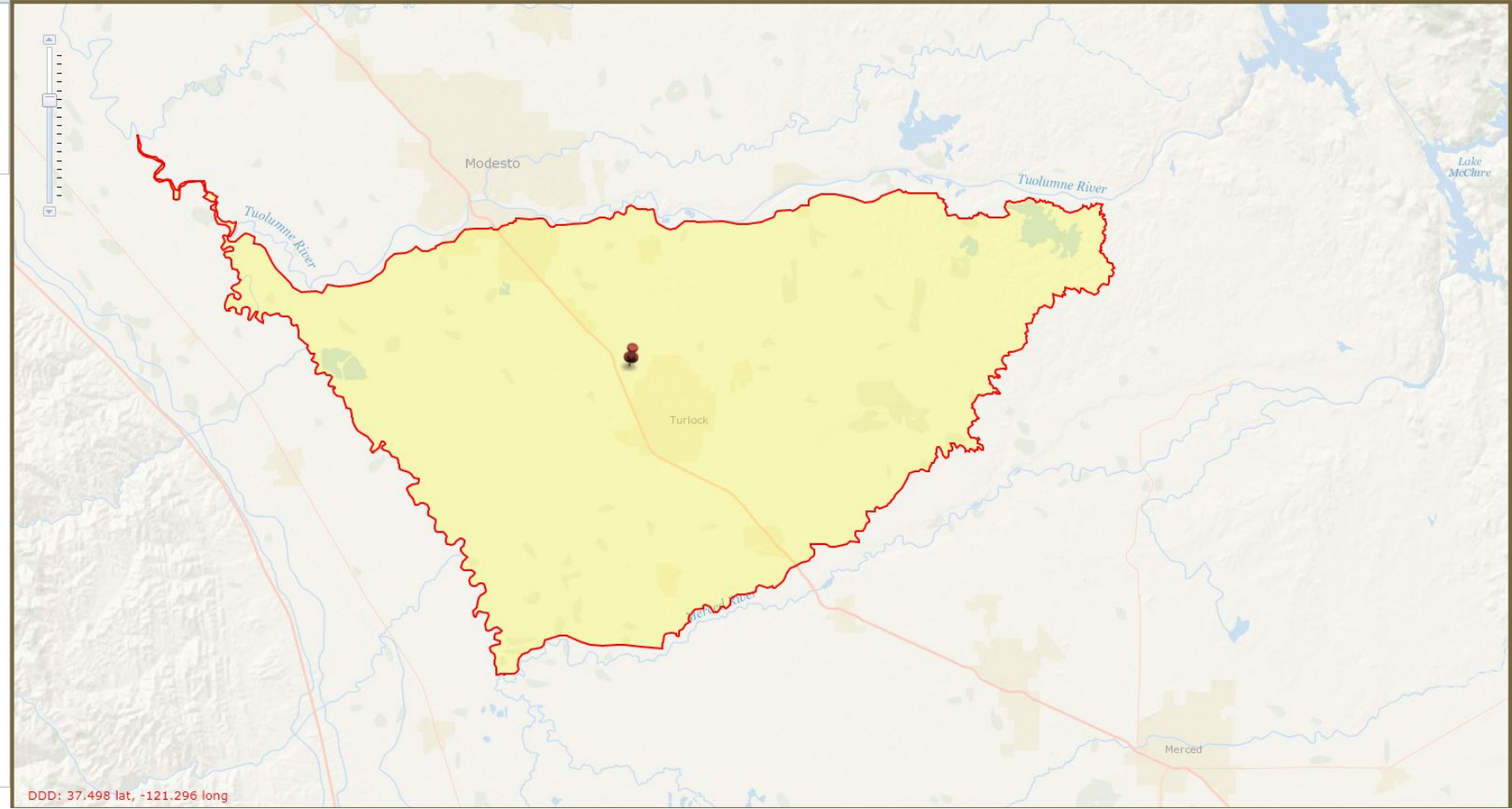
Region
- Select Region -

Essential Fish Habitat

Habitat Areas of Particular Concern

EFH Areas Protected from Fishing

Zoom: | Extent: | Location Query: | 10 Min sq.: | Help:



Appendix E. Soils Report



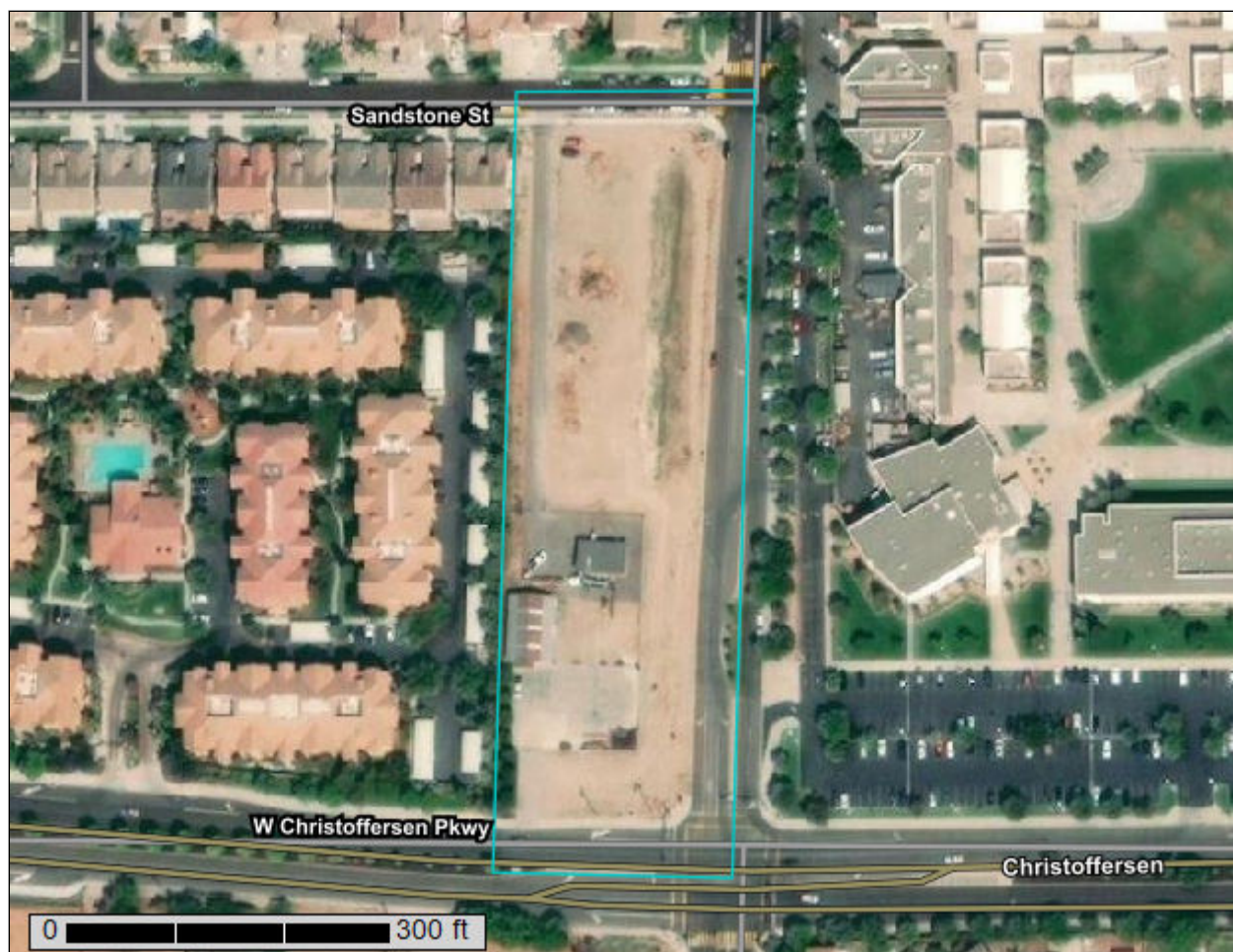
United States
Department of
Agriculture

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 **Eastern Stanislaus Area, California**



October 3, 2019

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

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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

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

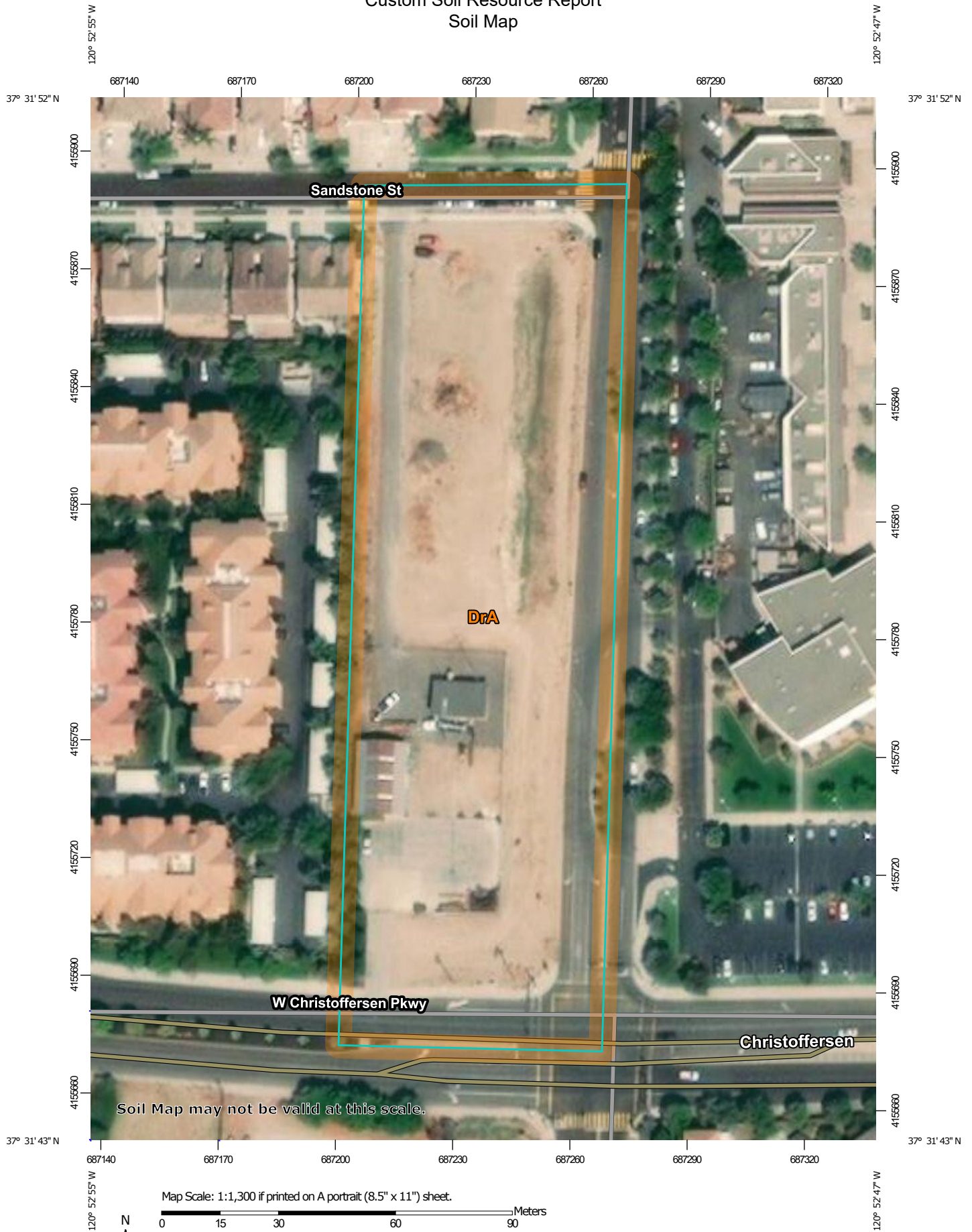
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identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

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.

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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: Eastern Stanislaus Area, California
Survey Area Data: Version 13, Sep 16, 2019

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

Date(s) aerial images were photographed: Jun 24, 2016—Nov 6, 2017

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
DrA	Dinuba sandy loam, 0 to 1 percent slopes	3.7	100.0%
Totals for Area of Interest		3.7	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 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.

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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.

Eastern Stanislaus Area, California

DrA—Dinuba sandy loam, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hjbl
Elevation: 100 to 500 feet
Mean annual precipitation: 12 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 250 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Dinuba

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 10 inches: sandy loam
H2 - 10 to 30 inches: sandy loam
H3 - 30 to 60 inches: very fine sand, silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4s
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components

Hilmar

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

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Hanford

Percent of map unit: 5 percent

Hydric soil rating: No

Fresno

Percent of map unit: 5 percent

Hydric soil rating: No

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