LIVE OAK ASSOCIATES, INC.

an Ecological Consulting Firm

JURISDICTIONAL WATERS INVESTIGATION
RED TOP CONVEYANCE PROJECT
MADERA AND FRESNO COUNTIES, CALIFORNIA

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EXECUTIVE SUMMARY

Live Oak Associates, Inc. (LOA) conducted a delineation of potential waters of the United States of an approximately 2-acre site within and adjacent to the San Joaquin River in Fresno and Madera Counties, California. An approximately 82 linear foot segment of the San Joaquin River, a known Traditionally Navigable Water (TNW), was identified as a water of the U.S. within the study area. An approximately 82 linear foot segment of the Poso Canal was identified as a potential tributary water to the San Joaquin River. Waters of the U.S. generally include navigable waters, interstate drainages, impoundments of jurisdictional waters, tributaries to navigable and interstate waters, and wetlands adjacent to such waters.

LOA plant/wetland/wildlife ecologist Jeff Gurule examined the entire study area for possible waters of the U.S. and gathered vegetation, soils and hydrology data at four sampling locations within and adjacent to such waters on December 1, 2015. The San Joaquin River within ordinary high water (OHW) is considered a TNW and a Section 10 water by the U.S. Army Corps of Engineers. Areas of Poso Canal within ordinary high water (OHW) are considered potentially jurisdictional tributary waters. The Poso Canal is considered potentially jurisdictional due to the fact that it receives water from the San Joaquin River, via the Main Canal, and appears to have an outlet to the San Joaquin River downstream of the study area. Jurisdictional boundaries and potentially jurisdictional boundaries within OHW mapped during LOA's field investigation occupied approximately 8,548 square feet (0.19 acres) of the study area. Areas meeting the three technical criteria of a wetland were absent from the study area.

No other portion of the study area would be considered a water of the U.S. A large area within the San Joaquin River levees consists of an upland flood plain. The upper San Joaquin River levee banks supported riparian vegetation. All other areas of the study area did not meet any of the technical criteria of jurisdictional wetlands or contained evidence of ordinary high water.

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1.0 INTRODUCTION

Live Oak Associates, Inc. (LOA) surveyed an approximately 2-acre area with the potential to be impacted by the Red Top Conveyance Project (hereafter referred to as the study area or site) for waters of the United States and other jurisdictional waters (hereafter referred to as "jurisdictional waters") in the fall of 2015. The site is located south of the State Route 152 crossing of the SJR immediately west of the intersection of Road 1 and the Avenue 18 ½ alignment (Figure 1). The project site is located on Assessor Parcel Numbers 020-200-001 and 001-090-03T in Section 2 of Township 11 South, Range 13 East, M. D. B. & M., on the *Santa Rita Bridge* U.S.G.S quadrangle (Figure 2).

1.1 REGULATORY DEFINITION OF WATERS OF THE U.S.

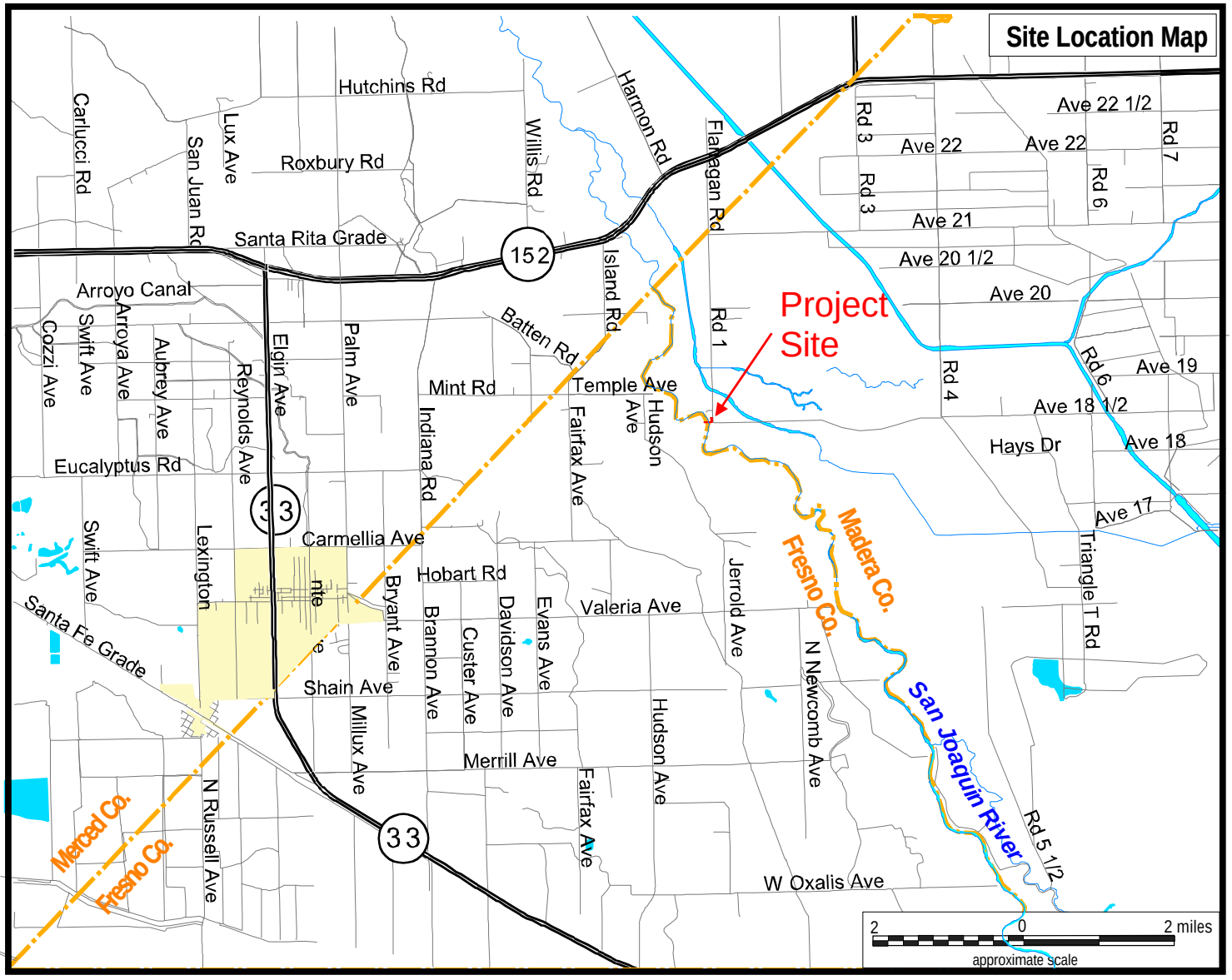
Section 404 of the federal Clean Water Act (CWA) regulates the discharge of dredged or fill material into "navigable waters" (33 U.S.C. §1344), defined in the CWA as "the waters of the United States, including the territorial seas" (33 U.S.C. §1362(7)). By regulation, the U.S. Army Corps of Engineers (USACE) has defined "waters of the United States" to mean:

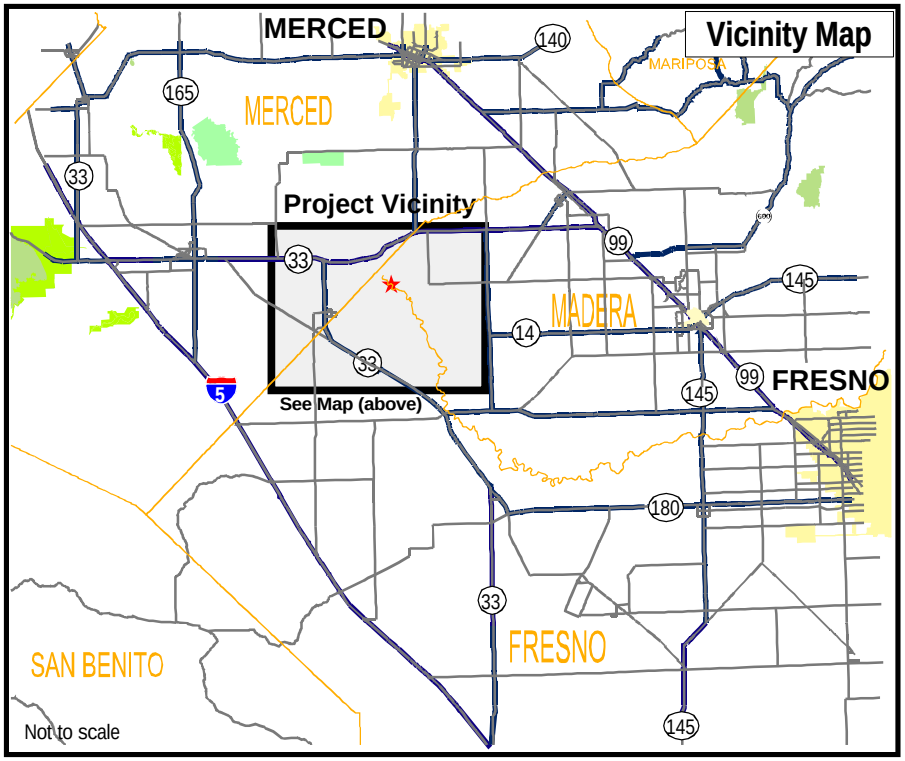
(1) All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;

(2) All interstate waters including interstate wetlands;

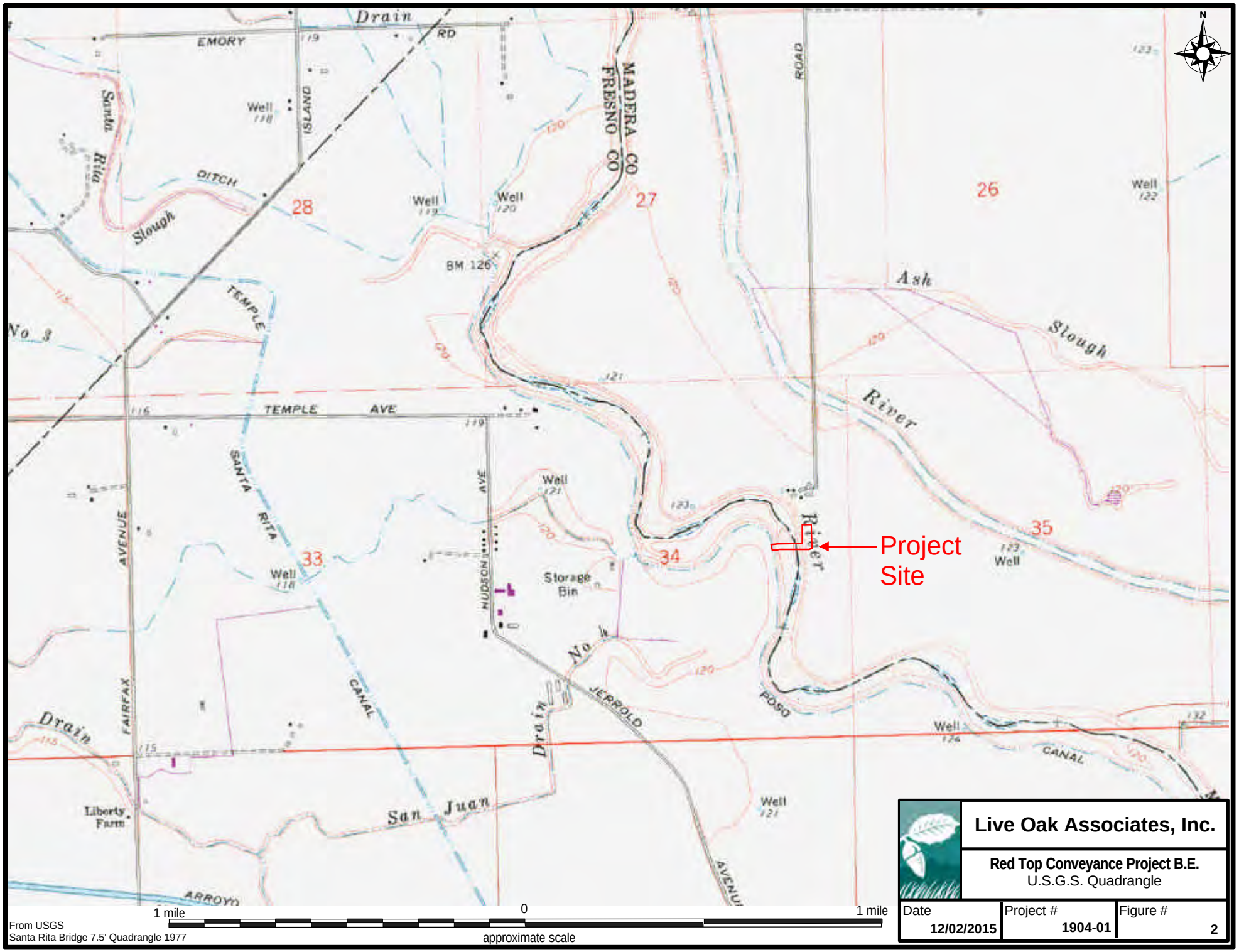
(3) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters:

(i) Which are or could be used by interstate or foreign travelers for recreational or other purposes; or





Live Oak Associates, Inc.		
Red Top Conveyance Project B.E. Site / Vicinity Map		
Date **12/02/2015**	Project # **1904-01**	Figure # **1**



From USGS
Santa Rita Bridge 7.5' Quadrangle 1977

Live Oak Associates, Inc.

Red Top Conveyance Project B.E.
U.S.G.S. Quadrangle

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(ii) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or

(iii) Which are used or could be used for industrial purpose by industries in interstate commerce;

(4) All impoundments of waters otherwise defined as waters of the United States under the definition;

(5) Tributaries of waters identified in paragraphs (a) (1) through (4) of this section;

(6) The territorial seas;

(7) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) (1) through (6) of this section (33 CFR § 328.3(a) (3)).

"Waters of the United States" are subject to the jurisdiction of the USACE and, per provisions of Section 404 of the CWA, the discharge of fill into such waters requires a federal permit issued by the USACE.

1.2 SUPREME COURT DECISIONS AFFECTING THE DEFINITIONS OF WATERS OF THE UNITED STATES

A number of U.S. Supreme Court decisions have attempted to address the jurisdictional status of aquatic features that are not hydrologically connected to navigable waters or their tributaries, or where the hydrologic connection is so insignificant that destruction or modification of the aquatic feature would have little effect on downstream waters of the United States.

1.2.1 SWANCC Decision

In January of 2001, the U.S. Supreme Court ruled in *Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers* (the SWANCC decision) that "non-navigable, isolated, intrastate" waters could not be claimed as jurisdictional by the USACE on the basis of their use by migratory birds. Although the Court did not

specifically address the meaning of the word "isolated," it upheld the jurisdictional status of "adjacent" wetlands (and other waters), which are by definition wetlands that are "bordering, contiguous, or neighboring" other jurisdictional waters. Therefore, the term "isolated wetland" has implicitly been defined as 'wetlands that are not bordering, contiguous, or neighboring' other jurisdictional waters. This definition does not, however, address the degree of proximity necessary to establish that one wetland (or other water) is "adjacent" to a known jurisdictional water. As established by the Supreme Court in the *United States v. Riverside Bayview Homes, Inc*. in 1985, "wetlands separated from other waters by man-made dikes or barriers, natural river berms, beach dunes, and the like are 'adjacent wetlands.'"

1.2.2 Consolidated Carabell/Rapanos Decision

In June of 2006 the U.S. Supreme Court ruled in the consolidated cases of *June Carabell v. U.S. Army Corps of Engineers* and *John Rapanos v. United States* that wetlands are waters of the United States "if the wetlands, either alone or in combination with similarly situated lands in the region, significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as 'navigable.'" When, in contrast, wetlands' effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term 'navigable waters.'

On June 5, 2007, the Environmental Protection Agency (EPA) and the USACE jointly issued guidance in interpreting the Carabell/Rapanos cases as they apply to the extent of federal jurisdiction covered by Section 404 of the Clean Water Act. The agencies revised this guidance memorandum on December 2, 2008. The key points of this guidance are that the EPA and the USACE: 1) will assert jurisdiction over traditional navigable waters, wetlands adjacent to traditional navigable waters, relatively permanent non-navigable tributaries of traditional navigable waters where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months), and wetlands that directly abut such tributaries; 2) will decide jurisdiction over relatively impermanent non-navigable tributaries of navigable waters, wetlands adjacent to such tributaries, and wetlands adjacent to but not directly abutting a relatively permanent non-navigable

tributary, based on a fact-specific analysis to determine whether they have a "significant nexus" with a traditional navigable water; and 3) generally will not assert jurisdiction over swales or erosional features (e.g., gullies, small washes characterized by low volume, infrequent, or short duration flow) or ditches excavated wholly in and draining only uplands and that do not carry a relatively permanent flow of water. In applying the "significant nexus" standard, the EPA and USACE will "assess the flow characteristics and functions of the tributary itself and the functions performed by all wetlands adjacent to the tributary to determine if they significantly affect the chemical, physical and biological integrity of downstream traditional navigable waters." "Significant nexus" includes consideration of hydrologic and ecological factors.

1.2.3 Post-Rapanos EPA/USACE Rule

The EPA and USACE published a joint rule in the Federal Register in June of 2015. The rule was an attempt by these agencies to clarify ambiguities of previous Supreme Court decisions. However, in October 2015 the U.S. Court of Appeals for the 6th Circuit granted a nationwide stay against the rule. At the time of the preparation of this report the implementation of the waters of the U.S. rule is still blocked pending future court decisions.

1.3 STATE OF CALIFORNIA JURISDICTION OVER AQUATIC FEATURES

The State of California also asserts jurisdiction over certain drainages and wetlands. The limits of jurisdiction vary slightly from those of the USACE. The California Department of Fish and Wildlife (CDFW) and the Regional Water Quality Control Board (RWQCB) are the two state regulatory agencies responsible for implementing state regulations that identify and protect waters of the state.

According to Section 1602 of the California Fish and Game Code, public and private entities may not substantially divert or obstruct the natural flow of any river, stream, or lake within the state. This section of Fish and Game Code establishes the State's interest in regulating construction activities in the "bed, channel, or bank" of a natural drainage or stream. A "stream" subject to the jurisdiction of the CDFW has been defined as "a body

of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life" (California Code of Regulations, Title 14).

Since its inception, the RWQCB has had regulatory authority over activities affecting water quality in rivers, streams, lakes, and wetlands of the State. Shortly after the U.S. Supreme Court rendered its SWANCC Decision, the State Water Resources Control Board notified the Regional Boards that isolated waters, including wetlands, were subject to the jurisdiction of the State of California per provisions of the Porter-Cologne Water Quality Control Act (California Water Code, Division 7). The Regional Boards, therefore, now assert jurisdiction over some isolated waters disclaimed as jurisdictional by the USACE.

2.0 METHODS

LOA wildlife/plant/wetland ecologist Jeff Gurule conducted a walking survey of the study area for jurisdictional waters on December 1, 2015. A previous reconnaissance survey was conducted by Mr. Gurule on November 9, 2015. The field investigator used aerial photography and project disturbance boundaries to guide the survey effort. The boundaries of likely jurisdictional waters were mapped using a Trimble Geo XT GPS unit. LOA prepared a map depicting likely jurisdictional waters using information collected in the field overlaid on a recent aerial photograph.

The survey was consistent with guidelines found in the *Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory 1987), *Minimum Standards for Acceptance of Preliminary Wetland Delineations* (USACE 2001), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). The survey has been described in more detail below.

2.1 SURVEY METHODS FOR AREAS MEETING THE TECHNICAL CRITERIA OF JURISDICTIONAL WETLANDS

Wetlands are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs and similar areas" (Environmental Laboratory 1987). The diagnostic environmental characteristics of wetlands include hydrophytic vegetation, hydric soils and a hydrology characterized by an aquic or peraquic moisture regime. Accordingly, LOA surveyed the site for wetland indicator plants, positive indicators of hydric soils and wetland hydrology.

Four sampling locations were selected within the study area to assess and collect vegetation, hydrology and soils information associated with observed hydrologic features and adjacent upland areas. The location of sample points was selected to best represent the predominant characteristics of the hydrologic feature(s) or upland area(s). This information was entered onto standard data sheets patterned after those used by the USACE for the Arid West Region. The data sheet for each numbered sampling location

can be found in Appendix A. The numbered sampling locations have been identified on the map depicting the areas meeting the criteria of jurisdictional waters. Color photographs, presented in Appendix B, were taken at sampling locations of the study area.

Plants observed within a five foot radius of each sampling location were identified to species using *The Jepson Manual: Vascular Higher Plants of California, Second Edition* (Baldwin et al, 2012). The wetland indicator status of each species was obtained from the *1987 Wetland Plant List, California* (Reed 1988). A complete list of vascular plants identified on the study area during 2015 surveys can be found in Appendix C.

Wetland indicator species are so designated according to their frequency of occurrence in wetlands.

OBLIGATE (OBL)	Probability to occur in wetland is >99%
FACULTATIVE WETLAND (FACW)	Probability to occur in wetland is between 67-99%
FACULTATIVE (FAC)	Probability to occur in wetland is between 33 to 67%
FACULTATIVE UPLAND (FACU)	Probability to occur in wetland is between 1 to <33%.
UPLAND (UPL)	Probability to occur in wetland is <1%

Hydrophytic vegetation is considered present when more than 50% of the dominant species at a given location are composed of obligate, facultative wetland and facultative plant species. However, the Arid West Supplemental Guidelines also incorporate an alternate prevalence index to be calculated in determining the presence of wetland vegetation if the dominance test is not met.

Each sampling location was also examined for positive indicators of wetland hydrology and hydric soils. Evidence of wetland hydrology consisted of primary indicators such as surface water, watermarks, drift lines, sediment deposits, etc. Secondary indicators of wetland hydrology include drainage patterns in wetlands, watermarks (Riverine), drift lines (Riverine), sediment deposits (Riverine), etc. In accordance with USACE guidelines, a soil pit 10” to 12” in depth was dug at all sampling locations. The soils excavated from each pit were also examined for low chromas, gleying, mottling, concretions, sulfidic odors, etc.

2.2 SURVEY METHODS FOR TRIBUTARY WATERS

In the absence of adjacent wetlands, the limit of jurisdiction in navigable rivers and their tributaries, whether inter- or intrastate, extends to "ordinary high water" (OHW). OHW refers to "that line on the shore established by the fluctuation of water and indicated by physical characteristics such as a clear natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas."

The term "channel" as used in this report refers to a drainage feature with a bed and defined bank. Where drainage channels are present on a given site, it is customary to walk the channel and take width measurements at a standard interval. Width measurements represent the channel width between OHW marks on opposing banks.

The field investigator visually inspected the site for physical characteristics of OHW in order to determine the extent of possible jurisdiction. Accumulation of leaf litter, debris and sediment, and water cuts along the banks of the drainage provided evidence of OHW.

3.0 RESULTS

3.1 SETTING

Two hydrologic features were found within the study area, the San Joaquin River (SJR) and the Poso Canal. The portion of the SJR within the study area consists of a seasonally flowing channel confined by levee banks. Most of the area between the levees is outside of ordinary high water (OHW). Vegetation within the SJR channel consists of a mix of mostly upland native and nonnative species. Riparian habitat occurs in portions of the study area along the SJR levee banks. The Poso Canal runs parallel to the west bank of the SJR and is dewatered approximately every other year between November and February. Riparian vegetation is absent from the canal. Areas outside the banks of these two channels are heavily disturbed by agricultural activities.

Elevations of the study area range from 104 to 118 feet National Geodetic Vertical Datum (NGVD) (see Figure 2). The study area, like most of California, has a Mediterranean climate with cool moist winters and hot dry summers. Precipitation falls in the form of rain between October and May, with the heaviest amounts in December, January, February, and March. Annual precipitation is approximately 10 inches.

Three soil mapping units from two soil series were identified within the project site (California Soil Resources Lab 2008) (Table 1). All three soils are considered hydric. Hydric soils are soils that are saturated, flooded, or ponded long enough to develop anaerobic conditions in the upper part; under sufficiently wet conditions, they support the growth and regeneration of hydrophytic vegetation (USDA Soil Conservation Service 1985, as amended by the National Technical Committee for Hydric Soils in December 1986).

The entire site is located on alluvium transported from the Sierra Nevada. Alluvium of the site consists of sands and gravels derived from granite and some older metamorphic and sedimentary rock. This alluvium has accumulated on site since the time of the Pleistocene from overbank flooding of the SJR.

TABLE 1. SOILS OF THE PROJECT SITE.				
Soil Mapping Unit	**Map Unit Symbol**	**Parent Material**	**Drainage Class**	**Hydric**
Fresno County, California				
Elnido sandy loam, drained, 0 to 1 percent slopes	320	Alluvium derived from igneous rock	Poorly drained	Yes
Bisgani-Elnido association, 0 to 1 percent slopes	941	Alluvium derived from igneous rock	Poorly drained	Yes
Madera County, California				
Columbia fine sandy loam, moderately deep and deep over temple soils, 0 to 1 percent slopes	CmtA	Coarse-loamy alluvium derived from igneous, metamorphic and sedimentary rock	Somewhat poorly drained	Yes

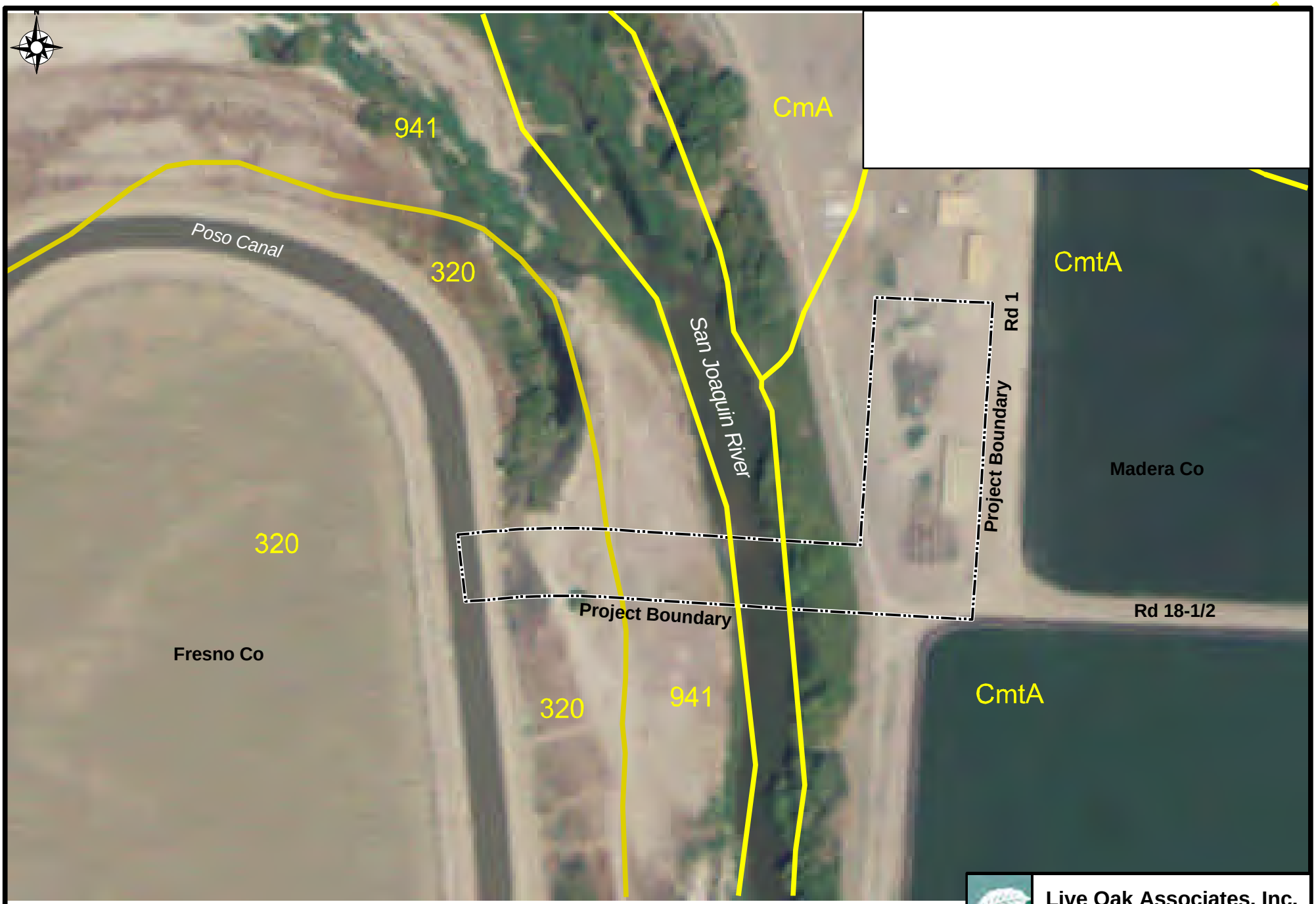
Figure 3 illustrates the location of these soils across the study area. Detailed information pertaining to these soils can be found in Appendix D.

3.2 POTENTIAL WATERS OF THE UNITED STATES

Potential jurisdictional waters identified within the study area comprised the SJR, a known water of the U.S., and the Poso Canal, a potential tributary water of the United States. The remainder of the site consisted of upland habitats supporting native and non-native vegetation. Potential jurisdictional waters identified during the field survey are depicted in Figure 4, and summarized in Table 2.

The study area encompassed approximately 80 linear feet of the SJR and 80 linear feet of the east half of the Poso Canal. Approximately 8,548 square feet (0.19 acres) of jurisdictional waters was identified within the study area.

TABLE 2. POTENTIAL JURISDICTIONAL WATERS IDENTIFIED ON THE STUDY AREA.			
Type of Potential Jurisdictional Water	**Approximate length (lf)**	**Approximate Area (ft.^{2})**	**Approximate Area (acres)**
Traditionally Navigable Water San Joaquin River	80	7,071	0.16
Potential Tributary Water Poso Canal	80	1,477	0.03
Total	160	8,548	0.19



100' 0 50' 100 feet

Approximate Scale

Source:
USDA-FSA Aerial Photography Field Office 2012
USDA Soil Conservation Service

Live Oak Associates, Inc.

Red Top Conveyance Project
Soils

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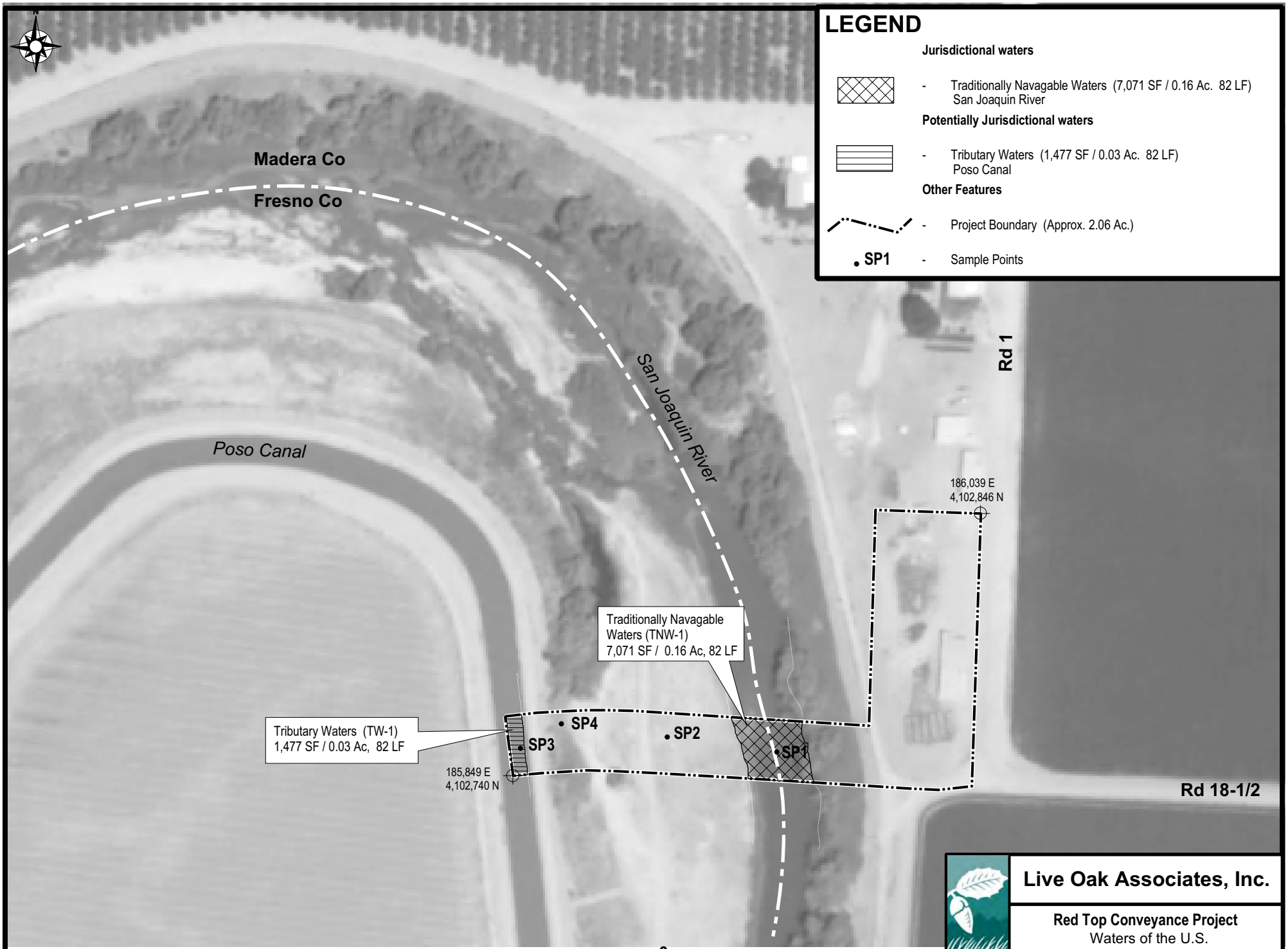

Source:
USDA-FSA Aerial Photography Field Office 2012
Universal Transverse Mercator Coordinate System Zone 10, NAD83 / NAVD 1988

Live Oak Associates, Inc.

Red Top Conveyance Project
Waters of the U.S.

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Potential jurisdictional waters of the site are described below:

3.2.1 San Joaquin River Channel

Vegetation: The bottom and lower sides of the SJR channel below the OHW mark were sparsely vegetated with mostly non-native upland forbs and shrubs, including black mustard (*Brassica nigra*) (UPL), annual bursage (*Ambrosia acanthicarpa*) (UPL), Canada horseweed (*Erigeron canadensis*) (FACU) and a couple saplings of Goodding's black willow (*Salix gooddingii*) (FACW). The vegetation was dominated by non-wetland species, and therefore the technical criterion for hydrophytic vegetation was not met.

Soils: The bed and lower banks of the SJR channel below the OHW mark were comprised of unconsolidated sand. The bed of the channel was not inundated during the site survey. Field indicators of hydric soils were absent at the location of the sample point and not apparent from visual inspection of the rest of the channel within the study area.

Hydrology: The SJR supports seasonal flows most years during winter and spring, and sometimes into summer, depending on yearly precipitation amounts. The channel showed evidence of wetland hydrology by having a defined bed and bank, a cut into the west bank from OHW, a scoured footprint within OHW where vegetation was sparse, and numerous aerial photos illustrating flows in this area of the channel.

Due to the absence of dominant wetland vegetation and field indicators of hydric soils associated with the SJR, this stretch of the SJR did not meet the criteria of a jurisdictional wetland. However, the hydrologic indicators of ordinary high water were used to map the limits of USACE jurisdiction.

3.2.2 Poso Canal

Vegetation: The inundated portion of the Poso Canal was devoid of vegetation. A thin, sparse line of wetland vegetation was present at the water's edge in the form of Mexican sprangletop (*Leptochloa fusca ssp. uninervia*). Due to the predominant absence of vegetation, the technical criterion for hydrophytic vegetation was not met.

Soils: The bed and lower banks of the Poso Canal below the OHW mark are assumed to be hydric, since the canal is inundated throughout most of the year. No soil pit was dug due to inundation.

Hydrology: The Poso Canal receives water from the Main Canal in Fresno County, which, in turn, receives water from the SJR at Mendota Pool. The canal appears to have a downstream connection to the SJR far north of the study area. The Poso Canal is permanently inundated every other year and sometimes temporarily dewatered during the alternating years. Numerous aerial photos reveal flows in the canal.

Due to the absence of dominant wetland vegetation this stretch of the Poso Canal did not meet the criteria of a jurisdictional wetland. However, the hydrologic indicators of ordinary high water were used to map the limits of USACE jurisdiction.

3.3 UPLAND AREAS

The remaining portions of the study area consisted of upland flood plain within the SJR levees, riparian vegetation along the SJR levee banks, and ruderal areas nearly devoid of vegetation. These areas did not meet the technical criteria of jurisdictional wetlands.

Vegetation: Weedy non-native plants, mixed with a few natives were the dominant vegetation within upland areas, which included red brome (*Bromus madritensis ssp. rubens*) (UPL), redstem filaree (*Erodium cicutarium*) (UPL), black mustard (UPL), ripgut brome (*Bromus diandrus*) (UPL), bractscale (*Atriplex serenana* var. *serenana*) (FAC), cheeseweed (*Malva sp.*) (UPL), and fiddleneck (*Amsinckia sp.*) (UPL), among others.

Soils: No field indicators of hydric soils were observed at the sample locations adjacent to the OHW channel. The soils consisted of unconsolidated sand (Sample Point 2) or very loose loamy sand (Sample Point 4).

Hydrology: Evidence of wetland hydrology, such as water-stained leaves, saturated or inundated soils, and drift deposits was absent in these areas. Evidence of inundation on aerial imagery was absent for all upland areas located outside of the SJR levee banks; however, the west edge of the flood plain within the SJR levees appear inundated in

aerial imagery captured in June of 2011, a year of above-average rainfall. Field inspection of the west side of the river channel found no OHW marks.

4.0 DISCUSSION

The potential jurisdictional waters mapped on the study area are within OHW of the SJR channel and the Poso Canal. The SJR is considered a Traditionally Navigable Water and a Section 10 water by the USACE. The Poso Canal receives water from the SJR and may have a downstream connection to the SJR. The USACE definition of a jurisdictional tributary water includes artificial waterways that receive water from a water of the U.S. and release water to a waters of the U.S. Therefore, the Poso Canal has been categorized as a potential tributary water.

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APPENDIX A: WETLAND DATA SHEETS

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Red Top Conveyance Project City/County: Madera/Fresno Sampling Date: 12-1-15

Applicant/Owner: CCID State: CA Sampling Point: 1

Investigator(s): Jeff Gurule Section, Township, Range: Sec. 2, T11S, R13E

Landform (hillslope, terrace, etc.): River bed Local relief (concave, convex, none): Concave Slope (%): <2°

Subregion (LRR): C Lat: 105 719757.85E Long: 4099772.74 Datum: UTM NAD83

Soil Map Unit Name: Water NWI classification: Riverine

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:
Area the dry sandy bed of the San Joaquin River.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0%		
Herb Stratum			
1. Brassica nigra	5%	Yes	UPL
2. Ambrosia acanthacarpha	1%	No	UPL
3. Erigeron canadensis	0.3%	No	FACU
4.			
5.			
6.			
7.			
8.			
Total Cover:	6.3%		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0%		

% Bare Ground in Herb Stratum 93.7 % Cover of Biotic Crust 0%

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

__ Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:
Hydrophytic vegetation absent.

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	4/3	100	—	0	—	—	Sand	Unconsolidated Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

Deep unconsolidated sand.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ✓ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area seasonally inundated as observed on aerial photos.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Red Top Conveyance Proj City/County: Madera/Fresno Sampling Date: 12-1-15
Applicant/Owner: CCID State: CA Sampling Point: 2
Investigator(s): Jeff Gurule Section, Township, Range: Sec. 2, T11S, R13E
Landform (hillslope, terrace, etc.): Flood Plain Local relief (concave, convex, none): concave Slope (%): <2%
Subregion (LRR): C Lat: 10S 719712.20E Long: 4079777.40 N Datum: UTM NAD83
Soil Map Unit Name: Bisgani-Elnido Assoc., 0 to 1% slopes NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____	No ✓	
Wetland Hydrology Present?	Yes ____	No ✓	

Remarks:
Area an upland flood plain within the levee banks of the San Joaquin River.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0%		
Herb Stratum			
1. Bromus madritensis	15%	Yes	Upl
2. Brasica nigra	5%	No	Upl
3. Erodium cicutarium	12%	Yes	Upl
4. Erodium botrys	1%	No	FACU
5.			
6.			
7.			
8.			
Total Cover:	33%		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0%		

% Bare Ground in Herb Stratum 77% % Cover of Biotic Crust 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
__ Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:
Hydrophytic vegetation is absent.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	4/3	100	—	0	—	—	Sandy	Unconsolidated Sand

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✓

Remarks:

Deep unconsolidated sand.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes _____ No ✓ Depth (inches): _____

Water Table Present? Yes _____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Historic aerial photos show this area consistently above ordinary high water mark.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Red Top Conveyance Proj City/County: Fresno/Madera Sampling Date: 12-1-15
Applicant/Owner: CCID State: CA Sampling Point: 3
Investigator(s): Jeff Gurule Section, Township, Range: Sec. 2, T11S, R13E
Landform (hillslope, terrace, etc.): Canal Local relief (concave, convex, none): concave Slope (%): <2%
Subregion (LRR): C Lat: 10S 719651.98E Long: 4099763.67N Datum: UTM NAD83
Soil Map Unit Name: Elnido Sandy Loam, Drained, 0 to 1% slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ____ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ✓	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:
Area is the inundated and well maintained Poso Canal.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0%		
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:	0%		
Herb Stratum			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	0%		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0%		

% Bare Ground in Herb Stratum 0% % Cover of Biotic Crust 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 0 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:
Area inundated, no rooted Vegetation present.

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ✓ No ___

Remarks:

Area inundated, no soil pit dug, soils assumed hydric.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ✓ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ✓ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ✓ No ___ Depth (inches): 36"

Water Table Present? Yes ___ No ___ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): _____

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area inundated.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Red Top Conveyance Proj. City/County: Fresno/Madera Sampling Date: 12-1-15
Applicant/Owner: CCID State: CA Sampling Point: 4
Investigator(s): Jeff Gurule Section, Township, Range: Sec. 2, T11S, R13E
Landform (hillslope, terrace, etc.): Levee bank Local relief (concave, convex, none): concave Slope (%): 20%
Subregion (LRR): C Lat: 10S 719672.42E Long: 4099776.02N Datum: UTM NAD83
Soil Map Unit Name: Elnido Sandy Loam, Drained, 0 to 1% slopes NWI classification: Riverine
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ____ No ✓	

Remarks:
Area a vegetated levee bank of San Joaquin River. Wetland hydrology and hydric soils absent.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:	0%		
Sapling/Shrub Stratum			
1. Salix exigua	20	Yes	FACW
2.			
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. Bromus madritensis	40	Yes	UPL
2. Conium maculatum	15	Yes	FACW
3. Silybum marianum	10	NO	UPL
4. Brassica nigra	1	NO	UPL
5.			
6.			
7.			
8.			
Total Cover:	66		
Woody Vine Stratum			
1.			
2.			
Total Cover:	0%		

% Bare Ground in Herb Stratum 14% % Cover of Biotic Crust 0%

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:
Hydrophytic vegetation (dominant) greater than 50%

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	3/2	100	—	0	~	~	Loamy Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes ____ No ✓

Remarks:

Loose Loamy sand, no redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): _____

Water Table Present? Yes ____ No ✓ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): _____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Area vegetated levee bank of San Joaquin River.

Area outside of OHW.

APPENDIX B: SELECTED PHOTOGRAPHS OF THE STUDY AREA

Photo 1. Sample Point 1 within OHW of the San Joaquin River channel.

Photo 2. Sample Point 2 within upland flood plain within the leveed channel of the San Joaquin River.

Photo 3. Sample Point 3 within the interior of the Poso Canal

Photo 4. Sample Point 4 within the upper west levee bank of the San Joaquin River.

Photo 5. Cut edges of the bank and dramatic change in vegetation cover provided evidence of OHW.

Photo 6. OHW marks were absent from the western edge of the leveed San Joaquin River channel.

APPENDIX C: VASCULAR PLANTS OF THE STUDY AREA

APPENDIX A: VASCULAR PLANTS OF THE STUDY AREA

The plants species listed below were observed on the project site during surveys conducted by Live Oak Associates, Inc. on November 9 and December 1, 2015. The U.S. Fish and Wildlife Service wetland indicator status of each plant has been shown following its common name.

OBL - Obligate
FACW - Facultative Wetland
FAC - Facultative
FACU - Facultative Upland
UPL - Upland

APIACEAE – Carrot Family		
Conium maculatum	Poison Hemlock	FACW
ASTERACEAE - Sunflower Family		
Ambrosia acanthicarpa	Annual Bursage	UPL
Artemisia douglasiana	Mugwort	FAC
Erigeron canadensis	Canada Horseweed	FACU
Heterotheca grandiflora	Telegraph Weed	UPL
Pseudognaphalium luteoalbum	Jersey Cudweed	FAC
Silybum marianum	Milk Thistle	UPL
Stephanomeria exigua	Small Wirelettuce	UPL
Xanthium strumarium	Rough Cocklebur	FAC
BORAGINACEAE – Borage Family		
Amsinckia sp.	Fiddleneck	UPL
Heliotropium curassavicum	Heliotrope	FACU
BRASSICACEAE – Mustard Family		
Brassica nigra	Black Mustard	UPL
CHENOPODIACEAE – Goosefoot Family		
Atriplex serenana var. *serenana*	Bractscale	FAC
GERANIACEAE - Geranium Family		
Erodium botrys	Broadleaf Filaree	FACU
Erodium cicutarium	Red Stemmed Filaree	UPL
JUNCACEAE – Rush Family		
Juncus sp.	Rush	FACW
LAMIACEAE – Mint Family		
Marrubium vulgare	Common Horehound	UPL
MALVACEAE – Mallow Family		
Malva sp.	Cheeseweed	UPL
OLEACEAE – Ash Family		
Fraxinus latifolia	Oregon Ash	FACW
POACEAE - Grass Family		
Bromus diandrus	Ripgut	UPL
Bromus hordeaceus	Soft Chess	FACU
Bromus madritensis rubens	Red Brome	UPL
Cynodon dactylon	Bermuda Grass	FACU
Distichlis spicata	Salt Grass	FAC

Leptochloa uninerva	Mexican Sprangletop	UPL
Polypogon monspeliensis	Rabbitsfoot Grass	FACW
POLYGONACEAE – Smartweed Family		
Rumex crispus	Curly Dock	FAC
ROSACEAE – Rose Family		
Rosa californica	California Wild Rosa	FAC
Rubus ursinus	California Blackberry	FAC
RUBIACEAE – Madder Family		
Cephalanthus occidentalis	Button Willow	OBL
SALICACEAE – Willow Family		
Salix exigua	Sandbar Willow	FACW
Salix gooddingii	Goodding's Black Willow	FACW
SOLANACEAE - Nightshade Family		
Datura wrightii	Jimson Weed	UPL
URTICACEAE- Nettle Family		
Urtica dioica ssp. *holericea*	Stinging Nettle	FAC
VISCACEAE – Mistletoe Family		
Phoradendron sp.	Mistletoe	UPL

APPENDIX D: SOILS INFORMATION

Map Unit Description

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 in this report, 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.

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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given 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.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Fresno County, California, Western Part

320—Elnido sandy loam, drained, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hnz7
Elevation: 110 to 170 feet
Mean annual precipitation: 8 to 9 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Elnido, Sandy Loam, Drained

Setting

Landform: Flood plains on basin floors
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

Ap - 0 to 14 inches: sandy loam
Bwg - 14 to 32 inches: sandy loam
Bkg - 32 to 40 inches: fine sandy loam
Cg1 - 40 to 53 inches: sandy loam
Cg2 - 53 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Calcium carbonate, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A

Minor Components

Palazzo, sandy loam, drained

Percent of map unit: 2 percent
Landform: Flood plains on basin floors

Tachi, clay

Percent of map unit: 2 percent
Landform: Flood plains on basin floors

Wekoda, clay, partially drained
Percent of map unit: 2 percent
Landform: Flood plains on basin floors

Armona, loam, partially drained
Percent of map unit: 2 percent
Landform: Flood plains on basin floors

Bisgani, sandy loam, drained
Percent of map unit: 2 percent
Landform: Flood plains on basin floors

Bolfar, loam, drained
Percent of map unit: 2 percent
Landform: Flood plains on basin floors

Dospalos, clay loam, drained
Percent of map unit: 2 percent
Landform: Flood plains on basin floors

Unnamed, river channel
Percent of map unit: 1 percent
Landform: Flood plains
Microfeatures of landform position: Channels

941—Bisgani-Elnido association, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: hp2j
Elevation: 110 to 140 feet
Mean annual precipitation: 8 to 9 inches
Mean annual air temperature: 62 to 63 degrees F
Frost-free period: 230 to 250 days
Farmland classification: Not prime farmland

Map Unit Composition

Bisgani, loamy sand, and similar soils: 45 percent
Elnido, sandy loam, and similar soils: 40 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Bisgani, Loamy Sand

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Microfeatures of landform position: Bars
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

A - 0 to 10 inches: loamy sand
Cg1 - 10 to 13 inches: loamy sand
Cg2 - 13 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 6 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 4.0
Available water storage in profile: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Description of Elnido, Sandy Loam

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Microfeatures of landform position: Channels
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous rock

Typical profile

Ap - 0 to 14 inches: sandy loam
Bwg - 14 to 32 inches: sandy loam
Bkg - 32 to 40 inches: fine sandy loam
Cg1 - 40 to 53 inches: sandy loam
Cg2 - 53 to 60 inches: sand

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: About 6 to 72 inches
Frequency of flooding: Frequent
Frequency of ponding: None

Calcium carbonate, maximum in profile: 3 percent
Salinity, maximum in profile: Nonsaline to slightly saline (1.0 to 4.0 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 20.0
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Minor Components

Unnamed, river channel
Percent of map unit: 6 percent
Landform: Flood plains
Microfeatures of landform position: Channels

Bisgani, sandy loam
Percent of map unit: 3 percent
Landform: Flood plains
Microfeatures of landform position: Bars

Elnido, sandy loam, dark thick surface
Percent of map unit: 2 percent
Landform: Basin floors, flood plains
Microfeatures of landform position: Channels

Bisgani, loamy sand, stratified
Percent of map unit: 2 percent
Landform: Backswamps on flood plains

Elnido, sandy loam, stratified
Percent of map unit: 2 percent
Landform: Flood plains, basin floors
Microfeatures of landform position: Channels

Madera Area, California

CmtA—Columbia fine sandy loam, moderately deep and deep over temple soils, 0 to 1 percent slopes

Map Unit Setting
National map unit symbol: hk57
Elevation: 150 feet
Mean annual precipitation: 12 to 25 inches
Mean annual air temperature: 63 degrees F
Frost-free period: 230 to 340 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition
Columbia and similar soils: 85 percent
Minor components: 15 percent

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

Description of Columbia

Setting

Landform: Flood plains
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Coarse-loamy alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 14 inches: fine sandy loam
H2 - 14 to 36 inches: fine sandy loam
H3 - 36 to 41 inches: stratified sand to silt loam
H4 - 41 to 60 inches: clay loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat poorly drained
Runoff class: Very low
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: About 0 inches
Frequency of flooding: Rare
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: A/D

Minor Components

Temple

Percent of map unit: 10 percent
Landform: Flood plains

Riverwash

Percent of map unit: 5 percent
Landform: Channels

W—Water

Map Unit Composition

Water: 100 percent

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

Description of Water

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8

Data Source Information

Soil Survey Area: Fresno County, California, Western Part
Survey Area Data: Version 10, Oct 1, 2015

Soil Survey Area: Madera Area, California
Survey Area Data: Version 9, Sep 30, 2015