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Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

EXISTING CONDITIONS TECHNICAL REPORT

Prepared for:
Wishtoyo Foundation and
Wishtoyo Foundation's Ventura
Coastkeeper Program

Prepared by:
cbec, inc., WRA, Inc. and
Mike Podlech, Aquatic Ecologist

January 7th, 2015
Project Number: 14-1023

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GLOSSARY OF ACRONYMS

Acronym	Meaning
APN	Assessor's Parcel Number
BOD	Biochemical Oxygen Demand
CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
CIWQS	California Integrated Water Quality System
cms	cubic meters per second
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CSUCI	California State University - Channel Islands
CWA	Clean Water Act
D50	mass mean sediment particle diameter
DDE	dichlorodiphenyldichloroethylene
DDT	dichlorodiphenyltrichloroethane
DO	Dissolved Oxygen
DPS	Distinct Population Segment
ENSO	El Nino Southern Oscillation
EPA	Environmental Protection Agency
ESA	Endangered Species Act
ESHA	Environmentally Sensitive Habitat Areas
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FRGP	Fisheries Restoration Grant Program
GIS	Geographic Information System
IPCC	Intergovernmental Panel on Climate Change
LARWQCB	Los Angeles Regional Water Quality Control Board
LIDAR	Light Detection and Ranging - remotely sensed topographic data acquired using a laser
MCL	Maximum Contaminant Level
MGD	Million Gallons per Day
MHHW	Mean Higher High Water
MLLW	Mean Lower Low Water
MSL	Mean Sea Level
MTL	Mean Tide Level
NAVD88	North American Vertical Datum of 1988
NFIP	National Flood Insurance Program
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NRC	National Research Council
OHWM	Ordinary High Water Mark

OPC	Ocean Protection Council
PCB	Polychlorinated Biphenyls
ppt	parts per thousand
PSD	Particle Size Distribution
psu	Practical Salinity Units
RPR	Rare Plant Rank
SCR	Santa Clara River
SCRE	Santa Clara River Estuary
SCSRP	Southern California Steelhead Recover Plan
SFHA	Special Flood Hazard Area
TDS	Total Dissolved Solids
TKN	Total Kjeldahl Nitrogen
TOC	Total Organic Carbon
TSO	Time Schedule Order
TSS	Total Suspended Solids
USACE, Corps	United States Army Corps of Engineers
USFWS	United States Fish & Wildlife Service
USGS	United States Geological Survey
UWCD	United Water Conservation District
VCK	Ventura Coastkeeper Program
VCWPD	Ventura County Watershed Protection District
WER	Water Effect Ratio
WSE	Water Surface Elevation

Species Status Codes	
FE	Federal Endangered
FT	Federal Threatened
FD	Federal Delisted
FC	Federal Candidate
BCC	USFWS Birds of Conservation Concern
MMPA	Species protected under the Marine Mammal Protection Act
NMFS	Species under the Jurisdiction of the National Marine Fisheries Service
SE	State Endangered
ST	State Threatened
SC	State Candidate
SR	State Rare
SSC	CDFW Species of Special Concern
SSI	CDFW Special Status Invertebrate
CFP	CDFW Fully Protected Animal
EPA	Eagle Protection Act Species
WBWG	Western Bat Working Group (High or Medium) Priority Species
VCLI	Ventura County Locally Important Species
VCS	Ventura County Sensitive Species

DISCLOSURE STATEMENT

This document was prepared through an agreement with the California Department of Fish and Wildlife through the Fisheries Restoration Grant Program as a Project deliverable in accordance with Agreement P1350015. Grant funds allocated to this Project are limited to a total Agreement amount of $663,282.00 and includes compensation for the preparation of multiple Project deliverables including: several written reports, spreadsheets, draft plan sets, field work activities, and expenses.

The contents of this document do not necessarily reflect the views and policies of the California Department of Fish and Wildlife, California State Parks, the Wishtoyo Foundation, or the Wishtoyo Foundation's Ventura Coastkeeper Program. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

1 INTRODUCTION

1.1 PURPOSE

This report was prepared as a key project deliverable for the Santa Clara River Estuary (SCRE) Habitat Restoration and Enhancement Feasibility Study (Project). The Project was principally funded through the California Department of Fish and Wildlife (CDFW) Fisheries Restoration Grant Program (FRGP), with additional funds granted by the U.S. Fish & Wildlife Service (USFWS) and the McGrath Lake Trustee Council. California State Parks (State Parks) and the Wishtoyo Foundation's Ventura Coastkeeper Program (VCK) provided in kind contributions. The primary purpose of the Project is to enhance Southern California Steelhead ("steelhead") estuary habitat by restoring, rehabilitating, or enhancing approximately 15 to 35 acres of the SCRE by providing lagoon, side channel, contiguous wetland, and/or additional upland riparian habitat in the space currently occupied by the McGrath State Beach Campground (campground) and adjacent areas. Separate, but coordinated efforts are underway to determine the feasibility of re-locating the campground further south.

The purpose of this report is to provide a focused technical assessment of the existing conditions and functionality of the SCRE and the lands of the adjacent campground. This report draws heavily on previous studies and assessments but also includes more recent data and analysis from field work efforts conducted by cbec, inc. (cbec) and WRA, Inc. (WRA) in the fall of 2014. By succinctly describing the complex systems in the SCRE as they pertain to the proposed Project, it is anticipated that this report will assist the Project team, participating state and federal agencies, and the independent panel of experts, in the development of appropriate and feasible restoration, enhancement, and rehabilitation concepts. Permit requirements for potential restoration activities are not considered in this existing conditions technical report. The content of this report will be subsequently incorporated into another Project deliverable, the Feasibility Study Report.

1.2 MOTIVATIONS

There are a number of motivations behind this Project.

As described in the National Marine Fisheries Service (NMFS) Southern California Steelhead Recovery Plan (SCSRP), natural and anthropogenic factors have caused precipitous steelhead population declines and have reduced the distribution of steelhead within southern California. Prior to 1950, the annual returning adult steelhead run on the Santa Clara River (SCR) was estimated to be over 8,000 steelhead per year and was home to one of the largest steelhead runs in southern California (Moore, 1980a). Now, very few adult steelhead are observed returning to the SCR and its tributaries. Southern California Steelhead were listed as an endangered species under the Endangered Species Act (ESA) in 1997. NMFS estimates that only 15% of the historical habitat within the watershed remains and designated the SCR and the SCRE as critical habitat. The SCR was further identified as one of the highest priority sites for recovery actions and one of the most likely to sustain independently viable populations. Because estuaries are the gateway used by both immigrating adults and emigrating juveniles moving between marine and freshwater environments, steelhead revitalization efforts within the watershed will benefit from ecologically suitable estuarine habitat. More specific information pertaining to the SCRE and concerns related to steelhead habitat and restoration activities is provided in Section 7.2.

This Project is also motivated by the long history of flooding (and the subsequent closure) of McGrath State Beach and Campground. Established as a State Park in 1962 when the site was purchased from the McGrath family, the area has been a popular recreation site for over fifty years. Flooding concerns from the seasonally closed mouth berm were observed even in 1962 as evidenced by breaching easements granted to Hugo McGrath and Associates to protect nearby agricultural productiveness (State Parks, 1979). A levee between the campground and the southern boundary of the main estuary provided some protection from surface water flooding (groundwater flooding was still a concern) until it was destroyed in the 1990's (Swanson et al., 1990; ESA, 2003). In recent years, flooding has significantly damaged campground infrastructure and resulted in intermittent closures.

Another motivation is manifest in the mission of the VCK program: "to protect, preserve, and restore the ecological integrity and water quality of Ventura County's inland water bodies, coastal waters, and watersheds, which are vital natural resources for the citizens and all inhabitants of Ventura County, and are the lifeblood of Chumash Native American culture." The SCRE is a complex system both in the way it functions ecologically and hydraulically, but also in the way it is part of the cultural and economic landscape of the local community. Beyond expanded and improved habitat for listed and endangered species, other co-benefits are anticipated for this project including: improved recreational opportunities, expanded avenues for Native American cultural education, and economic benefits to the local and regional economies.

1.3 LOCATION

The SCRE is located at the interface of the Santa Clara River and the Pacific Ocean in Ventura County, California (Figure 1). On the south side of the SCRE is McGrath State Beach and Campground. To the north is the Ventura Water Reclamation Facility (VWRF) operated by the City of San Buenaventura (City of Ventura). North Harbor Boulevard crosses over the eastern edge of the estuary. The water level within the estuary fluctuates seasonally and the inundation extents can extend over a thousand feet eastward of the Harbor Blvd. bridge at high stage. For the purposes of this report, the SCRE is generally defined to include areas where the ground surface is less than an elevation of approximately 11 ft (NAVD88). Ecological analyses of the estuary also include the surrounding riparian areas.

The majority of the central estuary is on a parcel of land owned by State Parks and is within the city limits of Oxnard, California. Restoration concept development is anticipated to be limited to this parcel (APN 138008006) and to the parcel to the south which is also owned by State Parks (APN 138008008). Two private inholdings exist (APN 138008003 and APN 138008002) and will not be included in the restoration plans (Figure 1). The Study Area for the wildlife and habitat assessments (included in Appendix B and Appendix C) is also shown on Figure 1 (noted as the project limits). It is anticipated that the campground will be relocated to the portion of the property south of the existing facilities. This area was disturbed (graded and filled) in the 1950's as part of oil and gas development (Swanson et al., 1990). As the campground relocation enables this restoration Project, the proposed campground area was included in the existing conditions assessments and mapping efforts.

The Project site is located within the Special Flood Hazard Area (SFHA) of the local Flood Insurance Rate Map (FIRM) last updated in 2010 through the National Flood Insurance Program (NFIP) of the Federal Emergency Management Agency (FEMA), which is included in Appendix D for reference. The majority of the site is not located in the currently mapped regulatory floodway, though a small sliver at the southeast end of the proposed campground site may be within the 'breakout' floodway which passes to the south.

1.4 KEY ESTUARY STUDIES

The SCRE and surrounding area have been studied for decades by many different agencies and consultants. In addition to supporting the data collection and synthesis efforts associated with this Project, local, state and federal agencies have also provided many years of insight into the function of the SCRE through ecological monitoring programs, data collection efforts, habitat analyses, site observations, and financial support for many related efforts (State Parks, 1979; Swanson et al., 1990; USFWS, 1999; Kelley, 2008 and many, many others).

One key recent scientific study, titled the "Estuary Subwatershed Study – Assessment of the Physical and Biological Condition of the Santa Clara River Estuary" (Estuary Subwatershed Study), prepared by Stillwater Sciences for the City of Ventura in 2011, synthesized many of the earlier studies, provided a majority of the recent water quality data and interpretation, and also provided a significant portion of the technical understanding related to the current and historical functions of the SCRE. An independent review of the Estuary Subwatershed Study, performed by Richard Ambrose, Ph.D. (then Director and Professor of the UCLA Environmental Science and Engineering Program) and Sean Anderson, Ph.D. (then Assistant Professor of Environmental Science and Resource Management at California State University – Channel Islands) at the request of the Wishtoyo Foundation, also provided important perspectives on the health and functions of the SCRE. Nonetheless, the Estuary Subwatershed Study is a wide-ranging and detailed synthesis report and the long-term monitoring data collected in the study form the basis for many of the sections within this report. This report is not intended to address any specific scientific controversies related to the health of the estuary as it pertains to the VWRF effluent discharge. It is only intended to support restoration concept development.

The VWRF currently discharges approximately 7 to 9 million gallons per day (MGD) of treated municipal wastewater into the northern end of the SCRE under waste discharge requirements established by the Los Angeles Regional Water Quality Control Board (LARWQCB) as required by the Clean Water Act (CWA) and the National Pollutant Discharge Elimination System (NPDES). As background, in 1975, the LARWQCB adopted the Water Quality Control Policy for the Enclosed Bays and Estuaries of California, which was intended to phase out discharges like the VWRF unless it was demonstrated that the discharge "enhanced the quality of receiving waters above that which would occur in the absence of the discharge" (LARWQCB, 2008). The Estuary Subwatershed Study, which the City of Ventura was ordered to complete by the LARWQCB in 2008, was intended to provide the LARWQCB with enough information to resolve the scientific disagreement related to whether the VWRF effluent was an enhancement to the SCRE. Definitive conclusions have yet to be made, but there is agreement on performing additional focused studies. The LARWQCB is now requiring the City of Ventura to complete three additional 'Phase 3' studies including an expanded water budget analysis, a Nutrient and Toxicity Special Study, and a Groundwater Special Study (LARWQCB, 2013; City of Ventura, 2014). The data for many of the previous estuary studies are the water quality monitoring and reporting requirements associated with the City of Ventura's NPDES VWRF discharge permit (NPDES permit No. CA0053651). Revised most recently by the LARWQCB in 2013, the permit requires continuous sonde and periodic grab sampling within the effluent and the SCRE (the 'receiving waters') (data from these efforts are cited herein as City of Ventura, 2000-2013). A number of associated Time Schedule Orders (TSO) issued by the LARWQCB, have also resulted in additional data collection efforts and several special focused studies (Stillwater Sciences, 2011; Nautilus Environmental, 2005; Entrix, 2002a/b; and others).

Many other references and scientific papers were consulted in the preparation of this report. Please see the reference list for further information.

1.5 UNITS AND DATUMS

For simplicity, data presented in this report are generally given in one unit system, typically the unit system used by the analytical lab, or the field equipment, which includes both U.S. customary and SI units. Vertical elevations are provided in feet relative to the North American Vertical Datum of 1988 (NAVD88). Where provided, horizontal coordinates use the North American Datum of 1983 - California State Plane Zone IV in feet.

2 GEOMORPHOLOGY

An understanding of the physical processes that drive geomorphic change within the SCR corridor is paramount to defining how the overall river and estuary systems function, as this understanding makes it possible to project the likely future trajectory of the system and aids in the development of sustainable river and estuary management strategies. The SCRE is an extremely dynamic site that periodically experiences major geomorphic changes that can result in a complete reworking of the estuary. Restoration planning efforts should consider the potential for frequent and significant geomorphic changes and may want to consider developing flexible concepts that do not include costly 'fixed' infrastructure. This section summarizes the geomorphology of the SCRE with a focus on describing processes that are most pertinent to developing restoration concepts; including sediment transport, mouth berm formation, breaching dynamics, estuary stage-volume relationships, and lagoon bathymetry. This section also includes a summary of the historic evolution of geomorphic processes that aids in the understanding of overall system function under existing conditions, but does not attempt to provide a comprehensive discussion of historic conditions.

2.1 HISTORICAL GEOMORPHIC CONTEXT

The SCRE has undergone significant geomorphic transformation over the last 150 years due to a combination of changes in watershed land use and climate. Historically, the SCRE was an expansive intertidal ecosystem that included unrestrained channels that supported a vast array of aquatic species. Various forms of land development since the 1850s have reduced the overall size and habitat within the SCRE by 75% (Swanson et al., 1990; ESA, 2003) to 90% (Nautilus Environmental, 2005). An example of this transformation is illustrated in Figure 2 with a historic cross section comparison 3.5 miles downstream from Highway 101 from 1850 to 2005. Historically, a large willow-cottonwood forest and wetland complex dominated the south side of the river from above the bridge to the mouth (Beller et al., 2011).

The combination of land conversion and levee construction has confined flood flows and locked the SCRE into its current extents (formerly ~6,900 foot wide river corridor, now a ~1,000 foot corridor), resulting in increased flow constriction and a reduction in overbank sediment deposition relative to historic conditions. These impacts have served to amplify bed scour and sediment transport efficiency due to increases in flow velocity and depth, thereby escalating a storm's potential to cause geomorphic change. Ranching activities beginning in the 1820s, are likely to have caused changes in watershed hydrology (rainfall-runoff relationships) and increased soil erosion due changes in vegetative cover and compacted soils. Beginning in the early 1900s, large-scale development of water supply infrastructure (irrigation) has lowered groundwater levels and reduced baseflow within river. Additionally, the construction of dams starting in 1920s, have resulted in interception of runoff and sediment from approximately 34% of the overall watershed area. Finally, with the dramatic increase in urbanization starting in the 1950s, the demand for aggregate materials needed to improve and expand existing infrastructure led to channel mining in 1960s - 1980s; which resulted in increased rates of channel incision upstream of aggregate mining pits during this period. The primary mechanisms that have driven geomorphic change within the SCRE since the 1820s are summarized as a conceptual model in Figure 3 (Downs et al., 2013). Of these processes, the most significant to the existing geomorphological function of the estuary is the constriction of flood flows as result of land conversion and levee construction.

After the period of extensive land conversion to agriculture subsided in the 1950s, a change in precipitation patterns related to the El Nino Southern Oscillation (ENSO) led to a wet-period beginning in the late 1960s, resulting in an increased occurrence of large storm events (Stillwater Sciences, 2011). Historical observations of storm related impacts have shown that a discharge greater than approximately 100,000 cfs (as occurred during the floods of 1884, 1938, 1969, 1978, 1983, 1992, and 2005) is necessary to cause extensive geomorphic change within the SCRE. Before the beginning of the most recent ENSO cycle (1969), a 100,000 cfs flow (approximate 12-year recurrence interval, based upon the long-term record) occurred approximately once every 23 years. Since 1969, a flow of at least 100,000 cfs has occurred approximately once every 7 years (Stillwater Sciences, 2011) within an ENSO year. Climate patterns and SCR peak flows are discussed further in Section 3.1.

2.2 SEDIMENT TRANSPORT AND SUBSTRATE

The SCR watershed sediment yield, measured at the Highway 101 bridge (USGS 11114000) from 1950 to 2004, is approximately 1.8 million tons/year as shown in Table 1 (Stillwater Sciences, 2011). Annual sediment discharge over the period of record is characterized by substantial year to year variability with approximately 230 tons in 1960 to 21 million tons in 1969 (Figure 4), coincident with the flood of record. Three years since 1950 (1969, 1978, and 1992) have produced almost half of the total watershed sediment yield over the period of record. The coarse fraction, or bed material load, (>0.0625 mm – fine sand and larger) of the total average sediment yield is approximately 620,000 tons/yr, or 35% of the total sediment yield. These coarse sediments exclude silt and clay sized particles (washload) that do not play a significant role in typical geomorphic processes (Simons, Li & Associates, 1983). Although the period of record ends prior to the 2005 flood event, it can be surmised that the sediment yield during 2005 would have been similar to the yield in 1969 based on similarities in their estimated discharge (Stillwater Sciences, 2011). The sediment load rating curve shown in Figure 5 demonstrates the importance of these large events greater than 100,000 cfs (≈2800 cms) in transporting sediments within the SCR.

Table 1 - Average annual sediment yield of the Santa Clara River watershed

Effective contributing area (km^2)	Period of record (water years)	Average annual total sediment yield (tons/year)	Average annual total sediment yield per unit area ($tons/km^2/yr$)	Average annual coarse (>0.0625 mm) sediment yield (tons/year)	Average annual coarse sediment yield per unit area ($tons/km^2/yr$)
2,675	1950 – 2004	1,800,000	660	620,000	230

Notes: Calculated from sediment load measurements near the Highway 101 Bridge (USGS 11114000) (Stillwater Sciences, 2011).

Bed sediments within the SCRE consist of stratified layers of coarse sand and gravel that range in size from clay- to boulder-sized particles (Stillwater Sciences, 2011). Generally, the surficial bed sediments within the SCRE demonstrate a spatial pattern typical of most estuaries, where the particle size decreases in the downstream direction as flow velocity decreases and the larger particles fall out of suspension. The overall spatial variability in the particle size distribution is driven by large flood events and deposition during periods with open tidal exchange. During most large flood events, sediments ranging in size from sands to gravels are delivered to the SCRE, but velocities in the mainstem channel during flood peaks are capable of transporting cobble to boulder-sized sediment into and through the SCRE (O'Hirok 1985). Deposition of silt and clay-sized sediment on the surface of the coarser sediment can occur as the flood flows subside and during closed mouth conditions (USFWS 1999). Sediment quality is discussed in Section 5.

Surficial sediment data collected from 2002 – 2004 characterize bed sediment size variability during a period between large storms events. SCRE sediment samples taken during the spring of 2002 (Entrix, Inc. 2002a) consisted of 13% gravel, 64% sand, and 22% silt and clay, on average. The coarsest sediments were restricted to the upstream portion of the estuary. The mass mean sediment particle diameter(D50) of the samples ranged from 0.04 mm within the SCRE to 2.4 mm along the upstream extent of the SCRE, with an overall D50 value of 0.7 mm (Entrix, Inc. 2002a). Bed sediment data from sites resurveyed over the subsequent two years (spring and fall 2003, and spring 2004) indicate a coarsening upstream towards Harbor Blvd. and fining (higher amount of small particles) towards the mouth berm. The evolution in particle size near the lagoon channel is attributed to normal seasonal flow dynamics with high winter flows eroding/exposing coarser bed sediment; low-energy conditions that followed allowed for fine sediment deposition over the coarser sediment.

More recent bed sediment data collected in the fall of 2014 as a part of this Project reflect the current conditions (i.e., inter-storm) within the SCRE. In general, the SCRE bed surface is still composed primarily of sand and silt, with coarser sediment towards the upstream extent of estuary and near the main channel in the lagoon. Upstream of Harbor Blvd., the mainstem channel includes isolated areas of coarse sand and gravel (mixed sand, gravel and cobbles) with the adjacent bars being composed of primarily gravel and cobbles. Upstream of the Harbor Blvd. bridge, there is a sharp transition in channel slope with coarser bed sediment upstream from the bridge. Downstream of Harbor Blvd. bridge within the main lagoon, the mainstem channel is located on the southern extents of the estuary (higher energy), which results in coarser bed sediment in the southern portion and finer surface sediment along the northern extents (lower energy). On the western extent of the SCRE towards the mouth berm, bed sediment is largely sand.

2.3 MOUTH BERM FORMATION AND BREACHING

Many dynamic processes influence the timing and duration of closed or open estuary configurations[1]. For the mouth berm of the SCRE, these processes include river sediment supply and transport, the

[1] It has been noted (Jacobs et al., 2010), that the binary formulation of a 'closed' or an 'open' estuary configuration is rather simplistic and often underestimates the duration of the effective estuary closure while also ignoring the variations in tidal cycles, wave dynamics and the possibility of local sills which might limit tidal exchange even during an 'open' period. However, the majority of the recent and historical data available for the SCRE is limited to the open/closed terminology (see Section 2.3.3).

length of time since a major storm event, the bathymetry of the estuary and nearshore, surface water inflows, VWRF effluent discharge rates, groundwater levels, tidal cycles, wave energy and littoral sediment transport. This section describes the sediments that form the mouth berm, the locational shifts observed in recent years, and discusses the recent and historical breach patterns and frequencies as they pertain to the Project.

A comprehensive analysis of berm formation prior to and since development within the watershed is recommended to support future management decisions related to the estuary and the mouth berm, but is beyond the scope of this report. This report does include a discussion of the ecological impacts associated with breach events (see Section 7.2.4 and Section 7.3.4). As this Project will not include any direct berm management activities or recommendations, a key consideration for the development of the restoration concepts is how the proposed Project may influence berm closure frequency indirectly through increased tidal prism or increased estuary volume.

2.3.1 MOUTH BERM SEDIMENTS

The SCR transports a significant amount of sediment primarily during large storm events (approximate 12-year recurrence interval and higher). Generally, sand-sized and larger sediment that is transported from the SCR during these events contributes to the development of nearshore and offshore deltas, which provide sediment for littoral transport and beach deposition (down-coast). These deltas also supply sediment that contributes to the development of the estuary mouth berm (sometimes called a barrier beach) during low flow periods. The size of offshore deltas can fluctuate significantly as a function of the magnitude and frequency of storm events within the SCR watershed. The largest influx of sediment from the SCR to the offshore deltas took place during the floods of 1969. During these events, approximately 13.0 million yd^3 of material was deposited (Noble Consultants, 1989). Again in 2005, approximately 6 million yd^3 of sediment was transported through the SCRE (Barnard et al., 2009). Large storm events that transport sediment from the SCR to offshore deltas are driven primarily by hyperpycnal flows (i.e., sediment-laden flows that are more dense than ocean water) from the SCR that cause sediment to pass through the SCRE and nearshore zone (Warrick and Milliman, 2003). Hyperpycnal flows associated with these larger flood events have the capability of depositing material through the adjacent littoral cell into offshore basins, which can result in a net loss of sediment (scour/erosion) from the SCRE (Warrick and Milliman, 2003).

Nearshore deltas can develop near the mouth of the SCR during both high and low magnitude storm events (Stillwater Sciences, 2011). These deposits were visible at SCR mouth after the 1969 and 2005 storm events (see Figure 6). Following flood events, nearshore delta features are exposed to wave impact and the sediment is subject to littoral transport or is deposited in the offshore delta. The average wave height in this area is on the order of 3 ft, but can range from 0.9 to 22 ft (Stillwater Sciences, 2011, citing O'Hirok 1985). Sediment that is immediately transported down-coast contributes to beach building, whereas sediment that is stored in the offshore delta is gradually eroded and transported down-coast or is re-deposited at the mouth during low-flow conditions when the mouth berm forms (Stillwater Sciences, 2011).

Sediment availability from the nearby deltas, in combination with sediment from littoral transport, river transport, and tidal dynamics, all influence the development and preservation of the SCR mouth berm. Due to depositional character along this section of the Pacific Coast, the foreshore is typically not steep enough to generate surging waves (Stillwater Sciences, 2011). The overall width of the surf zone is generally a function of wave height, tidal stage, the slope of nearshore bottom and river discharge. During high flow months (winter), storms events typically keep the estuary mouth open due to both offshore river discharge and onshore wave action. The nearshore delta formed off the SCRE mouth after large storm events can generate surf zones greater than 800 ft wide (Stillwater Sciences, 2011). When the tidal swings are minimized during low flow periods, the sediment transport capacity is reduced due to a reduction in the tidal prism. When this occurs, repeated wave impacts drive sediment deposition along the mouth allowing the mouth berm to form. Low flow conditions and reduced wave action during the summer months allow for onshore sediment transport and sediment deposition at the mouth, increasing mouth closure frequency and duration compared with the rest of the year (Swanson et al., 1990; Smith, 1990; ESA, 2003; Stillwater Sciences, 2011). A long-term reduction in sediment supply (littoral) due to dam construction (especially in the Ventura and Santa Clara River systems) and the dredging in the vicinity of Ventura Harbor, has been suggested to reduce the mouth berm development rate relative to historical conditions (Nautilus Environmental, 2005).

2.3.2 MOUTH BERM LOCATION

Historically the location of the mouth of the estuary migrated up and down the coast as the alignment of the main channel shifted (Beller et al. 2011); however, in the current condition, the location of the mouth is generally constrained to within the vicinity of the Project Area. An analysis of recent aerials (2005 – 2014) suggests that the location and the configuration of the mouth berm for the SCRE depends largely on the length of time following the last storm event capable of transporting sediments. As shown in Figure 6, the 2005 flood event formed a delta and reformed the mouth berm more than 800 ft westward into the Pacific Ocean from its 2014 position. Since 2005, littoral transport, wave and tidal action, combined with the lack of any major discharge events in the SCR, have caused the mouth berm to steadily retreat to the east. Future flood events in the SCR can be expected to produce similar changes in the location and configuration of the mouth berm. The west to east shift in the location of the mouth berm since 2005 has also resulted in substantial estuary volume and surface area changes. These changes and current conditions are discussed further in Section 2.4.

Another factor that may affect the development of the mouth berm is the long-term beach erosion and narrowing that has been documented along the Ventura County coast (Nautilus Environmental, 2005 citing the California Department of Boating and Waterways, and State Coastal Conservancy 2002). This beach narrowing, and the reduced littoral sediment supply discussed in Section 2.3, may also be related to the locational shifts observed in the mouth berm.

2.3.3 BREACH PATTERNS

As was discussed in Section 2.1, the geomorphology of the SCRE has changed dramatically from pre-development conditions. Similarly, the breach formation patterns, including width, duration, location, timing, and persistence, are also likely much different from what occurred historically. However, regular observations of the mouth berm and breach patterns are limited to post development conditions. Due to the difficulty of topographical surveying during breached conditions, reliable depth and width measurements for the breach opening are also not readily available. This section discusses the data that is available and how the historical and existing patterns of breach formation might be considered in development of restoration concepts. See Section 7.2.4 and Section 7.3.4 for a discussion of the ecological impacts associated with these breach events.

Historical Berm Characterization

Beller et al. (2011) provides a useful description of the historical SCRE berm and breach patterns through an analysis of early aerial photographs, historic maps, soil/vegetation studies, and a variety of ethnographic documents. The report observed that the SCRE mouth berm was "regularly closed above high-high tide or perched, with seasonal breaching and opening to the subtidal level" (Beller et al., 2011). The historical accounts described the estuary as a lagoon, separated from the ocean by a narrow beach and breached by heavy rains in the winter (Beller et al., 2011). It is important to note that, sometime in only the last 200 to 500 years, the course of the SCR shifted almost 6 miles northward from a meandering course through Oxnard and Point Heuneme, to its present day location (Beller et al., 2011). Thus, while field recent field observations and statistical analysis may suggest useful patterns related to seasonal berm formation and the duration and frequency of breach events, it should be remembered that the SCRE is a highly dynamic site. Restoration and rehabilitation planning may benefit from avoiding a focus on achieving any specific target percentage for an open or closed estuary. Rather, as is discussed further in Section 7.2.4.2, the number of actual breach events may be of more ecological importance than the duration.

Recent Berm Observations

Since 1984, the City of Ventura has made daily observations of the SCRE mouth berm and classified it as either 'closed' or 'open'. Analyzing this data over the 26-year period between 1984 and 2009, Stillwater Sciences (2011) reported that both natural and anthropogenic[2] breaches have resulted in an open estuary more often than a closed estuary. On an annual basis, the estuary was open on average 61% of the time (Figure 7). On a monthly basis, the observations showed that the river mouth was most consistently open during the winter months with the river mouth open more than 50% of the time from November through June (Stillwater Sciences, 2011) (Figure 8). Stillwater Sciences (2011) notes that these percentages reflect only the period of time between 1984 and 2009 and reflect both natural and man-made breaches. These percentages are not indicative of historical estuary breach patterns. Rather, these percentages reflect a relatively wet climate during that period (see Section 3.1), a number of

[2] In addition to high estuary water levels because of a storm runoff event, or an ocean wave overwash induced event, the mouth berm has also been breached in recent years through both authorized and un-authorized channel construction (either via mechanical or manual methods) aimed at draining the estuary to alleviate localized flooding, in association with the Ventura Port District dredging disposal operations, or for environmental concerns as was done in 1994 as part of the McGrath Lake oil spill (Stillwater Sciences, 2011; ESA, 2003). Prior to an understanding of the ecological effects, the berm was regularly breached by State Parks or by agricultural interests with easements to breach the berm for drainage control (State Parks, 1979). Water levels have also been lowered through recent pumping operations that did not involve a breach (Rincon, 2013b).

anthropogenic breaches, and an estuary constantly receiving inflow from VWRF effluent discharge (see Section 3.3). Stillwater (2011) also observed that the VWRF effluent can cause high water levels within the SCRE during the summer and fall months, and increase the likelihood that the mouth berm can be overtopped and/or breached (Stillwater Sciences, 2011).

Once the berm has been breached (a process which is thought to occur relatively rapidly over a few minutes to hours), it has been observed that open estuary conditions will persist as long as the flow into the SCRE (from either the SCR or the VWRF effluent discharge) contributes to the estuary water level rising faster than the mouth berm can build back up (ESA, 2003). In general, this timeframe depends on many factors including estuary inflows, sediment availability for berm building, tidal fluctuations, and wave conditions (Rich et al., 2013; Behrens, 2012). One study estimated that the mouth berm of the SCRE generally closes within two weeks of a breach following a storm event (ESA, 2003). Even without significant inflows, it has been observed that the estuary can remain open as long as the velocity across the beach (through the breach in the berm) is fast enough to scour and maintain the berm opening (Nautilus Environmental, 2005). This is often characterized as a balance between the tidal exchange (tending to keep the berm open) and the wave action and run-up (tending to close the berm), but it is important not to forget the importance of the upstream flows that caused the original breach and the other factors including sediment availability, watershed hydrology, and geologic setting (Jacobs et al., 2010).

Berm Elevation

Wave energy and wave run-up is often considered the major control on berm height (Takeda and Sunamura, 1982 as cited by Rich et al., 2013; Hanslow, 2000). Following initial entrance closure, it was observed by Hanslow (2000), that berm development can occur rapidly with growth (through wave deposited sediments) on a day by day basis. Berm growth then decreases over time as the increasingly higher berm is overtopped less often. Berm heights tended to stabilize with continued growth only on high tides or under conditions where the berm crest was only just overtopped. Thus it may be reasonable to assume that over a period of years, relatively consistent wave conditions would accompany relatively consistent berm heights. This appears to be true for the SCRE in the recent past.

Stillwater Sciences (2011) reviewed available LIDAR and survey data for the berm and observed that the mouth berm has consistently varied in elevation between 14 ft and 17 ft, which is approximately 8.7 to 11.7 ft above the present day mean higher high water elevation (MHHW) of 5.3 ft. The 2014 topographic survey of the berm found the mouth berm elevation to vary between 12 and 17 ft. While breaches have been previously observed when the SCRE surface water elevation reached 10 ft (Stillwater Sciences, 2011), the persistent recent inundation of the northern portion of the campground, which is mostly at an elevation of between 9.5 ft and 11 ft, indicates higher water levels (up to nearly 12 ft) may not cause a breach to occur. The bathymetry survey, which was performed in the fall of 2014 during a several month period of closed berm and flooded conditions, found SCRE water levels were around 11 ft (and had not caused a breach to occur).

Though the berm elevation at the mouth of the SCRE has not exhibited significant changes to date, sea level rise (see Section 3.6) will likely generate an equivalent increase in the elevation of the berm

(Hanslow, 2000) (see Figure 9). As the height of the berm plays a crucial role in the water surface elevation within the SCRE during dry weather conditions (and also in inundation levels during a storm runoff event prior to a breach), this is a crucial planning consideration for the restoration concepts and relocated campground grading.

2.4 CURRENT CONDITIONS

This section describes the morphological conditions present within the SCRE in the fall of 2014.

The SCRE lagoon area was surveyed in 2012 by California State University – Channel Islands (CSUCI) using a boat-mounted multibeam echo sounder which provided relatively high resolution bathymetry. In September 2014, cbec collected single-beam echo sounder bathymetry with the intent of confirming the suitability of the existing data for the Project. Several important data gaps existed in the previous bathymetry (likely because it was inaccessible by boat when the last survey was performed), including the VWRF outfall channel. Because many portions of the site were flooded during the 2014 field effort, it was possible to fill these data gaps with additional boat-based survey and to make several topography/bathymetry updates. Figure 10 shows the areas updated with revised bathymetry which include the mouth berm, VWRF channel, areas along the north edge of the campground including a small channel, and several deeper areas upstream of Harbor Blvd. As shown in Figure 11, comparison of the 2014 single beam data to the 2012 multibeam bathymetry indicates that the current estuary is, for the most part, still very well represented by the 2012 multibeam survey with only a few isolated locations showing large differences. These singular occurrences are most likely related to soundings near observed mats of thick, submerged vegetation as well as shifting channel margins.

As discussed in Section 2.3.2 and as shown in Figure 6, the mouth berm has been progressively moving to the east since the 2005 flood event. This has had significant impacts to the stage and volume relationships of the SCRE, as shown by Figure 12. For example, in the year 2000 and prior to the 2005 flood event, the SCRE had a volume of approximately 300 acre-ft at a water surface elevation (WSE) of 9 ft. After the 2005 flood event, the SCRE volume had more than doubled to a volume of over 600 acre-ft at the same WSE. Since 2005, the volume of the estuary has been substantially reduced, and as of September 2014, it is now back to conditions very similar to those present in 2000.

3 HYDROLOGIC REGIME

The hydrologic regime of the SCRE is affected by changing and uncertain precipitation patterns, surface water storage and diversions within the SCR watershed, agricultural drainage and other groundwater flows, VWRF effluent discharges, tidal exchanges during open mouth conditions, and wave action. This section summarizes the hydrologic regime of the historical and current SCRE to support development of appropriate restoration and rehabilitation concepts. The Project is limited to mostly physical modifications to the portions of the SCRE located within the Project property and does not include efforts to remedy or 'restore' the presently altered hydrologic regime to some previous historical hydrological condition. Rather, this section discusses the past and present hydrology to provide context for the development of appropriate concepts not as an objective or standard for restoration. Though a number of hydrologic changes within the estuary and the watershed may support the goals of the Project, they are considerably beyond the scope of this report. This section also includes a discussion of the climate change estimates for the future hydrologic regime of the SCRE.

3.1 CLIMATE PATTERNS

The climate of the SCR watershed is characterized by a semi-arid, two-season Mediterranean climate typical of the southern California coastline. There are cool wet winters and warm/hot summers with 80% of the precipitation occurring between November and March (ESA, 2003). Annual rainfall within various locations in the watershed ranges from 9 to 45 inches (averages for the period of 1971-2000) with the greatest rainfall occurring in the mountainous regions (Stillwater Sciences, 2011). Nearer to the estuary, the average annual rainfall is 15.4 inches as measured at Ventura (ESA, 2003).

Precipitation patterns may be linked to the ENSO phenomenon, the warming and cooling cycles of the equatorial eastern Pacific Ocean. The ENSO typically occurs on a 1 to 1.5 year duration and a 3 to 8 year recurrence interval (Stillwater Sciences, 2011). As previously mentioned, a change in precipitation related to the ENSO may have led to an observed wet-period that began in the late 1960s[3]. Inman and Jenkins (1999) observed multi-decade wet and dry periods where a relatively dry period occurred from 1944 to 1968 shifting to a relatively wet period in 1969 (Stillwater Sciences, 2011). In southern California, the ENSO has generally caused wetter rainy seasons with higher intensity rain events and higher annual peak flow magnitudes (Stillwater Sciences, 2011). It is unclear whether this behavior will persist in the future as climate patterns change or whether it holds over a larger period of record. In ENSO years, Stillwater Sciences (2011) observed that peak SCR flows would exceed 81,400 cfs in 1 out of 2 years, whereas in non-ENSO years the same flow was exceeded in only 1 out of 10 years. Rainfall trends associated with the ENSO cycle have direct impacts to the fluvial geomorphic processes of the SCR and the estuary. During ENSO years, higher river flow volumes in the SCR have a greater potential to transport sediment, generate geomorphic changes, and impact estuary ecology and breach dynamics at the river mouth.

[3] The United States Drought Monitor provides frequently updated drought maps for California. These maps, coupled with the hydrologic data records from the SCR gages, suggest the wet period may have ended around 2006.

Before it was destroyed in the 2005 flood event, USGS gage #11114000 (called Montalvo) was located at the Highway 101 bridge and provided flow records for the lower reaches of the SCR for the period from 1927-2004. Since 2008, streamflow data in the SCR is recorded at Ventura County Watershed Protection District (VCWPD) gage #723, which is located a short distance downstream at the Victoria Blvd bridge. The 1,600 square mile watershed and the locations of these two gaging stations are shown in Figure 13. Given their close proximity and lack of additional inflows between them, these two gages provide a combined period of flow since 1927. The daily mean discharge data for the SCR between 1927 and 2012 is shown in Figure 14.

The flow data retrieved from these gages indicate that, over the period of record, the SCR has low to no surface water flow in the summer and fall months (see Section 3.2 for a discussion of historical low flow conditions), but reacts quickly to high intensity storm events that occur in the winter and spring months. While daily average discharges range from 0 to over 90,000 cfs, Stillwater Sciences (2011) observed that over the course of a water year flows are usually less than 1 cfs (70% of the time) and rarely exceed 100 cfs. In general, low flows occur from May through December with the highest flows typically occurring in February. Monthly average daily mean discharges, for both wet years (ENSO dominated periods) and dry years (non-ENSO periods), are shown in Figure 15.

As part of this effort, the Stillwater Sciences (2011) flood frequency analysis from 1955-2004, was updated with the most recent instantaneous peak flows (2008-2012) from VCWPD gage #723 (Figure 16). The updated flood frequency analysis, which used the Log-Pearson Type III distribution (per USGS Bulletin 17B) is shown in Figure 17 and in Table 2. The most recent significant flood event occurred in January of 2005 with an estimated peak flow of 136,000 cfs.

Table 2 - Santa Clara River flood frequency for the period of 1955-2004

Return Period (years)	Peak Flow (cfs)
2	12,785
5	46,878
10	86,559
25	158,666
50	228,797
100	312,548
200	410,375

Local wind conditions are another important climatological consideration for SCRE restoration efforts. Wind patterns are an important component to estuary mixing, water quality circulation and influence onshore surface waves. Local wind data was obtained from the California Irrigation Management Information System (CIMIS) station #156 at Oxnard. This station has been active since October of 2001 and was used to determine wind patterns over the 14 year period. In general, onshore breezes from the west dominate in the midmorning to afternoon and are strongest in early afternoon. Northeasterly offshore breezes dominate in the evening and early mornings (Figure 18 - Figure 21). These offshore breezes are due to differential heating and cooling of the ocean and land. Occasionally hot dry Santa

Ana winds blow from inland in the fall and winter (ESA, 2003). Seasonally, winds are predominantly westerly onshore winds from March through October with the strongest winds in April, and predominantly north easterly offshore winds occur from November through February (Figure 22 and Figure 23).

3.2 HISTORICAL DRY SEASON FLOWS

While some research has examined the nature of dry season flow on the Santa Clara River preceding European settlement (Schwartzberg and Moore, 1995; as cited in Nautilus Environmental, 2005), and some researchers have hypothesized that perennial flow would have likely persisted along the majority of the river (Stillwater Sciences, 2007; Boughton et al., 2006), little comprehensive research has been undertaken to evaluate local historical conditions. Historical observations assembled from narrative accounts, maps, and photographs imply that while constant, perennial reaches existed along a good portion of the Santa Clara River, there were also large sections of consistently intermittent (ephemeral) flow (Beller et al., 2011). This type of system—with alternating perennial and ephemeral reaches—is called an interrupted perennial river (Stromberg et al., 2005). Various historical accounts from 1769 to the early 1900's consistently define specific reaches as ephemeral, while others are typically portrayed as having water year round (perennial). This spatial variability in historical summer base flows reflects the connectivity between groundwater and surface water within the SCR. In natural systems, these variations are often controlled broadly by local aquifer characteristics, local geologic structures (faults), and morphological variations in valley dimension (constrictions).

General spatial patterns of dry season flow still exist today, although anthropogenic activities have likely impacted the extent and persistence of perennial and intermittent reaches along the river. In particular, on the Oxnard Plain, summer water availability is very sensitive to changes in hydrology and water management (Beller et al, 2011).

By the early 1900's, sections of the river once considered perennial were described as ephemeral: "For the greater part of the year both the Santa Clara and Ventura rivers are dry in their lower reaches" (Holmes and Mesmer, 1901). Cooper (1967) noted that both Santa Clara and Ventura rivers were "dry most of the time but carrying very heavy loads during occasional floods." Tait (1912) was more overt as to the cause of the transition, noting that "all of the summer discharge of [the] Santa Clara River is taken out for irrigation and about forty pumping plants take water from wells." Engineer Vern Freeman, writing in 1930, is consistent with many other accounts, stating that the Santa Clara River was perennial until a point about three miles east of Piru, and then again for extensive sections around Fillmore and Santa Paula (Beller et al., 2011). However, he does not mention any summer surface flow present on the Oxnard Plain. Mann (1958) does note that "there is little further percolation" below the Highway 101 bridge, a formerly perennial reach. Contractions in the extent of summer water in the river by 1930 could be indications of the impacts of surface diversions and groundwater extraction (discussed further in Section 3.3).

Under existing conditions, the nature of seasonal flow patterns on the river generally reflect historical trends. While general patterns of groundwater-surface water interactions are still consistent, water diversions, extractions, impoundments and return flows continue to alter the location and availability dry-season flow relative to historical conditions.

3.3 SURFACE WATER STORAGE AND DIVERSIONS

In addition to the changing and variable climate patterns, anthropogenic developments throughout the SCR watershed including dams, water diversions, and groundwater extraction have affected surface flows. More than one third of the watershed is located upstream of dams and debris basins (Figure 13), which include the Santa Felicia (built in 1955) and Pyramids Dams (built in 1972) on Piru Creek, Castaic Dam (built in 1972) on Castaic Creek, and Bouquet Canyon Dam (built in 1934) on Bouquet Canyon (Stillwater Sciences, 2011). Water diversions are estimated to have reduced annual flows by 25% (Swanson et al., 1990) to 75% (Nautilus Environmental, 2005) with the greatest impacts during dry years when all surface water runoff may be diverted upstream of the SCRE. The most significant water diversion is the Vern Freeman Diversion Dam approximately 10 miles upstream of the SCRE. The Vern Freeman Diversion Dam (owned and operated by United Water Conservation District (UWCD)) was established in 1929, with a permanent dam constructed in 1991, for the purpose of groundwater recharge and limited surface delivery. Water rights enable UWCD to divert at a rate of 375 cfs with a maximum allowable diversion of 144,000 acre feet per year (Stillwater Sciences, 2011).

3.4 VENTURA WATER RECLAMATION FACILITY EFFLUENT

In addition to the SCR streamflow, the Ventura Water Reclamation Facility (VWRF) effluent is another significant water source to the SCRE. The VWRF essentially provides a continuous flow of treated water into the SCRE, and is therefore an important consideration in breach dynamics at the estuary mouth and the overall ecology of the SCRE. During closed mouth conditions, the VWRF can also have significant impacts on the water quality within the estuary (see Section 4).

When the facility was built in 1958, VWRF began discharging effluent into the SCRE at approximately 4 MGD[4]. An expansion in 1972 increased the discharge capacity to approximately 14 MGD, but peak flows over 10 MGD are typical only during high river discharge events, presumably due to precipitation infiltration into the City of Ventura's wastewater collection system (Stillwater Sciences, 2011). Current effluent discharges from the VWRF to the Wildlife Ponds (shown in Figure 1) have a daily average rate of 5.8-8.4 MGD (Stillwater Sciences 2011). Effluent discharge volumes reaching the SCRE are generally less due to evaporation within the ponds and recycled water diversions[5]. The monthly average VWRF effluent discharge rate between 1984 and 2010 is shown in Figure 24. While some small fluctuations in VWRF effluent volume are observed, the log scale used in Figure 25, which compares the monthly average VWRF effluent flow to the monthly average SCR flow, reveals how consistent the VWRF discharge is compared to the seasonal nature of the SCR which varies over many orders of magnitude. Stillwater Sciences (2011) observed that 90% of the flow into the SCRE from March through September

[4] 1 MGD is equivalent to a flow rate of 1.55 cfs for the day.
[5] Groundwater flow from the VWRF Wildlife Ponds is directly into the north end of the SCRE. This is discussed further in Section 3.5.

(in 2010) came from the VWRF effluent. Thus, while the VWRF discharge flows to the SCRE may compensate for SCR flows lost due to upstream water diversions, VWRF flows in the summer and fall months are likely greater compared to an unregulated southern California river (ESA 2003).

Future changes to VWRF effluent discharge to SCRE are important in understanding potential changes to hydrologic and ecological processes within the estuary. Both urban and agricultural sectors in the Santa Clara River Valley create different operational pressures and opportunities for the VWRF and can subsequently affect discharges to the SCRE. For example, urban development will, in the foreseeable future, create increased water demands, which could increase effluent discharged into the estuary. Conversely, increased agriculture and irrigation needs throughout the valley may create a bigger market for recycled water diversion projects, which could decrease effluent into the SCRE. Droughts and residential and commercial water conservation or water recycling and reuse efforts within the VWRF service area could also decrease VWRF flows. Any future change to the VWRF surface water source will be an important factor to consider when designing restoration concepts in and around the SCRE.

In addition, the Consent Decree entered into between the City of Ventura, Wishtoyo Foundation, Wishtoyo Foundation's Ventura Coastkeeper Program, and Heal the Bay, requires that the City of Ventura reclaim up to 100% of the VWRF effluent by 2025, and provides that the City of Ventura can only continue to discharge any VWRF effluent if scientific experts and resource agencies determine a particular amount of effluent is needed to sustain the native and endangered species within the estuary (United States District Court, 2012).

3.5 GROUNDWATER

This section summarizes what is known about the near surface groundwater levels and the subsurface flows as they pertain to the SCRE and the potential for restoration of the area currently occupied by the campground. The majority of this understanding comes from work performed in the preparation of the Estuary Subwatershed Study (Stillwater Sciences, 2011) and the McGrath State Beach Natural Resources Management Plan (ESA, 2003), but a few other data sources are also discussed. The current VWRF permit issued by the LARWQCB requires that the City of Ventura undertake a Groundwater Special Study to better characterize the interactions between the estuary, the VWRF discharge, and the local groundwater. When that report is completed[6], the nature and quality of the groundwater levels and flows will be better characterized. Still, some important trends have been identified that should be considered in the development of restoration concept designs.

The groundwater in the vicinity of the SCRE is generally shallow because of the permeable soils, proximity to the coast, and the presence of shallow clay layers observed at depths between 3 and 8 ft (ESA, 2003; Stillwater Sciences, 2011). The water surface elevation within the SCRE is therefore directly

[6] The draft report is due in September 2017 and the final report is schedule to be available in January of 2018. These reports will be useful to resource managers and should influence site management decisions and maintenance activities. Additional rehabilitation and restoration concept planning and design in the future should consider these additional studies, but sufficient information is presently available to guide the efforts for this Project.

linked to the elevation of the local groundwater. Thus, the distinction between the flooding of the campground from high and rising groundwater levels and direct surface water flows is the rate at which the flooding can physically occur. Surface water ponding was observed even before the earthen levee on the north side of the campground was removed in 1998 (Swanson et al., 1990; ESA, 2003).

Groundwater inflows into the SCRE come from the unlined VWRF wildlife/polishing ponds to the north and from upstream sources to the east (predominantly agricultural drainage). The magnitude of the groundwater flow from the VWRF ponds depends on the water surface elevation within the SCRE, but the average annual flow is estimated to be around 1.6 cfs, with slightly lower values (1.4 cfs to 1.5 cfs) expected when the SCRE is full (Stillwater Sciences, 2011). Estimates for groundwater inflows from the east depend on the season, with higher values in the winter (around 7 cfs) than during the rest of the year (0.3 to 4 cfs) (Stillwater Sciences, 2011).

The SCRE also has a subsurface hydrological connection with the groundwater of McGrath Lake to the south, where the direction of the groundwater flow depends on the water level in the SCRE and the management of McGrath Lake water levels. McGrath Lake is supplied primarily by surface water inflows associated with agricultural drainage from 1,400 acres of irrigated farm land to the east (ESA, 2003). To reduce flooding of the agricultural lands, the lake level is controlled by the Coastal Berry Company through pumps that discharge into a low area on the seaward side of the dunes (ESA, 2003) [7]. McGrath Lake is typically pumped so that the water surface elevation is between 5.3 ft and 6.3 ft (NAVD88) (Stillwater Sciences, 2011). During closed berm conditions, the water level in the SCRE is frequently above this level and the groundwater gradient causes groundwater flow to the south. During open mouth conditions, the gradient reverses and the flow is to the north (Stillwater Sciences, 2011; Nautilus Environmental, 2005). Recent continuous monitoring of groundwater elevations (see Figure 27) along a transect between the SCRE and McGrath Lake (GW1-GW3 as shown in Figure 26) show that the groundwater gradient is towards McGrath Lake when SCRE water levels are high and reversed when SCRE water levels are low. The data also indicate that the groundwater gradient responds quickly to changes in surface water levels.

When the mouth berm is closed, the water level within the SCRE is also influenced by groundwater losses to the ocean. Groundwater losses to the ocean depend on the length of the mouth berm, tidal elevations, and the water surface elevation within the SCRE. In the Estuary Subwatershed Study, Stillwater (2011) determined that, for the SCRE as configured in 2009/2010, the groundwater loss rate across the berm varied between zero (at high tide just after mouth closure) and 9.2 cfs at full estuary

[7] It should be noted that the outfall location for these pumps was previously directly connected to the SCRE through a long narrow inlet of estuary which paralleled the beach caused by the 2005 flood event. Since then, the connection has been intermittently observed during closed berm conditions. Topographical data suggest the connection is only present when water surface elevation in the estuary is higher than about 12 ft. This connection was not present in the fall of 2014 field efforts. Changes to the beach morphology may reduce the width of this potential connection or eliminate it entirely. No changes to this area are anticipated as part of this project.

stage[8] (Stillwater Sciences, 2011). The length of the mouth berm has not changed significantly since 2009/2010 and these estimates are likely still reasonable for the current condition of the SCRE.

While groundwater flows are relatively insignificant during winter months, when storm events can dramatically increase river flows, they are an important component, in addition to VWRF effluent, to understanding the water balance and water level regime within the estuary during closed berm/dry season conditions.

3.6 TIDES

Normal tidal fluctuations and elevated storm surges can play an important role in the dynamic processes at the river mouth. Tide levels can significantly affect inundation patterns during SCR flood events, and tidal exchange of seawater into the SCRE can also greatly influence the overall ecology. Historical tidal measurements are available from two nearby tide stations: the Santa Barbara Station (ID: 9411340) established in 1974, and the Santa Monica Station (ID: 9410840) established in 1932. These stations are operated by the National Oceanic and Atmospheric Administration (NOAA). The location of these stations is shown in Figure 13 with the SCRE located roughly halfway between the two stations. While another nearby tide station existed at Rincon Island from 1962 to 1990, it is no longer in operation and not considered in this report. Using the data from two operational sites and the recent bathymetry of the estuary, this section describes the current average tidal conditions present at the SCRE, the variability in tidal exchange estimates, the long term trends in mean sea level (MSL), and also provides exceedance probabilities for storm tides which will be helpful in restoration concept planning and hydrodynamic simulations.

The tides at the SCRE are mixed semidurnal tides where, for the most part, there are two low tides and two high tides per day. Using an average of the data from the two surrounding stations, the mean tide level (MTL) at the SCRE is 2.65 ft with a mean diurnal range (MHHW - MLLW) of 5.42 ft (Table 3).

Tidal exchange with the estuary during open conditions is variable and has changed significantly over the past twenty years and varies in large part on the bathymetry of the SCRE. The Estuary Subwatershed Study included a tidal inundation analysis of the SCRE bathymetry for the year 2000 and the year 2009 (before and after the 2005 flood event). The analysis indicated that at a MHHW of 5.3 ft, the tide could extend from approximately 980 ft inland from the river mouth in the year 2000, to approximately 1,300 ft inland in 2009 (Stillwater Sciences, 2011). Volume exchanges also varied, with only 3% of the total SCRE volume exchanged in 2000 to over 7% in 2009. The estimated volumes were not reported. Updated bathymetry for 2014 indicate that at a level of 5.3 ft, the tide could almost extend as far inland as the Harbor Blvd. bridge (2,500 ft inland from the present day location of the mouth berm) and could contribute a saltwater volume of approximately 50 acre-ft (Figure 12, approximately 12% of the total estuary volume if filled to a WSE of 10 ft). The variability in the tidal exchange during open conditions is

[8] Full estuary stage was then considered to be around 10 feet. Higher values have been observed for the water surface elevation and similarly, higher values for the groundwater loss rate are likely possible. Stillwater further determined that 8 cfs was an appropriate average value for the groundwater loss rate through the berm.

likely to continue in the future: restoration concept development should consider flexible designs and avoid relying on only the currently exhibited tidal exchange patterns. See Section 3.7 for a discussion of sea level rise (SLR) and climate change estimates.

Table 3 - Tidal datums

Tidal Datum (ft, NAVD88)	Santa Barbara	Santa Monica	SCRE
MHHW	5.27	5.24	**5.26**
MHW	4.51	4.50	**4.51**
MTL	2.68	2.62	**2.65**
MLW	0.85	0.74	**0.80**
MLLW	-0.13	-0.19	**-0.16**

Note: Station datums were converted to NAVD88. Santa Barbara used 3.29 ft and Santa Monica used 2.63 ft. (NOAA, 2014). These values may not match previous studies exactly due to ongoing data collection at each site which is updated on the NOAA site regularly.

To characterize the potential for storm surges and to predict the elevated high water levels, NOAA provides a statistical analysis of the frequency of extreme tide levels observed at the Santa Monica tide station. The NOAA analysis excludes wave run-up and also excludes tsunamis because of their relative infrequency during the periods of historic record. The analysis produced a set of exceedance probabilities which predict how often elevated tide levels may occur (value are also determined for low tides but are less relevant to this effort). A 50% exceedance level (alternatively called the 2-year recurrence interval) will be exceeded, every two years on average. Likewise, the 10% exceedance level will be exceeded, every ten years on average. For the Santa Monica station the analysis indicates, that for the year 2014, the 50% annual exceedance level is 7.19 ft and the 10% annual exceedance level is 7.55 ft. These are useful thresholds for planning and should be incorporated into hydrodynamic simulation of restoration alternatives.

3.7 CLIMATE CHANGE ESTIMATES

Climate changes have occurred on the earth for millennia due to variations in solar radiation, plate tectonics, volcanic eruptions, and other natural fluctuations, but human activities have been identified as significant causes of recent climate changes. While overall climate model projections for the globe are generally consistent (an increase in global mean temperature, a rise in mean sea levels, and changes in precipitation patterns), changes at the regional or local level are expected to vary significantly and predictions have considerably more uncertainty. This section describes the previous efforts to assess the effects of future climate change on the SCRE, provides recently updated SLR projections from the National Research Council (NRC) (2012), and briefly reviews the planning guidance from the California Coastal Commission (CCC) (2013).

As part of the Estuary Subwatershed Study, Carollo Engineers (2011) conducted a literature review and data analysis on the effects of future climate change scenarios on the SCRE. The report concluded that global climate change will primarily affect the SCRE through increases in mean air temperatures, increases in MSL, and increases in the frequency and magnitude of precipitation events. While there has been an increase in extreme events since 1948, there is no clear scientific consensus on the projected change in total average annual precipitation within the SCR watershed (Carollo Engineers, 2011; PRBO Conservation Science, 2011). Given the uncertainty in the climate change impacts on precipitation, this report will focus on sea level rise and air temperature projections[9]. Carollo Engineers (2011) recommended that future studies consider incorporating the following projection ranges:

An increase in atmospheric temperature

- by the year 2050 – 1.0 to 3.0°C, average of 2.0°C; and
- by the year 2100 – 1.1 to 5.0°C, average of 3.0°C.

A rise in mean sea level

- by the year 2050 – 0.7 to 2.0 feet; and
- by the year 2100 – 1.6 to 6.6 feet.

These projection ranges are comparable to those developed by PRBO Conservation Science (2011) for the Southwestern California Ecoregion which suggested an annual mean temperature increase of 1.7°C to 2.2°C by the year 2070, and lower ranges for the increase in mean sea level (0.3 ft by the year 2070 and 2.4 ft by the year 2100).

The most recent regional sea level rise projections, however, were published in the 2012 National Research Council (NRC) report on *Sea Level Rise for the Coasts of California, Oregon and Washington*. Based on the Intergovernmental Panel on Climate Change (IPCC) (2007) findings on global sea level changes and on regionally specific published research results related to vertical land motions, the NRC (2012) report summarized the processes contributing to sea level rise for the west coast, and provided updated projections for sea level rise. Projections and ranges applicable to the SCRE were slightly lower than previous estimates and include:

A rise in mean sea level (relative to 2000)

- by 2030 – 0.43 ft with a range of 0.13 to 0.98 ft; and
- by 2050 – 0.92 ft with a range of 0.39 to 2.0 ft; and
- by 2100 – 3.02 ft with a range of 1.38 to 5.48 ft.

These projections were also recommended by the March 2013 update to the *State of California Sea-level Rise Guidance Document* prepared by the Ocean Protection Council (OPC), the California Climate Action Team, and the California Ocean Science Trust. These sea level projections were also recognized by the draft *Sea-Level Rise Policy Guidance* issued by the California Coastal Commission (CCC) in 2013. Both of these reports also stress that there are uncertainties within climate change projections and emphasize the incorporation of adaptive management techniques, and the selection of appropriate risk and planning timeframes.

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[9] Some important downscaling research is being done to predict future climate change and precipitation patterns for the southern California region based on global climate change models. An important resource for recent reports is C-Change.LA (http://c-change.la/. As models improve and additional research is published, restoration planning will likely benefit from a focused consideration of climate predictions for the SCRE and the SCR watershed.

Though slightly lower than the previous projection estimates, sea level rise of this magnitude will have direct and significant impacts to the hydrologic regime and ecological functioning of the SCRE. Both normal tidal ranges and extreme tide levels will increase with increases in mean sea level. Because of the potential for increased downstream stage, the sediment transport dynamics in the SCRE may trend more towards aggradation. As was discussed in Section 2.3.3, the height of the mouth berm is also anticipated to increase (see Figure 9). Given the low elevation of the Project site and the already frequent inundation patterns, these potential changes are key considerations for the development of restoration concepts. Table 4 shows potential berm height and tidal fluctuations for the year 2050 and 2100 using the minimum, projected, and maximum values of the projected SLR ranges. These increases should be considered for the hydrodynamic simulation of restoration alternatives for the SCRE to inform refinement of the restoration concepts. Final planning decisions and longer-term management of the site may benefit from further analysis of appropriate projection timeframes, and ongoing SLR data and global climate modeling. The impacts of these changes to the ecological functioning of the SCRE are difficult to predict, but will likely increase average water temperatures, increase evapotranspiration rates, and may increase the amount of seawater exchanged during open mouth conditions.

Table 4 - Tidal datums and berm height for sea level rise projections

		2050			2100		
(ft, NAVD88)	SCRE (present)	Range Minimum (+0.39 ft)	**Projection (+0.92 ft)**	Range Maximum (+2ft)	Range Minimum (+1.38 ft)	**Projection (+3.02 ft)**	Range Maximum (+5.48 ft)
MHHW	5.26	5.65	**6.18**	7.26	6.64	**8.28**	10.74
MHW	4.51	4.90	**5.43**	6.51	5.89	**7.53**	9.99
MTL	2.65	3.04	**3.57**	4.65	4.03	**5.67**	8.13
MLW	0.80	1.19	**1.72**	2.80	2.18	**3.82**	6.28
MLLW	-0.16	0.23	**0.76**	1.84	1.22	**2.86**	5.32
Berm Height	14-17	14.4-17.4	**14.9-17.9**	16-18	15.4-18.4	**17-20**	19.5 – 21.5

4 WATER QUALITY

This section outlines the pertinent water quality data sources (both grab sampling and continuous monitoring efforts) and then describes several key water quality parameters in detail including: temperature (Section 4.2), pH (Section 4.3), dissolved oxygen (DO, Section 4.4), salinity and suspended solids (Section 4.5), copper (Section 4.6), chlorophyll-a (Section 4.7), and nitrogen and phosphorous (Section 4.8). Sampling locations for the water quality data discussed in this report are depicted in Figure 26. Samples and analyses for many other less relevant water quality parameters have been completed, but are not discussed in this effort.

It should be noted that restoration concepts formulated as part of this Project are anticipated to include mostly physical modifications (improved grading, substrates, and enhanced vegetation) to create expanded, suitable habitat within the area currently occupied by the campground. The Project is not anticipated to include any treatment of source waters or other remediation efforts aimed at directly changing the water quality in the SCRE. Though some water quality benefits may be realized in the more open areas of the main SCRE lagoon and in the enhanced areas as a result of the Project, the overall water quality of the SCRE is likely to remain greatly influenced by the VWRF discharge. It is beyond the scope of this report to predict the potential estuary impacts that might occur from VWRF discharge modifications or other hypothetical future scenarios.

Treatment process modifications, discharge volume reductions, or other changes within the upper watershed may occur in the future and may affect water quality within the SCRE. Speculating on future operations or other actions within the watershed is generally beyond the scope of this report, but may need to be considered when formulating restoration concepts. Rather, an assessment of the existing water quality data is presented to support the development of appropriate restoration concepts.

As is discussed in the following sections, recent measurements of various water quality parameters reveal that the water quality within the SCRE is generally less than ideal during closed berm conditions. In addition, restoration planning efforts and concept development efforts may want to consider how effluent reduction might reduce dry season water levels.

4.1 DATA SOURCES

The primary data source for the water quality data presented and interpreted in this report include the monitoring and reporting stipulated by the City of Ventura's VWRF discharge permit as issued and periodically updated by the LARWQCB. This required monitoring includes grab and continuous sampling and, through a variety of TSO's, has also resulted in several special focused studies (Stillwater Sciences, 2011; Nautilus Environmental, 2005; Entrix Inc., 2002a/b; and others). Estuarine grab samples collected for monitoring requirements established by the VWRF discharge permit are collected at locations R1 to

R5 (see Figure 26)[10]. Note that the location of R3 varies depending on the location of the most recent river mouth breach location.

Other independent efforts have also obtained useful water quality data within the SCRE (USFWS, 1999; Kelley, 2008; cbec 2014) as shown in Table 4. As the sampling locations varied between these studies, the Estuary Subwatershed Study grouped them into several zones for comparison, the Upper Estuary, the Middle Estuary, the Lower Estuary, the Upper Outfall, and the Lower Outfall. These areas are indicated schematically in Figure 26. It should be noted here that the morphology of the estuary has changed significantly over the past twenty years (Section 2), and that some of the early sample locations (pre-2005) are no longer actually within the estuary. Still, the zoned approach is useful and will also be used in this report when referring to the general location of any specific water quality results within the estuary.

Table 5 - Water quality data sources and parameters measured

Data Source	Approximate Dates of Sampling Efforts	*In situ* field data					Analytical laboratory data				
		Temperature	pH	Dissolved Oxygen	Specific Conductivity	Salinity	Turbidity	Nutrients	Metals	Chlorophyll-a	Bacteria
USFWS 1999[1]	1997-1999	X	X	X	X	X					
Entrix, Inc. 2002a/b[1]	2001-2002	X	X	X	X	X	X		X		
Nautilus Environmental, 2005[1]	2003-2005	X	X	X	X	X					
Kelley, 2008	2007-2008	X	X	X		X	X				
City of Ventura, 2000-2013	2000-present	X	X	X		X		X	X	X	X
Stillwater Sciences, 2011	2009-2010	X	X	X	X		X	X		X	
cbec, 2014	Sep, 2014	X	X	X	X	X		X	X		

Note: While the overall morphology of the estuary has changed significantly since these data were collected, the results are still relevant as the estuary will again change in the future and may return to a similar configuration.

In addition to these grab samples, a number of efforts have yielded more continuous water quality data. From February 2009 to July 2010, the City of Ventura had two multi-parameter water quality monitoring sondes, one on the north side of the estuary near the outfall channel ("north sonde") and a second on the south near McGrath State Beach ("south sonde"). These sondes recorded DO, pH, temperature, conductivity, turbidity, and estimates of chlorophyll-a at mid-depth within the water column at 15-minute intervals. Dewatering, maintenance activities, and vandalism resulted in some data gaps within the monitoring period. This sonde data was presented and interpreted in detail in the Estuary Subwatershed Study and will be summarized in the sections that follow for each water quality parameter of interest.

[10] The recently renewed NPDES discharge permit for the VWRF includes an additional monitoring point (M-01A) at the end of the pipe after the wildlife ponds and at the upstream end of the outfall channel in the northern portion of the estuary.

It should be noted that the City of Ventura, through the Phase 3 special studies provisions of the 2013 VWRF discharge permit, is also presently beginning work on an additional (and expanded) two-year water quality monitoring effort within the SCRE, which is expected to begin in the fall of 2014 (City of Ventura, 2014). Through independent expert review, it was determined that this Phase 3 effort will include four water quality monitoring instruments. The north sonde will remain in the outfall channel, but will be located at the bottom of the water column. The south sonde will remain in the same location, but will include a second instrument at depth. An additional central sonde will also be installed at the bottom of the water column in a deep portion of the estuary between the other two locations. As soon as it is available, data collected with these sondes should be used to inform further assessment of the estuary and any progress on restoration plans.

4.2 TEMPERATURE

Water temperature is pertinent to estuarine water quality due to its effects on the solubility of dissolved oxygen (Figure 28, and Section 4.4) and because of the effect it has on steelhead productivity and habitat suitability. As described in (Section 7.2), rearing juvenile steelhead generally prefer water temperatures between 10-13°C and have an upper lethal limit of about 24°C (Bjornn and Reiser, 1991). However, a growing body of recent literature describes the increasing temperature tolerances of steelhead when the associated increases in metabolic rates are supported by adequate food supplies. For example, Hayes et al. (2008) observed the highest juvenile steelhead growth rates in the Scott Creek estuary along the central California coast at temperatures between 15-24°C. Temperature is also important because, as noted in the discharge permit, "increased temperatures accelerate the biodegradation of organic material both in the overlying water and in bottom deposits and may also increase the odor of water because of the increased volatility of odor-causing compounds" (LARWQCB, 2013).

Water temperatures within the SCRE have been observed to vary from wintertime lows near 13 °C (both for open and closed conditions) to summertime highs near 23 °C with an open mouth, and 25 °C under closed conditions (Stillwater Sciences, 2011) although higher temperatures (as high as 29°C) have also been observed (USFWS, 1999; Kelley, 2008; Entrix Inc., 2002b; Nautilus Environmental, 2005). Recent monthly VWRF sampling in the estuary indicates daytime surface temperatures average around 21.4 °C between May and October and around 14.8 °C from October through April (LARWQCB, 2013).

It is unclear exactly how the temperature of the VWRF effluent affects the temperature within the estuary, but as the principal source of water during the dry months, it is reasonable to expect that the VWRF effluent temperature does affect the temperature within the estuary. The City of Ventura includes monthly average effluent temperatures in their annual VWRF reports. Winter (December – February) effluent temperatures between 2002 and 2009 averaged 17.5 °C and summer (July – August) effluent temperatures averaged 24.5 °C. This data mostly agrees with the observation in the Estuary Subwatershed Study that VWRF effluent temperatures are generally lower than SCRE water temperatures during summer months, but can be warmer during winter months (Stillwater Sciences, 2011). Data collected by the City of Ventura sondes shows relatively consistent daily temperature fluctuations of 1 to 3 °C, which often occur under closed mouth conditions with the lowest temperatures typically occurring near dawn and high temperatures occurring in late afternoon.

September 2014 field efforts included vertical temperature profiling at seven locations within the estuary (WQ1-WQ7) and observed day time temperature readings ranged from 22.4 °C at depth to 25.7 °C at the surface. Density stratification due to temperature was not observed. This finding is consistent with many of the previous temperature studies that indicated little to no thermal stratification within the estuary with surface to bottom temperature readings varying by only 1 to 2 °C (USFWS, 1999; Nautilus Environmental, 2005; Kelley, 2008). The SCRE is relatively shallow and these results generally suggest the estuary is sometimes relatively well-mixed due to wind driven waves and circulation. However, it should be noted that pockets of stratification have previously been observed near the mouth berm (Swanson et al., 1990, Nautilus Environmental, 2005). These pockets appear to be the result of density due to "haline" stratification (higher salinity, see also Section 4.5), which are occasionally accompanied by cooler water at depth, and are not necessarily the result of or accompanied by thermal stratification. Depending on the estuary morphology, the river inflow, and the specifics of the tidal cycle, it is anticipated that this type of stratification could occur again, but it does not appear to be the predominant behavior in recent years or it is spatially limited and was not observed. The full set of vertical profile data collected in September 2014 is included in Appendix A.

Limited water temperature data is available for the flooded campground areas but the shallow depth and areas of black asphalt likely cause higher daily water temperature fluctuations than observed in other areas of the estuary. Restoration concepts development may consider providing deeper and/or large-volume areas with the intent of possibly reducing elevated temperatures or large diurnal fluctuations.

4.3 pH

This section summarizes recent pH measurements within the SCRE and how pH may influence the restoration planning efforts.

pH levels with the SCRE are important for a number of reasons. First, most aquatic organisms are adapted to live in water with a pH between 5.0 and 9.0, although the preferred pH range for steelhead lies roughly between 6.0 and 9.0, outside of which mortality and sub-lethal effects such as reproductive failure may occur (Carter, 2008). Second, pH levels affect the portioning of un-ionized ammonia (highly toxic to many fish species) to total ammonia (see Section 4.8). See also Section 7.2 for a discussion of pH and ammonia levels as they pertain specifically to steelhead habitat. Thirdly, pH levels affect the solubility of various metals including copper (see Section 4.6 and Section 7.2/7.3) – also a critical water quality parameter for steelhead. Lastly, high pH levels can be indicative of an overabundance of algae (and high nutrient loads), due to the way algae and other aquatic plants remove carbon dioxide from the water column through photosynthesis. The carbon is converted into plant growth and the oxygen is released into the water column (see Section 4.4). The removal of carbon dioxide increases the pH of the estuary because the carbon dioxide is generally present within the water column as carbonic acid (H_2CO_3). Thus an overabundance of algae can cause pH levels to rise (to become more basic), possibly to levels dangerous to other aquatic organisms. This process can occur rapidly during an algae bloom and cause significant pH swings on a diurnal basis.

Based on *in situ* grab measurements performed in recent years and from the City of Ventura continuous monitoring sondes, it is observed under closed estuary conditions that the outfall channel generally has a lower pH (often around 7.0 to 8.0) than the more open estuary locations (8.0 to 9.6) (Stillwater Sciences, 2011; Kelley, 2008; USFWS 1999, LARWQCB, 2013). Due to tidal exchange and the buffering ability of seawater, lower pH levels (7.0 to 7.5) are generally observed under open mouth conditions than under closed conditions (Stillwater Sciences, 2011). Field efforts completed in association with this report in September 2014 (closed conditions) indicated generally consistent pH levels across the open-water portion of the estuary (8.8-9.4) with lower values in the VWRF outfall channel (8.3-8.7). No other consistent spatial trends in pH levels were readily apparent within the collected data.

The pH range permitted for the VWRF effluent is 6.5 to 8.5 with the additional stipulation that the pH of the SCRE should not "be depressed below 6.5 or raised above 8.5" or changed by more than 0.2 pH units (from natural conditions) as a result of wastes discharged (LARWQCB, 2013). Discharge records indicate the pH of the VWRF effluent is predominantly between 6.9 and 7.1 (City of Ventura, 2000-2013). Typical pH conditions within the SCRE prior to construction of the VWRF are not well known and thus the impact of the VWRF effluent discharge is difficult to characterize directly. However, as discussed earlier, pH levels within the estuary above 9.0 have been observed to occur with some regularity. This is likely a result of the overabundance of algae within the SCRE associated with increased nutrient levels (Section 4.7 and Section 4.8).

4.4 DISSOLVED OXYGEN

Adequate dissolved oxygen (DO) concentrations are required to support a variety of aquatic life in the SCRE and are particularly important for steelhead habitat (Section 7.2). The VWRF discharge permit includes a minimum water quality objective DO level of 5 mg/L for the SCRE (the receiving waters) as a result of the wastes discharged (LARWQCB, 2013), but higher concentrations (i.e. above 7 mg/L) are preferred by salmonid species such as steelhead (e.g. Carter, 2008). Predicting, modeling, and even adequately measuring DO levels in natural systems, particularly the SCRE, is difficult for a number of reasons:

First, the equilibrium solubility of oxygen in water has a direct dependence on the water temperature and salinity (Figure 28) both of which frequently vary daily, seasonally, spatially across the estuary, and vertically within the water column. Warmer, more saline water will generally support lower levels of dissolved oxygen. Because oxygen exchange is not instantaneous, DO concentrations in natural systems can be well above equilibrium levels (i.e. supersaturated) (YSI, 2005).

Second, photosynthetic algal species (often abundantly present in parts of the SCRE) produce oxygen during photosynthesis and on sunny days can increase DO levels within the near-surface layers of estuary to significantly supersaturated levels. Algal blooms sometimes occur naturally, but they are often the result of excess nutrients (i.e., nitrogen, phosphorus) from waste discharges or nonpoint sources (LARWQCB, 2013). Elevated and supersaturated DO levels were observed in the fall of 2014 in the fieldwork performed in association with this report and in previous and ongoing sampling and monitoring efforts (Kelley, 2008; Nautilus Environmental, 2005; City of Ventura, 2000-2013; USFWS, 1999). These supersaturated values are misleading as DO conditions lower in the water column can be significantly lower because of the oxygen demand created by settled and decomposing vegetative cells. Furthermore, algal respiration at night (an uncommon time for manual grab sampling) consumes oxygen and can significantly reduce surface DO levels, though not always to hypoxic (<3 mg/L) or anoxic (0 mg/L) levels. As the independent reviewers of the Estuary Subwatershed Study pointed out, "the VWRF discharge may be linked directly to periods of low DO levels due to algal growth" (Ambrose & Anderson, 2011).

Third, many other factors can affect DO levels including water-column stratification, VWRF outfall BOD levels, bacteria, sediments, wind mixing within the estuary (see Section 3.1) and the oxidation of ammonia.

Notwithstanding these complications, a significant amount of data has been collected on DO levels within the SCRE that is relevant for the current restoration planning efforts. Section 4.4.1 summarizes previous and recent DO observations.

4.4.1 DISSOLVED OXYGEN OBSERVATIONS

Many observations of DO within the SCRE have been near-surface or mid-depth samples with only a few samples taken at depth. It is assumed that most of the sampled observations were taken during daylight hours. While analysis of the average conditions at the surface can be useful, a few isolated DO crash events and/or anoxic conditions at the bottom of the estuary can have significant ecological impacts. While the data indicate that the estuary (at least near the surface and during daylight hours) is often supersaturated, DO levels below those necessary to sustain most fish life have been frequently recorded in certain portions of the estuary (and the flooded campground) under low-flow, closed-berm conditions. (State Parks, 1979; USFWS, 1999; Entrix Inc., 2002b; Stillwater Sciences, 2011; McLaughlin et al., 2012).

Data collected by the USFWS in 1999 included vertical profiling and indicated that the lowest DO levels occurred in the bottom strata, generally in backwater areas and in the sewage discharge area (USFWS, 1999). Measured DO levels in that study ranged from 0.21 mg/L to greater than 20 mg/L. During closed mouth conditions, DO levels were highest near the top of the water column and often supersaturated, while DO levels near the bottom of the estuary were frequently below the water quality objective (5 mg/L).

Data collected in 2002 generally exhibited DO levels lower than other studies (ranging from 0.28 to only 10.12 mg/L) (Entrix Inc., 2002b). This data may have been indicative of less eutrophic conditions present in the estuary at that time. However, the data also suggest that DO levels near the VWRF can be several mg/L lower than in other areas of the estuary during closed mouth conditions (Entrix Inc., 2002b). It is not clear whether this study included vertical profiling of DO as only average values at each location were reported.

Sampling efforts in 2005, which include sampling at the surface and mid-depth, were also indicative of possibly eutrophic conditions within the estuary. Dissolved oxygen levels were generally supersaturated, except near the discharge point, which generally had lower values, although no measurements were observed below 4.0 mg/L (Nautilus Environmental, 2005).

Though not an extensive data collection effort, sampling efforts in 2008 did include vertical profiling and suggested that DO concentrations did not vary significantly with depth or spatially within the estuary (Kelley, 2008). This suggests that the estuary was well mixed vertically and spatially during the sample period.

The Estuary Subwatershed Study included statistical analyses for open/closed berm conditions during each season (winter, spring, summer, fall). The study observed that *in situ* DO levels recorded by the sondes (which sampled at mid-depth) during the continuous monitoring period were below the 5 mg/L water quality objective more than 25% of the time except in winter (Stillwater Sciences, 2011). DO was found to be generally higher during closed mouth conditions (consistent with previous efforts and likely due to algal production and eutrophic conditions) and generally lower at the north sonde (nearer to the VWRF and more sheltered from the wind) than at the south sonde. It was also observed that DO levels peaked an hour or so after the solar maximum, which is also consistent with algal production (Stillwater Sciences, 2011). Selected sonde DO data from an extended closed mouth period that occurred between March 2009 and September 2009 is shown in Figure 29. Though only a subset of the data, the results clearly show the diurnal fluctuations in DO levels and suggest overnight DO drops of up to 3 or 4 mg/L are common during closed mouth conditions. These results also show that periods of poor dissolved oxygen levels have occurred in the SCRE although the spatial extent of the hypoxia is not easily determined and broader statistical analysis of the data is difficult because of data gaps, dewatering, and vandalism.

Water quality sampling associated with this report included vertical water profiling for DO at seven locations (WQ1 – WQ7) within the estuary (Figure 26 and Figure 30). DO profiling was performed midday on September 22nd and 23rd of 2014 and the results were consistent with those previous observations taken during closed mouth conditions where the estuary was well-mixed (site weather conditions before and during sampling included warm sunny days and relatively strong on-shore winds during the day). DO levels were generally supersaturated (10mg/L to 15 mg/L) near the surface and decreased slightly with depth. Within the main body of the estuary no values were observed below the 5 mg/L objective, but DO levels in the VWRF outfall channel were lower and dropped to 4.9 mg/L near the bottom of the water column.

The 2014 field effort also included several pre-dawn grab samples (WQ9-WQ11) to provide some indication of how DO levels can decrease overnight (see Figure 26 and Appendix A). These samples were taken at the upstream end of the estuary from the Harbor Blvd. bridge, at the north end of the flooded campground, and within the deepest part of the estuary near where the City of Ventura's south sonde was located. The morning measurement made at the bridge (WQ9) was 9.6 mg/L (down from the 12 to 13 mg/L observed in the late afternoon of the day before). This indicates that DO levels within the estuary can drop by up to 4 mg/L overnight. Though only one measurement, the magnitude of the drop in DO is consistent with the more continuous DO data collected by the City of Ventura sondes. This likely reflects a return to more equilibrium or saturated conditions, after the supersaturated conditions observed in the afternoon, but may also reflect significant algae respiration demands exist. The sonde data from the Phase 3 efforts is anticipated to provide additional DO data which will better characterize diurnal fluctuations at different locations and depths within the SCRE.

Though DO was only measured at one location within the flooded campground, it should be noted that the level recorded in the early morning hours was very low (only 0.7 mg/L), while values closer to the solubility limit were observed later in the day (likely due to oxygen production from photosynthetic algae). Decaying plant material in the flooded campground is one likely probable cause of the low DO levels in morning. Thick vegetation to the north and west appeared to isolate this area from wind related mixing. The full set of vertical profile data collected in this effort is included in Appendix A.

This data suggests that even shallow flooding of the campground, due to higher water levels within the estuary, may have adverse effects on the overall water quality when low DO water from the campground or other areas is allowed to rapidly drain into the main lagoon. As fish mortality events are often linked with breach events (see also Section 7.2 for the ecological impacts of a breach event), when backwatered areas such as the campground are allowed to drain through and mix with waters of the main lagoon, it is reasonable to conclude that restoration of the campground may have localized water quality benefits and might reduce impacts associated with a breach event.

Restoration planning efforts should consider this DO data and pursue concepts that avoid creating isolated backwater or stagnant areas and avoid un-connected deeper grading situations that might create salinity wedges and strongly stratified layers after a breach and berm closure event.

4.5 SALINITY / TOTAL DISSOLVED SOLIDS

This section summarizes recent salinity measurements within the SCRE and discusses some related considerations that may influence restoration planning efforts.

Salinity is an important water quality parameter within the SCRE because it can cause persistent density stratification, it directly affects the solubility of dissolved oxygen (Section 4.4), it influences the toxicity of ammonia (and how water quality criteria are determined by the LARWQCB) (Section 4.8), and because it impacts the functioning of the marine ecology (Section 7). Salinity is generally defined as the amount of dissolved salts present in a body of water. For freshwater systems, salinity is often replaced with the term total dissolved solids (TDS). Units are commonly given gravimetrically as g/L or as parts per thousand (ppt) which, for the purposes of the SCRE and this restoration effort, is essentially the same as the dimensionless practical salinity units (psu) used by many authors and studies. The average salinity of the waters of the Pacific Ocean to the west of the SCRE is approximately 33 ppt (33 g/L). Freshwater streams and rivers, including the SCR typically have TDS below 0.5 mg/L (0.0005 ppt). In field situations, salinity is often estimated using electrical conductivity which is temperature dependent. These conductivity values are then converted into an approximate salinity value.

A number of field efforts have included grab salinity measurements and provided some considerations. First, after a breach event, when the mouth berm is open and river flows are receding, both the highest and the lowest salinity concentrations have been observed to occur because of freshwater inputs from the river and tidal exchange (ESA, 2003; USFWS, 1999). As the wave energy builds up the mouth berm and closes off the estuary, a significant volume of ocean water can become trapped within the estuary and, depending on the volume and the estuary morphology, may form isolated deep pockets of saltwater or widespread salinity stratification. Field observations since the early 1990's indicate that this process does sometimes occur. Some sampling efforts that included vertical profiling have observed salinity stratification within the portions of the lower estuary with salinity levels near the surface of 0.6 to 5 ppt while values of 9-12 ppt (and up to 30 ppt) were observed at depth (Swanson et al., 1990; USFWS, 1999; Nautilus Environmental, 2005). At other times, including the most recent vertical profiling conducted by cbec in the fall of 2014, salinity stratification was not observed, with average salinities around 1-2 ppt in the main estuary (with little to no vertical variations) and lower salinities (<1 ppt) identified in the surface waters of the outfall channel (Kelley, 2008; Stillwater Sciences, 2011).

Monthly salinity measurements between 2010 and 2011, taken at the City of Ventura's designated monitoring locations within the estuary (R1-R5), indicate consistent salinity values around 2.0 ppt are common under closed conditions with higher and more spatially variable values (up to 33.1 ppt) are observed during open berm periods because of tidal exchange (City of Ventura, 2010-2011).

The more continuous data from the City of Ventura water quality sondes also included salinity and provides some additional insights into salinity levels within the estuary. First, after the berm closed, the salinity was observed to decrease over time, steadily approaching a salinity value of approximately 2.5 ppt, because the VWRF effluent had a relatively low salinity and was the predominant source of water. Data from the sondes also revealed that short-term salinity increases are possible because waves (during a particularly high tide or strong wind event) can occasionally wash over the berm without causing a breach (Stillwater Sciences, 2011). This behavior was observed in the September 2014 field efforts as well.

A special salinity assessment and modeling effort was conducted in 2007 to estimate salinity levels within the estuary for a number of different VWRF effluent reduction scenarios (Kamman Hydrology & Engineering, 2007). The study noted that only modest increases in salinity levels might be expected with a complete reduction in VWRF flows because of groundwater flows into the estuary and seepage losses out of the estuary through the sand berm. Though the morphology of the estuary has changed since the Kamman (2007) model was developed, with significant changes to the berm length/position and estuary volume/surface area changes, the overall conclusion is likely still valid. The SCRE will likely continue to be a brackish water body with occasional periods of salinity stratification.

4.6 COPPER

This section summarizes previous studies related to copper sources within the SCRE, describes recent water quality results, and provides a brief description of how copper is currently understood to behave within this estuary system. Copper is an important water quality parameter because elevated levels can be toxic to fish, invertebrates, plants and amphibians. Ecological discussions for specific species and habitat types are included in Section 7.

Within an aqueous system, copper can be bound to suspended particulate matter (adsorbed) or as a dissolved ion. It has long been recognized that the dissolved fraction is a better representation of the biologically active portion of the metal than is the total or total recoverable fraction (EPA, 1996). Discharge permit regulations generally require limits to be stated in terms of the total recoverable metal. These approaches are both useful and defensible, but because of the different methods, a 'translator' study and calculation is often warranted to determine what fraction of the metal in the effluent will be dissolved in the receiving water body (EPA, 1996). The ratio of the sorbed metal to the dissolved metal is called a partition coefficient that can vary from site to site and with changes in pH, temperature, and Total Suspended Solids (TSS) / Total Organic Carbon (TOC).

Copper levels for discharge regulations are also often quite different for freshwater (which also includes a correction for the water hardness) and saltwater systems. Limits are typically influenced by Water Effect Ratio (WER) studies that determine the bioavailability and toxicity for specific anticipated species under actual site conditions for pH and hardness. The rationale for the current VWRF copper discharge limits (6.1 µg/L monthly average and 14 µg/L maximum daily), were revised in 2013 by the LARWQCB, and use the saltwater criterion (reflecting the conditions typical in the winter when the berm is open). The limits were developed based on the Metals Translator Study (Entrix Inc., 2002b) conducted for the estuary, copper toxicity testing and WER studies (Nautilus Environmental, 2005), and ongoing VWRF discharge and estuary monitoring and reporting conducted by the City of Ventura (LARWQCB, 2013). It should be noted, however, that NMFS found dissolved copper concentration increases of 0.75-2.5 µg/L above ambient levels of up to 3 µg/L to adversely affect juvenile salmonid behavior and growth (Hecht et al.,2007).

The major source of copper in the VWRF discharge was identified as the corrosion of domestic plumbing (Stillwater Sciences, 2011). Recent discharge records (2010-2013) for the VWRF effluent indicate that monthly averages for total copper are about 3 µg/L, and have ranged from monthly averages of less than 2 µg/L up to 8.88 µg/L with two observed violations of 7.63 µg/L in December 2011 and 8.88 µg/L in November 2012 (City of Ventura, 2010 & 2011; LARWQCB, 2013).

Recent total copper levels during February and August, measured within the estuary at R3, R4 and R5 (Figure 26), have been consistently less than 3 µg/L with one sampling at 5 µg/L (LARWQCB, 2013). Data for other months was not included in the permit documentation or the VWRF annual reports.

Water quality samples collected as part of this effort were obtained in September 2014 at number of sites throughout the estuary (BS1 – BS4) and suggest similar results with total copper levels below 1 µg/L found at all sites.

With a continuous copper source, such as the VWRF, copper levels within the estuary sediments (see also Section 5) could be anticipated to increase over time during closed mouth conditions. However, measured sediment concentrations have led other studies to conclude that copper is not accumulating in the estuary sediments because of bed scour associated with breach and flood events (Nautilus Environmental, 2005). If large events continue to scour estuary sediments on a regular basis this may be a reasonable assumption for the sediments within the main body of the lagoon. As most of the sampling locations for the aforementioned study were located in the main body of the lagoon, it is possible that copper may accumulate in bed sediments in areas of the SCRE that are inundated regularly but do not scour regularly. Thus, sediment monitoring within the proposed restoration area may be an important component of a long term monitoring program (see Section 5).

4.7 CHLOROPHYLL-A

Chlorophyll-a is a specific form of chlorophyll present in the living cells of algae, phytoplankton and some species of bacteria and is a critical molecule in the photosynthesis process. As a water quality parameter, it is typically a measure of the phytoplankton biomass present in a water sample and used as an indicator of ecological health. Waters that have high chlorophyll conditions are typically high in nutrients (generally phosphorous and nitrogen). Chlorophyll measurement is therefore often used as an indirect measure of nutrient levels, which are discussed further in Section 4.8.

A number of different categorization systems use chlorophyll-a levels to determine and assess eutrophic conditions within natural water bodies. Under one regime, eutrophic conditions are indicated when the chlorophyll-a level averages above 0.03 mg/L. Another system uses the 90th percentile and calls levels above 0.06 mg/L hypereutrophic (McLaughlin et al., 2013). Elevated chlorophyll-a levels in these ranges are often associated with excessive nutrient loading, frequent algal blooms, cloudy water, depressed DO levels at depth, and sometimes fish kills.

As chlorophyll-a is not necessarily a pollutant in and of itself, no specific levels for chlorophyll-a are specified in the VWRF discharge permit. As would be expected from a treated source (as opposed to a natural water body), recent VWRF annual reports indicate effluent chlorophyll-a concentrations are generally very low and consistently below 0.002 mg/L (City of Ventura, 2010-2011).

Within the estuary however, recent sampling indicates average chlorophyll-a levels with the estuary (R1-R5) are around 0.02 to 0.06 mg/L with occasional values as high as 0.53 mg/L (City of Ventura, 2011). The data suggest that chlorophyll-a levels rise and fall within the main body of the estuary as a whole without any clear spatial patterns. This result is consistent with the assumption that the surface water within the main body of the lagoon is typically well-mixed. Further analysis and additional data collected as part of the Estuary Subwatershed Study suggest that average chlorophyll-a levels within the estuary are around 0.08 to 0.10 mg/L during closed berm conditions in the summer and fall, around 0.03 to 0.08

mg/L during closed conditions in the spring and winter, with lower levels around 0.010-0.080 mg/L exhibited during open mouth conditions (Stillwater Sciences, 2011). These chlorophyll-a levels are indicative of high nutrient conditions and strongly suggest that eutrophic conditions are commonly present in the SCRE throughout the year.

4.8 NITROGEN AND PHOSPHOROUS

As key nutrients for both algae and vegetation growth, nitrogen and phosphorus are important water quality parameters and play an important role in the estuarine ecosystem. Nitrogen and phosphorous are of particular concern in the SCRE because, in addition to other natural and anthropogenic sources, they are also continuously being discharged into the estuary through the VWRF outfall at significant levels. Nutrient levels in an estuarine system are inherently variable and challenging to predict, monitor, and characterize. Concentrations vary spatially and can also fluctuate daily, seasonally, and yearly. The complicated processes that govern the specific molecular form (nitrate vs nitrite, ammonia, phosphate, etc.) and prevalence within a water body are also strongly dependent on other parameters including temperature, pH, algae/vegetation uptake rates, and salinity. A detailed discussion of the nutrient cycles is beyond the scope of this report. Rather, this section will summarize recent nutrient levels and patterns within the SCRE and in the VWRF discharge, and provide an assessment of these conditions as they pertain to the restoration concept development.

At several locations within the SCRE (R1-R5, see Figure 26), long-term monitoring for several nutrients has been conducted by the City of Ventura as required by the discharge permit issued by the LARWQCB. The specific chemical formulations of nitrogen monitored include nitrate (NO_3^-), nitrite (NO_2^-)[11], ammonia (present as un-ionized NH_3 and ionized NH_4^+) and total Kjehldahl nitrogen (TKN) which is the sum of ammonia-nitrogen plus organically bound nitrogen (i.e., does not include nitrate or nitrite). Phosphorous is monitored as phosphate (PO_4^{3-}) and total phosphorous. It is important to note that, because of a number of effluent violations, the specific VWRF treatment processes related to these nutrients have been expanded and improved in recent years, in accordance with a number TSO's and revised effluent limitations issued by the LARWQCB. Of particular interest here, the VWRF completed a nitrification/de-nitrification system in October of 2011. Historical exceedances of these water quality objectives may therefore not be indicative of current conditions in the SCRE. Even so, it is worth considering the recent data and analyses. The Estuary Subwatershed Study analyzed estuarine data collected by the City of Ventura between 2000 and 2010 and observed:

- Ammonia levels above the then established water quality objectives throughout the estuary and outfall channel during closed mouth conditions
- Higher phosphorous and nitrate levels in the outfall channel than in other locations within the SCRE under all mouth conditions and seasons

[11] To be consistent with the VWRF data and the water quality standards of the NPDES permit, nitrate and nitrite concentrations presented in this report are given in mg/L-N (as Nitrogen).

For nutrient levels in the estuary, regular (monthly) monitoring data (locations R1-R5) are included in the VWRF 2011 Annual Report (City of Ventura, 2000-2013) and the recently renewed NPDES discharge permit (LARWQCB, 2013). The data suggest some similar spatial patterns. Measured nitrate levels ranged from 0.8 to 9.4 mg/L (as Nitrogen), with higher levels in the outfall channel (R4) with an average value of 4.4 mg/L (as Nitrogen) than in the other areas of the estuary which averaged 2.3 mg/L as (Nitrogen). Nitrite[12] levels throughout the estuary were generally below 0.4 mg/L (as Nitrogen). Ammonia levels were predominantly below 0.4 mg/L and did not indicate any clear spatial or seasonal trends. TKN levels within the estuary were relatively uniform and averaged from 1.5 to 2.1 mg/L with values not exceeding 5.8 mg/L. Phosphorous levels ranged between 0.8 and 1.1 mg/L in areas of the lagoon away from the VWRF. Higher average values between 2.3 to 2.5 mg/L were observed in the outfall channel (R4) and directly connected areas of the main lagoon (R3). These spatial patterns are generally consistent with expectations. As the VWRF discharge is the primary source of nitrogen and phosphorous during closed berm conditions, biological uptake of these nutrients within the relatively well mixed water of the open water estuary, should lead to higher concentrations of these nutrients in the isolated effluent channel and reduced levels elsewhere.

The limited water quality sampling performed in association with this report indicated similar patterns for nutrient distribution within the estuary, but at generally lower levels. Phosphorous levels were between 0.1 and 0.3 mg/L in the open estuary and around 1.1 mg/L in the VWRF outfall channel. Nitrate levels were also lower with samples from the open water areas of the estuary testing below 0.1 mg/L (as Nitrogen) and samples from near the VWRF outfall channel testing around 3.4 mg/L (as Nitrogen).

Recent effluent sampling data at the VWRF discharge point (prior to the wildlife ponds) are included in the recently renewed NPDES permit (LARWQCB, 2013). Phosphorous levels in the effluent were consistently around 3.4 mg/L and nitrate levels averaged 8.0 mg/L and ranged between 5 and 12.3 mg/L (as Nitrogen) (LARWQCB, 2013). As expected, biological uptake of these key nutrients within the SCRE, yields effluent nutrient levels that are higher than the levels observed in the SCRE.

As also suggested in Section 4.4 and Section 4.7, these nutrient levels, though possibly improved from previous levels through recent VWRF treatment upgrades, are indicative of eutrophic conditions within the SCRE and may be linked to both supersaturated DO levels and periods of hypoxic or anoxic conditions. Though concerning and worth considering during restoration planning, nutrient levels within the SCRE are not prohibitive.

[12] Natural water bodies often have low nitrite concentrations because bacteria, algae, and phytoplankton can quickly convert it to other more stable nitrogen ions. Nitrite is often used as a water quality parameter though because it can be toxic to aquatic species.

5 SOIL QUALITY

The quality of the soil within the estuary and the portion of the campground being considered for restoration is important because it may have water quality implications, guide the selection of viable plant communities for restoration concept development, and help determine habitat suitability for different species. It should be noted that contaminants present in soils are not necessarily available for uptake by aquatic organisms. A comprehensive study of the nature and quality of the sediments within the estuary and within the campground has not been completed; however, recent studies have included some limited sampling efforts that do provide some insight into the overall soil quality and may be useful to consider in restoration concept development. It is not anticipated that any soil treatment or off-site disposal will be required, but as is discussed at the end of this section, additional sampling may be warranted. Sediment sizes and transport considerations are discussed in Section 2.2.

The unconsolidated alluvial soils within the campground consist primarily of a moderately permeable Camarillo loam and Huememe loamy sand and have exhibited elevated salinity levels (3 to 16 ppt) likely due to remnant salts from historical tidal influences (State Parks, 1979; Swanson et al., 1990; ESA, 2003). The soil present in the estuary is typically classified as Riverwash or Tidal flats and can exhibit highly stratified layers of cobbles, gravelly sand and, depending on the nature and magnitude of the preceding storm activity, varying amounts of silt and clay (State Parks, 1979; USFWS, 1999). A dense clay and sand-clay layer has been observed at depths between 3 to 8 feet below ground (ESA, 2003), which contributes to near surface groundwater levels. Groundwater is discussed further in Section 3.4.

The historic sediment conditions may have been impacted by a number of nearby contaminant sources. On December 22, 1993, an estimated 92,400 gallons of crude oil was spilled upstream of McGrath Lake (just south of the proposed campground location) and was then inadvertently pumped (along with water from the lake) into a slough that used to traverse a portion of the sand dunes and from there into the Pacific Ocean (ESA, 2003; URS, 2005). Some oil was also documented at the mouth of the SCRE (State Parks, 2005). Restoration efforts involved earthwork and a variety of decontamination efforts and also included the creation of a trust account to fund restoration projects (the McGrath Lake Trustee Council).

Five years later, in 1998, sediment and water quality testing within McGrath Lake reported elevated concentrations of selenium, manganese, total polychlorinated biphenyls (PCBs), and various agricultural pesticides, but did not show elevated concentrations of petroleum hydrocarbons. The study concluded that agricultural runoff has more heavily impacted lake sediments than the 1993 oil spill (ESA, 2003; LARWQCB, 2013). Impacts to the SCRE and the soils below the existing campground, were not thoroughly investigated, but given the groundwater (Section 3.4) exchanges between the SCRE and McGrath Lake, it is possible that some contamination (oil or agricultural pesticides) might have occurred over the years. Other McGrath Lake sediment samples, obtained in 2003, also indicated some elevated levels of pesticides (DDE and DDT) and suggested that no PCB's were present at the detection limit of 50 µg/kg (URS, 2005).

Sediment sampling and analysis has been performed at several locations within the SCRE with the intent of characterizing the impact of the VWRF effluent. The results, though limited, bear some consideration for this restoration effort, but do not seem to suggest major feasibility challenges from a soil quality perspective. Bed sediments acquired within the SCRE between 2002 and 2004 (i.e., prior to the complete re-working of the estuary in the 2005 event) were analyzed for selenium, nickel, zinc, copper and total organic carbon(TOC) (Nautilus Environmental, 2005). Results indicated generally low levels of selenium (below the detection limit of 5 mg/kg), copper concentrations between 2.3 and 4.2 mg/kg (with two notable exceptions at 16.9 and 19.3 mg/kg), and variable nickel, zinc and TOC concentrations; all below the “effects range-low” (ER-L) values corresponding the 10^{th} percentile concentration at which biological effects are reported (Nautilus Environmental, 2005). No evident spatial trends were observed across the site samples, but the results did indicate that higher levels of copper, nickel and TOC, were observed in the estuary sediments during closed mouth conditions (at a time when the sediment chemistry represented prolonged exposure to water that originated largely from the VWRF) (Nautilus Environmental, 2005). Nonetheless, the results of the associated species toxicity tests, and the contaminant concentrations below effect thresholds, led to the conclusion that the sediment quality throughout the SCRE is relatively good (Nautilus Environmental, 2005).

Sediment analyses were also conducted in 2008 as part of the City of Ventura’s discharge monitoring requirements (ABC Laboratories, 2009). Samples were acquired with a petite Ponar dredge from multiple locations in the estuary including the lower estuary, the upper estuary, and near the end of the outfall channel. No organic constituents (pesticides or PCB’s) were present in concentrations above the detection limit, but metals results indicated that copper and nickel occasionally exceeded the ER-L and with higher concentrations in the VWRF effluent channel sediments than in the estuary sediments.

As part of the Estuary Subwatershed Study, groundwater grab samples were obtained in January 2010 at three locations within the campground (GW-1, GW-2, GW-3 on Figure 26) and analyzed for organic compounds (volatile and semi-volatile), cyanide, metals, a variety of pesticides and PCB’s, and dioxins and dibenzofurans (Stillwater Sciences, 2011). Zinc, nickel, molybdenum, vanadium, arsenic, copper, and aluminum were detected at trace levels. Cyanide and the dioxins were not present above the detection limit. One volatile organic compound, 1,2 Dichloropropane, was detected at GW-2 at the very low concentration of 0.445 µg /L (well below the maximum contaminant level (MCL) set by the EPA for potable drinking water). Though not soil samples, these groundwater results do provide some indications that the soil beneath the campground is not extensively contaminated.

Discussions with State Parks and Wishtoyo have established that additional targeted sampling may need to be considered to support this feasibility analysis once restoration concepts have been developed and specific excavation depths and design elevations are available to guide the sampling effort. Due to the history of the nearby McGrath Lake site and the VWRF effluent, soil and/or groundwater analyses should include metals, pesticides, and organic compounds.

6 VEGETATION AND RARE PLANT SUMMARY

This section includes a summary of the vegetation and rare plant assessments conducted by WRA in September 2014. The complete report documenting these technical assessments is in Appendix C.

As part of the assessment, WRA identified the types and distribution of plant communities at the site and performed focused surveys for special-status plant species determined to have moderate to high potential to occur at the site. For special-status plant species, which bloom during other parts of the year, WRA assessed the potential for those species to occur based on habitat conditions observed at the site.

Prior to conducting fieldwork, WRA conducted a search of the CDFW *California Natural Diversity Database* (CNDDB) and the California Native Plant Society (CNPS) *Inventory of Rare and Endangered Plants* to determine which rare plant species have been documented in the vicinity of the site (i.e., from the USGS 7.5-minute quadrangles for Ventura, Oxnard, or Point Mugu). WRA also reviewed existing plant and vegetation descriptions for the site (Swanson et al., 1990; ESA, 2003; Stillwater Sciences and URS, 2007; Stillwater Sciences, 2011), the Ventura County 2014 Locally Important Plant List, historic and current aerial imagery (Google Earth, 2014), and soils maps for the area (USDA, 2014). Following the initial literature and database review, WRA conducted a site assessment to map plant communities at the site, conduct focused surveys for special-status plants with a fall blooming period, and to assess habitat conditions for special-status plant species with blooming periods that occur during other portions of the year. WRA botanists surveyed the site on foot and by boat. The distribution and extent of plant communities at the site were documented on field maps of the site at a 1:200 scale and with recent aerial imagery (Figure 31).

Plant communities were identified based on existing descriptions provided by Holland (1986) and Sawyer et al. (2009). In some cases, it was necessary to describe variants of these communities based on site conditions. All plant species were identified using a combination of the *Jepson Manual, Second Edition* (Baldwin et al., 2012) and the *Jepson eFlora* (Jepson Flora Project, 2014). Plant nomenclature follows Baldwin et al. and subsequent revisions by the Jepson Flora Project, except where noted. For cases in which regulatory agencies, the CNPS, or other entities base rarity on older taxonomic treatments, precedence was given to the treatment used by those entities.

WRA observed 15 biological communities identified at the general community (i.e., Holland, 1986) and alliance (i.e., Sawyer et al., 2009) levels, including several communities not described at either level. Six of these communities were considered sensitive, either because they are identified as sensitive plant communities by the CDFW or as Environmentally Sensitive Habitat Areas (ESHA) under the City of Oxnard Coastal Land Use Plan, or because they occur in wetlands and non-wetland waters and are regulated as such by the U.S. Army Corps of Engineers (Corps), the LARWQCB, or the CDFW. These communities included the following:

- Arroyo willow thickets (*Salix lasiolepis* Shrubland Alliance)[13]
- Black cottonwood forest (*Populus trichocarpa* Forest Alliance)
- Dune mat (*Abronia latifolia – Ambrosia chamissonis* Herbaceous Alliance)
- Freshwater marsh (multiple alliances)[14]
- Seasonal wetlands (multiple alliances)[14]
- Non-wetland waters[14]

The remaining communities are either dominated by common native species such as coyote brush (*Baccharis pilularis*), quailbush (*Atriplex lentiformis*), or western ragweed (*Ambrosia psilostachya*), or they are dominated by non-native and invasive species such as Tasmanian bluegum (*Eucalyptus globulus*), iceplant (*Carpobrotus edulis*), myoporum (*Myoporum laetum*), tamarisk (*Tamarix* sp.), or other species. These communities are highly degraded and primarily occur within the campground footprint or within the eastern portion of the foredunes, which were substantially disturbed during historic oil exploration activities.

Based the results of the literature and database review, WRA identified 26 special-status plant species, including four Locally Important species, that have been documented from the Ventura, Oxnard, or Point Mugu 7.5-minute USGS quadrangles. Based on the types and condition of habitats observed at the site, WRA determined that 19 of these species, including four Locally Important species, have a moderate to high potential to occur within the site, including four species that were observed on the site. Red sand verbena (*Abronia maritima*; CNPS Rare Plant Rank [RPR] 4.2) was observed in limited patches on the foredunes at the southwestern edge of the site. Coast dudleya (*Dudleya caespitosa*; Locally Important) was observed at the far southern end of the site in disturbed backdune habitat. Sand dune sedge (*Carex pansa*; Locally Important) was observed in the south of the campground on a sandy berm between backdune habitat and a myoporum grove. Fragrant flatsedge (*Cyperus odoratus*; Locally Important) was observed in disturbed wetland habitat in the north side of the campground. The remaining 15 special-status plant species determined to have potential to occur at the site include the following:

<u>Present</u>

- Red sand verbena (*Abronia maritima*; CNPS RPR 4.2)
- Coast dudleya (*Dudleya caespitosa*; Locally Important)
- Sand dune sedge (*Carex pansa*; Locally Important)
- Fragrant flatsedge (*Cyperus odoratus*; Locally Important)

<u>High Potential to Occur</u>

- Aphanisma (*Aphanisma blitoides*; CNPS RPR 1B.2, Locally Important)

[13] This alliance is considered sensitive only when found in wetland or riparian settings.
[14] Alliances in these communities are considered sensitive due to their occurrence in areas regulated as wetlands, non-wetland waters, or riparian habitat by the Corps, the LARWQCB, and/or the CDFW.

- Ventura marsh milk vetch (*Astragalus pycnostachyus* var. *lanosissimus*; FE; SE; CNPS RPR 1B.1; Locally Important)
- Orcutt's yellow pincushion (*Chaenactis glabriuscula* var. *orcuttiana*; CNPS RPR 1B.1)
- False goldenaster (*Heterotheca sessiliflora*; CNPS RPR 1B.1)
- Mexican malacothrix (*Malacothrix similis*, CNPS RPR 2A)
- Branching phacelia (*Phacelia ramosissima* var. *austrolitoralis*; CNPS RPR 3.2)
- Estuary seablite (*Suaeda esteroa*; CNPS RPR 1B.2, Locally Important)
- Wooly seablite (*Suaeda taxifolia*; CNPS RPR 4.2)
- Seaside fiddleneck (*Amsinckia spectabilis* var. *spectabilis*; Locally Important)

<u>Moderate Potential to Occur</u>

- Coulter's saltbush (*Atriplex coulteri*; CNPS RPR 1B.2)
- Pacific saltbush (*Atriplex pacifica*; CNPS RPR 1B.2)
- Davidson's saltbush (*Atriplex serenana* var. *davidsonii*; CNPS RPR 1B.2)
- Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum*; FE; SE; CNPS RPR 1B.2, Locally Important)
- Leopold's rush (*Juncus acutus*; CNPS 4.2)
- Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*; CNPS RPR 1B.1; Locally Important)

These species were determined to primarily have potential to occur within the intact foredune habitat along the western edge of the site or in association with wetland habitat at the site and habitat along the edges of the SCR where limited marsh vegetation occurs. Although some of the disturbed habitats at the site (e.g., the campgrounds and the disturbed foredune habitat to the east of the intact foredunes to the west) may contain elements of suitable habitat for one or more of these species, prior and current disturbances in these areas limit the potential for these species to occur there. Similarly, the dense overstory canopy and high levels of non-native, invasive species within the arroyo willow and other scrub-shrub and woodland habitats at the site limit the potential for these species to occur there.

7 WILDLIFE

This section summarizes the broad-spectrum habitat and wildlife assessments of the SCRE which were conducted by WRA in October 2014 (Section 7.1). The complete report documenting these technical assessments is in Appendix C. In addition, this section also includes two focused assessments, one for steelhead (Section 7.2) and one for tidewater goby (Section 7.3), which describes the existing conditions of the SCRE and the suitability for restoration and rehabilitation efforts.

7.1 WILDLIFE HABITAT ASSESSMENT SUMMARY

In October of 2014, WRA conducted a wildlife habitat assessment within the Study Area. As part of the assessment, WRA identified wildlife habitat types and distribution at the site and performed general visual detection surveys to observe what wildlife species were present at the time of the survey. A summary of the special-status wildlife species observed at the site, or with the potential to occur within the Study Area, are provided below and were used as a baseline in WRA's current evaluation.

Prior to conducting fieldwork, WRA conducted a search of the CDFW CNDDB and the USFWS County list to determine what wildlife species have been documented from the vicinity of the Study Area (i.e., from the United States Geological Survey (USGS) 7.5-minute quadrangles for Ventura, Oxnard, or Point Mugu). WRA also reviewed existing wildlife and habitat descriptions for the site (Swanson et al., 1990; ESA, 2003; Stillwater Sciences and URS, 2007; Stillwater Sciences, 2011) and historic and current aerial imagery for the area (Google Earth, 2014). Following the initial literature and database review, WRA conducted a site assessment to evaluate what wildlife species and habitat were present at the site. Using this information, WRA evaluated the potential for special-status wildlife species to occur within the Study Area.

WRA observed 85 species of wildlife during the October site visit, of which 10 were special-status species. Based on the types and condition of habitats observed at the site, WRA determined that 37 additional special-status wildlife species have the potential to occur within the Study Area. The special-status wildlife species[15] determined to have potential to occur at the site include the following:

<u>Present - Observed During Site Visit to Study Area</u>

- Northern harrier (*Circus cyaneus*; SSC)
- White-tailed kite (*Elanus leucurus*; CFP)
- American peregrine falcon (*Falco peregrinus anatum*; FD, SD, CFP, BCC)
- Western snowy plover (*Charadrius alexandrinus nivosus*; FT, SSC, BCC)
- Bank swallow (*Riparia riparia*; ST)
- American white pelican (*Pelecanus erythrorhynchos*; SSC)
- California brown pelican (*Pelecanus occidentalis californicus*; FD, SD, CFP)
- Allen's hummingbird (*Selasphorus sasin*; BCC)

[15] Status code acronyms are defined in the Glossary of Acronyms at the beginning of this report.

- Monarch butterfly (*Danaus plexippus*; SSI)
- Globose dune beetle (*Coelus globosus*; VCS)

Present - Documented to Occur in the Study Area

- California least tern (*Sternula antillarum browni*; FE, SE, CFP)
- Long-billed curlew (*Numenius americanus*; BCC)
- Caspian tern (*Hydroprogne caspia*; BCC)
- Nuttall's woodpecker (*Picoides nuttallii*; BCC)
- Yellow warbler (*Setophaga (Dendroica) petechia brewsteri*; SSC)
- Yellow-breasted chat (*Icteria virens*; SSC)
- Silvery legless lizard (*Anniella pulchra pulchra*; SSC)
- Redhead (*Aythya Americana*; SSC)
- Common loon (*Gavia immer*; SSC)
- Western burrowing owl (*Athene cunicularia*; SSC, BCC)
- Loggerhead shrike (*Lanius ludovicianus*; SSC)
- Pacific (western) pond turtle (*Actinemys marmorata*; SSC)
- Steelhead, southern California DPS (*Oncorhynchus mykiss*; FT, SSC, Critical Habitat)
- Tidewater goby (*Eucyclogobius newberryi*; FE, SSC, Critical Habitat)
- Threespine stickleback (*Gasterosteus aculeatus microcephalus*; VCLI)

High Potential to Occur in Study Area

- Pallid bat (*Antrozous pallidus*; SSC, WBWG High)
- Western red bat (*Lasiurus blossevillii*; SSC, WBWG High)
- Least bittern (*Ixobrychus exilis*; SSC, BCC)Least Bell's vireo (*Vireo bellii pusillus*; FE, SE, SSC)Two-striped garter snake (*Thamnophis hammondii*; SSC)
- South coast garter snake (*Thamnophis sirtalis ssp.*; SSC)Pacific lamprey (*Entosphenus (=Lampetra) tridentatus*; VCLI)
- Santa Ana sucker (*Catostomus santaanae*; FT, SSC)
- Arroyo chub (*Gila orcutti*; SSC)
- Sandy beach tiger beetle (*Cicindela hirticollis gravida*; VCS)
- Mimic tryonia (=California brackishwater snail) (*Tryonia imitator*; VCS)

Moderate Potential to Occur in the Study Area

- Fringed myotis (*Myotis thysanodes*; WBWG High)
- Long-legged myotis (*Myotis volans*; WBWG High)
- San Diego black-tailed jackrabbit (*Lepus californicus bennettii*; SSC)
- San Diego desert woodrat (*Neotoma lepida intermedia*; SSC)Long-eared owl (*Asio otus*; SSC)Southwestern willow flycatcher (*Empidonax traillii extimus*; FE, SE)Belding's savannah sparrow (*Passerculus sandwichensis beldingi*; SE)
- Tricolored blackbird (*Agelaius tricolor*; SSC, BCC)
- Arboreal salamander (*Aneides lugubris*; VCLI)Prickly sculpin (*Cottus asper*; VCLI)
- Senile tiger beetle (*Cicindela senilis frosti*; VCS)

The Study Area supports a range of aquatic and terrestrial habitat, and serves as an important biological area for resident and migratory species. Based on the geographic location of the Study Area, along with the proximity to urban development and relatively infrequent distribution of estuaries along the Southern California coast, the Study Area supports a large number of special-status wildlife species throughout the year. The following sections briefly discuss some of the wildlife habitat identified during the baseline conditions assessment.

Aquatic Habitat

The Study Area contains the terminus of the SCR, which forms a large and dynamic estuary. Water levels within the estuary, along with important abiotic conditions such as salinity, temperature, and DO levels, are largely regulated by the mouth berm along the western boundary (Stillwater Sciences, 2011). When the mouth berm is present, the estuary typically fills and contains mainly low salinity or fresh water conditions. Contributing to the freshwater input of the estuary is the VWRF, which serves as the dominant source of water input to the Study Area throughout much of the year (Stillwater Sciences, 2011). During periods when the mouth berm is breached, the volume and salinity of the estuary can rapidly change as fresh or low salinity water drains to the ocean, and tidally influenced marine water enters the estuary. These events can significantly shift the type and suitability of aquatic habitat in the estuary.

The aquatic habitat within the Study Area provides suitable year round habitat for several species of fish. The federally endangered tidewater goby relies upon the Study Area for breeding and rearing habitat. Depending upon water level and flow conditions within the SCR, tidewater goby may be seasonally constrained to the aquatic habitat within the Study Area and immediately upstream. The Southern California Distinct Population Segment (DPS) of steelhead occur within the SCR Watershed, and utilize the Study Area for rearing and as a migration corridor to and from the ocean. Steelhead in this DPS are also designated as federally endangered. For both of these species, the Study Area has been designated as critical habitat by NMFS and the USFWS which indicates the habitat is vital for the continued existence of the species.

In addition to many species of fish, the Study Area provides important nesting and rearing habitat for waterfowl. The typically large open water surface during periods when the mouth berm is in place allows waterfowl and diving avian species to forage on fish, invertebrates, and aquatic plants. The estuary also provides an important sheltered natural resting location for migratory avian species.

Terrestrial Habitat

Important terrestrial habitat found within the Study Area includes dune, riparian, and wetland habitat types. Dune habitat along the western and southern portion of the Study Area provides suitable nesting and foraging habitat for several special-status wildlife species, including the western snowy plover, California least tern, and globose dune beetle. Higher quality dune habitat occurs along the western boundary of the Study Area compared to the southern portion which had large patches of the non-native ice plant and fill material.

Large dense stands of riparian vegetation, which include dense arroyo willow thicket, are located throughout the northern and eastern portion of the Study Area, closely surrounding the estuary. Portions of this riparian corridor are dense multistory stands. The habitat within these locations provides nesting and foraging habitat for many resident and migratory avian species, including the state and federal endangered least bell's vireo and southwestern willow flycatcher. The riparian canopy also supports roosting and foraging habitat for bats, such as the western red bat.

Wetland habitat surrounds the estuary, and has transitioned into much of the existing disturbed footprint of the campground. Wetlands provide a dynamic habitat that can provide resources for both terrestrial and aquatic species. During periods of inundation, fish including juvenile steelhead may move into the flooded areas to seek out invertebrate prey. When not inundated, the wetland areas can provide nesting habitat for several avian species including northern harrier and tricolored blackbird.

7.2 SOUTHERN CALIFORNIA STEELHEAD

7.2.1 STATUS AND DISTRIBUTION

The southern California coast DPS of steelhead (*Oncorhynchus mykiss*) was listed as a federal endangered species by NMFS in 1997. This population occurs in coastal basins from the Santa Maria River, San Luis Obispo County, to the U.S.-Mexico border. In 2006, NMFS issued a revised final listing determination for west coast steelhead, reaffirming the continued endangered status of southern California steelhead. Critical habitat for southern California coast steelhead was designated in September 2005 and includes all areas that are known or assumed to be occupied by the species and contain physical and biological features essential to the conservation of the species. The SCR its estuary are included in the critical habitat designation. A recovery plan for the southern California DPS was published by NMFS in January 2012 and identifies the SCR as one of the highest priority sites (Core 1) for recovery actions and as one of the most likely to sustain independently viable populations and as critical for ensuring viability of the DPS as a whole (NMFS, 2012).

Historically, the SCR watershed was home to one of the largest steelhead runs in southern California with an estimated annual run of over 8,000 steelhead returning adults prior to the 1950s (Moore, 1980). Based on monitoring conducted at the Vern Freeman Diversion Dam on the lower mainstem, very few adult steelhead currently return to the SCR and its tributaries. Reduced instream flows, barriers to adult and juvenile migrations to and from spawning and rearing habitat, degradation of water quality, channelization for flood control purposes, and an approximately 85% reduction in the size of the estuary have been identified as factors contributing to the decline of the species in the SCR watershed (e.g., Moore, 1980; Stillwater Sciences, 2011; NMFS, 2012).

7.2.2 LIFE HISTORY AND HABITAT REQUIREMENTS

Steelhead exhibit one of the most complex life histories of any salmonid species. The resident rainbow trout form spends its entire life in freshwater environments while the anadromous steelhead form migrates between their natal streams and the ocean. Steelhead migrate to marine waters after spending up to seven years in freshwater, although two to three years is more common. They then typically reside in marine waters for one to three years prior to returning to their natal stream to spawn as three- or four-year olds. The spawning season can run from December through April, depending on the stream, with most spawning occurring in January through March.

When spawning, female steelhead construct redds (spawning “nests”) near the head of a riffle in substrate consisting of gravel and small cobble. Newly hatched fry (embryos) remain in the interstices of the gravel for approximately three weeks before emerging and schooling in still, shallow water along stream margins. As they grow and become known as parr during the spring, juvenile steelhead disperse to pools where they set up individual territories. In coastal watersheds of central California, juvenile steelhead have been shown to exhibit up to three different life history pathways before ocean entry, as documented by Hayes et al. (2008). The first pathway consists of juvenile steelhead migrating downstream to an estuary after spending only a few months in the upper watershed. The second pathway consists of juveniles spending 1–2 years rearing in the upper watershed before migrating downstream to an estuary, and remaining there for an additional 1–10 months before ocean entry. The third pathway is to spend one or more years rearing in the upper watershed, then to migrate downstream with little or no time spent rearing in the estuary prior to ocean entry. Alternatively, fish exhibiting the third pathway might never migrate, instead completing their entire life cycle in freshwater as residents. Growth rates vary significantly among these three life histories (Hayes et al., 2008). Growth rates were generally highest among the estuary-reared juveniles (Hayes et al., 2008).

After rearing for one to three years, juvenile steelhead migrate to the ocean in spring, primarily during the months of March, April, and May. During this time, juveniles undergo smoltification, the process of adapting to the marine environment. The juveniles emigrate to the ocean as smolts and after one to three years of growing and sexually maturing in the marine environment, adult steelhead return to their natal streams to spawn and begin the life cycle again.

Water temperatures influence the growth rate, population density, swimming ability, ability to capture and metabolize food, and ability to withstand diseases of rearing juveniles. Rearing steelhead prefer water temperatures between 10-13°C and have an upper lethal limit of about 24°C (Bjornn and Reiser, 1991). However, it is important to recognize that elevated water temperatures can increase growth rates of juvenile salmonids if food is abundant, which is often the case in well-functioning lagoons. For example, Hayes et al. (2008) observed the highest juvenile steelhead growth rates in the Scott Creek estuary along the central California coast at temperatures between 15-24°C. Steelhead also require relatively high levels of DO in the water. Low oxygen levels have similar effects as high water temperature. DO levels should ideally remain at or near saturation levels and preferred oxygen concentrations are typically above 5.0 mg/l (Bjornn and Reiser, 1991). Furthermore, high levels of suspended sediments (turbidity) can adversely affect rearing steelhead.

The majority of juvenile steelhead rear in perennial freshwater streams with clean, cool water, coarse channel substrates, and adequate instream cover (e.g., large woody debris, undercut stream banks). However, steelhead have also been shown to utilize lagoons and estuaries for seasonal rearing. Smith (1990) and Bond (2006) conducted studies on lagoon systems in central California (San Mateo and Santa Cruz counties, respectively) showing that each summer a fraction of juvenile steelhead over-summered in the estuary of their natal creek. Like southern California estuaries, these estuaries are cut off from the ocean during the summer by the formation of a mouth berm, creating a seasonal lagoon. Bond (2006) showed that many juveniles grow fast enough after their first year of lagoon rearing to migrate to the ocean, and most enter the ocean at a larger size than the same year class fish rearing in freshwater habitats of the stream system. Larger size greatly improves survival in the ocean, and the lagoon-reared fish represented a large majority of the returning adult spawning population (Hayes et al., 2008; Bond, 2006). Steelhead populations within the southern California DPS have not been investigated to determine whether, or to what extent, they may exhibit this life history strategy (NMFS, 2012).

Certain conditions need to be present in a lagoon to create favorable steelhead rearing conditions. After mouth berm formation, freshwater inflows raise lagoon levels and greatly increase lagoon size and habitat variety. Inflows also convert the lagoon towards freshwater, with the surface freshwater layer thickening and the bottom saltwater layer percolating through the bar. Larger lagoons, or lagoons with substantial amounts of salt water present at the time sandbar formation, require more inflow and/or a longer time to convert to freshwater. Smith (1990) showed that lagoons that are fully converted to freshwater are relatively cool, well-mixed, and suitable for steelhead rearing, promoting rapid growth. Brackish lagoons, with insufficient inflows after mouth berm formation, remain stratified unless mixed by strong winds; water temperatures are high and DO levels often low in the bottom saltwater layer, generally producing low invertebrate abundance and poor rearing conditions, and thus poor growth rates, for steelhead (Smith, 1990). As such, Smith (1990) found that frequent or artificial breaching of the mouth berm generally resulted in poor steelhead growth.

While the hydrologic and water quality conditions that promote steelhead survival and growth in estuaries are well documented, the species' physical habitat preferences within lagoons have not been studied in detail. Nevertheless, the flooded margins of estuaries are increasingly being recognized as potential steelhead rearing habitat as these predominantly shallow water habitats are generally characterized by abundant prey resources and are often devoid of predators (Becker & Laurenson, 2008, cited in Seghesio, 2011).

7.2.3 CURRENT USE OF SCRE

As summarized by Anderson and Ambrose (2011), little is known about current steelhead use of the SCRE. In a one-year study, Kelley (2008) tagged and released 81 steelhead smolts on the SCR, 48 of which (59%) were detected emigrating to the ocean. An additional 51 smolts were captured, but not tagged due to their small size (i.e., less than 150 mm forklength). Kelley (2008) found that tagged smolts spent only a few days at most before moving to the ocean when the estuary was open. Although the study did not provide conclusive evidence regarding the fate of the 33 tagged, but subsequently undetected smolts (i.e., mortality or detection evasion), Kelley (2008) speculates that high turbidity, high water temperatures, insufficient cover to hide from predators, and resident populations of avian species pose major potential problems for smolt survival in the SCRE. The Kelley (2008) study included only one season of data and focused on smolts, and therefore provides only a limited view of steelhead use of the SCRE. Moreover, the study design precluded definitive conclusions regarding the fate of the remaining 33 tagged smolts or the 51 untagged smolts. Lastly, Kelly (2008) refers to all captured juvenile steelhead as "smolts", suggesting all exhibited morphological signs of having undergone smoltification, the process of adapting to saltwater that preceded ocean entry. It is unclear whether any non-smolt juveniles were observed migrating to the estuary during the study, which would indicate the potential presence of an estuary-rearing life history strategy in the SCRE. Thus, only limited information regarding estuarine residency or survival can be drawn from the study.

Although no steelhead have been documented in routine seining surveys of the SCRE (Stillwater Sciences, 2011), seven dead *O. mykiss*, ranging in size from 227 mm to 310 mm, were observed after a reportedly artificial breach of the SCRE on September 17, 2010 (Cardno/Entrix, 2010). The authors of the investigation noted that "[t]he relatively large size and robust condition of these fish indicate they were doing relatively well in or near the estuary and that adequate conditions existed for them in at least part of the local habitat" (Cardno/Entrix, 2010). It is important to note that based on a 2009-2010 study of the estuary conducted by Stillwater Sciences (2011), the mouth of the estuary during that year had closed on May 11th and then remained closed the entire time (over 4 months) until the September 17th breach. These extended summer closed conditions are consistent with Smith's (1990) observations of favorable lagoon conditions for rearing steelhead. Similarly, lagoon breaches have been linked to large-scale fish kills, including steelhead, in Pescadero Lagoon in San Mateo County (Sloan, 2006) and many other estuaries where stratification can lead to hypoxic conditions near the bottom of the water column and rapid lagoon draining mixes low DO waters throughout the system.

7.2.4 SCRE HABITAT SUITABILITY

The different life cycle stages of steelhead utilize estuaries at different times and for potentially varying durations. Depending on the type of utilization (e.g., migration corridor or extended rearing), different habitat parameters determine the suitability of the estuary for a given life stage. For example, adult steelhead migrating through the SCRE toward spawning grounds in the upper watershed typically spend very little time in the estuary. As such, if adequate flows for migration are present, habitat conditions within the estuary are less important for in-migrating adults than actual access into (open berm) and through (adequate depths) the SCRE. Smolts also require open berm conditions to allow for emigration to the ocean during the spring, but also spend some time in the estuary (e.g., Kelley 2008) rearing and acclimatizing to saltwater conditions, and therefore estuarine habitat conditions are more important for smolts than adults.

In addition to serving as the entrance and exit point for in-migrating adult steelhead and out-migrating steelhead smolts and kelts (spawned adults returning to the ocean), functioning estuaries are known to provide highly productive rearing habitat for juvenile steelhead if their water quality and physical habitat requirements are met (e.g., Smith, 1990; Hayes et al., 2008). Stillwater Sciences (2011) provide a comprehensive summary of available data pertinent to the suitability of the SCRE for different steelhead life cycle stages. The following discussion focuses on the primary factors affecting steelhead habitat suitability in estuaries, and describes the current conditions of these factors within the SCRE.

7.2.4.1 WATER QUALITY

Physical habitat characteristics of an estuary (e.g., surface area, depth, cover availability, etc.) are irrelevant to steelhead habitat suitability if adequate water quality conditions are not present. As such, water quality can arguably be the primary limiting factor determining the juvenile steelhead rearing potential of an estuary. Section 4 (Water Quality) of this report provides a summary of the current data on a number of different water quality parameters. Of these, water temperature and DO levels are arguably the most important water quality factors affecting an estuary's habitat potential for juvenile steelhead rearing.

As summarized in Section 4.2 of this report, the currently available data on water temperature in the SCRE suggest that while summer temperatures are generally near the upper tolerance range of juvenile steelhead, existing temperatures are roughly similar to those of other southern California estuaries (Anderson and Ambrose 2011) and are unlikely to preclude summer rearing at times when food supplies are adequate.

Section 4.4 of this report summarizes currently available DO data. While DO levels in the SCRE are generally high, periodic crashes in DO levels can have significant effects (including mortality) to juvenile steelhead present in the SCRE at the time. When hypoxic or anoxic conditions are present in isolated areas, steelhead can avoid these areas (but may be forced to shallower habitat that may increase predation by non-native species, if unvegetated). However, when such conditions can become prevalent through much of the estuary during summer berm breach events when low DO waters are flushed from isolated areas (e.g., in the northern portion of the SCRE as well as on the flooded campgrounds) toward the ocean (e.g., Sloan, 2006). It should be noted that while Cardno/Entrix (2010) commented on the "relatively large size and robust condition" of seven juvenile steelhead observed after the documented September 17, 2010 breaching event were indicative of adequate conditions in the SCRE, these fish were in fact dead after the breach. To the best of our knowledge, the cause of death of these juvenile fish has not been determined, but Cardno/Entrix (2010) noted that many fish "were observed to be stressed by very low oxygen and were seen gulping and gasping at the surface or at the edge of the water." Breach-related deteriorations in water quality (i.e., DO) conditions have been shown to result in steelhead mortalities in other estuaries (e.g., Sloan, 2006). Restoration planning efforts should consider existing DO data and pursue concepts that avoid creating isolated backwater or stagnant areas and avoid un-connected deeper grading situations that might create stratified layers with low DO conditions after a breach and berm closure event.

While the suitability of the SCRE for juvenile steelhead rearing may also be affected by potential sub-lethal effects of pollutants such as dissolved copper and emerging contaminants, a physical habitat enhancement such as is being evaluated under this Project is unlikely to effectively address such water quality impacts. However, these effects are currently being monitored and studies under the VWRF

NPDES permit requirements and, if found to be significant, would presumably be addressed under the VWRF NPDES permit process.

7.2.4.2 BERM FORMATION AND BREACHING

As described in ESA (2003), the importance of estuary and lagoon systems as feeding and rearing grounds for steelhead has long been acknowledged (Moyle et al., 1995; Smith, 1990). Smith (1990) found that lagoons in San Mateo and Santa Cruz counties were heavily used by juvenile steelhead for rearing, despite the predominance of shallow, warm-water conditions. Furthermore, most of the yearling steelhead captured in the Waddell Creek lagoon, San Mateo County, during the late summer and early fall had grown big enough to enter the ocean by the end of their first year, presumably due the abundance of food supplies found in lagoons (Smith, 1990). Scale samples collected from a limited number of adult steelhead collected on Pescadero Creek showed that at least 70% had reared in the lagoon rather than within the stream channel. Smith (1990) estimated that the entire 25 miles of accessible streams in the Pescadero Creek watershed produce fewer and smaller steelhead than the lagoon. The same study also analyzed the effects of mouth berm formation and breaching on the aquatic habitat of the lagoon. Smith (1990) concluded that juvenile steelhead survival and growth was excellent when the lagoons were open to full tidal mixing and when the closed lagoons were entirely converted to freshwater. Growth was poor during the long, stratified transition periods between mouth berm closure and conversion to freshwater (Smith, 1990).

Stillwater Sciences (2011) provide synthesized data from daily observations of the SCRE mouth berm made by the City of Ventura from 1984 to 2010 into daily frequency percentages, noting that on an annual basis the estuary has been open on average 61% of the time. On a monthly basis, the observations showed that the river mouth was most consistently open during the winter months with the river mouth open more than 50% of the time from November through June (Stillwater Sciences, 2011). Unfortunately, this summary does not provide any information regarding the seasonal frequency of actual breach events, particularly during the summer and early fall period. Stillwater Sciences (2011) do, however, indicate that when the mouth is closed, the SCRE has been shown to take over a month to fill and breach, but that the VWRF effluent can cause high water levels within the SCRE during the summer and fall months, and increase the likelihood that the mouth berm can be overtopped and breached. As indicated by ESA (2003) the discharge of approximately 14 cfs of VWRF effluent during the summer period is far more than the 0-5 cfs summer and fall streamflow that would be expected from an unimpeded southern California river. Under natural conditions, closed lagoons in central and southern California would not be expected to breach at all during the summer and fall rearing period, and extended closed periods appear to have been the historic norm at the SCRE when the berm was "regularly closed above high-high tide or perched" and subsequently breached by heavy rains in the winter (Beller et al., 2011).

Reiterating Smith's (1990) findings, the transition period between open berm conditions and closed, fully converted and de-stratified conditions is typically a period of low invertebrate abundance and poor rearing conditions for steelhead. Therefore, repeated breaches during the summer and fall rearing period can render a lagoon largely unsuitable for juvenile steelhead rearing. As discussed above, the observation of seven steelhead in "relatively large size and robust condition" on September 17, 2010 followed a period in which the mouth had remained closed from May 11 through September 17 (over 4 months), providing a strong indication of the potential steelhead habitat quality of the SCRE during extended closed conditions, while the mortality of these fish following an unauthorized artificial breach (Stillwater Sciences 2011) provides a strong indication of the potential detrimental effects of dry season breaches. Restoration concept development may consider opportunities that would decrease the frequency of summer and early fall breaches.

7.2.4.3 PHYSICAL HABITAT CONDITIONS

As described above, physical habitat conditions in the estuary are largely inconsequential factors determining steelhead habitat suitability in an estuary if water quality conditions are not suitable. However, if the water quality requirements of the species are met, the availability of physical habitat features such as diversity in water depths and cover from predators and excessive velocities can influence survival and productivity. Stillwater Sciences (2011) noted very little submerged aquatic vegetation or other instream cover within the SCRE during recent surveys. Similarly, Kelley (2008) noted low cover availability in the SCRE. Based on its current configuration (i.e., 2014 bathymetry), the SCRE currently does not contain sloughs, alcoves or other low velocity backwater areas. As such, high streamflow events in the SCR likely result in high water velocities through much of the estuary, which may cause premature flushing of juvenile steelhead into the ocean. Restoration concept development may consider opportunities to promote the establishment and retention of cover as well as velocity refuge habitat.

7.3 TIDEWATER GOBY

7.3.1 STATUS AND DISTRIBUTION

Tidewater gobies are endemic to California and typically inhabit coastal lagoons, estuaries, and marshes, preferring relatively low salinities. The tidewater goby was listed by the USFWS as an endangered species in 1994. In March 2014, USFWS (2014c) proposed to reclassify the tidewater goby as a threatened species. USFWS (2005) published a recovery plan for the species in 2005, and designated critical habitat in 2008. The critical habitat designation was revised in 2013 and currently includes 323 acres of the SCR (USFWS, 2013). The SCRE population, a sub-unit of the genetically unique Los Angeles/Ventura recovery unit, is considered a likely source population important in maintaining metapopulation dynamics and the long-term viability of the species in the region (USFWS, 2013).

7.3.2 LIFE HISTORY AND HABITAT REQUIREMENTS

The tidewater goby is primarily an annual species in central and southern California, although some variation in life history has been observed. If reproductive output during a single season fails, few (if any) tidewater gobies survive into the next year. Reproduction typically peaks from late April or May to July and can continue into November or December depending on the seasonal temperature and amount of rainfall. Males begin the breeding ritual by digging burrows in clean, coarse sand of open areas. Females then deposit eggs into the burrows, averaging 400 eggs per spawning effort. Males remain in the burrows to guard the eggs. They frequently forego feeding, which may contribute to the mid-summer mortality observed in some populations. Within 9 to 10 days, larvae emerge and live in vegetated areas in the lagoon until they are 1.5 to 1.7 cm (0.6 to 0.7 inch) long. When they reach this life stage, they become substrate-oriented, spending the majority of time on the bottom rather than in the water column. Both males and females can breed more than once in a season, with a lifetime reproductive potential of 3 to 12 spawning events (USFWS, 2005).

Tidewater goby habitat is characterized by brackish estuaries, lagoons, and lower stream reaches where the water is fairly still but not stagnant. The species can withstand a range of habitat conditions and has been documented in waters with salinity levels that range from 0 to 42 ppt, temperatures from 8 to 25°C, and depths from approximately 25 to 200 cm (10 inches to 6.5 feet) (USFWS, 2005). However, reproduction has been shown to occur within a narrower salinity range of 2 to 27 ppt (Swensen, 1999; as cited in USFWS, 2007). Tidewater gobies have been shown to withstand extremes in dissolved oxygen concentrations (Chamberlain, 2006). High wet season flows (November through March) typically wash out lagoons and stream-estuarine interface habitats to a varying degree, at times dramatically reducing tidewater goby population sizes. In some cases, extreme flood events can temporarily extirpate a local population, which are generally recolonized by gobies from other nearby coastal water bodies. Velocity refuges, such as backwater marshes, aquatic vegetation, or structural cover, are important habitat features for self-sustaining tidewater goby populations. Tidewater goby densities tend to be greatest among emergent and submerged vegetation (Moyle, 2002).

7.3.3 CURRENT USE OF SCRE

Based on a Stillwater Sciences (2011) review of tidewater goby habitat use within the SCRE, tidewater gobies represented the most common and widespread fish species in the estuary and have been observed within all parts of the estuary as well as the lower SCR as far as 3 miles upstream from the estuary/lagoon. In fact, the SCRE is known to support tens of thousands of tidewater gobies during certain times of the year and is considered one of the largest tidewater goby populations in southern California (USFWS, 2013). Ongoing tidewater goby surveys during the spring and fall have found tidewater gobies to be common with relatively stable population dynamics, although abundances are typically higher in the fall following the spawning period (Nautilus Environmental, 2009; as cited in Stillwater Sciences, 2011). However, no tidewater water gobies were found in the SCRE during recent surveys conducted in September 2013 and August 2014 (Cardno/Entrix, 2014)[16]. Although the causes of the apparently precipitous decline in tidewater goby abundances are not known, Cardno/Entrix (2014) speculate that the lack of estuary breaching for more than a year had led to increasingly poor water quality conditions that were unsuitable for tidewater gobies. However, an apparent abundance of non-

[16] Several additional goby survey reports were provided just as this report was being finalized. A cursory review of these documents indicated tideway goby were present in the SCRE as late as June, 2013 (Aquatic Resource Specialists, 2013) and even into August of 2013 (Rincon, 2013) but were not observed in seine hauls conducted in September, 2013 (Cardno/Entrix, 2013) or in the August 2014 survey (Cardno/Entrix, 2014).

native predator species may have also contributed to the observed decline (Jacobs, pers. comm.). The SCRE supports a wide variety of non-native, invasive species, including carp (*Cyprinus carpio*), fathead minnow (*Pimephales promelas*), mosquitofish (*Gambusia affinis*), green sunfish (*Lepomis cyanellus*), Mississippi silverside (*Menidia audens*), yellowfin goby (*Acanthogobius flavimanus*) Louisiana crayfish (*Procambarus clarki*), and African clawed frog (*Xaenopus laevis*) (Stillwater Sciences, 2011). Of these, yellowfin gobies and African clawed frogs in particular are suspected of adversely affecting tidewater gobies (Lafferty et al., 1999), presumably through competition and/or predation.

When present, tidewater gobies have been observed in the main channel areas of the SCRE and backwater areas, including the VWRF outfall channel, which supports freshwater marsh habitat, side channel/backwater refugia during river peak flow periods, as well as stable flows and minimum depths during periods when the lagoon is draining (Nautilus Environmental, 2005; as cited in Stillwater Sciences, 2011).

7.3.4 SCRE HABITAT SUITABILITY

Until recently, tidewater gobies were the most abundant fish species in the SCRE. The relatively wide water quality tolerance ranges of the species (e.g., high temperatures, low DO) make tidewater gobies less susceptible to extreme water quality events than steelhead. The area near the VWRF outfall channel appears to provide backwater refugia during peak scour periods. Overall, the SCRE appears to provide suitable habitat conditions for the species. However, sudden lagoon breaches can be detrimental to tidewater gobies due to their association with shallow water burrows. Mass strandings and mortalities of thousands of tidewater gobies occurred across the suddenly-dry shallows of the SCRE following the September 17, 2010 breach. In addition, hundreds of dead/dying gobies were scattered across the ocean-facing beach, attesting to a significant proportion of the SCRE population being flushed out to sea (Anderson and Ambrose, 2011).

While restoration concept development may consider opportunities to improve habitat for tidewater gobies (e.g., decrease in breaching frequency), the primary goal of the restoration project is to avoid conditions that would reduce tidewater goby habitat quality or availability.

8 WETLAND DELINEATION SUMMARY

This section includes a summary of the wetland delineations conducted by WRA in September 2014. The complete report documenting the delineations is included in Appendix B.

Since 1998, much of the central portion of the Study Area, including the northern portion of the campground, has experienced annual, prolonged surface-water flooding as a result of the lagoon level rising behind the mouth berm (ESA, 2003). Because of this flooding, many formerly upland areas have transitioned to or are currently transitioning into wetlands, and the mixed, transitional nature of the vegetation can lead to difficult biological classification. A number of previous studies have documented the extent of wetlands and non-wetland waters at the site (ESA, 2003; Stillwater Sciences and URS, 2007; Swanson et al., 1990), and were used as a baseline in WRA's current evaluation.

Prior to conducting field surveys, available reference materials were reviewed, including soil survey data for the Study Area (USDA, 2014), the USFWS National Wetland Inventory (USFWS, 2014a), rainfall data (UCANR, 2014), WETS precipitation data (USDA, 2002), previous studies (ESA, 2003; Stillwater Sciences, 2011; Stillwater Sciences and URS, 2007; Swanson et al., 1990), and available aerial photographs of the site (Google Earth, 2014).

On September 22 through 26 and October 27, 2014, WRA conducted a delineation of wetlands and non-wetland waters within the Study Area to document the location and extent of features that are potentially subject to jurisdiction by federal and state agencies under Sections 404 or 401 of the Clean Water Act, the California Coastal Act, or Section 1600 of the California Fish and Game Code. Methods used to delineate wetlands and non-wetland waters were based on the U.S. Army Corps of Engineers (Corps) *Wetlands Delineation Manual* (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Corps, 2008a). Sample point data were recorded on standard Arid West Supplement data forms. Where applicable, the location of the ordinary high water mark was visually determined using water staining, sediment deposits, scouring, and other indicators identified in the Corps *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps, 2008b). The extent of wetlands and non-wetland waters in the Study Area was mapped using a combination of hand-held GPS equipment with sub-meter accuracy and mapping by hand based on topographic contours and wetland signatures visible on aerial imagery. The majority of wetlands were mapped based on the Corps three-parameter approach which requires the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. However, areas that met only one of the wetland parameters were generally considered to be wetlands subject to jurisdiction by the California Coastal Commission under the California Coastal Act; a small number of one-parameter wetlands were mapped within the footprint of the campground.

WRA documented approximately 166.0 acres of wetlands and non-wetland waters potentially subject to jurisdiction by one or more federal or state natural resource agencies. A summary of the wetlands and non-wetland waters observed by WRA, their regulatory jurisdiction, and their acreages is provided in Figure 32 and Table 6.

Table 6 - Potential jurisdiction over wetlands and non-wetland waters in the study area

Feature Type	Section 404 Jurisdiction (acres)	Sections 401 Jurisdiction (acres)	Coastal Act Jurisdiction (acres)
Freshwater Marsh	37.6	37.6	37.6
Scrub-Shrub Wetlands	37.0	37.0	37.0
Seasonal Wetlands	1.2	1.2	1.6
Disturbed Wetlands	19.3	19.3	20.3
Non-Wetland Waters	69.5	69.5	69.5
Total	***164.6***	***164.6***	***166.0***

The northern portion of the Study Area is dominated by the SCR, adjacent riparian scrub dominated by a mix of arroyo willow (*Salix lasiolepis*) and giant reed (*Arundo donax*), and marsh habitat dominated by a mix of tule (*Schoenoplectus acutus*), cattail (*Typha* sp.), and giant reed. During the site visits by WRA, the river mouth was closed and water surface levels in the estuary were elevated. A large portion of the campground was flooded during WRA's site assessment. Aerial imagery, as well as anecdotal evidence from campground hosts living at the site, suggest that the partial campground flooding observed by WRA was increasing towards peak dry season/closed berm levels, which often result in the flooding of a majority of the campground. The only portions of the campground which appear to not be flooded on an annual basis during the dry season include the restroom facilities and central portions of the three sets of campsites.

Prolonged flooding of the campground has resulted in a transition from upland to wetlands. The northern portions of the campground, closest to the river, are dominated by a mix of marsh and seasonal wetland vegetation. In these portions of the campground, wetland vegetation is pronounced. Other portions of the campground contain more transitional vegetation, with a mix of woody upland landscape species such as weeping bottlebrush (*Melaleuca citrina*) and herbaceous wetland species such as pickleweed (*Salicornia pacifica*). In general, wetland determinations were based on the native or naturalized vegetation present and not on planted landscape species. In some cases, flooding made it impossible to determine the composition of vegetation—these areas were considered freshwater marsh, which was mapped along the northern portion of the campground.

Wetlands within the campground were classified as disturbed wetlands due to the previous development and regular maintenance (e.g., mowing, pruning, etc.) associated with the campground. These wetlands were generally dominated by a mix of native and non-native herbaceous wetland species, with non-native landscape species dominating the areas along roads and around campsites. Within the area identified as disturbed wetlands, some areas were slightly elevated and contained evidence of hydric soils and wetland hydrology, but they were dominated by upland vegetation. These wetlands were considered subject to jurisdiction by the California Coastal Commission under the California Coastal Act, but not subject to other regulatory jurisdiction.

Previous studies have mapped a swath of riparian scrub along the eastern edge of the Study Area. WRA mapped a similar swath of riparian scrub extending along the eastern edge of the Study Area from the SCR to the southern end of the campground. However, south of the campground, WRA noted that the dominant species transitioned from arroyo willow, a wetland species, to myoporum (*Myoporum lateum*), a non-native upland species. Whereas the myoporum within the flooded portions of the campground appeared to be physiologically stressed (presumably due to the flooding), the myoporum within the scrub habitat south of the campground appeared to be relatively healthy. Due to the lack of apparent flooding stress in this species, the relatively low cover of arroyo willow, and the lack of indicators of hydric soils or wetland hydrology, WRA determined that this area is not a wetland subject to federal or state regulation. This area did not have an apparent hydrological connection to the riparian scrub mapped along the eastern edge of the campground, and therefore was not considered to be subject to jurisdiction as riparian habitat. At the southeast corner of the Study Area, this scrub vegetation transitions to an arroyo willow thicket which contained indicators of hydric soils and wetland hydrology and therefore was considered a scrub-shrub wetland subject to federal and state jurisdiction. Due to the apparent lack of hydrological connection to the river, this scrub-shrub wetland was not considered riparian habitat.

9 RECOMMENDATIONS

The focused technical assessment of the existing (and historical) conditions and functionality of the SCRE provided in this report forms a baseline for the development of appropriate and feasible restoration and rehabilitation concepts. In the preparation of this report, a number of recommendations specific to the development of restoration and rehabilitation concepts emerged. Many of the recommendations are specifically related to the mostly physical habitat enhancement contemplated by the Project. A few other recommendations emerged that move beyond the present scope but may be useful to longer term planning and support adaptive management of the estuary. These recommendations are summarized below:

- Consider the potential for significant geomorphic changes during large unpredictable storm runoff events and avoid estuary concepts that include any costly 'fixed' infrastructure.

- Consider estuary concepts that avoid creating isolated backwater or stagnant areas and avoid un-connected deeper grading situations that might create salinity wedges and strongly stratified layers after a breach and berm closure event.

- Consider grading concepts that specifically address drainage considerations to reduce the likelihood of stranding during a breach event.

- Consider a focused geotechnical study to determine the appropriateness of current soil materials for use as fill to create a raised campground site.

- Consider using upper end of the ranges predicted for sea level rise to influence and select appropriate campground elevations.
- Consider avoiding a focus on achieving any specific target percentage for an open or closed estuary since the number, and seasonal timing of breach events is likely of more ecological importance than the duration. Excavation within the estuary will increase the volume available and may generally reduce breach frequency in summer and fall. Increased surface area will increase evaporation rates but will not significantly impact the overall SCRE water budget.

- Long term management of the estuary may consider regular water quality, wildlife, and hydrologic monitoring programs to supplement and continue those currently required through the Phase 3 requirements of the recently renewed NPDES permit as issued by the LARWQCB.

- Consider options and locations for estuary access to support vessel based research and monitoring activities.

- Consider implementing an invasive species management study which might evaluate the potential benefits of an eradication and prevention program.

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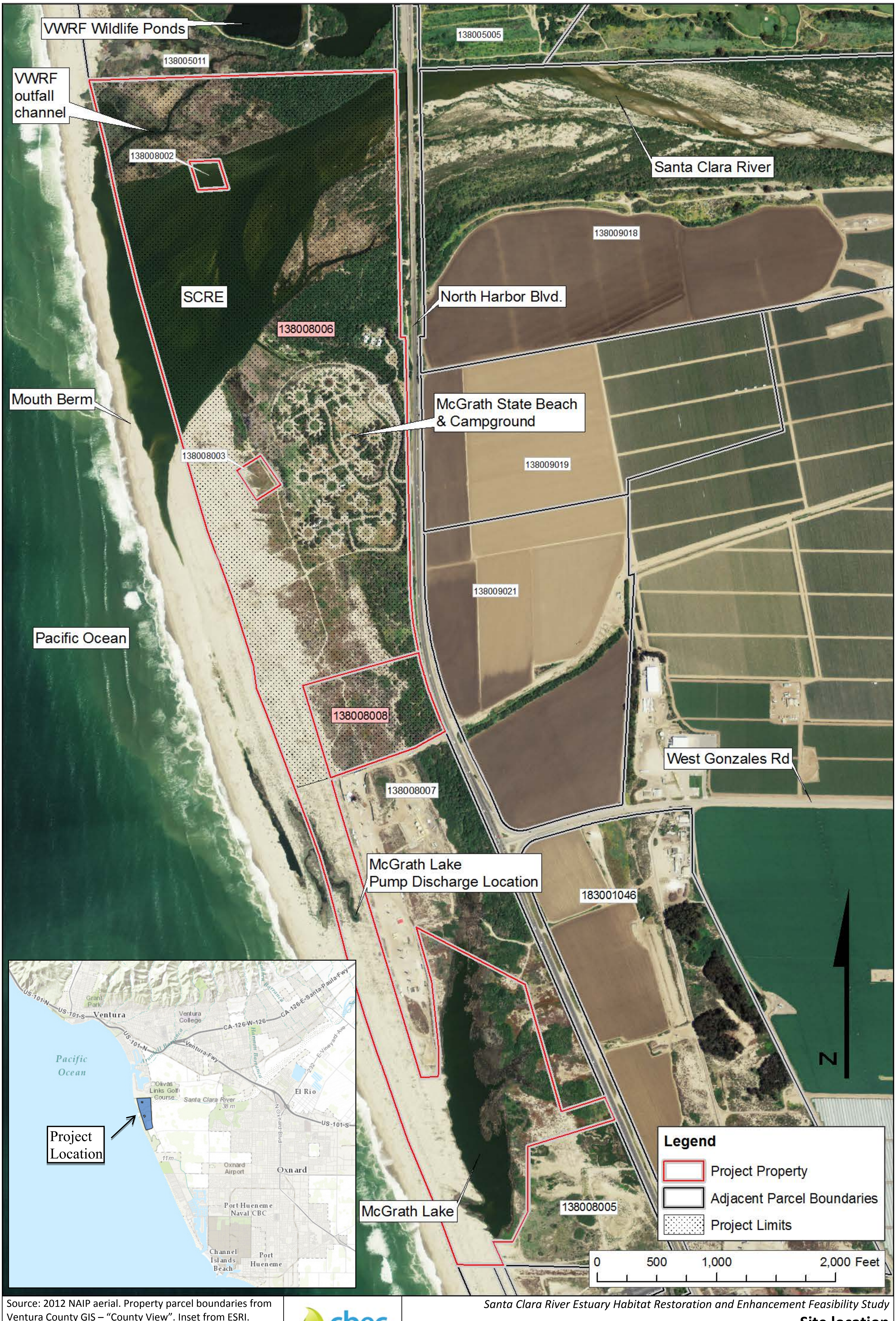

Source: 2012 NAIP aerial. Property parcel boundaries from Ventura County GIS – "County View". Inset from ESRI.

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Site location

Project No. 14-1023 | Created By: DM | **Figure 1**

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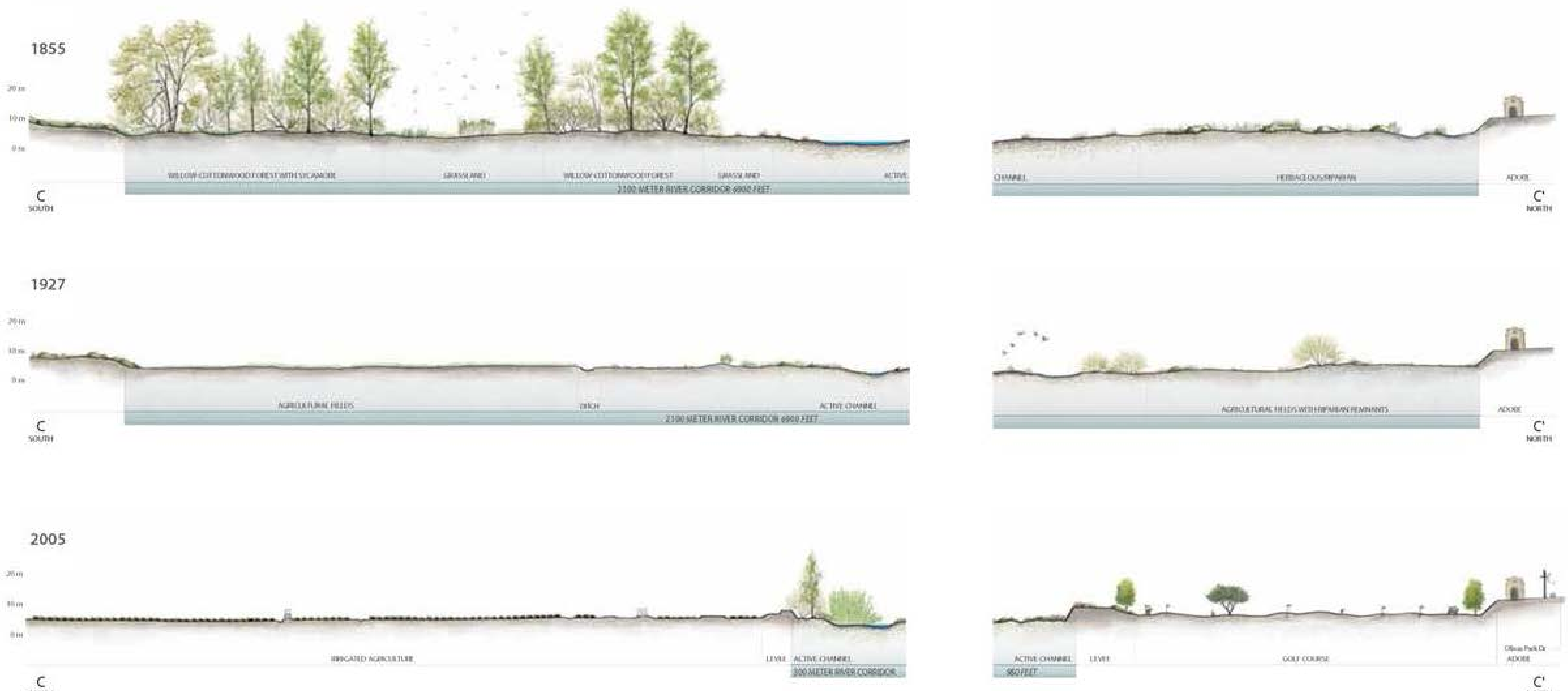
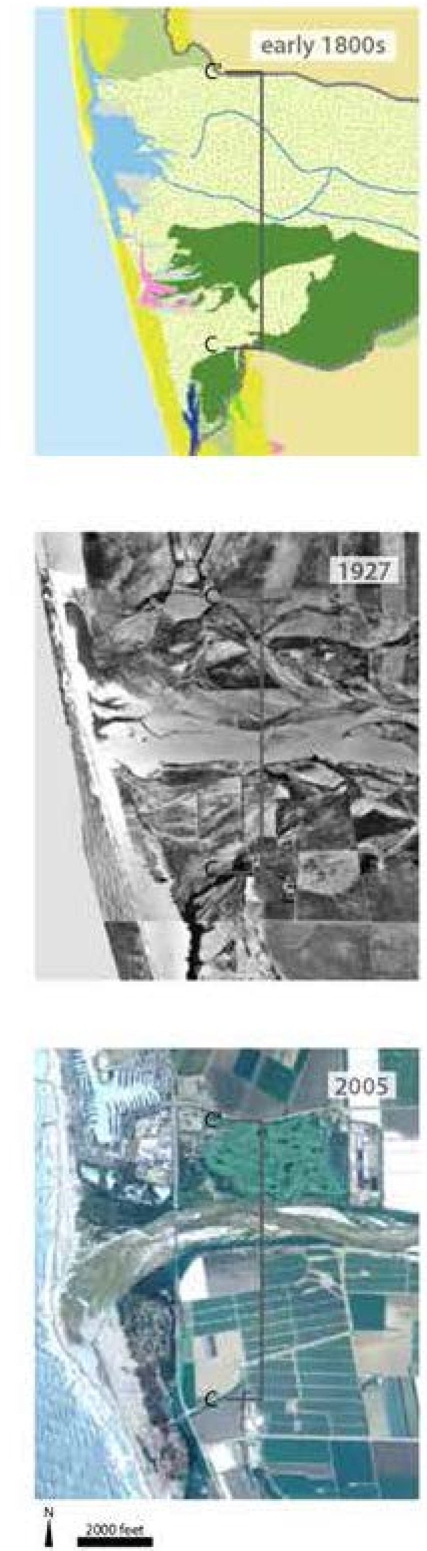
Fig. 3.47. Historical cross-sections at the Santa Clara River mouth, 1855-2005. This time series shows the Santa Clara River at its mouth, about 3.5 miles downstream from the Highway 101 bridge. A large willow-cottonwood forest and wetland complex dominated the left bank (south side) of the river from above the bridge all the way to the river mouth, a distance of over four miles. Very little of this once-expansive forest remains today. The earliest cross-section is derived from GLO notes and the mid-19th century T-sheet drawn for the river mouth by the U.S. Coast Survey. Cross-sections are drawn with 5x vertical exaggeration. (Hancock 1854; Johnson 1855c, courtesy of the National Oceanographic and Atmospheric Administration; Fairchild Aerial Surveys 1927, courtesy of Whittier College; USDA 2005; Stillwater Sciences and URS Corporation 2007. Cross-sections produced by Jen Natali)



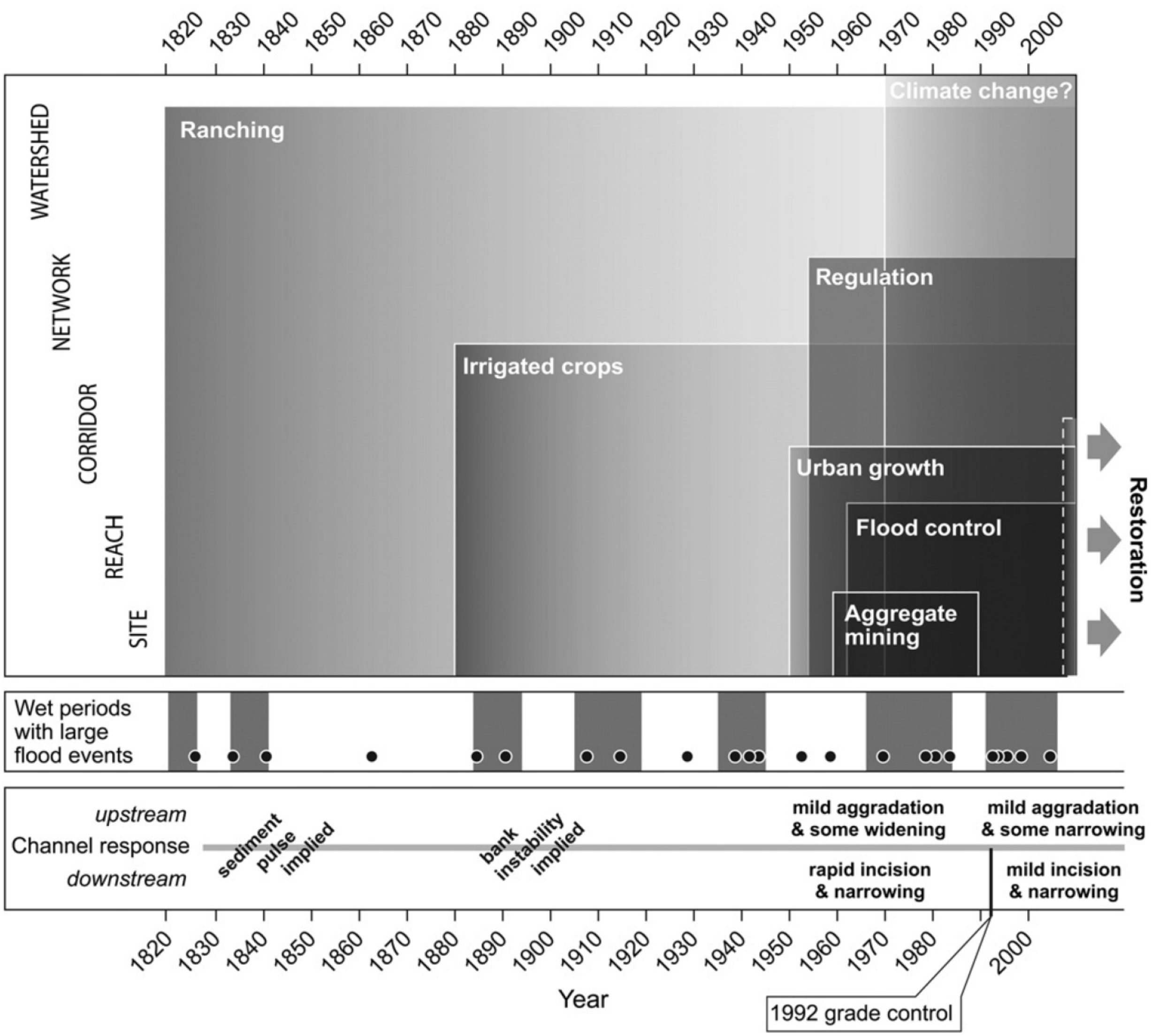


Source: Adapted from Beller et al., 2011.

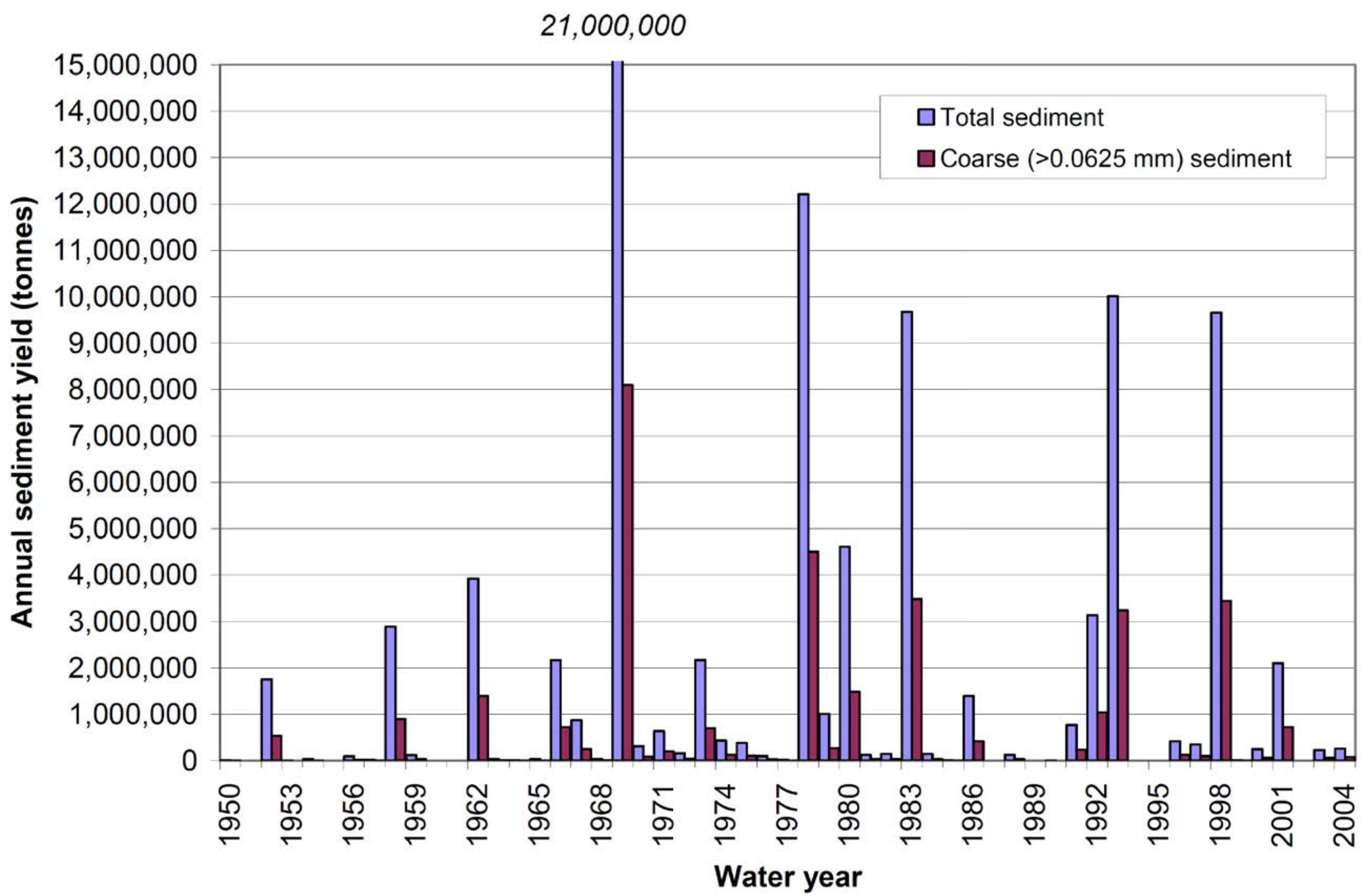
Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Historical cross sections, 1855-2005

Project No. 14-1023	Created By: DM	**Figure 2**



Source: Adapted from Downs, et.al. 2013.	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Conceptual model of morphological disturbances** Project No. 14-1023 · Created By: JS · **Figure 3**

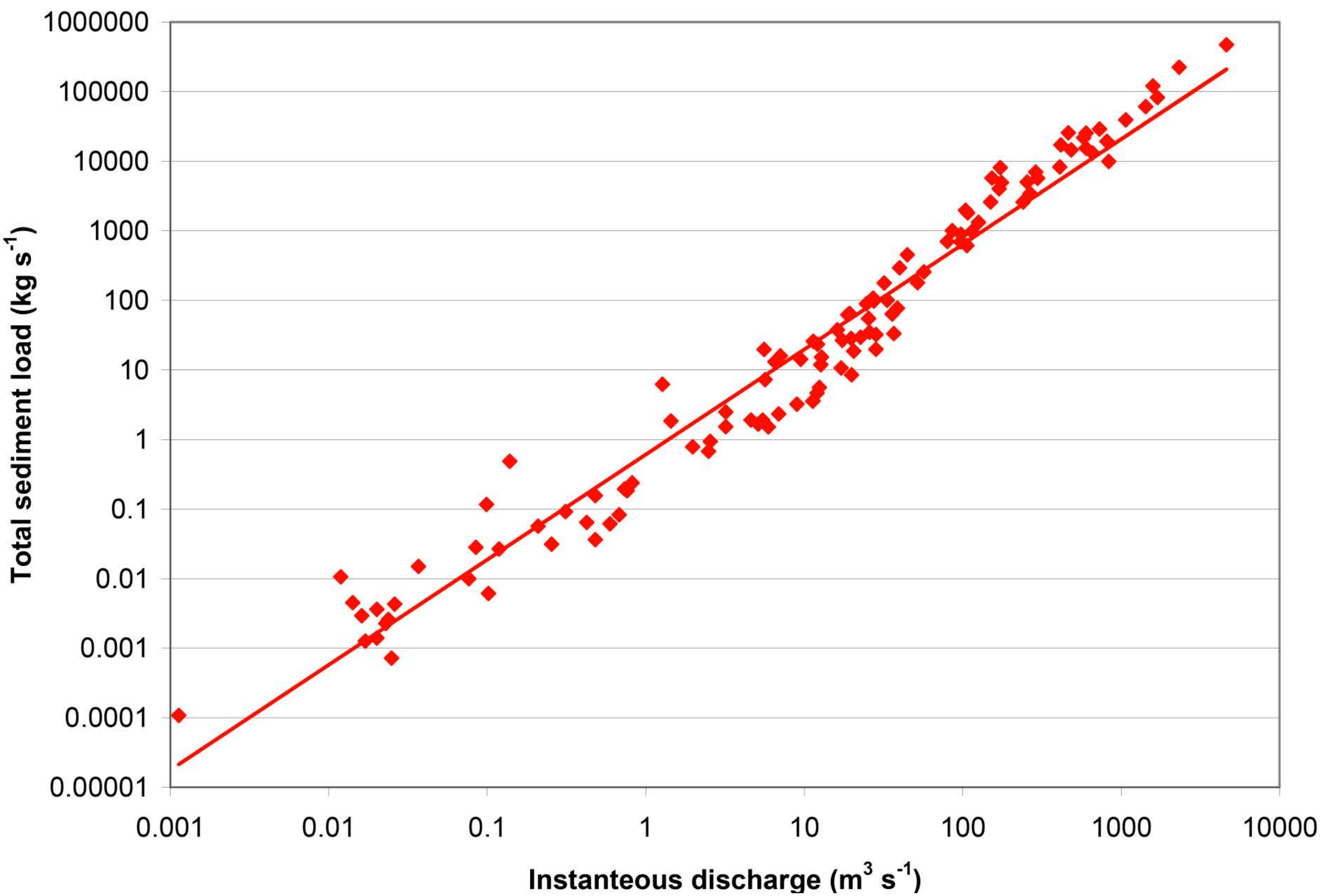


Source: Adapted from Stillwater Sciences, 2011.
Notes: Sediment yield estimates for the SCR at the Montalvo flow gage location just upstream of the SCRE.

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

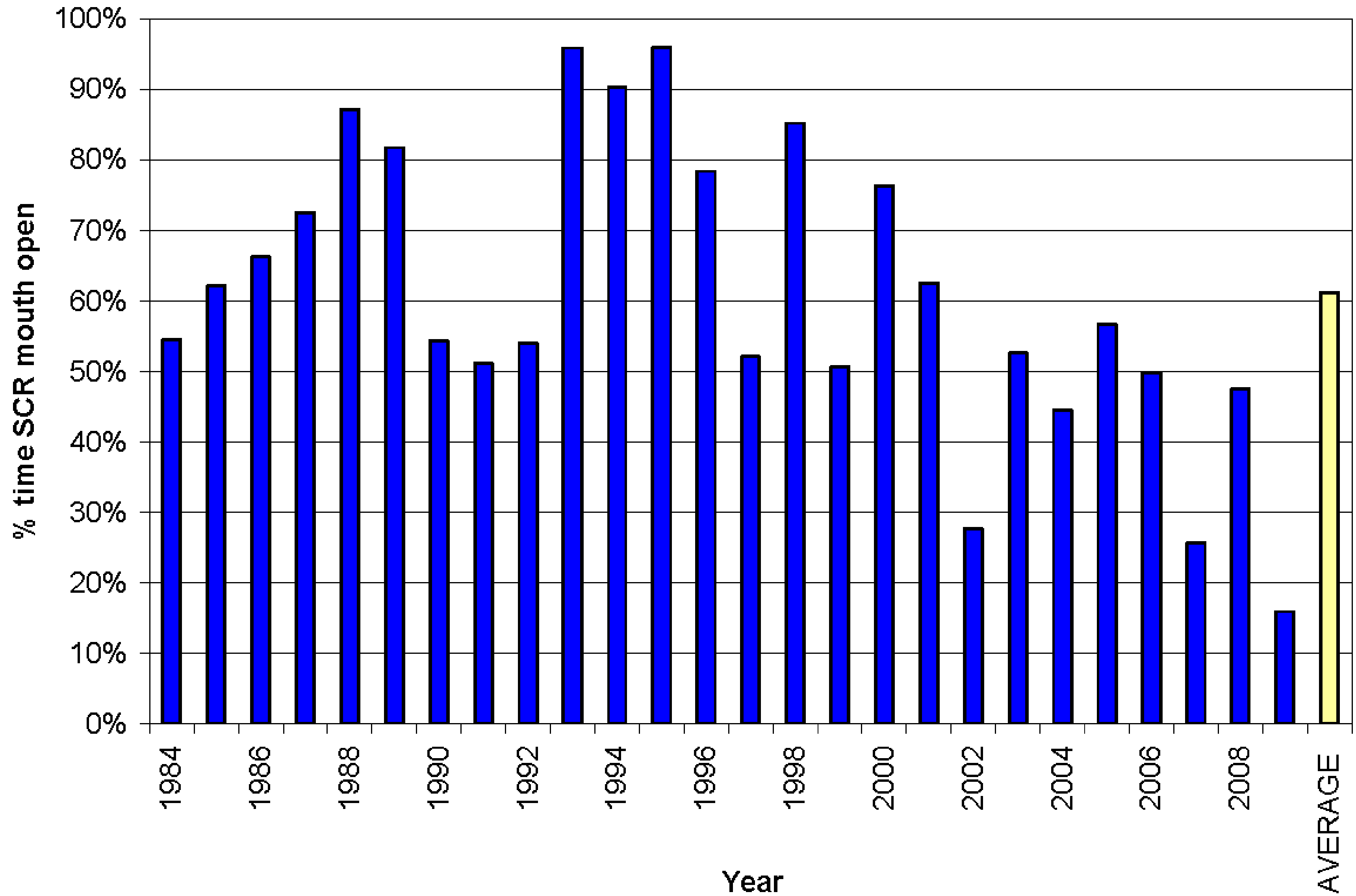
Calculated total and coarse sediment yield

Project No. 14-1023 | Created By: DM | **Figure 4**



Source: Adapted from Stillwater Sciences, 2011. Notes: Data from the Montalvo and Highway 101 bridge (USGS 11114000) from WY 1950 to 2004.	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Total sediment load rating curve** Project No. 14-1023 Created By: JS **Figure 5**

Source: 2012 NAIP aerial. Notes: banklines digitized from Google Earth	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Recent berm trends**
		Project No. 14-1023 · Created By: DT · **Figure 6**



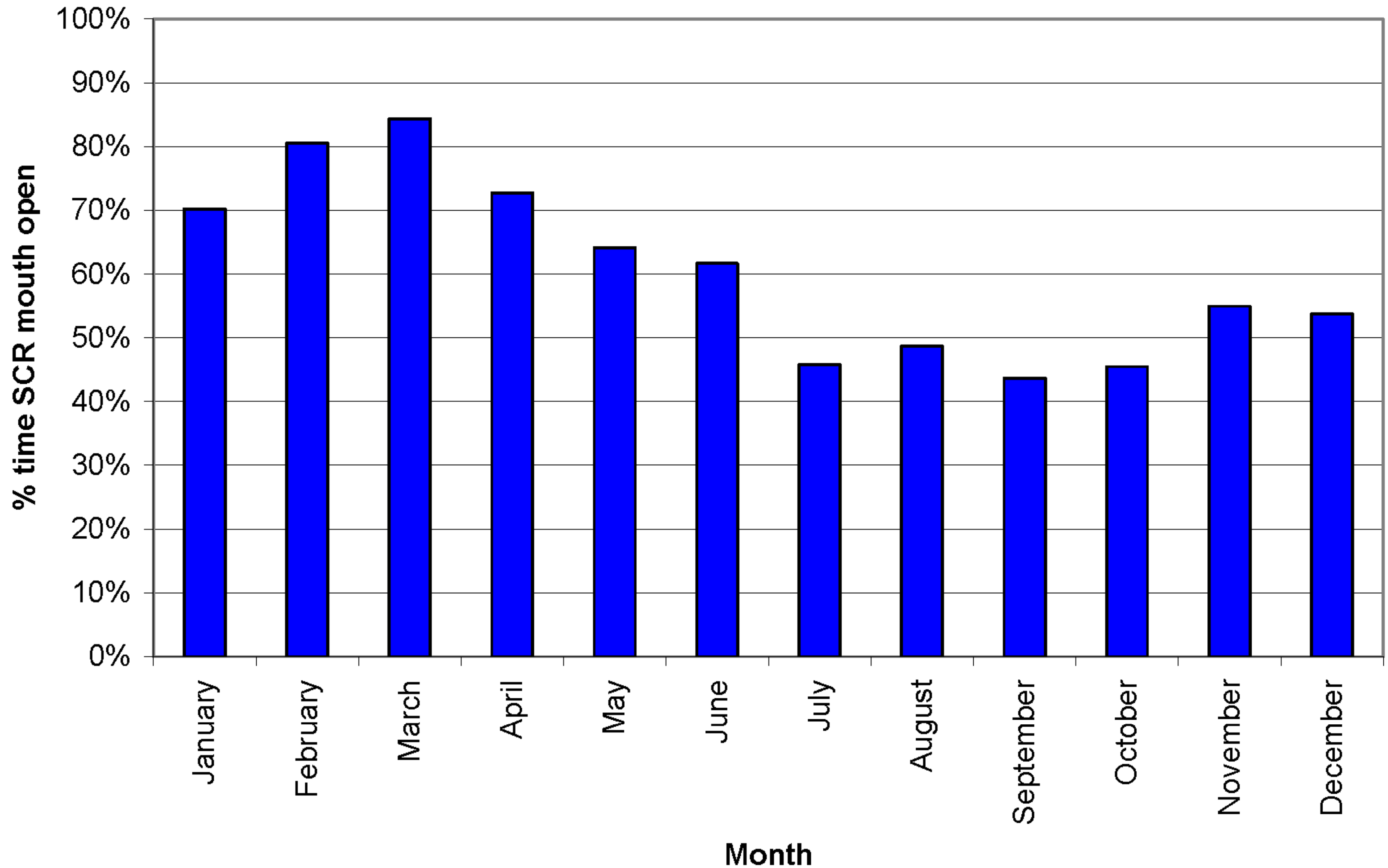
Source: Adapted from Stillwater Sciences, 2011.
Notes: 1984-2009.

cbec eco engineering

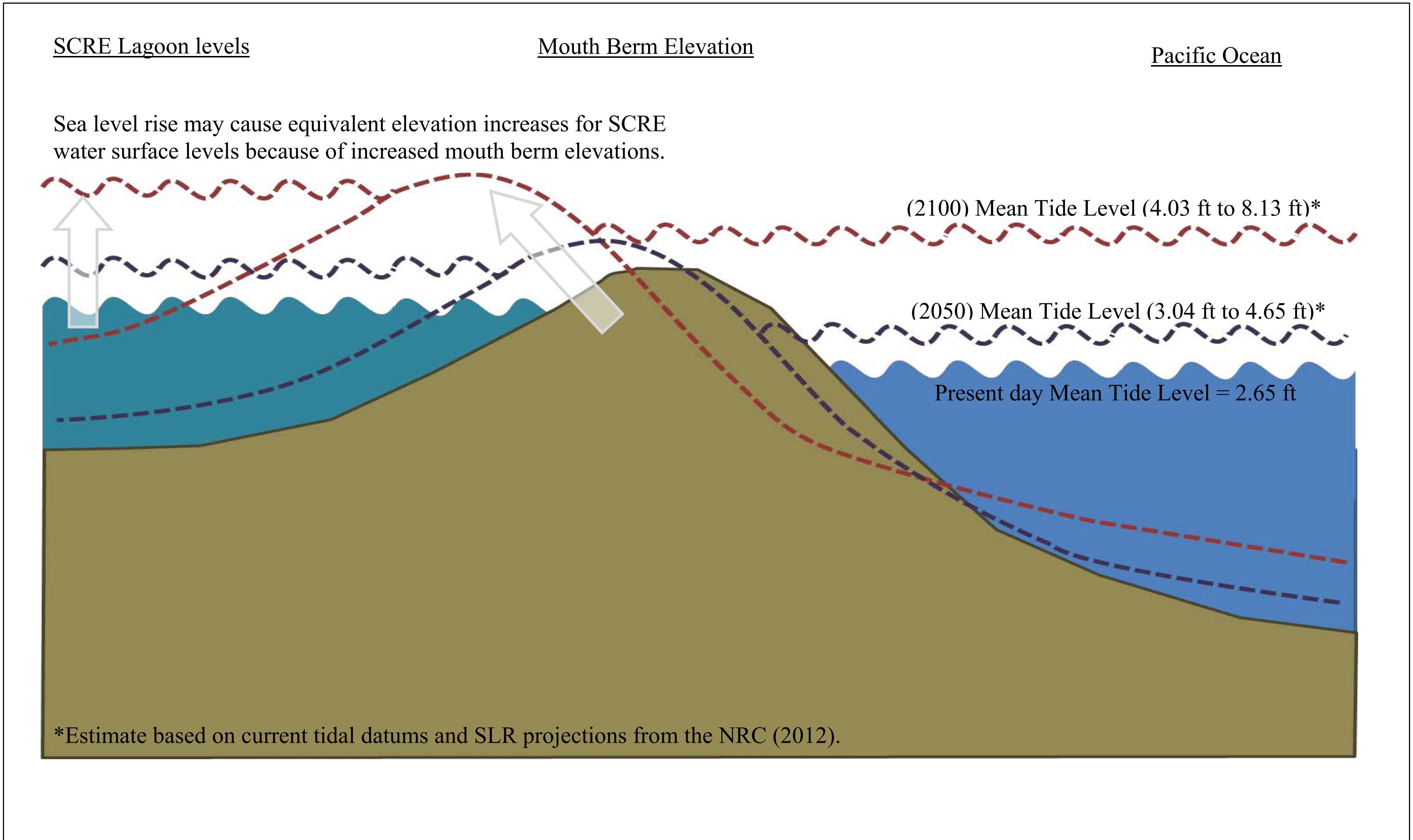
Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Percent time SCR mouth open annually

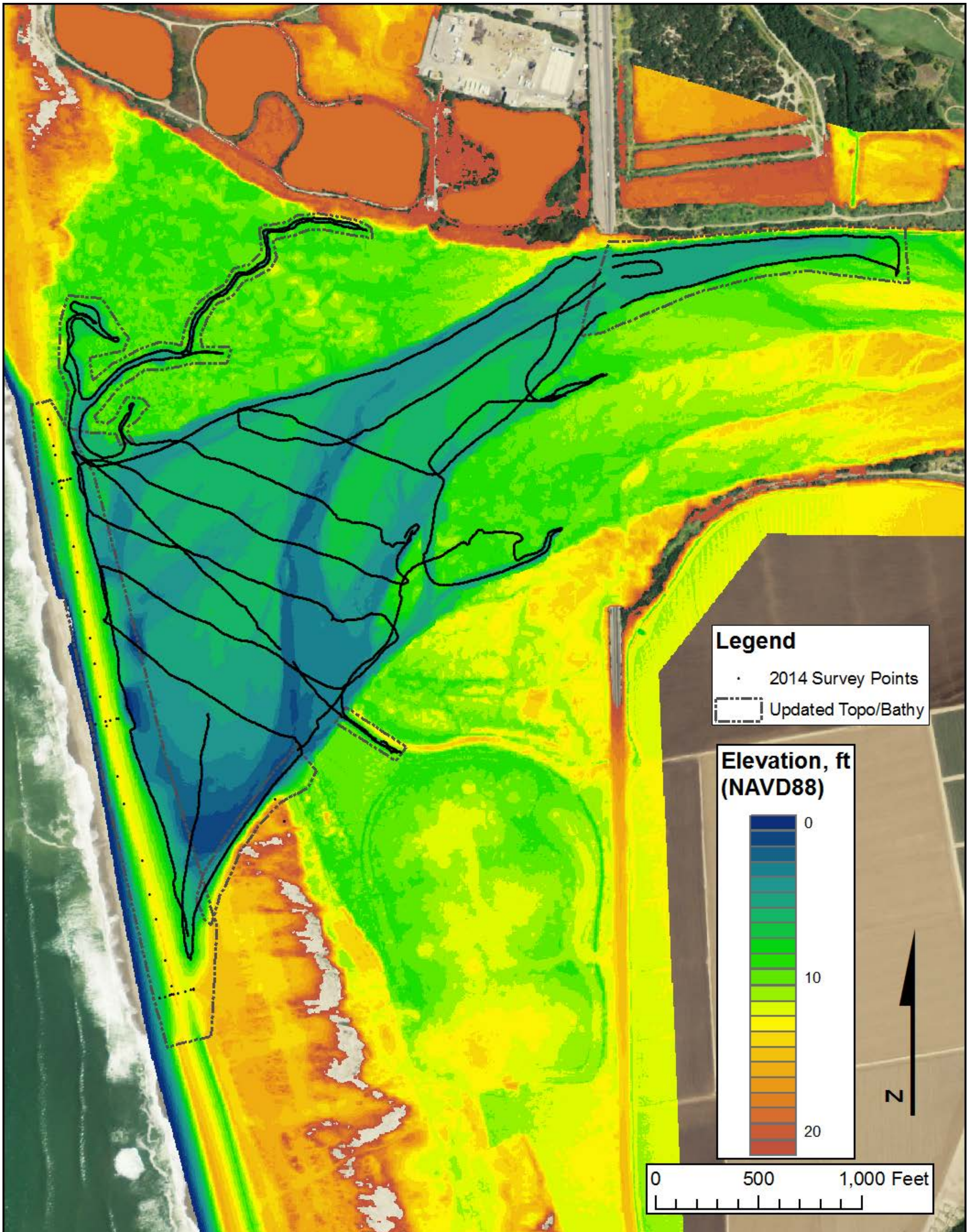
Project No. 14-1023	Created By: DT	**Figure 7**



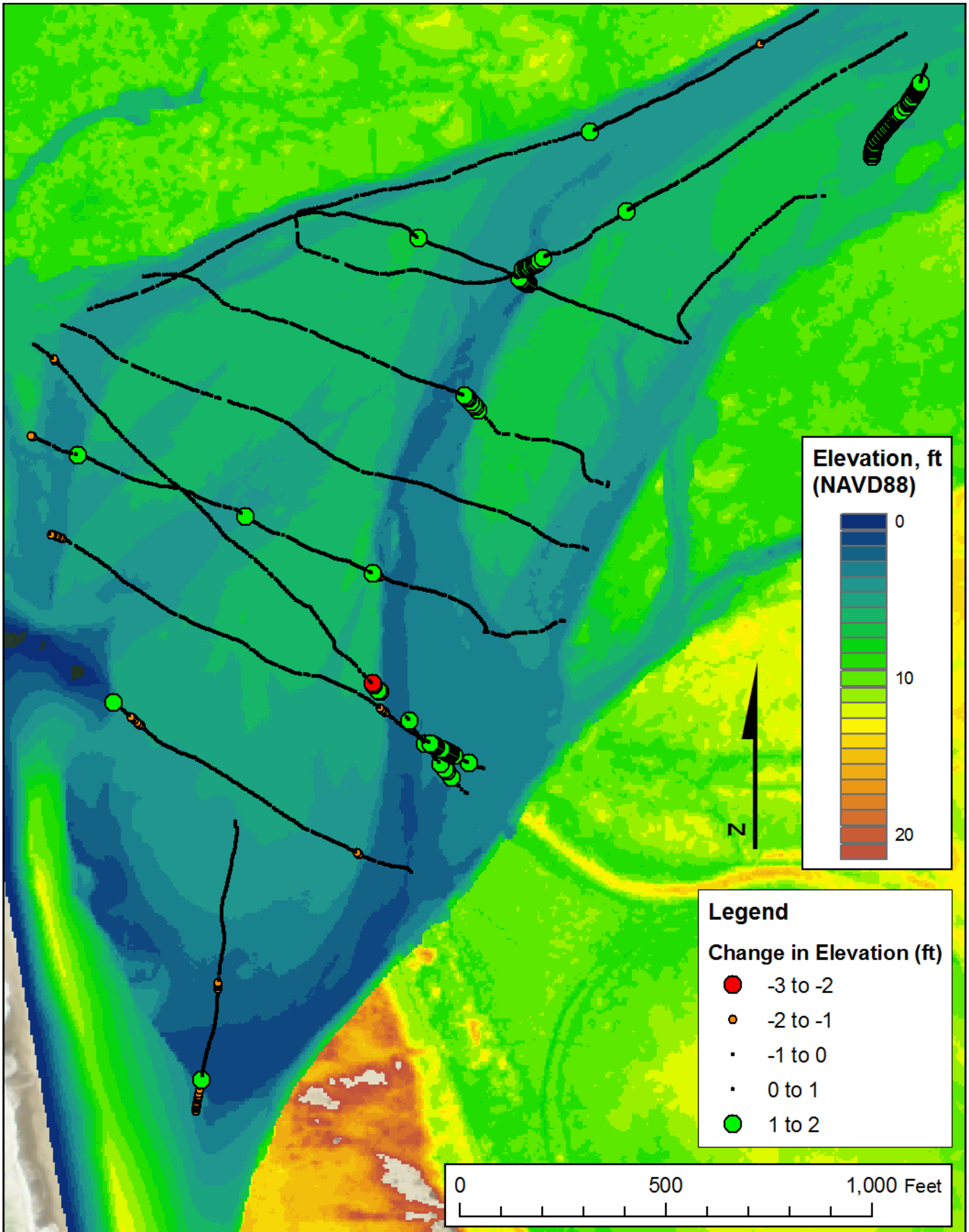
Source: Adapted from Stillwater Sciences, 2011. Notes: 1984-2009	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Percent time SCR mouth open monthly**	
		Project No. 14-1023	Created By: DT
			Figure 8



Source: Adapted from Hanslow, 2000 after Dean & Maurmeyer (1983). Current mean tide levels from average of Santa Monica and Santa Barbara tide gages NOAA (2014). Sea level rise projections based on the National Research Council 2012 projection ranges for the Southern California Coast for the years 2050 and 2100. Concept only. N.T.S.	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Sea level rise and mouth berm elevation**		
		Project No. 14-1023	Created By: DM	**Figure 9**



Source: 2012 NAIP aerial, 2009 NOAA DCSC LiDAR, 2012 CSUCI bathymetry, 2014 cbec survey.	cbec eco engineering	Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study **Fall 2014 bathymetry**	
		Project No. 14-1023	Created By: DM	**Figure 10**



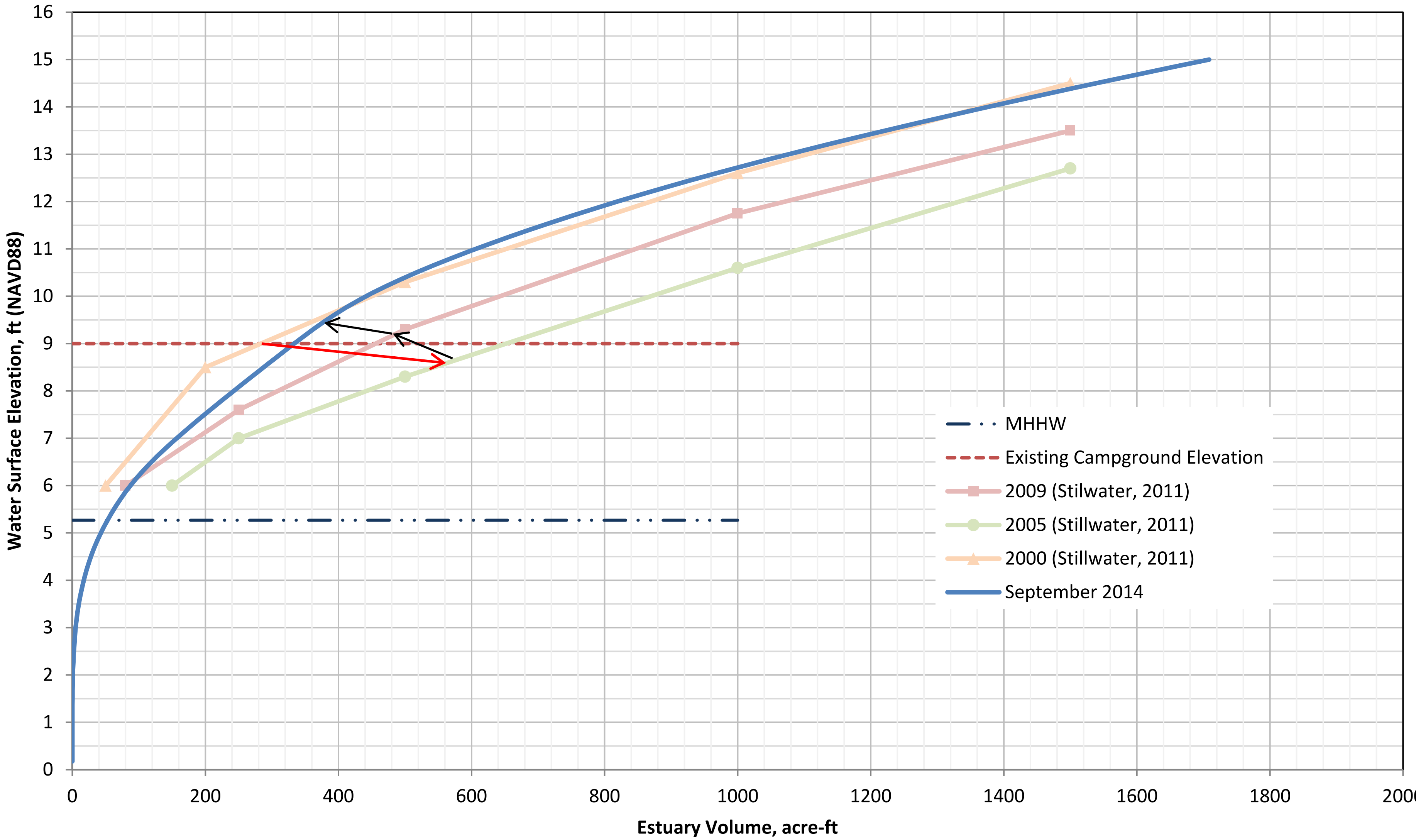
Source: 2012 NAIP aerial.
2009 NOAA DCSC LiDAR.
2012 CSUCI bathymetry.
2014 cbec survey

cbec eco engineering

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Bathymetry comparison

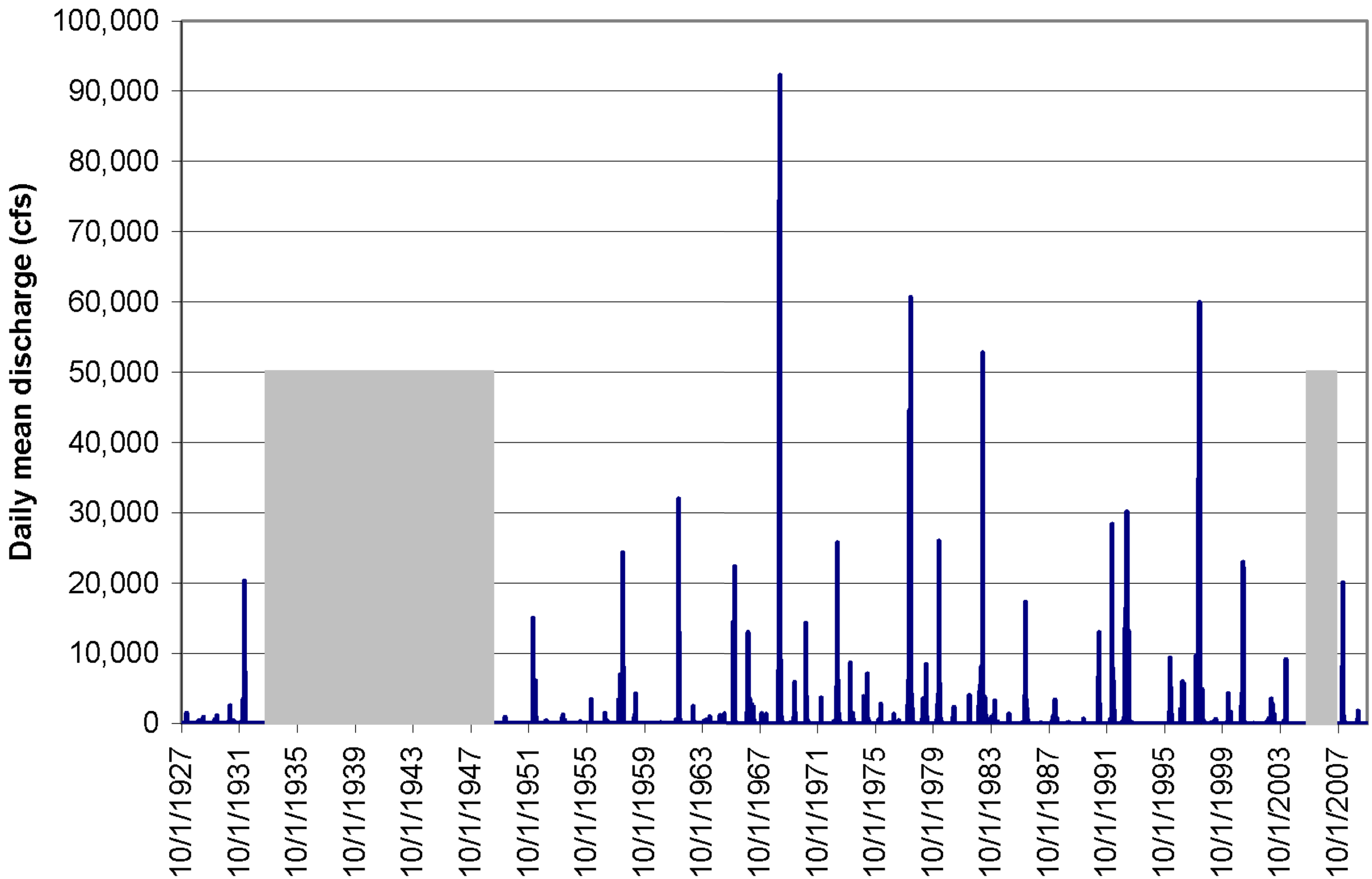
Project No. 14-1023 | Created By: DM | **Figure 11**



Notes: Curve data estimated for 2000, 2005 and 2009 and adapted from Stillwater 2011. Campground elevation is an approximate average. MHHW from average of bounding NOAA tidal gage stations. Red arrows indicates change after 2005 event. Black arrows indicate changes since 2005 event.	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Hypsometric analysis and recent trends**
		Project No. 14-1023 / Created By: DM / **Figure 12**

Source: ESRI base aerial.	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study*		
		Santa Clara River watershed and gaging stations		
		Project No. 14-1023	Created By: DT	**Figure 13**

C:_WORK\14-1023_SCRE_Feasibility_Study\Reports\ECTR (Task 1.1.11)\FinalFigures\Fig13_Watershedmap.docx
1/1/2015



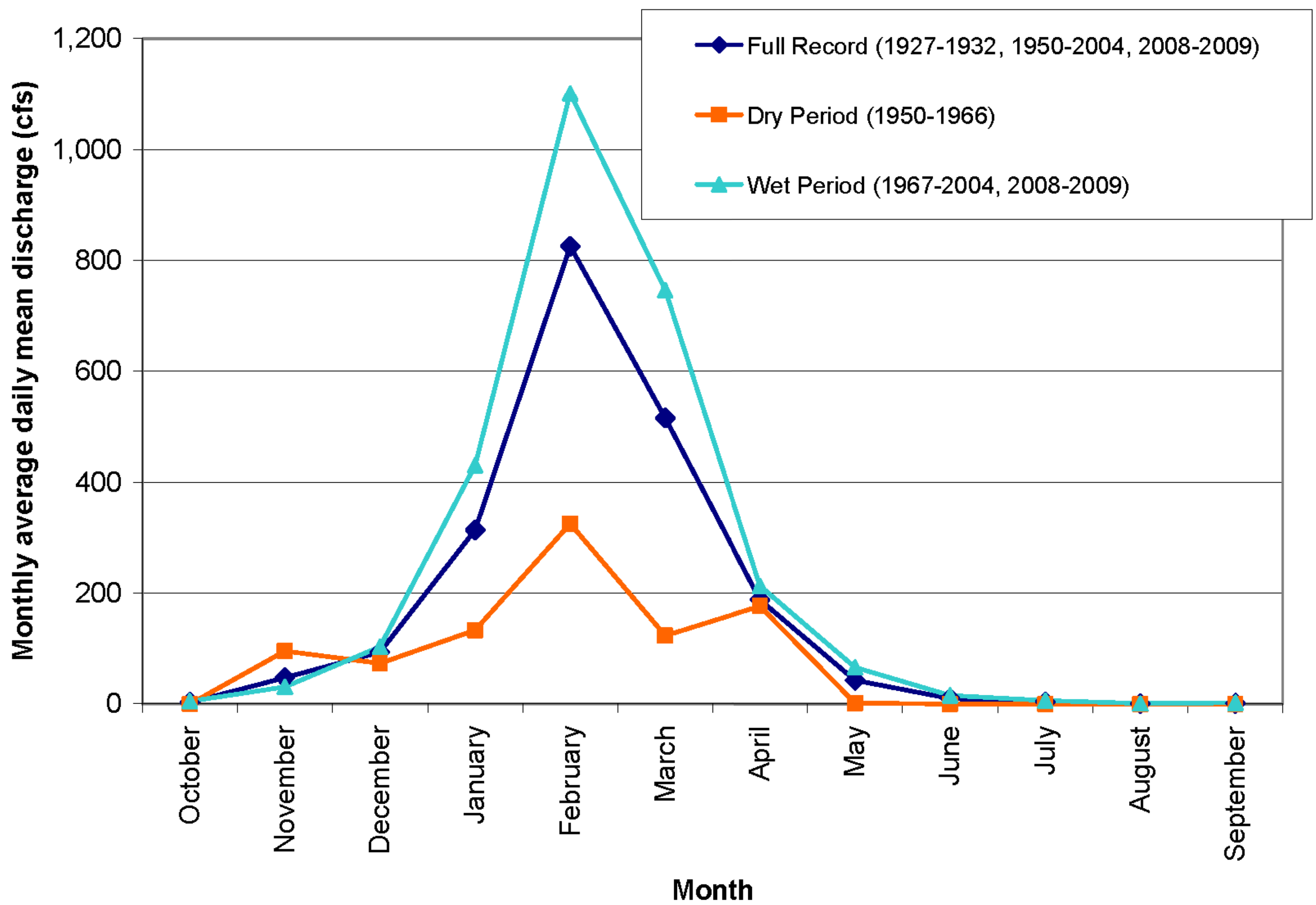
Source: Adapted from Stillwater Sciences, 2011.
Notes: USGS gage #11114000 Santa Clara River at Montalvo and VCWPD gage #723 Santa Clara River at Victoria Ave.

cbec eco engineering

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Santa Clara River daily mean discharge

Project No. 14-1023	Created By: DT	**Figure 14**



Source: Adapted from Stillwater Sciences, 2011.
Notes: USGS gage #11114000 Santa Clara River at Montalvo and VCWPD gage #723 Santa Clara River at Victoria Ave. Wet periods and dry periods as observed in the hydrologic record not necessarily correlated with short term ENSO fluctuations.

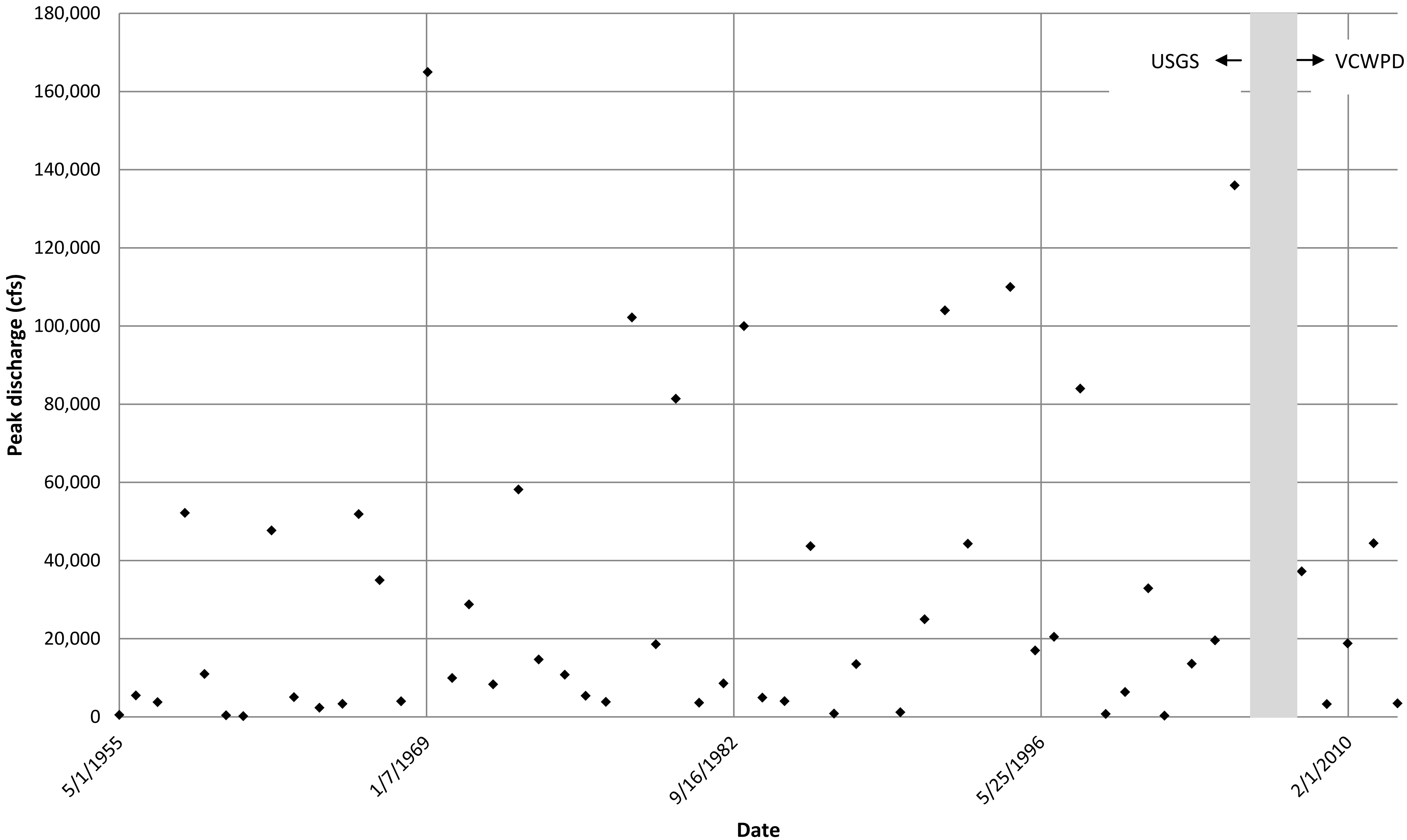
cbec eco engineering

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Santa Clara River monthly mean discharge

Project No. 14-1023 | Created By: DT/DM | **Figure 15**

C:_WORK\14-1023_SCRE_Feasibility_Study\Reports\ECTR (Task 1.1.11)\FinalFigures\Fig15_MonthlyAverageDischarge.docx
1/1/2015



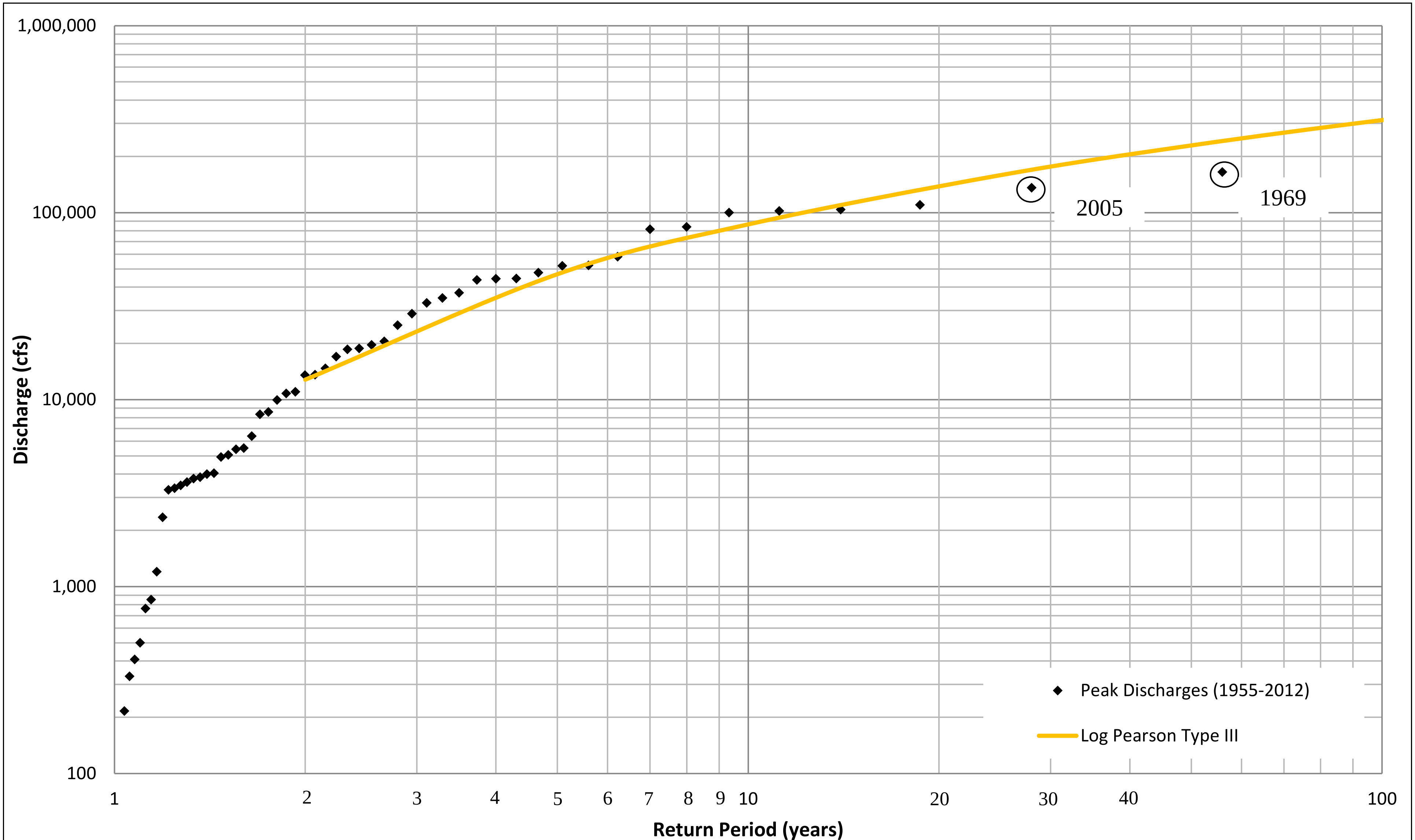
Source: USGS gage #11114000 Santa Clara River at Montalvo and VCWPD gage #723 Santa Clara River at Victoria Ave.
Notes: Annual peak discharges for 1955-2012. No data for WY 1989, 2006, 2007. 1995 flow estimated from Flood Protection Report (1995-1996). 2005 flow estimated at VCWPD gage #724.

cbec eco engineering

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Santa Clara River annual peak discharges

Project No. 14-1023	Created By: DT	**Figure 16**



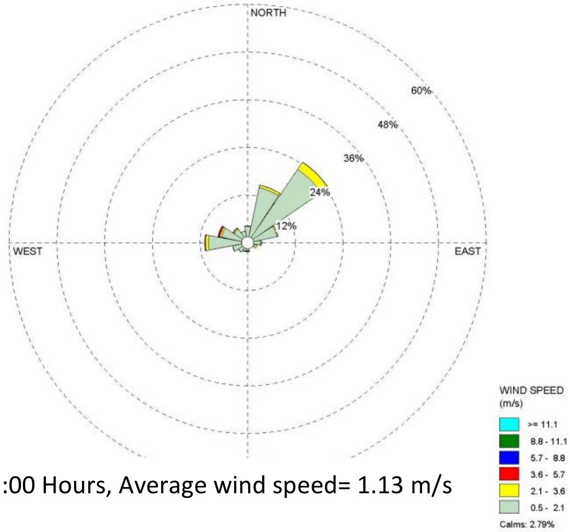
Source: USGS gage #11114000 Santa Clara River at Montalvo and VCWPD gage #723 Santa Clara River at Victoria Av.
Notes: Annual peak discharges for 1955-2012. No data for WY 1989, 2006, 2007. 1995 flow estimated from Flood Protection Report (1995-1996). 2005 flow estimated from VCWPD gage #724.

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

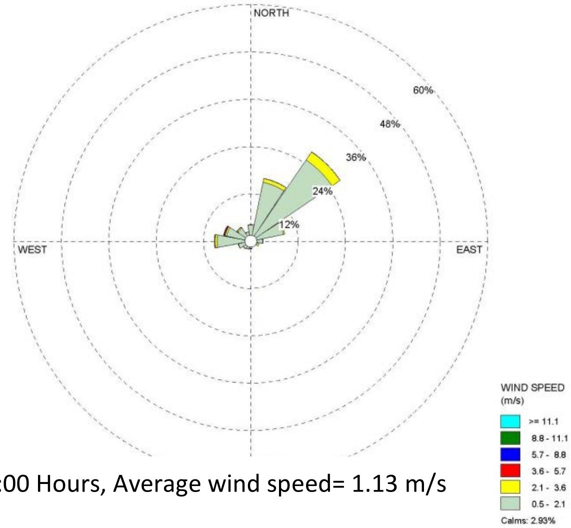
Santa Clara River flood frequency analysis

Project No. 14-1023	Created By: DT	**Figure 17**

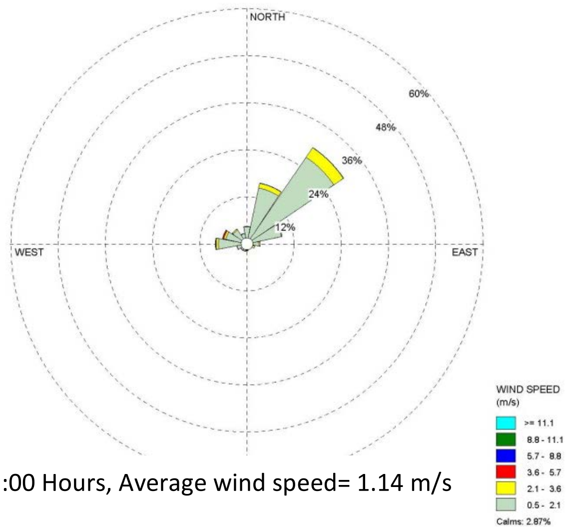
C:_WORK\14-1023_SCRE_Feasibility_Study\Reports\ECTR (Task 1.1.11)\FinalFigures\Fig17_FFA.docx
1/7/2015



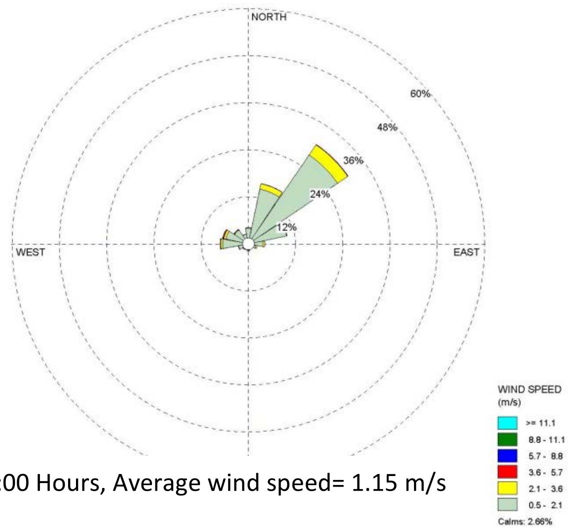
1:00 Hours, Average wind speed= 1.13 m/s



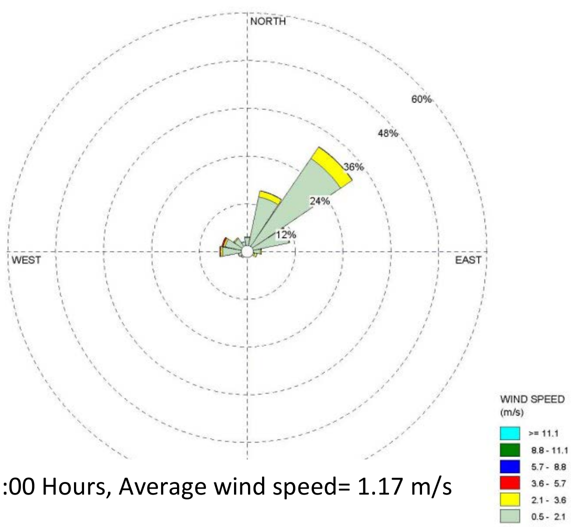
2:00 Hours, Average wind speed= 1.13 m/s



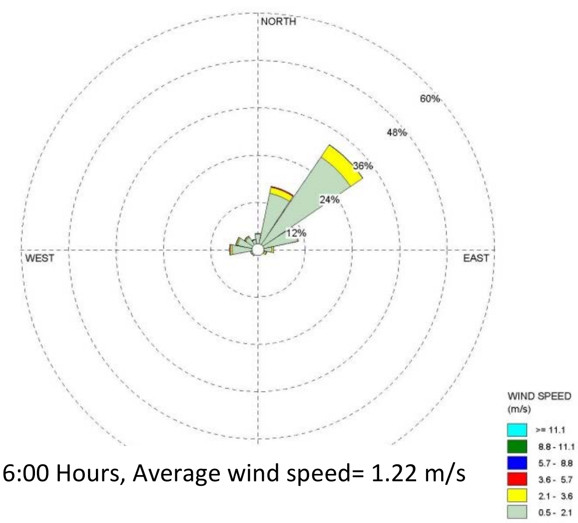
3:00 Hours, Average wind speed= 1.14 m/s



4:00 Hours, Average wind speed= 1.15 m/s

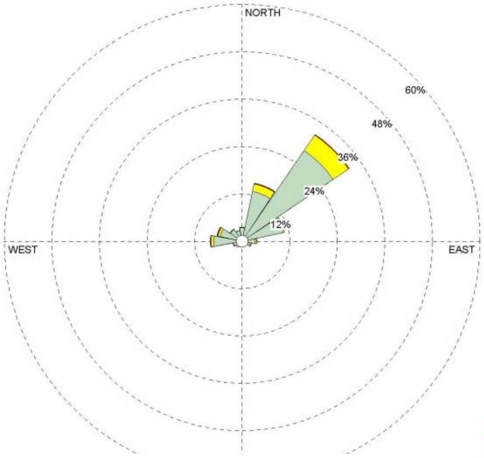


5:00 Hours, Average wind speed= 1.17 m/s

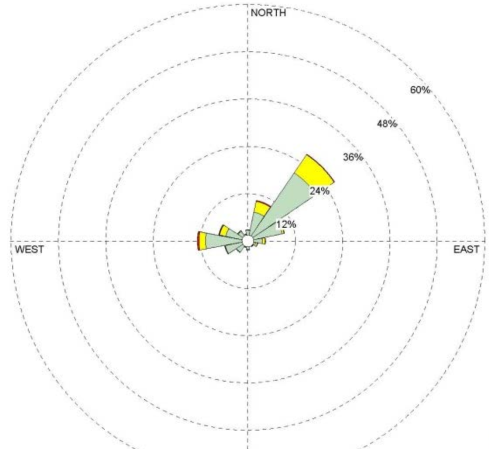


6:00 Hours, Average wind speed= 1.22 m/s

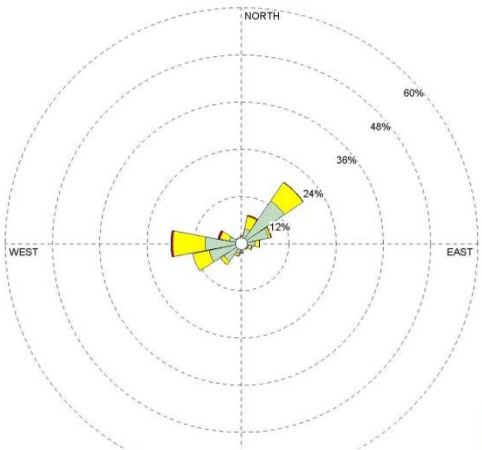
Notes: Wind data from CIMIS station #156: 10/12/2001 to 10/26/2014	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Hourly wind speed and direction, 1:00-6:00 hours**		
		Project No. 14-1023	Created By: DT	**Figure 18**



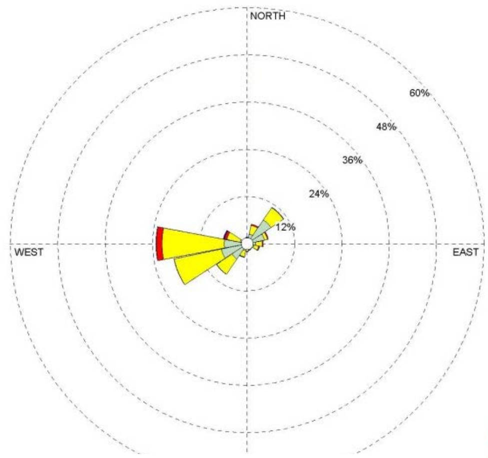
7:00 Hours, Average wind speed= 1.33 m/s



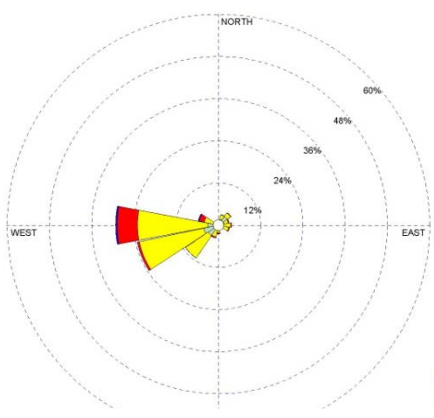
8:00 Hours, Average wind speed= 1.50 m/s



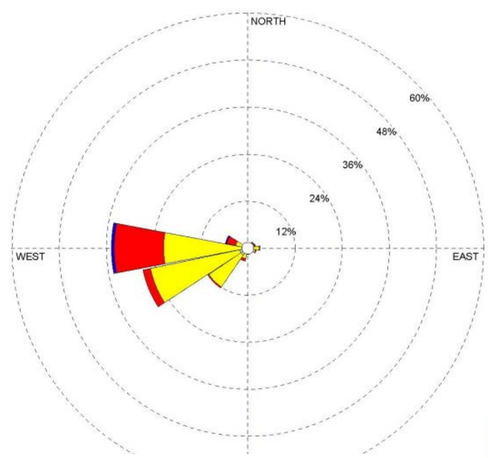
9:00 Hours, Average wind speed= 1.79 m/s



10:00 Hours, Average wind speed= 2.15 m/s

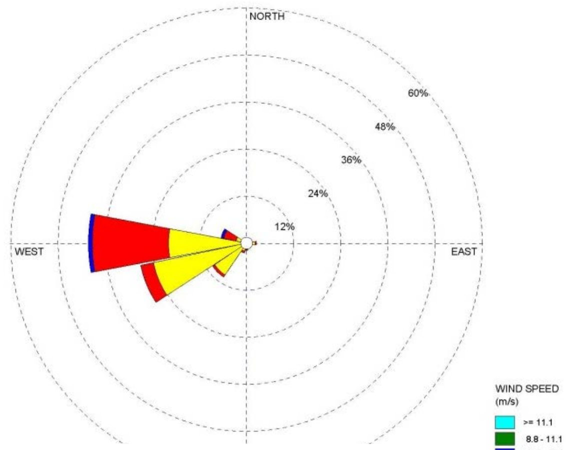


11:00 Hours, Average wind speed= 2.57 m/s

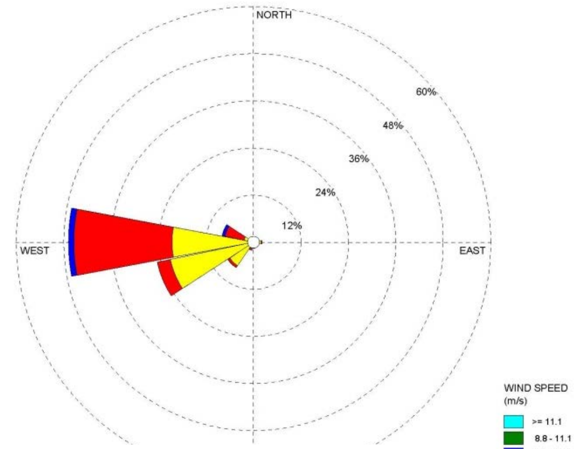


12:00 Hours, Average wind speed= 2.97 m/s

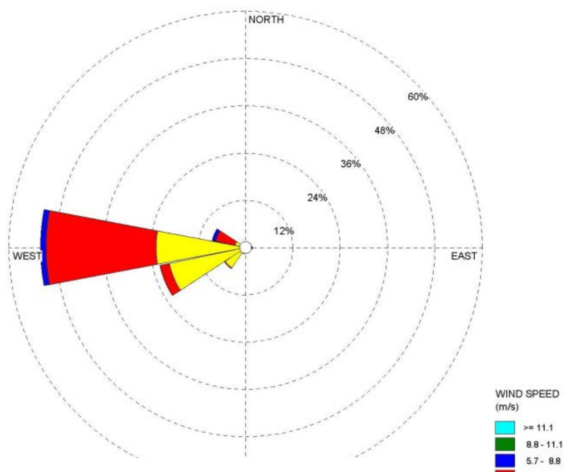
Notes: Wind data from CIMIS station #156: 10/12/2001 to 10/26/2014	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Hourly wind speed and direction, 7:00-12:00 hours**		
		Project No. 14-1023	Created By: DT	**Figure 19**



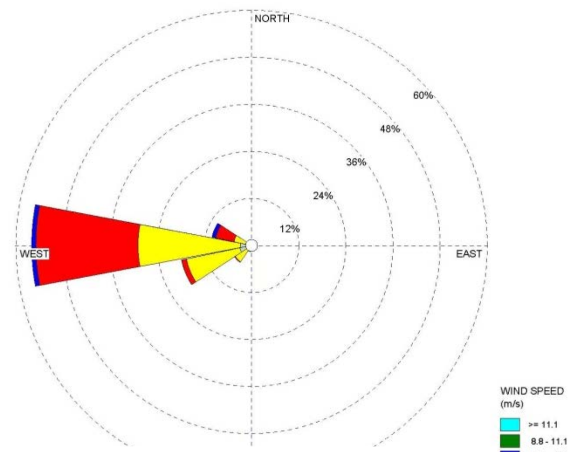
13:00 Hours, Average wind speed= 3.26 m/s



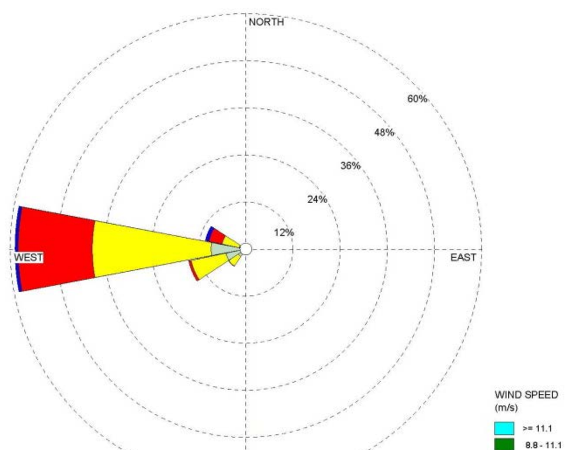
14:00 Hours, Average wind speed= 3.40 m/s



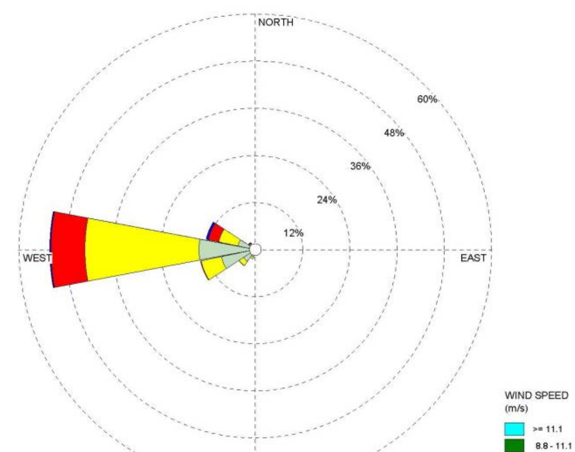
15:00 Hours, Average wind speed= 3.40 m/s



16:00 Hours, Average wind speed= 3.25 m/s



17:00 Hours, Average wind speed= 2.88 m/s



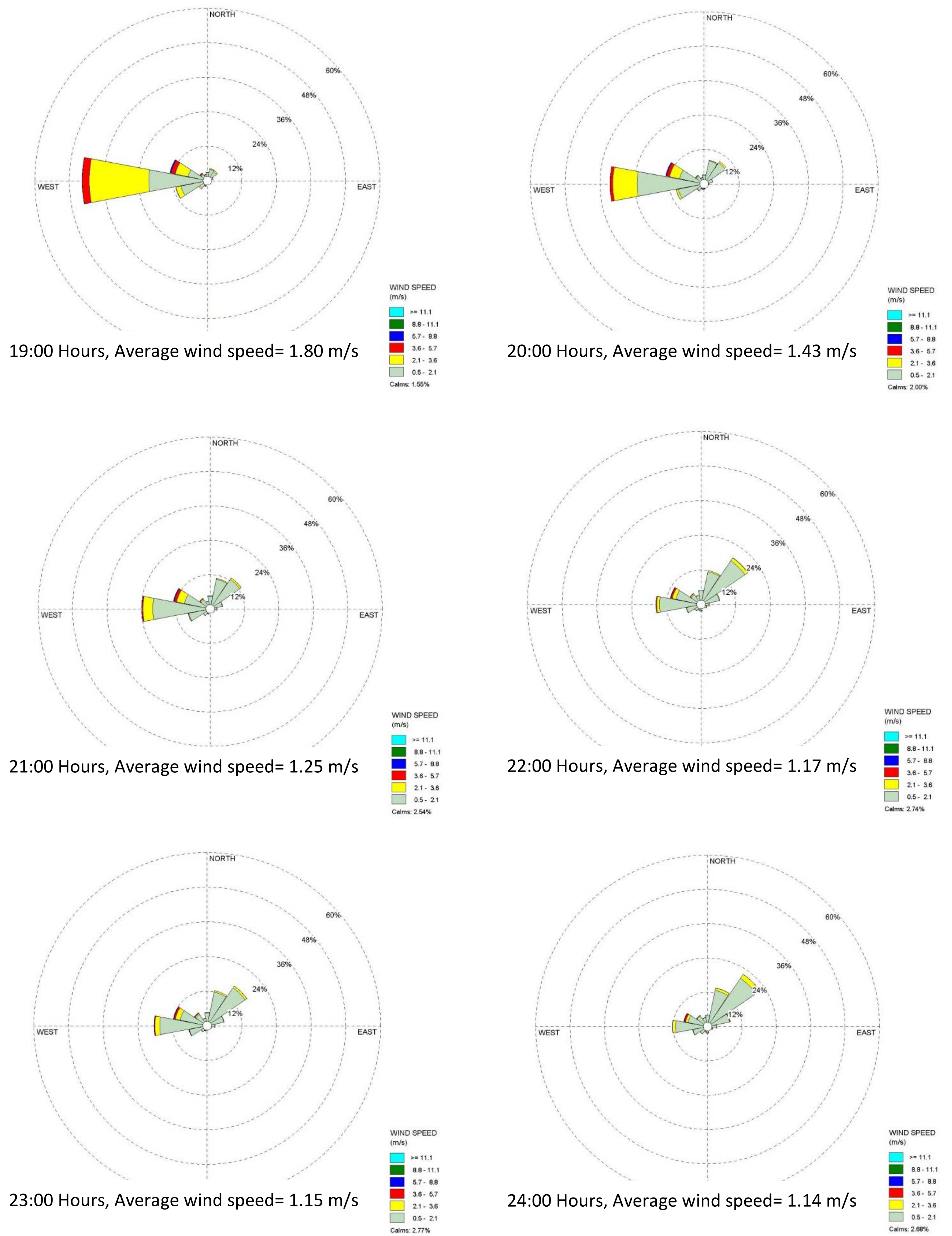
18:00 Hours, Average wind speed= 2.33 m/s

Notes: Wind data from CIMIS station #156: 10/12/2001 to 10/26/2014

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Hourly wind speed and direction, 13:00-18:00 hours

Project No. 14-1023	Created By: DT	**Figure 20**



19:00 Hours, Average wind speed= 1.80 m/s

20:00 Hours, Average wind speed= 1.43 m/s

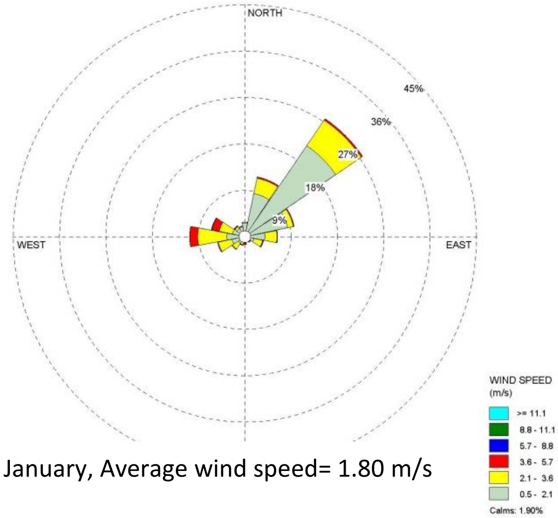
21:00 Hours, Average wind speed= 1.25 m/s

22:00 Hours, Average wind speed= 1.17 m/s

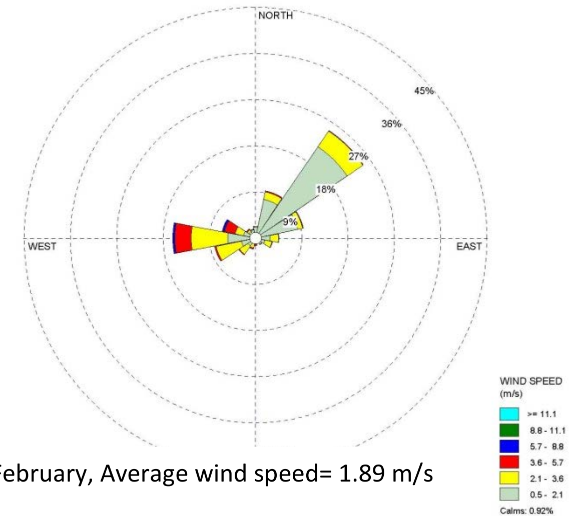
23:00 Hours, Average wind speed= 1.15 m/s

24:00 Hours, Average wind speed= 1.14 m/s

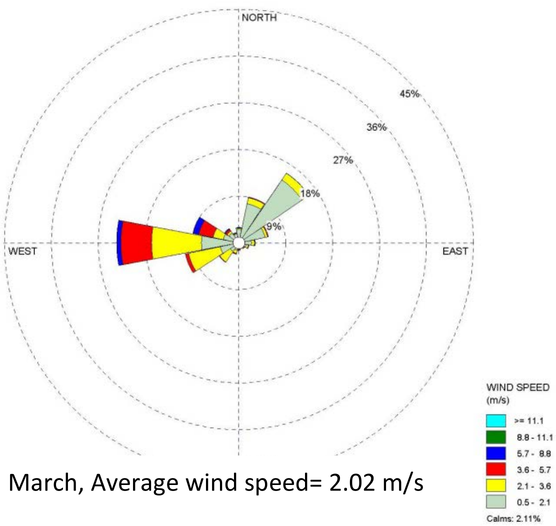
Notes: Wind data from CIMIS station #156: 10/12/2001 to 10/26/2014	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Hourly wind speed and direction, 19:00-24:00 hours**		
		Project No. 14-1023	Created By: DT	**Figure 21**



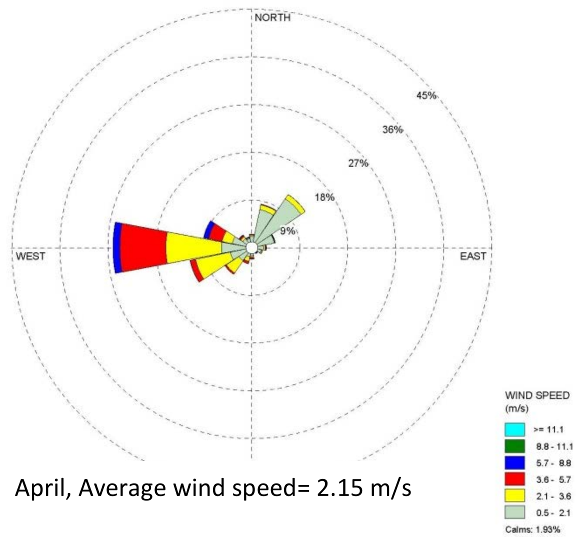
January, Average wind speed= 1.80 m/s



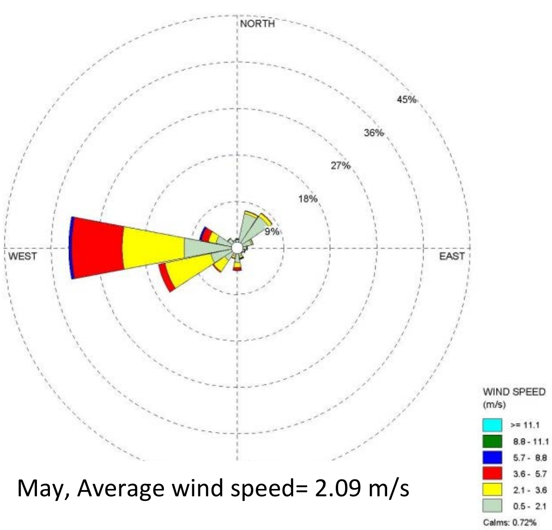
February, Average wind speed= 1.89 m/s



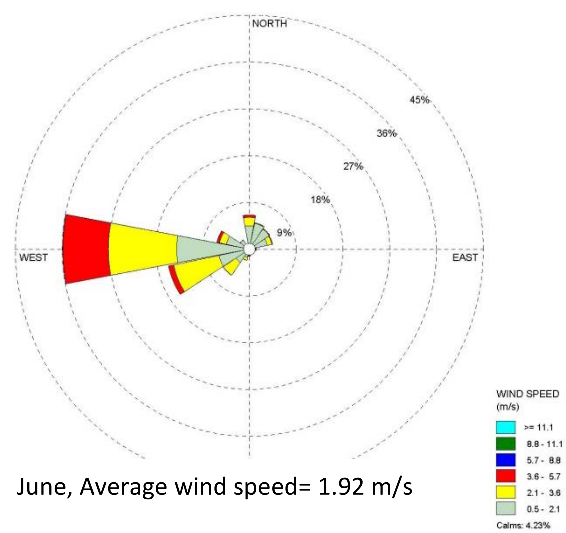
March, Average wind speed= 2.02 m/s



April, Average wind speed= 2.15 m/s

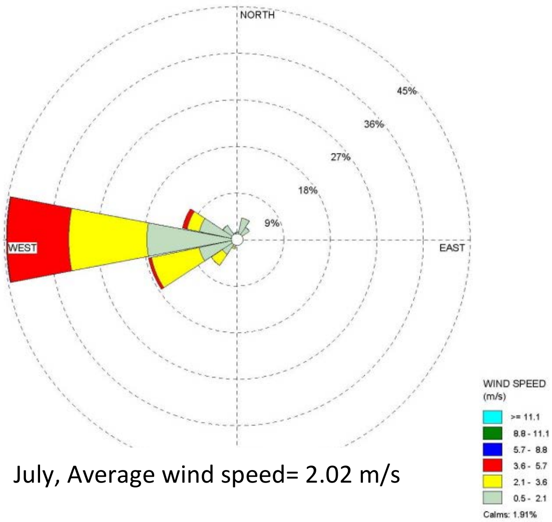


May, Average wind speed= 2.09 m/s

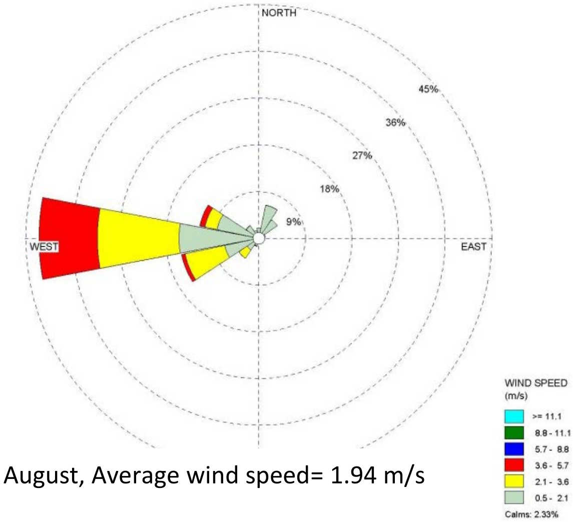


June, Average wind speed= 1.92 m/s

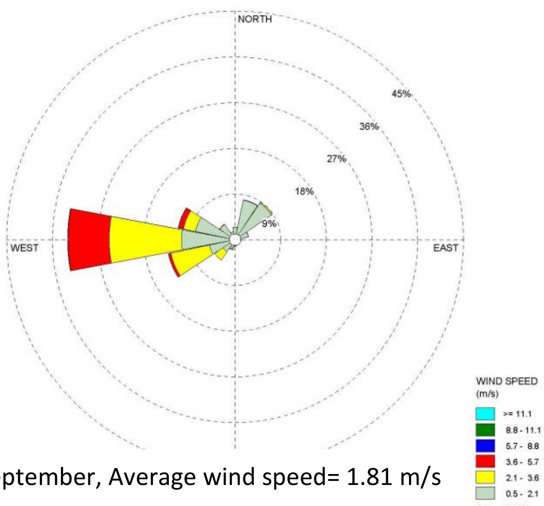
Notes: Wind data from CIMIS station #156: 10/12/2001 to 10/26/2014	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Monthly wind speed and direction, January-June**		
		Project No. 14-1023	Created By: DT	**Figure 22**



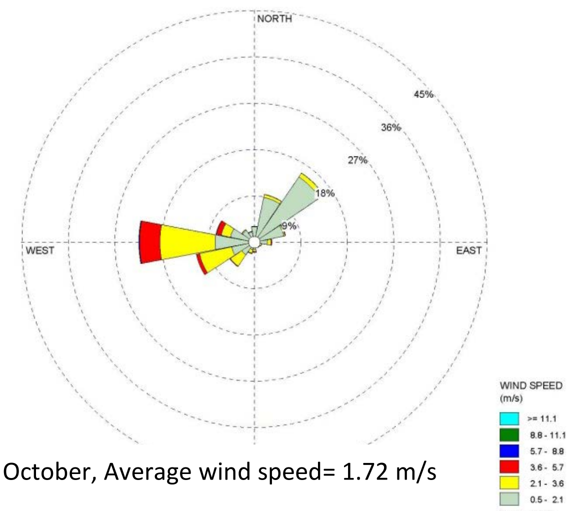
July, Average wind speed= 2.02 m/s



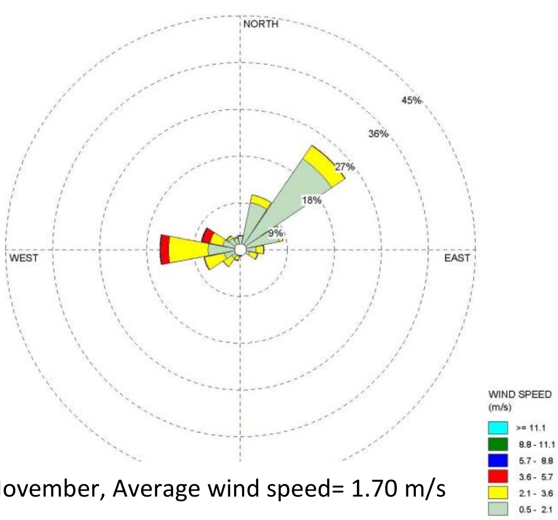
August, Average wind speed= 1.94 m/s



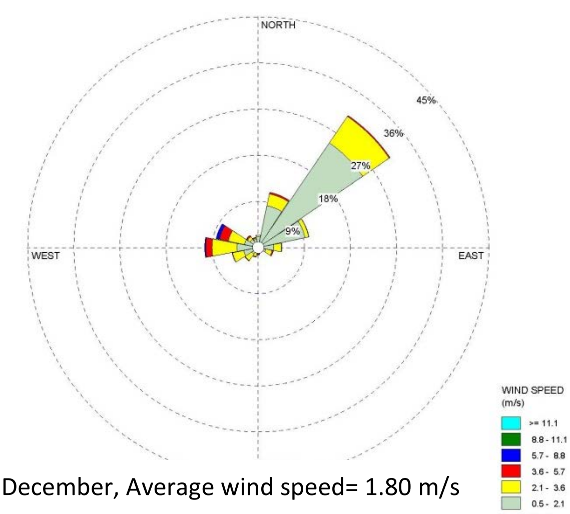
September, Average wind speed= 1.81 m/s



October, Average wind speed= 1.72 m/s

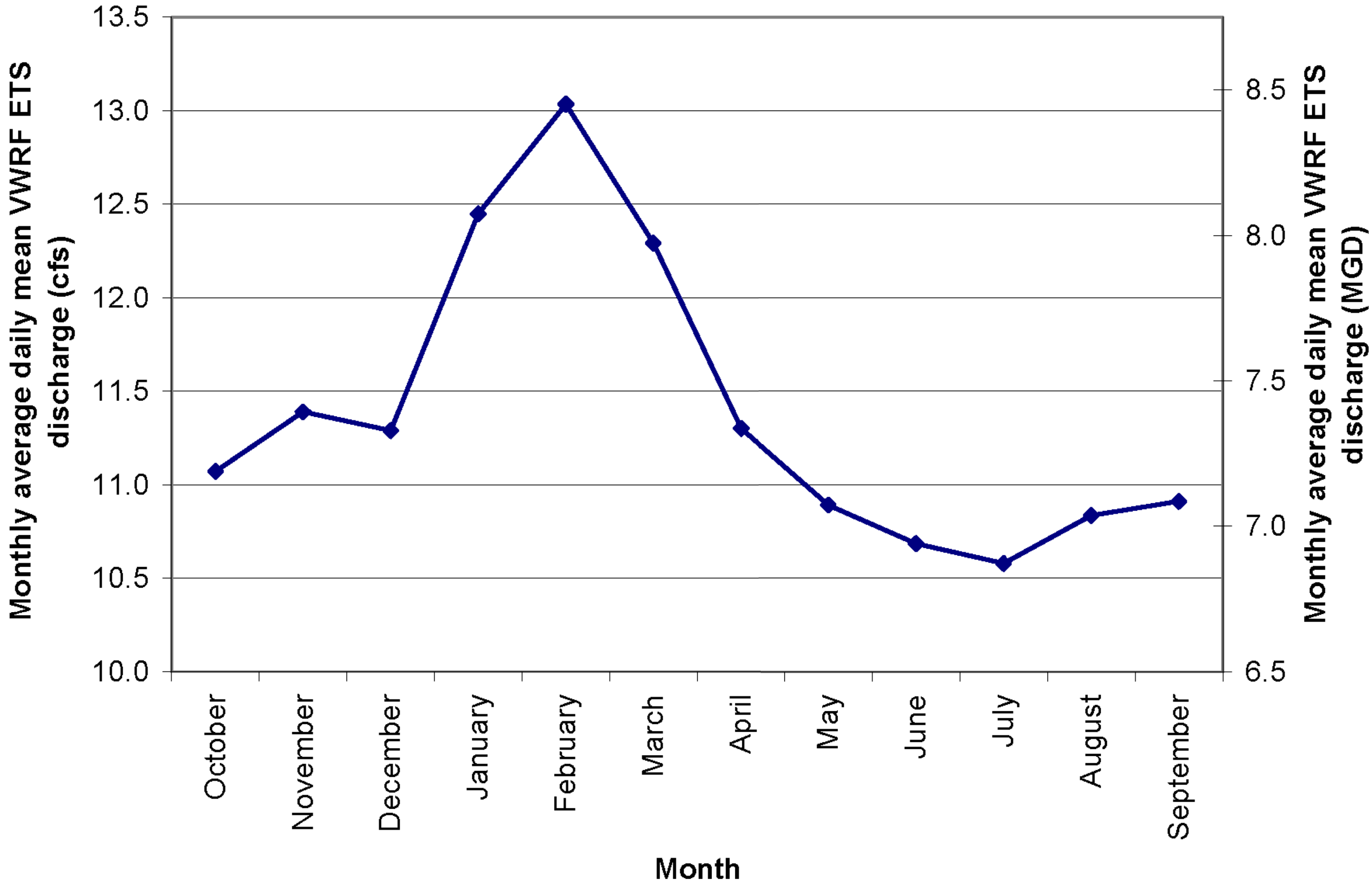


November, Average wind speed= 1.70 m/s

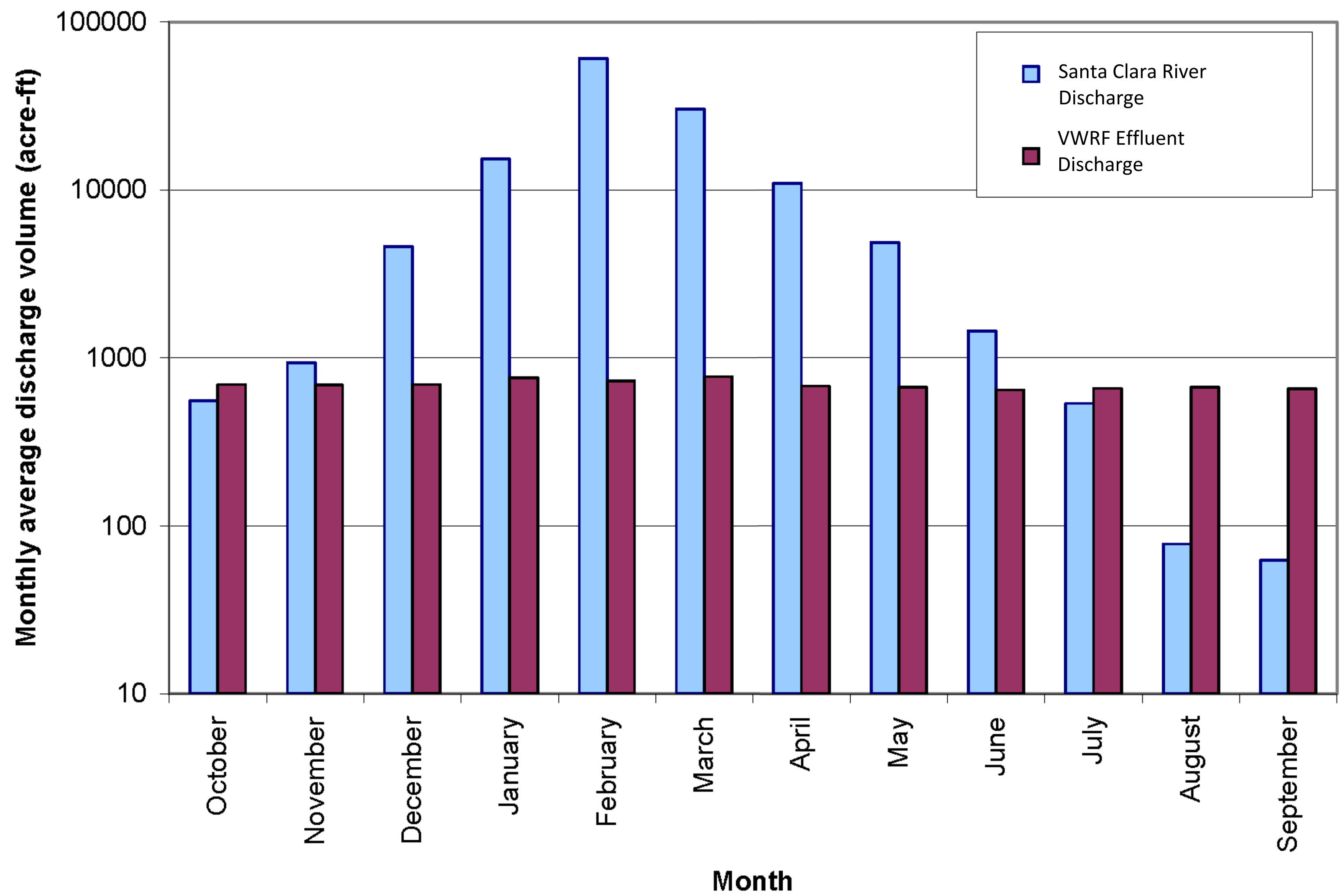


December, Average wind speed= 1.80 m/s

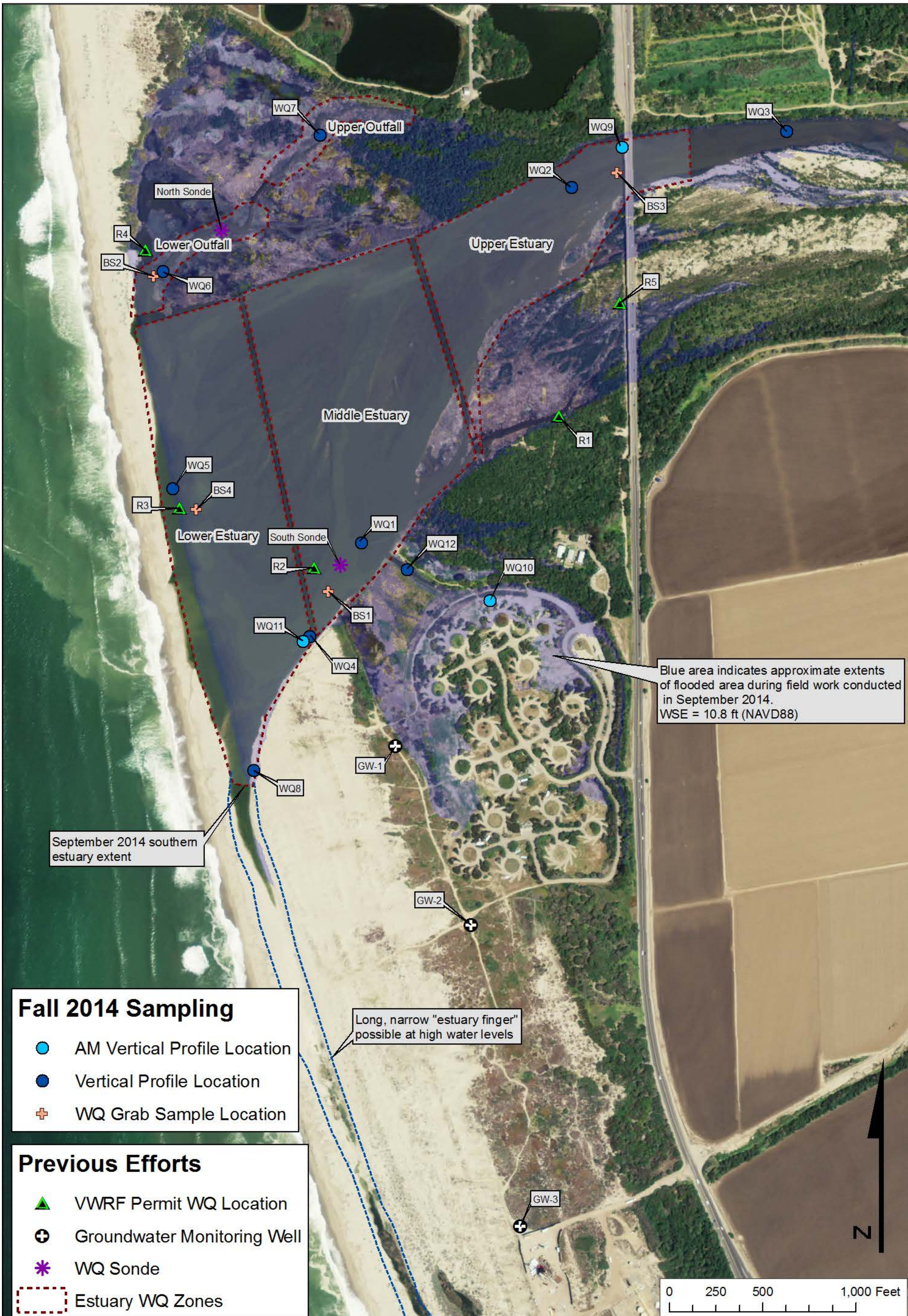
Notes: Wind data from CIMIS station #156: 10/12/2001 to 10/26/2014	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Monthly wind speed and direction, July-December**		
		Project No. 14-1023	Created By: DT	**Figure 23**



Source: Adapted from Stillwater Sciences, 2011. Notes: 1984-2010	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **VWRF monthly mean effluent flow**		
		Project No. 14-1023	Created By: DT	**Figure 24**



Source: Adapted from Stillwater Sciences, 2011.	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Monthly average flow volume delivered to SCRE**
		Project No. 14-1023 / Created By: DT / **Figure 25**



Source: 2012 NAIP Aerial, Stillwater Sciences (2011), City of Ventura (2000-2013), CRWQCB (2013).

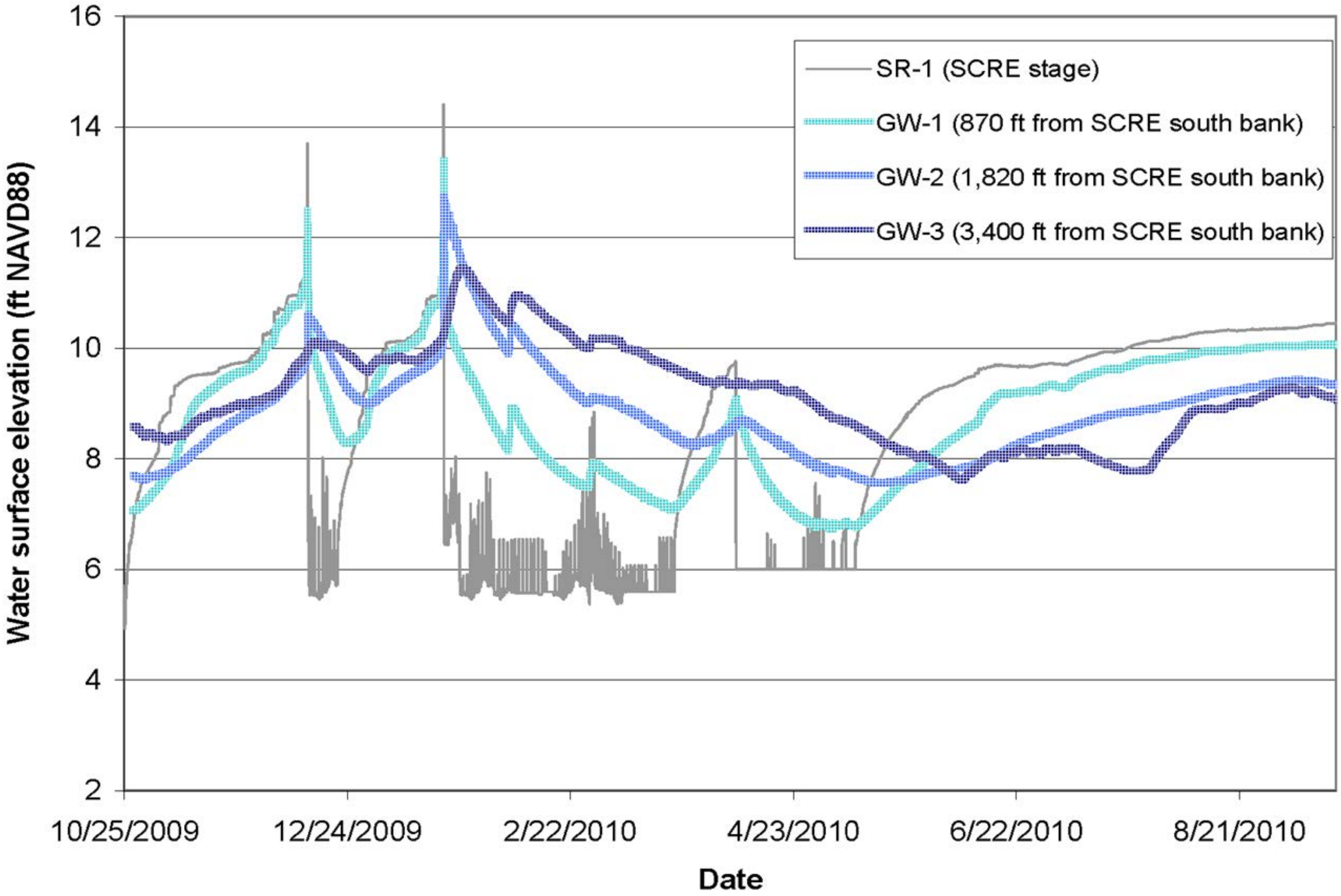
cbec eco engineering

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Water quality monitoring locations

Project No. 14-1023 | Created By: DM | **Figure 26**

C:_WORK\14-1023_SCRE_Feasibility_Study\Reports\ECTR (Task 1.1.11)\FinalFigures\Fig26_WQLocations_rev.docx
1/1/2015



Source: Adapted from Stillwater Sciences, 2011.
Notes: SCRE stage and adjacent groundwater elevation between October 25, 2009 and September 15, 2010 as measured at the South Sonde and GW-1, GW-2, GW-3. See Figure 25 for locations.

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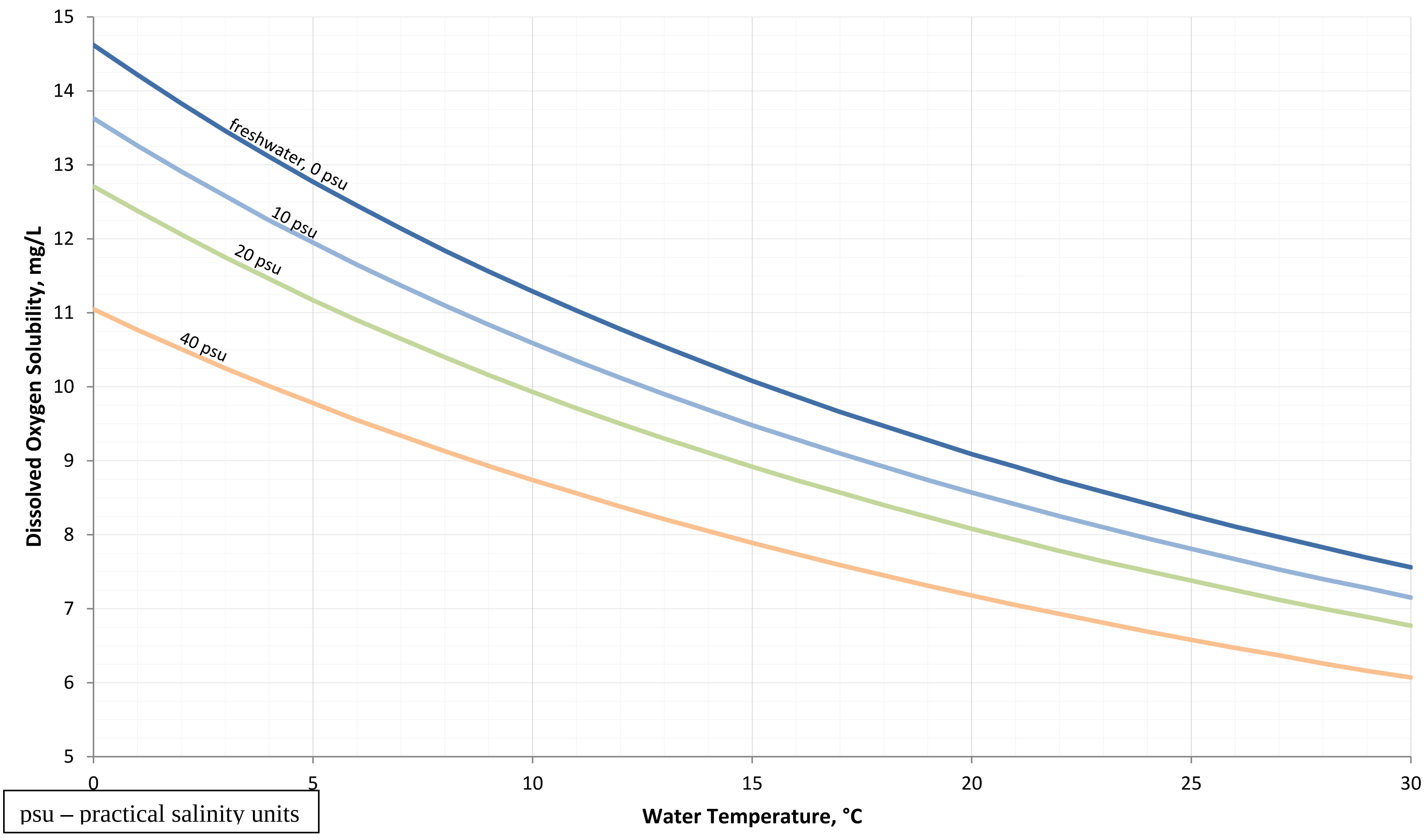
Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Groundwater levels water year 2010

Project No. 14-1023	Created By: DM	**Figure 27**



Notes: Values based on published equations by Benson and Krause (1980 and 1984) and supplied by the USGS DOTABLES: http://water.usgs.gov/software/DOTABLES/

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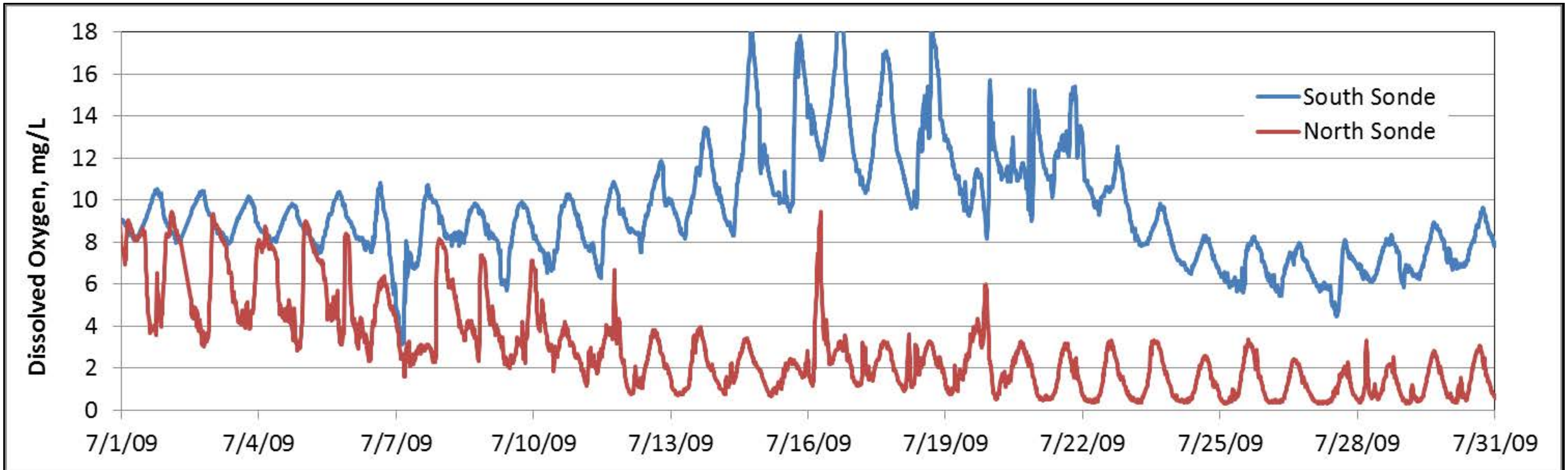
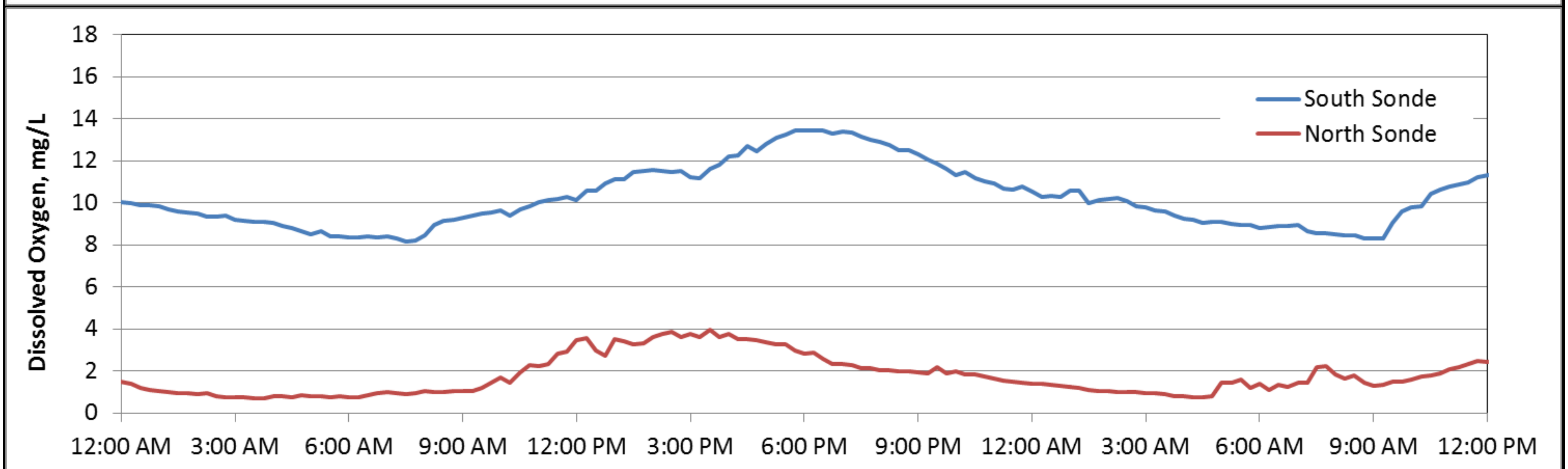
Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Dissolved oxygen solubility

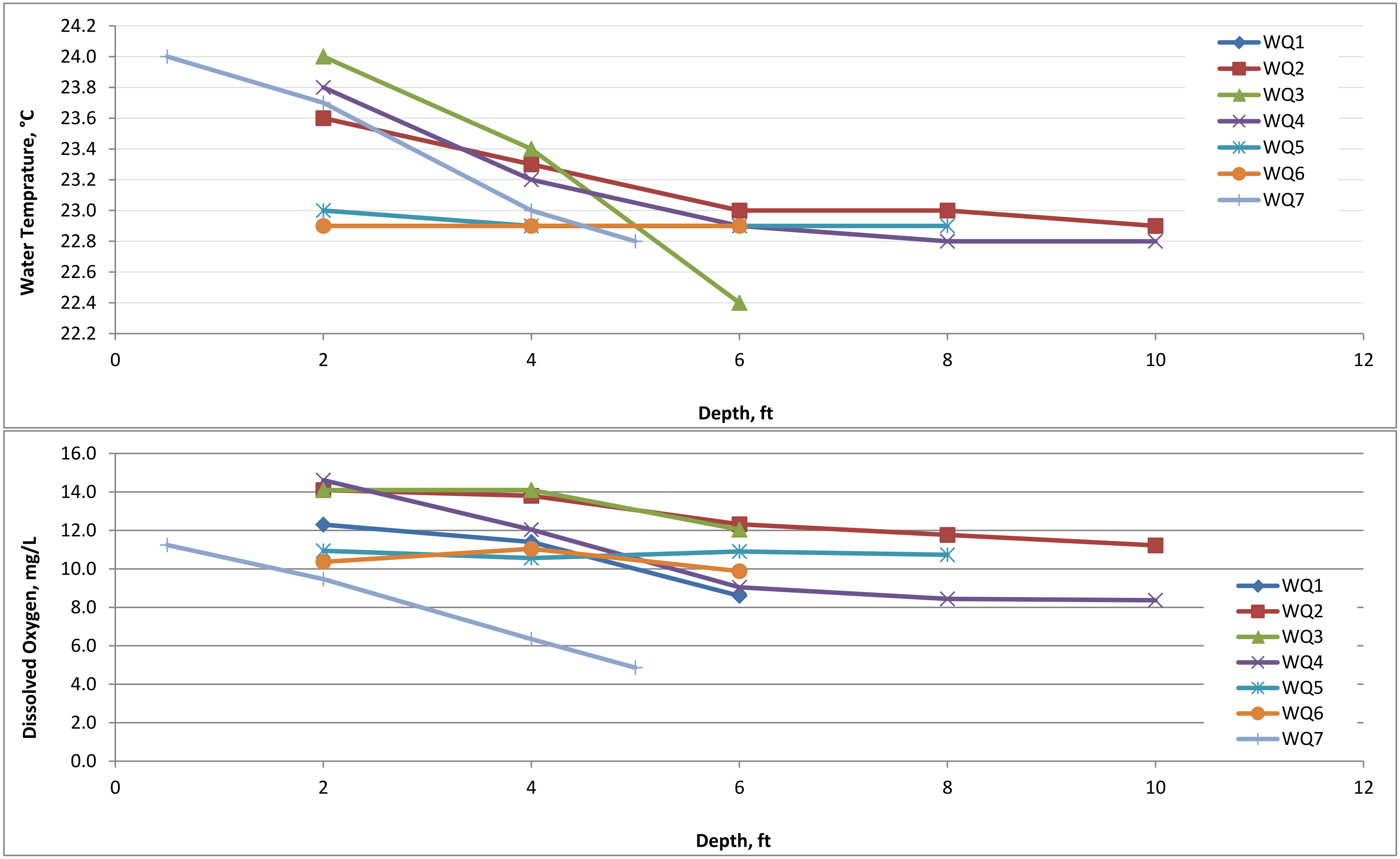
Project No. 14-1023	Created By: DM	**Figure 28**





Source: City of Ventura WQ sonde data. Notes: Selected data from July 2009 corresponds to an extended period of closed berm conditions without overwash or measureable precipitation events.	cbec eco engineering	*Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study* **Selected sonde DO data**		
		Project No. 14-1023	Created By: DM	**Figure 29**

C:_WORK\14-1023_SCRE_Feasibility_Study\Reports\ECTR (Task 1.1.11)\FinalFigures\Fig29_SondeDOGraphs.docx
1/1/2015



Notes: Vertical profile data acquired on September 22, 2014 between 10:30am and 12:50pm. Locations are shown on Figure 25.

cbec eco engineering

Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study

Water quality vertical profiles

Project No. 14-1023	Created By: DM	**Figure 30**

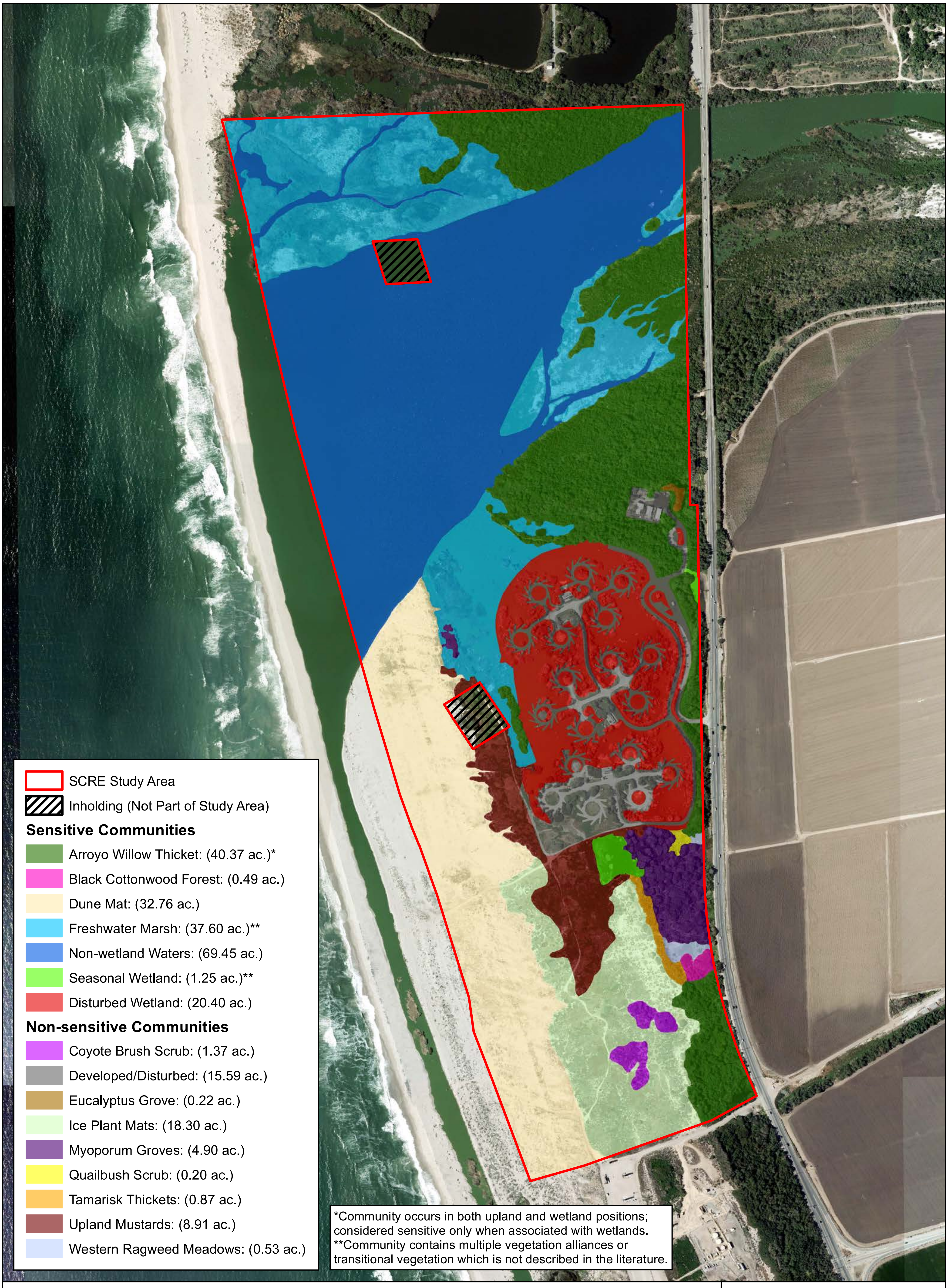


Figure 31 - Biological Communities within the Study Area

Santa Clara River Estuary
Ventura County, California

wra ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Novemebr 2014
Base Source: USGS April 2013

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\FigX_VegComm20141118.mxd

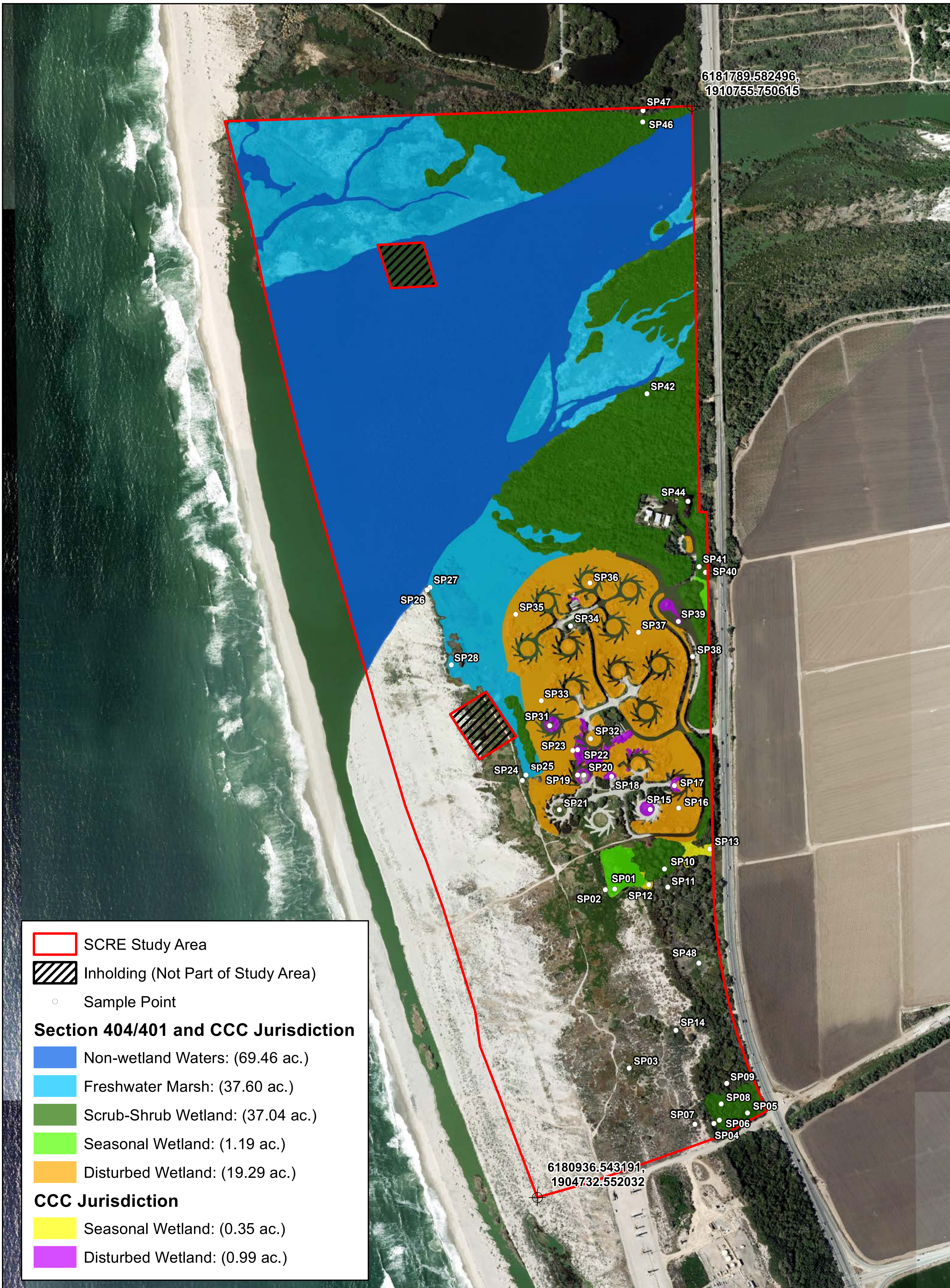


Figure 32 - Corps and CCC Jurisdictional Features within the Study Area

N
W E
S

wra
ENVIRONMENTAL CONSULTANTS

Santa Clara River Estuary
Ventura County, California

0 250 500 1,000
Feet
1 Inch = 500 Feet

Map By: SG
Date: Novemebr 2014
Base Source: USGS April 2013

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\FigX_CorpsCCCDelin20141118.mxd

APPENDIX A – SEPTEMBER 2014 WATER QUALITY SAMPLING

APPENDIX A - September 2014 - Tabular Field Data

cbec project number: 14-1023
Data collected 9/22/2014 - 9/24/2014 by Dale Meck, John Stofleth and Nick Hernandez
Weather was generally warm, sunny and windy (from ocean). Sizable waves on surface of estuary by mid-afternoon.

Location		Depth	Temperature	Specific Conductance	Total Dissolved Solids	Salinity	Dissolved Oxygen		pH	Acquisition	
Code	Description	ft	°C	mS/cm	mg/L	ppt	%	mg/L		Date	Time
WQ1	Near Campground	2	23.6	2.6	1.7	1.3	146.1	12.3	9.3	09/22/14	10:27 AM
		4	23.3	2.6	1.7	1.4	134.0	11.4	9.3	09/22/14	10:27 AM
		6	23.0	2.6	1.7	1.4	101.0	8.6	9.1	09/22/14	10:27 AM
WQ2	Near Bridge	2	23.6	2.6	1.7	1.3	167.3	14.1	9.3	09/22/14	11:10 AM
		4	23.3	2.6	1.7	1.3	163.4	13.8	9.2	09/22/14	11:10 AM
		6	23.0	2.6	1.7	1.3	144.9	12.3	9.1	09/22/14	11:10 AM
		8	23.0	2.6	1.7	1.3	138.3	11.8	9.1	09/22/14	11:10 AM
		10	22.9	2.6	1.7	1.3	129.5	11.2	9.1	09/22/14	11:10 AM
WQ3	Upstream of Bridge	2	24.0	2.6	1.7	1.4	168.5	14.1	9.1	09/22/14	11:22 AM
		4	23.4	2.6	1.7	1.4	166.8	14.1	8.8	09/22/14	11:22 AM
		6	22.4	2.8	1.8	1.4	139.5	12.0	7.9	09/22/14	11:22 AM
WQ4	Near stage recorder	2	23.8	2.6	1.7	1.3	174.5	14.6	9.3	09/22/14	12:06 PM
		4	23.2	2.6	1.7	1.3	141.8	12.0	9.2	09/22/14	12:06 PM
		6	22.9	2.6	1.7	1.4	106.3	9.0	9.1	09/22/14	12:06 PM
		8	22.8	2.6	1.7	1.3	99.3	8.4	9.1	09/22/14	12:06 PM
		10	22.8	2.6	1.7	1.3	98.5	8.4	8.8	09/22/14	12:06 PM
WQ5	berm center	2	23.0	2.6	1.7	1.3	128.3	10.9	9.2	09/22/14	12:34 PM
		4	22.9	2.6	1.7	1.3	123.7	10.6	9.2	09/22/14	12:34 PM
		6	22.9	2.6	1.7	1.3	127.8	10.9	9.2	09/22/14	12:34 PM
		8	22.9	2.6	1.7	1.3	125.5	10.7	9.2	09/22/14	12:34 PM
WQ6	VWRF 1	2	22.9	2.4	1.5	1.2	122.0	10.4	8.7	09/22/14	12:40
		4	22.9	2.6	1.7	1.3	129.3	11.0	9.1	09/22/14	12:40
		6	22.9	2.6	1.8	1.3	115.4	9.9	9.0	09/22/14	12:40
WQ7	VWRF 2	0.5	24.0	1.9	1.2	1.0	134.6	11.2	8.5	09/22/14	12:49
		2	23.7	1.9	1.2	1.0	112.6	9.5	8.5	09/22/14	12:49
		4	23.0	2.4	1.5	1.2	74.5	6.4	8.3	09/22/14	12:49
		5	22.8	2.4	1.6	1.2	56.7	4.9	8.3	09/22/14	12:49
WQ8	SW Corner	3	23.8	2.6	1.7	1.3	146.7	12.3	9.3	09/22/14	3:31 PM
WQ9	AM @ bridge	3	23.4	2.6	1.7	1.3	115.3	9.7	9.2	09/23/14	5:45 AM
		7	23.4	2.6	1.7	1.3	113.7	9.6	9.2	09/23/14	5:45 AM
WQ10	In flooded campground	1	18.7	2.9	1.9	1.5	7.5	0.7	7.3	09/23/14	6:21 AM
WQ11	near stage recorder	2	22.8	2.4	1.6	1.2	99.0	8.5	9.2	09/23/14	6:49 AM
WQ12	Channel at north end of campground	1	25.7	2.6	1.7	1.3	214.5	17.4	9.4	09/23/14	4:03 PM
		3	25.6	2.6	1.7	1.3	213.7	17.4	9.4	09/23/14	4:03 PM
		6	25.3	2.6	1.7	1.3	185.6	15.1	9.3	09/23/14	4:03 PM
		8	25.2	2.6	1.7	1.3	171.8	14.1	9.2	09/23/14	4:03 PM

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Environmental Testing Services
2520 N. San Fernando Rd., Los Angeles, CA 90065 Tel: (323) 223-9700 Fax: (323) 223-9500

Ordered By

cbec
2544 Industrial Blvd.
W. Sacramento, CA 95691-

Number of Pages	5
Date Received	09/24/2014
Date Reported	10/01/2014

Telephone (970)903-8297
Attn Dale Meck

Job Number	Ordered	Client
62173	09/24/2014	CBEC

Project ID: 14-1023
Project Name: 14-1023-SCRE
Site: 175 N. Harbor Blvd.
Oxnard, CA 93036

Enclosed are the results of analyses on 4 samples analyzed as specified on attached chain of custody.

Wendy Lu
Organics Supervisor

AMERICAN SCIENTIFIC LABORATORIES, LLC
Environmental Testing Services
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Page ______ Of ______

COC# № 69526 GLOBAL ID ________ E REPORT: ☑ PDF ☐ EDF ☐ EDD ASL JOB# 62173

CHAIN OF CUSTODY RECORD

Company: cbec	Report To: Dale Meck
Address: 2544 Industrial Blvd. W. Sacramento CA 95691	Project Name: 14-1023-SCRE
Telephone: 970-903-8297	Site Address: 175 N. Harbor Blvd. Oxnard, CA 93036
Fax:	Address:
Special Instruction:	Project ID: 14-1023
E-mail: d.meck@cbecoeng.com	Project Manager: Dale Meck
Invoice To:	P.O.#:

ANALYSIS REQUESTED: Nitrate (300); Total Phosphorous (365.2); Metals (6000/7471A)

ITEM	Lab ID (LAB USE ONLY)	Sample ID	Date	Time	#	Container Type	Matrix	Preservation	Nitrate (300)	Total Phosphorous (365.2)	Metals (6000/7471A)	Remarks
	322098	BS1	9/24/14	8:15am	3	1 Liter Plastic	W		X	X	X	
	322099	BS2	9/24/14	8:15am	3	1 L Plastic	"		X	X	X	
	322100	BS3	9/24/14	8:15am	3	1 L Plastic	"		X	X	X	
	322101	BS4	9/24/14	8:15am	3	1 L Plastic	"		X	X	X	

Collected By:	Date	Time	Relinquished By: [signature]	Date 9/24/14	Time 12:50	TAT
Relinquished By:	Date	Time	Received For Laboratory: Janet Chin	Date 9/24/14	Time 12:50	☑ Normal ☐ Rush
Received By:	Date	Time	Condition of Sample:			

White - Report, Yellow - Laboratory, Pink - Client

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Environmental Testing Services
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ANALYTICAL RESULTS

Ordered By

cbec
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W. Sacramento, CA 95691-

Site

175 N. Harbor Blvd.
Oxnard, CA 93036

Telephone: (970)903-8297
Attn: Dale Meck

Page: **2**

Project ID: 14-1023
Project Name: 14-1023-SCRE

ASL Job Number	Submitted	Client
62173	09/24/2014	CBEC

Method: 300, Nitrate by Ion Chromatography

QC Batch No: 092414-1

Our Lab I.D.		**322098**	**322099**	**322100**	**322101**	
Client Sample I.D.		BS1	BS2	BS3	BS4	
Date Sampled		09/24/2014	09/24/2014	09/24/2014	09/24/2014	
Date Prepared		09/24/2014	09/24/2014	09/24/2014	09/24/2014	
Preparation Method						
Date Analyzed		09/24/2014	09/24/2014	09/24/2014	09/24/2014	
Matrix		Water	Water	Water	Water	
Units		mg/L	mg/L	mg/L	mg/L	
Dilution Factor		1	1	1	1	
Analytes	**PQL**	**Results**	**Results**	**Results**	**Results**	
Conventionals						
Nitrate, as N	0.100	ND	3.40	ND	ND	

QUALITY CONTROL REPORT

QC Batch No: 092414-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Conventionals										
Nitrate, as N	101	101	<1	80-120	20					

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ANALYTICAL RESULTS

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W. Sacramento, CA 95691-

Site

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Oxnard, CA 93036

Telephone: (970)903-8297
Attn: Dale Meck

Page: 3

Project ID: 14-1023
Project Name: 14-1023-SCRE

ASL Job Number	Submitted	Client
62173	09/24/2014	CBEC

Method: 6010B/7470A, CCR Title 22 Metals (TTLC)

QC Batch No: 092414-4

Our Lab I.D.			322098	322099	322100	322101	
Client Sample I.D.			BS1	BS2	BS3	BS4	
Date Sampled			09/24/2014	09/24/2014	09/24/2014	09/24/2014	
Date Prepared			09/24/2014	09/24/2014	09/24/2014	09/24/2014	
Preparation Method							
Date Analyzed			09/25/2014	09/25/2014	09/25/2014	09/25/2014	
Matrix			Water	Water	Water	Water	
Units			mg/L	mg/L	mg/L	mg/L	
Dilution Factor			1	1	1	1	
Analytes	**MDL**	**PQL**	**Results**	**Results**	**Results**	**Results**	
AA Metals							
Mercury	0.0001	0.0005	ND	ND	ND	ND	
ICP Metals							
Antimony	0.0040	0.0100	ND	ND	ND	ND	
Arsenic	0.0030	0.0100	ND	ND	0.0064J	0.0033J	
Barium	0.0010	0.0100	0.0190	0.0139	0.0207	0.0194	
Beryllium	0.0007	0.0050	ND	ND	ND	ND	
Cadmium	0.0007	0.0050	ND	ND	ND	ND	
Chromium	0.0010	0.0100	ND	ND	ND	ND	
Cobalt	0.0010	0.0100	0.0016J	ND	ND	ND	
Copper	0.0010	0.0100	ND	ND	ND	ND	
Lead	0.0020	0.0050	ND	ND	ND	ND	
Molybdenum	0.0010	0.0100	0.0121	0.0110	0.0148	0.0131	
Nickel	0.0020	0.0100	0.0057J	0.0113	0.0077J	0.0091J	
Selenium	0.0040	0.0100	ND	ND	ND	ND	
Silver	0.0010	0.0100	ND	ND	ND	ND	
Thallium	0.0030	0.0100	ND	ND	ND	ND	
Vanadium	0.0010	0.0100	ND	ND	ND	ND	
Zinc	0.0070	0.0100	0.0071J	0.0086J	ND	ND	

QUALITY CONTROL REPORT

QC Batch No: 092414-4

Analytes	LCS % REC	LCS/LCSD % Limit							
AA Metals									
Mercury	96	80-120							
ICP Metals									
Antimony	110	80-120							
Arsenic	105	80-120							

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ANALYTICAL RESULTS

Project ID: 14-1023
Project Name: 14-1023-SCRE

ASL Job Number	Submitted	Client
62173	09/24/2014	CBEC

Method: 6010B/7470A, CCR Title 22 Metals (TTLC)
QUALITY CONTROL REPORT

QC Batch No: 092414-4

Analytes	LCS % REC	LCS/LCSD % Limit							
ICP Metals									
Barium	104	80-120							
Beryllium	113	80-120							
Cadmium	107	80-120							
Chromium	104	80-120							
Cobalt	106	80-120							
Copper	107	80-120							
Lead	107	80-120							
Molybdenum	102	80-120							
Nickel	109	80-120							
Selenium	105	80-120							
Silver	117	80-120							
Thallium	110	80-120							
Vanadium	104	80-120							
Zinc	101	80-120							

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ANALYTICAL RESULTS

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W. Sacramento, CA 95691-

Site

175 N. Harbor Blvd.
Oxnard, CA 93036

Telephone: (970)903-8297
Attn: Dale Meck

Page: **5**

Project ID: 14-1023
Project Name: 14-1023-SCRE

ASL Job Number	Submitted	Client
62173	09/24/2014	CBEC

Method: SM4500-P-B&E, Total Phosphorus

QC Batch No: 092514-1

Our Lab I.D.		**322098**	**322099**	**322100**	**322101**	
Client Sample I.D.		BS1	BS2	BS3	BS4	
Date Sampled		09/24/2014	09/24/2014	09/24/2014	09/24/2014	
Date Prepared		09/25/2014	09/25/2014	09/25/2014	09/25/2014	
Preparation Method						
Date Analyzed		09/25/2014	09/25/2014	09/25/2014	09/25/2014	
Matrix		Water	Water	Water	Water	
Units		mg/L	mg/L	mg/L	mg/L	
Dilution Factor		1	1	1	1	
Analytes	**PQL**	**Results**	**Results**	**Results**	**Results**	
Conventionals						
Phosphorus, Total (as P)	0.100	0.270	1.10	0.250	0.150	

QUALITY CONTROL REPORT

QC Batch No: 092514-1

Analytes	LCS % REC	LCS DUP % REC	LCS RPD % REC	LCS/LCSD % Limit	LCS RPD % Limit					
Conventionals										
Phosphorus, Total (as P)	102	98	4.0	80-120	20					

APPENDIX B – WETLAND DELINEATION TECHNICAL REPORT

Wetland Delineation Technical Report

SANTA CLARA RIVER ESTUARY RESTORATION PROJECT
OXNARD, VENTURA COUNTY, CALIFORNIA

Prepared For:

Wishtoyo Foundation
3875-A Telegraph Road #423
Ventura, California 93003

Contact: Jason Weiner
jweiner.venturacoastkeeper@wishtoyo.org

Prepared By:

WRA, Inc.
2169-G East Francisco Boulevard
San Rafael, California 94901

Contact: Dan Chase
chase@wra-ca.com

Date: November 20, 2014

WRA Project: 18106-2

ENVIRONMENTAL CONSULTANTS

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1.0 INTRODUCTION

On September 22 to 26 and October 27, 2014, WRA, Inc. (WRA) performed a delineation of wetlands and non-wetland waters potentially subject to jurisdiction under the Clean Water Act, the Porter-Cologne Act, and the California Coastal Act within the area proposed for restoration in the Santa Clara River Estuary, in Ventura County, California (Study Area). A component of the Study Area includes McGrath Sate Beach in Oxnard (Figure 1). This report provides a summary of the methods and results of the delineation. A map depicting the extent of wetlands and non-wetland waters mapped in the Study Area is provided as Appendix B-A. Wetland delineation data forms are provided as Appendix B-B. A list of plant species observed in the Study Area is included as Appendix B-C.

2.0 REGULATORY BACKGROUND

2.1 Section 404 of the Clean Water Act

Section 404 of the Clean Water Act (CWA) gives the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps) regulatory and permitting authority regarding discharge of dredged or fill material into "navigable waters of the United States [U.S.]". 33 U.S.C. § 1344. Section 502(7) of the CWA defines "navigable waters" as "waters of the U.S., including territorial seas." Part 328 of Chapter 33 in the Code of Federal Regulations (CFR) defines the term "waters of the U.S." as it applies to the jurisdictional limits of the authority of the EPA and the Corps under the CWA. A summary of this definition of "waters of the U.S." provided in 33 CFR 328.3 includes: (1) waters used for commerce; (2) interstate waters and wetlands; (3) "other waters" such as intrastate lakes, rivers, streams, and wetlands; (4) impoundments of waters; (5) tributaries to the above waters; (6) territorial seas; and (7) wetlands adjacent to waters. Here the term "other waters" is treated synonymously with the term "non-wetland waters" and generally refers to streams, drainages, and ponds.

2.2 Section 401 of the Clean Water Act – Porter-Colgone Water Quality Control Act

The Porter-Cologne Water Quality Control Act defines the term "waters of the State" as "any surface water or groundwater, including saline waters, within the boundaries of the state." Waters of the State are regulated by the RWQCB under the State Water Quality Certification Program which regulates discharges of fill and dredged material under Section 401 of the Clean Water Act and under the Porter-Cologne Act. The Regional Water Quality Control Board (RWQCB) protects all waters of the State within its regulatory scope and has special responsibility for wetlands, riparian areas, and headwaters. These waterbodies have high resource value, are vulnerable to filling, and may not be systematically protected by other programs. Regional Water Quality Control Board jurisdiction includes "isolated" wetlands and non-wetland waters that may not be regulated by the Corps under Section 404 of the CWA. Projects that require a Corps permit, or that fall under other federal jurisdiction, and have the potential to impact waters of the State, are required to comply with the terms of the Water Quality Certification determination. If a proposed project does not require a federal permit, but does involve dredge or fill activities that may result in a discharge to Waters of the State, the RWQCB has the option to regulate the dredge and fill activities under its State authority in the form of Waste Discharge Requirements.

Figure 1. Study Area Location Map

Santa Clara River Estuary
Ventura County, California

0 0.25 0.5 1 Miles

Map By: SG
Date: Novemebr 2014
Base Source: ESRI World Topo

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\Fig1_LocMap20141118.mxd

2.3 California Coastal Act

Under the California Coastal Act, the California Coastal Commission (CCC) regulates the diking, filling, or dredging of wetlands within the coastal zone. Section 30121 of the Coastal Act defines "wetlands" as land "which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, and fens." The 1981 CCC Statewide Interpretive Guidelines state that hydric soils and hydrophytic vegetation "are useful indicators of wetland conditions," but the presence or absence of hydric soils and/or hydrophytes alone are not necessarily determinative when the CCC identifies wetlands under the Coastal Act.

The boundaries of areas regulated by the Corps and the CCC are often not the same due to differing goals of the respective regulatory programs and differing definitions of wetlands. Unless a situation is problematic, the CCC generally uses the presence of any one of the three wetland parameters used by the Corps—hydrophytic vegetation, hydric soils, and wetland hydrology—to determine wetland boundaries. The CCC would include, for example, mudflats, beaches, and certain other unvegetated habitats as wetlands.

3.0 METHODS

Prior to conducting field surveys, available reference materials were reviewed, including soil survey data for the Study Area (California Soil Resource Lab 2014), the U.S. Geological Survey (USGS) 7.5-minute quadrangle map for Oxnard (USGS 1949), the U.S. Fish and Wildlife Service (USFWS) National Wetland Inventory (USFWS 2014), rainfall data (UCANR 2014), WETS precipitation data (USDA 2002), and available aerial photographs of the site (Google Earth 2014).

A field study to investigate the presence or absence of indicators used to identify wetlands and non-wetland waters (also described as "other waters" by the Corps. See section 2.1) was performed in the Study Area on September 22 to 26 and October 27, 2014. The routine methods outlined in the *U.S. Army Corps of Engineers Wetlands Delineation Manual* ("Corps Manual"; Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* ("Arid West Supplement"; Corps 2008a) were used to map wetlands and non-wetland waters in the Study Area. Sample point data were recorded on standard Arid West Supplement data forms.For all open waters and streams, the location of the ordinary high water mark (OHWM) was used. It was visually determined using water staining, sediment deposits, scouring, and other indicators identified in the Corps *Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps 2008b).

The extent of wetlands and non-wetland waters in the Study Area was mapped using a combination of hand-held GPS equipment with sub-meter accuracy and mapping by hand based on topographic contours and wetland signatures visible on aerial imagery. The majority of wetlands were mapped based on the Corps three-parameter approach which requires the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. However, areas that met only one of the wetland parameters were generally considered to be wetlands subject to jurisdiction by the CCC under the California Coastal Act; a small number of one-parameter wetlands were mapped within the footprint of the campground.

4.0 RESULTS AND DISCUSSION

4.1 Study Area Description

The 253-acre Study Area is located at the terminus of the Santa Clara River and includes McGrath State Beach in Oxnard, Ventrua County, Calfiornia. The site is located in a coastal setting. Bordering land uses include agriculture, oil extraction, waste water treatment, and recreation. Elevations in the Study Area range from approximately 0 to 25 feet above sea level. The Study Area contains a developed campground set within a varied landscape including beach, foredune, scrub, riparian, marsh, estuaries, and seasonal wetland habitats. The following sections present a summary of biological communities, hydrology, and soils in the Study Area.

4.1.1 Vegetation and Biological Communities

WRA identified a range of upland and wetland plant communities in the Study Area, including the following vegetation types and other biological communities:

- Arroyo willow thicket
- Black cottonwood forest
- Dune mat
- Freshwater marsh
- Non-wetland waters
- Seasonal wetland
- Coyote brush scrub
- Developed/disturbed
- Eucalyptus grove
- Ice plant mats
- Myoporum groves
- Quailbush scrub
- Tamarisk thickets
- Upland mustards
- Western ragweed meadows

These communities are described in detail in the Biological Resources Technical Report prepared for the proposed Santa Clara River Estuary Habitat and Restoration Project (WRA 2014). Portions or the entirety of several of these communities are potentially subject to jurisdiction by the Corps, the RWQCB, or the CCC. Jurisdictional wetlands and non-wetland waters identified within the Study Area are discussed in Section 4.2.

4.1.2 Soils

Soil survey data for the Study Area (California Soil Resource Lab 2014; USDA 2014) indicates that the Study Area contains eight soil mapping units, including three native soil series (Figure 2). Four of the mapping units do not belong to any soil series: coastal beaches, riverwash, tidal flats, and water. These non-soil mapping units are primiarly distributed at the northern and western portions of the Study Area. The three soil series—Hueneme, Metz, and Camarillo series—occur primarily along the eastern and southern portions of the Study Area. These series account for the remaining four soil map units. These soils are poorly drained, somewhat poorly drained, and somewhat excessively drained, respectively, and are derived from alkaline and sedimentary alluvium. The four non-soil mapping units are categorized as “misecellaneous

Figure 2. Soils Map

Santa Clara River Estuary
Ventura County, California

wra ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Novemebr 2014
Soils Data: SSURGO 2014
Base Source: USGS April 2013

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\FigX_Soils20141118.mxd areas," which have "essentially no soil and support little or no vegetation" for various reasons (Soil Survey Division Staff 1993).

The soil map does not perfectly match ground conditions observed at the site because it may be based on older data or contain broad categories that may not reflect the fine-scale situation of a particular location. For example, in the Study Area, the foredunes—mapped as "coastal beaches" in the Soil Survey—are vegetated, although it is often sparse. Similarly, the freshwater marsh found at the northern end of the Study Area—mapped as "water" in the Soil Survey—contains dense cattail (*Typha* sp.; OBL) and tule (*Schoneoplectus acutus* var. *occidentalis*; OBL). However, the soil data used was listed "current" by the Web Soil Survey (USDA 2014).

4.1.3 Hydrology

The primary natural sources of hydrology within the Study Area include flows from the Santa Clara River, precipitation, and ground water from a shallow semi-perched aquifer. The Ventura Water Recclamation Facility occurs adjacent to northern edge the Study Area, and water from the facility is discharged into the estuary year-round. During periods of high flow, the Santa Clara River connects to the Pacific Ocean, allowing for tidal influence into the river channel and forming an estuary. As flows decrease, a natural sand bar forms at the mouth of the river, blocking any surface connection to the ocean and causing the formation of a lagoon. The lagoon levels continue to rise during the dry season, but when periods of high flow return, the sand bar typically breaches, causing the lagoon to drain, allowing tidal flow to occur in the estuary.

Since 1998, when high flows form a storm event breached a levee along the southern bank of the Santa Clara River, much of the central portion of the Study Area, including the campground, has experienced annual, prolonged surface-water flooding (ESA 2003). Because of this flooding, many formerly upland areas within the campground have transitioned to or are in the process of transitioning into wetlands, and the mixed, transitional nature of the vegetation can lead to difficult biological classification. A number of previous studies have documented the extent of wetlands and non-wetland waters at the site (ESA 2003; Stillwater Sciences and URS 2007; Swanson et al. 1990); these studies were used to guide WRA's current evaluation of the site.

During the site visits by WRA, the Santa Clara River was in its non-breached phase and appeared to be at or above bankfull. Due to the breach in the levee along its southern bank, a large portion of the campground was flooded during WRA's site assessment. Recent aerial imagery, as well as anecdotal evidence from campground hosts living at the site, suggest that the flood stage observed by WRA was increasing to an annual peak which results in the flooding of a majority of the campground. The only portions of the campground which appear to not be flooded on an annual basis include the restroom facilities and central portions of the three sets of campsites; these areas appear to be elevated above the level of the flood waters.

The average annual rainfall for the Ventura climate station, located approximately 4 miles northeast of the Study Area, is approximately 15.35 inches (USDA 2002). A comparison of rainfall data from the closest weather station with suitable data (Oxnard, CIMIS #156; UCANR 2014) to long-term WETS data (Ventura, CA9285; USDA 2002) showed that dry conditions were present during the September 22 to 26 and October 27, 2014 site visits. The WETS assessment is based on whether a site received normal rainfall in the preceding three months (USDA 1995). Rainfall for the months of June, July, and August 2014 were below normal.

Although rainfall levels were below average, remnant and current field indicators of wetland hydrology and inundation visible on aerial photographs allowed for an adequate assessment of wetland hydrology during the 2014 delineation.

4.2 Assessment of Wetlands and Non-Wetland Waters

A total of approximately 96.5 acres of wetlands and 69.5 acres of non-wetland waters were documented in the Study Area. Wetlands and non-wetland waters documented in the Study Area are shown on the map provided as Appendix B-A. Data on vegetation, soils, and hydrology collected at sample points during the surveys were reported on Arid West Region data forms and are provided as Appendix B-B. A list of plant species observed in the Study Area is included as Appendix B-C. A summary of the wetlands and non-wetland waters observed by WRA, their regulatory jurisdiction, and their acreages is provided in Tables 1 and 2.

Table 1. Summary of Types of Potential Jurisdictional Wetlands and Non-Wetland Waters in the Study Area.

Feature Type	Study Area Total (acres)
Freshwater Marsh	37.6
Scrub-Shrub Wetlands	37.0
Seasonal Wetlands	1.6
Disturbed Wetlands	20.3
Non-Wetland Waters	69.5
Total	***166.0***

Table 2. Summary of Potential Jurisdiction over Wetlands and Non-Wetland Waters in the Study Area.

Feature Type	Section 404 Jurisdiction (acres)	Sections 401 Jurisdiction (acres)	Coastal Act Jurisdiction (acres)
Freshwater Marsh	37.6	37.6	37.6
Scrub-Shrub Wetlands	37.0	37.0	37.0
Seasonal Wetlands	1.2	1.2	1.6
Disturbed Wetlands	19.3	19.3	20.3
Non-Wetland Waters	69.5	69.5	69.5
Total	***164.6***	***164.6***	***166.0***

4.2.1 Wetlands

A total of 96.5 acres of wetlands were identified within the Study Area. The majority of the campground and surrounding habitats, excluding the dunes, were mapped as wetland habitat potentially subject to regulatory jurisdiction. Annual, prolonged flooding of the campground has resulted in a transition from upland habitats to wetlands. The northern portions of the campground, closest to the river, are dominated by a mix of marsh and seasonal wetland vegetation. In these portions of the campground, wetland vegetation is predominant. Other portions of the campground contain more transitional vegetation, with a mix of woody upland landscape species such as crimson bottlebrush (*Melaleuca citrina*; NL) and herbaceous wetland species such as pickleweed (*Salicornia pacifica*; OBL). In general, wetland determinations were based on the native or naturalized vegetation present and not on planted landscape species. In some cases, flooding made it impossible to determine the composition of vegetation—these areas were generally considered freshwater marsh, which was mapped along the northern portion of the campground.

A brief description of wetland features found within the Study Area is provided in the following sections.

<u>Freshwater Marsh</u>

Freshwater marsh occurs in the north end of the Study Area adjacent to the Santa Clara River. It occurs both in large, contiguous areas and mixed with scrub-shrub wetlands. Where the levee has eroded on the south bank of the Santa Clara River, freshwater marsh extends southeast to the northwestern edge of the campground. Although freshwater marsh areas may receive saltwater input when the sand bar is breached, the primary input most of the year is freshwater from the Santa Clara River and inputs from the Ventura Water Recclamation Facility. Species common in freshwater marsh include cattail, tule, and giant reed (*Arundo donax*; FACW).

<u>Scrub-Shrub Wetlands</u>

Scrub-shrub wetlands primarily occur adjacent to the Santa Clara River and east of the campground. Previous studies have mapped a swath of riparian scrub along the eastern edge of the Study Area. WRA mapped a similar swath of riparian scrub extending along the eastern edge of the Study Area from the Santa Clara River to the southern end of the campground. However, south of the campground, WRA noted that the dominant species transitioned from arroyo willow (*Salix lasiolepis*; FACW), a wetland species, to myoporum (*Myoporum lateum*; FACU), a non-native upland species. Whereas the myoporum within the flooded portions of the campground appeared to be physiologically stressed (presumably due to the flooding), the myoporum within the scrub habitat south of the campground appeared to be relatively healthy. Due to the lack of apparent flooding stress in this species, the relatively low cover of arroyo willow, and the lack of indicators of hydric soils or wetland hydrology, WRA determined that this area is not a wetland subject to federal or state regulation. This area did not have an apparent hydrological connection to the riparian scrub mapped along the eastern edge of the campground, and therefore, this area was not considered to be subject to jurisdiction as a wetland or as riparian habitat. At the southeast corner of the Study Area, this scrub vegetation transitions to an arroyo willow thicket which contained indicators of hydric soils and wetland hydrology, and therefore, was considered a scrub-shrub wetland subject to federal and state jurisdiction. Due to the apparent lack of hydrological connection to the river, this scrub-shrub wetland was not considered riparian habitat.

Seasonal Wetlands

Seasonal wetlands are seasonally inundated features that retain water for a sufficient duration to develop hydrophytic vegetation and hydric soils, but they typically dry out each year. Seasonal wetlands are uncommon in the Study Area, occurring in depressions outside of the developed campground area, at the southern extent of annual flooding. Vegetation cover is typically dense and is composed of a mix of native and non-native herbaceous and woody species including quail bush (*Atriplex lentiformis*; FAC), creeping wildrye (*Elymus triticoides*; FAC), curly dock (*Rumex crispus*; FAC), horse weed (*Erigeron* [*Conyza*] *canadensis*; FACU), and western goldenrod (*Euthamia occidentalis*; FACW).

Disturbed Wetlands

Wetlands within the campground were classified as disturbed wetlands due to the previous development and regular maintenance (e.g., mowing, pruning, etc.) associated with the campground. These wetlands were generally dominated by a mix of native and non-native herbaceous wetland species, with non-native landscape species dominating the areas along roads and around campsites. Within the area identified as disturbed wetlands, some areas were slightly elevated and contained evidence of hydric soils and wetland hydrology, but were dominated by upland vegetation. These wetlands were considered subject to jurisdiction by the CCC under the California Coastal Act, but not subject to other regulatory jurisdiction as they did not meet the three-parameter wetland definition used by the Corps and the RWQCB. Herbaceous vegetation present in disturbed wetlands includes pickleweed, fleshy jaumea (*Jaumea carnosa*; OBL), salt grass (*Distichlis spicata*; FAC), fat hen (*Atriplex prostrata*; FACW), western ragweed (*Ambrosia psilostachya*; FACU), and Bermuda grass (*Cynodon dactylon*; FACU).

4.2.2 Non-Wetland Waters

Non-wetland waters were mapped in areas of open water in the footprint of the Santa Clara River and its associated lagoon. In addition, channels running through the freshwater marsh and scrub-shrub habitat along the margins of the river were also mapped as non-wetland waters. Based on patterns observed in historical aerial imagery of the site, it appears that the areas mapped as non-wetland waters remain inundated for only a portion of the year, when the Santa Clara River is in its non-breached phase. During the breached phase, a large portion of this area may dry down, exposing the substrates below.

5.0 CONCLUSION

The following potential jurisdictional features were identified within the Study Area: freshwater marsh, scrub-shrub wetlands, seasonal wetlands, disturbed wetlands, and non-wetland waters. This includes 96.5 acres of wetlands and 69.5 acres of non-wetland waters. The conclusions reached in this delineation are based on conditions observed at the time of the field surveys conducted from September 22 to 26 and October 27, 2014, and are subject to review by the Corps, the RWQCB, and the CCC.

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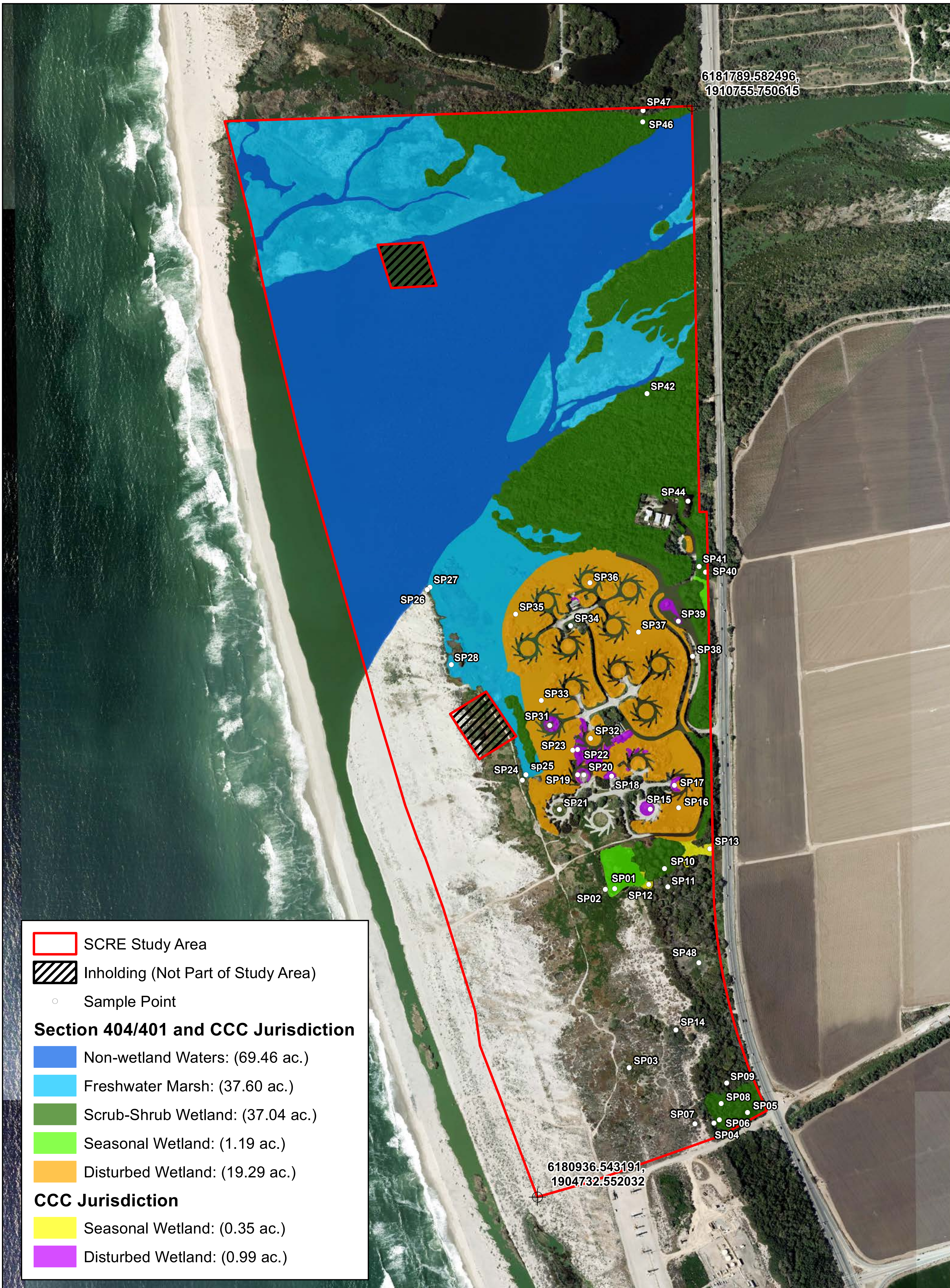
APPENDIX B-A

POTENTIAL JURISDICTIONAL FEATURES MAP



Appendix B-A. Corps and CCC Jurisdictional Features within the Study Area

Santa Clara River Estuary
Ventura County, California

wra
ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Novemebr 2014
Base Source: USGS April 2013

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\FigX_CorpsCCCDelin20141118.mxd

APPENDIX B-B

WETLAND DATA SHEETS

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/23/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP01**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): backdune | Local Relief (concave, convex, none): slightly convex | Slope(%): 2

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Coastal beaches | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a depressional area in backdunes south of the campgrounds. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. The boundary between wetland and upland is based on a change in topography and shift to upland vegetation. SP01 and SP02 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Tamarix sp.*	<1	no	?
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Rumex crispus*	25	yes	FAC
2. *Erigeron canadensis*	10	yes	FACU
3. *Artemisia biennis*	10	yes	FACW
4. *Atriplex prostrata*	5	no	FACW
5. *Heliotropium curassivicum*	3	no	FACU
6. *Sonchus asper*	2	no	FAC
7.			
8.			
Herb Stratum Total Cover:	55		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	67	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FAC and FACW vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.
Additional cover: thatch, 45%

SOIL

Sampling Point SP01

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-5	10YR 4/2	85	5YR 4/6	15	C	RC, M	loamy fine sand	
5-18	10YR 5/3	95	5YR 4/6	5	C	RC, M	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is loamy fine sand and sand and meets the Sandy Redox indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery and Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/23/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP02**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): backdune | Local Relief (concave, convex, none): concave | Slope(%): 2

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located sounth of the campgrounds and upgrade from SP01 on an ice plant dominated dune flat. The sample point is determined to be an upland because of a lack of hydrophytic vegetation, hydric soils, and wetland hydrology. SP01 and SP02 are paired points.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Carex edulis*	60	yes	NL
2. *Hirschfeldia incana*	20	yes	NL
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	80		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 20 | % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP02

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12+	10YR 4/3	100					sand	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: That sample point soil is sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary City: Oxnard County: Ventura Sampling Date: 9/23/2014

Applicant/Owner: Wishtoyo Foundation State: CA Sampling Point: **SP03**

Investigator(s): NH, SJB, TH Section,Township,Range: see map

Landform (hillslope, terrace, etc.): back dunes Local Relief (concave, convex, none): slightly convex Slope(%): 0-2

Subregion(LRR): LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name: Coastal beaches NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☒ No
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☐ **Yes** ☒ **No**

Remarks: The sample point occurs in a stand of shrubs located in ice-plant-dominated, stabilized back dunes. The sample point is determined to be an upland because of a lack of wetland hydrology, lack of hydric soils, and a dominance of upland shrubs.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: 30 feet x 30 feet			
1. *Baccharis pilularis*	40	yes	NL
2. *Baccharis salicifolia*	25	yes	FAC
3. *Arundo donax*	15	no	FACW
4.			
Sapling/Shrub Stratum Total Cover:	80		
HERB STRATUM Plot Size: 10 feet by 10 feet			
1. *Opuntia littoralis*	30	yes	NL
2. *Artemisia douglasiana*	20	yes	FAC
3. *Baccharis pilularis (seedling)*	1	no	NL
4. *Carpobrotus edulis*	9	no	NL
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	60		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 40 % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	4	(B)
% of dominant species that are OBL, FACW, or FAC?	50	(A/B)

Prevalence Index Worksheet

Total % cover of:			Multiply by:	
OBL species	0	x1	0	
FACW species	15	x2	30	
FAC species	45	x3	135	
FACU species	0	x4	0	
UPL species	80	x5	400	
Column Totals	140	(A)	565	(B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%

☐ Prevalence Index is </= 3.0[1]

☐ Morphological adaptations (provide supporting data in remarks)

☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland vegetation and is determined to be an upland because it does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP03

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 3/2	100					fine 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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sand and does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/23/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP04**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) base of dune slope Local Relief (concave, convex, none) slightly concave Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Coastal beaches NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a willow stand at the base of a dune slope in a slight trough near the south end of the Project Area. The sample point is determined to be an upland because of high cover of ice plant and a lack of both hydric soils and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM **Plot Size:** N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Salix exigua*	20	yes	FACW
2. *Myoporum laetum*	10	yes	FACU
3. *Baccharis pilularis*	10	yes	NL
4.			
Sapling/Shrub Stratum Total Cover:	40		
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Carpobrotus edulis*	50	yes	NL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	50		
WOODY VINE STRATUM **Plot Size:**			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum ______ % cover of biotic crust ______

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	4	(B)
% of dominant species that are OBL, FACW, or FAC?	25	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species	0	x1	0
FACW species	20	x2	40
FAC species	0	x3	0
FACU species	10	x4	40
UPL species	60	x5	300
Column Totals	90 (A)		380 (B)

Prevalence Index = B/A = 4.2

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland vegetation and is determined to be an upland because it does not meet any of the hydrophytic vegetation indicators. The willows present are assumed to be exhibiting phreatophytic behavior and tapping into a deeper source of ground water.
Additional cover: thatch, 50%

SOIL

Sampling Point SP04

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[1]	Texture	Remarks
0-12+	10YR 3/2	100					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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sand and does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/23/0214

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP05**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) depression Local Relief (concave, convex, none) concave Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Camarillo loam NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a pickleweed stand at the southeastern corner of the Project Area in a depression bordered by roads to the south and east. Vegetation surrounding the depression is generally dominated by woody species. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM **Plot Size:** N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:**			
1. *Salicornia pacifica*	75	yes	OBL
2. *Distichlis spicata*	10	no	FAC
3. *Cressa truxillensis*	1	no	FACW
4. *Malvella leprosa*	1	no	FACU
5. *Frankenia salina*	<1	no	FACW
6.			
7.			
8.			
Herb Stratum Total Cover:	87		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 15 % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	1	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☒ Dominance Test is >50%

☐ Prevalence Index is </= 3.0[1]

☐ Morphological adaptations (provide supporting data in remarks)

☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by OBL vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP05

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	Texture	Remarks
0-5	2.5Y 3/2	95	7.5Y 3/4	5	C	RC, M	silty clay	oxidized rhizospheres
5-10	10YR 3/3	90	7.5Y 3/4	10	C	RC, M	silty clay	salt concentrations present
10-16	10YR 4/3	100						

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is silty clay that meets the Redox Depressions indicator. A salt crust is present on the surface of the soil, but it is likely from soil evaporation and not from surface water evaporation.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery and Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/23/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP06**

Investigator(s): NH, SJB, TH | Section, Township, Range: see map

Landform (hillslope, terrace, etc.): terrace | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Camarillo loam | NWI classification: PFO/SSC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located at the south end of the Project Area in a stand of Artemisia biennis located in a flat spot below a berm and north of a road. The sample point is surrounded by willows and lollypop tree. It is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Salix lasiolepis*	10	yes	FACW
2. *Myoporum laetum*	1	no	FACU
3.			
4.			
Tree Stratum Total Cover:	11		
SAPLING/SHRUB STRATUM Plot Size: 30 feet x 30 feet			
1. *Myoporum laetum*	<1	no	FACU
2. *Tamarix sp.*	<1	no	?
3.			
4.			
Sapling/Shrub Stratum Total Cover:	<1		
HERB STRATUM Plot Size: 10 feet by 10 feet			
1. *Artemisia biennis*	85	yes	FACW
2. *Chenopodium aff. murale*	1	no	?
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	86		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 5 | % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: There are numerous dead lollypop trees within the sampled area. The sample point is dominated by FACW vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

Additional cover: thatch, 10%.

SOIL

Sampling Point SP06

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-0.5								organic matter
0.5-10	7.5YR 4/2	97	7.5YR 3/4	3	C	RC, M	silty clay	salt concentrations--matrix, roots
10-20	10YR 4/2	65	7.5YR 3/4	35	C	RC, M	sandy clay loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is silty clay above sandy clay loam, and it meets the Depleted Matrix hydric soil indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizosphere along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary | City Oxnard | County Ventura | Sampling Date 9/23/2014

Applicant/Owner Wishtoyo Foundation | State CA | Sampling Point **SP07**

Investigator(s) NH, SJB, TH | Section,Township,Range see map

Landform (hillslope, terrace, etc.) stabilized dune side slope | Local Relief (concave, convex, none) slightly convex | Slope(%) 5

Subregion(LRR) LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name Coastal beaches | NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located near the south end of the Project Area on a side slope of a stabilized dune that runs parallel to the beach. The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soil, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Myoporum laetum*	90	yes	FACU
2.			
3.			
4.			
Tree Stratum Total Cover:	90		
SAPLING/SHRUB STRATUM Plot Size: 30 feet x 30 feet			
1. *Toxicodendron diversilobum*	60	yes	FACU
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	60		
HERB STRATUM Plot Size:			
1. *Heliotropium curassivicum*	4	yes	FACU
2. *Artemisia biennis*	1	yes	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	5		
WOODY VINE STRATUM Plot Size:			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 95 | % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	4	(B)
% of dominant species that are OBL, FACW, or FAC?	25	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU vegetation and is determined to be an upland because it does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point SP07

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 4/3	100					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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/23/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP08**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): forest bottom | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Camarillo loam | NWI classification: PFO/SSC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a flat area in a willow stand near the southeast side of the Project Area. The sampled area is bordered by a berm to the west and a road to the east. It is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM **Plot Size:** 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Salix lasiolepis*	75	yes	FACW
2. *Myoporum laetum*	10	no	FACU
3.			
4.			
Tree Stratum Total Cover:	85		
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Toxicodendron diversilobum*	10	yes	FACU
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	10		
HERB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:			
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 85 | % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	50	(A/B)

Prevalence Index Worksheet

Total % cover of:			Multiply by:
OBL species	0	x1	0
FACW species	75	x2	150
FAC species	0	x3	0
FACU species	20	x4	80
UPL species	0	x5	0
Column Totals	95 (A)		230 (B)

Prevalence Index = B/A = 2.4

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☒ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FACW vegetation and is determined to contain hydrophytic vegetation because it meets the Prevalence Index indicator.

SOIL

Sampling Point SP08

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-0.5								organic layer
0.5-4	7.5YR 3/2	85	5YR 4/6	15	C	M	clay	salt concentrations present
4-12	10YR 4/2	60	7.5YR 4/4	40	C	M	clay	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is clay that meets the hydric soil indicator for Depleted Matrix.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point contains no herbaceous vegetation. However, because oxidized rhizospheres were observed on herbaceous vegetation adjacent to the sample point in similar conditions as the sample point, it is inferred that wetland hydrology is present at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/23/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP09**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) woodland bottom Local Relief (concave, convex, none) none Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Camarillo loam NWI classification PFO/SSC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is in a flat, wooded area at the edge of a willow-dominated wetland where tree dominance shifts to lollypop tree. It is located at the southeast side of the Projec Area. The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM **Plot Size:** 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Myoporum laetum*	75	yes	FACU
2.			
3.			
4.			
Tree Stratum Total Cover:	75		
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:			
WOODY VINE STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Toxicodendron diversilobum*	40	yes	FACU
2.			
Woody Vines Total Cover:	40		

% Bare ground in herb stratum 10 % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%

☐ Prevalence Index is </= 3.0[1]

☐ Morphological adaptations (provide supporting data in remarks)

☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU species and is determined to be an upland because it does not meet any hydrophytic vegetation indicators.
Additional cover: litter, 60%

SOIL

Sampling Point SP09

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	Texture	Remarks
0-0.5								leaf litter
	10YR 3/2	100					clay	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The sample point has clay soil that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/23/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP10**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) terrace Local Relief (concave, convex, none) slightly convex Slope(%) 1

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification PSSC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soil Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located south of the campground in a slight depression in an herbaceous vegetation-dominated opening in forest canopy. The area appears to flood seasonally. To the north of the sample point is riparian forest, and to the south is upland forest. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP10 and SP11 are paired points.

VEGETATION (use scientific names)

TREE STRATUM **Plot Size:** 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Myoporum laetum*	10	yes	FACU
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Atriplex lentiformis*	5	yes	FAC
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Salicornia pacifica*	55	yes	OBL
2. *Atriplex prostrata*	30	yes	FACW
3. *Heliotropium curassivicum*	1	no	FACU
4. *Distichlis spicata*	<1	no	FAC
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	81		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 0 % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 3 (A)
Total number of dominant species across all strata? 4 (B)
% of dominant species that are OBL, FACW, or FAC? 75 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%
☐ Prevalence Index is </= 3.0[1]
☐ Morphological adaptations (provide supporting data in remarks)
☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Several dead and dying lollypop trees and coyote brush plants are present in the surrounding area, possibly as a result of flooding. Additional cover: standing dead shrubs, 10%

SOIL

Sampling Point SP10

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-16	7.5YR 3/2	95	5YR 4/6	5	C	M, RC	sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: Salt concentrations are present along root channels, and a salt crust is present on the soil surface. The soil at the sample point is sandy loam that meets the Depleted Matrix indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery and Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/23/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point SP11

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) terrace Local Relief (concave, convex, none) none Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification PSSC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a dense stand of lollypop trees south of the campground. Two woodrat nests are present. The area is south of and upslope from an area that appears to flood seasonally. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP10 and SP11 are paired points. The boundary between upland and wetland was determined by a change in topography and shift to healthier trees that do appear to experience seasonal flooding.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Myoporum laetum*	90	yes	FACU
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:			
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 0 % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is in a dense stand of the FACU lollypop tree and is determined to lack hydrophytic vegetation because it does not meet the Dominance Test indicator.
Additional cover: litter, 10%

SOIL

Sampling Point SP11

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-0.5								organic layer
0.5-6	10YR 4/3	99	7.5YR 4/4	1			loamy sand	
6-15	10YR 4/3	100					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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: Salt concentrations are present along root channels down to 6 inches. The sample point contains loamy sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/24/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP12**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) field Local Relief (concave, convex, none) none Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification PSSC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is south of the campground in an area dominated by FACU vegetation and inundated on aerial imagery. The sample point is determined to be a wetland under California Coastal Commission (CCC) regulations because it has wetland hydrology. However, it is not a wetland under U.S. Army Corps of Engineers regulations because it only meets one wetland parameter. The boundary of the CCC wetland is based on shift to healthy-looking lollypop trees and the extent of inundation on aerial imagery.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Ambrosia psilostachya*	55	yes	FACU
2. *Polypogon monspeliensis*	5	no	FACW
3. *Atriplex prostrata*	3	no	FACW
4. *Juncus bufonius*	1	no	FACW
5. *Salicornia pacifica*	1	no	OBL
6.			
7.			
8.			
Herb Stratum Total Cover:	65		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 35 % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%

☐ Prevalence Index is </= 3.0[1]

☐ Morphological adaptations (provide supporting data in remarks)

☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU vegetation and is determined to be an upland because it does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point SP12

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-15	10YR 4/3	98	5YR 4/3	2	C	PL, M	fine sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks:

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP13**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): field | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: PFO/SSC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located adjacent to a paved road. The sample point is determined to be a wetland under the Coastal Act because of the presence of wetland hydrology. However, because it does not have hydrophytic vegetation and hydric soils, it is not a Corps-regulated wetland. The wetland boundary is based on the edge of pavement.

VEGETATION (use scientific names)

Stratum / Species	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: 15 feet x 15 feet			
1. *Baccharis salicifolia*	10	yes	FAC
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	10		
HERB STRATUM Plot Size:			
1. *Euthamia occidentalis*	40	yes	FACW
2. *Ambrosia psilostachya*	15	yes	FACU
3. *Artemisia douglasiana*	5	no	FAC
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	60		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	67	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals	(A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks:

Additional cover: thatch, 40%

SOIL

Sampling Point SP13

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	Texture	Remarks
0-4	10YR 3/2	98	5YR 4/6	2	C	PL, M	sandy loam	salt concentrations present in matrix
4-16	10YR 4/3	100					sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks:

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP14**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): stabilized dune | Local Relief (concave, convex, none): convex | Slope(%): 3

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Coastal Beaches | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☐ **Yes** ☒ **No**

Remarks: The sample point occurs in a stabilized dune/rock and asphalt disposal mound in backdune habitat at the southen end of the Project Area. The sample point is dominated by hydrophytic vegetation (arroyo willow), but it has been determined that the vegetaion is phreatophytic and tapping into deeper ground water. Hydric soils and wetland hydrology are not present.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			

SAPLING/SHRUB STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Salix lasiolepis*	90	yes	FACW
2. *Myoporum laetum*	8	no	FACU
3. *Baccharis pilularis*	2	no	NL
4.			
Sapling/Shrub Stratum Total Cover:	100		

HERB STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		

WOODY VINE STRATUM Plot Size:	Absolute % cover	Dominant Species?	Indicator Status
1. *Toxicodendron diversilobum*	5	yes	FACU
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	50	(A/B)

Prevalence Index Worksheet

Total % cover of:			Multiply by:
OBL species	0	x1	0
FACW species	90	x2	180
FAC species	0	x3	0
FACU species	13	x4	52
UPL species	2	x5	10
Column Totals	105 (A)		242 (B)

Prevalence Index = B/A = 2.3

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☒ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FACW vegetation and is determined to contain hydrophytic vegetation because it meets the Prevalence Index indicator.
Additional cover: leaf litter, 100%

SOIL

Sampling Point SP14

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0.5-0								leaf litter
0-16	10YR 5/4	100					sand	no mottles

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________________

Depth (inches): ____________________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sand and does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP15**

Investigator(s): SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): field | Local Relief (concave, convex, none): slightly convex | Slope(%): 1

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☒ No
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located on a grassy, manmade island in the center of a campsite ring. The sample point is determined to be a wetland under the Coastal Act because of the presence of wetland hydrology. However, because it does not have hydrophytic vegetation and hydric soils, it is not a Corps-regulated wetland. The wetland boundary is based on the edge of pavement.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Cynodon dactylon*	90	yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	90		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 10 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:			Multiply by:
OBL species	0	x1	0
FACW species	0	x2	0
FAC species	0	x3	0
FACU species	90	x4	360
UPL species	0	x5	0
Column Totals	90 (A)		360 (B)

Prevalence Index = B/A = 4

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP15

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-6	10YR 3/3	100					fine sandy loam	
6-16	10YR 3/3	98	5YR 4/6	2	C	RC, M	fine sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present ? ☐ Yes ☒ No

Remarks: The sample point contains fine sandy loam that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/24/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP16**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) field Local Relief (concave, convex, none) none Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soil Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a mowed field in a picnic area of the campground. There are areas of bare ground as a result of compaction from foot traffic. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. The boundary between wetland and upland is based on the edge of pavement and the extent of inundation on aerial imagery.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Atriplex prostrata*	40	yes	FACW
2. *Spergularia marina*	15	no	OBL
3. *Salicornia pacifica*	5	no	OBL
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	60		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 40 % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 1 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 100 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☒ Dominance Test is >50%
☐ Prevalence Index is </= 3.0[1]
☐ Morphological adaptations (provide supporting data in remarks)
☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FACW vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP16

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-2	10YR 3/2	97	5YR 3/4	3	C	PL, RC	fine sandy loam	
2-12	10YR 4/2	90	5YR 4/6	10		PL, RC	fine sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is fine sandy loam that meets the Depleted Matrix indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery and Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP17**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): field | Local Relief (concave, convex, none): convex | Slope(%): 1

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☒ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located on a grassy, manmade island in the center of a campsite ring. The sample point is determined to be a wetland under the Coastal Act because of the presence of hydric soils and wetland hydrology. However, because it does not have hydrophytic vegetation, it is not a Corps-regulated wetland. The wetland boundary is based on pavement, the extent of inundation on aerial imagery, and an elevation-associated change in vegetation to myoporum and iceplant.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Myoporum laetum*	5	yes	FACU
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: 30 feet x 30 feet			
1. *Myoporum laetum*	<1	no	FACU
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Cynodon dactylon*	80	yes	FACU
2. *Carpobrotus edulis*	15	no	NL
3. *Heliotropium curassivicum*	5	no	FACU
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species	0	x1	0
FACW species	0	x2	0
FAC species	0	x3	0
FACU species	90	x4	360
UPL species	15	x5	75
Column Totals	105 (A)		435 (B)

Prevalence Index = B/A = 4.1

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU vegetation and is determined to have upland vegetation because it does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP17

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-4	10YR 4/2	98	5YR 3/4	2	C	M	fine sandy loam	
4-16	10YR 4/3	95	5YR 4/6	5	C	RC, M	fine sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is fine sandy loam that meets the Depleted Matrix indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: There is no evidence of inundation on aerial imagery. However, the sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP18**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): terrace | Local Relief (concave, convex, none): flat | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☒ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a flat area adjacent to a bathroom building in the campground. The sample point is determined to be a wetland under the Coastal Act because of the presence of hydric soils and wetland hydrology. However, because it does not have hydrophytic vegetation, it is not a Corps-regulated wetland. The wetland boundary was determined by the presence of upland ornamental vegetation and the extent of inundation on aerial imagery.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:**			
1. *Cynodon dactylon*	5	yes	FACU
2. *Atriplex prostrata*	1	no	FACW
3. *Malva neglecta*	<1	no	NL
4. *Sonchus asper*	<1	no	FAC
5. *Spergularia marina*	<1	no	OBL
6.			
7.			
8.			
Herb Stratum Total Cover:	6		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 50 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:			Multiply by:	
OBL species	0	x1	0	
FACW species	1	x2	2	
FAC species	0	x3	0	
FACU species	5	x4	20	
UPL species	0	x5	0	
Column Totals	6	(A)	22	(B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Additional cover: thatch, 40%
The sample point is dominated by FACU vegetation and is determined to have upland vegetation because it does not meet any of the hydrophytic vegetation indicators. The high bare ground cover is caused by compaction as a result of foot traffic to the bathroom.

SOIL

Sampling Point SP18

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-10	10YR 3/2	90	10YR 4/6	10	C	RC, M	sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is sandy loam that meets the Redox Dark Surface indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicators. The sample point is adjacent to an area that is inundated on aerial imagery.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP19**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): field | Local Relief (concave, convex, none): slightly convex | Slope(%): 1

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☒ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located on a grassy, manmade island in the center of a campsite ring. The sample point is determined to be a wetland under the Coastal Act because of the presence of hydric soils and wetland hydrology. However, it does not have hydrophytic vegetation, it is thus not a Corps-regulated wetland. The upper/central area is without redox or wetland hydrology, the lower area is inundated on aerial imagery. The wetland boundary is based on the edge of pavement, increase in elevation, and extent of inundation on aerial imagery.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Cynodon dactylon*	85	yes	FACU
2. *Distichlis spicata*	5	no	FAC
3. *Jaumea carnosa*	4	no	OBL
4. *Salicornia pacifica*	3	no	OBL
5. *Ambrosia psilostachya*	2	no	FACU
6. *Plantago lanceolata*	<1	no	FAC
7. *Symphyotrichum subulatum var. squamatum*	<1	no	OBL
8.			
Herb Stratum Total Cover:	99		
WOODY VINE STRATUM Plot Size: N/a			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 1 | % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species	7	x1	7
FACW species	0	x2	0
FAC species	5	x3	15
FACU species	87	x4	348
UPL species	0	x5	0
Column Totals	99 (A)		370 (B)

Prevalence Index = B/A = 3.7

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU vegetation and is determined to have upland vegetation because it does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP19

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

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[1]	Texture	Remarks
0-4	10YR 4/3	100					sandy loam	
4-12	10YR 4/2	90	7.5YR 4/6	10	C	PL, RC	sandy loam	Concentrations also in matrix

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is sandy loam that meets the Depleted Matrix indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/24/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point SP20

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) mound Local Relief (concave, convex, none) convex Slope(%) 0-2

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Camarillo loam NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located on a grassy, manmade island in the center of a campsite ring. The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Atriplex suberecta*	60	yes	FACU
2. *Heliotropium curassivicum*	15	no	FACU
3. *Atriplex prostrata*	10	no	FACW
4. *Plantago major*	<1	no	FAC
5. *Rumex crispus*	<1	no	FAC
6.			
7.			
8.			
Herb Stratum Total Cover:	85		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 15 % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is <= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU vegetation and is determined to have upland vegetation because it does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP20

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-8	10YR 3/2	100					sandy loam	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sandy loam that does not meet any hydric soil indicators. A thin salt crust is present on the soil surface that is likely from soil evaporation and not from surface water evaporation.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP21**

Investigator(s): NH, SJB, TH | Section, Township, Range: see map

Landform (hillslope, terrace, etc.): mound | Local Relief (concave, convex, none): convex | Slope(%): 0-2

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located on a grassy, manmade island in the center of a campsite ring. The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Hirschfeldia incana*	2	no	NL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:			
WOODY VINE STRATUM **Plot Size:**			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 49 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?		(A)
Total number of dominant species across all strata?		(B)
% of dominant species that are OBL, FACW, or FAC?		(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Additional cover: thatch, 49%
The sample point is dominated by upland vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP21

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-13	10YR 3/4	100					sand	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP22**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): field (marsh plain) | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Camarillo loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a flat, open arae near a paved turnaround area. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. The boundary between wetland and upland is based on a slight change in elevation that results in a shift from wetland vegetation to FACU vegetation. SP22 and SP23 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Atriplex prostrata*	40	yes	FACW
2. *Cotula coronopifolia*	25	yes	OBL
3. *Cynodon dactylon*	10	no	FACU
4. *Ambrosia psilostachya*	1	no	FACU
5. *Plantago major*	<1	no	FAC
6. *Symphyotrichum subulatum var. squamatum*	<1	no	OBL
7.			
8.			
Herb Stratum Total Cover:	76		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 24 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%

☐ Prevalence Index is </= 3.0[1]

☐ Morphological adaptations (provide supporting data in remarks)

☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FACW and OBL vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP22

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	Texture	Remarks
0-4	10YR 3/2	100					sandy clay	
4-14	10YR 3/2	90	7.5YR 4/6	10	C	PL, RC	sandy clay	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is sandy clay that meets the Redox Dark Surface indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery and Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/24/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP23**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) field Local Relief (concave, convex, none) none Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a flat, open arae near a paved turnaround area. The sample point is determined to be a wetland under the Coastal Act because of the presence of hydric soils and wetland hydrology. However, because it does not have hydrophytic vegetation, it is not a Corps-regulated wetland. The boundary between wetland and upland is based on a slight change in elevation that results in a shift from wetland vegetation to FACU vegetation. SP22 and SP23 are paired points.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Cynodon dactylon*	95	yes	FACU
2. *Symphyotrichum subulatum var. squamatum*	5	no	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 0 % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species	5	x1	5
FACW species	0	x2	0
FAC species	0	x3	0
FACU species	95	x4	380
UPL species	0	x5	0
Column Totals	100 (A)		385 (B)

Prevalence Index = B/A = 3.9

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP23

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-3	10YR 3/2	95	5YR 4/6	5	C	RC, M	find sandy loam	
3-10	10YR 3/2	85	5YR 4/6	15	C	RC, M	fine sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is sandy clay that meets the Redox Dark Surface indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery and Oxidized Rhizospheres along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP24**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): flat peninsula | Local Relief (concave, convex, none): flat | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ Yes	☒ No
Hydric Soil Present?	☐ Yes	☒ No
Wetland Hydrology Present?	☐ Yes	☒ No

Is the Sampled Area within a Wetland? ☐ **Yes** ☒ **No**

Remarks: The sample point is located west of the campground area on a small, elevated peninsula that is bordered to the north, east, and south by wetland. The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soils, and wetland hydrology. SP24 and SP25 are paired points.

VEGETATION (use scientific names)

Stratum / Species	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Carpobrotus edulis*	95	yes	NL
2. *Artemisia biennis*	<1	no	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	95		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 5 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU ice plant and is determined to be an upland because it does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point SP24

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-15	10YR 4/4	100					sand	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP25**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): depression | Local Relief (concave, convex, none): concave | Slope(%): 0-1

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located west of the campground area in a large, gently sloping depression. An upland berm is adjacent to the west. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP24 and SP25 are paired points.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size:			
1. *Atriplex prostrata*	95	yes	FACW
2. *Rumex crispus*	5	no	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	1	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by dense, FACW vegetation and is determined to contain hydrophytic vegetation because it passes the Dominance Test indicator.

SOIL

Sampling Point SP25

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 3/3	75	10YR 4/6	25	C	M, RC	fine 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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is fine sand that meets the Sandy Redox indicator.

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): 12
Saturation Present? (includes capillary fringe)	☒ Yes	☐ No	Depth (inches): 5

Wetland Hydrology Present ? ☒ **Yes** ☐ **No**

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the High Water Table, Saturation, and Oxidized Rhizosphere along Living Roots indicators.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary City: Oxnard County: Ventura Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation State: CA Sampling Point: **SP26**

Investigator(s): NH, SJB, TH Section,Township,Range: see map

Landform (hillslope, terrace, etc.): dune slope Local Relief (concave, convex, none): slope Slope(%): 7

Subregion(LRR): LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name: Coastal beaches NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located near the estuary on a dune slope at the edge of a dune complex (upslope) and a wetland (downslope). The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soils, and wetland hydrology. SP26 and SP27 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Carpobrotus edulis*	75	yes	NL
2. *Ambrosia psilostachya*	25	yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum ______ % cover of biotic crust ______

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland and FACU vegetation and is determined to be an upland because it does not meet any hydrophytic vegetation indicators.

SOIL

Sampling Point SP26

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 4/3	100					sand	no mottles

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The sample point is dune sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP27**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): marsh plain | Local Relief (concave, convex, none): slightly concave | Slope(%): 1

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Coastal beaches | NWI classification: PEMC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located near the estuary in a low area at the base of dunes. It is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP26 and SP27 are paired points.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: 15 feet x 15 feet			
1. *Salix lasiolepis*	3	yes	FACW
2. *Salix exigua*	2	yes	FACW
3.			
4.			
Sapling/Shrub Stratum Total Cover:	5		
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Frankenia salina*	30	yes	FACW
2. *Symphyotrichum subulatum*	20	yes	OBL
3. *Atriplex prostrata*	12	yes	FACW
4. *Jaumea carnosa*	12	yes	OBL
5. *Baccharis glutinosa*	10	no	FACW
6. *Distichlis spicata*	5	no	FAC
7. *Typha sp.*	5	no	OBL
8. *Heliotropium curassivicum*	3	no	FACU
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	6	(A)
Total number of dominant species across all strata?	6	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FACW and OBL vegetation and is determined to be a wetland because it passes the Dominance Test indicator.
Additional species: Rumex crispus, 1%, no, FAC.

SOIL

Sampling Point SP27

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-4	10YR 6/2	85	5YR 5/8	15	C	M	sand	
4-8	N 2.5/-	100					sand	see Remarks section below

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil in the sample point is sand that meets the Sandy Redox hydric soil indicator.
From 4-8 inches, the sand grains are stripped. The color is from organic matter in the interstitial spaces.

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):	6
Saturation Present? (includes capillary fringe)	☒ Yes ☐ No	Depth (inches):	1

Wetland Hydrology Present ? ☒ **Yes** ☐ **No**

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the following indicators: High Water Table, Saturation, Inundation Visible on Aerial Imagery, Hydrogen Sulfide Odor, Oxidized Rhizospheres along Living Roots.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP28**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): depression | Local Relief (concave, convex, none): concave | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Coastal beaches | NWI classification: PEMC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located west of the campground area in a depression between dunes and berms. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Laennecia coulteri*	30	yes	FAC
2. *Chenopodium aff. macrospermum*	30	yes	FACW
3. *Hirschfeldia incana*	15	no	NL
4. *Atriplex prostrata*	5	no	FACW
5. *Symphyotrichum subulatum*	<1	no	OBL
6. *Persicaria aff. hydropiperoides*	<1	no	OBL
7.			
8.			
Herb Stratum Total Cover:	80		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Additional cover: thatch, 20%
The sample point is dominated by FAC and FACW vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP28

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	Texture	Remarks
0-4	10YR 3/2	95	5YR 4/6	5	C	PL, RC	silt loam	
4-7	10YR 3/2	100					silt loam	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is silt loam that meets the Redox Dark Surface indicator.

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:

	Yes	No	Depth (inches)
Surface water present?	☐	☒	
Water table present?	☒	☐	7
Saturation Present? (includes capillary fringe)	☒	☐	4

Wetland Hydrology Present ? ☒ **Yes** ☐ **No**

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the High Water Table and Saturation indicators.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/24/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP29**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): backdune depression | Local Relief (concave, convex, none): concave | Slope(%): 0-2

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Coastal beaches | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soil Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is west of the campground area in a stand of creeping wildrye that dominates a backdune closed depression. The depression is bordered by dunes and a berm. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP29 and SP30 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Elymus triticoides*	95	yes	FAC
2. *Distichlis spicata*	5	no	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 1 (A)

Total number of dominant species across all strata? 1 (B)

% of dominant species that are OBL, FACW, or FAC? 100 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☒ Dominance Test is >50%
☐ Prevalence Index is </= 3.0[1]
☐ Morphological adaptations (provide supporting data in remarks)
☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FAC vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP29

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-5	10YR 4/3	85	7.5YR 7/8	15		RC, M	loamy sand	
5-15	10YR 5/2	95	7.5YR 4/6	5	C	RC, M	loamy sand	redox-coated sand grains

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is loamy sand that meets the Sandy Redox indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/24/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP30**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) back dune Local Relief (concave, convex, none) none Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Coastal beaches NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☐ Yes ☒ No
Hydric Soil Present? ☐ Yes ☒ No
Wetland Hydrology Present? ☐ Yes ☒ No

Is the Sampled Area within a Wetland? ☐ **Yes** ☒ **No**

Remarks: The sample point is located adjacent to a depressional wetland on an upland, sandy berm west of the campground area. The boundary between the depressional wetland and the upland berm is based on a change in topography and a shift to dominance by upland species. The sample point is determined to be an upland because of a lack of hydrophytic vegetation, hydric soils, and wetland hydrology. SP29 and SP30 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Carpobrotus edulis*	95	yes	NL
2. *Ambrosia psilostachya*	3	no	FACU
3. *Distichlis spicata*	2	no	FAC
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum ____ % cover of biotic crust ____

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)
% of dominant species that are OBL, FACW, or FAC? 0 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%
☐ Prevalence Index is </= 3.0[1]
☐ Morphological adaptations (provide supporting data in remarks)
☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland ice plant and is determined to be an upland because it does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP30

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 3/3	100					sand	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The sample point contains sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP31**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): mound | Local Relief (concave, convex, none): convex | Slope(%): 0-2

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Camarillo loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located on a manmade island in the center of a campsite ring. The sample point is determined to be a wetland under the Coastal Act because of the presence of hydric soil. However, because it does not have hydrophytic vegetation and wetland hydrology, it is not a Corps-regulated wetland. The wetland boundary is based on the edge of pavement.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Chenopodium aff. murale*	50	yes	FACU
2. *Ambrosia psilostachya*	20	yes	FACU
3. *Distichlis spicata*	3	no	FAC
4. *Atriplex prostrata*	1	no	FACW
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	74		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 10 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Additional cover: thatch, 20%
The sample point is dominated by FACU vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP31

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-15	10YR 3/2	98	5YR 4/6	2	C	M	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: __________

Depth (inches): __________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The sample point soil is loamy sand that meets the Sandy Redox indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary City: Oxnard County: Ventura Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation State: CA Sampling Point: **SP32**

Investigator(s): NH, SJB, TH Section,Township,Range: see map

Landform (hillslope, terrace, etc.): mound Local Relief (concave, convex, none): convex Slope(%): 0-2

Subregion(LRR): LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located on an iceplant-dominated, manmade island in the center of a campsite ring. The sample point is determined to be an upland because of a lack of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Carpobrotus edulis*	100	yes	NL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM Plot Size:			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP32

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
1-0								
0-12+	10YR 3/2	100					sand	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☐ **Yes** ☐ **No**

Remarks: That sample point soil is sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary City: Oxnard County: Ventura Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation State: CA Sampling Point: **SP33**

Investigator(s): NH, SJB, TH Section,Township,Range: see map

Landform (hillslope, terrace, etc.): plain Local Relief (concave, convex, none): none Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name: Camarillo loam NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a flat, inundated area west of the campgrounds. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Cotula coronopifolia*	40	yes	OBL
2. *Lemna sp.*	30	yes	OBL
3. *Typha sp.*	7	no	OBL
4. *Distichlis spicata*	5	no	FAC
5. *Symphyotrichum subulatum var. squamatum*	<1	no	OBL
6. *Rumex crispus*	<1	no	FAC
7. *Plantago major*	<1	no	FAC
8.			
Herb Stratum Total Cover:	82		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Additional cover: open water, 20%
The sample point is dominated by OBL vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP33

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: Hydric soils are inferred from hydrophytic vegetation and standing water.

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): 6
Water table present?	☒ Yes	☐ No	Depth (inches): 6
Saturation Present? (includes capillary fringe)	☒ Yes	☐ No	Depth (inches): 0

Wetland Hydrology Present ? ☒ **Yes** ☐ **No**

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Surface Water indicator.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/25/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP34**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) Local Relief (concave, convex, none) Slope(%)

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☐ Yes ☒ No
Hydric Soil Present? ☐ Yes ☒ No
Wetland Hydrology Present? ☐ Yes ☒ No

Is the Sampled Area within a Wetland? ☐ **Yes** ☒ **No**

Remarks: The sample point is located in a flat area between a paved road and a paved campsite. The sample point is determined to be an upland because of a lack of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Cynodon dactylon*	85	yes	FACU
2. *Atriplex prostrata*	5	no	FACW
3. *Frankenia salina*	<1	no	FACW
4. *unknown grass*	<1	no	?
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	90		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 10 % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC? 0 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%
☐ Prevalence Index is </= 3.0[1]
☐ Morphological adaptations (provide supporting data in remarks)
☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACU vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP34

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 4/3	99	5YR 4/6	1	C	M	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The sample point soil is loamy sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP35**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): plain | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Camarillo loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a flat, inundated area next to a campsite at the northwest end of the campground. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Salicornia pacifica*	40	yes	OBL
2. *Distichlis spicata*	15	yes	FAC
3. *Atriplex prostrata*	1	no	FACW
4. *Bolboschoenus maritimus ssp. paludosus*	<1	no	OBL
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	56		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Additional cover: open water, 35%
The sample point is dominated by OBL and FAC vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP35

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: Hydric soils are inferred from hydrophytic vegetation and standing water.

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): 5
Water table present?	☒ Yes	☐ No	Depth (inches): 5
Saturation Present? (includes capillary fringe)	☒ Yes	☐ No	Depth (inches): 0

Wetland Hydrology Present ? ☒ **Yes** ☐ **No**

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Surface Water indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP36**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): mound | Local Relief (concave, convex, none): convex | Slope(%): 0-2

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soil Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located on a manmade, mounded island in the center of a turnaround at the north end of the campground. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Melaleuca citrina*	40	yes	NL
2.			
3.			
4.			
Tree Stratum Total Cover:	40		
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size:			
1. *Atriplex prostrata*	75	yes	FACW
2. *Jaumea carnosa*	10	no	OBL
3. *Rumex crispus*	<1	no	FAC
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	85		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	50	(A/B)

Prevalence Index Worksheet

Total % cover of:			Multiply by:
OBL species	10	x1	10
FACW species	75	x2	150
FAC species	0	x3	0
FACU species	0	x4	0
UPL species	40	x5	200
Column Totals	135 (A)		360 (B)

Prevalence Index = B/A = 2.7

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☒ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Additional cover: litter/thatch, 15%
The sample point is dominated by OBL, FAC, and upland vegetation and is determined to contain hydrophytic vegetation because it meets the Prevalence Index indicator. The bottlebrush trees present are remanant ornamental trees that were planted prior to the time the area began flooding annually.

SOIL

Sampling Point SP36

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 4/2	90	10Y 4/1	10	C	RC, M	silty loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________________

Depth (inches): ____________________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The sample point soil is silty loam that meets the Depleted Matrix indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres Along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP37**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): campsite | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

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

Remarks: The sample point is located in an inundated former campsite at the northeast side of the campground. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

Stratum / Species	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Distichlis spicata*	50	yes	FAC
2. *Cotula coronopifolia*	10	no	OBL
3. *Atriplex prostrata*	2	no	FACW
4. *Salicornia pacifica*	1	no	OBL
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	63		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	1	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Additional cover: open water, 40%
The sample point is dominated by FAC vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP37

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☒ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: Hydric soils are inferred from hydrophytic vegetation and standing water.

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): 7
Water table present?	☒ Yes	☐ No	Depth (inches): 7
Saturation Present? (includes capillary fringe)	☒ Yes	☐ No	Depth (inches): 0

Wetland Hydrology Present ? ☒ **Yes** ☐ **No**

Describe recorded data (stream guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Surface Water indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP38**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): median | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located on a median between two paved roads south of the entrance booth. The sample point is determined to be an upland because of a lack of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Myoporum laetum*	2	no	FACU
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Ambrosia psilostachya*	40	yes	FACU
2. *Distichlis spicata*	30	yes	FAC
3. *Cynodon dactylon*	5	no	FACU
4. *Jaumea carnosa*	1	no	OBL
5. *Heliotropium curassivicum*	1	no	FACU
6. *Rumex crispus*	<1	no	FACU
7. *Spergularia marina*	<1	no	OBL
8.			
Herb Stratum Total Cover:	77		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	50	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Additional cover: mulch, 23%
The sample point is dominated by FACU and FAC vegetation and does not meet any of the hydrophytic vegetation indicators. The sample point is placed in a small, salt grass-dominated area to check for redox, but the median overall is dominated by Ambrosia psilostachya.

SOIL

Sampling Point SP38

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[1]	Texture	Remarks
0-12	10YR 4/3	100					loamy sand	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________________

Depth (inches): ____________________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The sample point soil is loamy sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/25/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point **SP39**

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) landscape Local Relief (concave, convex, none) none Slope(%) 0

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a landscaped flat area between curbs near the entrance kiosk. The sample point is determined to be a wetland under the Coastal Act because of the presence of hydric soil and wetland hydrology. However, because it does not have hydrophytic vegetation, it is not a Corps-regulated wetland. The wetland boundary is based on the edge of the curbs.

VEGETATION (use scientific names)

TREE STRATUM **Plot Size:** N/A	Absolute % cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Cynodon dactylon*	89	yes	FACU
2. *Jaumea carnosa*	10	no	OBL
3. *Salicornia pacifica*	1	no	OBL
4. *Melilotus albus*	<1	no	NL
5. *Plantago major*	<1	no	FAC
6. *Symphyotrichum subulatum var. squamatum*	<1	no	OBL
7.			
8.			
Herb Stratum Total Cover:	100		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 0 % cover of biotic crust

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☐ No

Remarks:

SOIL

Sampling Point SP39

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-10	10YR 4/3	85	5YR 3/4	15	C	M	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The sample point soil is loamy sand that meets the Sandy Redox indicator.

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 guage, monitoring well, aerial photos, etc.) if available.
Aerial imagery from Google Earth, dated April 2013.

Remarks: The sample point is determined to have wetland hydrology because it meets the Inundation Visible on Aerial Imagery indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP40**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): depression | Local Relief (concave, convex, none): slightly concave | Slope(%): 1

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a depression in a dense willow stand between Harbor Road (to the east) and a Park residential area road (to the west). The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP40 and SP41 are paired points.

VEGETATION (use scientific names)

TREE STRATUM **Plot Size:** 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Salix lasiolepis*	85	yes	FACW
2. *Myoporum laetum*	1	no	FACU
3.			
4.			
Tree Stratum Total Cover:	86		
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Salix lasiolepis*	15	yes	FACW
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	15		
HERB STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:			
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum ______ % cover of biotic crust ______

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: Additional cover: thatch/litter: 15%
The sample point is dominated by FACW vegetation and is determined to contain hydrophytic vegetation because it meets the Dominance Test indicator.

SOIL

Sampling Point SP40

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-4	10YR 2/1	55	10YR 4/6	5	C	M	sandy loam	
	10YR 4/2	40						
4-15	10YR 4/3	100					sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The sample point soil is sandy loam that meets the redox dark surface indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Water-Stained Leaves indicator.

Wetland Determination Data Form - Arid West Region

Project/Site Santa Clara River Estuary City Oxnard County Ventura Sampling Date 9/25/2014

Applicant/Owner Wishtoyo Foundation State CA Sampling Point SP41

Investigator(s) NH, SJB, TH Section,Township,Range see map

Landform (hillslope, terrace, etc.) hillslope Local Relief (concave, convex, none) none Slope(%) 10

Subregion(LRR) LRR C (Medit. CA) Lat: see map Long: see map Datum: WGS 84

Soil Map Unit Name Hueneme sandy loam NWI classification no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located on a slope in a dense willow stand between Harbor Road and a Park residential road. The sample point is determined to be an upland because of a lack of hydrophytic vegetation, hydric soils, and wetland hydrology.

SP40 and SP41 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Salix lasiolepis*	85	yes	FACW
2.			
3.			
4.			
Tree Stratum Total Cover:	85		
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Salix lasiolepis*	3	no	FACW
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	3		
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Cynodon dactylon*	<1	no	FACU
2. *Urtica dioica*	<1	no	FAC
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	<1		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum 0 % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	1	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☒ Dominance Test is >50%
☐ Prevalence Index is </= 3.0[1]
☐ Morphological adaptations (provide supporting data in remarks)
☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Additional cover: litter, 22%
The sample point vegetation is dominated by arroyo willow, a phreatophytic (deep taprooted) species. Although the sample point vegetation meets the Dominance Test indicator for hydrophytic vegetation, based on the lack of wetland hydrology and lack of hydric soils, it is assumed that the willows are tapping into a deep water source and not functioning as true wetland plants.

SOIL

Sampling Point SP41

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-15	10YR 4/3	100					sandy loam	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The sample point soil is sandy loam that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP42**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): floodplain | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: PFOC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a riparian floodplain adjacent to open water of an estuary channel near Harbor Road. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Populus trichocarpa*	80	yes	FAC
2. *Salix lasiolepis*	15	no	FACW
3. *Myoporum laetum*	2	no	FACU
4.			
Tree Stratum Total Cover:	95		
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Arundo donax*	<1	no	FACW
2. *Rubus ursinus*	<1	no	FACU
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Equisetum laevigatum*	50	yes	FACW
2. *Euthamia occidentalis*	<1	no	FACW
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:			
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 25 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	2	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☒ Dominance Test is >50%

☐ Prevalence Index is </= 3.0[1]

☐ Morphological adaptations (provide supporting data in remarks)

☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FAC and FACW vegetation and is determined to have hydrophytic vegetation because it passes the Dominance Test indicator.
Additional cover: litter, 25%

SOIL

Sampling Point SP42

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 5/2	98	5YR 4/6	2	C	RC	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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: The soil at the sample point is sand that meets the Sandy Redox indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP43**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): depression | Local Relief (concave, convex, none): slightly concave | Slope(%): 1

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: PFOC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a disturbed flat to slightly depressed area adjacent to a power pole and below the Harbor Rd bridge near the estuary. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Salix lasiolepis*	10	yes	FACW
2. *Arundo donax*	10	yes	FACW
3.			
4.			
Sapling/Shrub Stratum Total Cover:	20		
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Spergularia marina*	10	yes	OBL
2. *Plantago major*	10	yes	FAC
3. *Ambrosia psilostachya*	1	no	FACU
4. *Berula erecta*	1	no	OBL
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	22		
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 58 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	4	(A)
Total number of dominant species across all strata?	4	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FAC and FACW vegetation and is determined to have hydrophytic vegetation because it passes the Dominance Test indicator.

SOIL

Sampling Point SP43

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	2.5Y 4/2	90	5YR 4/6	10	C	PL, RC,	fine 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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________________

Depth (inches): ____________________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: Soil at the sample point is fine sand that meets the Sandy Redox indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/23/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP44**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): upland flat | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: PFOC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in a flat area under eucalyptus canopy east of the park staff residences. The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soils, and wetland hydrology. SP44 and SP45 are paired points.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Eucalyptus globulus*	40	yes	NL
2. *Salix lasiolepis*	5	no	FACW
3. *Populus trichocarpa*	1	no	FAC
4.			
Tree Stratum Total Cover:	51		
SAPLING/SHRUB STRATUM Plot Size: 30 feet x 30 feet			
1. *Salix exigua*	5	yes	FACW
2. *Arundo donax*	1	no	FACW
3.			
4.			
Sapling/Shrub Stratum Total Cover:	6		
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Tropaeolum majus*	50	yes	NL
2. *Carpobrotus edulis*	30	yes	NL
3. *Artemisia douglasiana*	1	no	FAC
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	81		
WOODY VINE STRATUM Plot Size: 30 feet x 30 feet			
1. *Toxicodendron diversilobum*	5	yes	FACU
2.			
Woody Vines Total Cover:	5		

% Bare ground in herb stratum 0 % cover of biotic crust

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	5	(B)
% of dominant species that are OBL, FACW, or FAC?	20	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by upland vegetation and is determined to not have hydrophytic vegetation because it does not pass the Dominance Test indicator.
Additional cover: thatch, 20%

SOIL

Sampling Point SP44

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-15	10YR 4/3	100					loamy sand	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: __________

Depth (inches): __________

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is loamy sand that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP45**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): | Local Relief (concave, convex, none): | Slope(%):

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: no classification

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present? ☒ Yes ☐ No
Hydric Soil Present? ☒ Yes ☐ No
Wetland Hydrology Present? ☒ Yes ☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located in a relatively flat area adjacent to a power pole between the park staff residence and Harbor Rd frontage road. The vegetation is problematic because it is mowed, but it is assumed to be hydrophytic because of the presence of numerous young willows at the sample point and hydrophytic vegetation surrounding it. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP44 and SP45 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Salix exigua*	5	yes	FACW
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	5		
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Cynodon dactylon*	50	yes	FACU
2. *unknown grass*	15	yes	?
3. *Ambrosia psilostachya*	10	no	FACU
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	75		
WOODY VINE STRATUM **Plot Size:**			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 5 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC? 1 or 2 (A)
Total number of dominant species across all strata? 3 (B)
% of dominant species that are OBL, FACW, or FAC? 33 or 67 (A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

☐ Dominance Test is >50%
☐ Prevalence Index is </= 3.0[1]
☐ Morphological adaptations (provide supporting data in remarks)
☒ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is located next to a power pole and as such is composed of managed vegetation that is mowed. The herbaceous cover is dominated by the FACU Bermuda grass and a grass that was unidentifiable due to mowing. However, numerous sandbar willow saplings were present, and it is inferred that, were it not mowed, the vegetation would eventually match the hydrophytic vegetation (including giant reed, sandbar willow, and black cottonwood) surrounding the sample point. Other cover: thatch, 15%

SOIL

Sampling Point SP45

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-12	10YR 4/2	80	5YR 4/6	20	C	RC, M,	fine sandy loam	

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: Soil at the sample point is fine sandy loam that meets the Depleted Matrix indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP46**

Investigator(s): SJB, TH | Section, Township, Range: see map

Landform (hillslope, terrace, etc.): riparian terrace | Local Relief (concave, convex, none): flat | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme loamy sand, loamy substratum | NWI classification: PFOC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☒ Yes	☐ No
Hydric Soil Present?	☒ Yes	☐ No
Wetland Hydrology Present?	☒ Yes	☐ No

Is the Sampled Area within a Wetland? ☒ **Yes** ☐ **No**

Remarks: The sample point is located on a low bench below a steep fill slope north of the estuary at the northeast end of the Project Area. The sample point is determined to be a wetland because of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. SP 46 and SP47 are paired points.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM Plot Size: 30 feet x 30 feet			
1. *Salix lasiolepis*	40	yes	FACW
2.			
3.			
4.			
Tree Stratum Total Cover:	40		
SAPLING/SHRUB STRATUM Plot Size: 30 feet x 30 feet			
1. *Arundo donax*	50	yes	FACW
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	50		
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Schoenoplectus acutus var. occidentalis*	5	yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	5		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 1 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	3	(A)
Total number of dominant species across all strata?	3	(B)
% of dominant species that are OBL, FACW, or FAC?	100	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species	x1	
FACW species	x2	
FAC species	x3	
FACU species	x4	
UPL species	x5	
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☒ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☒ Yes ☐ No

Remarks: The sample point is dominated by FACW and OBL vegetation and is determined to have hydrophytic vegetation because it passes the Dominance Test indicator.
Additional cover: litter, 65%

SOIL

Sampling Point SP46

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-15	10YR 4/1	95	10YR 5/6	2	C	PL, RC	fine 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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ____

Depth (inches): ____

Hydric Soil Present ? ☒ **Yes** ☐ **No**

Remarks: Soil at the sample point is fine sand that meets the Sandy Redox indicator.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: The sample point is determined to have wetland hydrology because it meets the Oxidized Rhizospheres along Living Roots indicator.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 9/25/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP47**

Investigator(s): SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): ridgetop | Local Relief (concave, convex, none): none | Slope(%): 0

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme loamy sand, loamy substratum | NWI classification: PFOC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located adjacent to the water treatment plant fenceline on a flat ridge at the top of an artificial fill slope in the northeast side of the Project Side. The sample point is determined to be an upland because it lacks hydrophytic vegetation, hydric soils, and wetland hydrology. SP 46 and SP47 are paired points.

VEGETATION (use scientific names)

TREE STRATUM Plot Size: 30 feet x 30 feet	Absolute % cover	Dominant Species?	Indicator Status
1. *Salix lasiolepis*	30	yes	FACW
2. *Myopurum laetum*	5	no	FACU
3. *Baccharis pilularis*	1	yes	NL
4.			
Tree Stratum Total Cover:	35		
SAPLING/SHRUB STRATUM Plot Size: N/A			
1.			
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:	1		
HERB STRATUM Plot Size: 10 feet x 10 feet			
1. *Carpobrotus edulis*	80	yes	NL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:	80		
WOODY VINE STRATUM Plot Size: N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC?	1	(A)
Total number of dominant species across all strata?	2	(B)
% of dominant species that are OBL, FACW, or FAC?	50	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:	
OBL species		x1	
FACW species		x2	
FAC species		x3	
FACU species		x4	
UPL species		x5	
Column Totals		(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: The sample point is dominated by FACW and upland vegetation, and it is determined that hydrophytic vegetation is not present because it does not pass the Dominance Test indicator. Note; Baccharis pilularis was placed in the tree stratum for the purposes of this sample point because by itself, it does not provide enough cover to constitute a sapling/shrub stratum.
Additional cover: litter, 20%.

SOIL

Sampling Point SP47

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[1]	Texture	Remarks
0-15	10YR 4/2	100					sandy loam	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type:

Depth (inches):

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: Soil at the sample point is sandy loam that does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

Wetland Determination Data Form - Arid West Region

Project/Site: Santa Clara River Estuary | City: Oxnard | County: Ventura | Sampling Date: 10/27/2014

Applicant/Owner: Wishtoyo Foundation | State: CA | Sampling Point: **SP48**

Investigator(s): NH, SJB, TH | Section,Township,Range: see map

Landform (hillslope, terrace, etc.): field | Local Relief (concave, convex, none): none | Slope(%): 2

Subregion(LRR): LRR C (Medit. CA) | Lat: see map | Long: see map | Datum: WGS 84

Soil Map Unit Name: Hueneme sandy loam | NWI classification: PEMC

Are climatic/hydrologic conditions on-site typical for this time of year? ☒ Yes ☐ No (If no, explain in remarks)

Are any of the following significantly disturbed? ☐ Vegetation ☐ Soil ☐ Hydrology | Are "Normal Circumstances" present? ☒ Yes ☐ No

Are any of the following naturally problematic? ☐ Vegetation ☐ Soil ☐ Hydrology (If needed, explain any answers in remarks)

SUMMARY OF FINDINGS - Attach site map showing sample 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: The sample point is located in an herbaceous vegetation dominated opening in lollypop tree scrub in the southeast part of the Study Area. The sample point is determined to be an upland because of a lack of hydrophytic vegetation, hydric soils, and wetland hydrology.

VEGETATION (use scientific names)

	Absolute % cover	Dominant Species?	Indicator Status
TREE STRATUM **Plot Size:** N/A			
1.			
2.			
3.			
4.			
Tree Stratum Total Cover:			
SAPLING/SHRUB STRATUM **Plot Size:** 30 feet x 30 feet			
1. *Toxicodendron diversilobum*	5	yes	FACU
2.			
3.			
4.			
Sapling/Shrub Stratum Total Cover:			
HERB STRATUM **Plot Size:** 10 feet x 10 feet			
1. *Ambrosia psilostachya*	80	yes	FACU
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Herb Stratum Total Cover:			
WOODY VINE STRATUM **Plot Size:** N/A			
1.			
2.			
Woody Vines Total Cover:			

% Bare ground in herb stratum: 0 | % cover of biotic crust:

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)
% of dominant species that are OBL, FACW, or FAC?	0	(A/B)

Prevalence Index Worksheet

Total % cover of:		Multiply by:
OBL species		x1
FACW species		x2
FAC species		x3
FACU species		x4
UPL species		x5
Column Totals	(A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators

- ☐ Dominance Test is >50%
- ☐ Prevalence Index is </= 3.0[1]
- ☐ Morphological adaptations (provide supporting data in remarks)
- ☐ Problematic hydrophytic vegetation[1] (explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? ☐ Yes ☒ No

Remarks: Additional cover: thatch, 20%
The sample point is dominated by FACU vegetation and does not meet any of the hydrophytic vegetation indicators.

SOIL

Sampling Point SP48

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

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[1]	Texture	Remarks
0-10	10YR 4/3	100					fine sandy loam	no redox

[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)
- ☐ 1cm 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]:

- ☐ 1cm Muck (A9) (LRR C)
- ☐ 2cm Muck (A10)(LRR B)
- ☐ Reduced Vertic (F18)
- ☐ Red Parent Material (TF2)
- ☐ Other (explain in remarks)

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

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present ? ☐ **Yes** ☒ **No**

Remarks: The soil at the sample point is sand and does not meet any hydric soil indicators.

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 guage, monitoring well, aerial photos, etc.) if available.

Remarks: No field indicators of wetland hydrology were observed at the sample point.

APPENDIX B-C

LIST OF PLANT SPECIES OBSERVED

Appendix B-C. Plant species observed within the Study Area during the field visit on September 22-26 and October 26-27, 2014.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Abronia maritima	Red sand verbena	Rank 4.2	native	--	NL
Abronia umbellata var. *umbellata*	Pink sand-verbena	--	native	--	NL
Acacia melanoxylon	Blackwood acacia	--	non-native	limited	NL
Ambrosia psilostachya	Western ragweed	--	native	--	FACU
Anagallis arvensis	Scarlet pimpernel	--	non-native	--	NL
Anemopsis californica	Yerba mansa	--	native	--	OBL
Artemisia biennis	Biennial sagewort	--	non-native	--	FACW
Artemisia californica	Coast sagebrush	--	native	--	NL
Artemisia douglasiana	Mugwort	--	native	--	FAC
Arundo donax	Giant reed	--	non-native	high	FACW
Atriplex aff. *canescens* var. *canescens*	Fourwing saltbush	--	native	--	NL
Atriplex lentiformis	Big saltbush	--	native	--	FAC
Atriplex leucophylla	Beach saltbush	--	native	--	FAC
Atriplex prostrata	Fat hen	--	non-native	--	FACW
Atriplex semibaccata	Australian saltbush	--	non-native	moderate	FAC
Atriplex suberecta	Peregrine saltbush	--	non-native	--	FACU
Azolla filiculoides	Pacific mosquitofern	--	native	--	OBL
Baccharis glutinosa	Marsh baccharis	--	native	--	FACW
Baccharis pilularis ssp. *consanguinea*	Coyote brush	--	native	--	NL
Baccharis salicifolia ssp. *salicifolia*	Mule fat	--	native	--	FAC
Berula erecta	Water parsnip	--	native	--	OBL
Bolboschoenus maritimus ssp. *paludosus*	Saltmarsh bulrush	--	native	--	OBL
Bromus diandrus	Ripgut brome	--	non-native	moderate	NL
Bromus madritensis ssp.	Red brome	--	non-	high	NL

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
rubens			native		
Cakile maritima	European searocket	--	non-native	limited	FAC
Calystegia soldanella	Beach morning glory	--	native	--	NL
Camissoniopsis cheiranthifolia ssp. *suffruticosa*	Beach evening-primrose	--	native	--	NL
Carex pansa	Sanddune sedge	LI	native	--	FACU
Carpobrotus edulis	Iceplant	--	non-native	high	NL
Casuarina sp.	Sheoak	--	non-native	--	NL
Centaurea melitensis	Tocalote	--	non-native	moderate	NL
Chenopodium aff. *macrospermum*	Largeseed goosefoot	--	non-native	--	FACW
Chenopodium aff. *murale*	Sowbane	--	non-native		
Clematis ligusticifolia	Western white clematis	--	native	--	FAC
Conium maculatum	Poison hemlock	--	non-native	moderate	FACW
Corethrogyne filaginifolia	Common sandaster	--	native	--	NL
Cortaderia selloana	Uruguayan pampas grass	--	non-native	high	FACU
Cotula coronopifolia	Common brassbuttons	--	non-native	limited	OBL
Crassula ovata	Jade plant	--	non-native		
Cressa truxillensis	Spreading alkaliweed	--	native	--	FACW
Croton californicus	California croton	--	native	--	NL
Cucurbita foetidissima	Missouri gourd	--	native	--	NL
Cylindropuntia prolifera	Coast cholla	--	native		
Cynodon dactylon	Bermuda grass	--	non-native	moderate	FACU
Cyperus odoratus	Fragrant flatsedge	LI	native	--	FACW
Delairea odorata	Cape ivy	--	non-native	high	NL

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Distichlis spicata	Saltgrass	--	native	--	FAC
Dittrichia graveolens	Stinkwort	--	non-native	moderate	NL
Dudleya caespitosa	Coast dudleya	LI	native	--	NL
Echium candicans	Pride of Madeira	--	non-native	limited	NL
Elymus triticoides	Beardless wild rye	--	native	--	FAC
Emex spinosa	Devil's thorn	--	non-native		
Equisetum laevigatum	Smooth horsetail	--	native	--	FACW
Ericameria ericoides	California goldenbush	--	native	--	NL
Erigeron bonariensis	Flax-leaved horseweed	--	non-native	--	FACU
Erigeron canadensis	Canadian horseweed	--	native	--	FACU
Eriogonum parvifolium	Dune buckwheat	--	native	--	NL
Eucalyptus globulus	Blue gum	--	non-native	moderate	NL
Euthamia occidentalis	Western goldentop	--	native	--	FACW
Festuca perennis	Italian rye grass	--	non-native	moderate	FAC
Foeniculum vulgare	Fennel	--	non-native	high	NL
Frankenia salina	Alkali heath	--	native	--	FACW
Glebionis coronaria	Corndaisy	--	non-native	--	NL
Hedera canariensis	Canary ivy	--	non-native	high	NL
Heliotropium curassavicum var. *oculatum*	Seaside heliotrope	--	native	--	FACU
Helminthotheca echioides	Bristly ox-tongue	--	non-native	limited	FACU
Hesperocyparis macrocarpa	Monterey cypress	Rank 1B.2*	native	--	NL
Heterotheca grandiflora	Telegraphweed	--	native	--	NL
Hirschfeldia incana	Short podded mustard	--	non-native	moderate	NL
Isocoma menziesii var. *menziesii*	Menzies' goldenbush	--	native	--	FAC
Jaumea carnosa	Marsh	--	native	--	OBL

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
	jaumea				
Juncus bufonius var. *congestus*	Toad rush	--	native	--	FACW
Laennecia coulteri	Coulter's horseweed	--	native	--	FAC
Lemna sp.	Duckweed	--	native		
Lepidium aff. *nitidum*	Shining pepperweed	--	native		
Lepidium latifolium	Perennial pepperweed	--	non-native	high	FAC
Ludwigia peploides ssp. *peploides*	Floating primrose willow	--	native	--	OBL
Malva parviflora	Cheeseweed mallow	--	non-native	--	NL
Malvella leprosa	Alkali mallow	--	native	--	FACU
Medicago polymorpha	Bur medic	--	non-native	limited	FACU
Melaleuca citrina	Crimson bottlebrush	--	non-native	--	NL
Melaleuca nesophila	Showy honey myrtle	--	non-native	--	NL
Melilotus albus	White sweetclover	--	non-native	assessed	NL
Myoporum laetum	Myoporum	--	non-native	moderate	FACU
Nicotiana glauca	Tree tobacco	--	non-native	moderate	FAC
Oenothera elata ssp. *hirsutissima*	Hairy evening-primrose	--	native	--	FACW
Opuntia littoralis	Coast prickly pear	--	native		NL
Paspalum dilatatum	Dallis grass	--	non-native	--	FAC
Pennisetum clandestinum	Kikuyu grass	--	non-native	limited	FACU
Persicaria aff. *hydropiperoides*	Common smartweed	--	native	--	OBL
Phoenix canariensis	Canary Island date palm	--	non-native	limited	NL
Phyla nodiflora	Common lippia	--	native	--	FACW
Plantago coronopus	Buckhorn plantain	--	non-native	assessed	FACW
Plantago lanceolata	English plantain	--	non-native	limited	FAC

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Plantago major	Common plantain	--	non-native	--	FAC
Platanus racemosa	California sycamore	--	native	--	FAC
Pluchea odorata var. *odorata*	Salt marsh fleabane	--	native	--	FACW
Polypogon monspeliensis	Rabbit's-foot grass	--	non-native	limited	FACW
Polypogon viridis	Water beard grass	--	non-native	--	FACW
Populus trichocarpa	Black cottonwood	--	native	--	FAC
Portulaca oleracea	Little hogweed	--	non-native	--	FAC
Potentilla anserina ssp. *pacifica*	Pacific potentilla	--	native	--	OBL
Pseudognaphalium luteoalbum	Jersey cudweed	--	non-native	--	FAC
Rhus integrifolia	Lemonade sumac	--	native	--	NL
Ricinus communis	Castor bean	--	non-native	limited	FACU
Rubus ursinus	California blackberry	--	native	--	FACU
Rumex crispus	Curly dock	--	non-native	limited	FAC
Salicornia pacifica	Pacific swampfire	--	native	--	OBL
Salix exigua	Sandbar willow	--	native	--	FACW
Salix lasiolepis	Arroyo willow	--	native	--	FACW
Salsola australis	Russian thistle	--	non-native	limited	FACU
Salvia mellifera	Black sage	--	native	--	NL
Schoenoplectus acutus var. *occidentalis*	Hardstem bulrush	--	native	--	OBL
Sisymbrium irio	London rocket	--	non-native	moderate	NL
Sonchus asper ssp. *asper*	Prickly sow thistle	--	non-native	assessed	FAC
Sonchus oleraceus	Common sow thistle	--	non-native	--	NL
Spergularia marina	Saltmarsh sandspurry	--	native	--	OBL
Stipa miliacea var. *miliacea*	Smilo grass	--	non-native	limited	NL
Symphyotrichum subulatum var. *squamatum*	Eastern annual salt marsh aster	--	non-native		

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Tamarix aff. *parviflora*	Smallflower tamarisk	--	non-native	high	FAC
Tamarix aphylla	Athel tree	--	non-native	limited	FAC
Taraxacum officinale	Common dandelion	--	non-native	assessed	FACU
Tetragonia tetragonioides	New Zealand spinach	--	non-native	high	NL
Toxicodendron diversilobum	Poison oak	--	native	--	NL
Tropaeolum majus	Nasturtium	--	non-native	assessed	NL
Typha sp.	Cattail	--	unknown		OBL
Urtica dioica ssp. *holosericea*	Hoary nettle	--	native	--	FAC
Vinca major	Bigleaf periwinkle	--	non-native	moderate	NL
Washingtonia robusta	Washington fan palm	--	non-native	moderate	NL
Xanthium strumarium	Rough cocklebur	--	native	--	FAC

[1]Key to rarity status codes:

FE	Federal Endangered
FT	Federal Threatened
SE	State Endangered
ST	State Threatened
SR	State Rare
LI	Locally Important
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2	CNPS Rank 2: Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3	CNPS Rank 3: Plants about which CNPS needs more information (a review list)
Rank 4	CNPS Rank 4: Plants of a limited distribution throughout a broader range of California (a watch list)
Threat Rank	0.1: Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat) 0.2: Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat) 0.3: Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

[2]Rankings from California Invasive Plant Council. 2011. California Invasive Plant Inventory Database. California Invasive Plant Council, Berkeley, CA. Online at: http://www.cal-ipc.org/ip/inventory/index.php; most recently accessed: November 2014.

[3]For Arid West Region, based on Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. *The National Wetland Plant List*: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

This wetland classification system is based on the expected frequency of occurrence in wetlands as follows:

OBL	Always found in wetlands	>99% frequency
FACW	Usually found in wetlands	67-99%
FAC	Equal in wetland or non-wetlands	34-66%
FACU	Usually found in non-wetlands	1-33%
UPL/NL	Upland/Not listed (upland)	<1%

*Considered rare only where it occurs in natural stands on the Monterey Peninsula

APPENDIX C – BIOLOGICAL RESOURCES TECHNICAL REPORT

Biological Resources Technical Report

SANTA CLARA RIVER ESTUARY RESTORATION PROJECT
OXNARD, VENTURA COUNTY, CALIFORNIA

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Date: December 31, 2014

WRA Project: 18106-2

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LIST OF ACRONYMS AND ABBREVIATIONS

CCC	California Coastal Commission
CDFW	California Department of Fish and Wildlife (formerly California Department of Fish and Game [CDFG])
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
Corps	U.S. Army Corps of Engineers
EFH	Essential Fish Habitat
ESA	Federal Endangered Species Act
ESHA	Environmentally Sensitive Habitat Area
Inventory	CNPS Inventory of Rare and Endangered Plants
LCP	Ventura County Local Coastal Plan
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
OWHM	Ordinary High Water Mark
Rank	California Rare Plant Rank
RWQCB	Regional Water Quality Control Board
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WBWG	Western Bat Working Group
WRA	WRA, Inc.

1.0 INTRODUCTION

On September 22 to 26 and October 26 and 27, 2014, WRA, Inc. (WRA) performed an assessment of biological resources within the area proposed for the restoration in the Santa Clara River Estuary in Ventura County, California (Study Area). A component of the Study Area includes McGrath Sate Beach in Oxnard, Ventura County, California (Figure 1). This report provides a summary of existing biological conditions in the Study Area as part of the Santa Clara River Estuary Habitat Restoration and Enhancement Feasibility Study. Included in this report are the methods and results of the field investigations, which assessed the Study Area for (1) the potential to support special-status species; and (2) the presence of other sensitive biological resources protected by local, state, and federal laws and regulations. Specific findings on the habitat suitability or presence of special-status species or sensitive habitats may require that protocol-level surveys be conducted. A biological resources assessment provides general information on the potential presence of sensitive species and habitats. The biological assessment is not an official protocol-level survey for listed species that may be required for project approval by local, state, or federal agencies. This assessment is based on information available at the time of the study and on site conditions that were observed on the dates of the site visit.

1.1 Setting

The Study Area is located in the western portion of coastal Ventura County, approximately 2 miles south of downtown Ventura and 5 miles northwest of central Oxnard. Nearby land uses are primarily agriculture, golf courses, oil extraction facilities, a wastewater reclamation facility, and the Ventura Harbor. The Study Area is located in the northern portion of McGrath State Beach, which includes the Santa Clara River Estuary Natural Preserve, a campground, and a dune complex south and west of the campground. The Study Area is bordered to the north by the Ventura Water Reclamation Facility and marsh and riparian habitats along the northern bank of the Santa Clara River; to the west by the Pacific Ocean and sandy beach; to the south by dune and scrub habitat and the West Montalvo oil field; and to the east by Harbor Boulevard and agricultural fields. The Study Area is located approximately 2 miles south of U.S. Route 101, between Harbor Boulevard and the Pacific Ocean.

2.0 REGULATORY BACKGROUND

The following sections explain the regulatory context of the biological resources assessment, including applicable laws and regulations that were applied to the field investigations.

2.1 Sensitive Biological Communities

Sensitive biological communities include habitats that fulfill special functions or have special values, such as wetlands, streams, or riparian habitat. These habitats are protected under federal regulations such as the Clean Water Act; state regulations such as the Porter-Cologne Act, the California Department of Fish and Wildlife (CDFW) Streambed Alteration Program, and the California Environmental Quality Act (CEQA). These habitats may also be protected by local ordinances or policies such as city or county tree ordinances, Special Habitat Management Areas, or General Plan Elements.

Figure 1. Study Area Location Map

Santa Clara River Estuary
Ventura County, California

0 0.25 0.5 1
Miles

WRA ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Novemebr 2014
Base Source: ESRI World Topo

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\Fig1_LocMap20141118.mxd

Wetlands, Waters, and Riparian Habitat.

In the State of California, wetlands, waters (rivers, streams, lakes, and other open water habitats), and riparian habitat are subject to jurisdiction and regulation by the U.S. Army Corps of Engineers (Corps), the Regional Water Quality Control Board (RWQCB), and the CDFW and are considered sensitive habitats. Further detail regarding the regulatory background of these sensitive habitats is included in the Wetland Delineation Technical Report (WRA 2014).

Other Sensitive Biological Communities

Other sensitive biological communities not discussed above include habitats that fulfill special functions or have special values. Natural communities considered sensitive are those identified in local or regional plans, policies, regulations, or by the CDFW. The CDFW ranks sensitive communities as "threatened" or "very threatened" and keeps records of their occurrences in its California Natural Diversity Database (CNDDB; CDFW 2014A). Sensitive plant communities are also identified by the CDFW (CDFG 2010). Vegetation alliances listed in the CBDDB are ranked 1 through 5 based on NatureServe's (2010) methodology, with those alliances with global (G) or state (S) ranks of 1 through 3 being considered sensitive. Impacts to sensitive natural communities identified in local or regional plans, policies, or regulations or those identified by the CDFW or USFWS must be considered and evaluated under the CEQA (CCR Title 14, Div. 6, Chap. 3, Appendix G). Specific habitats may also be identified as sensitive in city or county general plans or ordinances.

Environmentally Sensitive Habitat Areas (ESHAs)

The City of Oxnard Local Coastal Plan (LCP) includes provisions for environmentally sensitive habitat areas (ESHAs) which include, but are not limited to, “wetlands,” “dunes,” “riparian habitat,” and “endangered species.” For the purposes of this report, WRA has taken into consideration any areas that may meet the definition of any ESHA defined by the LCP.

In addition, the LCP includes a resource protection ordinance for areas designated a Resource Protection Zone, including McGrath State Beach, where the Study Area occurs. Resource protection policies include, but are not limited to:

- Prohibition of unauthorized vehicles in sensitive areas,
- Minimization of foot traffic on dunes,
- Prohibition of vegetation destruction and disturbance on dunes, and
- Implementation of 50- to 100-foot buffers around sensitive resources and mitigation for impacts to sensitive resources for development adjacent to ESHAs

In addition, the California Coastal Commission (CCC) considers all sensitive habitats and special-status species that are identified by federal, state, and local agencies and that occur in the Coastal Zone to be ESHAs. When policies differ between the CCC, the City of Oxnard, or other agencies, the policy with the strictest measures will be adopted.

2.2 Special-Status Species

Special-status species include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These acts afford protection to both listed and proposed species. In addition, CDFW Species of Special Concern, which are species that face extirpation in California if current population and habitat trends continue, U.S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern, sensitive species included in USFWS Recovery Plans, and CDFW Special-Status Invertebrates are all considered special-status species. Although CDFW Species of Special Concern generally have no special legal status, they are given special consideration under CEQA. Bat species designated as "High Priority" by the Western Bat Working Group (WBWG) qualify for legal protection under Section 15380(d) of the CEQA Guidelines. Species designated "High Priority" are defined as "imperiled or are at high risk of imperilment based on available information on distribution, status, ecology and known threats" (CDFG 2014). In addition to regulations for special-status species, most birds in the United States, including non-status species, are protected by the Migratory Bird Treaty Act of 1918. Under this legislation, destroying active nests, eggs, and young is illegal. Plant species on the California Native Plant Society (CNPS) Rare and Endangered Plant Inventory (Inventory) with California Rare Plant Ranks (Rank) of 1 and 2 are also considered special-status plant species and must be considered under CEQA. Rank 3 and Rank 4 species are generally not considered special-status, but may be given special consideration under the CEQA and are therefore included in this analysis. A description of the CNPS Ranks is provided in Table 1.

Table 1. Description of CNPS Ranks and Threat Codes

California Rare Plant Ranks (formerly known as CNPS Lists)	
Rank 1A	Presumed extirpated in California and either rare or extinct elsewhere
Rank 1B	Rare, threatened, or endangered in California and elsewhere
Rank 2A	Presumed extirpated in California, but more common elsewhere
Rank 2B	Rare, threatened, or endangered in California, but more common elsewhere
Rank 3	Plants about which more information is needed - A review list
Rank 4	Plants of limited distribution - A watch list
Threat Ranks	
0.1	Seriously threatened in California
0.2	Moderately threatened in California
0.3	Not very threatened in California

<u>Locally Important and Sensitive Species</u>

Ventura County maintains a list of Locally Important Species that are protected as a "significant biological resource". The Ventura County General Plan (County of Ventura 2013) defines a Locally Important Species as "a plant or animal species that is not an endangered, threatened or rare species, but which is considered by qualified biologists to be a quality example or unique species within the County or region." These lists are updated regularly, and species must meet a standard set of criteria to be included. The 2014 Locally Important Species List was considered in this assessment (County of Ventura 2014).

Additionally, though not associated directly with legal protections, many species have been given a conservation status rank by NatureServe, an international non-profit conservation organization that is the leading source for information about rare and endangered species and threatened ecosystems. The Ventura County Planning Division considers the following NatureServe conservation status ranks as sensitive for the purposes of CEQA impact assessment (G = Global, S = Subnational or State):

G1 or S1 - Critically Imperiled
G2 or S2 – Imperiled
G3 or S3 - Vulnerable to extirpation or extinction

The City of Oxnard LCP outlines the City's policies regarding the protection of sensitive resources (i.e., ESHAs) within the coastal zone in compliance with the California Coastal Act. The LCP considers rare and endangered species as ESHAs. Under the LCP, a plant or animal may be considered rare if:

It exists only in one or a very few restricted localities.

a) It occurs in such small numbers that it is seldom seen or collected regardless of its local area

b) It exists only in a type of habitat that is likely to disappear or change for any reason.

A plant or animal may be considered endangered under the LCP if:

a) It is actively threatened with extinction and not likely to survive unless some protective measures are taken.

Plants and animals that meet these definitions of rare and endangered may receive special protection under the LCP.

Critical Habitat

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. The ESA requires federal agencies to consult with the USFWS to conserve listed species on their lands and to ensure that any activities or projects they fund, authorize, or carry out will not jeopardize the survival of a threatened or endangered species. In consultation for those species with critical habitat, federal agencies must also ensure that their activities or projects do not adversely modify critical habitat to the point that it will no longer aid in the species' recovery. In many cases, this level of protection is similar to that already provided to species by the ESA jeopardy standard. However, areas that are currently unoccupied by the species but which are needed for the species' recovery are protected by the prohibition against adverse modification of critical habitat.

3.0 METHODS

On September 22 to 26 and October 26 and 27, 2014, the Study Area was traversed on foot to determine (1) plant communities present within the Study Area, (2) if existing conditions provide suitable habitat for any special-status plant or wildlife species, and (3) if sensitive habitats or ESHAs are present. All plant and wildlife species encountered were recorded, and are summarized in Appendix C-A. Plant nomenclature follows Baldwin *et al*. (2012) and subsequent revisions by the Jepson Flora Project (2014), except where noted. Because of recent changes in classification for many of the taxa treated by Baldwin *et al*. and the Jepson Flora Project, relevant synonyms are provided in brackets. For cases in which regulatory agencies, CNPS, or other entities base rarity on older taxonomic treatments, precedence was given to the treatment used by those entities.

3.1 Biological Communities

Prior to the site visit, an online soil survey of the Study Area (California Soil Resource Lab 2014) and aerial imagery (Google Earth 2014) were examined to determine if any unique soil types that could support sensitive plant communities, such as serpentine areas, and/or aquatic features, such as hydric soils, were present in the Study Area. Biological communities present in the Study Area were mapped and classified based on a combination of existing plant community descriptions provided in *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986) and *A Manual of California Vegetation, Second Edition* (Sawyer et al. 2009). Holland classifies more often in broader, habitat-level descriptions than Sawyer et al, which typically provides narrower classifications based on individual species. Although the CDFW uses Natural Community descriptions used in Sawyer et al., it also follows habitat descriptions used by Holland, such as freshwater marsh.

In some cases it was necessary to identify variants of community types or to describe non-vegetated areas that are not described in the literature. Biological communities were classified as sensitive or non-sensitive as defined by the CEQA and other applicable laws and regulations. Biological communities were mapped using a combination of handheld GPS equipment with sub-meter accuracy and hand-drawing on field maps at a 1:200 scale with recent (2013) color aerial imagery of the site. The minimum mapping unit for non-sensitive communities was approximately 0.5 acre. The minimum mapping unit for sensitive communities was approximately 0.05 acre.

3.1.1 Non-sensitive Biological Communities

Non-sensitive biological communities are those communities that are not afforded special protection under CEQA or other state, federal, or local laws, regulations, or ordinances. These communities may, however, provide suitable habitat for some special-status plant or wildlife species and are identified or described in Section 4.1.1.

3.1.2 Sensitive Biological Communities

Sensitive biological communities are defined as those communities that are given special protection under the CEQA or other applicable federal, state, or local laws, regulations, or ordinances. Applicable laws and ordinances are discussed above in Section 2.0. Special methods used to identify sensitive biological communities are discussed below.

Wetlands and Waters

The Study Area was surveyed to determine if any wetlands and waters potentially subject to jurisdiction by the Corps, the RWQCB, or the CCC were present. For a detailed explanation of the methods used to evaluate the presence or absence of such habitats, see the Wetland Delineation Technical Report (WRA 2014). Other Sensitive Biological Communities

Other Sensitive Biological Communities

The Study Area was evaluated for the presence of other sensitive biological communities, including riparian areas and sensitive plant communities recognized by CDFW or ESHAs recognized under the City of Oxnard LCP. Plant communities with a global (G) or state (S) rank of 1 through 3 were considered sensitive and were mapped at a minimum mapping unit of 0.05 acre. Similarly, habitats identified in the LCP as ESHAs were mapped at a 0.05-acre minimum mapping unit.

3.2 Special-Status Species

3.2.1 Literature Review

Potential occurrence of special-status species in the Study Area was evaluated by first determining which special-status species occur in the vicinity of the Study Area through a literature and database search. Database searches for known occurrences of special-status species focused on the U.S. Geological Survey (USGS) 7.5-minute quadrangle maps for Oxnard, Ventura, and Point Mugu (USGS 1949, 1951, 1974). In addition, the following sources were reviewed to determine which special-status plant and wildlife species have been documented to occur in the vicinity of the Study Area:

- California Natural Diversity Database (CNDDB) records (CDFW 2014A)
- USFWS quadrangle species lists (USFWS 2014)
- CNPS Inventory records (CNPS 2014)
- CDFG publication “California’s Wildlife, Volumes I-III” (Zeiner et al. 1990)
- CDFG publication “Amphibians and Reptile Species of Special Concern in California” (Jennings and Hayes 1994)
- A Field Guide to Western Reptiles and Amphibians (Stebbins 2003)
- Steelhead/rainbow trout resources south of the Golden Gate (Becker and Reining 2008)
- CDFW Publication California Bird Species of Special Concern (Shuford and Gardali 2008)
- eBird online observation data (eBird 2014)
- Previous studies done in the Study Area (Swanson et al. 1990, ESA 2003; Magney 2005; Stillwater Sciences and URS 2007, Stillwater Sciences 2011, Cardno-Entrix 2014)

- City of Oxnard LCP (City of Oxnard 1982)
- Ventura County Locally Important Plant and Animal Lists (County of Ventura 2014)

3.2.2 Site Assessment

Multiple site visits were made to the Study Area to search for suitable habitats for special-status species. Habitat conditions observed within the Study Area were used to evaluate the potential for presence of special-status species based on these searches and the professional expertise of the investigating biologists. The potential for each special-status species to occur in the Study Area was then evaluated according to the following criteria:

- <u>No Potential</u>. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).
- <u>Unlikely</u>. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- <u>Moderate Potential</u>. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- <u>High Potential</u>. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.
- <u>Present</u>. Species is observed on the site or has been recorded (i.e. CNDDB, other reports) on the site recently.

The literature review and site assessment were intended to identify the presence or absence of suitable habitat for each special-status species known to occur in the vicinity to determine its potential to occur in the Study Area. The site visits do not constitute a protocol-level survey as required by federal or state agencies to demonstrate the actual presence or absence of a species; however, if a special-status species was observed during the site visit, its presence was recorded, and it is discussed in Section 4.1. For some species, a site assessment visit at the level conducted for this report may not be sufficient to determine presence or absence of a species to the specifications of regulatory agencies. In cases where suitable habitat is present and the species is known for the region, further surveys may be necessary to demonstrate its occurrence or absence. In cases where little information is known about species occurrences and habitat requirements, the species evaluation was based on best professional judgment of WRA biologists with experience working with the species and habitats. Special-status species for which further protocol-level surveys may be necessary are described below in Section 4.2.

4.0 RESULTS

The 281-acre Study Area is located at the terminus of the Santa Clara River and includes McGrath State Beach in Oxnard, Ventura County, California. The site is located in a coastal setting. Bordering land uses include agriculture, oil extraction, waste water treatment, and recreation. Elevations in the Study Area range from approximately 0 to 25 feet above sea level. The Study Area contains a developed campground set within a varied landscape including beach, foredune, scrub, riparian, marsh, and seasonal wetland habitats. The following sections present the results of the site visit and a discussion of the biological resources documented within the Study Area. A list of plant and wildlife species observed in the Study Area is included as Appendix C-A. Photographs of the Study Area are included as Appendix C-B.

4.1 Biological Communities

Non-sensitive biological communities in the Study Area include coyote brush scrub, eucalyptus groves, ice plant mats, myoporum groves, quailbush scrub, tamarisk thickets, upland mustards, western ragweed meadows, and developed/disturbed areas. Sensitive communities within the Study Area include arroyo willow thickets, black cottonwood forest, dune mat, freshwater marsh, seasonal wetlands, and non-wetland waters (i.e., the Santa Clara River). Descriptions of all biological communities are contained in the following sections. Biological communities identified within the Study Area are shown in Figure 2.

4.1.1 Non-Sensitive Biological Communities

The Study Area contains a number of non-sensitive biological communities. Some of these communities are dominated by native plant species, but are considered non-sensitive due to the widespread occurrence of those species or the community within the state. Alternatively, some of the non-sensitive communities are dominated by non-native and invasive plant species or are areas that have been developed or highly modified from their natural state due to historic and/or current disturbance (e.g., the campgrounds).

Coyote Brush Scrub

Two patches of coyote brush scrub (1.37 acres) were mapped in the southern end of the Study Area. This community has been described as the *Baccharis pilularis* Shrubland Alliance (rarity ranking G5 S5), with coyote brush (*Baccharis pilularis*) as a dominant or co-dominant shrub species reaching up to 3 meters in height (Sawyer et al. 2009). Coyote brush scrub can grow up to approximately 10 feet tall, with a variable canopy and herbaceous layer and occurs throughout California. Coyote brush scrub occurs throughout coastal California and in the Great Valley, and is found on variable soils and habitats (Sawyer et al. 2009). The coyote brush scrub rarity ranking of G5 S5 (Sawyer et al. 2009) indicates that the alliance is considered demonstrably secure globally and statewide (NatureServe 2010). Although coyote brush is a native plant, it often occurs in weedy, disturbed settings and can form monocultures. Within the Study Area, coyote brush scrub occurs to the south, where historical oil exploration activities significantly disturbed the natural foredune community that historically occurred there.

Eucalyptus Groves

The Study Area contains approximately 0.22 acre of eucalyptus groves (*Eucalyptus globulus* [and other species] Semi Natural Woodland Stands, no rarity ranking; Sawyer et al. 2009), located east of the State Park residences in the northeastern portion of the Study Area. Eucalyptus stands contain trees up to 50 meters tall with an intermittent to continuous canopy and contain individual Eucalyptus species that are rated by California Invasive Plant Council (Cal-IPC; 2014) as having “limited” to “moderate” potential to cause negative ecological impacts.

Ice Plant Mats

The Study Area contains 18.30 acres of ice plant mats located inland from the foredunes that occur along the western edge of the Study Area. Ice plant mats occur within the area that was historically disturbed by oil exploration activities. Sawyer et al. (2009) reported that ice plant mats (*Carpobrotus edulis* or other Ice Plants Semi-Natural Herbaceous Stands, no rarity ranking; Sawyer et al. 2009) invade a variety of habitats, competing with native plants for moisture and nutrients, while creating adverse conditions for future native plant establishment. The majority of observed areas containing ice plant mats within the Study Area contained a monoculture of iceplant (*Carpobrotus edulis*), which is listed as having “high” potential to cause negative ecological impacts by the Cal-IPC (2014).

Myoporum Groves

Approximately 4.90 acres of myoporum groves were observed in the Study Area, with a large patch located south of the campground and a small patch located to the west of the campground. Sawyer et al. (2009) describes this community as Myoporum groves (Myoporum laetum Semi-Natural Woodland Stands, no rarity ranking), which occur in coastal canyons, washes, slopes, riparian areas, and along roadsides. Myoporum (Myoporum laetum) is an escaped ornamental, rated by the Cal-IPC as having “moderate” potential to cause ecological impacts, and is typically found in central and southern California (Sawyer et al. 2009). Myoporum is an escaped cultivar evergreen shrub or small tree that is native to New Zealand, and is distributed throughout the San Francisco Bay region, and along the north, central, and south coasts of California (DiTomaso 2007). Myoporum typically occurs in disturbed coastal habitats, woodland riparian areas, and on moist soils near urban areas. This species appears to have been planted widely throughout the campground and may have subsequently spread to more naturalized areas of the site following its original planting.

Quailbush Scrub

Quailbrush scrub is found in a small patch of approximately 0.20 acre, directly south of the campground area, and is described by Sawyer et al. (2009) as the *Atriplex lentiformis* Shrubland Alliance (rarity ranking G4 S4), which prefers alkaline or saline soils and typically occurs in alkali sinks, flats, washes, wetlands, or gentle to steep slopes. Characteristic species include but are not limited to quail bush (*Atriplex lentiformis*), coyote brush and tamarisk (*Tamarix* spp.). The rarity ranking of G4 S4 for quailbush scrub indicates that it is apparently secure globally and in California, and is therefore not considered sensitive under the CEQA (NatureServe 2010; Sawyer et al. 2009).

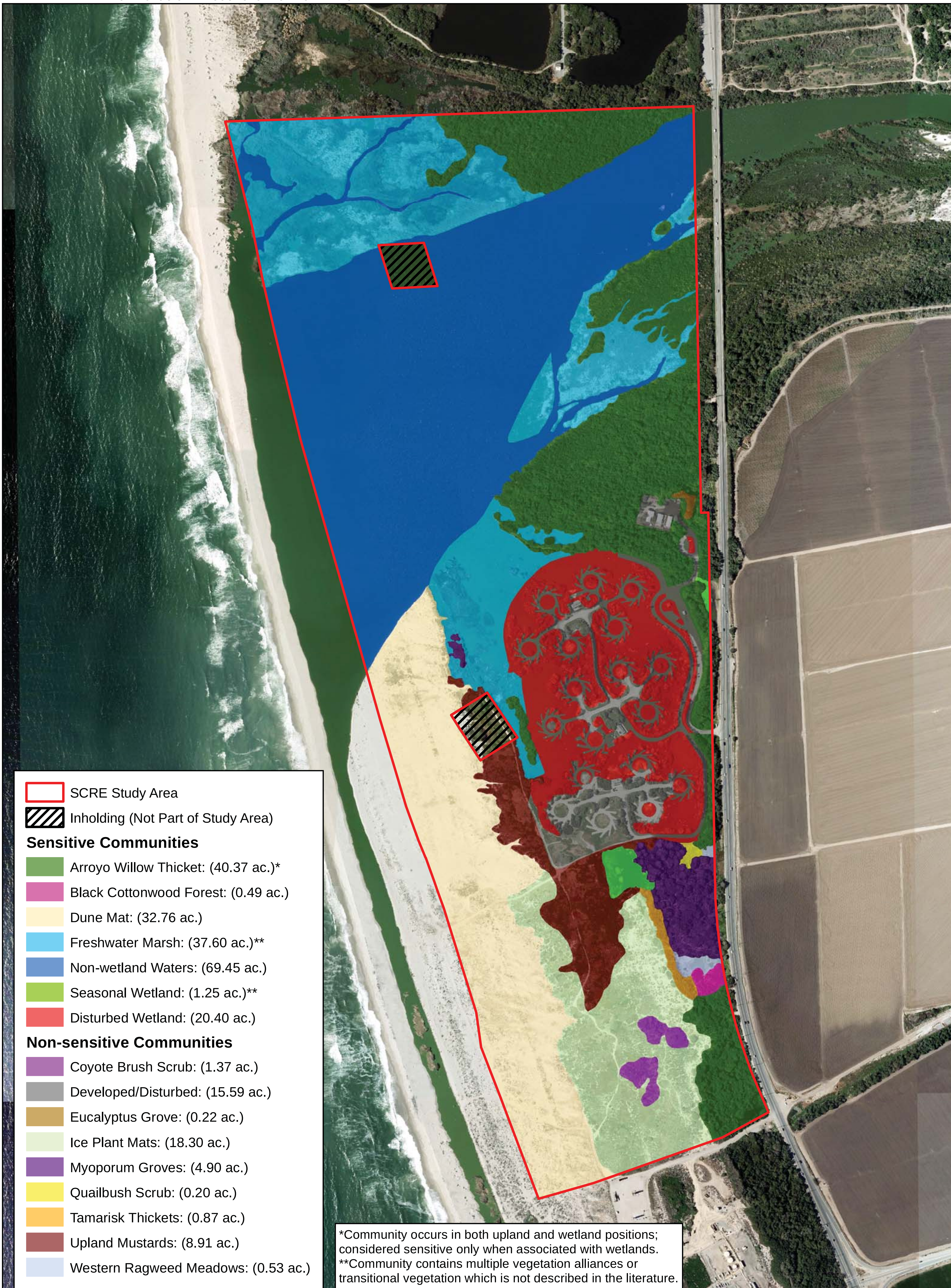

Figure 2. Biological Communities within the Study Area

N
W E
S

Santa Clara River Estuary
Ventura County, California

0 250 500 1,000
Feet
1 Inch = 500 Feet

wra
ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Novemebr 2014
Base Source: USGS April 2013

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\FigX_VegComm20141118.mxd

Tamarisk Thickets

Within the Study Area, 0.87 acre of tamarisk thickets was observed lining a dune crest extending from just south of the campground nearly to the southern end of the Study Area. Tamarisk thickets (Tamarix spp. Semi-natural Shrubland Stands, no rarity ranking; Sawyer et al. 2009) are usually found along arroyo margins, lake margins, ditches, washes, rivers, and along watercourses (Sawyer et al. 2009). This plant community contains tamarisk as one of the various dominant shrub canopy species, but can also contain emergent Fremont cottonwood (*Populus fremontii*) or willow (*Salix spp*.) trees at low cover (Sawyer et al. 2009). Holland (1986) describes this community as Tamarisk scrub, a weedy monoculture of Tamarix species that usually supplants native vegetation following major disturbances. Characteristic species in this community type include but are not limited to quail bush and saltgrass (*Distichlis spicata*) (Holland 1986). Tamarisk is rated by Cal-IPC as having “high” potential to cause negative ecological impacts (2014).

Upland Mustards

The Study Area contains a large extent (approximately 8.91 acres) of upland habitat dominated by summer mustard (*Hirschfeldia incana*). Sawyer et al. (2009) describe an upland mustard association (*Brassica nigra* and Other Mustards Semi-Natural Herbaceous Stands; no rarity ranking). Upland mustards occur in fallow fields, grasslands, along roadsides, on levee slopes, in disturbed scrublands, riparian areas, and waste places at elevations ranging from sea level to 1,500 meters (Sawyer 2009). Summer mustard is listed as having “moderate” potential to cause negative ecological impacts by the Cal-IPC (2011). Within the Study Area, this community occurs south of the campground, in the area that was historically disturbed by oil exploration activities.

Western Ragweed Meadows

Two small patches, totaling 0.53 acre, of western ragweed meadows exist south of campground within the Study Area. Western ragweed meadows (*Ambrosia psilostachya* Provisional Herbaceous Alliance, rarity ranking G4 S4) occurs on sandy to clay soils in intermittently wet and disturbed meadows and along salt and brackish marsh margins (Sawyer et al. 2009). This community typically has western ragweed (*Ambrosia psilostachya*) as a dominant or co-dominant in the herbaceous layer, with the herb canopy growing up to 1 meter in height and with an intermittent to continuous canopy (Sawyer et al. 2009). The rarity ranking of G4 S4 for western ragweed meadows indicates that this community is apparently secure globally and in California, and is therefore not considered sensitive under the CEQA (NatureServe 2010; Sawyer et al. 2009).

Developed/Disturbed Areas

Developed and disturbed portions of the Study Area (15.59 acres) consist of roads, buildings, and other built structures in the existing campground, State Park residences, and associated facilities. Developed and disturbed areas are not considered a sensitive biological community because they are entirely within the footprint of previous development and are subject to active maintenance activities when not flooded.

4.1.2 Sensitive Biological Communities

Arroyo Willow Thickets

Approximately 40.37 acres of Study Area contain arroyo willow thickets (*Salix lasiolepis* Shrubland Alliance, rarity ranking G4 S4), which can be found throughout California along stream banks and benches, seeps, and along drainages at elevations up to 2,170 meters

(Sawyer et al. 2009). Holland (1986) describes this community as Southern Willow Scrub, composed of dense, broadleaved, winter-deciduous riparian thickets dominated by several willow species with scattered emergent Fremont cottonwood and western sycamore (*Platanus racemosa*). While the rarity ranking of G4 S4 for arroyo willow thickets indicates that this community is apparently secure globally and in California (NatureServe 2010), this community generally occurs in wetland or riparian habitats and therefore is often protected by the Corps, the RWQCB, and the CDFW and may be considered sensitive under the CEQA and the City of Oxnard LCP (i.e., as a protected ESHA). Within the Study Area, arroyo willow thickets occur in both riparian and non-riparian positions. Arroyo willow thickets along the margins of the Santa Clara River were considered riparian, as were arroyo willow thickets that occurred along a ditch along the eastern edge of the campgrounds. However, a patch of arroyo willow thicket at the southeastern corner of the Study Area was not hydrologically connected to the Santa Clara River or any other stream-like feature, and therefore, was not considered riparian.

Black Cottonwood Forest

The Study Area contains one patch (0.49 acre) of black cottonwood forest, located south of the campground. Black cottonwood forest (*Populus trichocarpa* Forest Alliance, rarity ranking G5 S3) is dominated or co-dominated by black cottonwood (*Populus trichocarpa*) that reaches up to 30 meters in height with an intermittent to continuous canopy, an open to continuous shrub layer, and a sparse to abundant forb layer (Sawyer et al. 2009). Black cottonwood forest generally occurs in seasonally flooded and permanently saturated soils on stream banks and on alluvial terraces at elevations up to 2,800 meters above sea level (Sawyer et al. 2009); however, within the Study Area, it occurred in an upland positon with sandy soils. The rarity ranking of G5 S3 for black cottonwood forest indicates that this community is globally secure but vulnerable in California, and therefore, this community is considered sensitive under the CEQA (NatureServe 2010; Sawyer et al. 2009).

Dune Mat

The Study Area contains approximately 32.76 acres of dune mat vegetation that occurs within the foredunes at the western edge of the site. Dune mat (*Abronia latifolia-Ambrosia chamissonis* Herbaceous Alliance, rarity ranking G3 S3) contains a mix of sand verbena (*Abronia latifolia*) and beach bur (*Ambrosia chamissonis*) with other perennial and annual herbs, grasses, and low shrubs that form a low, sparse to continuous canopy less than 50 centimeters in height (Sawyer et al. 2009). This community is also known as Southern Foredunes (Holland 1986), which are areas of sand accumulation along the coast that lack perennial grasses and can have suffrutescent plants, with species commonly including verbenas (*Abronia* spp.) and burs (*Ambrosia* spp.). The rarity ranking of G3 S3 for dune mat indicates that this community is globally vulnerable and vulnerable in California, and is therefore considered sensitive under the CEQA (NatureServe 2010; Sawyer et al. 2009). In addition, dune mat vegetation is considered an ESHA under the CCC.

Freshwater Marsh

Approximately 37.60 acres of Coastal and Valley Freshwater Marsh (Holland 1986) was observed adjacent to the Santa Clara River within the Study Area. Coastal and Valley Freshwater Marsh typically occurs on sites lacking significant flow and that are permanently flooded by freshwater with prolonged saturation of deep, peaty soils (Holland 1986). Within the Study Area, areas mapped as freshwater marsh may be considered brackish at certain times of year, depending on the level of freshwater input from the Ventura Water Reclamation Facility and freshwater inputs upstream from the Study Area.

Within the Study Area, freshwater marsh was dominated by hardstem bulrush (*Schoenoplectus acutus*), cattail (*Typha* sp.), and giant reed (*Arundo donax*). Hardstem bulrush marsh (*Schoenoplectus acutus* Herbaceous Alliance, rarity ranking G5 S4) is described by Sawyer et al. (2009) as having membership rule of at least 10 percent absolute cover of hardstem bulrush in the herbaceous layer, with cattail that can occur between 30 to 60 percent relative cover. Giant reed breaks (*Arundo donax* Semi-Natural Herbaceous Stands, no rarity ranking, Cal-IPC High) are also described by Sawyer et al. (2009), which is a highly invasive community that can crowd out native vegetation, interfere with flood control efforts, increase fire potential, and decrease the quality of wildlife habitat.

While the communities that comprise the freshwater marsh are considered invasive or are native communities that are apparently or demonstrably secure worldwide and/or statewide, freshwater marsh is protected as wetland habitat and is regulated by the Corps, the RWQCB, and the CDFW. Freshwater marsh habitat is protected as an ESHA under the CCC and is considered sensitive under the CEQA.

<u>Seasonal Wetlands</u>

Seasonal wetlands are not described by Holland (1986) or Sawyer et al. (2009). Approximately 1.25 acres of seasonal wetland plant communities occur in the Study Area in swales and depressions that are ponded during the rainy season for sufficient duration to support vegetation adapted to wetland conditions. Seasonal wetlands in California are highly variable in plant composition, depending on the length of ponding or inundation and other factors such as soil salinity. They also generally lack the plant community assemblage typical of defined marshes and vernal pools.

Four seasonal wetland areas were identified around the campground areas within the Study Area. The seasonal wetland to the east of the campground was dominated by saltgrass, and Bermuda grass (*Cynodon dactylon*). To the south of the campground, the seasonal wetland was dominated by curly dock (*Rumex crispus*).

Saltgrass flats (*Distichlis spicata* Herbaceous Alliance, rarity ranking G5 S4) are dominated by saltgrass, a native perennial forb that occurs throughout the state of California in coastal salt marshes, playas, swales, and terraces along intermittently flooded washes (Sawyer et al. 2009). This alliance is considered demonstrably secure globally and apparently secure in California; however, because it occurs in seasonal wetlands, it is regulated by the Corps and RWQCB and is therefore considered sensitive under CEQA (CDFW 2014b; NatureServe 2014). Where this vegetation community occurs in wetlands, it is considered an ESHA under the CCC.

Curly dock seasonal wetlands are not described by Holland (1986) or Sawyer et al. (2009) and are not recognized by the CDFW. However, seasonal wetlands dominated by curly dock are common throughout California. This plant community does not have a sensitivity ranking; however, due to its occurrence in wetlands, it is regulated by the Corps and the RWQCB and is considered sensitive under the CEQA. This habitat is also considered an ESHA under the CCC.

<u>Disturbed Wetlands</u>

Disturbed wetlands, as a biological community, are not described by Holland (1986) or Sawyer et al. (2009). Wetlands within the campground totaling 20.40 acres were classified as disturbed wetlands due to the previous development and regular maintenance (e.g., mowing, pruning, etc.) associated with the campground. These wetlands were generally dominated by a mix of native and non-native herbaceous wetland species, with non-native landscape species dominating the areas along roads and around campsites. Within the area identified as disturbed wetlands, some areas were slightly elevated and contained evidence of hydric soils and wetland hydrology, but were dominated by upland vegetation. These wetlands were considered subject to jurisdiction by the CCC under the California Coastal Act, but not subject to other regulatory jurisdiction as they did not meet the three-parameter wetland definition used by the Corps and the RWQCB. These wetlands are considered sensitive if the CCC considers them to be within their jurisdiction. Disturbed wetland that meets the three-parameter wetland definition are considered sensitive if the Corps and RWQCB consider them to be within their jurisdictions. Herbaceous vegetation present in disturbed wetlands includes pickleweed, fleshy jaumea (*Jaumea carnosa*), salt grass, fat hen (*Atriplex prostrata*), western ragweed, and Bermuda grass.

<u>Non-Wetland Waters</u>

Non-wetland waters, as non-vegetated communities, are not described by Holland (1986) or Sawyer et al. (2009). Non-wetland waters comprising 69.45 acres were mapped in areas of open water in the footprint of the Santa Clara River and its associated lagoon. In addition, channels running through the freshwater marsh and scrub-shrub habitat along the margins of the Santa Clara River were also mapped as non-wetland waters. Based on patterns observed in historical aerial imagery of the site, it appears that the areas mapped as non-wetland waters remain inundated for only a portion of the year, when the River is in its non-breached phase. During the breached phase, a large portion of this area may dry down, exposing the substrates below.

4.2 Special-Status Species

4.2.1 Plants

Based upon a review of the literature and databases outlined in Section 3.2.1, 26 special-status plant species, including four Locally Important species, have been documented within the vicinity of the Study Area. An assessment of the potential for these species to occur within the Study Area is provided in Appendix C-C. The online databases, previous studies conducted in the Study Area (Swanson et al. 1990, ESA 2003, Stillwater Sciences 2007, Stillwater Sciences 2011), and other sources of information provide a strong idea of which plant species are likely to occur in and around the Study Area. The California Natural Diversity Database occurrences within five miles of the Study Area are shown on Figure 3. Although only seven special-status species occur within the CNDDB database within 5 miles of the Study Area, a total of 22 species were documented in the database search for the three referenced USGS 7.5-minute quadrangles. Based on the types and condition of habitats present within the Study Area, it was determined that 19 special-status species, including four Locally Important species, have a moderate to high potential to occur there, and four of those species were observed during the site assessment. The other five species occur in habitats not present within the Study Area such as chaparral or grasslands and are not discussed further within this document.

Special-status species that were observed or that were determined to have moderate to high potential to occur in the Study Area are discussed below. These are generally species associated with coastal dunes, wetlands, and the edges of estuaries. In general, the site assessment occurred outside or toward the end of the blooming period for most special-status plant species determined to have a moderate or high potential to occur at the site. In addition, the site assessment occurred at the end of the growing season during a record drought in California, and much of the annual vegetation had already senesced. These two factors limit the potential for observing many of the special-status plant species determined to have potential to occur in the Study Area, if they are present.

<u>Present</u>

Red sand verbena (*Abronia maritima*), CNPS RPR 4.2. Present. Red sand verbena is a perennial herb in the four o'clock family (Nyctaginaceae) that blooms from February to November. It typically occurs on sandy substrate in coastal dune habitats at elevations ranging from 0 to 325 feet (CNPS 2014). Observed associated species include pink sand verbena (*Abronia umbellata*), silver beach weed (*Ambrosia chamissonis*), sea rocket (*Cakile maritima*), beach primrose (*Camissoniopsis cheiranthifolia*), California buckwheat (*Eriogonum fasciculatum*), coast buckwheat (*Eriogonum latifolium*), dune bush lupine (*Lupinus chamissonis*), and wire lettuce (*Stephanomeria virgata*) (CDFW 2014a).

One individual red sand verbena was observed within the coastal dune habitat in the southwest portion of the Study Area during the September 2014 survey. In addition, several additional red sand verbena individuals were observed just outside of the southwest corner of the Study Area boundary, in foredune habitat. This species was not observed elsewhere in the Study Area during the September 2014 survey; however, it has potential to occur throughout the foredune habitat within the Study Area.

Ventura County Locally Important Plant Species. The following Ventura County Locally Important Plant Species were observed in the Study Area during the September 2014 survey:

- coast dudleya (*Dudleya caespitosa*)
- sand dune sedge (*Carex pansa*)
- fragrant flatsedge (*Cyperus odoratus*)

Coast dudleya was observed at the far southern end of the Study Area in disturbed backdune habitat. Sand dune sedge was observed in the south of the campground on a sandy berm between backdune habitat and a myoporum grove. Fragrant flatsedge was observed in disturbed wetland habitat in the north side of the campground. Though these species were only observed in the aforementioned locations, they have potential to occur elsewhere in the Study Area. These species are not considered rare or sensitive by the CDFW or the CNPS; however, they are afforded special protection under the City of Oxnard General Plan and CEQA.

<u>High Potential to Occur</u>

Aphanisma (*Aphanisma blitoides*), CNPS RPR 1B.2; Locally Important. High Potential. Aphanisma is an annual herb in the goosefoot family (Chenopodiaceae) that blooms from March to June. It is most often found on sandy substrates in coastal areas containing bluff scrub, dunes, or scrub, at elevations ranging from 1 to 305 meters (CNPS 2014).

The Study Area contains suitable coastal foredune habitat for this species, and aphanisma therefore was determined to have high potential to occur in dune mat habitat at the site. This species has less potential to occur within the historically disturbed foredune habitat inland from the intact foredunes in the Study Area. This species was not observed during the September and October site visits; however, the site visits occurred outside of the blooming period of this species, reducing the potential for locating this species, if present.

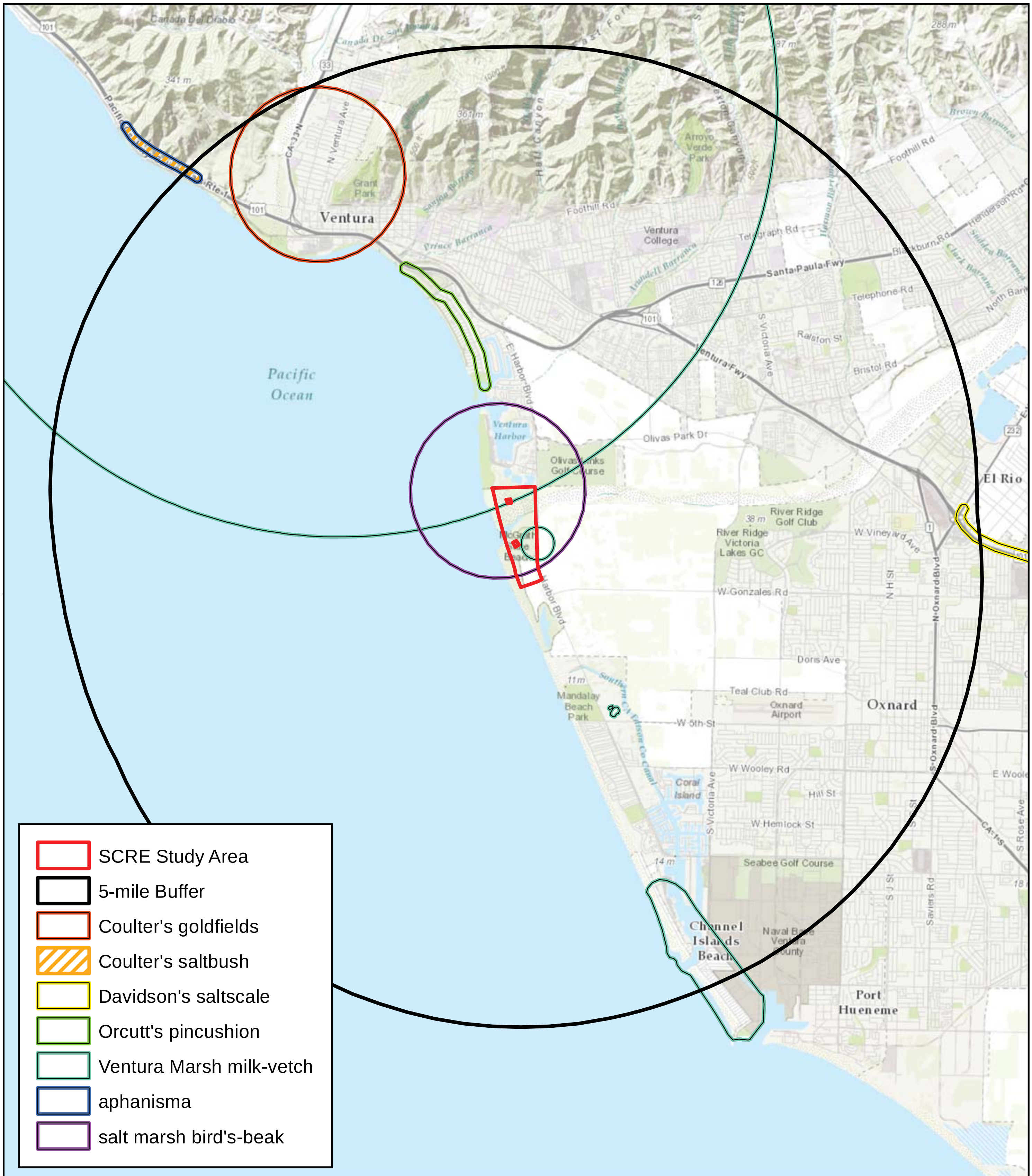

Figure 3. Special Status Plant Species Documented in CNDDB within a 5-mile Radius of the Study Area

Santa Clara River Estuary
Ventura County, California

N W E S

0 0.5 1 2 Miles

ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Novemebr 2014
Base Source: ESRI World Topo

Path: L:\Acad 2000 Files\18000\18106-2\GIS\ArcMap\FigX_CNDDBPlant.mxd

Ventura marsh milk vetch (*Astragalus pycnostachyus* var. *lanosissimus*), Federally Endangered; State Endangered; CNPS RPR 1B.1. High Potential. Ventura marsh milk-vetch is a perennial herb in the pea family (Fabaceae) that blooms from June to October. It typically occurs near sandy bluff seeps, behind barrier beaches, and near the high tide zone in coastal dune, coastal scrub, and coastal salt marsh habitats at elevations ranging from 0 to 115 feet (CNPS 2014, CDFW 2014a). Observed associated species include coyote brush, mulefat (*Baccharis salicifolia* ssp. *salicifolia*), arroyo willow, ice plant, myoporum, and rabbit's-foot grass (*Polypogon monspeliensis*; CDFW 2014a).

The Study Area contains suitable habitat in the foredune habitat at the western edge of the Study Area. There is also potential suitable habitat along the fringes of the estuary. This species was observed in an agriculture field southeast of the Study Area in 1997 (ESA 2003), and in 2002, an experimental population was planted at McGrath Lake, which is less than 1 mile south of the Study Area. The September and October site visits were conducted toward the end of the blooming period of Ventura marsh milk vetch, thereby reducing the potential for observing this species, if present.

Orcutt's yellow pincushion (*Chaenactis glabriuscula* var. *orcuttiana*), CNPS RPR 1B.1. High Potential. Orcutt's yellow pinchusion is an annual herb within the sunflower family (Asteraceae) that blooms from January to August. It typically occurs on sandy sites in coastal bluff scrub and coastal dune habitats at elevations ranging from 10 to 330 feet (CNPS 2014). Observed associated species include California buckwheat, beach primrose, silver beach weed, wire lettuce (*Stephanomeria* spp.), dune bush lupine (*Lupinus chamissonis*), and sand verbena species (*Abronia* spp.; CDFW 2014a).

The Study Area contains suitable foredune habitat for this species. Orcutt's yellow pincushion was not observed during the September and October site visits, but the site visits occurred outside of the blooming period of this species, thereby reducing the potential for observing this species, if present.

False goldenaster (*Heterotheca sessiliflora*), CNPS RPR 1B.1. High Potential. False goldenaster is a perennial herb in the sunflower family (Asteraceae) that blooms from March through December. It typically occurs in coastal chaparral, coastal dunes, and coastal scrub habitat at elevations up to 1,225 meters above sea level.

The western portion of the Study Area contains suitable foredune habitat for this species. This species was not observed during the site assessment; however, the September and October site visits were conducted toward the end of the blooming period of false goldenaster, which reduces the potential for observing this species, if present.

Mexican malacothrix (*Malacothrix similis*), CNPS RPR 2A. High Potential. Mexican malacothrix is an annual herb in the sunflower family (Asteraceae) that blooms from April through May. It typically occurs in coastal dunes at elevations ranging from 0 to 40 meters.

The western portion of the Study Area contains suitable foredune habitat for this species. Mexican malacothrix was not observed during the September and October site visits, but the site visits occurred outside of the blooming period of this species, thereby reducing the potential for observing this species, if present.

Branching phacelia (*Phacelia ramosissima* var. *austrolitoralis*), CNPS RPR 3.2. High Potential. South Coast branching phacelia is a perennial forb in the waterleaf family (Hydrophyllaceae) that blooms from March to August. It typically occurs in sandy or well drained substrate in chaparral, coastal dune, coastal scrub, and coastal salt marsh habitat at elevations ranging from 15 to 1,000 feet (CNPS 2014). Observed associated species are not reported in the literature; however, based on the experience of WRA biologists, associated species include dune bush lupine, pink sand verbena, California suncup (*Camissoniopsis bistorta*), beach primrose, and Madrid brome (*Bromus madritensis*).

Suitable habitat for this species is present in the foredune portions of the Study Area. There is also potential suitable habitat along the fringes of the estuary. Branching phacelia was not observed during the September and October site visits; however, the site visits occurred outside of the blooming period of this species, thereby reducing the potential for observing this species, if present.

Estuary seablite (*Suaeda esteroa*), CNPS RPR 1B.2; Locally Important. High Potential. Estuary seablite is an evergreen shrub in the goosefoot family (Chenopodiaceae) that blooms from May to October. It typically occurs in marshes and swamps at elevations ranging from 0 to 15 feet (CNPS 2014). Observed associated species include California sagebrush (*Artemisia californica*), alkali heath (*Frankenia salina*), alkali weed (*Cressa truxillensis*), pickleweed, coast buckwheat, and bladder pod (*Isomeris arborea*) (CDFW 2014a).

The Study Area contains suitable habitat for this species along the fringes of the estuary. This species was not observed during the site assessment; however, the September and October site visits were conducted toward the end of the blooming period of estuary seablite, thereby reducing the potential to observe this species, if present.

Wooly seablite (*Suaeda taxifolia*), CNPS RPR 4.2. High Potential. Woolly seablite is an evergreen shrub in the goosefoot family (Chenopodiaceae) that blooms from January to December. It typically occurs in coastal bluff scrub, coastal dunes, and within the margins of coastal salt marshes and swamps at elevations ranging from 0 to 165 feet (CNPS 2014). Observed associated species are not reported in the literature; however, observations by WRA include pickleweed species, slender leaf iceplant (*Conicosia pugioniformis*), and acacias (*Acacia* spp.).

The Study Area contains suitable habitat in the foredune areas. There is also potential suitable habitat along the fringes of the estuary. The September and October site visits were conducted during the blooming period of wooly seablite, but this species was not observed.

Ventura County Locally Important Plant Species. Three Ventura County Locally Important plant species have been documented in McGrath State Beach by David Magney (2005), although it is unknown whether they were documented within the Study Area. Two species—Ventura marsh milkvetch and salt marsh bird's beak—are discussed elsewhere in this section. The third species—seaside fiddleneck (*Amsinckia spectabilis* var. *spectabilis*)—was determined to have high potential to occur in the Study Area because of suitable coastal dune habitat and because it has been documented recently in close proximity to, if not within, the Study Area. Seaside fiddleneck was not observed during the site assessment; however, the September and October site visits occurred outside or at the end of the blooming periods for this species, thereby reducing the potential to observe it, if present.

<u>Moderate Potential to Occur</u>

Coulter's saltbush (*Atriplex coulteri*), CNPS RPR 1B.2. Moderate Potential. Coulter's saltbush is a perennial herb in the goosefoot family (Chenopodiaceae) that blooms from March to October. It is found on alkaline or clay soils in coastal bluff scrub, coastal dunes, coastal scrub, and valley and foothill grassland, from 10 to 1,500 feet in elevation, in Los Angeles, Orange, Santa Barbara, San Bernardino, San Diego, San Luis Obispo, and Ventura counties, including the Channel Islands (CNPS 2014).

The Study Area contains suitable habitat in the more stable portions of foredune areas. The Study Area contains coastal scrub habitat, but it occurs in small patches in the historically disturbed backdune habitat inland from the intact foredunes. The nearest documented occurrence of this species approximately 5 miles to the northwest and is potentially a misidentification. This species was not observed during the site assessment; however, the September and October site visits were conducted toward the end of the blooming period of this species, thereby reducing the potential to observe this species, if present.

Pacific saltbush (*Atriplex pacifica*), CNPS RPR 1B.2. Moderate Potential. South Coast saltscale is an annual herb in the goosefoot family (Chenopodiaceae) that blooms from March to October. It typically occurs on alkali soils in coastal bluff scrub, coastal dunes, coastal scrub, playa, and the margins of coastal salt marsh habitats at elevations ranging from 0 to 460 feet (CNPS 2014). Observed associated species include coastal goldenbush (*Isocoma menziesii*), American wild carrot (*Daucus pusillus*), pygmy weed (*Crassula connata*), Australian saltbush (*Atriplex semibaccata*), alkali heath, toad rush (*Juncus bufonius*), inkweed (*Suaeda torreyana*), Parish's pickleweed (*Salicornia subterminalis*), royal goldfields (*Lasthenia coronaria*), alkali pepperweed (*Lepidium dictyotum*), coastal prickly pear (*Opuntia littoralis*), and lemonade berry (*Rhus integrifolia*) (CDFW 2014a).

The Study Area contains suitable habitat in the foredune areas. There is also potential suitable habitat along the fringes of the estuary. This species was not observed during the site assessment; however, the September and October site visits were conducted toward the end of the blooming period of this species, thereby reducing the potential to observe this species, if present.

Davidson's saltbush (*Atriplex serenana* var. *davidsonii*), CNPS RPR 1B.2. Moderate Potential. David's saltscale is an annual herb within the goosefoot family (Chenopodiaceae) that blooms from April to October. It typically occurs on alkaline soils in coastal bluff scrub and coastal scrub habitats at elevations ranging from 30 to 650 feet (CNPS 2014). Known associated species include several pickleweed (*Salicornia* spp.) and saltscale (*Atriplex* spp.) species (CDFW 2014a).

The Study Area contains suitable habitat in the backdune areas in coyote brush scrub and ice plant mats habitat. This species was not observed during the site assessment; however, the September and October site visits were conducted toward the end of the blooming period of this species, thereby reducing the potential to observe this species, if present.

Salt marsh bird's-beak (*Chloropyron maritimum* ssp. *maritimum)*, Federally Endangered; State Endangered; CNPS RPR 1B.2; Locally Important. Moderate Potential. Salt marsh bird's-beak is an annual, hemiparasitic herb in the broomrape family (Orobanchaceae) that blooms from May to October and occurs in coastal dunes and coastal salt marshes and swamps, at elevations up to 30 meters above sea level (CNPS 2014). It blooms from May to October.

The Study Area contains suitable habitat in the foredune areas. There is also potential suitable habitat along the fringes of the estuary. There is a CNDDB record of salt marsh bird's-beak from 1960 at the far northwest corner of the Study Area. However the exact location is unknown. This species was last documented in the estuary in 1983 (Covin and Norby 1986, as cited in Swanson et al. 1990). This species was not observed during the site assessment; however, the September and October site visits were conducted toward the end of the blooming period of this species, thereby reducing the potential to observe this species, if present.

Leopold's rush (*Juncus acutus*), CNPS 4.2. Moderate Potential. Southwestern spiny rush is a perennial graminoid in the rush family (Juncaceae) that blooms from May to June, with readily identifiable floral and vegetative structures persisting through summer. It is typically located in mesic, alkali sites in coastal dune, meadow, seep, and coastal salt marsh habitats at elevations ranging from 10 to 2,925 feet (CNPS 2014). Observed associated species are not reported in the literature.

The Study Area contains suitable habitat in foredune areas that border wetlands. There is also potential suitable habitat along the fringes of the estuary. This species was not observed during the site assessment; however, the September and October site visits were conducted outside of the blooming period of this species, thereby reducing the potential to observe this species, if present.

Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*), CNPS RPR 1B.1; Locally Important. Moderate Potential. Coulter's goldfields is an annual forb in sunflower family (Asteraceae) that blooms from February to June. It typically occurs on sandy soils in coastal salt marsh, playa, valley and foothill grassland, and vernal pool habitat at elevations ranging from 1 to 4,000 feet (CDFW 2014A, CNPS 2014). Observed associated species include Olney's bulrush (*Scirpus maritimus*), alkali popcornflower (*Plagiobothrys leptocladus*), Mojave seablite (*Suaeda torreyana*), brass buttons (*Cotula coronopifolia*), alkali weed, rabbit's-foot grass, toad rush, Italian rye grass (*Festuca perennis*), alkali heath, five hook (*Bassia hyssopifolia*), prairie plantain (*Plantago elongata*), yellow sweet clover (*Melilotus indicus*), and salt sandspurry (*Spergularia marina*) (CDFW 2014a).

The Study Area contains suitable habitat on the fringes of the estuary and in seasonal wetland habitat south of the campground. This species was not observed during the site assessment; however, the September and October site visits were conducted outside of the blooming period of this species, thereby reducing the potential to observe this species, if present.

4.2.2 Wildlife

Results from the literature search indicate that 95 special-status species of wildlife have been recorded in the vicinity of the Study Area. These species are listed in Appendix C-B-2. Special-status species documented in CNDDB within five miles of the Study Area are shown in Figure 4 (CDFW 2014a). A total of 47 special-status species have potential to occur within the Study Area. Ten of these special-status species were observed during the October 2014 site visit, including western snowy plover (*Charadrius alexandrinus nivosus*), which has designated Critical Habitat within the Study Area. The Study Area contains designated Critical Habitat or Recovery Plan management areas for three additional special-status species not observed during the site visit: California least tern (*Sterna antillarum browni*), southern steelhead (*Oncorhynchus mykiss*), and tidewater goby (*Eucyclogobius newberryi*). These three species, along with 12 additional special-status species have been recently documented in the Study Area and are considered present within the Study Area (ESA 2003, Stillwater Sciences 2011, Rincon 2013). An additional 22 special-status species have a high or moderate potential to occur within the Study Area. Special-status wildlife species that are present or have potential to occur in the Study Area are discussed below. Species listed as Locally Important or Sensitive by Ventura County are also discussed below based on their potential to occur within the Study Area.

Special-Status Wildlife Species Observed within the Study Area during the Site Visit

Northern harrier (*Circus cyaneus*), CDFW Species of Special Concern. In southern California, harriers are both residents and winter visitors. Harriers reside in open wetlands, including marshy meadows; wet, lightly grazed pastures; old fields; freshwater and brackish marshes. They also frequent also dry uplands, including upland prairies, mesic grasslands, drained marshlands, croplands, cold desert shrub-steppe, and riparian woodland throughout California (MacWhirter and Bildstein 1996). Harriers typically nest on ground in open (treeless) habitats in dense, often tall, vegetation. They exhibit extremely varied choice of vegetative cover, even within a single area. Nests are built of a large mound of sticks. This species was observed within the Study Area during the October 2014 site visit, outside of the breeding season. While the Study Area provides suitable marsh foraging and nesting and nesting habitats, the Study Area is outside of this species' documented breeding range, so it is unlikely to nest there (Shuford and Gardali 2008).

White-tailed kite (*Elanus leucurus*), CDFW Fully Protected Species. Kites occur in low elevation grassland, agricultural, wetland, oak woodland, and savannah habitats. Riparian zones adjacent to open areas are also used. Vegetative structure and prey availability seem to be more important than specific associations with plant species or vegetative communities. Lightly grazed or ungrazed fields generally support large prey populations and are often preferred to other habitats. Kites primarily feed on small mammals, although, birds, reptiles, amphibians, and insects are also taken. Nest trees range from single isolated trees to trees within large contiguous forests. Preferred nest trees are extremely variable, ranging from small shrubs (less than 10 ft. tall), to large trees (greater than 150 ft. tall). (Dunk 1995). This species was observed within the Study Area during the October 2014 site visit, outside of the breeding season. The Study Area provides suitable open habitat for foraging white-tailed kites, and trees within the Study Area are suitable for breeding with this species.

American peregrine falcon (*Falco peregrinus anatum*); Federal Delisted, State Endangered, CDFW Fully Protected Species, USFWS Bird of Conservation Concern. This large falcon occurs as a generally uncommon resident as well as a winter visitor and migrant throughout much of California. Occupied habitat (both breeding and non-breeding) is highly variable, but this species is typically associated with open areas and/or bodies of water. Nesting typically occurs on the ledges of steep cliffs, or man-made structures with ledges above sheer faces such as bridges and the tops of buildings (White et. al 2002). The species preys upon a wide variety of animals, mostly birds; on the Pacific coast, waterbirds (e.g. waterfowl, shorebirds and seabirds) are especially favored (White et. al 2002). This species was observed in the Study Area during the October 2014 site visit, outside of the breeding season. While the Study Area provides coastal foraging habitat for this species, it does not contain cliffs or other suitable nesting structures for nesting peregrine falcons so this species is unlikely to breed on the site.

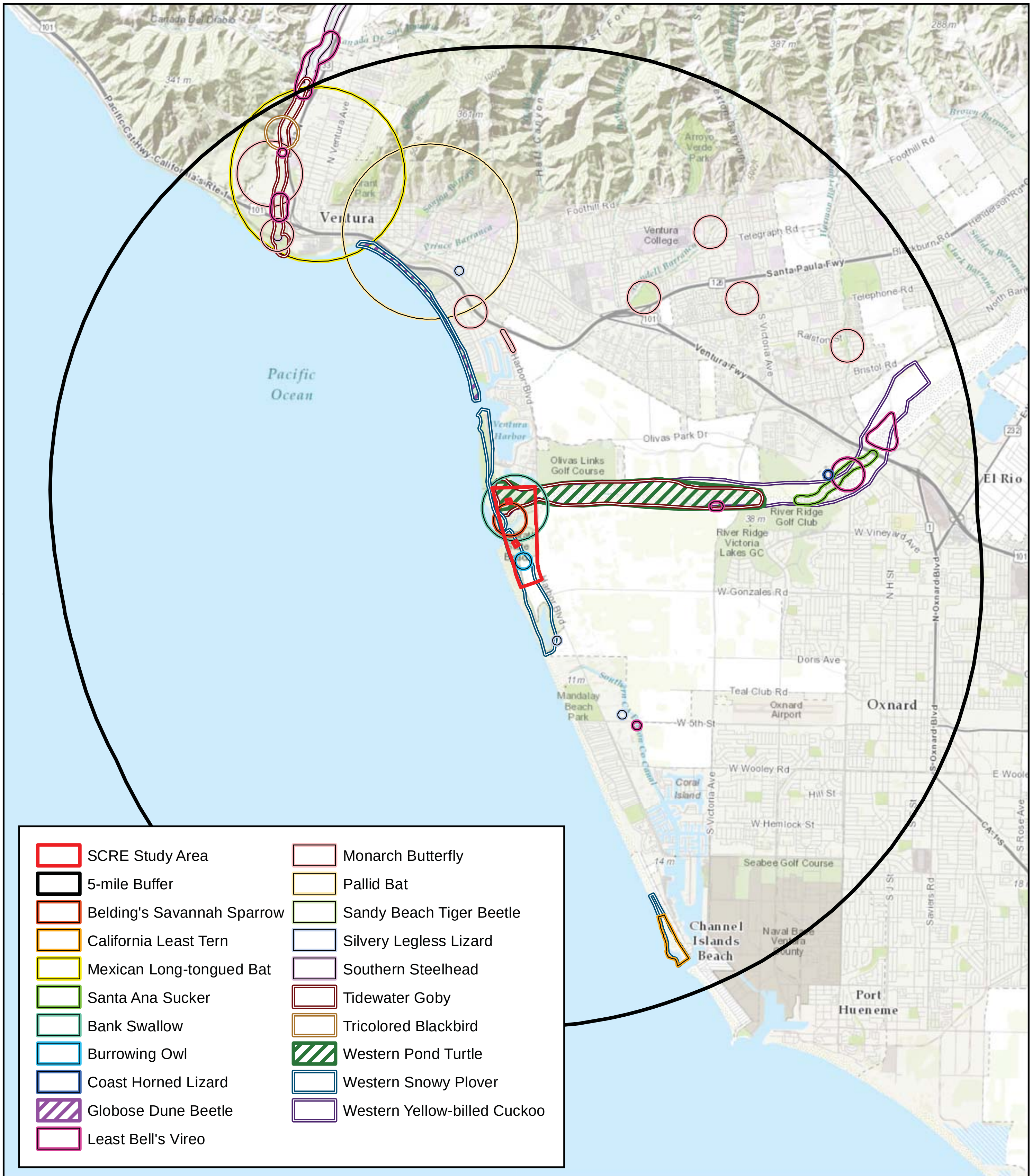

Figure 4. Special Status Wildlife Species Documented in CNDDB within a 5-mile Radius of the Study Area

Santa Clara River Estuary
Ventura County, California

WRA ENVIRONMENTAL CONSULTANTS

Map By: SG
Date: Novemebr 2014
Base Source: ESRI World Topo

Western snowy plover (*Charadrius alexandrinus nivosus*), Federally Threatened, CDFW Species of Special Concern. USFWS Bird of Conservation Concern. The Pacific coast breeding population of the western snowy plover currently extends from Washington to Baja California, Mexico (USFWS 2007). Western snowy plovers breed primarily above the high tide line on coastal beaches, sand spits, dune-backed beaches, sparsely vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries. Less common nesting habitats include bluff-backed beaches, dredged material disposal sites, salt pond levees, dry salt ponds, and river bars (USFWS 2007). Nests typically occur in flat, open areas with sandy or saline substrates where vegetation and driftwood are usually sparse or absent. Nesting season extends from early March through late September. Snowy plover winters mainly in coastal areas from southern Washington to Central America. In winter, snowy plovers are found on many of the beaches used for nesting as well as on beaches where they do not nest, in man-made salt ponds, and on estuarine sand and mud flats (USFWS 2007). The Study Area contains portions of unit CA 38 of USFWS designated Critical Habitat for western snowy plover, and this species was observed in the Study Area during the October 2014 site visit (USFWS 2007).

Bank swallow (*Riparia riparia*), State Threatened. In California, historical range in southern and central areas has been eliminated by loss of nesting habitat due to flood and erosion-control projects, but the species is currently known to breed in Siskiyou, Shasta, and Lassen Cos., and along Sacramento River from Shasta Co. south to Yolo Co. (Garrison 1999).Throughout much of its western North American breeding range, the bank swallow nests in erodible soils on vertical or near-vertical banks and bluffs in lowland areas dominated by rivers, streams, lakes, and oceans. The species breeds locally throughout its range where suitable habitat exists, generally at lower elevations. Suitable conditions for breeding are often ephemeral; thus breeding locations may change frequently. This species was observed within the Study Area outside of the breeding season during the October 2014 site visit. While this species nested within the Study Area in 1976 (CDFW 2014a), it is now considered extirpated as a breeder in southern California and is thus unlikely to breed within the Study Area (Garrison 1999).

American white pelican (*Pelecanus erythrorhynchos*); CDFW Species of Special Concern. This pelican is primarily an inland species, occurring along the coast of southern California as a migrant and winter visitor. The nearest breeding locations are in northeastern California (Shuford and Gardali 2008). Prey consists primarily of small, schooling fishes; foraging typically occurs in shallow waters, often cooperatively. This species was observed during the October 2014 site visit. The open waters of the Study Area provide wintering habitat for this species. However, this species does not breed in Ventura County (Zeiner et al. 1990).

California brown pelican (*Pelecanus occidentalis californicus*), Federal Delisted, State Delisted, CDFW Fully Protected Species. The California brown pelican nests in colonies on offshore islands, from the Channel Islands southward, that are free of mammalian predators and human disturbance. This species is a winter/non-breeding visitor to estuarine, marine subtidal, and marine pelagic waters along the California coast. Brown pelicans forage for surface-shoaling fishes in open water by plunge-diving, and roost in groups on coastal rocks, sandbars and man-made structures such as jetties and piers. This species was observed during the October 2014 site visit. The Study Area provides non-breeding foraging and roosting habitat for this species. This species does not breed in Ventura County (Zeiner et al. 1990).

Allen's hummingbird (*Selasphorus sasin*). USFWS Bird of Conservation Concern. Allen's hummingbird, common in many portions of its range, is a summer resident along the majority of California's coast and a year-round resident in portions of coastal southern California and the Channel Islands. Breeding occurs in association with the coastal fog belt, and typical habitats used include coastal scrub, riparian, woodland and forest edges, and eucalyptus and cypress groves (Mitchell 2000). This hummingbird feeds on nectar, as well as insects and spiders. There are a variety of suitable habitats for this species throughout much of the Study Area; areas most likely to be utilized for breeding include riparian corridors interfacing with scrub habitats and planted tree groves. Allen's hummingbird was observed within the Study Area during the October 2014 site visit. While this observation occurred during migration, this species is a common breeder in Ventura County and the Study Area provides suitable scrub and riparian habitats for nesting in this species.

Monarch butterfly (*Danaus plexippus*). CDFW Special Status Invertebrate. This large, showy butterfly is found throughout the United States, southern Canada, and Central America. It also occurs in parts of South America and other continents. In North America, this species spends spring and summer months breeding and foraging across much of its range. Monarch butterfly generally uses milkweed (*Asclepias* spp.) for both breeding and nectaring, although nectar may also be obtained from a variety of additional plant species. From August to October, monarchs will migrate thousands of miles to winter roost sites located along the California Coast and central Mexico. At roost sites, monarchs will congregate in thousands or millions on a tree or group of trees (Opler, Lotts, and Naberhaus, 2011). Winter roost sites are located in wind protected tree groves, with nectar and water sources nearby. While this species was observed during the October 2014 site visit, the Study Area does not contain groves of coastal tree species that would likely support wintering butterflies. Trees would likely not be sufficient to shelter monarchs against wind and low temperatures. This species may occasionally pass through or migrate through the Study Area.

Globose dune beetle (*Coelus globosus*), Venture County Sensitive Species. Inhabitant of coastal sand dune habitat, from Bodega Head in Sonoma County south to Ensenada, Mexico. The species is widely distributed in spite of the fact that the adults lack functional wings. Inhabits foredunes and sand hummocks; it burrows beneath the sand surface and is most common beneath dune vegetation. These beetles are primarily subterranean, tunneling through sand underneath dune vegetation (Doyen 1976). This species was observed in the Study Area during the October 2014 site visit. Suitable dune habitat is available within the western portion of the Study Area for this species.

<u>Special-Status Wildlife Species Documented to Occur in the Study Area</u>

California least tern (*Sternula antillarum browni*), Federal Endangered, State Endangered, CDFW Fully Protected Species. California least tern is a summer resident in California, with a current breeding distribution from the San Francisco Bay Area south to Baja California. This distribution is widely fragmented as a result of human activities. The California subspecies winters on the southern coast of Mexico and the Gulf of California. The nesting season lasts from mid-April through August, with peak activity between June and July. Least terns typically nest in loose colonies on flat sand-shell beaches, mud or gravel flats, and man-made habitats including airports, landfills, and dredge-fill sites, relatively free of plant growth (Fancher 1992). Typical colony population size is 25 pairs (USFWS 2006b). Islands or isolated beaches are preferred, and nest sites are generally located in the proximity of suitable foraging habitat including coastal lagoons, estuaries, or rivers. Colony size may be linked to habitat availability, as nests may be located between 10 to 300 feet apart (USFWS 1985). Least terns forage in inshore waters for small fishes.

The beaches within the Study Area provide suitable breeding habitat for this species, and breeding occurrences of California least tern have been documented along the western portion of the Study Area between 2007 and 2009 (Stillwater Sciences 2011). The Santa Clara River estuary is part of Coastal Management Area E under the 1985 USFWS California Least Tern

Recovery Plan. Furthermore, dune communities and the lagoon within the Study Area are noted as least tern breeding habitat in the Oxnard Costal Land Use Plan.

Long-billed curlew (*Numenius americanus*). USFWS Bird of Conservation Concern. This large sandpiper is a relatively common winter visitor to the California coast and the Central Valley, foraging for invertebrates on mudflats (both tidal and non-tidal), and also open grasslands and pastures with relatively short vegetation. Breeding within California is restricted to the northeastern portion of the state, where short-grass prairies, wet meadows and pastures are utilized (Dugger and Dugger 2002). The Study Area provides suitable estuarian wintering habitat for this species, and this species has been documented in the vicinity of the Study Area and has previously been reported to occur at the site (ESA 2003, eBird 2014). However, this species does not breed in Ventura County, and thus it is highly unlikely it will breed at the Study Area.

Caspian tern (*Hydroprogne caspia*). USFWS Bird of Conservation Concern. Caspian tern is the largest tern species, and a summer and yearlong resident in southern California. It breeds colonially on undisturbed, sparsely-vegetated islands or beaches with adjacent expanses of open water including estuaries, large lakes, and rivers. Nests are placed on the ground, with a variety of soil types and substrates used. Many of the largest nesting colonies on the Pacific Coast occur on artificial features, e.g. dredge spoil islands. The species forages almost exclusively on fishes, which are captured via plunge-diving. The Study Area provides suitable breeding habitat for this species and is within its documented breeding range (Zeiner et al. 1990). This species has been observed in the vicinity of the Study Area in 2014 and has previously been reported to occur at the site (ESA 2003, eBird 2014).

Nuttall’s woodpecker (*Picoides nuttallii*). USFWS Bird of Conservation Concern. Nuttall’s Woodpecker, common in much of its range, is a year-round resident throughout most of California west of the Sierra Nevada. Typical habitat is oak or mixed woodland, and riparian areas (Lowther 2000). Nesting occurs in tree cavities, principally those of oaks and larger riparian trees. This species forages on a variety of arboreal invertebrates. Suitable riparian habitat is available within the Study Area to support foraging Nuttall’s woodpecker, and large trees within the Study Area may provide cavities for nesting. This species has previously been reported to occur at the site (ESA 2003).

(Brewster’s) yellow warbler (*Setophaga petechia brewsteri*), CDFW Species of Special Concern, USFWS Bird of Conservation Concern. The yellow warbler is a neotropical migrant bird that is widespread in North America, but has declined throughout much of its California breeding range. The Brewster’s (*brewsteri*) subspecies is a summer resident and represents the vast majority of yellow warblers that breed in California. West of the Central Valley, typical yellow warbler breeding habitat consists of dense riparian vegetation along watercourses, including wet meadows, with willow growth especially being favored (Shuford and Gardali 2008). Insects comprise most of the diet. The Study Area is within this species’ breeding range, and willow riparian habitat suitable for foraging and/or nesting yellow warblers is present within the Study Area (Shuford and Gardali 2008). This species has previously been reported to occur at the site (ESA 2003).

Yellow-breasted chat (*Icteria virens*), CDFW Species of Special Concern. The yellow-breasted chat is a generally uncommon summer resident that occurs throughout California. It is an aberrantly large member of the wood-warbler family (Parulidae). Breeding habitat consists of early successional-type riparian habitats where a dense understory of thickets and tangles forms below an open canopy; plant species typically used for nesting include blackberry, wild grape, and willows (Shuford and Gardali 2008). Though males often sing from exposed perches in trees, this species is generally secretive and difficult to observe. The Study Area provides the dense riparian understory that this species prefers, and the Study Area is within the species' breeding range (Shuford and Gardali 2008). This species has previously been reported to occur at the site (ESA 2003).

Redhead (*Aythya americana*), CDFW Species of Special Concern. Although migratory, this duck occurs year-round in California. Breeding occurs in scattered, lower-elevation areas of the interior (e.g., the Central Valley and Great Basin) and along portions of the southern California coast (Shuford and Gardali 2008). Breeding habitat consists of deeper marshes with both open water and dense stands of emergent vegetation, where nests are constructed. Females also regularly lay their eggs in the nests of other duck species. Wintering typically occurs on larger, deeper bodies of inland waters. Food consists of aquatic plants and invertebrates captured via diving. The Study Area is located within this species' breeding range (Shuford and Gardali 2008). Suitable wetland breeding and wintering habitat exists within the Study Area, and this species has been documented both in spring and fall months in the large ponds approximately 250 feet north of the Study Area in 2014 (ESA 2003, eBird 2014).

Common loon (*Gavia immer*), CDFW Species of Special Concern. In California, common loon nest at certain large lakes and reservoirs in the interior of the state, primarily in the northeastern plateau region. This species prefers lakes larger than 24 hectares with clear water, an abundance of small fish, numerous small islands, and an irregular shoreline that creates coves, but has been documented using a wider variety of freshwater aquatic habitats, including reservoirs (Evers et al 2010). This species over-winters along the Pacific coast, and wintering and non-breeding loons generally use habitat within inland coastal waters such as bays, channels, coves, and inlets; rarely occupies habitat more than several kilometers offshore. The use of specific marine habitat is dictated primarily by prey availability, which is influenced by water depth, clarity and salinity gradients, and tide lines (Evers et al 2010). While the Study Area is not within this species' breeding range, the open waters within the Study Area provide winter habitat for common loon. This species has been documented in the Study Area (ESA 2003, eBird 2014).

Western burrowing owl (*Athene cunicularia*), CDFW Species of Special Concern; USFWS Bird of Conservation Concern. The burrowing owl typically favors flat, open grassland or gentle slopes and sparse shrub-land ecosystems. These owls prefer annual or perennial grasslands, typically with sparse or nonexistent tree or shrub canopies; however, they also colonize debris piles and old pipes. Burrowing owls exhibit high site fidelity and usually nest in abandoned burrows of ground squirrels or pocket gophers. The Study Area contains open habitats and some suitably-sized burrows to accommodate this species. While the Study Area is outside this species' known breeding range, the Study Area is within this species' winter range. One burrowing owl was documented approximately 140 feet south of the Study Area in February of 2002 (ESA 2003, CDFW 2014a).

Loggerhead shrike (*Lanius ludovicianus*), CDFW Species of Special Concern, USFWS Bird of Conservation Concern. Loggerhead shrike is a common resident and winter visitor in lowlands and foothills throughout California. It prefers open habitats with scattered trees, shrubs, posts, fences, utility lines or other perches. Nests are usually built on a stable branch in a densely-foliaged shrub or small tree and are usually well-concealed. While this species eats mostly arthropods, they also take amphibians, small to medium-sized reptiles, small mammals and birds. They are also known to scavenge on carrion. The Study Area provides suitable shrub habitats for nesting and open habitats for foraging by this species. Additionally, the Study Area is within this species' breeding range per a recent monograph in Shuford and Gardali (2008), and the species has been previously documented at the site (ESA 2003).

Silvery legless lizard (*Anniella pulchra pulchra*), CDFW Species of Special Concern. The silvery legless lizard is subspecies of the California legless lizard, with a spotty distribution along the California coast that includes Ventura County. This burrowing species is associated with sandy or loose organic soils or areas where there is abundant leaf litter and cover. Often frequents sparsely vegetated areas of beaches, dune habitats, chaparral, pine-oak woodland, stream sides or desert washes. Legless lizards are often found under surface objects that lie barely covered in loose soil, such as logs, rocks, boards and woodrat nests. Because legless lizards are dependent on loose soil and soil moisture; their habitat can be greatly degraded by urbanization, agriculture and non-native vegetation**.** The primary source of food for this species is spiders and insects including termites, small lepidopterans, beetles, and insect larvae insect larvae (Stebbins 2003). Sand dunes and scrub communities within the Study Area provide habitat for this species. This species has been documented in sand dunes 1 mile south of the Study Area and has previously been identified at the site (ESA 2003, CDFW 2014a).

Pacific (western) pond turtle (*Actinemys marmorata*), CDFW Species of Special Concern. Pacific pond turtle (PPT) is uncommon to common in freshwater aquatic habitat throughout California, west of the Sierra-Cascade crest and Transverse Ranges. PPT inhabits annual and perennial aquatic habitats, such as coastal lagoons, lakes, ponds, marshes, rivers, and streams from sea level to 5,500 feet in elevation. PPT also occupies man-made habitats such as stock ponds, wastewater storage, percolation ponds, canals, and reservoirs. This species requires low-flowing or stagnant freshwater aquatic habitat with suitable basking structures, including rocks, logs, algal mats, mud banks and sand. Warm, shallow, nutrient-rich waters are ideal as they support PPT prey items, which include aquatic invertebrates and occasionally fish, carrion, and vegetation. Turtles require suitable aquatic habitat for most of the year; however, PPT often occupies creeks, rivers, and coastal lagoons that become seasonally unsuitable. To escape periods of high water flow, high salinity, or prolonged dry conditions, PPT may move upstream and/or take refuge in vegetated, upland habitat for up to four months (Rathbun et al. 2002). Although upland habitat is utilized for refuging and nesting, this species preferentially utilizes aquatic and riparian corridors for movement and dispersal.

PPT nests from late April through July. This species requires open, dry upland habitat with friable soils for nesting and prefer to nest on unshaded slopes within 5 to 100 meters of suitable aquatic habitat (Rathbun et al. 1992). Females venture from water for several hours in the late afternoon or evening during the nesting season to excavate a nest, lay eggs, and bury the eggs in well concealed nests. Hatchlings generally emerge in late fall but may overwinter in the nest and emerge in early spring of the following year.

Aquatic and riparian habitats within the Study Area are highly suitable for this species, as they provide foraging, basking, and nesting habitats. PPT has been documented 1 mile upstream of the Study Area along Santa Clara River, and has previously been documented within the Study Area (ESA 2003, CDFW 2014a).

Southern steelhead-Southern California DPS (*Onocorhynchus mykiss irideus*), Federal Endangered, CDFW Species of Special Concern. The southern steelhead-southern California DPS includes all naturally spawned anadromous *O. mykiss* (steelhead) populations below natural and manmade impassable barriers in streams from the Santa Maria River, San Luis Obispo County, California, (inclusive) to the U.S.-Mexico Border. The life history patterns for steelhead are both highly variable and flexible (Moyle 2002). While similar to most Pacific salmonids (*Oncorhynchus* sp.) in their anadromous life history, steelhead exhibit a greater variation in timing for each component of their life history (NMFS 2012). Steelhead typically migrate to marine waters after spending one to three years in freshwater, though they may stay up to seven (NMFS 2012). They then reside in marine waters for one to four years prior to returning to their natal stream to spawn (NMFS 2012). In addition to the anadromous life history, a resident freshwater life history known as rainbow trout exists for the species. Both of these life history types often exist in the same populations, and genetically these types are indistinct from each other with resident rainbow trout capable of producing steelhead and steelhead progeny sometimes becoming resident rainbow trout (Moyle 2002). Preferred spawning habitat for steelhead is in perennial streams with cool to cold water temperatures, high dissolved oxygen levels and fast flowing water. The specific timing of spawning can vary by a month or more among streams within a region, occurring in winter or early spring the spawning fish reach suitable gravel riffles (shallow areas with gravel or cobble substrate) in the upper sections of streams and dig their redds. Abundant riffle areas for spawning and deeper pools with sufficient riparian cover for rearing are necessary for successful breeding and rearing.

The Santa Clara River has a documented steelhead run, and the Study Area is part of designated Critical Habitat for this species. The Study Area does not contain the shallow, fast flowing stream habitat necessary for spawning steelhead, but it does provide sheltered, deeper rearing habitat and is a migration corridor to upstream spawning habitat.

Tidewater Goby (*Eucyclogobius newberryi*), Federal Endangered Species, CDFW Species of Special Concern. Tidewater goby are found within estuaries, marshes, lagoons, and streams along the California coast ranging from Del Norte to San Diego County (Lafferty et al. 1999, USFWS 2005). Water depth and velocity are strong indicators of a habitat's capacity to support this species (Chamberlain 2006). Tidewater Goby is generally found in waters less than one meter in depth, and within areas of little to no current. Unique among fishes of the Pacific coast, this primarily annual species prefers waters with low salinity in coastal estuaries, but can tolerate periods of high salinity. They feed along the bottom, preferring clean, shallow, slow-moving waters. They can tolerate a wide range of abiotic conditions. Substrate and vegetation composition varies among occupied habitats; however, spawning generally occurs in unvegetated areas with sand or slightly coarser material (Swenson 1999). Spawning can occur virtually year round, with peak spawning typically occurring in the spring and a smaller peak in late summer/early fall (Lafferty et al. 1999, Swenson 1999). The Study Area contains suitable estuarine breeding and rearing habitat for this species, and this species has been documented within the lagoon and the Santa Clara River (CDFW 2014). The Study Area is also within designated Critical Habitat for this species, and the lagoon is listed as habitat for tidewater goby in the Oxnard Coastal Land Use Plan.

Threespine stickleback (*Gasterostues aculeatus microcephalus*), Ventura County Locally Important Species. This species is anadramous or historically anadramous due to stream modification, and is found in coastal waters or freshwater bodies connected (or once well connected) to the ocean (Moyle 2002). The species inhabits relatively clear fresh, brackish, or salt water environments. This species requires slow-flowing water with areas of emerging vegetation, including ditches, ponds, lakes, backwaters, quiet rivers, sheltered bays, marshes, and harbors. The Study Area contains suitable riverine, slow water habitats with emergent vegetation to support this species and the species has been documented at the site (ESA 2003, Rincon 2013, PISCES 2014).

<u>Special-Status Wildlife Species with High Potential to Occur in the Study Area</u>

Pallid bat (*Antrozous pallidus*). CDFW Species of Special Concern, WBWG High Priority. Pallid bats are distributed from southern British Columbia and Montana to central Mexico, and east to Texas, Oklahoma, and Kansas. This species occurs in a number of habitats ranging from rocky arid deserts to grasslands, and into higher elevation coniferous forests. Pallid bats often roost in colonies of between 20 and several hundred individuals. Roosts are typically in rock crevices, tree hollows, mines, caves, and a variety of man-made structures, including vacant and occupied buildings. Tree roosting has been documented in large conifer snags (e.g., ponderosa pine), inside basal hollows of redwoods and giant sequoias, and within bole cavities in oak trees. Pallid bats are primarily insectivorous, feeding on large prey that is taken on the ground, or sometimes in flight. Prey items include arthropods such as scorpions, ground crickets, and cicadas (WBWG 2010). Trees within the Study Area may provide suitable night roost sites and open terrestrial and aquatic habitats including the dunes and the Santa Clara River provide foraging habitat for this species.

Western red bat (*Lasiurus blossevillii*), CDFW Species of Special Concern, WBWG High Priority. This species is highly migratory and broadly distributed, reaching from southern Canada through much of the western United States. Western red bats are believed to make seasonal shifts in their distribution, although there is no evidence of mass migrations (Pierson et al. 2006). They are typically solitary, roosting primarily in the foliage of trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas possibly and association with riparian habitat (particularly willows, cottonwoods, and sycamores; Pierson et al. 2006). It is believed that males and females maintain different distributions during pupping where females take advantage of warmer inland areas and males occur in cooler areas along the coast. The riparian canopy provides suitable roost sites and foraging habitat is supported throughout much of the Study Area.

Least bittern (*Ixobrychus exilis*), CDFW Species of Special Concern, USFWS Bird of Conservation Concern. California populations concentrated in low-lying areas of the Central Valley and Modoc Plateau, along the Colorado River, and coastal southern California south of San Luis Obispo County. The species is a colonial nester in fresh and brackish marshlands and borders of ponds and reservoirs which provide ample cover, and nests usually placed low in tules, over water, and is built of emergent aquatic vegetation and sticks (Poole et al. 2009). The Study Area contains suitable wetland breeding habitat for this species. This species was detected in the ponds approximately 250 feet north of the Study Area in 2010 (eBird 2014).

Least Bell's vireo (*Vireo bellii pusillus*), Federal Endangered, State Endangered, CDFW Species of Special Concern. This subspecies of Bell's vireo is a neotropical migrant and summer resident in California and northern Baja California, wintering in southern Baja California (Brown 1993). This vireo was once common in lowland riparian habitats throughout California but declined precipitously during the twentieth century (USFWS 1998). By the time of federal listing in 1986, an estimated 300 pairs were restricted to southern California, primarily San Diego County (USFWS 1998). The population has increased since, with the number of nesting territories in the state in 2006 estimated to be approximately ten times greater than in 1986 (USFWS 2006). However, the distribution of the vireo at that time remained almost entirely within southern California (USFWS 2006).

Least Bell's vireo breeding habitat consists of riparian vegetation, usually in an early successional state (i.e., between five and ten years old), and near water (USFWS 1998). Such habitat is preferred because it provides both dense cover in the lower shrub layer for nest concealment, and a stratified canopy structure favorable to insect abundance and thus vireo foraging (USFWS 1998). Riparian habitat types used for breeding include those dominated by willows, cottonwood, and/or oaks, with a dense understory of species such as willows, mulefat, California wild rose (*Rosa californica*), poison oak (*Toxicodendron diversilobum*), and mugwort (*Artemisia douglasiana*) (USFWS 1998). Nests are typically placed within three feet of the ground. Least Bell's Vireo may attempt multiple broods during the breeding season from mid-March to late September, although one brood is typical (Brown 1993). Habitats such as chaparral and coastal sage scrub adjacent to riparian areas are used for foraging and even nesting, and thus provide another potentially important habitat component (Kus and Miner 1989).

While the williow riparian habitat within the Study Area and along the Santa Clara River corridor to the east is of a later successional stage, it nonetheless provides suitable breeding habitat for least Bell's vireo. Breeding was confirmed in this species 3.5 miles upstream from the Study Area along the Santa Clara River in 2003 and least Bell's vireo have been documented along the river 2.0 miles upstream from the Study Area (CDFW 2014a).

Two-striped Gartersnake (*Thamnophis hammondii*), CDFW Species of Special Concern. The two-striped gartersnake commonly inhabits perennial and intermittent streams having rocky beds bordered by willow thickets or other dense vegetation. During the day, this species is often found basking on stream rocks or along densely vegetated banks. The two-striped gartersnake is highly aquatic; using the water and stream banks to forage and often taking to the water when threatened. Their primary food source is fish, amphibians and amphibian larvae, but small mammals and various invertebrates like leeches may be taken also. Dense riparian vegetation and the river estuary within the Study Area are highly suitable for this species.

South coast garter snake (*Thamnophis sirtalis ssp*), CDFW Species of Special Concern. The CDFW listing applies to populations on the coastal plain from Ventura County. to San Diego County, from sea level to about 850 m. This subspecies is associated with permanent or semi-permanent bodies of water in a variety of habitats, associated with perennial surface water, low gradient topography, and dense multi-storied riparian vegetation. This species is chiefly terrestrial and does not depend on water as much as other gartersnake species. This snake eats a wide range of prey, including amphibians and their larvae, fish, birds, mice, lizards, snakes, worms, leeches, slugs, and snails. Aquatic and riparian habitats within the Study Area are highly suitable for this species.

Pacific lamprey (*Entosphenus [=Lampetra] tridentatus*), Ventura County Locally Important Species. This anadramous lamprey is found along the entire California coast with regularity until becoming disjunct south of San Luis Obispo County with the exception of regular runs to the Santa Clara River (PICES 2014). With the exception of land-locked populations, this species spends the predatory phase of its life in the ocean, feeding off the bodily fluids of a variety of fish. This species is usually concentrated near the mouths of their spawning streams because its prey is most abundant in coastal areas (Moyle 2002). Adults move up into spawning streams between early March and late June. After hatching, ammocetes are washed downstream, where they burrow into soft substrates and filter feed. Five to seven years later, ammocetes undergo metamorphosis into the predatory phase of their life cycle, and outmigrate to the ocean as adults. Although this species is declining throughout much of its range, it is still documented to occur in the Santa Clara River (Swift and Howard 2009). The Santa Clara River within Study Area is a migration corridor to upstream spawning habitat, and the lagoon provides some soft substrates which ammocetes of this species may use to filter feed.

Santa Ana sucker (*Catostomus santaanae*). Federal Threatened, CDFW Species of Special Concern. The Santa Ana sucker, listed as threatened by USFWS in 2000, is a small member of the Castomid fishes (sucker family) that is endemic to the Los Angeles, San Gabriel, and Santa Ana River systems, with an additional population that was translocated to the Santa Clara River watershed (PISCES 2014). The sucker inhabits rivers and larger streams within its restricted range, preferring cool, flowing water, although seasonal turbidity is tolerated (Moyle 2002 and USFWS 2011a). Preferred substrates are gravel, rubble and boulder. Riparian vegetation at the water's edge provides cover, particularly for juvenile fish, though such vegetation is not as important in areas with riffles and deeper pool habitat. The sucker is well-adapted to the periodic flooding of occupied reaches due to heavy rainfall, in part because of a relatively prolonged spawning period that occurs from mid-March to July. Santa Ana sucker feeds primarily on algae and detritus. The Study Area contains the aquatic and riparian habitats needed to support Santa Ana sucker. This species was translocated to the Santa Clara

Watershed (PISCES 2014), and has been documented 3.4 miles upstream of the Study Area (CDFW 2014a).

Arroyo chub (*Gila orcutti*), CDFW Species of Special Concern. Native to the Los Angeles Basin south coastal streams, this species has been extirpated from much of its native range and is now common only in the upper Santer Margarita River, De Luz Creek , Trabuco Creek, San Juan Creek, Malibu Creek, and the west fork of the upper San Gabriel River (Moyle 2002). This chub has been widely introduced in other water systems in southern California, and is common in the Santa Clara River (Moyle 2002). Arroyo chub is adapted to warm, fluctuating streams and is most abundant in slow-moving or backwater sections of warm to cool streams with muddy or sandy bottoms (Moyle 2002). This species is omnivorous, feeding heavily on aquatic vegetation and associated invertebrates. The Study Area contains suitable aquatic habitat and the species is documented to occur within the Santa Clara River watershed (PISCES 2014).

Sandy beach tiger beetle (*Cicindela hirticollis gravida*), Ventura County Sensitive Species. This species inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico. The species is found in clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action. The Study Area contains suitable habitat for this species, and this species has been documented 0.3 mile from the Study Area (CDFW 2014a).

Mimic tryonia (*Tryonia imitator*), Ventura County Locally Important Species. This species inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types and is able to withstand a wide range of salinity. The lagoon within the Study Area provides highly suitable estuarian/wetland habitat for this species.

<u>Special-Status Wildlife Species with Moderate Potential to Occur in the Study Area</u>

Fringed myotis (*Myotis thysanodes*), WBWG High Priority. Fringed myotis ranges through much of western North America from southern British Columbia, Canada, south to Chiapas, Mexico and from Santa Cruz Island in California, east to the Black Hills of South Dakota. This species is found in desert scrubland, grassland, sage-grass steppe, old-growth forest, and subalpine coniferous and mixed deciduous forest. Oak and pinyon-juniper woodlands are most commonly used. Fringed myotis roosts in colonies from 10 to 2,000 individuals, although large colonies are rare. Caves, buildings, underground mines, rock crevices in cliff faces, and bridges are used for maternity and night roosts, while hibernation has only been documented in buildings and underground mines. Tree-roosting has also been documented in Oregon, New Mexico, and California (WBWG 2010). The Study Area contains snags that may be used as night roosts by this species. This species may also forage or migrate through the area.

Long-legged myotis (*Myotis volans*), WBWG High Priority. Long-legged myotis ranges across western North America from southeastern Alaska to Baja California and east to the Great Plains and central Texas. This species is usually found in coniferous forests, but also occurs seasonally in riparian and desert habitats. They use abandoned buildings, cracks in the ground, cliff crevices, exfoliating tree bark and hollows within snags as summer day roosts. Caves and mines are used as hibernation roosts. Long-legged myotis forage in and around the forest canopy and feed on moths and other soft-bodies insects (WBWG 2010). The Study Area contains snags that may be used as night roosts by this species. This species may also use the riparian habitats for foraging.

San Diego black-tailed jackrabbit (*Lepus californicus bennettii*). CDFW Species of Special Concern. This subspecies of the widespread black-tailed jackrabbit occurs on the western coastal slopes of southern California and northern Baja California. This jackrabbit typically favors open habitats such as grazed grasslands, but also occurs in areas with scattered shrubs (Best 1996). The Study Area contains suitable coastal shrub habitats that may support this species.

San Diego desert woodrat (*Neotoma lepida intermedia*). CDFW Species of Special Concern. This subspecies of the desert woodrat occurs on the coastal slope from San Luis Obispo County to northern Baja California. Habitat is variable and includes chaparral, coastal sage scrub, riparian scrub and woodland; generally found in association with large rocks and rock outcrops in southern California (Verts and Carraway 2002). Like other woodrats, the San Diego desert woodrat constructs large nests made of piles of sticks, vegetation, cacti and dung. The Study Area contains suitable scrub and woodland habitats to support this species.

Long-eared owl (*Asio otus*). CDFW Species of Special Concern. This generally uncommon species is resident throughout much of California outside of the Central Valley. Long-eared owls breed in a variety of woodland and forest habitats, including coniferous, oak and riparian, as well in planted tree groves. Nearby open habitats with small mammal populations, such as grasslands, meadows and marshes are also required for foraging. Breeding typically relies on the presence of old nests made by similar-sized birds including hawks and crows (Shuford and Gardali 2008). Communal roosting often occurs during the winter. The Study Area is within this species' breeding range, and provides suitable riparian woodland nesting habitat and open foraging habitats for the species (Shuford and Gardali 2008).

Southwestern willow flycatcher (*Empidonax traillii extimus*), Federal Endangered, State Endangered. Southwestern willow flycatcher, a subspecies of the willow flycatcher, is a neotropical migrant and summer resident in the American southwest, including southern California. Wintering occurs in southern Mexico and Central America (Sedgwick 2000). Once a common breeder throughout much of lowland southern California, the destruction or alteration of riparian systems within the region during the twentieth century greatly reduced this flycatcher population; a total of only 256 breeding territories were documented to exist in the state by 2001, following several years of intensive surveying (USFWS 2002a). These territories also showed limited geographic distribution, with the majority occurring along portions of the Kern and Owens rivers, and several discrete sites in San Diego and Riverside counties (USFWS 2002a).

The USFWS recovery plan (2002) outlines habitat requirements for this species. Southwestern willow flycatcher habitat consists of riparian forest or woodland, usually in floodplains. Although variable across sites, the dominant vegetation is usually willows, with cottonwoods, box elder (*Acer negundo*), and/or sycamores (*Platanus* spp.) also often present, and shrubs and herbaceous species generally present in the understory. Other principal components are 1) dense vegetation in the habitat patch interior, usually from the ground up to approximately 13 feet, and 2) the nearby presence of still or slow-moving water, or at least saturated soil, during the breeding season. Riparian zones with steep gradients and/or that are less than approximately 35 feet wide are generally not used by the species. Nest height varies greatly, although the average is approximately 6.5 to 23 feet above the ground. The greater breeding season occurs from early May to mid-August. The willow riparian scrub habitats within the Study Area and along the Santa Clara river corridor to the east provide potentially suitable breeding and foraging habitat for southwestern willow flycatcher.

Belding's savannah sparrow (*Passerculus sandwichensis beldingi*), State Endangered. This subspecies inhabits coastal salt marshes from Santa Barbara south through San Diego County. The species nests in *Salicornia* on and about margins of tidal flats. This species was documented to breed within the Study Area in 1977 (CDFW 2014a). However, much of this area is now inundated following berm failure, which may make this breeding habitat less suitable. Despite this irregular tidal influence, the Study Area contains some pickleweed habitat, providing potentially suitable habitat for nesting and/or foraging in the species. Furthermore, the Oxnard Coastal Use Plan lists the Santa Clara River wetlands as nesting habitat for this species.

Tricolored blackbird (*Agelaius tricolor*). CDFW Species of Special Concern, USFWS Bird of Conservation Concern. The tricolored blackbird is a locally common resident in the Central Valley and along coastal California. This species breeds adjacent to fresh water, preferably in emergent wetlands with tall, dense cattails or tules; thickets of willow, blackberry and/or tall herbs, as well as flooded agricultural fields with dense vegetation, are also used (Shuford and Gardali 2008). This species is highly colonial; nesting habitat must be large enough to support a minimum of 30 pairs, and colonies are commonly substantially larger (up to thousands of pairs) (Shuford and Gardali 2008). Large expanses of freshwater marsh with dense emergent vegetation are present within the Study Area, which may support breeding and foraging habitat for the species. While less common in southern California, there is a documented breeding occurrence of tricolored blackbird from 1993, 4.7 miles northwest of the Study Area.

Arboreal salamander (*Aneides lugubris*), Ventura County Locally Important Species. Arboreal salamanders occur from Humboldt County south along the coast and coast ranges into Baja California del Norte, and in the foothills of the Sierra Nevada Mountains from El Dorado County to Madera County. The species lives in moist places on land, mostly in coastal oak woodlands, but is also found in yellow pine and black oak forests in the Sierra Nevada and other dryer habitats, including coastal sand dunes. The species is generally found on moist, mossy rock faces, under rocks and woody debris, inside stumps, and in urban yards and buildings. In Southern California, this salamander is also associated with sycamores along seasonal streams. The Study Area is within the species' known range, and provides sand dune and freshwater habitats that may support this species.

Prickly sculpin (*Cottus asper*), Ventura County Locally Important Species. This species inhabits rivers, lakes and estuaries along the coast from Alaska to Ventura County, California, although populations south of Point Conception are the result of colonization by south-drifting larvae. (Moyle 2002). Found in lakes and in rivers and swims down into brackish estuaries to breed, and are common in reservoirs. This species is tolerant of a wide range of salinities. Upon hatching, larvae swim downstream in the water column into a lake or reservoir, or the open ocean for rearing. Juvenile migrate upstream into streams or estuaries, and feed mostly on benthic invertebrates, but also take other aquatic insects, mollusks, small fish, isopods, and amphipods (Moyle 2002). The Study Area contains suitable lagoon and river aquatic for prickly sculpin and this species is documented to occur within the Santa Clara River watershed (PISCES 2014).

Senile tiger beetle (*Cicindela senilis frosti*), Ventura County Sensitive Species. This species inhabits the marine shoreline in coastal salt marshes and tidal mud flats from the California coast in Sonoma and Lake Counties south to the salt marshes of San Diego (Pearson et al. 2006). Inhabits dark-colored mud in the lower zone and dried salt pans in the upper zone. Urbanization has severely reduced or extirpated all but a few populations (Pearson et al. 2006) The Study Area contains suitable habitat for this species, and this species has been documented 11.3 miles from the Study Area (CDFW 2014a).

5.0 SUMMARY

Six sensitive biological communities were identified in the Study Area. Four special-status plant species, including three Locally Important species, and ten special-status wildlife species were observed in the Study Area. Eighteen special-status plant species, including six Locally Important species, and 37 special-status wildlife species were previously documented to be present or determined to have moderate to high potential to occur in the Study Area.

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APPENDIX C-A

LIST OF OBSERVED PLANT AND WILDLIFE SPECIES

Appendix C-A-1. Plant species observed within the Study Area during the field visit on September 22-26 and October 26-27, 2014.

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Abronia maritima	Red sand verbena	Rank 4.2	native	--	NL
Abronia umbellata var. *umbellata*	Pink sand-verbena	--	native	--	NL
Acacia melanoxylon	Blackwood acacia	--	non-native	limited	NL
Ambrosia psilostachya	Western ragweed	--	native	--	FACU
Anagallis arvensis	Scarlet pimpernel	--	non-native	--	NL
Anemopsis californica	Yerba mansa	--	native	--	OBL
Artemisia biennis	Biennial sagewort	--	non-native	--	FACW
Artemisia californica	Coast sagebrush	--	native	--	NL
Artemisia douglasiana	Mugwort	--	native	--	FAC
Arundo donax	Giant reed	--	non-native	high	FACW
Atriplex aff. *canescens* var. *canescens*	Fourwing saltbush	--	native	--	NL
Atriplex lentiformis	Big saltbush	--	native	--	FAC
Atriplex leucophylla	Beach saltbush	--	native	--	FAC
Atriplex prostrata	Fat hen	--	non-native	--	FACW
Atriplex semibaccata	Australian saltbush	--	non-native	moderate	FAC
Atriplex suberecta	Peregrine saltbush	--	non-native	--	FACU
Azolla filiculoides	Pacific mosquitofer n	--	native	--	OBL
Baccharis glutinosa	Marsh baccharis	--	native	--	FACW
Baccharis pilularis ssp. *consanguinea*	Coyote brush	--	native	--	NL
Baccharis salicifolia ssp. *salicifolia*	Mule fat	--	native	--	FAC
Berula erecta	Water parsnip	--	native	--	OBL
Bolboschoenus maritimus ssp. *paludosus*	Saltmarsh bulrush	--	native	--	OBL
Bromus diandrus	Ripgut brome	--	non-native	moderate	NL
Bromus madritensis ssp.	Red brome	--	non-	high	NL

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
rubens			native		
Cakile maritima	European searocket	--	non-native	limited	FAC
Calystegia soldanella	Beach morning glory	--	native	--	NL
Camissoniopsis cheiranthifolia ssp. *suffruticosa*	Beach evening-primrose	--	native	--	NL
Carex pansa	Sanddune sedge	LI	native	--	FACU
Carpobrotus edulis	Iceplant	--	non-native	high	NL
Casuarina sp.	Sheoak	--	non-native	--	NL
Centaurea melitensis	Tocalote	--	non-native	moderate	NL
Chenopodium aff. *macrospermum*	Largeseed goosefoot	--	non-native	--	FACW
Chenopodium aff. *murale*	Sowbane	--	non-native		
Clematis ligusticifolia	Western white clematis	--	native	--	FAC
Conium maculatum	Poison hemlock	--	non-native	moderate	FACW
Corethrogyne filaginifolia	Common sandaster	--	native	--	NL
Cortaderia selloana	Uruguayan pampas grass	--	non-native	high	FACU
Cotula coronopifolia	Common brassbutton s	--	non-native	limited	OBL
Crassula ovata	Jade plant	--	non-native		
Cressa truxillensis	Spreading alkaliweed	--	native	--	FACW
Croton californicus	California croton	--	native	--	NL
Cucurbita foetidissima	Missouri gourd	--	native	--	NL
Cylindropuntia prolifera	Coast cholla	--	native		
Cynodon dactylon	Bermuda grass	--	non-native	moderate	FACU
Cyperus odoratus	Fragrant flatsedge	LI	native	--	FACW
Delairea odorata	Cape ivy	--	non-native	high	NL

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Distichlis spicata	Saltgrass	--	native	--	FAC
Dittrichia graveolens	Stinkwort	--	non-native	moderate	NL
Dudleya caespitosa	Coast dudleya	LI	native	--	NL
Echium candicans	Pride of Madeira	--	non-native	limited	NL
Elymus triticoides	Beardless wild rye	--	native	--	FAC
Emex spinosa	Devil's thorn	--	non-native		
Equisetum laevigatum	Smooth horsetail	--	native	--	FACW
Ericameria ericoides	California goldenbush	--	native	--	NL
Erigeron bonariensis	Flax-leaved horseweed	--	non-native	--	FACU
Erigeron canadensis	Canadian horseweed	--	native	--	FACU
Eriogonum parvifolium	Dune buckwheat	--	native	--	NL
Eucalyptus globulus	Blue gum	--	non-native	moderate	NL
Euthamia occidentalis	Western goldentop	--	native	--	FACW
Festuca perennis	Italian rye grass	--	non-native	moderate	FAC
Foeniculum vulgare	Fennel	--	non-native	high	NL
Frankenia salina	Alkali heath	--	native	--	FACW
Glebionis coronaria	Corndaisy	--	non-native	--	NL
Hedera canariensis	Canary ivy	--	non-native	high	NL
Heliotropium curassavicum var. *oculatum*	Seaside heliotrope	--	native	--	FACU
Helminthotheca echioides	Bristly ox-tongue	--	non-native	limited	FACU
Hesperocyparis macrocarpa	Monterey cypress	Rank 1B.2*	native	--	NL
Heterotheca grandiflora	Telegraphweed	--	native	--	NL
Hirschfeldia incana	Short podded mustard	--	non-native	moderate	NL
Isocoma menziesii var. *menziesii*	Menzies' goldenbush	--	native	--	FAC
Jaumea carnosa	Marsh	--	native	--	OBL

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
	jaumea				
Juncus bufonius var. *congestus*	Toad rush	--	native	--	FACW
Laennecia coulteri	Coulter's horseweed	--	native	--	FAC
Lemna sp.	Duckweed	--	native		
Lepidium aff. *nitidum*	Shining pepperweed	--	native		
Lepidium latifolium	Perennial pepperweed	--	non-native	high	FAC
Ludwigia peploides ssp. *peploides*	Floating primrose willow	--	native	--	OBL
Malva parviflora	Cheeseweed mallow	--	non-native	--	NL
Malvella leprosa	Alkali mallow	--	native	--	FACU
Medicago polymorpha	Bur medic	--	non-native	limited	FACU
Melaleuca citrina	Crimson bottlebrush	--	non-native	--	NL
Melaleuca nesophila	Showy honey myrtle	--	non-native	--	NL
Melilotus albus	White sweetclover	--	non-native	assessed	NL
Myoporum laetum	Myoporum	--	non-native	moderate	FACU
Nicotiana glauca	Tree tobacco	--	non-native	moderate	FAC
Oenothera elata ssp. *hirsutissima*	Hairy evening-primrose	--	native	--	FACW
Opuntia littoralis	Coast prickly pear	--	native		NL
Paspalum dilatatum	Dallis grass	--	non-native	--	FAC
Pennisetum clandestinum	Kikuyu grass	--	non-native	limited	FACU
Persicaria aff. *hydropiperoides*	Common smartweed	--	native	--	OBL
Phoenix canariensis	Canary Island date palm	--	non-native	limited	NL
Phyla nodiflora	Common lippia	--	native	--	FACW
Plantago coronopus	Buckhorn plantain	--	non-native	assessed	FACW
Plantago lanceolata	English plantain	--	non-native	limited	FAC

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Plantago major	Common plantain	--	non-native	--	FAC
Platanus racemosa	California sycamore	--	native	--	FAC
Pluchea odorata var. *odorata*	Salt marsh fleabane	--	native	--	FACW
Polypogon monspeliensis	Rabbit's-foot grass	--	non-native	limited	FACW
Polypogon viridis	Water beard grass	--	non-native	--	FACW
Populus trichocarpa	Black cottonwood	--	native	--	FAC
Portulaca oleracea	Little hogweed	--	non-native	--	FAC
Potentilla anserina ssp. *pacifica*	Pacific potentilla	--	native	--	OBL
Pseudognaphalium luteoalbum	Jersey cudweed	--	non-native	--	FAC
Rhus integrifolia	Lemonade sumac	--	native	--	NL
Ricinus communis	Castor bean	--	non-native	limited	FACU
Rubus ursinus	California blackberry	--	native	--	FACU
Rumex crispus	Curly dock	--	non-native	limited	FAC
Salicornia pacifica	Pacific swampfire	--	native	--	OBL
Salix exigua	Sandbar willow	--	native	--	FACW
Salix lasiolepis	Arroyo willow	--	native	--	FACW
Salsola australis	Russian thistle	--	non-native	limited	FACU
Salvia mellifera	Black sage	--	native	--	NL
Schoenoplectus acutus var. *occidentalis*	Hardstem bulrush	--	native	--	OBL
Sisymbrium irio	London rocket	--	non-native	moderate	NL
Sonchus asper ssp. *asper*	Prickly sow thistle	--	non-native	assessed	FAC
Sonchus oleraceus	Common sow thistle	--	non-native	--	NL
Spergularia marina	Saltmarsh sandspurry	--	native	--	OBL
Stipa miliacea var. *miliacea*	Smilo grass	--	non-native	limited	NL
Symphyotrichum subulatum var. *squamatum*	Eastern annual salt marsh aster	--	non-native		

SCIENTIFIC NAME	COMMON NAME	CONSERVATION STATUS[1]	ORIGIN	INVASIVE STATUS[2]	WETLAND INDICATOR[3]
Tamarix aff. *parviflora*	Smallflower tamarisk	--	non-native	high	FAC
Tamarix aphylla	Athel tree	--	non-native	limited	FAC
Taraxacum officinale	Common dandelion	--	non-native	assessed	FACU
Tetragonia tetragonioides	New Zealand spinach	--	non-native	high	NL
Toxicodendron diversilobum	Poison oak	--	native	--	NL
Tropaeolum majus	Nasturtium	--	non-native	assessed	NL
Typha sp.	Cattail	--	unknown		OBL
Urtica dioica ssp. *holosericea*	Hoary nettle	--	native	--	FAC
Vinca major	Bigleaf periwinkle	--	non-native	moderate	NL
Washingtonia robusta	Washington fan palm	--	non-native	moderate	NL
Xanthium strumarium	Rough cocklebur	--	native	--	FAC

[1]Key to rarity status codes:

FE	Federal Endangered
FT	Federal Threatened
SE	State Endangered
ST	State Threatened
SR	State Rare
LI	Locally Important
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2	CNPS Rank 2: Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3	CNPS Rank 3: Plants about which CNPS needs more information (a review list)
Rank 4	CNPS Rank 4: Plants of a limited distribution throughout a broader range of California (a watch list)
Threat Rank	0.1: Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat) 0.2: Fairly threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat) 0.3: Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

[2]Rankings from California Invasive Plant Council. 2011. California Invasive Plant Inventory Database. California Invasive Plant Council, Berkeley, CA. Online at: http://www.cal-ipc.org/ip/inventory/index.php; most recently accessed: November 2014.

[3]For Arid West Region, based on Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2014. *The National Wetland Plant List*: 2014 Update of Wetland Ratings. Phytoneuron 2014-41: 1-42.

This wetland classification system is based on the expected frequency of occurrence in wetlands as follows:

OBL	Always found in wetlands	>99% frequency
FACW	Usually found in wetlands	67-99%
FAC	Equal in wetland or non-wetlands	34-66%
FACU	Usually found in non-wetlands	1-33%
UPL/NL	Upland/Not listed (upland)	<1%

*Considered rare only where it occurs in natural stands on the Monterey Peninsula

Appendix C-A-2. Wildlife species observed in the Study Area on October 26 and 27, 2014

Scientific Name	Common Name
Otospermophilus beecheyi	California ground squirrel
Procyon lotor	raccoon
Sylvilagus bachmani	brush rabbit
Neotoma sp.	woodrat
Streptopelia decaocto	Eurasian collared dove
Zonotrichia leucophrys	white-crowned sparrow
Elanus leucurus	white-tailed kite
Cathartes aura	turkey vulture
Zonotrichia atricapilla	golden-crowned sparrow
Melozone crissalis	California towhee
Melospiza melodia	song sparrow
Selasphorus sasin	Allen's hummingbird
Anas cyanoptera	cinnamon teal
Mimus polyglottos	northern mockingbird
Vermivora celata	orange-crowned warbler
Geothlypis trichas	common yellowthroat
Anas platyrhynchos	mallard
Anas clypeata	northern shoveler
Carpodacus mexicanus	house finch
Zenaida macroura	mourning dove
Psaltriparus minimus	bushtit
Sturnus vulgaris	European starling
Circus cyaneus	northern harrier
Riparia riparia	bank swallow
Falco peregrinus	American peregrine falcon
Numenius phaeopus	whimbrel
Thalasseus elegans	elegant tern
Accipiter cooperii	Cooper's hawk
Melanitta perspicillata	surf scoter

Scientific Name	**Common Name**
Falco sparverius	American kestrel
Corvus corax	common raven
Calypte anna	Anna’s hummingbird
Tringa melanoleuca	greater yellowlegs
Colaptes auratus	northern flicker
Regulus calendula	ruby-crowned kinglet
Buteo lineatus	red-shouldered hawk
Bombycilla cedrorum	cedar waxwing
Nycticorax nycticorax	black crowned night heron
Anthus rubescens	American pipit
Ardea herodias	great blue heron
Gallinago delicata	Wilson’s snipe
Buteo jamaicensis	red-tailed hawk
Laridae occidentalis	Western gull
Larus californicus	California gull
Sayornis nigricans	black phoebe
Setophaga townsendi	Townsend’s warbler
Fulica americana	American coot
Phalacrocorax auritus	double-crested cormorant
Podilymbus podiceps	pie-billed grebe
Oxyura jamaicensis	ruddy duck
Septophaga coronata	yellow-rumped warbler
Pelecanus occidentalis	brown pelican
Megaceryle alcyon	belted kingfisher
Egretta thula	snowy egret
Aythya valisineria	canvasback
Agelaius phoeniceus	red-winged blackbird
Quiscalus quiscula	common grackle
Haemorhous purpureus	purple finch
Ardea alba	great egret

Scientific Name	**Common Name**
Charadrius vociferus	killdeer
Podiceps nigricollis	eared grebe
Polioptila caerulea	blue-gray gnatcatcher
Aechmophorus occidentalis	western grebe
Porzana carolina	sora
Calidris minutilla	least sandpiper
Calidris mauri	western sandpiper
Charadrius nivosus (alexandrines) nivosus	western snowy plover
Troglodytes hiemalis	winter wren
Rallus limicola	Virginia rail
Cistothorus palustris	marsh wren
Calidris pusilla	semipalmated sandpiper
Pelecanus erythrorhynchos	American white pelican
Phalacrocorax pelagicus	pelagic cormorant
Cyprinus carpio	common carp
Menidia beryllina	inland silverside
Gambusia affinis	western mosquitofish
Pseudacris hypochondriaca hypochondriaca	Baja California treefrog
Elgaria multicarinata ssp.	alligator lizard
Uta stansburiana elegans	Western side-blotched lizard
Coelus globosus	globose dune beetle
Pacifastacus leniusculus	signal crayfish
Danaus plexippus	monarch butterfly
Anax junius	green darner
Vanessa annabella	western painted lady
Brephidium exilis	western pygmy blue

APPENDIX C-B

POTENTIAL FOR SPECIAL-STATUS SPECIES TO OCCUR WITHIN THE STUDY AREA

Appendix C-B-1. Special status plant species that may occur, or are known to occur in habitats similar to those found in the Study Area. List compiled from USFWS (2014) Species Lists, CNPS (2014) Electronic Inventory and CNDDB (CDFW 2014) searches of the Oxnard, Ventura, and Point Mugu USGS 7.5 minute quadrangles.

SCIENTIFIC NAME	COMMON NAME	STATUS*	HABITAT REQUIREMENTS	RATIONAL FOR POTENTIAL TO OCCUR IN STUDY AREA
Abronia maritima	Red sand-verbena	Rank 4.2	Coastal dunes. Blooms February-November. 0-100 meters.	**Present.** One individual red sand verbena was observed within the coastal dune habitat in the southwest portion of the Study Area during the September 2014 survey. In addition, several additional red sand verbena individuals were observed just outside of the southwest corner of the Study Area boundary, in foredune habitat.
Abronia villosa var. *aurita*	Chaparral sand-verbena	Rank 1B.1	Sandy chaparral, sandy coastal scrub, desert dunes. Elevation range: 75-1,600 meters. Blooms: January - September	**Unlikely.** The Study Area does not contain chaparral or desert dune habitat. The Study Area contains sandy coastal scrub habitat, but it occurs in small stands in disturbed backdune habitat.
Aphanisma blitoides	Aphanisma	Rank 1B.2, LR	Coastal bluff scrub, coastal dunes, coastal scrub. Typically located on bluffs and slopes near the ocean on sandy or clay soils. Elevation range: 1 – 990 feet. Blooms: March – June.	**High Potential.** The Study Area contains suitable coastal foredune habitat for this species. This species has less potential to occur within the historically disturbed foredune habitat inland from the intact foredunes in the Study Area.

SCIENTIFIC NAME	COMMON NAME	STATUS*	HABITAT REQUIREMENTS	RATIONAL FOR POTENTIAL TO OCCUR IN STUDY AREA
Astragalus pycnostachyus var. *lanosissimus*	Ventura Marsh milk-vetch	FE, SE, Rank 1B.1, LR	Coastal salt marsh, coastal dune, coastal scrub. Typically located within reach of high tide protected by barrier beaches and near seeps on sandy bluffs. Elevation range: 1 – 115 feet. Blooms: June – October.	**High Potential.** The western edge of the Study Area contains suitable habitat in the foredune habitat at the western edge. There is also potential suitable habitat along the fringes of the estuary. This species was observed in an agriculture field southeast of the Study Area in 1997 and in 2002, an experimental population was planted at McGrath Lake, which is less than 1 mile south of the Study Area.
Atriplex coulteri	Coulter's saltbush	Rank 1B.2, LR	Alkaline or clay soils in coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland. Blooms March-October. 3-460 meters.	**Moderate Potential.** The Study Area contains suitable coastal dune habitat in the foredune areas. The backdune area has more limited potential for this species because of historical disturbance. However, these habitats have limited clay soils.
Atriplex pacifica	South coast saltscale	Rank 1B.2	Coastal scrub, coastal bluff scrub, playas, chenopod scrub. Located on alkaline soils. Elevation range: 0 – 460 feet. Blooms: March – October.	**Moderate Potential.** The Study Area does not contain coastal bluff scrub, playa, or chenopod scrub habitats. The Study Area contains coastal scrub in the backdune habitat, but the area is historically disturbed..
Atriplex serenana var. *davidsonii*	Davidson's saltscale	Rank 1B.2	Coastal bluff scrub, coastal scrub. Located on alkaline soils. Elevation range: 30 – 650 feet. Blooms: April – October.	**Moderate Potential.** The Study Area does not contain coastal bluff scrub habitat. The Study Area contains coastal scrub in the backdune habitat, but the area is historically disturbed.

SCIENTIFIC NAME	COMMON NAME	STATUS*	HABITAT REQUIREMENTS	RATIONAL FOR POTENTIAL TO OCCUR IN STUDY AREA
Calochortus catalinae	Catalina mariposa lily	Rank 4.2	Heavy soil in chaparral, cismontane woodland, coastal scrub, valley and foothill grassland. Blooms February-June. 15-700 meters.	**Unlikely.** The Study Area does not contain chaparral or valley and foothill grassland. The Study Area contains cismontane woodland and limited coastal scrub, but heavy soils rarely occur.
Calochortus fimbriatus [*C. weedii* var. *vestus*]	Late-flowered mariposa-lily	Rank 1B.2, LR	Chaparral, open cismontane woodland, open riparian woodland, often on serpentine soils. Blooms June-August. 275-1,905 meters.	**Unlikely.** The Study Area does not contain chaparral habitat or serpentine soils. The Study area contains cismontane and riparian woodland, but it is typically dense and often disturbed or weedy.
Chaenactis glabriuscula var. *orcuttiana*	Orcutt's pincushion	Rank 1B.1	Coastal bluff scrub, coastal dunes; located on sandy substrate. Elevation range: 0 – 325 feet. Blooms: January – August.	**High Potential.** The Study Area contains suitable coastal dune habitat in the foredune areas. The backdune area has more limited potential for this species because of historical disturbance.
Chloropyron maritimum ssp. *maritimum*	Salt marsh bird's-beak	FE, SE, Rank 1B.2, LR	Coastal dunes, coastal salt marshes and swamps. Elevation range: 0-30 meters. Blooms: May – October.	**Moderate Potential.** The Study Area contains suitable coastal dune habitat in the foredune areas. There is also potential suitable coastal salt marsh habitat along the fringes of the estuary. There is a CNDDB record of salt marsh bird's-beak from 1960 at the far northwest corner of the Study Area. However the exact location is unknown. This species was also documented in the estuary in 1983.
Heterotheca sessiliflora ssp. *sessiliflora*	Beach goldenaster	Rank 1B.1	Coastal chaparral, coastal dunes, coastal scrub. Blooms: March – December. Elevation range: 0 – 1,225 meters.	**High Potential.** The Study Area contains suitable coastal dune habitat in the foredune areas. The backdune area has more limited potential for this species because of historical disturbance.

SCIENTIFIC NAME	COMMON NAME	STATUS*	HABITAT REQUIREMENTS	RATIONAL FOR POTENTIAL TO OCCUR IN STUDY AREA
Juncus acutus ssp. *leopoldii*	Southwestern spiny rush	Rank 4.2	Mesic coastal dunes, alkaline seeps, coastal salt marshes and swamps. Elevation range: 10 – 2925 feet. Blooms: May – June.	**Moderate Potential.** The Study Area contains suitable coastal dune habitat in foredune areas that border wetlands. There is also potential suitable coastal salt marsh habitat along the fringes of the estuary.
Lasthenia glabrata ssp. *coulteri*	Coulter's goldfields	Rank 1B.1, LR	Coastal salt marshes and swamps, playas and vernal pools. Blooms February-June. 1-1,220 meters.	**Moderate Potential.** The Study Area contains suitable coastal salt marsh habitat on the fringes of the estuary and limited potential in seasonal wetlands west and south of the campground.
Lepechinia fragrans	Fragrant pitcher sage	Rank 4.2	Chaparral. Blooms March-October. Elevation range: 20-1,310 meters.	**No Potential.** The Study Area contains no chaparral habitat.
Malacothrix similis	Mexican malacothrix	Rank 2A	Coastal dunes. Blooms April-May. 0-40 meters.	**High Potential.** The Study Area contains suitable coastal dune habitat in the foredune areas. The backdune area has more limited potential for this species because of historical disturbance.
Monardella hypoleuca ssp. *hypoleuca*	White-veined monardella	Rank 1B.3, LR	Chaparral, oak woodland. Blooms April-December. 50-1525 meters	**No Potential.** The Study Area does not contain chaparral or oak woodland habitat.
Navarretia ojaiensis	Ojai navarretia	Rank 1B.1	Valley and foothill grassland, openings in chaparral, openings in coastal scrub. Elevation range: 890 – 2015 feet. Blooms: May – July.	**No Potential.** The Study Area is well below the known elevation range of this species. In addition, the Study Area does not contain chaparral or valley and foothill grassland habitats.

SCIENTIFIC NAME	COMMON NAME	STATUS*	HABITAT REQUIREMENTS	RATIONAL FOR POTENTIAL TO OCCUR IN STUDY AREA
Phacelia hubbyi [*P. cicutaria* var. *h.*]	Hubby's phacelia	Rank 4.2	Gravelly, rocky, or talus slopes in chaparral, coastal scrub and valley and foothill grassland. Blooms April-June. 0-1,000 meters.	**No Potential.** The Study Area does not contain gravelly, rocky, or talus slopes.
Phacelia ramosissima var. *austrolitoralis* [*P. ramosissima* var. *austrolitoralis*]	south coast branching phacelia	Rank 3.2	Sandy or sometimes rocky soils in chaparral, coastal dunes, coastal scrub and coastal saltmarshes and swamps. Blooms March-August. 5-300 meters.	**High Potential.** The Study Area contains suitable coastal dune habitat in the foredune areas. The backdune area has more limited potential for this species because of historical disturbance. There is also potential suitable coastal salt marsh habitat along the fringes of the estuary
Suaeda esteroa	estuary seablite	Rank 1B.2, LR	Coastal salt marshes. Located on clay, silt, and sand substrates. Elevation range: 0 – 15 feet. Blooms: May – October.	**High Potential.** The Study Area contains potential suitable coastal salt marsh habitat for this species along the fringes of the estuary.
Suaeda taxifolia	woolly seablite	Rank 4.2	Coastal bluff scrub, coastal dunes, margins of coastal salt marshes. Elevation range: 0 – 165 feet. Blooms: January – December.	**High Potential.** The Study Area contains suitable coastal dune habitat in the foredune areas. The backdune area has more limited potential for this species because of historical disturbance. There is also potential suitable coastal salt marsh habitat along the fringes of the estuary

***Key to rarity status codes:**

FE	Federal Endangered
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ST	State Threatened
SR	State Rare
LR	Locally Rare
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2	CNPS Rank 2: Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3	CNPS Rank 3: Plants about which CNPS needs more information (a review list)
Rank 4	CNPS Rank 4: Plants of a limited distribution throughout a broader range of California (a watch list)
Threat Rank	0.1: Seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat) 0.2: Fairly threatened in California (20-80% occurrences threatened / Moderate Potential degree and immediacy of threat) 0.3: Not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Appendix C-B-2. Potential for Special Status Wildlife Species to Occur in the Study Area. List compiled from the California Department of Fish and Wildlife (CDFW) Natural Diversity Database (CNDDB), U.S. Fish and Wildlife Service (USFWS) Species Lists electronic inventory search of the Oxnard, Ventura, and Pt. Mugu USGS 7.5' quadrangles and a review of other CDFW lists and publications (Jennings and Hayes 1994, Zeiner et al. 1990, Shuford and Gardali 2008).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
MAMMALS			
pallid bat *Antrozous pallidus*	SSC, WBWG; High	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, forages along river channels. Roost sites include old ranch buildings, rocky outcrops, caves within sandstone outcroppings, and trees. Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	**High Potential.** Trees within the Study Area may provide suitable night roost sites and open terrestrial and aquatic habitats including the dunes and the Santa Clara River provide foraging habitat for this species.
Townsend's big-eared bat *Corynorhinus townsendii*	SC, SSC, WBWG; High	Primarily found in rural settings in a wide variety of habitats including oak woodlands and mixed coniferous-deciduous forest. Females typically form maternity colonies in buildings, caves and mines and males roost singly or in small groups. This species has also been reported to utilize bridges, rock crevices and hollow trees as roost sites. Very sensitive to human disturbance. Foraging occurs in open forest habitats where they glean moths from vegetation.	**Unlikely.** The Study Area does not contain the typical forested habitats or cave-like structures that support roosting Townsend's big-eared bats. This species may use the riparian and scrub habitats with the Study Area for foraging.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
western red bat *Lasiurus blossevillii*	SSC, WBWG; High	This species is typically solitary, roosting primarily in the foliage of trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores).	**High Potential**. The riparian habitat within the Study Area provides suitable roost sites for western red bats. Additionally, suitable foraging habitat is present.
western mastiff bat *Eumops perotis californicus*	SSC, WBWG; High	Found in a wide variety of open, arid and semi-arid habitats. Distribution appears to be tied to large rock structures which provide suitable roosting sites, including cliff crevices and cracks in boulders.	**Unlikely**. Suitable rock structures typical of roosting habitat for this species are not present within the Study Area. This species may occasionally forage or migrate through the area.
fringed myotis *Myotis thysanodes*	WBWG; High	Associated with a wide variety of habitats including mixed coniferous-deciduous forest, redwood/sequoia groves, dry woodlands, desert scrub, and grasslands. Buildings, mines and large snags are important day and night roosts.	**Moderate Potential.** The Study Area contains snags that may be used as night roosts by this species. This species may also forage or migrate through the area.
long-legged myotis *Myotis volans*	WBWG; High	Typically occupies mountainous or relatively rugged areas, in dry coniferous forests, and sometimes in oak or streamside woodlands, and deserts. Large hollow trees, rock crevices and buildings are important day roosts. Other roosts include caves, mines and buildings.	**Moderate Potential.** The Study Area contains snags that may be used as night roosts by this species. This species may also forage or migrate through the area.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Mexican long-tongued bat *Choeronycteris mexicana*	SSC, WBWG	Occasionally found in San Diego County in the periphery of their range. Feeds on the nectar and pollen of night-blooming succulents. Roosts in relatively well-lit caves, and in and around buildings.	**Unlikely.** While CNDDB records indicate an occurrence of this species near the Study Area, the Study Area is outside this species' typical documented range (CDFW 2014).
spotted bat *Euderma maculatum*	SSC, WBWG; High	Occupies a wide variety of habitats from arid deserts and grasslands through mixed conifer forests. Feeds over water and along washes. Needs rock crevices in cliffs or caves for roosting.	**Unlikely.** This species had been predominately documented in the more aird regions in the southeast portion of the state. The Study Area does not contain the forested, desert, or grassland habitat associated with this species. This species may incidentally pass through the Study Area.
ring-tailed cat (ringtail) *Bassariscus astutus*	CFP	The ringtail is widely distributed throughout most of California, absent from some portions of the Central Valley and northeastern California. Found in a variety of habitats throughout the western US including riparian areas, semi-arid country, deserts, chaparral, oak woodlands, pinyon pine woodlands, juniper woodlands and montane conifer forests usually under 1400m in elevation. Typically uses cliffs or large trees for shelter.	**Unlikely**. The Study Area does not contain typical woodland or riparian habitats for this species. Riparian scrub within the Study Area generally contains trees too small to support cavities used for shelter.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
American badger *Taxidea taxus*	SSC	Most abundant in dry, open-stage shrub, forest, and herbaceous habitats with friable soils. This species needs sufficient food, friable soils and open, uncultivated ground. They primarily prey on burrowing rodents.	**Unlikely**. The Study Area does not contain large expanses of open shrub habitats with friable soils to support burrows. Developed areas around the campground cointaining open space are inundated throughout much of the year, likely precluding colonization. Furthermore, the Study Area does not currently support high densities of burrowing rodents; only a few small burrows were seen during the site visits. The nearest documented occurrence of this species is 4.1 miles north of the Study Area (CDFW 2014).
San Diego black-tailed jackrabbit *Lepus californicus bennettii*	SSC	Intermediate canopy stages of shrub habitats and open shrub / herbaceous and tree / herbaceous edges. Coastal sage scrub habitats along the western side of the southern California mountains.	**Moderate Potential.** The Study Area contains suitable shrub habitats that may support this species.
San Diego desert woodrat *Neotoma lepida intermedia*	SSC	Coastal southern California from San Diego County to San Luis Obispo County. Found in scrub and chaparral. Moderate to dense canopies preferred. They are particularly abundant in rock outcrops and rocky cliffs and slopes.	**Moderate Potential.** The Study Area contains suitable scrub and woodland habitats to support this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Southern California saltmarsh shrew *Sorex ornatus salicornicus*	SSC	Coastal marshes in Los Angeles, Orange and Ventura counties from Point Mugu southwards. Requires dense vegetation and woody debris for cover.	**No Potential.** The Study Area is outside this sub-species' known range.
south coast marsh vole *Microtus californicus stephensi*	SSC	Tidal marshes in Los Angeles and Orange counties from Point Mugu south the Sunset Beach.	**No Potential.** The Study Area is outside this sub-species' known range.
Guadalupe fur seal *Arctocephalus townsendi*	FT, ST, CFP	Breed on Isla de Guadalupe off the coast of Mexico, occasionally found on San Miguel, San Nicolas, and San Clemente islands. Prefers shallow, nearshore island water with cool and sheltered rocky areas for haul-outs.	**Unlikely.** This species is not typically found in ocean waters adjacent to the Study Area, and the shoreline within the Study Area does not contain sheltered rocky areas typical of haul-outs.
northern elephant seal *Mirounga angustirostris*	CFP, MMPA	Pacific Ocean and coastal waters. While on land, they prefer sandy beaches.	**Unlikely.** The Study Area and surrounding areas are not known to support haulout locations for this species. While the species may occasionally occur within the area, it is unlikely to use the beach habitat by the Study Area for breeding.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
BIRDS			
California condor *Gymnogyps californianus*	FE, SE	Resident in vast expanses of open savannah, grasslands, and foothill chaparral in mountain ranges of moderate altitude. Deep canyons containing clefts in the rocky walls provide nesting sites. Forages up to 100 miles from roost/nest.	**Unlikely**. The Study Area does not provide nesting or roosting habitat for the species. Occaisionally mammal carrion may be present within the Study Area that could attract foraging condors, and this species may occaisionally fly over the site.
northern harrier *Circus cyaneus*	SSC	Resident and winter visitor in southern California. Nests and forages in grassland habitats, usually in association with coastal salt and freshwater marshes. Nests on ground in shrubby vegetation, usually at marsh edge; nest built of a large mound of sticks in wet areas. May also occur in alkali desert sinks.	**Present**. The Study Area provides grassland foraging habitat and marginal nesting habitat for northern harrier, and this species was observed during the October 2014 site visit. However, the Study Area is approximately 10 miles outside of the current known breeding range per a recent monograph in Shuford and Gardali (2008).
white-tailed kite *Elanus leucurus*	CFP	Resident of coastal and valley lowlands; often associated with agricultural areas. Preys on small diurnal mammals as well as other vertebrates and insects. Nests in small to large trees, often at habitat edges.	**Present**. The Study Area contains suitable open and scrub foraging habitat and ample trees for nesting white-tailed kite. The species was observed during the October 2014 site visit.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Swainson's hawk *Buteo swainsoni*	ST, BCC	Summer resident in California's Central Valley and limited portions of the southern California interior. Nests in tree groves and isolated trees in riparian and agricultural areas, including near buildings. Forages in grasslands and scrub habitats as well as agricultural fields, especially alfalfa. Forages on arthropods year-round as well as smaller vertebrates during the breeding season. Winters primarily in South America.	**Unlikely**. The Study Area provides suitable foraging habitat for this species and it may be detected during winter months; however, Swainson's hawk does not breed in California.
ferruginous hawk *Buteo regalis*	BCC	Winter visitor in California to open habitats, including grasslands, sagebrush flats, scrub, and low foothills surrounding valleys. Preys on small mammals.	**Unlikely**. The Study Area provides suitable foraging habitat for this species and it may be detected during winter months; however, ferruginous hawk does not breed in California.
golden eagle *Aquila chrysaetos*	CFP, BCC, EPA	Resident in rolling foothills, mountain areas, sage-juniper flats, and desert. Cliff-walled canyons provide nesting habitat in most parts of range; also nests in large trees in open areas.	**Unlikely.** The Study Area provides suitable open foraging habitat for this species; however breeding is unlikely, as there are few suitably-sized trees to support nesting.
bald eagle *Haliaeetus leucocephalus*	FD, SE, CFP, BCC, EPA	Nests on large trees in the vicinity of large lakes, reservoirs and rivers. Wintering birds are most often found near large concentrations of waterfowl or fish.	**Unlikely**. White the Study Area contains a large lagoon that could support nesting bald eagles; this species is not known to breed in Ventura county (Shuford and Gardali 2008). Individuals may forage within the Study Area in the winter months.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
American peregrine falcon *Falco peregrinus anatum*	FD, SD, CFP, BCC	Largely resident. Requires protected cliffs, ledges or manmade structures for nesting. Often associated with coasts, bays, marshes and other open expanses of water. Preys primarily upon waterbirds; forages widely.	**Present**. This species was observed in the Study Area during the October 2014 site visit. The Study Area provides coastal foraging habitat for this species, however, it does not contain cliffs or other suitable nesting structures for breeding peregrine falcons, so this species is unlikely to breed on the site.
prairie falcon *Falco mexicanus*	BCC	Resident and winter visitor. Inhabits dry, open terrains, including foothills and valleys. Breeding sites located on cliffs. Forages widely.	**Unlikely**. The Study Area does not contain cliffs or other suitable nesting structures for the species and is outside of its known breeding range (Shuford and Gardali 2008). However, this species may occasionally forage within the Study Area.
light-footed clapper rail *Rallus longirostris levipes*	FE, SE, CFP	Found in salt marshes traversed by tidal sloughs, where cordgrass and pickleweed are the dominant vegetation. Require dense growth of either pickleweed or cordgrass for nesting or escape cover; feeds on molluscs and crustaceans.	**Unlikely.** While this species is documented to occur in the salt marshes near Point Mugu, 9.6 miles to the south (CDFW 2014), the Study Area no longer contains expansive salt marsh habitats due to a lack of consistent tidal influence and has not been documented to contain this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
western snowy plover *Charadrius nivosus (alexandrines) nivosus*	FT, SSC, BCC,	Federal listing applies only to the Pacific coastal population. Resident on sandy beaches, salt pond levees and shores of large alkali lakes. Requires sandy, gravelly or friable soils for nesting.	**Present.** The Study Area contains designated Critical Habitat for western snowy plover, and this species was observed in the Study Area during the October 2014 site visit.
mountain plover *Charadrius montanus*	BCC, SSC	Winters in the Central Valley and foothills west of San Joaquin Valley. Occurs in short grasslands, freshly plowed fields, newly sprouting grain fields, and sod farms where short vegetation, bare ground and flat topography are present. Prefers open sagebrush habitats with scattered shrubs or grazed areas with burrowing rodents, below 1000 m elevation. Feeds preferentially on grasshoppers.	**No Potential**. The Study Area is located outside of the current winter range of the species. This species does not breed in California (Zeiner et al. 1990).
long-billed curlew *Numenius americanus*	BCC	Winter visitor to large coastal estuaries, upland herbaceous areas, and agricultural lands. Within California, nests only in the northeastern portion of the state in wet meadow habitat.	**Present.** The Study Area provides suitable estuarian wintering habitat for this species, and this species has been documented in the vicinity of the Study Area (ESA 2003, eBird 2014). However, this species does not breed in Ventura County.
least bittern *Ixobrychus exilis*	BCC, SSC	Colonial nester in marshlands and borders of ponds and reservoirs which provide ample cover. Nests usually placed low in tules, over water.	**High Potential.** The Study Area contains suitable wetland breeding habitat for this species. This species was detected in the ponds approximately 250 feet north of the Study Area in 2010 (eBird 2014).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
redhead *Aythya americana*	SSC	Resident and winter visitor in southern California. Typically breeds in freshwater emergent marshes, usually with deeper water (>3 ft), and dense cattail and/or tule stands. Typical wintering habitat consists of large, deep bodies of water.	**Present.** Suitable wetland breeding and wintering habitat exists within the Study Area, and this species has been documented both in spring and fall in the large ponds approximately 250 feet north of the Study Area in 2014 (ESA 2003, eBird 2014).
American white pelican *Pelecanus erythrorhynchos*	SSC	Colonial nester on large interior lakes. Nests on large lakes, providing safe roosting and breeding places in the form of well-sequestered islets.	**Present.** This species was observed during the October 2014 site visit. The open waters of the Study Area provide wintering habitat for this species. However, this species does not breed in Ventura County (Zeiner et al. 1990)..
California brown pelican *Pelecanus occidentalis californicus*	FD, SD, CFP	Colonial nester on coastal islands just outside the surf line. Nests on coastal islands of small to moderate size which afford immunity from attack by ground-dwelling predators. The only nesting colonies in the western United States are found in the Channel Islands on West Anacapa and Santa Barbara Islands.	**Present.** This species was observed during the October 2014 site visit. The Study Area provides non-breeding habitat for this species. This species does not breed in Ventura County (Zeiner et al. 1990).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
California least tern *Sternula antillarum browni*	FE, SE, CFP	Nests along the coast from San Francisco Bay south to northern Baja California. Colonial breeder on barren or sparsely vegetated, flat substrates near water.	**Present.** The beaches within the Study Area provide suitable breeding habitat for this species, and breeding occurrences of California least tern have been documented along the western portion of the Study Area between 2007 and 2009 (Stillwater Sciences 2011). Furthermore, the Santa Clara River estuary is part of Coastal Management Area E under the 1985 USFWS California Least Tern Recovery Plan.
Caspian tern *Hydroprogne caspia*	BCC	Nests in small colonies inland and along the coast. Inland fresh-water lakes and marshes; also, brackish or salt waters of estuaries and bays.	**Present.** The Study Area provides suitable breeding habitat for this species and is within its documented breeding range (Zeiner et al. 1990). This species has been observed in Study Area (ESA 2003, eBird 2014).
Brant *Branta bernicla*	SSC	(wintering and staging) Spring and fall migrant and winter resident in California. Tends to congregate in winter at a few specific coastal bays with eelgrass beds including Humboldt Bay, Pt. Reyes–Bodega estuaries, Morro Bay, and San Diego Bay.	**Unlikely.** This species does not breed in California and the Study Area is not a part of this species' documented wintering congregation areas (Zeiner et al. 1990). This species may occasionally use the Study Area during the winter or pass through it during migration.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
common loon *Gavia immer*	SSC	Nesting locations at certain large lakes and reservoirs in interior of state, primarily in northeastern plateau region. Bodies of water regularly frequented are extensive, fairly deep, and produce quantities of large fish.	**Moderate Potential.** While the Study Area is not within this species' breeding range, the wopen waters within the Study Area provide winter habitat for common loon. This species has been documented in the Study Area (ESA 2003, eBird 2014).
California spotted owl *Strix occidentalis occidentalis*	SSC, BCC	Resident in dense, structurally complex forest habitats, including coniferous, hardwood, and mixed forests. Most often found in deep-shaded canyons, on north-facing slopes, and within 1,000 feet of water.	**Unlikely.** The Study Area does not contain dense, structurally complex forest habitat for this species. Additionally, the Study Area is outside the species' current range per a recent monograph in Shuford and Gardali (2008).
short-eared owl *Asio flammeus*	SSC	Found in wetlands both fresh and salt; lowland meadows; irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depression concealed in vegetation.	**Unlikely**. The Study Area provides foraging and nesting habitat for the species; however, Ventura County is outside the species' current breeding range per a recent monograph in Shuford and Gardali (2008).
long-eared owl *Asio otus*	SSC	Resident and visitor in the region. Nests in a variety of woodland habitats, including oak and willow and cottonwood riparian, as well as tree groves. Requires adjacent open land with rodents for foraging, and the presence of old nests of crows, hawks, magpies etc. for breeding.	**Moderate Potential.** The Study Area provides suitable riparian woodland nesting habitat and open foraging habitats for the species. The Study Area is within this species' breeding range per a recent monograph in Shuford and Gardali (2008).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
western burrowing owl *Athene cunicularia*	BCC, SSC	Resident and winter visitor in open, dry annual or perennial grasslands and scrub habitats with low-growing vegetation, perches and abundant mammal burrows. Preys upon insects and small vertebrates. Nests and roosts in old mammal burrows, generally those of ground squirrels.	**Present**. The Study Area contains open habitats and some suitably-sized burrows to accommodate this species. While the Study Area is outside this species' known breeding range, the Study Area is within this species' winter range. One burrowing owl was documented approximately 140 feet south of the Study Area in February of 2002 (ESA 2003, CDFW 2014).
Allen's hummingbird *Selasphorus sasin*	BCC	Found in a wide variety of woodland and riparian habitats that provide nectar-producing flowers. A common, nearly ubiquitous breeder in Ventura County. A summer resident from late January through July.	**Present**. Allen's hummingbird was observed within the Study Area during the October 2014 site visit. While this observation occurred during migration, this species is a common breeder in Ventura County and the Study Area provides suitable nesting habitat for the species.
Nuttall's woodpecker *Picoides nuttallii*	BCC	Resident in lowland woodlands throughout much of California west of the Sierra Nevada. Typical habitat is dominated by oaks.	**Present.** Suitable riparian habitat is present within the Study Area and large trees within the Study Area may provide cavities for nesting. The species has been observed in the Study Area (ESA 2003).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Lewis's woodpecker *Melanerpes lewis*	BCC	Uncommon winter resident occurring on open oak savannahs, broken deciduous and coniferous habitats.	**Unlikely**. The Study Area and adjacent areas may provide marginal foraging habitat for the species; however, the Study Area is located just outside the range of the species (Zeiner et al. 1990). Additionally, this species is not known to breed in Ventana County (Zeiner et al. 1990).
olive-sided flycatcher *Contopus cooperi*	BCC, SSC	Summer resident. Breeds in montane coniferous forests, as well as mixed forests along the coast. Often associated with edge habitats.	**Unlikely**. Riparian habitat within the Study Area may provide suitable foraging habitat for the species. However, the Study Area is located outside of the species' current breeding range per a recent monograph in Shuford and Gardali (2008) and it is unlikely to breed there.
southwestern willow flycatcher *Empidonax traillii extimus*	FE, SE	In southern California, breeding habitat is typically moist meadows with perennial streams, and lowland riparian woodlands dominated by *Salix* spp (Craig 1998). This species is a riparian obligate species restricted to dense stream-side vegetation.	**Moderate Potential.** The willow riparian scrub habitats within the Study Area and along the river corridor to the east provide potentially suitable breeding and foraging habitat for southwestern willow flycatcher.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
loggerhead shrike *Lanius ludovicianus*	SSC	Resident in open habitats with scattered shrubs, trees, posts, etc. from which to forage for large insects and small vertebrates. Nest well concealed above ground in densely-foliaged shrub or tree.	**Present**. The Study Area provides suitable shrub habitats for nesting and open habitats for foraging habitat in this species. The Study Area is within this species' breeding range per a recent monograph in Shuford and Gardali (2008), and the species has been observed in the Study Aea before (ESA 2003).
least Bell's vireo *Vireo bellii pusillus*	FE, SE, SSC	Summer visitor. Breeds in riparian habitat along rivers and perennial or nearly perennial streams; prefers a multi-tiered canopy with early successional vegetation in the understory. Willows, mulefat and other understory species typically used for nesting.	**High Potential.** The riparian habitats within the Study Area and along the river corridor to the east provide suitable breeding habitat for least Bell's vireo. Breeding was confirmed in this species 3.5 miles upstream from the Study Area along the Santa Clara River in 2003 and it has been documented along the river 2.0 miles upstream from the Study Area (CDFW 2014).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
purple martin *Progne subis*	SSC	Found in areas with high availability of flying insects, especially large onse such as dragonflies, and locations with low densities or absence of starlings. Inhabits woodlands and low elevation coniferous forests. Nests in old woodpecker cavities and human-made structures. Nest is often located in tall, isolated tree or snag. Nesting sites support concentrations of very large trees. May also nest on bridges that support an abundance of vertical "weep holes."	**Unlikely**. The Study Area does not contain typical woodland or coniferous forest habitat to support this species. Additionally, Ventura County is located outside the species' breeding range per a recent monograph in Shuford and Gardali (2008). This species may pass through the Study Area during migration.
bank swallow *Riparia riparia*	ST	Migrant in riparian and other lowland habitats in western California. Colonial nester in riparian areas with vertical cliffs and bands with fine-textured or fine-textured sandy soils near streams, rivers, lakes or the ocean. Historical range in southern and central areas of California has been eliminated by loss of nesting habitat due to flood and erosion-control projects, but currently is known to breed in Siskiyou, Shasta, and Lassen Cos., and along Sacramento River from Shasta Co. south to Yolo Co.	**Present.** This species was observed within the Project Area outside of the breeding season during the October 2014 site visit. While this species nested within the Study Area in 1976 (CDFW 2014), it is considered extirpated as a breeder in southern California (Garrison 1999).
oak titmouse *Baeolophus inornatus*	BCC	Oak woodland and savannah, open broad-leaved evergreen forests containing oaks, and oak riparian woodlands. Associated with oak and pine-oak woodland and arborescent chaparral. Nests in tree cavities.	**Unlikley.** This species is closely associated with oak woodland, and no oak woodland habitat is present within the Study Area.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
coastal California gnatcatcher *Polioptila californica californica*	FT, SSC	Obligate, permanent resident of coastal sage scrub below 2500 feet in southern California. Low, coastal sage scrub in arid washes, on mesas and slopes. Not all areas classified as coastal sage scrub are occupied.	**Unlikely.** The Study Area does not contain coastal sage scrub habitats for this species, and only small populations have been documented in southern Ventura County, over 10 miles south of the Study Area (Atwood and Bontrager 2001).
yellow warbler *Setophaga (Dendroica) petechia brewsteri*	SSC	Summer resident, nesting in riparian stands of willows, cottonwoods, aspens, sycamores, and alders. Also nests in suitable montane shrubbery. Occurs widely during migration.	**Present.** Willow riparian habitat suitable for foraging and/or nesting in the species is present within the Study Area. The Study Area is within this species' breeding range per a recent monograph in Shuford and Gardali (2008), and the species has been observed in the Study Aea before (ESA 2003).
yellow-breasted chat *Icteria virens*	SSC	Summer resident, utilizing riparian areas with an open canopy, very dense understory, and trees for song perches. Nests in thickets of willow, blackberry, and wild grape.	**Present.** The Study Area provides the dense riparian understory that this species prefers. The Study Area is within this species' breeding range per a recent monograph in Shuford and Gardali (2008), and the species has been observed in the Study Aea before (ESA 2003).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
Belding's savannah sparrow *Passerculus sandwichensis beldingi*	SE	Inhabits coastal salt marshes, from Santa Barbara south through San Diego County. Nests in *Salicornia* on and about margins of tidal flats.	**Moderate Potential.** This species was documented to breed within the Study Area in 1977 (CDFW 2014). Despite irregular tidal influence, the Study Area contains some pickleweed habitat, providing potentially suitable habitat for nesting and/or foraging in the species.
Bell's sage sparrow *Amphispiza belli belli*	BCC	Prefers dense chaparral and scrub habitats for breeding; associated with chamise. Found in coastal sage scrub in southern portions of range. Nest is typically located on the ground beneath a shrub or in a shrub 6 to 18 inches above ground. Territories about 50 yards apart.	**Unlikely**. The Study Area does not provide chamise chaparral or typical scrub habitat for this species.
grasshopper sparrow *Ammodramus savannarum*	SSC	Inhabits dense grasslands on rolling hills, lowland plains, in valleys and on hillsides on lower mountain slopes. Favors native grasslands with a mix of grasses, forbs, and scattered shrubs. Loosely colonial when nesting.	**Unlikely**. The Study Area does not contain grassland habitat for this species. This species may pass through the Study Area during migration.
black-chinned sparrow *Spizella atrogularis*	BCC	Prefers sloping ground in mixed chaparral, chamise-redshank chaparral, sagebrush, and similar brushy habitats. Often on arid, south-facing slopes with ceanothus, manzanita, sagebrush, and chamise.	**Unlikely.** The Study Area does not provide sagebrush or chaparral habitat preferred by this species. Although the species occurs in Ventura County, the Study Area is located outside the range of the species (Zeiner et al. 1990).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
tricolored blackbird *Agelaius tricolor*	SSC, BCC	A highly colonial resident species, most numerous in the Central Valley and vicinity. Largely endemic to California. Usually nests over or near open freshwater in dense cattails, tules, or thickets of willow, blackberry, wild rose or other tall herbs. Requires breeding habitat sufficient to support at least 30 nesting pairs.	**Moderate Potential**. Large expanses of freshwater marsh with dense emergent vegetation are present within the Study Area. While less common in southern California, there is a documented breeding occurrence in 1993 4.7 miles northwest of the Study Area.
yellow-headed blackbird *Xanthocephalus xanthocephalus*	SSC	Migrant and local summer resident. Nests colonially in freshwater emergent wetlands with dense vegetation and deep water, often along borders of lakes or larger ponds. Forages primarily on large aquatic insects during the breeding period.	**Unlikely**. While the Study Area contains suitable freshwater habitat for this species, it is not known to breed in Ventura County.
western yellow-billed cuckoo *Coccyzus americanus occidentalis*	FT, SE, BCC	Riparian forest nester, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape. In California, breeding distribution is now thought to be restricted to isolated sites in the Sacramento, Amargosa, Kern, Santa Ana, and Colorado River valleys (Laymon and Halterman 1987).	**Unlikely.** While this species was documented in the Santa Clara River in 1942 (CDFW 2014), there were negative survey results in 1977. This species is considered extirpated from much of California and there are no current documented breeding occurrences in Ventura County.
Lawrence's goldfinch *Spinus (= Carduelis) lawrencei*	BCC	A summer visitor in coastal southern California, generally uncommon and local. Typically found in arid open woodlands, including oak savannah. Breeding distribution is erratic from year to year.	**Unlikely.** The Study Area does not contain the open woodland habitat preferred by this species and is outside this specie's documented range (Zeiner et al. 1990).
AMPHIBIANS AND REPTILES			

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
arboreal salamander *Aneides lugubris*	VCLI	Occurs from Humboldt county, south along the coast and coast ranges into Baja California del Norte, and in the foothills of the Sierra Nevada Mountains from El Dorado County to Madera County. Lives in moist places on land, mostly in coastal oak woodlands, but also found in yellow pine and black oak forests in the Sierra Nevada and other dryer habitats, including coastal sand dunes. Also found on moist, mossy rock faces, under rocks and woody debris on land, inside stumps, and in urban yards and buildings. In Southern California, this salamander is also associated with sycamores along seasonal streams.	**Moderate Potential.** The Study Area provides potential sand dune and freshwater habitats for this species.
California red-legged frog *Rana draytonii*	FT, SSC	Inhabits permanent and semi-permanent aquatic habitats with emergent, submergent and/or riparian vegetation, including ponds and creek backwaters. In non-perennial aquatic habitats, may aestivate in rodent burrows or cracks during dry periods.	**Unlikely.** The species is documented to occur within the headwaters and tributaries to the Santa Clara River; however, the species has not been documented within at least 8 miles of the Study Area (CDFW 2014). While potentially suitable aquatic habitat occurs within the Study Area, there have been no known occurances of the species in the estuary, and it is therefore unlikely to occur (USFWS 2002).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
foothill yellow-legged frog *Rana boylii*	SSC	Found in or near rocky streams in a variety of habitats. Prefers partly-shaded, shallow streams and riffles with a rocky substrate; requires at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis. Feeds on both aquatic and terrestrial invertebrates.	**No Potential.** The Study Area does not contain the rocky streams that are typical habitat for this species and is outside of this species' documented range (Zeiner et al. 1990).
western spadefoot *Spea hammondii*	SSC	Occurs primarily in grassland habitats, but can be found in valley-foothill hardwood woodlands. Vernal pools are essential for breeding and egg-laying.	**Unlikely.** The Study Area does not contain seasonally wetted pools or ponds that are typically associated with this species, and the frequently inundated state of the estuary does not provide sutiable aestivation or breeding habtat for the species within the Study Area.
arroyo toad *Anaxyrus (=Bufo) californicus*	FE, SSC	Semi-arid regions near washes or intermittent streams, including valley-foothill and desert riparian, desert wash, etc. Rivers with sandy banks, willows, cottonwoods, and sycamores; loose, gravelly areas of streams in drier parts of range.	**No Potential.** While this species is documented to occur in the Santa Clara River Watershed, it is only found in the upper portions of the watershed. The frequently inundated state of the estuary within the Study Area does not provide suitable aestivation or breeding habitat for this species (USFWS 2011).
coast range newt *Taricha torosa torosa*	SSC	Found in coastal drainages from Mendocino County to San Diego County. Lives in terrestrial habitats and will migrate over 1 kilometer to breed in ponds, reservoirs and slow moving streams.	**No Potential.** The Study Area is not within this species' documented range (Zeiner et al. 1990).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
silverylegless lizard *Anniella pulchra pulchra*	SSC	Sandy or loose loamy soils covered by sparse vegetation. Chaparral, pine-oak woodland, washes, streamside terraces utilized. Elevated soil moisture is required.	**High Potential.** Sand dunes and scrub communities within the Study Area provide habitat for this species. This species has been documented within Study Area and in sand dunes 1 mile south of the Study Area (ESA 2003, CDFW 2014).
Blainville's (coast) horned lizard *Phrynosoma blainvillii*	SSC	Found in a variety of habitats, including coastal sage scrub, chaparral, oak woodland, riparian woodland, and coniferous forest. Friable, sandy soils in areas with abundant ant populations (for forage) are key habitat components.	**Unlikely.** Scrub communities typical for this species are not found within the Study Area.
coast patch-nosed snake *Salvadora hexalepis virgultea*	SSC	Brushy or shrubby vegetation in semi-arid canyons, rocky hillsides, and plains in coastal southern California. Require small mammal burrows for refuge and overwintering sites.	**Unlikely.** The Study Area does not contain semi-arid canyons, rocky hillsides or plains that are characteristic of this species' habitat.
two-striped garter snake *Thamnophis hammondii*	SSC	Coastal California from vicinity of Salinas to northwest Baja California. From sea to about 7,000 feet elevation. Highly aquatic, found in or near permanent fresh water. Often along streams with rocky beds and riparian growth.	**High Potential.** Aquatic and riparian habitats within the Study Area are highly suitable for this species.
south coast garter snake *Thamnophis sirtalis ssp.*	SSC	SSC listing applies to populations on the coastal plain from Ventura Co. to San Diego Co., from sea level to about 850 m. Associated with permanent or semi-permanent bodies of water in a variety of habitats.	**High Potential.** Aquatic and riparian habitats within the Study Area are highly suitable for this species.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
San Joaquin whipsnake *Masticophis flagellum ruddocki*	SSC	Found in valley grassland and saltbush scrub in the San Joaquin Valley in open, dry habitats with little or no tree cover. Requires mammal burrows for refuge and breeding sites.	**No Potential.** The Study Area is outside of this species' documented range.
Pacific (=western) pond turtle *Actinemys marmorata*	SSC	A thoroughly aquatic turtle of ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Require basking sites such as partially submerged logs, vegetation mats, or open mud banks, and suitable upland habitat (sandy banks or grassy open fields) for egg-laying.	**Present.** Aquatic and riparian habitats within the Study Area provide suitable habitat for all life stages of this spec ies. This species has been documented within and 1 mile upstream of the Study Area in the Santa Clara River (ESA 2003, CDFW 2014).
FISH			
Pacific lamprey *Entosphenus (=Lampetra) tridentatus*	VCLI	Spawn between March and July in gravel bottomed streams in riffle habitat. Larvae drift downstream to areas of low velocity and fine substrates and are relatively immobile in the stream substrates.	**High Potential.** This species is documented to occur in the Santa Clara River (Swift and Howard 2009) and the lagoon and River within the Study Area is a migratory corridor to upstream spawning habitat for this species (PISCES 2014). Additionally, larvae may use the lagoon for filter feeding.

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
southern steelhead,southern California DPS *Oncorhynchus mykiss irideus*	FE, SSC, NMFS, Critical Habitat	This DPS includes all naturally spawned anadromous *O. mykiss* (steelhead) populations below natural and manmade impassable barriers in streams from the Santa Maria River, San Luis Obispo County, California, (inclusive) to the U.S.-Mexico Border. The DFW "Species of Special Concern" designation refers to southern steelhead trout. Preferred spawning habitat for steelhead is in perennial streams with cool to cold water temperatures, high dissolved oxygen levels and fast flowing water.	**Present.** The Santa Clara River has a documented steelhead run, and the Study Area is part of designated Critical Habitat for this species. While the Study Area does not support spawning habitat for steelhead, it does provide rearing habitat and is a migration corridor to upstream spawning habitat.
tidewater goby *Eucyclogobius newberryi*	FE, SSC, Critical Habitat	Brackish water habitats along the California coast from Agua Hedionda Lagoon, San Diego County to the mouth of the Smith River. Found in shallow lagoons and lower stream reaches, they need fairly still but not stagnant water and high oxygen levels.	**Present.** The Study Area contains suitable breeding and rearing habitat for this species, and is also within its designated Critical Habitat.
threespine stickleback *Gasterosteus aculeatus microcephalus*	VCLI	Anadramous or historically anadramous. Found in coastal waters or freshwater bodies connected (or once well connected) to the ocean. Inhabits fresh, brackish, or salt water. Prefers slow-flowing water with areas of emerging vegetation, including ditches, ponds, lakes, backwaters, quiet rivers, sheltered bays, marshes, and harbors.	**Present.** The Study Area contains suitable riverine, slow water habitats with emergent vegetation to support this species. (PISCES 2014).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
unarmored threespine stickleback *Gasterosteus aculeatus williamsoni*	FE, SE, CFP	Weedy pools, backwaters, and among emergent vegetation at the stream edge in small southern California streams. Cool (<24 degrees C), clear water with abundant vegetation.	**Unlikely.** This subspecies has been documented in the Santa Clara River watershed (USFWS 1980). However, the primary habitat for unarmored threespine stickleback is located farther upstream in freshwater habitats. The extant range of this subspecies is approximately 8.6 miles upstream of the Project Area (PISCES 2014). Furthermore, this subspecies is a freshwater resident; a lack of defensive body plating makes marine and brackish waters less suitable for it due to the elevated presence of potential predators in these waters. The Study Area does not contain designated Critical Habitat for this species (USFWS 1980).
Santa Ana sucker *Catostomus santaanae*	FT, SSC	Endemic to Los Angeles Basin southern coastal streams. Habitat generalists, but prefer sand-rubble-boulder bottoms, cool, clear water, and algae.	**High Potential.** The Study Area contains the aquatic and riparian habitats needed to support this species. This species was translocated to the the Santa Clara Watershed (PISCES 2014), and has been documented 3.4 miles upstream of the Study Area (CDFW 2014).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
arroyo chub *Gila orcutti*	SSC	Los Angeles Basin south coastal streams. Slow water stream sections with mud or sand bottoms. Feed heavily on aquatic vegetation and associated invertebrates.	**High Potential.** The Study Area contains suitable aquatic habitat and the species is documented to occur within the Santa Clara River watershed (PISCES 2014).
prickly sculpin *Cottus asper*	VCLI	Found in lakes, or in rivers and swims down into brackish estuaries to breed. Tolerant of high and low salinities.	**Moderate Potential.** The Study Area contains suitable aquatic habitat and the species is documented to occur within the Santa Clara River watershed (PISCES 2014).
INVERTEBRATES			
monarch butterfly *Danaus plexippus*	SSI	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, Monterey cypress), with nectar and water sources nearby.	**Present.** While this species was observed during the October 2014 site visit, the Study Area does not contain groves of coastal trees that would likely support wintering. Trees would likely not be sufficient to shelter monarchs against wind and low temperatures. This species may occasionally pass through or migrate through the Study Area.
sandy beach tiger beetle *Cicindela hirticollis gravida*	VCS	Inhabits areas adjacent to non-brackish water along the coast of California from San Francisco Bay to northern Mexico. Clean, dry, light-colored sand in the upper zone. Subterranean larvae prefer moist sand not affected by wave action.	**High Potential.** The Study Area contains suitable habitat for this species, and this species has been documented 0.3 mile from the Study Area (CDFW 2014).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
senile tiger beetle *Cicindela senilis frosti*	VCS	Inhabits the marine shoreline, from the central California coast south to the salt marshes of San Diego. Inhabits dark-colored mud in the lower zone and dried salt pans in the upper zone.	**Moderate Potential.** The Study Area contains suitable habitat for this species, and this species has been documented 11.3 miles from the Study Area (CDFW 2014).
globose dune beetle *Coelus globosus*	VCS	Inhabitant of coastal sand dune habitat, from Bodega Head in Sonoma County south to Ensenada, Mexico. Inhabits foredunes and sand hummocks; it burrows beneath the sand surface and is most common beneath dune vegetation.	**Present.** This species was observed in the Study Area during the October 2014 site visit. Suitable dune habitat is available within the western portion of the Study Area for this species.
white abalone *Haliotis sorenseni*	FE	Rocky pinnacles and deep reefs in southern California; especially those off the Channel Islands. Live at depths from 80 feet to over 200 feet.	**Unlikely.** The Study Area does not provide typical or suitable habitat for this species, and is mostly cut off from the ocean.
mimic tryonia (=California brackishwater snail) *Tryonia imitator*	VCS	Inhabits coastal lagoons, estuaries and salt marshes, from Sonoma County south to San Diego County. Found only in permanently submerged areas in a variety of sediment types; able to withstand a wide range of salinity.	**High Potential.** The lagoon within the Study Area provides highly suitable habitat for this species.
trask shoulderband *Helminthoglypta traskii traskii*	VCLI	A southern California endemic, known to Ventura, Los Angeles, Orange, and San Diego Counties, and rare in Ventura County. Has been found in the Conejo Valley south of Newbury Park (Thousand Oaks), Ventura County, and at Malibu Lagoon State Park. Mainly found in coastal sage scrub and chaparral.	**Unlikely.** This species is rare in Ventura County, and the nearest documented occurrence is in Point Mugu State Park, 15 miles from the Study Area (CDFW 2014).

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE
slotted lancetooth *Haplotrema caelatum*	VCLI	A southern California endemic, known from Santa Barbara, Ventura, Los Angeles, and San Diego Counties, and rare in Ventura County	**Unlikely.** This species is considered rare in Ventura County, and is unlikely to be found within the Study Area.
walking stick *timema monikensis*	VCLI	Specific information regarding this species' habitat requirements and distribution in Ventura County could not be retrieved for this report.	**Unlikely.** Little information is available on the the species habitat requirements or distribution within Ventura County.
Riverside fairy shrimp *Streptocephalus woottoni*	FE, SSI	Endemic to western Riverside, Orange and San Diego counties in areas of tectonic swales/earth slump basins in grassland and coastal sage scrub. Inhabit seasonally astatic pools filled by winter/spring rains. Hatch in warm water later in the season.	**No Potential**. The Study Area does not contain vernal pools or other features that would provide suitable habitat for the species, and is outside of this species' documented range (Eriksen and Belk 1999).
conservancy fairy shrimp *Branchinecta conservatio*	FE, SSI, RP	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	**No Potential**. The Study Area does not contain vernal pools or other features that would provide suitable habitat for the species, and is outside of this species' documented range (Eriksen and Belk 1999).
vernal pool fairy shrimp *Branchinecta lynchi*	FT, SSI, RP	Endemic to the grasslands of the Central Valley, central coast mountains, and south coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	**No Potential**. The Study Area does not contain vernal pools or other features that would provide suitable habitat for the species, and is outside of this species' documented range (Eriksen and Belk 1999).

*** Key to status codes:**

FE	Federal Endangered
FT	Federal Threatened
FD	Federal Delisted
FC	Federal Candidate
BCC	USFWS Birds of Conservation Concern
MMPA	Species protected under the Marine Mammal Protection Act
NMFS	Species under the Jurisdiction of the National Marine Fisheries Service
SE	State Endangered
ST	State Threatened
SC	State Candidate
SR	State Rare
SSC	CDFW Species of Special Concern
SSI	CDFW Special Status Invertebrate
CFP	CDFW Fully Protected Animal
EPA	Eagle Protection Act Species
WBWG	Western Bat Working Group (High or Medium) Priority species
CCC	California Coastal Commission
G1, S1	NatureServe: Globally Imperiled (G1),Statewide Imperiled (S1)
VCLI	Ventura County Locally Important Species
VCS	Ventura County Sensitive Species (G1, G2, S1, or S2 NatureServe ranking)

Critical Habitat	The Study Area contains designated Critical Habitat for the species

California Rare Plant Ranks

Rank 1A	CNPS Rank 1A: Plants presumed extinct in California
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2A	CNPS Rank 2A: Plants presumed extirpated in California, but more common elsewhere
Rank 2B	CNPS Rank 2B: Plants rare, threatened, or endangered in California, but more common elsewhere
Rank 3	CNPS Rank 3: Plants about which CNPS needs more information (a review list)
Rank 4	CNPS Rank 4: Plants of limited distribution (a watch list)

Species Evaluations:

<u>No Potential</u>. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

<u>Unlikely</u>. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

<u>Moderate Potential</u>. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

<u>High Potential</u>. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

<u>Present</u>. Species was observed on the site or has been recorded (i.e. CNDDB, other reports) on the site recently.

APPENDIX D – FEMA/NFIP – FIRM FOR PROJECT SITE

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations tables should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) zone 11. The **horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was derived from U.S. Geological Survey Digital Orthophoto Quadrangles produced at a scale of 1:12,000 from photography dated 1994 or later.

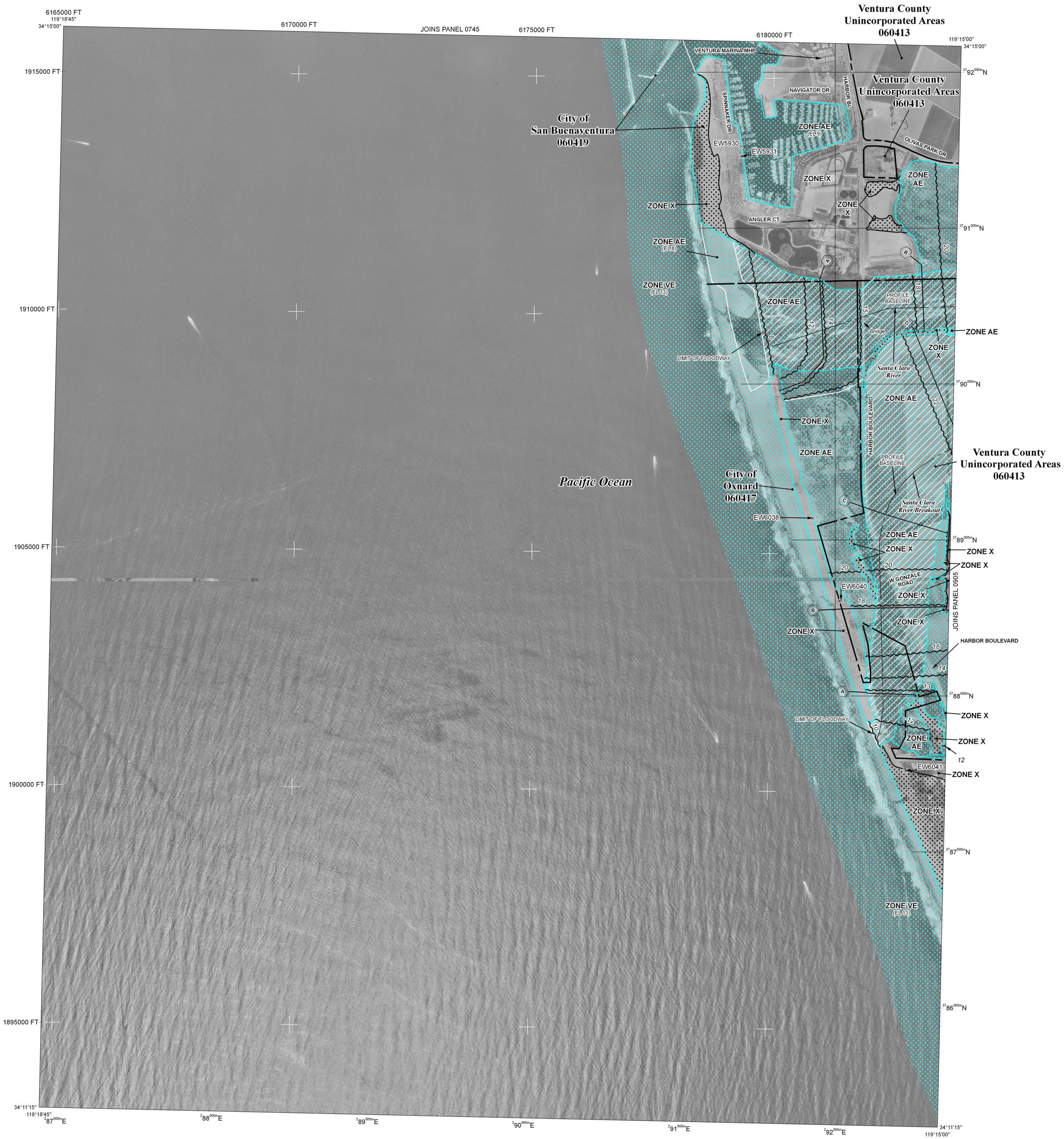
This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to confirm to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study Report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://www.mcs.fema.gov.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
$^{24}76^{000m}$N	1000-meter Universal Transverse Mercator grid values, zone 11
600000 FT	5000-foot grid ticks: California State Plane coordinate system, zone V (FIPSZONE 0405), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
January 20, 2010

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0885E

FIRM
FLOOD INSURANCE RATE MAP

VENTURA COUNTY, CALIFORNIA
AND INCORPORATED AREAS

PANEL 885 OF 1275
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
OXNARD, CITY OF	060417	0885	E
SAN BUENAVENTURA, CITY OF	060419	0885	E
VENTURA COUNTY	060413	0885	E

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06111C0885E

EFFECTIVE DATE
JANUARY 20, 2010

Federal Emergency Management Agency