Appendix F Waters of the US Delineation Report



Waters of the U.S. Delineation

East Sand Slough Restoration Project

Tehama County, California





U.S. Department of the Interior Bureau of Reclamation

Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

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Name	Description
Attachment 1	East Sand Slough Restoration Waters of the U.S.
	delineation maps
Attachment 2	LiDAR Imagery
Attachment 3	Soil Survey Information
Attachment 4	2005, 2010, 2012, and 2016 NAIP Imagery
Attachment 5	Botanical Survey Report
Attachment 6	National Wetlands Inventory Map
Attachment 7	Data Sheets
Attachment 8	Site Visit Photographs
Attachment 9	Aerial Photography

1.0 Request for delineation verification

The Bureau of Reclamation (Reclamation) requests a preliminary jurisdictional determination (PJD) for the East Sand Slough Restoration Waters of the U.S. delineation maps (Attachment 1). Reclamation understands that all delineated waters in the Study Area will be considered jurisdictional under a PJD, per *Regulatory Guidance Letter 16-01* (USACE, 2016b).

2.0 Project and Study Area Location

The Study Area is located along the east bank of the Sacramento River, east of Interstate 5, in the City of Red Bluff and the surrounding region in Tehama County, California. The site can be seen on the Red Bluff East, California 7.5-Minute U.S. Geological Survey (USGS) Quadrangle. The 372.98-acre Study Area for the delineation of waters of the U.S. includes potential access routes to East Sand Slough from Sale Lane, and potential staging and stockpile areas in the Red Bluff Recreation Area. The primary work areas include the entire East Sand Slough side channel, starting at the upstream confluence with the Sacramento River to approximately 3,400 feet upstream of the old Red Bluff Diversion Dam (RBDD).

Table 1. Study Area Location				
Study Area Center Co	oordinates (NAD 83)			
Latitude	Longitude			
40°10'12.06 N	122°13'12.17 W			
UT	Μ.			
10T 566431m l	E 4447201m N			
USF	PLS			
Section 17, Township 27 Nor	rth, Range 3 West, MDB&M			
Section 20, Township 27 Nor	Section 20, Township 27 North, Range 3 West, MDB&M			
Section 28, Township 27 North, Range 3 West, MDB&M				
USGS 7.5-Min Quadrangle Na	me: Red Bluff East, California			

1.1 Directions to the Site and Access Considerations

From the Corps of Engineers field offices at 310 Hemsted Drive in Redding, California or 1325 J Street in Sacramento, California, take Interstate 5 to Exit 649, Antelope Boulevard, in Red Bluff. For access to the Study Area north of Antelope Boulevard, take Sale Lane north and park in the northwestern edge of the fast food parking lot at 200 Antelope Boulevard. A foot trail begins from the parking lot at 40°11'1.49"N, 122°13'16.14"W and provides access to the Study Area north of Antelope Boulevard bridge. To access the downstream part of the Study Area, take Sale Lane south from Antelope Boulevard and park in the paved lot west of Sale Lane at 40° 9'47.94"N, 122°12'46.96"W. From the lot, hiking trails provide access to and around the Study Area. Coordinate with Jane Dolan, Sacramento River Forum (see contact information below), at least a few days prior to access to make sure all land owners are informed about anticipated access.

1.2 **Property Owner Information**

The Study Area is located on property owned and managed by the United States Forest Service. The Bureau of Reclamation, having interest in improving the status of special-status species that influence water delivery and management in the Sacramento Valley, is the applicant.

Table 2. Property Owner and Applicant Information					
Property Owners:	Applicant:	Technical Assistance:			
U.S. Forest Service	John Hannon, Fish Biologist	Luke Davis, Natural Resources			
Attn: Christine Hill	Bureau of Reclamation	Specialist			
Mendocino National Forest	Bay-Delta Office	Bureau of Reclamation			
825 N. Humboldt Ave	801 I Street, Suite 140	Bay-Delta Office			
Willows, CA 95988	Sacramento, CA	801 I Street, Suite 140			
(530) 934-3316	(916) 414-2413	Sacramento, CA			
		(916) 414-2429			
Durango RV Park and City					
of Red Bluff – contact Jane					
Dolan for access questions					
at:					
(530) 528-7435;					
Jane.dolan@water.ca.gov					

3.0 **Project Background**

3.1 Red Bluff Diversion Dam Fish Passage Improvement Project

The slough was historically inundated during summertime irrigation as a result of the operation of the downstream RBDD control gates, but since the operation of these gates ceased in 2012, the area is no longer seasonally inundated on a predicted schedule. East Sand Slough now becomes inundated with Sacramento River flows that are high enough to flow over the upstream end of East Sand Slough.

There is an existing mitigation site on the west bank of the Sacramento River, downstream of the proposed project site and confluence of East Sand Slough with the Sacramento River. This mitigation project excavated a channel to provide year-round flow and additional aquatic habitat, to mitigate for the construction of the Red Bluff Pumping Plant that was installed when the **RBDD** was decommissioned.

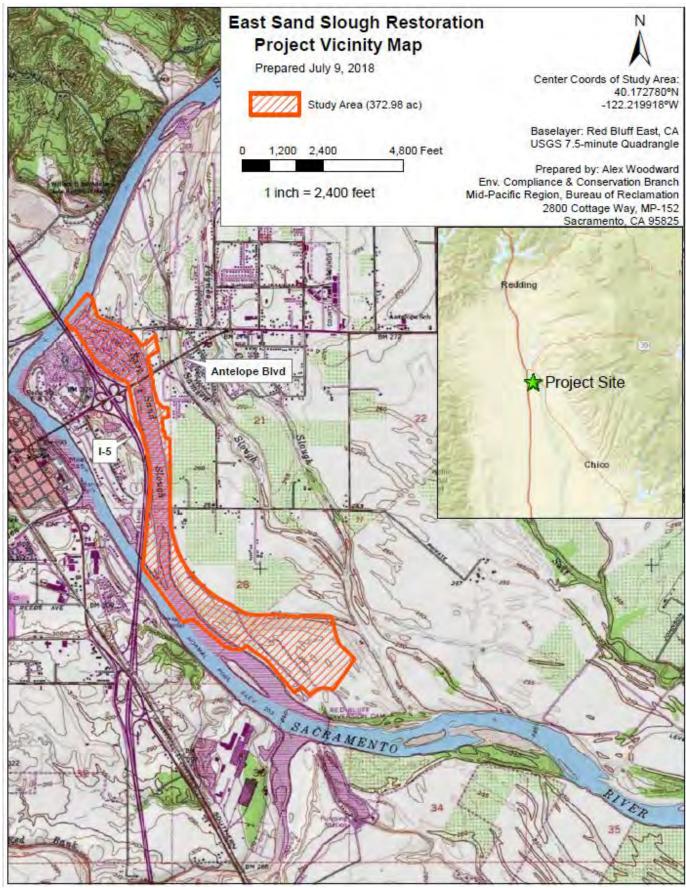
The proposed project for which this delineation report was prepared is the reconnection of East Sand Slough on a permanent basis, so that water flows through the side channel year-round, including during the lowest flow period of late fall and early winter, when this type of habitat is needed most by juvenile winter-run Chinook salmon.

4.0 Jurisdictional Authorities and Regulated Activities

4.1 Rivers and Harbors Act of 1899

The Sacramento River is designated as a Section 10 waterway from its mouth to Keswick Dam, northwest of Redding. East Sand Slough is an overflow side channel on the Sacramento River and is also a navigable waterway under Section 10. The Sacramento River was designated by the U.S. Army Corps of Engineers (USACE) as a navigable river based on the procedure described in 33 CFR Part 329. Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) prohibits the building of structures, excavation, or fill that modifies the course, location, condition or capacity of a channel of any navigable river in the U.S., unless the work has been recommended by the USACE. Section 10 jurisdiction would occur over the entire bed of the river, extending laterally to the entire water surface and bed of a navigable water body, which includes all the land and waters below the ordinary high water mark (OHWM).

Figure 1. Project Vicinity Map



4.2 Clean Water Act

The Clean Water Act encompasses Section 10 waters, plus their tributaries and adjacent wetlands where the use, degradation or destruction of such waters could affect interstate or foreign commerce. Section 404 of the Clean Water (33 USC 1344) Act would also apply to activities in the Sacramento River and East Sand Slough at this location (33 CFR 328).

4.3 Regulated Activities

The proposed activity would involve the reconnection and restoration of the East Sand Slough side channel to the Sacramento River for the benefit of salmonid rearing and spawning habitat. This would involve excavation, hauling, and depositing gravel, sand and other fine material below the OHWM of East Sand Slough and the Sacramento River, and wetlands above and below the OHWM. These activities will require a permit from the Corps to authorize activities under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act.

5.0 Study Area Description

The 372.98-acre Study Area includes the full extent of East Sand Slough from its upstream to downstream confluence with the Sacramento River. The southern end of the Study Area also includes a large part of the Red Bluff Recreation Area to the southeast, which can be accessed by public hiking trails. The Study Area does not include the area of the Red Bluff Diversion Dam Fish Passage Improvement Project Mitigation Site further southeast along the Sacramento River. Figure 1 illustrates the Study Area for this report.

5.1 Topography and Bathymetric Characteristics

East Sand Slough is approximately 1.6 miles long and ranges from 400 yards wide at the upstream end, down to 115 yards wide at the downstream end. Elevation ranges from 244 to 278 above mean sea level. Attachment 2 contains a LiDAR imagery from DWR (2010) and NOAA Fisheries (2017) for the site. On the most upstream end of the slough (above the Antelope Street bridge), the topography is variable, with higher areas of riparian forest, and a primary channel that runs along the east bank of the slough, and a secondary channel closer to the west bank. The secondary channel is braided where it flows in from the Sacramento River and the inlet elevation is approximately 5 feet higher than when the secondary channel becomes formed from the braided channels. Downstream of the Antelope Street bridge, the slough transitions to a wide, flat channel with little topographic variation.

5.2 Geology and Soils

There are nine soil units in the Study Area. Those most closely associated with the channel include the Columbia fine sandy loam (CmA), Columbia complex (Cu), riverwash (Rw), and water (W). The portion of the Study Area along the western edge of the Sacramento River includes Columbia silt loam (CsA), Newville gravelly loam (NrE), Red Bluff loam (Rb), Redding gravelly loam (RnB), and Tehama gravelly loam (Tb), all associated with a 0 to 8 percent slope, except for NrE which is associated with 10 to 40 percent slopes. These soil types

all derive from alluvium parent material, and are associated with floodplain, drainageway, fan remnants, or stream terrace landforms. Attachment 3 includes a soil map and the soil unit descriptions.

Of the soil units onsite, Columbia fine sandy loam, Columbia complex, and riverwash have hydric soil ratings and are on the National List of Hydric Soils (NRCS, 2015). The depth to the restrictive feature is greater than 80 inches for all soil types in the Study Area, except for Redding gravelly loam, which features an abrupt textural change at 19 inches depth and duripan at 20-39 inches depth.

Descriptions for soils observed in the wetland features in the field are detailed in Section 7.

5.3 Aerial Imagery

Digital, color aerial imagery is publicly available from the National Agriculture Inventory Project (NAIP) on ArcGIS for years 2005, 2010, 2012, and 2016 (Attachment 4). Metadata from the base map layers through ArcGIS Online indicate that the aerial imagery covering the Study Area was flown on the following dates: June 30, 2005, July 20, 2010, July 3, 2012, and January 1, 2016. The World Imagery base map from ArcGIS Online was also updated with imagery flown on October 26, 2017, which represents fall vegetation after a very wet winter from earlier in the year that ended a six-year drought. The 2005 imagery also represents peak vegetation conditions after a wet spring, but when the RBDD gates were still in operation and caused water to backflow into East Sand Slough.

5.4 Vegetation Communities

Eleven general vegetation communities were mapped in the Study Area (GIC 2016): *Artemisia douglasiana* (California mugwort) – provisional; Barren, Gravel, Sand; California Introduced Annual and Perennial Herbaceous; California Warm Temperate Marsh/Seep; Naturalized Warm-Temperature Riparian/Wetland; *Populus fremontii* (Fremont cottonwood); *Quercus lobata* (Valley oak); *Salix exigua* (Narrowleaf willow); and *Salix gooddingii* (Gooding's black willow).

A botanical report prepared for the project is included in Attachment 5.

The lower elevation low-flow channels are predominantly covered by a barren, gravel, and sand alliance and lack a definitive vegetation layer. The long low-flow channels are exposed and barren when Sacramento River flows are low. Surrounding this layer, much of the Study Area is a California Introduced Annual and Perennial Herbaceous alliance. This alliance also makes up the large majority of vegetation communities in the Red Bluff Recreation Area part of the Study Area. This area was determined to be upland, except for an ephemeral drainage feature, which consists of the same alliance with some willows. A California Warm Temperate Marsh/Seep alliance exists in the northeastern interior, centered around 40°11'04.49 N, 122°13'25.73 W, in a forested wetland. A Naturalized Warm-Temperate Riparian/Wetland alliance exists along the southern edge, and at a portion of the eastern edge, in higher elevation, around 40°10'34.58, N 122°13'09.27 W.

A *Salix exigua* (Narrowleaf willow) alliance is present along the edges of the OHWM and around scrub-shrub or forested wetlands, in parts of the northeastern and eastern, interior, and southern parts of the Study Area. In the northern portion, northwestern edge, and border of the OHWM in the downstream section of the Study Area, large regions of *popullus fremontii* (Fremont cottonwood) exist. A small region of *Salix gooddingii* exists in the northeastern edge and a small region of *Artemisia douglasiana* (California mugwort) exists near the southwestern edge of the Study Area, closer to the East Sand Slough's downstream confluence with the Sacramento River.

California Introduced Annual and Perennial Herbaceous alliance habitat occurs within the majority of the terrace, active floodplain, and upland portions of the Study Area. Common species observed in these alliances include Bromus diandrus, *Avena barbata*, *Brassica nigra*, *Bromus madritensis* ssp. *rubens*, *Festuca perennis*, and *Brassica rapa*.

In most reaches of the Study Area, riparian habitat alliances exist as along the Sacramento River and in scattered patches on the lower terrace and banks of the slough. *Populus fremontii, Salix exigua*, California Warm Temperate Marsh/Seep, *Artemisia douglasiana* – provisional, and Naturalized Warm-Temperate Riparian/Wetland alliance habitats occur interspersed with one another, and either below or within close proximity to the OHWM. Common species observed in these alliances include *Populus fremontii, Quercus lobata, Platanus recemosa, Acer negundo, Fraxinus latifolia*, and *Juglans hindsii*. The understory contains *Salix lasiolepis, Salix exigua, Salix laevigata, Sambucus nigra* ssp. *caerulea*, and *Rubus armeniacus*.

5.5 Local Climate

The Study Area is in a Mediterranean climate with extreme lows not going below 17 degrees Fahrenheit and extreme highs not going above 121 degrees Fahrenheit, based on temperature records between 1933 and 2010 (WRCC, 2018). Red Bluff, California, has a frost-free period between May and October, with an average of 21 days between November and April where temperatures freeze overnight. Precipitation in the area averages 22 to 24 inches per year in a normal year. The most recent storm event and resulting high Sacramento River flows as measured at the USGS 11377100 gage (Sac River AB Bend Bridge near Red Bluff, CA) occurred on April 7, 2018, reaching 52,200 cubic-feet per second (cfs). This gage is located approximately 11 river miles upstream of the Study Area, so flows were likely slightly higher at the Study Area. Low-flow conditions existed on the Sacramento River during the field survey from April 30, 2018 to May 3, 2018, lows as measured at the USGS 11377100 gage, reaching 8,400 cfs. There were no active flows through East Sand Slough during the survey, but water remained in isolated pools in low points of the channel as remnant water from the high flow event earlier that month.

5.6 Hydrology

The Sacramento River is a perennial waterway that drains the northern part of the Central Valley and its watershed covers 27,210 square miles. Its headwaters are at the junction of the Middle Fork Sacramento River and South Fork Sacramento River about 5.5 miles west-southwest of the town of Mount Shasta. The Sacramento River flows through or borders eleven counties,

including Siskiyou, Shasta, Tehama, Butte, Glenn, Colusa, Sutter, Yolo, Sacramento, Solano, and Contra Costa. The river flows southward, joining the San Joaquin River northeast of Pittsburg to form Suisun Bay. Suisun Bay empties into the San Francisco Bay. Flows in the Sacramento River near Redding are controlled through flow releases from Shasta Dam and Keswick Dam.

Sacramento River flows enter the northeastern-most low-flow channel at the upstream end of East Sand Slough at around 18,000 cfs. Reclamation reviewed the gage data from the USGS gage at Bend Bridge (site no. 11377100), upstream of Red Bluff, and analyzed data along with video available on YouTube taken above the Market Street bridge at the water intake facility during a release that Reclamation reported at 35,000 cubic foot per second (cfs) from Shasta Dam. Peak flow during the release occurred on March 20, 2011, with flows ranging from 53,500 cfs to 97,300 cfs.

Flow rates were also obtained for the dates corresponding to the NAIP imagery covering the Study Area, are as follows:

- June 30, 2005: 14,400 cfs 14,500 cfs
- July 2, 2009: 12,800 cfs 13,500 cfs
- July 20, 2010: 12,900 cfs 13,200 cfs
- July 3, 2012: 14,600 cfs 15,300 cfs

These flow rates are indicative of low-flow conditions, thus the NAIP imagery depict low-flow channel conditions.

5.7 National Wetlands Inventory

The riverine streambed mapped in the National Wetlands Inventory (NWI) generally coincide with the delineated area for this report. However, the riverine and palustrine habitat mapped in the NWI appear to be from before 2012 when the RBDD gates were decommissioned, which changed the hydrology in East Sand Slough. When the RBDD gates were in operation at different intervals from 1966 to 2012, Sacramento River water backed up into East Sand Slough, most recently from May 15 to September 15 from 1994 to 2008, and June 15 to August 31 from 2009 to 2012. The frequent and consistent inundation of East Sand Slough created a complex riparian wetland system. The water regime in East Sand Slough is now driven purely by Sacramento River flows, starting around 17,000 cfs when flows are high enough to enter the channel upstream. This means the channel now experiences less frequent inundation and for shorter periods once flows recede, which the riparian features had to adapt to. The NWI map of the area (see Attachment 6) shows riverine, freshwater emergent, and freshwater forested/shrub habitat in the Study Area. Freshwater emergent wetlands as indicated on the NWI map either are no longer present or converted to a forested/shrub wetland habitat after changing from seasonally flooded to seasonally saturated or temporarily flooded systems. A similar case occurred for some areas indicated on the NWI map as forested wetlands but are either absent or are now shrub habitat due to the hydrology shift and 2013 fire in the slough.

6.0 Field Methods

A delineation of waters of the U.S. was conducted within the Study Area on April 30, 2018 through May 3, 2018, by Alexandra Woodward, Jamie LeFevre, Luke Davis, Sarah Perrin, and Spencer Marshall, Natural Resources Specialists, with Reclamation. The weather was clear with no recent precipitation. The most recent precipitation occurred April 7, 2018 (0.75 inch of rain) and April 11, 2018 (0.24 inch of rain) (Weather Underground 2018). Data collection in the field was conducted in accordance with the *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (USACE, 2008a) (OHWM manual), the 1987 Corps of Engineers Wetland Delineation Manual (USACE, 1987) (1987 manual), and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (USACE, 2008b) (regional manual). The OHWM data for the Sacramento River and East Sand Slough were collected on the *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid Water Mark (OHWM) in the Arid Water Mark (OHWM) in the Arid West Region of the Western United States (USACE, 2010). Suspected wetland areas were evaluated using data collected on Wetland Determination Forms found in the back of the regional manual.*

The study area was evaluated by foot. Eight data points were completed in the Study Area to determine the presence of the three wetland parameters (vegetation, soils, and hydrology). The datasheets for each point are included in Attachment 7, and site visit photos are included in Attachment 8.. The wetland indicator status of plant species was based on the *Arid West 2016 Regional Wetland Plant List* (Lichvar et al. 2016). Soil colors were determined using the *Munsell Soil Color Charts* (Munsell Color 2000).

The boundaries of channelized features, such as the Sacramento River, East Sand Slough, and other waters of the U.S. were delineated based on the OHWM indicators observed in the field, using the methods outlined in *Regulatory Guidance Letter No. 05-05*. The high water year events and floods on the Sacramento River in winter and spring of 2017 resulted in conditions that complicated locating the OHWM with just field indicators. Field indicators observed for the OHWM include wrack or debris on shrubs and branches in taller trees indicating height of high flow events, erosion and bank cutting, change in average sediment texture from cobble-gravel low points to sand and fines as move up-slope, and change in plant density and species composition from water-tolerant species to upland species. LiDAR, aerial imagery, and hydraulic modelling shape files were analyzed and used in addition to observed field indicators to determine the location of the OHWM. A total of eight transects (transects 1a, 1b, 2a, 2b, 2c, 2d, 2e, 3a) were taken on OHWM data sheets throughout the Study Area. The first transect (Transect 1a) started at the upstream confluence with the Sacramento River, including the river island on the east bank of the river. Transect 2a walked from river-left to river-right crossed a scrub-shrub wetland within a low-flow channel, to an upland island containing a mixture of *Populus* fremontii, Ouercus lobata, and California Introduced Annual and Perennial Herbaceous alliance habitats, to a cobble-gravel low-flow channel, a small upland island, and a third more narrow cobble-gravel low-flow channel. Transect 2b was similar to and approximately 1,000 feet downstream of the previous one, but with a narrower island between the outermost OHWM boundaries. Transect 2c walked immediately downstream of the Antelope Boulevard bridge, from the OHWM at river-right to river-left, crossing areas of cobble-gravel and vegetated (Avena fatua, Rorippa curvisiliqua, Cyperus sp., Brassica rapa, Vicia villosa, Rumex crispus, Leontodon *saxatilis, Lupinus bicolor, Bromus diandrus, Avena barbata, Festuca perennis*) intermittent streambed, and a scrub-shrub wetland of mostly willows. Transect 2d walked a 15-foot wide side channel on river-right, approximately 215 feet downstream of Transect 2c. This side channel starts out sandy, then becomes densely vegetated with annual and perennial herbaceous species, with forested riparian wetlands developed along the edges of the OHWM as move downstream towards its reconnection with the main channel. Transect 3a walked a 50-foot wide forested riparian wetland above the OHWM, that runs parallel to Interstate-5, and appears to be fed by storm water runoff from a culvert off the highway. Transect 2e walked from the OHWM at riverright to river-left, approximately 1,250 feet downstream from Transect 2e, covering vegetated intermittent streambed along the edges of the active floodplain, and cobble-gravel intermittent streambed in the low-flow channel. Transect 1b started at the OHWM river-left and walked across a combination of cobble-gravel, sandy, and vegetated intermittent streambed until reaching the active low-flow channel of the Sacramento River. This transect was extended to the other side of the Sacramento River bank to complete the extent of the OHWM.

Suspected wetlands and drainages on aerial imagery (Attachment 9) were evaluated prior to the site visit during a preliminary desk review and targeted for evaluation in the field. Due to the size of the Study Area, the plan was to rely heavily on the NWI map to help focus on areas to confirm wetland presence and determine which areas to evaluate further and add. As mentioned above, once in the field, Reclamation saw some different conditions and determined the NWI map is likely from before 2012 when the slough saw more frequent and prolonged inundation from lowered RBDD gates on the Sacramento River. The existing conditions that have normalized over the past six years lack certain fresh emergent wetlands where the NWI map indicates they are present, have more scrub-shrub riparian instead of indicated forested riparian wetland features due to less water and the fire in 2013, and have a more intermittent riverine streambed below the OHWM instead of the indicated lower perennial riverine unconsolidated bottom. Areas in topographic depressions in topographic swales not indicated on the NWI map as a wetland were also evaluated by taking wetland delineation data points. Soils pits were dug in suspected wetland areas to refusal. Vegetation was surveyed in one square meter plots unless otherwise noted on the data sheets.

Data points and transect features were drawn onto paper maps by hand and collected using a Trimble GPS unit and later processed for the delineation map using ESRI ArcMap 10.5.1, a geographic information system (GIS) software.

7.0 Results

There are 15.81 acres of the Sacramento River, 86.10 acres of East Sand Slough, 10.57 acres of wetlands and 0.07 acres of ephemeral drainage below the OHWM, and 22.86 acres of wetlands and 0.77 acre of ephemeral drainages above the OHWM identified within the 372.98-acre Study Area. See Table 3 for each water of the U.S. feature identified. The wetlands and waters of the U.S. features are further discussed below, and labelled on the delineation map (Figure 2) as the following:

- Riverine Lower Perennial, Unconsolidated Bottom, Cobble Gravel (RUB)
- Riverine Lower Perennial, Unconsolidated Shore, Cobble Gravle (RUS)

- Riverine Intermittent Streambed, Cobble-Gravel (RIScg)
- Riverine Intermittent Streambed, Sand (RISs)
- Riverine Intermittent Streambed, Vegetated (RISv)
- Ephemeral Drainage (ED)
- Palustrine Seasonal Wetland (PSW)
- Scrub-Shrub Riparian Wetland (SSW)
- Forested Riparian Wetland (FW)

Zoomed-in versions of this map are in Attachment 1.

Table 3. Overview of	of Waters of the U.S. in the Stu	ıdy Area	

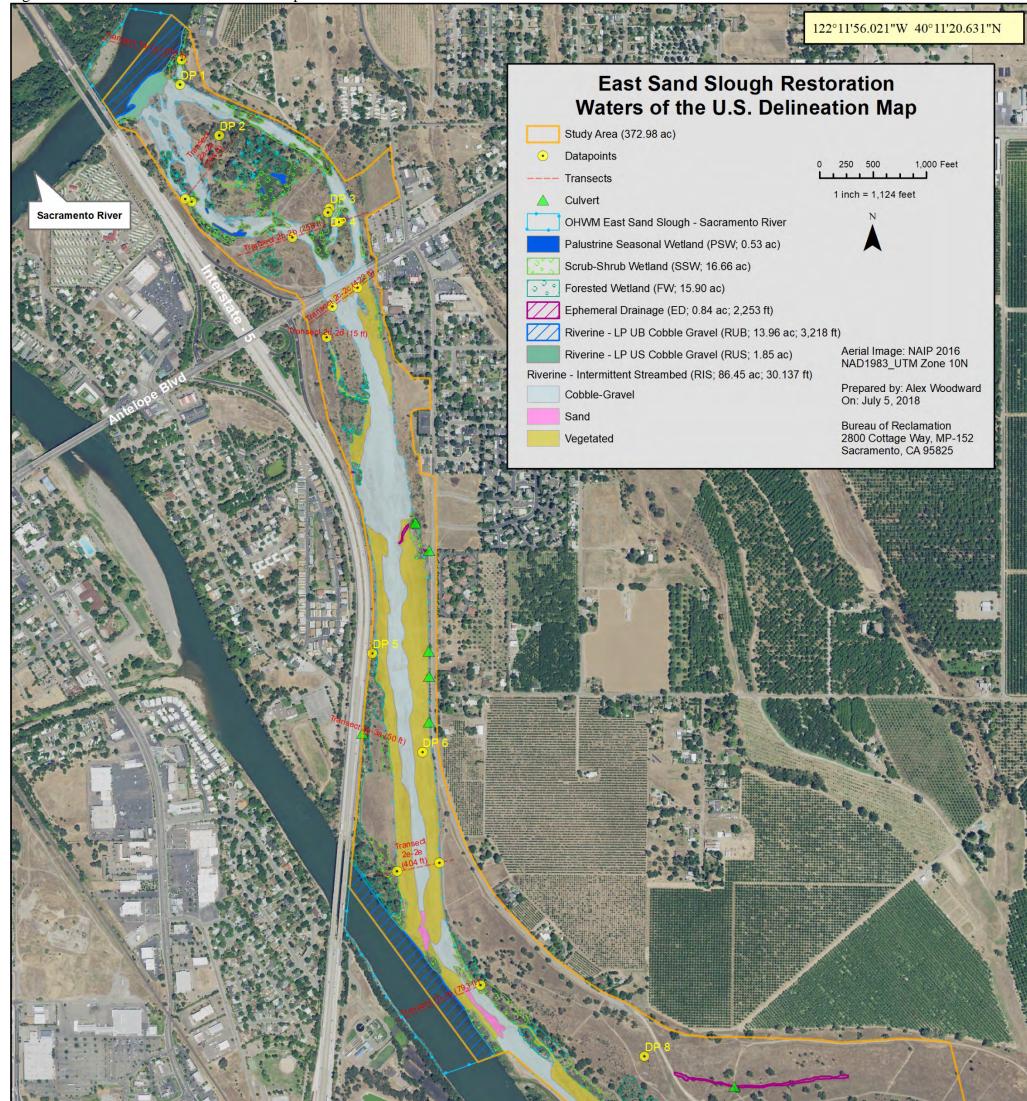
Feature	Cowardin Code	Above/Below OHWM	Area (acres)	Linear Feet (streams or drainages)		
Riverine, Lower Perennial – Sacramento River						
Riveri	ne, Lower Perenni	al, Unconsolidated	Bottom, Permane	ntly Flooded (R2UBH)		
RUB-1	R2UBH	below	5.43	1,062		
RUB-2	R2UBH	below	8.52	2,156		
	I	R2UBH Subtotal =	13.95	3,218		
R	iverine, Lower Per	ennial, Unconsolida	ated Shore, Cobbl	e-Gravel (R2US1)		
RUS-1	R2US1	below	1.85	167		
		R2US1 Subtotal =	1.85	167		
	Riverine,	Intermittent Stream	bed – East Sand S	Slough		
		Cobble-Grave	l (R4SB3)			
RIScg-1	R4SB3	below	8.48	3,347		
RIScg-2	R4SB3	below	1.01	625		
RIScg-3	R4SB3	below	6.13	2,932		
RIScg-4	R4SB3	below	25.23	5,919		
RIScg-5	R4SB3	below	6.30	2,489		
		RIScg Subtotal =	47.51	15,312		
		Sand (R4	SB4)			
RISs-1	R4SB4	below	0.09	257		
RISs-2	R4SB4	below	0.43	384		
RISs-3	R4SB4	below	0.69	528		
		RISs Subtotal =	1.21	1,169		
		Vegetated (R4SB7)			
RISv-1	R4SB7	below	0.33	95		
RISv-2	R4SB7	below	0.09	82		
RISv-3	R4SB7	below	2.88	1,251		

Feature	Cowardin Code	Above/Below OHWM	Area (acres)	Linear Feet (streams or drainages)
RISv-4	R4SB7	below	0.42	704
RISv-5	R4SB7	below	1.05	561
RISv-6	R4SB7	below	15.42	3,950
RISv-7	R4SB7	below	10.66	4,134
RISv-8	R4SB7	below	1.74	1,131
RISv-9	R4SB7	below	5.14	1,928
		RISv Subtotal =	37.73	13,836
		Ephemeral D)rainage	
	Culvert-fed	, Intermittent, Strea	mbed, Vegetated	(R4SB7)
ED-1	R4SB7	above	0.005	47
ED-2	R4SB7	below	0.07	208
ED-3	R4SB7	above	0.007	54
ED-4	R4SB7	above	0.68	1,660
ED-5	R4SB7	above	0.08	284
ED Subtotal = 0.84 2,253				
		Palustrine Seaso	onal Wetland	
	Aquatic Bed,	Floating vascular, S	Seasonally Floode	ed (PAB4C)
PSW-1	PAB4C	below	0.24	-
PSW-2	PAB4C	below	0.03	-
PSW-3	PAB4C	below	0.21	-
PSW-4	PAB4C	below	0.05	-
		PSW Subtotal =	0.53	-
		Scrub-Shrub Ripa	rian Wetland	
	Palustrine, Broad	-Leaved Deciduous	; various water re	egimes (PSS1_)
SSW-1	PSS1E	below	0.28	-
SSW-2	PSS1E	below	0.06	-
SSW-3	PSS1E	below	0.23	-
SSW-4	PSS1G	below	0.02	-
SSW-5	PSS1H	below	0.97	-
SSW-6	PSS1G	below	0.65	-
SSW-7	PSS1H	below	0.99	-
SSW-8	PSS1F	below	0.19	-
SSW-9	PSS1F	below	0.24	-
SSW-10	PSS1A	below	2.66	-

Feature	Cowardin Code	Above/Below OHWM	Area (acres)	Linear Feet (streams or drainages)	
SSW-11	PSS1E	below	0.09	-	
SSW-12	PSS1B	above	0.61	-	
SSW-13	PSS1A	below	0.19	-	
SSW-14	PSS1A	below	0.11	-	
SSW-15	PSS1J	below	0.08	-	
SSW-16	PSS1C	below	0.08	-	
SSW-17	PSS1B	below	0.07	-	
SSW-18	PSS1A	below	0.10	-	
SSW-19	PSS1C	below	0.04	-	
SSW-20	PSS1A	below	0.11	-	
SSW-21	PSS1C	below	0.05	-	
SSW-22	PSS1A	below	0.17	-	
SSW-23	PSS1A	below	0.69	-	
SSW-24	PSS1C	below	0.42	-	
SSW-25	PSS1B	above	1.09	-	
SSW-26	PSS1C	below	0.35	-	
SSW-27	PSS1C	below	0.97	-	
SSW-28	PSS1C	below	0.25	-	
SSW-29	PSS1B	above	1.57	-	
SSW-30	PSS1B	above	2.16	-	
SSW-31	PSS1B	below	0.11	-	
SSW-32	PSS1C	below	0.36	-	
SSW-33	PSS1A	below	0.24	-	
SSW-34	PSS1A	below	0.11	-	
SSW-35	PSS1B	above	0.53	-	
SSW-36	PSS1C	below	0.04		
		SSW Subtotal =	16.66	-	
Forested Riparian Wetland					
	-	l-leaved Deciduous	-	gimes (PFO1_)	
FW-1	PFO1A	below	1.90	-	
FW-2	PFO1A	below	0.17	-	
FW-3	PFO1A	below	0.08	-	
FW-4	PFO1J	below	0.06	-	

Feature	Cowardin Code	Above/Below OHWM	Area (acres)	Linear Feet (streams or drainages)
FW-5	PFO1J	below	0.12	-
FW-6	PFO1A	below	0.25	-
FW-7	PFO1B	above	1.09	-
FW-8	PFO1A	below	0.09	-
FW-9	PFO1A	below	0.26	-
FW-10	PFO1A	below	0.27	-
FW-11	PFO1A	below	0.08	-
FW-12	PFO1A	below	0.08	-
FW-13	PFO1A	below	0.08	-
FW-14	PFO1A	below	0.18	-
FW-15	PFO1B	above	3.23	-
FW-16	PFO1B	above	3.38	-
FW-17	PFO1C	below	0.38	-
FW-18	PFO1B	below	0.87	-
FW-19	PFO1B	below	0.60	-
FW-20	PFO1B	below	1.90	-
FW-21	PFO1B	below	0.83	-
	FW Subtotal =		15.90	-
	Other Waters	of the U.S. Total =	102.75	35,955
	Wetlands Total =			-

Figure 2. Waters of the U.S. Delineation Map





7.1 Riverine

Based on LiDAR shape files of the Study Area, the elevation of the OHWM of the slough starts at the north end of the Study Area at approximately 260 feet above sea level and drops to approximately 253 feet above sea level at the south end of the Study Area.

Based on the Cowardin *et al.* (1979) NWI classification system, the NWI map shows the majority of East Sand Slough to be riverine, lower perennial, unconsolidated bottom, permanently flooded (R2UBH). However, since the 2012 decommissioning of the RBDD gates downstream in the Sacramento River, East Sand Slough now has flowing water only part of the year, during high flows from large storm events, instead of some flow all year based on an operation schedule. The substrate below the OHWM is either cobblegravel in the low-flow channels, vegetated with upland species that have moved in along the edges of the OHWM and low-flow channels, or patches of sand deposition throughout. The vegetated streambed (RISv) features have a variety of herbaceous species such as *Scleranthus annuus, Polanisia dodecandra ssp. trachysperma, Avena fatua, Rorippa curvisiliqua, Cyperus* sp., Leontodon saxatillis, Xanthium strumarium, Plagiobothrys stipitatus ssp. micranthus, *Brassica rapa, Rumex crispus, Bromus diandrus, Avena barbata*, and *Festuca perennis*.

7.2 Palustrine Seasonal Wetlands

All the observed palustrine seasonal wetlands occurred below the OHWM, north of the Antelope Boulevard bridge, and contained floating, non-emergent vascular plants including *Potamogeton crispus* and *Ludwigia peploides*. Soils were typically cobbles and riverwash and were frequently under ponded water.

7.3 Scrub-Shrub Riparian Wetland

Scrub-shrub riparian wetlands largely matched up with what the NWI map indicates, but also were observed in the field where the 2013 fire burned previously forested land. They were also observed along the OHWM margins and areas that no longer receive as much water as pre-2012 that one would expect to have developed into forested riparian wetland by now. The dominant shrub species in these areas is typically *Salix exigua*. The herbaceous stratum varies and includes *Equisetum hyemale*, *Festuca perennis*, *Brassica* spp., and *Hordeum marinum* ssp. *gussoneanum*. Soils varied from loams to sand and silt loams.

7.4 Forested Riparian Wetland

The majority of forested riparian wetlands occured along the OHWM margins in seasonal overflow channels, within the low-flow channels, and in depressions in upland areas. The tree canopy was typically composed of *Populus fremontii*, *Platanus racemosa*, *Acer negundo*, *Salix goodingii* and *Salix exigua*. The understory was typically composed of *Rubus armeniacus*. Soils tended to be drier and were composed of sandy loams.

7.5 Ephemeral Drainage

Several of these drainages were fed by culverts from roads, most of which occurred above the East Sand Slough OHWM. The largest drainage (feature ED-4) drains an historic swale and drains through a culvert under Sale Lane. The soils and plants in these drainages varied considerably, though the herbaceous cover was typically grasses such as *Festuca perennis* and *Bromus* spp. Feature ED-2 was colonized by *Lepidium latifolium* and annual grasses.

8.0 Conclusion and Request for a Jurisdictional Determination

Subject to Corps verification, within the 14.71-acre Study Area, there are approximately 33.43 acres of wetlands, regulated under Section 404 of the Clean Water Act, and 101.98 acres and 35,910 linear feet of

other waters of the U.S. (Sacramento River, East Sand Slough, and ephemeral drainages), regulated under Section 10 of the Rivers and Harbors Act and Section 404 of the Clean Water Act. Reclamation requests a preliminary jurisdictional determination of the extent of waters shown in Figure 2, and Attachment 1, for the East Sand Slough Restoration Project.

9.0 References

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Attachment 1

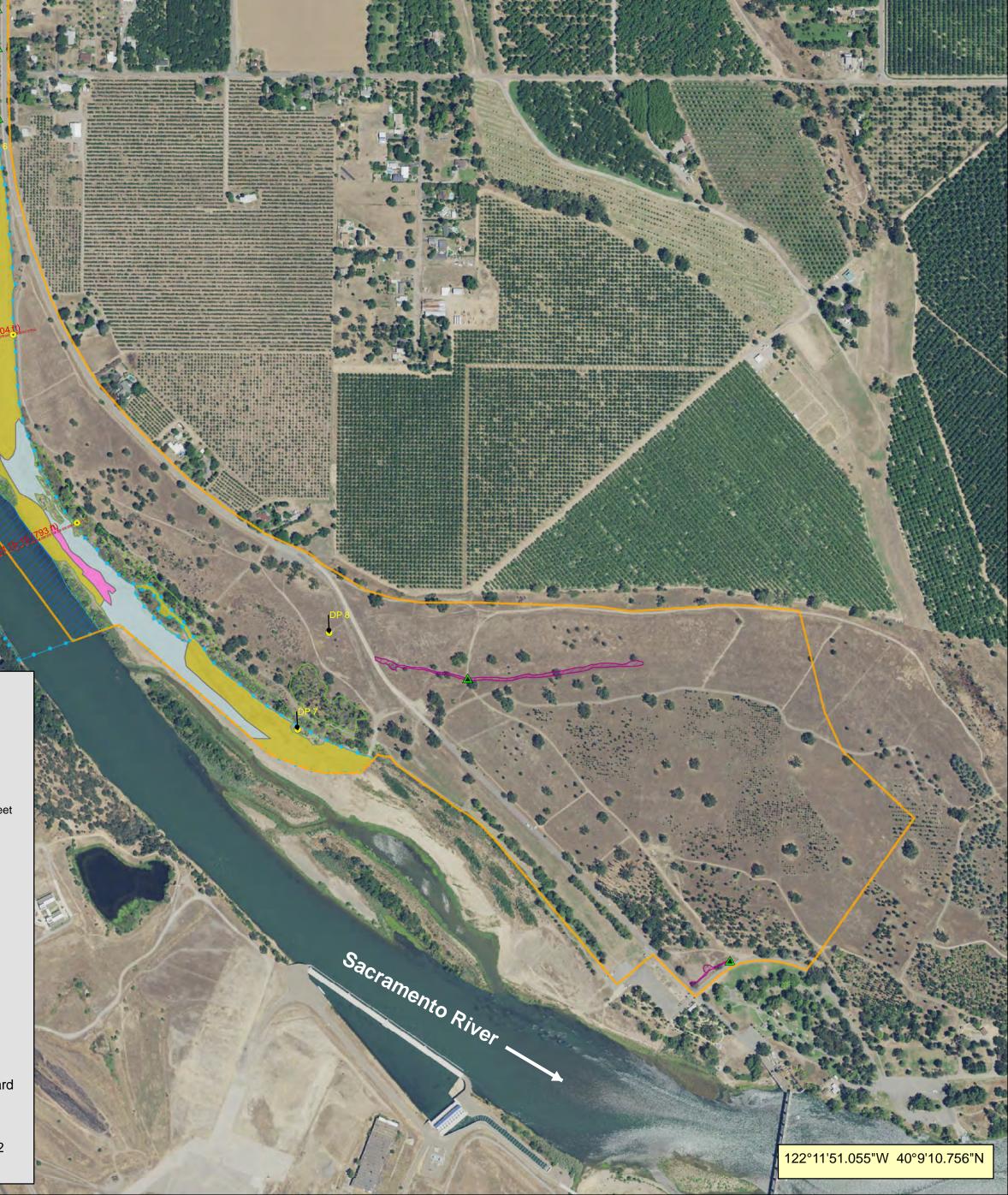
East Sand Slough Restoration Waters of the U.S. delineation maps

122°13'54.426"W 40°11'25.925"N

Sacramento River

East Sand Slough Restoration Waters of the U.S. Delineation Map





Ephemeral Drainage (ED; 0.84 ac; 2,253 ft)

Cobble-Gravel

Sand

Vegetated

Riverine - LP UB Cobble Gravel (RUB; 13.96 ac; 3,218 ft)

Riverine - LP US Cobble Gravel (RUS; 1.85 ac)

Riverine - Intermittent Streambed (RIS; 86.45 ac; 30.137 ft)

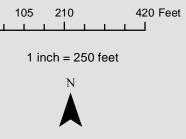
Aerial Image: NAIP 2016 NAD1983_UTM Zone 10N

Prepared by: Alex Woodward On: July 5, 2018

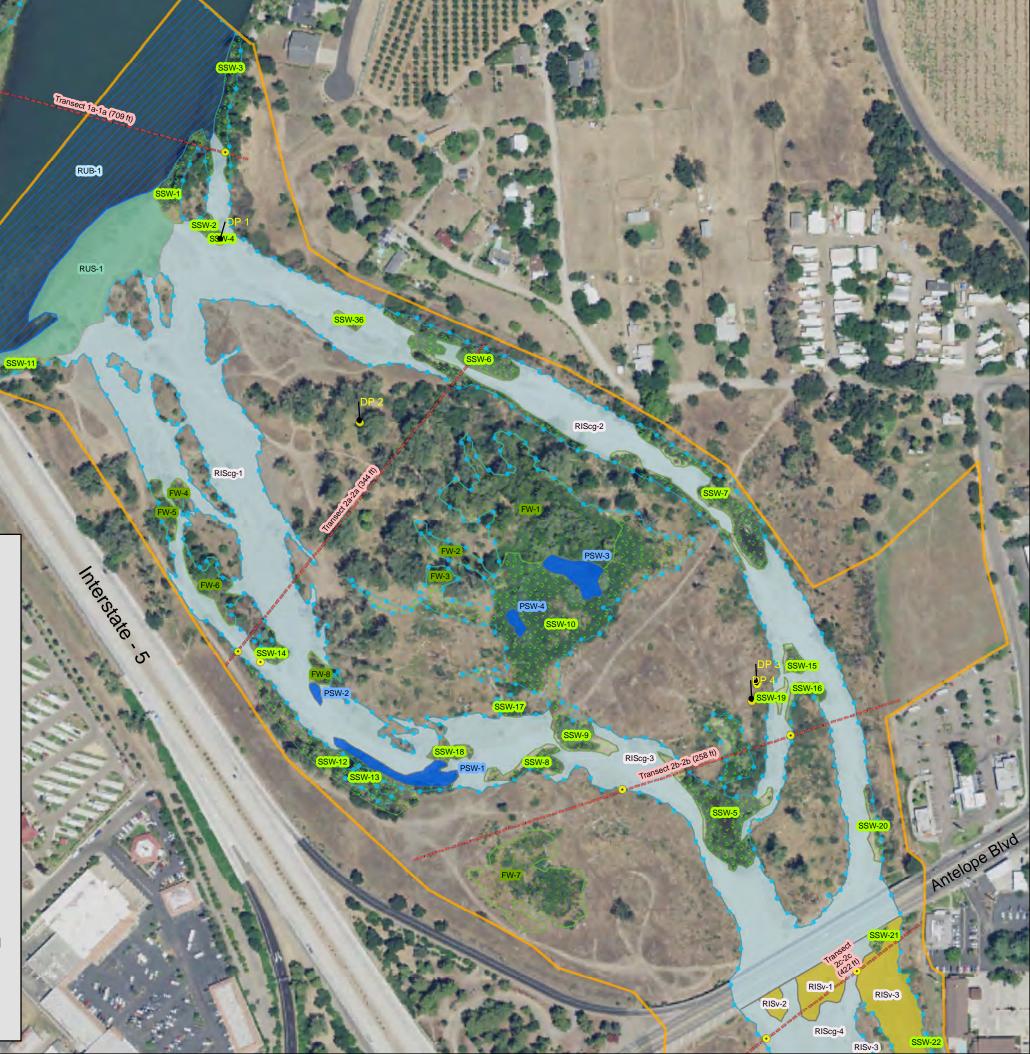
Bureau of Reclamation 2800 Cottage Way, MP-152 Sacramento, CA 95825

East Sand Slough Restoration Waters of the U.S. Delineation Map - Zoom 1/5

	Study Area (372.98 ac)					
	Datapoints					
	Transects	0 L	105	210	, 	420 Feet
	Culvert		1 in	ich = 250 f	eet	
	OHWM East Sand Slough - Sacramento River			Ν		
	Palustrine Seasonal Wetland (PSW; 0.53 ac)					
	Scrub-Shrub Wetland (SSW; 16.66 ac)					
`````````` ``````````````````````````	Forested Wetland (FW; 15.90 ac)					
	Ephemeral Drainage (ED; 0.84 ac; 2,253 ft)					
	Riverine - LP UB Cobble Gravel (RUB; 13.96 ac; 3,	218 f	t)			
	Riverine - LP US Cobble Gravel (RUS; 1.85 ac)			I Image: N		
Riverin	e - Intermittent Streambed (RIS; 86.45 ac; 30.137 ft)	NAD	1983_UTN		e TUN
	Cobble-Gravel		•	ared by: A uly 5, 201		oodward
	Sand			•		
	Vegetated		2800	au of Recl Cottage \ amento, C	Nay, N	/IP-152



Sacramento River



East Sand Slough Restoration Naters of the U.S. Delineation Map - Zoom 2/5

Antelope Blvd

Interstate 5

ers of the U.S. Delineation
Study Area (372.98 ac)
Datapoints
Transects 0
Culvert
OHWM East Sand Slough - Sacramento River
Palustrine Seasonal Wetland (PSW; 0.53 ac)
Scrub-Shrub Wetland (SSW; 16.66 ac)
Forested Wetland (FW; 15.90 ac)
Ephemeral Drainage (ED; 0.84 ac; 2,253 ft)
Riverine - LP UB Cobble Gravel (RUB; 13.96 ac; 3,218
Riverine - LP US Cobble Gravel (RUS; 1.85 ac)
e - Intermittent Streambed (RIS; 86.45 ac; 30.137 ft)
Cobble-Gravel
Sand
Vegetated

8 ft) Aerial Image: NAIP 2016 NAD1983_UTM Zone 10N Prepared by: Alex Woodward On: July 5, 2018 Bureau of Reclamation 2800 Cottage Way, MP-152 Sacramento, CA 95825

85

170

340 Feet

RIScg-3

RISV-2

RISs

(15 ft

RISv-1

RISv-5

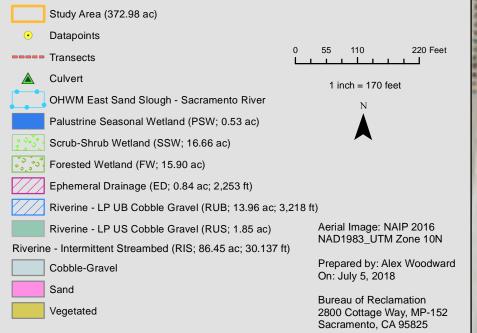
ED-1

RISv-3



RIScg-4

East Sand Slough Restoration Waters of the U.S. Delineation Map - Zoom 3/5



5 Interstate -

RISv-6 RIScg-4 RISv-7



East Sand Slough Restoration Waters of the U.S. Delineation Map - Zoom 4/5

RIScg-4

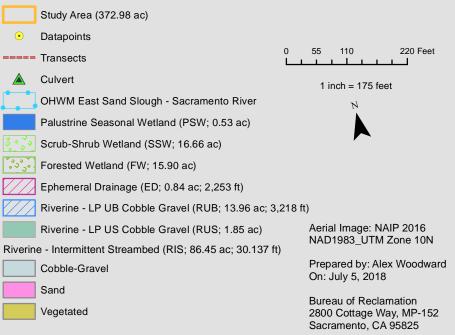
RISv-7

RISv-6

RISv-8

RUB-2

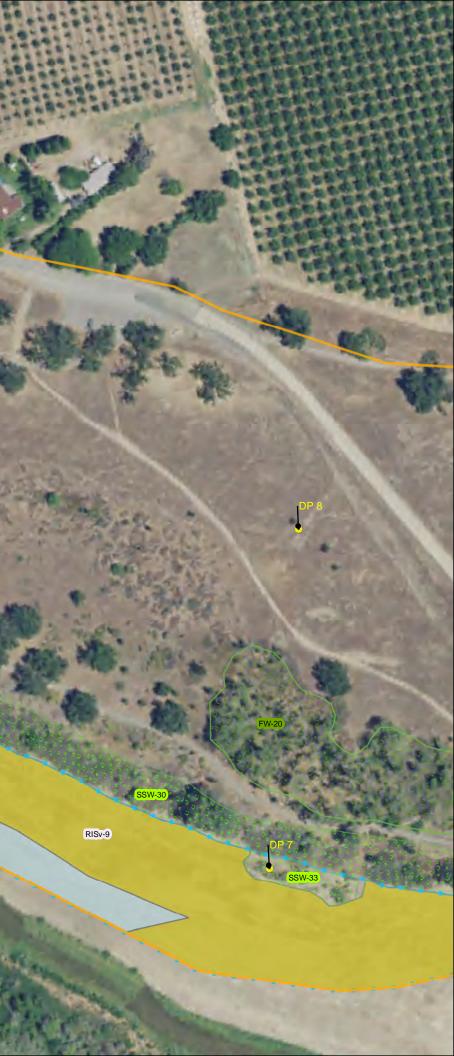
RISs-2





RIScg-5

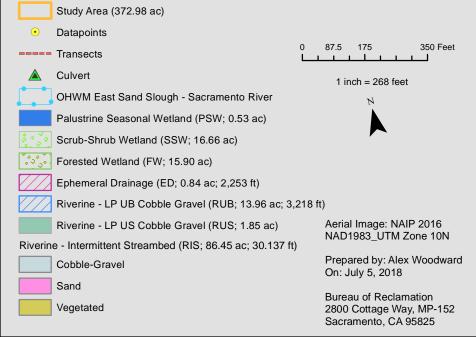
RISs-3



East Sand Slough Restoration Waters of the U.S. Delineation Map - Zoom 5/5

RISv-9

RIScg-5



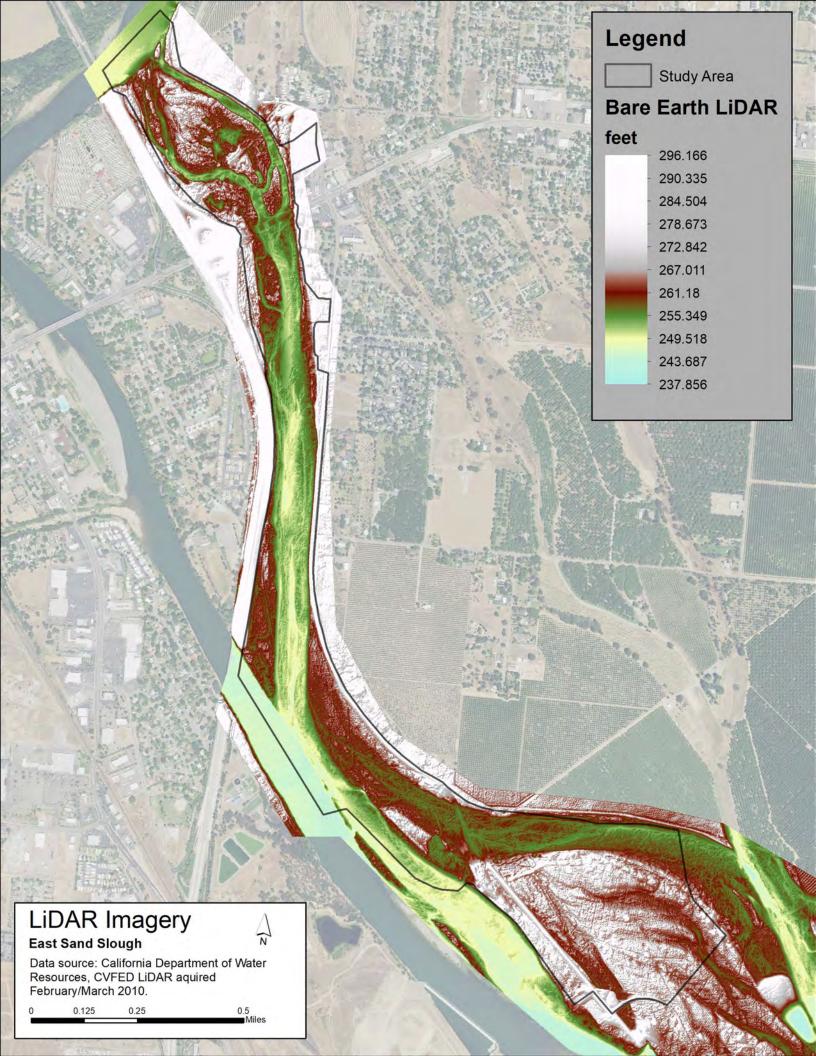
Sacramento River

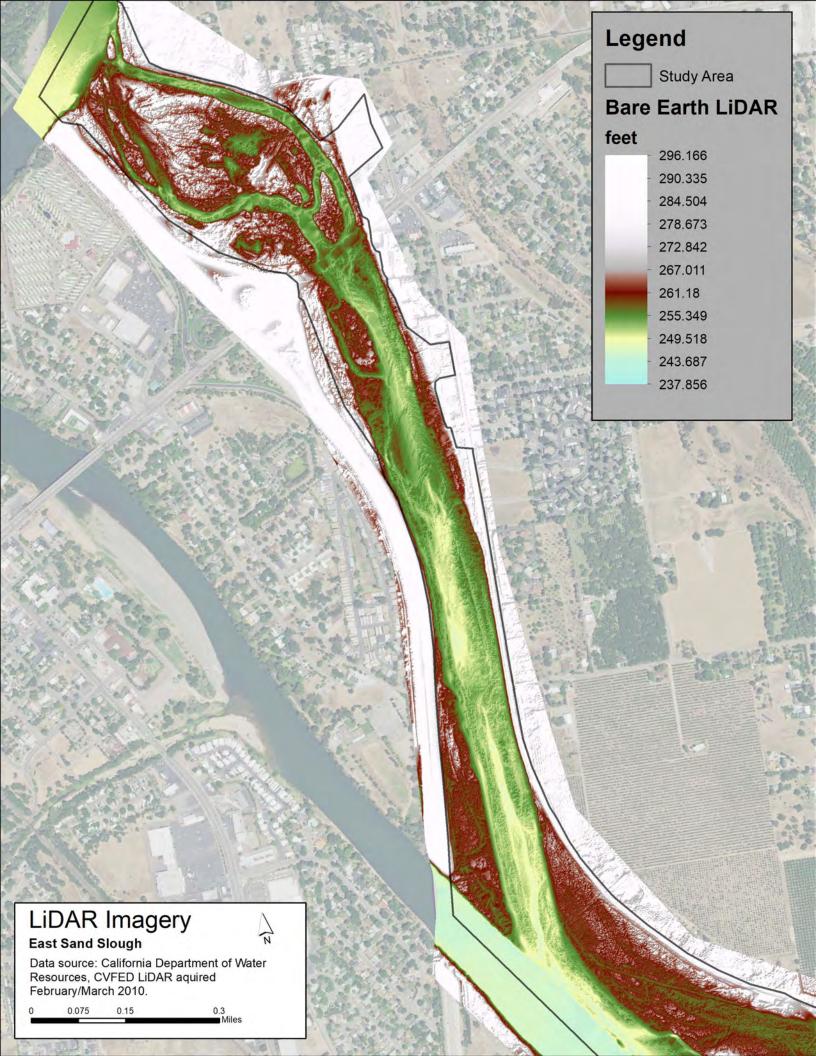
Sale Lane



Attachment 2

LiDAR Imagery





No. C. P. Station	A CARLES AND A CARLES AND A CARLES
Legend	
	Study Area
Bare	Earth LiDAR
feet	
-	296.166
	290.335
	284.504
	278.673
-	272.842
-	267.011
-	261.18
-	255.349
-	249.518
	243.687
-	237.856

LiDAR Imagery East Sand Slough

Data source: California Department of Water Resources, CVFED LiDAR aquired February/March 2010.

0.075 0.15

N



LiDAR Imagery East Sand Slough

Data source: NOAA Fisheries, Upper Sacramento River, California Topobathymetric LiDAR. Acquired 9/10 thru 9/17, 2017.

N

500 Feet

125 250

	1000	AL	
	Lege	end	2.
		Study Area	1.7
	Bare	Earth Surface	-7
	Feet	High : 309.84	1
		Low : 244.7	115111
-			
	. 201		
1 1 A ANALES			
K// Aller			
			4
LiDAR Imagery East Sand Slough			
Data source: NOAA Fisheries, Upper Sacramento River, California Topobathymetric LiDAR. Acquired 9/10 thru 9/17, 2017.		alle.	
0 215 430 860 Feet			

痼



1

LiDAR Imagery East Sand Slough

Data source: NOAA Fisheries, Upper Sacramento River, California Topobathymetric LiDAR. Acquired 9/10 thru 9/17, 2017.

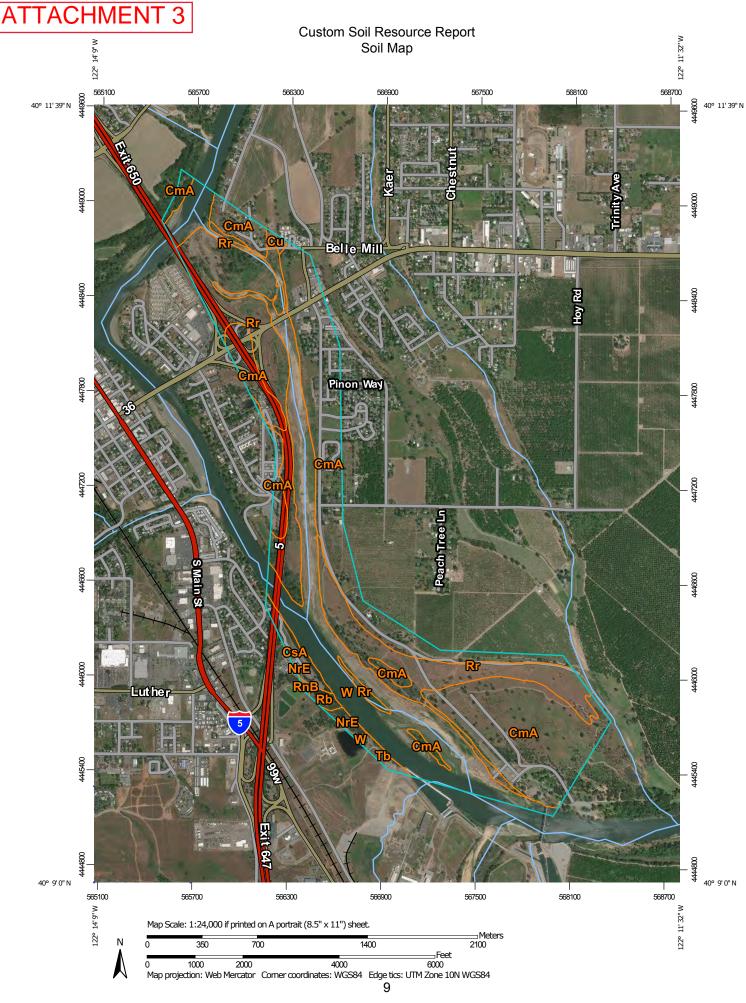
N

1,400 Feet

350 700

Attachment 3

Soil Survey Information



	MAP L	EGEND)	MAP INFORMATION
Area of In	terest (AOI) Area of Interest (AOI)	8	Spoil Area Stony Spot	The soil surveys that comprise your AOI were mapped at 1:20,000.
ioils	Soil Map Unit Polygons Soil Map Unit Lines	00 V	Very Stony Spot Wet Spot	Please rely on the bar scale on each map sheet for map measurements.
	Soil Map Unit Points Point Features		Other Special Line Features	Source of Map: Natural Resources Conservation Service Web Soil Survey URL: Coordinate System: Web Mercator (EPSG:3857)
Special ©	Blowout	Water Fea	itures Streams and Canals	Maps from the Web Soil Survey are based on the Web Mercator
×	Borrow Pit Clay Spot	Transport	ation	projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the
\$	Closed Depression		Rails Interstate Highways	Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.
*	Gravel Pit Gravelly Spot	~	US Routes	This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.
0	Landfill	~	Major Roads Local Roads	Soil Survey Area: Tehama County, California
. م عليہ	Lava Flow Marsh or swamp	Backgrou	nd Aerial Photography	Survey Area Data: Version 11, Sep 14, 2017
R	Mine or Quarry			Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.
0	Miscellaneous Water Perennial Water			Date(s) aerial images were photographed: Feb 21, 2015—Oct 2016
\vee	Rock Outcrop			The orthophoto or other base map on which the soil lines were
+	Saline Spot Sandy Spot			compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.
⇔	Severely Eroded Spot			
⋧	Sinkhole Slide or Slip			
ø	Sodic Spot			

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
CmA	Columbia fine sandy loam, 0 to 3 percent slopes	343.8	43.3%
CsA	Columbia silt loam, 0 to 3 percent slopes	14.3	1.8%
Cu	Columbia complex, channeled	2.8	0.4%
NrE	Newville gravelly loam, 10 to 40 percent slopes, MLRA 17	5.2	0.7%
Rb	Red Bluff loam, 0 to 3 percent slopes, MLRA 17	4.5	0.6%
RnB	Redding gravelly loam, 0 to 8 percent slopes, MLRA 17	0.7	0.1%
Rr	Riverwash	206.5	26.0%
ТЬ	Tehama gravelly loam, 0 to 3 percent slopes, MLRA 17	5.7	0.7%
W	Water	210.8	26.5%
Totals for Area of Interest		794.5	100.0%

Map Unit Legend

Map Unit Descriptions

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

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

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a

given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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

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

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

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

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

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

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

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

Tehama County, California

CmA—Columbia fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hgdm Elevation: 10 to 150 feet Mean annual precipitation: 12 to 25 inches Mean annual air temperature: 57 to 63 degrees F Frost-free period: 230 to 340 days Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Columbia

Setting

Landform: Flood plains Landform position (two-dimensional): Summit Landform position (three-dimensional): Tread Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 26 inches: fine sandy loam *H2 - 26 to 60 inches:* fine sandy loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 1 Land capability classification (nonirrigated): 3c Hydrologic Soil Group: A Ecological site: COARSE LOAMY (R015XD011CA) Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 10 percent *Hydric soil rating:* No

Zamora

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

CsA—Columbia silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hgds Elevation: 10 to 150 feet Mean annual precipitation: 12 to 25 inches Mean annual air temperature: 57 to 63 degrees F Frost-free period: 230 to 340 days Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Columbia

Setting

Landform: Flood plains Landform position (two-dimensional): Summit Landform position (three-dimensional): Tread Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 26 inches: silt loam *H2 - 26 to 60 inches:* silt loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Rare
Frequency of ponding: None
Available water storage in profile: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): 1 Land capability classification (nonirrigated): 3c Hydrologic Soil Group: B Other vegetative classification: LOAMY (015XD047CA_1) Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent Landform: Drainageways Hydric soil rating: Yes

Unnamed

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

Zamora

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

Cu—Columbia complex, channeled

Map Unit Setting

National map unit symbol: hgdw Elevation: 10 to 2,900 feet Mean annual precipitation: 8 to 25 inches Mean annual air temperature: 46 to 63 degrees F Frost-free period: 110 to 340 days Farmland classification: Not prime farmland

Map Unit Composition

Columbia and similar soils: 25 percent Columbia and similar soils: 25 percent Riverwash: 25 percent Minor components: 25 percent Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbia

Setting

Landform: Flood plains Landform position (two-dimensional): Summit Landform position (three-dimensional): Tread, riser Down-slope shape: Concave Across-slope shape: Linear Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 26 inches: fine sandy loam *H2 - 26 to 60 inches:* fine sandy loam

Properties and qualities

Slope: 0 to 5 percent

Depth to restrictive feature: More than 80 inches Natural drainage class: Well drained Runoff class: Very low Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr) Depth to water table: More than 80 inches Frequency of flooding: Occasional Frequency of ponding: None Available water storage in profile: Moderate (about 7.8 inches)

Interpretive groups

Land capability classification (irrigated): 6w Land capability classification (nonirrigated): 6w Hydrologic Soil Group: A Hydric soil rating: Yes

Description of Columbia

Setting

Landform: Flood plains Landform position (two-dimensional): Summit Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 26 inches: silt loam H2 - 26 to 36 inches: silt loam H3 - 36 to 60 inches: extremely gravelly sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: Occasional
Frequency of ponding: None
Available water storage in profile: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 6w Land capability classification (nonirrigated): 6w Hydrologic Soil Group: B Hydric soil rating: Yes

Description of Riverwash

Setting

Landform: Drainageways Parent material: Sandy and gravelly alluvium

Typical profile

H1 - 0 to 6 inches: extremely gravelly sand *H2 - 6 to 60 inches:* stratified gravelly sand to extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 2 percent
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 8 Hydric soil rating: Yes

Minor Components

Unnamed

Percent of map unit: 10 percent *Hydric soil rating:* No

Zamora

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

Maywood

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

Cortina

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

NrE—Newville gravelly loam, 10 to 40 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2w8c9 Elevation: 260 to 1,720 feet Mean annual precipitation: 21 to 33 inches Mean annual air temperature: 58 to 62 degrees F Frost-free period: 250 to 280 days Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Newville

Setting

Landform: Fan remnants Landform position (two-dimensional): Backslope Landform position (three-dimensional): Riser Down-slope shape: Convex Across-slope shape: Convex Parent material: Pliocene alluvium derived from metamorphic and sedimentary rock

Typical profile

A1 - 0 to 2 inches: gravelly loam

- A2 2 to 6 inches: gravelly loam
- AB 6 to 9 inches: gravelly loam
- Bt1 9 to 13 inches: gravelly clay loam
- Bt2 13 to 20 inches: gravelly clay loam
- Bt3 20 to 42 inches: very gravelly sandy clay loam
- Bt4 42 to 60 inches: gravelly sandy clay loam

Properties and qualities

Slope: 10 to 40 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.2 to 0.5 mmhos/cm)
Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 6e Hydrologic Soil Group: C Ecological site: GRAVELLY LOAM (R015XD090CA) Hydric soil rating: No

Minor Components

Altamont

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

Dibble

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

Corning

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

Rb-Red Bluff loam, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2t7r1 Elevation: 230 to 530 feet Mean annual precipitation: 22 to 29 inches Mean annual air temperature: 63 degrees F Frost-free period: 250 to 280 days Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Red Bluff

Setting

Landform: Fan remnants Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Tread Down-slope shape: Linear Across-slope shape: Linear Parent material: Alluvium derived from metamorphic and sedimentary rock

Typical profile

Ap - 0 to 6 inches: loam AB - 6 to 20 inches: loam Bt - 20 to 45 inches: clay loam BCt - 45 to 72 inches: clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.3 to 0.5 mmhos/cm)
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): 3s Land capability classification (nonirrigated): 3s Hydrologic Soil Group: C Other vegetative classification: LOAMY (015XD047CA_1) Hydric soil rating: No

Minor Components

Unnamed, ponded

Percent of map unit: 5 percent Landform: Terraces Hydric soil rating: Yes

Corning

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

Redding

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

Perkins

Percent of map unit: 2 percent Hydric soil rating: No

RnB—Redding gravelly loam, 0 to 8 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2w8bl Elevation: 20 to 420 feet Mean annual precipitation: 19 to 28 inches Mean annual air temperature: 61 to 63 degrees F Frost-free period: 230 to 320 days Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Redding

Setting

Landform: Fan remnants
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread, riser
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Loamy alluvium derived from igneous, metamorphic and sedimentary rock over clayey alluvium derived from igneous, metamorphic and sedimentary rock over cemented alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

A1 - 0 to 8 inches: gravelly loam

- A2 8 to 15 inches: gravelly loam
- A3 15 to 19 inches: gravelly loam

Bt - 19 to 22 inches: clay

2Bqm1 - 22 to 24 inches: cemented gravelly material

2Bqm2 - 24 to 35 inches: cemented gravelly material

Properties and qualities

Slope: 0 to 8 percent
Depth to restrictive feature: About 19 inches to abrupt textural change; 20 to 39 inches to duripan
Natural drainage class: Moderately well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: About 15 to 39 inches
Frequency of flooding: None
Frequency of ponding: None
Salinity, maximum in profile: Nonsaline (0.2 to 0.5 mmhos/cm)
Sodium adsorption ratio, maximum in profile: 2.0
Available water storage in profile: Very low (about 2.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e Land capability classification (nonirrigated): 4e Hydrologic Soil Group: D Ecological site: GRAVELLY LOAM (R015XD090CA) Hydric soil rating: No

Minor Components

Keyes

Percent of map unit: 10 percent Landform: Depressions Hydric soil rating: No

Corning

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

Unnamed, ponded

Percent of map unit: 2 percent Landform: Fan remnants Microfeatures of landform position: Vernal pools Hydric soil rating: Yes

Rr—Riverwash

Map Unit Setting

National map unit symbol: hgmb Elevation: 700 to 2,900 feet Mean annual precipitation: 8 to 15 inches Mean annual air temperature: 46 to 52 degrees F Frost-free period: 110 to 180 days Farmland classification: Not prime farmland

Map Unit Composition

Riverwash: 100 percent *Estimates are based on observations, descriptions, and transects of the mapunit.*

Description of Riverwash

Setting

Landform: Drainageways Down-slope shape: Linear, concave Across-slope shape: Linear, convex Parent material: Gravelly alluvium

Typical profile

H1 - 0 to 6 inches: extremely gravelly sandH2 - 6 to 60 inches: stratified gravelly sand to extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 2 percent
Natural drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: Frequent
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified Land capability classification (nonirrigated): 8 Hydric soil rating: Yes

Tb—Tehama gravelly loam, 0 to 3 percent slopes, MLRA 17

Map Unit Setting

National map unit symbol: 2srjb Elevation: 100 to 1,970 feet Mean annual precipitation: 17 to 43 inches Mean annual air temperature: 61 to 64 degrees F Frost-free period: 250 to 350 days Farmland classification: Prime farmland if irrigated

Map Unit Composition

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

Description of Tehama

Setting

Landform: Stream terraces, stream terraces Landform position (two-dimensional): Toeslope Landform position (three-dimensional): Riser, tread Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Fine-loamy alluvium derived from metamorphic and sedimentary rock

Typical profile

Ap - 0 to 9 inches: gravelly loam *Bt - 9 to 27 inches:* gravelly clay loam *BCtk - 27 to 60 inches:* gravelly clay loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 1.28 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: Moderate (about 7.2 inches)

Interpretive groups

Land capability classification (irrigated): 2s Land capability classification (nonirrigated): 3s Hydrologic Soil Group: C Hydric soil rating: No

Minor Components

Arbuckle

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

Hillgate

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

Plaza

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

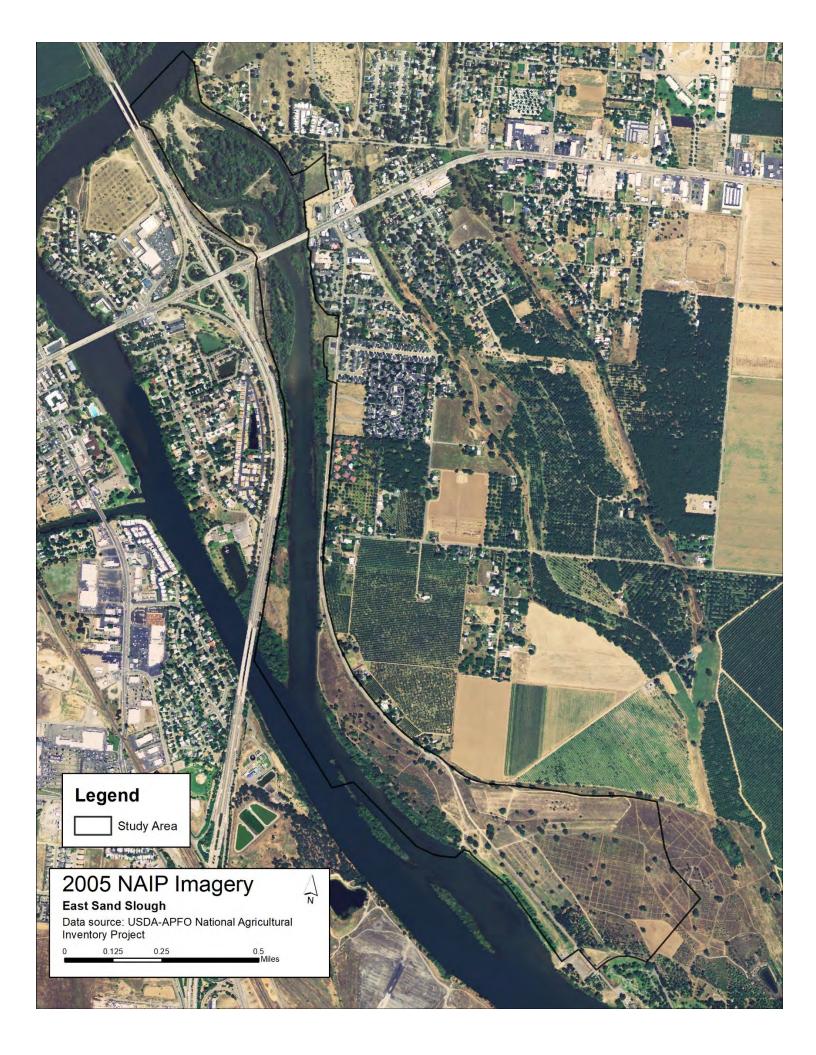
W—Water

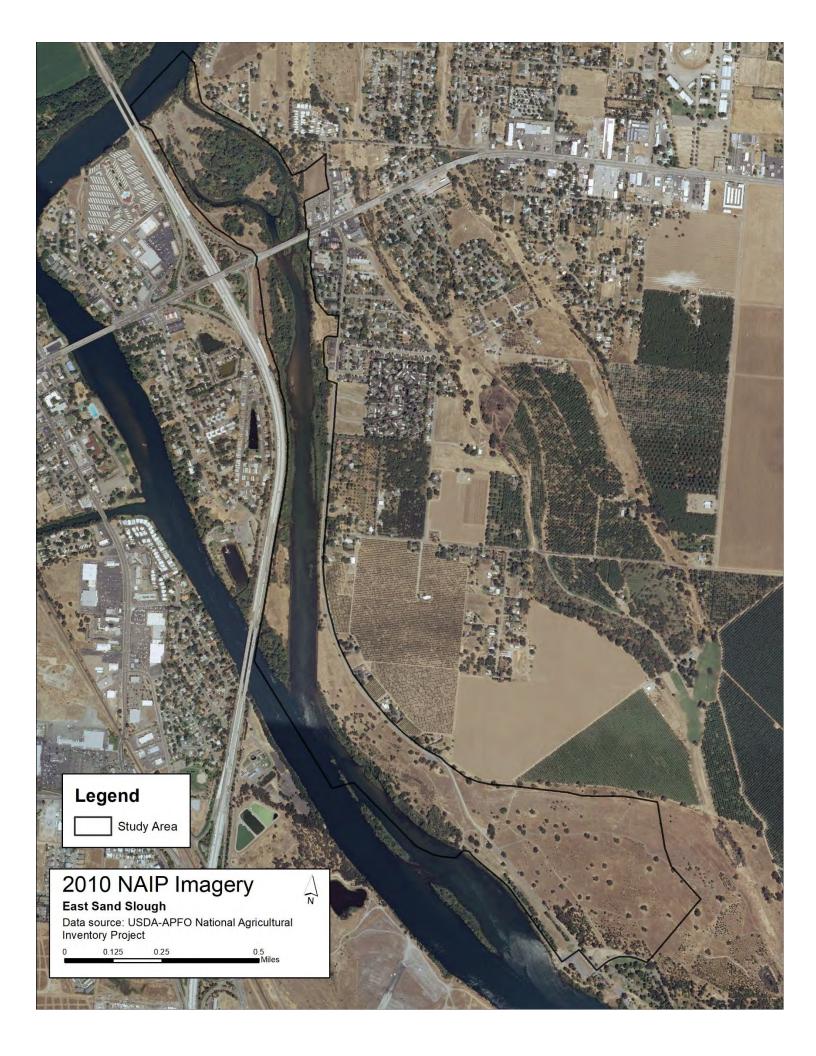
Map Unit Composition

Water: 100 percent *Estimates are based on observations, descriptions, and transects of the mapunit.*

Attachment 4

2005, 2010, 2012, and 2016 NAIP Imagery









Attachment 5

Botanical Survey Report

BOTANICAL SURVEY RECORD: EAST SAND SLOUGH

Survey Dates: 03/28-03/30/18; 04/09/18; 04/19/18; 07/10-07/11/18. **Location:** East Sand Slough

Person(s) present: Barbara Castro, Evan MacKinnon, Rob Irwin

Record Prepared by: Evan MacKinnon & Barbara Castro

Purpose: The purpose of this survey was to search for rare plants near planned project activities at East Sand Slough, an intermittent side channel of the Sacramento River. The project aims to improve salmonid habitat by maintaining continuous flows through the side channel. Potential impacts to botanical resources include sediment excavation, a spoils area, haul routes and staging areas for heavy equipment, as well as permanent inundation of the channel (which now supports plants associated with a hydrologic pattern involving both inundated and dry periods).

Target Rare Plants: A list of potential rare plants was generated from a nine-quad search of the California Natural Diversity Database using the California Department of Fish and Wildlife's Biological Information and Observation System. Using information on rare species' habitat, microhabitat, soil type, and elevation range (Janeway 2013; Consortium of California Herbaria; Jepson eFlora), the potential rare plant list was divided into a high likelihood list (Table 1), a moderate likelihood list (Table 2), and a low likelihood list (Table 3). The high likelihood list contains "target rare plants," which were the focus of field surveys.

Site Characterization: Land use of the surrounding area is a mix of agricultural, residential, and commercial development. The southern, downstream end of the side channel leads to the Red Bluff Recreation Area, a semi-natural area managed by the Mendocino National Forest.

Vegetation structure and composition is variable throughout East Sand Slough. At the upstream end north of Antelope Blvd, the side channel has varying ground elevations with multiple meandering channels and ponds (Fig. 1). Patches of mixed riparian forest exist, as well as open annual grassland, and scattered riparian trees and shrubs. The overstory at the upstream end consists of scattered patches of large tree species including Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), Oregon ash (*Fraxinus latifolia*), and northern California walnut (*Juglans hindsii*). Understory vegetation consists of several willow species (*Salix spp.*), blue elderberry (*Sambucus nigra* ssp. *caerulea*), and Himalayan blackberry (*Rubus armeniacus*). South of Antelope Blvd, East Sand Slough becomes a narrow single channel with banks dominated by annual grasses with occasional valley oak, interior live oak (*Quercus wislizeni*), and tree of heaven (*Ailanthus altissima*). The southernmost portion of the project area, southeast of where East Sand Slough re-enters the Sacramento River, consists of valley oak savannah with an understory of annual grasses. Much of the vegetation at East Sand Slough is recovering from a wildfire that occurred in June 2013. Also, the recent decommissioning of the Red Bluff Diversion Dam and subsequent loss of Lake Red Bluff has most likely resulted in a hydrologic change that will continue to modify vegetation characteristics at East Sand Slough (Resource Conservation District of Tehama County 2017).

Target microenvironments: The current hydrologic pattern involves both inundated and dry periods, which could produce conditions associated with several rare plants. The periodic inundation followed by gradual soil dry-down may be analogous to nearby vernal pool habitats, which support rare plants like Red Bluff dwarf rush (*Juncus leiospermus* var. *leiospermus*), Boggs Lake hedge-hyssop (*Gratioloa heterosepala*), and legenere (*Legenere limosa*). This hydrology also creates several ponds, which can support rare plants like Sanford's arrowhead (*Sagittaria sanfordii*) and Brazilian watermeal (*Wolffia brasiliensis*). Intermittent stream gravel bars and streambeds in nearby tributaries to the Sacramento River support rare plants like Stony Creek spurge (*Euphorbia ocellata ssp. rattanii*), silky cryptantha (*Cryptantha crinita*), and shield-bracted monkeyflower (*Erythranthe glaucescens*) which are all more typical of higher elevations.

Activities: The first survey was performed 3/28-3/30 to target early-season target rare plants (Table 1). A follow-up early season survey on 4/09 focused on upland acreage that had been added to the project area for a possible spoils area (Fig. 1). A highly focused survey on 4/19 targeted silky cryptantha at the northernmost end of East Sand Slough, after the plant was confirmed to be present and identifiable at a nearby reference site. This north end of East Sand Slough is less than one mile from a known CNDDB occurrence of silky Cryptantha, and closely resembles the conditions of the reference site (gravely substrate and similar species composition). A late-season survey was performed on 7/10-7/11, which focused on gravel bars, ponds, and moist areas likely to support late-season target rare plants (Table 1).

Survey Results: In total, 194 species were observed within the East Sand Slough project area (Table 4; Fig. 1). Interesting findings that resulted in voucher specimens included Azure penstemon (*Penstemon azureus* var. *azureus*) and contorted sun cup (*Camissonia contorta*). No rare plants were found, although we did encounter Valley spurge (*Euphorbia ocellata* ssp. *ocellata*), a close relative of the rare Stony Creek spurge (*Euphorbia ocellata* ssp. *ocellata*), a close relative of the rare Stony Creek spurge (*Euphorbia ocellata* ssp. *rattanii*), and weak-stemmed cryptantha (*Cryptantha flaccida*), a relative and associate species of the rare silky cryptantha (*Cryptantha crinita*). We also found *Mimulus guttatus* and *Mimulus pilosus*, two relatives of the rare shield-bracted monkeyflower (*Mimulus glaucescens*).

The hydrology of East Sand Slough creates areas that experience shallow inundation followed by gradual soil drydown. We found these conditions favored plants often associated with vernal pools, such as toothed downingia (*Downingia cuspidata*), Orcutt's quillwort (*Isoetes orcuttii*), stalked popcornflower (*Plagiobothrys stipitatus* ssp. *micranthus*) and purslane speedwell (*Veronica peregrina* ssp. *xalapensis*). Similar hydrologic conditions have also been produced from willow removal by beaver, an activity that exposes moist soil to sunlight. Despite hydrologic conditions comparable to nearby vernal pool habitats, we did not encounter any rare vernal pool obligate plants.

Minimization Measures: Based on findings from field surveys, we do not anticipate the project to have a negative effect on botanical resources. Because no rare plants were observed, we propose no minimization measures for rare plant protection; however unique environments should be preserved to the extent possible. For example, riparian trees and shrubs serve an important ecological and hydrological role and should be preserved as much as possible during construction.

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Scientific Name	Common Name	CRPR	Blooming Period	Habitat	Micro Habitat	Elevation Low (ft)	Elevation High (ft)
Juncus leiospermus var. leiospermus	Red Bluff dwarf rush	1B.1	Mar-Jun	Chaparral, Cismontane woodland, Meadows and seeps, Valley and foothill grassland, Vernal pools	Vernally mesic	110	4100
Cryptantha crinita	silky cryptantha	1B.2	Apr-May	Cismontane woodland, Lower montane coniferous forest, Riparian forest, Riparian woodland, Valley and foothill grassland	Gravelly streambeds	200	3985
Gratiola heterosepala	Boggs Lake hedge-hyssop	1B.2	Apr-Aug	Marshes and swamps (lake margins), Vernal pools	Clay	30	7790
Legenere limosa	legenere	1B.1	Apr-Jun	Wet areas	Vernal pools and ponds	0	2885
Wolffia brasiliensis	Brazillian watermeal	2B.3	Jun-Aug	Ponds	Sloughs	0	300
Erythranthe glaucescens	shield-bracted monkeyflower	4.3	Feb-Aug(Sep)	Chaparral, Cismontane woodland, Lower montane coniferous forest, Valley and foothill grassland	Serpentinite seeps, sometimes streambanks	195	4070
Euphorbia ocellata ssp. rattanii	Stony Creek spurge	1B.2	May-Sep	sandy, gravel river bed		600	600

Table 1. Potential Rare Plants with a High Likelihood of Occurring at East Sand Slough

Table 2. Potential Rare Plants with a Moderate Likelihood of Occurring at East Sand Slough

Scientific Name	Common Name	CRPR	Blooming Period	Habitat	Micro Habitat	Elevation Low (ft)	Elevation High (ft)
Astragalus pauperculus	depauperate milk-vetch	4.3	Mar-Jun	Chaparral, Cismontane woodland, Valley and foothill grassland	Vernally mesic, volcanic	195	3985
Limnanthes floccosa ssp. floccosa	woolly meadowfoam	4.2	Mar-May(Jun)	Chaparral, Cismontane woodland, Valley and foothill grassland, Vernal pools	Vernally mesic	195	4380
Agrostis hendersonii	Henderson's bent grass	3.2	Apr-Jun	Valley and foothill grassland (mesic), Vernal pools	Vernally mesic tuscan mudflow	225	1000
Sagittaria sanfordii	Sanford's arrowhead	18.2	May-Oct(Nov)	Marshes and swamps (assorted shallow freshwater)	Ponds	0	2135
Sidalcea celata	Redding checkerbloom	3	Apr-Aug	Cismontane woodland	Sometimes serpentinite	440	5005

Scientific Name	Common Name	CRPR	Blooming Period	Habitat	Micro Habitat	Elevation Low (ft)	Elevation High (ft)
Downingia pusilla	dwarf downingia	2B.2	Mar-May	Valley and foothill grassland (mesic), Vernal pools	Vernal pools	0	1460
Juncus leiospermus var. ahartii	Ahart's dwarf rush	1B.2	Mar-May	Valley and foothill grassland (mesic)		95	750
Navarretia leucocephala ssp. bakeri	Baker's navarretia	1B.1	Apr-Jul	Cismontane woodland, Lower montane coniferous forest, Meadows and seeps, Valley and foothill grassland, Vernal pools	Mesic, Vernal pools	15	5710
Navarretia heterandra	Tehama navarretia	4.3	Apr-Jun	Valley and foothill grassland (mesic), Vernal pools	Vernal pools	95	3315
Polygonum bidwelliae	Bidwell's knotweed	4.3	Apr-Jul	Chaparral, Cismontane woodland, Valley and foothill grassland	Volcanic, thin vernally moist soils	195	3935
Orcuttia tenuis	slender Orcutt grass	1B.1	May-Sep(Oct)	Vernal pools	Often gravelly. Vernal pools	110	5775
Paronychia ahartii	Ahart's paronychia	1B.1	Feb-Jun	Cismontane woodland, Valley and foothill grassland, Vernal pools		95	1675
Fritillaria pluriflora	adobe-lily	1B.2	Feb-Apr	Chaparral, Cismontane woodland, Valley and foothill grassland	Often adobe	195	2315
Hemizonia congesta ssp. calyculata	Mendocino tarplant	4.3	Jul-Nov	Clay. Grassland		660	4600
Eriogonum tripodum	tripod buckwheat	4.2	May-Jun	Serpentine		900	2400
Cypripedium montanum	mountain lady's-slipper	4.2	Mar-Aug	Broadleafed upland forest, Cismontane woodland, Lower montane coniferous forest, North Coast coniferous forest	Conifer forest	605	7300
Acmispon rubriflorus	red-flowered bird's-foot trefoil	1B.1	Apr-Jun	Cismontane woodland, Valley and foothill grassland	Clay	655	1395

Table 3. Potential Rare Plants with a Low Likelihood of Occurring at East Sand Slough

Table 4. East Sand Slough Species List

Family	Scientific Name	Common Name	Wetland Indicator Status (incomplete)	OBSERVED 03-28-18 to 03- 30-18	OBSERVED 04-09-18	OBSERVED 07-10-18 to 07- 11-18
Eudicots			•	•		
Adoxaceae	Sambucus nigra subsp. caerulea	Blue elderberry	FAC	X		х
Amaranthaceae	Amaranthus albus	Pigweed amaranth				X
Anacardiaceae	Toxicodendron diversilobum	Poison oak			X	X
Apiaceae	Anthriscus caucalis	Bur chervil			x	
	Conium maculatum	Poison hemlock				
	Daucus carota	Queen Anne's lace		X		X
	Torilis arvensis	Field hedge parsley			X	
Apocynaceae	Vinca major	Periwinkle			x	
Aristolochiaceae	Aristolochia californica	California pipevine		X		X
Asteraceae	Ambrosia psilostachya	Western ragweed	540	X		X
	Artemesia douglasiana	Mugwort	FAC	X		X
	Baccharis salicifolia	Mule-fat	FAC	X		X
	Blennosperma nanum	Yellow carpet		X		
	Brickellia californica	California brickelbush		X		X
	Calycadenia ciliosa	Klamath calycadenia				X
	Calycadenia fremontii (?, dry)	Fremont's calycadenia		X	~ ~	
	Centaurea solstitialis	Yellow starthistle			X	X
	Centromadia fitchii	Fitch's spikeweed				X
	Chicory intybus	Chicory				X
	Erigeron annuus	Annual fleabane	540			X
	Erigeron canadensis	Horseweed	FAC	X		X
	Euthamia occidentalis	Western goldenrod				X
	Gnaphalium palustre	Lowland cudweed	1101	X		X
	Grindelia camporum	Valley gumplant	UPL	X		X
	Helenium puberulum	Rosilla		~		X
	Heterotheca grandiflora	Telegraph weed	UPL	X		X
	Heterotheca oregona	Oregon false goldenaster	FACU	X		x
	Hypochaeris glabra	Smooth cats-ear	540			
	Lactuca serriola	Prickly lettuce	FAC	X		X
	Leontodon saxatilis ssp. longirostris	Long-beaked hawkbit	FACU	X		X
	Logfia gallica	Narrowleaf		X	V	
	Matricaria discoidea	Pineapple weed		X	X	
	Senecio vulgaris Silybum marianum	Old-man-of-spring Milk-thistle		x		
	Sonchus oleraceus	Common sow-thistle		X		
	Symphyotrichum subulatum var.	Annual saltmarsh		Λ		
	parviflorum	aster		х		
	Xanthium strumarium	Cocklebur	FAC	x		x
Bignoniaceae	Catalpa speciosa	Northern catalpa	1710	~		x
Boraginaceae	Amsinckia lycopsoides	Bugloss fiddleneck		X		
		Weak-stemmed				
	Cryptantha flaccida	cryptantha		X		
	Eriodictyon californicum	Yerba santa		X		x
	Heliotropium europaeum	European heliotrope				x
	Heliotropium curassavicum var.	Wild heliotrope				
	oculatum	which henotrope				X (1 indiv.)
	Plagiobothrys canescens	Valley popcornflower		X		
	Plagiobothrys stipitatus ssp. micranthus	Small-flowered stalked	FACW	x		
Brassicaceae	Arabidopsis thaliana	Thalecress		X		
	Barbarea verna	Early winter cress		X		
	Brassica nigra	Black mustard	UPL	X		x
	Brassica rapa	Field mustard				
	Cardamine hirsuta	Hairy bittercress		X		
	Cardamine oligosperma	Western bittercress		X		
	Hirschfeldia incana	Summer mustard	UPL	X		
	Lepidium latifolium	Perennial				x
	Lepidium nitidum	Shining peppergrass		X		
	Nasturtium officinale	Watercress				
	Raphanus sp.	Radish		X		
		Curvepod yellow cress		x		

Table 4 (continued). East Sand Slough Species List

Family	Scientific Name	Common Name	Wetland Indicator Status (incomplete)	OBSERVED 03-28-18 to 03- 30-18	OBSERVED 04-09-18	OBSERVED 07-10-18 to 07- 11-18
Campanulaceae	Downingia cuspidata	Toothed downingia				х
Caryophyllaceae	Herniaria hirsuta var. hirsuta	Hairy rupturewort		X		
	Petrorhagia dubia	Grass-pink		X		
	Scleranthus annuus	German knotgrass		X		
	Spergula arvensis	Corn spurry				
	Spergularia bocconi	Red sand-spurry	FAC	X		
	Stellaria media	Common chickweed			х	
Chenopodiaceae	Chenopodium album	Lamb's quarters				X
	Dysphania botrys	Jerusalem-oak		X		X
Cleomaceae	Polanisia dodecandra ssp. trachysperma	Western clammyweed	FACU	x		x
Convolvulaceae	Convolvulus arvensis	Field bindweed				х
		Mediterranean pygmy				
Crassulaceae	Crassula tillaea	weed		X		
Cucurbitaceae	Marah fabacea	California manroot		X		
Euphorbiaceae	Croton setigerus	Turkey mullein				х
	Euphorbia maculata	Spotted spurge				х
	Euphorbia ocellata ssp. ocellata	Valley spurge				Х
	Euphorbia peplus	Petty spurge		X		
	Euphorbia serpyllifolia	Thyme-leaved spurge				Х
Fabaceae	Acmispon americanus var. americanus	Spanish lotus				х
	Cercis occidentalis	Western redbud			x	
	Lotus corniculatus	Bird's foot trefoil				x
	Lupinus albifrons	Silver bush lupine			X	
	Lupinus bicolor	Bicolored lupine		x		
	Lupinus succulentus	Succulent lupine		X		
	Medicago polymorpha	Burclover	FACU	X		
	Melilotus albus	White sweetclover	17100	~		x
	Melilotus indicus	Yellow sweetclover	FACU	x		~~~~~
	Robinia pseudoacacia	Black locust	1400	~	х	x
	Sesbania punicea	Scarlet wisteria			~	x
	Soartium junceum	Spanish broom				X
	Trifolium hirtum	Rose clover		X		
	Vicia villosa ssp. varia	Winter vetch	UPL	x		
Fagaceae	Quercus lobata	Valley oak	FAC	X		x
ragaceae			FAC	^	v	
Continuono	Quercus wislizeni	Interior live oak			X	X
Gentianaceae	Zeltnera venusta	Charming centaury		~		
Geraniaceae	Erodium cicutarium	Red-stemmed filaree	UPL	X		
	Geranium molle	Crane's bill geranium Creeping St. John's-		X		
Hypericaceae	Hypericum anagalloides	wort Small-flowered St.		X		
	Hypericum mutilum	John's-wort				X
	Hypericum perforatum	Klamath-weed	FACU	X		X
Juglandaceae	Juglans hindsii	Northern California black walnut	FAC	x		x
Lamiaceae	Lamium amplexicaule	Giraffehead		x		
	Lamium purpureum	Purple dead nettle				
	Lycopus americanus	Cut-leaved				x
	Marrubium vulgare	Horehound		x		X
	Mentha pulegium	Pennyroyal		X		X
	Trichostema lanceolatum	Vinegarweed				X
Lauraceae	Umbellularia californica	California bay			X	
Loasaceae	Mentzelia laevicaulis	Giant blazing star				x
Lythraceae	Ammannia robusta	Grand ammania				x
,	Ficus carica	Fig				x
	Lythrum hyssopifolia	Hyssop loosestrife	FACW	x		~

Table 4 (continued). East Sand Slough Species List

Family	Scientific Name	Common Name	Wetland Indicator Status (incomplete)	OBSERVED 03-28-18 to 03- 30-18	OBSERVED 04-09-18	OBSERVED 07-10-18 to 07- 11-18
Molluginaceae	Mollugo verticillata	Green carpetweed				X
Montiaceae	Calandrinia menziesii	Red maids		Х		
	Claytonia perfoliata	Miner's lettuce			Х	
Moraceae	Maclura pomifera	Osage orange				
	Morus alba	Mulberry		X		X
Myrtaceae	Eucalyptus sp.	Eucalyptus			х	
Oleaceae	Fraxinus latifolia	Oregon ash	FACW	Х		X
Onagraceae	Camissonia contorta	Contorted sun cup			х	
	Epilobium brachycarpum	Tall annual	UPL	X		
	Epilobium ciliatum ssp. ciliatum	Fringed willowherb				X
	Ludwigia peploides	Water primrose	OBL	X		X
	Oenothera elata ssp. hirsutissima	Evening primrose				X
Orobanchaceae	Castilleja attenuata	Valley-tassels			х	
	Triphysaria eriantha	Johnny tuck		x		
Papaveraceae	Eschscholzia caespitosa	Foothill poppy				
	Platystemon californicus	Cream cups		X		
Phrymaceae	Mimulus guttatus (Erythranthe guttata)	Seep monkey-flower	OBL	x		
	Mimulus pilosus (Mimetanthe pilosa)	Downy mimetanthe				X
Pinaceae	Pinus halepensis?	Aleppo pine?			Х	X
	Pinus sabiniana	Gray pine			х	X
Plantaginaceae	Antirrhinum cornutum	Spurred snapdragon				X
	Kickxia elatine	Sharp-leaved fluellin	NI	X		X
	Penstemon azureus var. azureus	Azure beardtongue		X		X
	Plantago erecta	California plantain			х	
	Plantago lanceolata	English plantain	FACW	Х		X
	Veronica anagallis-aquatica	Water speedwell	OBL	Х		X
	Veronica arvensis	Speedwell			х	
	Veronica peregrina ssp. xalapensis	Purslane speedwell	OBL	Х		
Platanaceae	Platanus racemosa	Western sycamore	FACW	X		X
Polemoniaceae	Leptosiphon sp.			Х		
	Linanthus (?)					
Polygonaceae	Eriogonum nudum	Naked buckwheat		X		X
	Eriogonum wrightii var. trachygonum	Wright's buckwheat		X		X
	Persicaria hydropiper	Common smartweed				X
	Polygonum aviculare	Prostrate knotweed				
	Rumex crispus	Curly dock	FACW	X		X
Potamogetonaceae	Potamogeton crispus	Curly pondweed				X
Rhamnaceae	Frangula californica	Coffeeberry			Х	X
Rosaceae	Heteromeles arbutifolia	Toyon			Х	
	Prunus cerasifera (green leaf)	Cherry plum				X
	Prunus cerasifera (purple leaf)	Cherry plum				X
	Prunus dulcis	Almond				X
Rosaceae	Rosa californica	California rose	FAC	x		X
	Rubus armeniacus	Himalayan blackberry	FACW	x		X
Rubiaceae	Galium parisiense	Wall bedstraw	UPL	X		
Salicaceae	Populus fremontii	Fremont cottonwood	FAC	Х		X
	Salix exigua	Sandbar willow	OBL	X		X
	Salix goodingii	Black willow			х	X
	Salix laevigata	Red willow				X
	Salix lasiolepis	Arroyo willow	FACW	Х		X

Table 4 (continued). East Sand Slough Species List

Family	Scientific Name	Common Name	Wetland Indicator Status (incomplete)	OBSERVED 03-28-18 to 03- 30-18	OBSERVED 04-09-18	OBSERVED 07-10-18 to 07- 11-18
Sapindaceae	Acer negundo	Box elder	FACW	Х		х
Scrophulariaceae	Verbascum blattaria	Moth mullein	UPL	X		X
	Verbascum thapsus	Wooly mullein	FACU	X		х
Simaroubaceae	Ailanthus altissima	Tree of heaven			х	X
Solanaceae	Datura wrightii	Jimsonweed			х	х
	Solanum americanum	American black nightshade				x
Verbenaceae	Phyla nodiflora var. nodiflora	Creeping lippia (large leaf)				x
	Phyla nodiflora var. rosea	Rosy lippia (small leaf- compact mat)				x
	Verbena bonariensis	Purple top vervain	UPL			х
Vitaceae	Vitis californica	California wild grape	FACW	X		X
Zygophyllaceae	Tribulus terrestris	Puncturevine				X
Monocots						
Alismataceae	Echinodorus bertoroi	Burhead				X (9/13/18)
Cyperaceae	Eleocharis macrostachya	Creeping spike rush		X		
	Carex barbarae	Santa barbara sedge				X
	Cyperus sp.	Nutsedge				
	Schoenoplectus acutus var. occidentalis	Tule				X
Juncaceae	Juncus balticus	Baltic rush		X		
	Juncus bufonius var. bufonius	Toad rush	FACW	X		
	Juncusacuminatus					
Poaceae	Aira caryophyllea (?)	Silver hairgrass				
	Alopecurus carolinianus	Carolina foxtail		X		
	Arundo donax	Giant reed				
	Avena barbata or A. fatua	Wild oats	UPL	X		
	Brachypodium distachyon	False brome	UPL	X		
	Bromus diandrus	Ripgut brome	UPL	X		
	Bromus hordeaceus	Soft chess	FACU	X		
	Bromus madritensis ssp. rubens	Red brome	UPL	X		
	Cynodon dactylon	Bermudagrass	FAC	X		х
	Echinochloa sp.			X		
	Elymus glaucus(?)	Blue wildrye				
	Festuca (=Vulpia) myuros	Rattail sixweeks grass		X		
	Festuca perennis	Italian rye grass		X		
	Hordeum marinum ssp. gussoneanum	Mediterranean barley	FAC	X		
	Hordeum murinum	Wall barley		X		
	Paspalum dilatatum	Dallis grass				X
	Phalaris arundinacea (?)	Reed canarygrass				Х
	Secale cereale	Cereal rye			х	
	Sorghum halepense	Johnsongrass				X
	Stipa miliacea ssp. miliacea	Smilo grass		X		х
Themidaceae	Dichelostemma capitatum	Blue-dicks			х	
Typhaceae	Typha sp.	Cattail	OBL	X		X
Pteridophytes	· · · ·					
Equisetaceae	Equisetum hyemale	Scouringrush		X		X

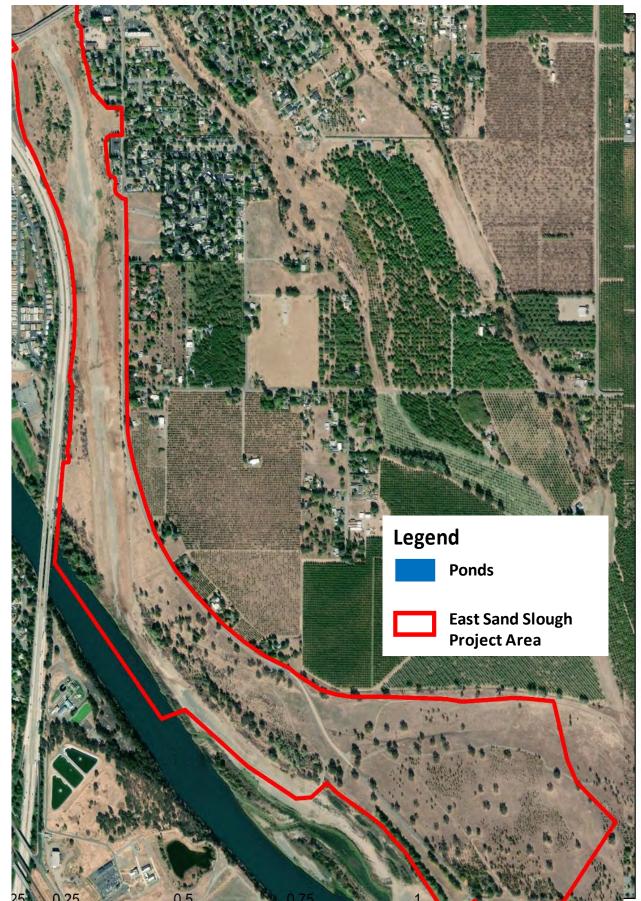


Figure 1. Areas surveyed for sensitive botanical resources -2018 Note: Minor boundary modifications were made in September 2018 that did not require a re-survey.

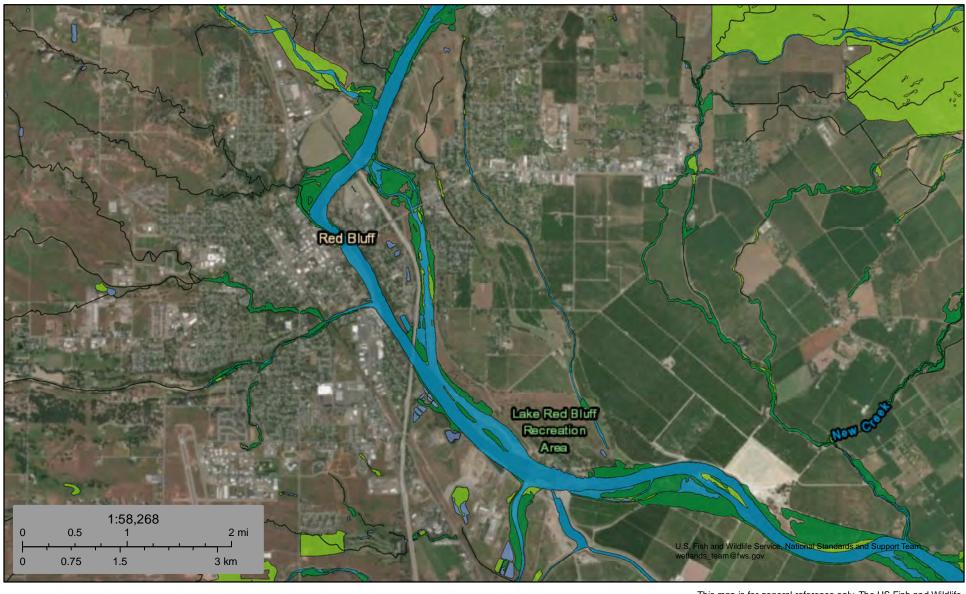
Attachment 6

National Wetlands Inventory Map

ATTACHMENT 6

U.S. Fish and Wildlife Service National Wetlands Inventory

East Sand Slough NWI Map



March 12, 2018

Wetlands

Estuarine and Marine Deepwater

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland

Freshwater Pond

Lake Other Riverine This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site. Attachment 7

Data Sheets

TACHMENT 7		TY	ansect-la-la
Arid We	est Ephemeral and Interm		
Project Number: Stream: Sacvamer	nd Slough Pestoration it fiver Woodward, Jamie	Town: Fed Bloff Photo begin file#:	Photo end file#:
Y X / N Do normal	l circumstances exist on the sites significantly disturbed?	NE tip connection to Projection: UTM 10 N	Datum: NAD83
Potential anthropogen Shasta Dam re River.	nic influences on the channel sy equilates Saevamento Ruer	vstem:	885°N; -122.227317° 5 on Sacraments
Brief site description: Backwater, side Facines upstr	e channel with raised islam ream on right-hand side	d separating it from n	nach river flow.
X Vegetation maps	6/30/05, 7/20/10, Hist	f record: ory of recent effective discl alts of flood frequency anal	0
 Rainfall/precipitation Existing delineation Global positioning 	on maps East, CA USGS Gag n(s) for site 7.5 Guad mos system (GPS)	st recent shift-adjusted ratin e heights for 2-, 5-, 10-, and st recent event exceeding a 10/01/2007 - prese	g 1 25-year events and the 5-year event
 Rainfall/precipitation Existing delineation Global positioning 	on maps East, CA USGS Gag n(s) for site 7.5 Guad mos system (GPS)	st recent shift-adjusted ratin e heights for 2-, 5-, 10-, and st recent event exceeding a 10/01/2007 - prese	g 1 25-year events and the 5-year event
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 Other studies Lip Other studies Lip Other studies Lip Procedure for identify 1. Walk the channel and vegetation present at 2. Select a representative 3. Determine a point on a) Record the floodploid point on a) Record the floodploid b) Describe the seding floodplain unit. c) Identify any indice 4. Repeat for other point 5. Identify the OHWM 	AR Hydrogeomorphi AR Low-Flow Channels ying and characterizing the flood and floodplain within the study ar	trecent shift-adjusted ratin the heights for 2-, 5-, 10-, and st recent event exceeding a 10/01/2007 - prese ic Floodplain Units in Low Terrace OHWM Paleo Ch odplain units to assist in it ea to get an impression of the eteristic of one of the hydroger orth class size) and the vege	annel identifying the OHWM: the geomorphology and and label the floodplain units. geomorphic floodplain units. tation characteristics of the te cross section.

Cross section ID: Transect 1a - 1a Date: 4/30/18 Time: 10:30 AM **Project ID: Cross section drawing:** 10thonwood Valley oak 0HWM -642' Mugwort unto River Backber reedquass Nillo! cobbles Blackberry ystrea OHWM MTU GPS point: 4448894 N 565775 W Indicators: Change in average sediment texture Break in bank slope Other: ______ Other: Change in vegetation species Change in vegetation cover **Comments:** Fines & cabiles in low-flow channel, then fine sand as more up-slope. More dense veg. & trees as more up-slope. Floodplain unit: KLow-Flow Channel Active Floodplain Low Terrace GPS point: See map for transect Characteristics of the floodplain unit: Average sediment texture: <u>Sandy Share</u> cobby low flow Total veg cover: <u>5</u>% Tree: <u>3</u>% Shrub: <u>%</u> Herb: <u>12</u>% Community successional stage: Mid (herbaceous, shrubs, saplings) NA Early (herbaceous & seedlings) Late (herbaceous, shrubs, mature trees) Indicators: Mudcracks Soil development Surface relief Ripples Drift and/or debris Other: Presence of bed and bank Other: A Benches Other: Right lowflow backwater area has no flow, but soil development present of transitions **Comments:** copples donnstream

WETLAND	DETERMINATION	DATA	FORM - Aric	West Region

Ves Yes No within a Wetland? Yes No emarks: Depression at foot of island, with deposited Bepression at foot of island, with deposited GETATION - Use scientific names of plants. ree Stratum (Plot size: M2 2 Absolute Dominant Indicator % Cover Species? Dominant Species	plicanta <u>Burea of Reclar</u> restigator(s): <u>Alex Woodward</u> , J				
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MMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc. vdrophytic Vegetation Present? Yes No is the Sampled Area within a Wetland? Yes No Ordan Hydrology Present? Yes No Is the Sampled Area within a Wetland? No Depression att foot aff of the Stratum Sector aff of the Stratum Aff of the Stratum No No GETATION - Use scientific names of plants. Deminant Indicator % Cover Deminant Indicator Sectors? Deminant Species That Are OBL, FACW, or FAC: 3 (A) Total Number of Dominant Species and stratum Provalence Index worksheet: Total % Cover of Sectors At Strata: 3 (B) Prevalence Index worksheet: Total % Cover of Matter OBL, FACW, or FAC: 3/3 (A/B) Prevalence Index worksheet: Total % Cover of Matter OBL, FACW, or FAC: 3/3 (A/B) Prevalence Index worksheet: Total % Cover of Matter OBL, FACW, or FAC: 3/3 (A/B) Prevalence Index worksheet: Total % Cover of Matter OBL, FACW, or FAC: 3/3 (A/B) Prevalence Index is 3:0° Prevalence Index is 3:0° (B) Prevalence Index is 3:0° Prevalence Index is 3:0° (B) Prevalence Index is 3:0° Preva	e Vegetation, Soil, or Hyd	Irology significantly distu	rbed? Are "N	lormal Circumstances" presen	t? Yes No
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ree Stratum (Plot size:			minant Indicator	Dominance Test worksheet	
Salix exigua 40 x FACW That Are OBL, FACW, or FAC: 3 (A) Total Number of Dominant 3 (B) Percent of Dominant Species 3/3 (A) apling/Shrub Stratum (Plot size: m² (A) Total Number of Dominant Species 3/3 (A) Prevent of Dominant Species 3/3 (A) That Are OBL, FACW, or FAC: 3/3 (A) Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species x 2 = FACU species x 3 = FAC species x 3 = FACU species x 4 = UPL species x 5 = Column Totals: (A) (B) Mast write on affici in afee X OOL Prevalence Index is 3.0.° Mast write on affici in afee 33/2 = Total Cover Hydrophytic Vegetation Indicators: X Voody Vine Stratum (Plot size:) ' Prevalence Index is 3.0.°	Tree Stratum (Plot size:/) <u>% Cover</u> Sp			
Species Across All Strata:	Salix exigua	30	× FALW	이 같은 것이 같이 잘 가지? 아파 가지? 것이 가지 않는 것이 같은 것이 있다. 사가 많이 가져져 있는 것이	
Species Across All Strata:	J			Total Number of Dominant	-
apling/Shrub Stratum (Plot size:					<u> </u>
apling/Shrub Stratum (Plot size:				Percent of Dominant Species	2.2
Prevalence Index worksheet:	apling/Shrub Stratum (Plot size:	m) <u>861.</u> =T	otal Cover		
OBL species x 1 =	and the second sec			Prevalence Index workshee	et:
FACW species x 2 = erb Stratum (Plot size:) = Total Cover Phalaris Arundinacea 25 × FACW Masturnion afficinate 25 × FACW Obstratum (Plot size:) (A)(B) Prevalence Index = B/A = Hydrophytic Vegetation Indicators: ✓ ✓ ✓ > ØBU Prevalence Index = B/A = — — — — — — Masturnion afficinate X OBU Prevalence Index = B/A = — — Montanace Test is >50% — — — — Morphological Adaptations' (Provide supporting data in Remarks or on a separate sheet) — — — — Mody Vine Stratum (Plot size:) — — — — — — — — — — — — —				Total % Cover of:	Multiply by:
FAC species x 3 = erb Stratum (Plot size:				OBL species	x 1 =
erb Stratum (Plot size:				FACW species	x 2 =
erb Stratum (Plot size:				FAC species	x 3 =
Phalaris arundina.ca 25 Y FACW Nasturpion afficinala 8 OBL Prevalence Index = B/A =		= T	otal Cover		
Mast untion affici mala 8 06L Coldmin rotals. (A) (B) Prevalence Index = B/A = Hydrophytic Vegetation Indicators: ✓ Dominance Test is >50% Prevalence Index is <3.01		260. 25	X CALL		
Prevalence Index = B/A =				Column Totals:	(A) (B)
Hydrophytic Vegetation Indicators: ✓ Dominance Test is >50% Prevalence Index is ≤3.01 Morphological Adaptations1 (Provide supporting data in Remarks or on a separate sheet) .5 = 16.5 .2 = 6.6 33 ½= Total Cover Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic. Hydrophytic Vegetation Yearding K Bare Ground in Herb Stratum % Cover of Biotic Crust Wearding				Prevalence Index = B/	A =
Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Problematic Hydrophytic Vegetation ¹ (Explain) "				Prevalence Index is ≤3.0	¹
.5 = 16.5 .2 = 6.6 33½ = Total Cover Problematic Hydrophytic Vegetation ¹ (Explain) Voody Vine Stratum (Plot size:) - - -				Morphological Adaptatio	ns ¹ (Provide supporting
Voody Vine Stratum (Plot size:)					
Voody Vine Stratum (Plot size:)	.5=16.5.2=	6.6 <u>331</u> =1	otal Cover	Problematic Hydrophytic	Vegetation' (Explain)
be present, unless disturbed or problematic.	Noody Vine Stratum (Plot size:)		1	
= Total Cover	·		((
Bare Ground in Herb Stratum % Cover of Biotic Crust Vegetation Present? Yes Y No	2				
Bare Ground in Herb Stratum % Cover of Biotic Crust Present? Yes Y No				Vegetation	
Demontrat	% Bare Ground in Herb Stratum	% Cover of Biotic Crust	<u> </u>	Present? Yes 🗡	No

SOIL

Sampling Point: D

(SSW-14)

P

epth <u>Matrix</u>	Redox Features Color (moist) % Type ¹ Loc ²	Texture Remarks
ches) Color (moist) %		
-8 104P.4/1 60 5	17R4/6 40 C PL	Loamy sand
	12	
2 227 62 10	A 19780 7 1.0 000 19	
	1.0	alarma 2 a s Classific
	and the second s	
ype: C=Concentration, D=Depletion, RM=R	educed Matrix, CS=Covered or Coated San	d Grains. ² Location: PL=Pore Lining, M=Matrix.
dric Soil Indicators: (Applicable to all LF	RRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
Histosol (A1)	Sandy Redox (S5)	1 cm Muck (A9) (LRR C)
Histic Epipedon (A2)	Stripped Matrix (S6)	2 cm Muck (A10) (LRR B)
Black Histic (A3)	Loamy Mucky Mineral (F1)	Reduced Vertic (F18)
_ Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Red Parent Material (TF2)
_ Stratified Layers (A5) (LRR C)	Depleted Matrix (F3)	Other (Explain in Remarks)
_ 1 cm Muck (A9) (LRR D)	Redox Dark Surface (F6)	
_ Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and
_ Thick Dark Surface (A12)	Redox Depressions (F8)	wetland hydrology must be present,
Sandy Mucky Mineral (S1) Sandy Gleyed Matrix (S4)	Vernal Pools (F9)	unless disturbed or problematic.
estrictive Layer (if present):		
Туре:		/
Depth (inches):		Hydric Soil Present? Yes Vo
Depth (mones).		nyuric son Flesentr Tes P no
Pemarks:	d iron concentra	
emarks: Very wet with re	d iron concentra	
YDROLOGY	d iron concentra	
Yem wet with ve YDROLOGY Wetland Hydrology Indicators:		tions.
YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required;	check all that apply)	Secondary Indicators (2 or more required)
YDROLOGY YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; Surface Water (A1)	check all that apply) Salt Crust (B11)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine)
YDROLOGY Very wet with re YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; V Surface Water (A1) _ High Water Table (A2)	check all that apply) Salt Crust (B11) Biotic Crust (B12)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine)
YDROLOGY Very wet with re YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; Y Surface Water (A1) High Water Table (A2) Saturation (A3)	<u>check all that apply)</u> Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine)
Very wet with re YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; V Surface Water (A1) _ High Water Table (A2) _ Saturation (A3) _ Water Marks (B1) (Nonriverine)	check all that apply) Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10)
Very wet with re YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; V Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine)	<u>check all that apply)</u> Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) g Roots (C3) Dry-Season Water Table (C2)
Very wet with re YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; Varface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine) Drift Deposits (B3) (Nonriverine)	<u>check all that apply)</u> Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxidized Rhizospheres along Living Presence of Reduced Iron (C4)	Secondary Indicators (2 or more required)Water Marks (B1) (Riverine)Sediment Deposits (B2) (Riverine)Drift Deposits (B3) (Riverine)Drainage Patterns (B10) g Roots (C3)Dry-Season Water Table (C2)Crayfish Burrows (C8)
Very wet with re YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; Variace Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine) Drift Deposits (B3) (Nonriverine) Surface Soil Cracks (B6)	<u>check all that apply)</u> Salt Crust (B11)Biotic Crust (B12)Aquatic Invertebrates (B13)Hydrogen Sulfide Odor (C1)Oxidized Rhizospheres along LivingPresence of Reduced Iron (C4)Recent Iron Reduction in Tilled Soi	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drinage Patterns (B10) g Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Is (C6) Saturation Visible on Aerial Imagery (C9)
Vem wet with ve YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; 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	<u>check all that apply)</u> Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) y Oxidized Rhizospheres along Living Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled Soi) Thin Muck Surface (C7)	Secondary Indicators (2 or more required)
emarks: Veny wet with ver Vetland Hydrology Indicators: Primary Indicators (minimum of one required; 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)	<u>check all that apply)</u> Salt Crust (B11)Biotic Crust (B12)Aquatic Invertebrates (B13)Hydrogen Sulfide Odor (C1)Oxidized Rhizospheres along LivingPresence of Reduced Iron (C4)Recent Iron Reduction in Tilled Soi	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drinage Patterns (B10) g Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Is (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
emarks: Veny wet with very very with very very wet with very very very very very very very very	check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drinage Patterns (B10) g Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Is (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
Very wet with very very with very very wet with very very very very very very very very	check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drinage Patterns (B10) g Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Is (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
Very wet with re YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required; 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) Field Observations: Surface Water Present? Yes N Water Table Present? Yes N	check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) g Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Is (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) FAC-Neutral Test (D5)
emarks: Veny wet with very very with very very wet with very very very very very very very very	check all that apply)	Secondary Indicators (2 or more required)
Yem wet with re YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required; Y 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) Field Observations: Surface Water Present? Yes Nater Table Present?	check all that apply)	Secondary Indicators (2 or more required)
Remarks: Vemy wet with we YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required; ✓ 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) Field Observations: Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes Mater Table Present? Yes	check all that apply)	Secondary Indicators (2 or more required)
Remarks: Very wet with we YDROLOGY Netland Hydrology Indicators: Primary Indicators (minimum of one required; Y 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) Field Observations: Surface Water Present? Yes Nater Table Present? Yes Nate	check all that apply)	Secondary Indicators (2 or more required)
Remarks: Very wet with we YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required; Y 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) Field Observations: Surface Water Present? Yes Nater Table Recorded Data (stream gauge, mo	check all that apply)	Secondary Indicators (2 or more required)
Remarks: Very wet with we YDROLOGY Netland Hydrology Indicators: Primary Indicators (minimum of one required; Y 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) Field Observations: Surface Water Present? Yes Nater Table Present? Yes Nate	check all that apply)	Secondary Indicators (2 or more required)
emarks: Veny wet with re Veny wet with re Vetland Hydrology Indicators: Primary Indicators (minimum of one required; 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) Field Observations: Surface Water Present? Yes N Saturation Present? Yes N Saturati	check all that apply)	Secondary Indicators (2 or more required)

Arid West Ephemeral and Intermittent Streams OHWM Datasheet Date: 4/30/18 Project: East Sand Slavah Restoration Time: . 1:15 PM Town: Red Bluff **Project Number:** State: CA Photo begin file#: Stream: East Sand Slough Photo end file#: Investigator(s): Aex Woodward Jamie Leferre Luke Davis Sarah Perrin Spencer Murshall **Location Details:** Y X / N Do normal circumstances exist on the site? Halfway down, North of portion of bridge Projection: VTM 10 N Datum: NA083 $Y \square / N \bowtie$ Is the site significantly disturbed? Coordinates: 40. 1842 729 °N; -122. 2272389 °W Potential anthropogenic influences on the channel system: shusta Dam controls flow on Sacromento River. Operation of Red Bluff Shusta Dam controls Tow or university 2012, so nater no longer backs up into East Diversion Dam gates decommissioned in 2012, so nater no longer backs up into East Sound Slough. Brief site description: Active flapplain, North part of site. Total of 3 low flow channels along this transect, with island upland in middle. Checklist of resources (if available): Aerial photography X Stream gage data Dates: see previous form Gage number: USGS 11377100 Sac River AB Bend Bridge near Topographic maps Red Bluff East, CA Period of record: Red Bluff, CA 10/04/1988 - present History of recent effective discharges Geologic maps 7.5' Quad X Vegetation maps Results of flood frequency analysis Y Soils maps Most recent shift-adjusted rating Gage heights for 2-, 5-, 10-, and 25-year events and the Rainfall/precipitation maps Existing delineation(s) for site most recent event exceeding a 5-year event S Global positioning system (GPS) 10/01/2007 - present Other studies L; DAR Hydrogeomorphic Floodplain Units Active Floodplain Low Terrace Low-Flow Channels OHWM Paleo Channel Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM: 1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site. 2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units. 3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units. a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section. 5. Identify the OHWM and record the indicators. Record the OHWM position via: GPS Datapoint taken then walked Mapping on aerial photograph X Other: X Digitized on computer 1.5-2 year event hydraulic modeling shapefiles.

Transect - 2a-2a

Facines upstream
VM-266 ATP OHWM-118
acores a
Valleyoak mustard apple of willows
es veillaire Biome
Low flow channel Cobbles
COUDIES
Break in bank slope
Other:
Other:
th low channel, crossed higher plateau.
s. Sandy loar textures in higher elevations.
arreas
nod arreas.
Active Floodplain Low Terrace
Active Floodplain Low Terrace
colliss
rub: <u>6</u> % Herb: <u>14</u> %
100. <u>0</u> 76 11610. <u>1 7</u> 6
Mid (herbaceous, shrubs, saplings)
Late (herbaceous, shrubs, mature trees)
Soil development
Surface relief
Other:
Other:
Other:
th fener willows

A.

WETLAND DETERMINATION DATA FORM - Arid West Region

		- And West Region
Project/site: East Sand Slough ci	ty/County: Red	BIV AF Sampling Date: 436118
Applicant: Bureau of Reclamation .		State: CA Sampling Point: DP 2 (UPL
Investigator(s): Woodward, Leterre, Davis, Herrin, Se	ection, Township, Ran	198: 520; T27N, R 3W
Landform (hillslope, terrace, etc.): terrace	ocal relief (concave, c	convex, none): <u>concave</u> Slope (%): <u>D-5 /</u>
Subregion (LRR): Lat: 40.)	185901 °N	Long: -122. 226083 °W Datum: NAD83
Soil Map Unit Name: Rr - Rivernash		NWI classification: _PF01A
Are climatic / hydrologic conditions on the site typical for this time of year	/	(If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly dis		Normal Circumstances" present? Yes V
Are Vegetation, Soil, or Hydrology naturally proble		eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing s		
Hydrophytic Vegetation Present? Yes 🖌 No	a transition	
Hydric Soil Present? Yes No X	Is the Sampled	
Wetland Hydrology Present? Yes Ko	within a Wetlan	d? Yes No
Remarks: Middle of valley oak nipar	ian are	ca, slight depression
with drainage patterns	on Floodpl	ain. see Hydrology Remarks
VEGETATION – Use scientific names of plants.		
	Dominant Indicator Species? Status	Dominance Test worksheet:
1. Populas Fremiontii 47	X FAC	Number of Dominant Species4 (A)
2. Canya Illinoin-Ensis 35	X FAC	/
3. Quercus lobata 05	X FACU	Total Number of Dominant Species Across All Strata:5(B)
4. Salix lasiolupis 8-	PACW	Percent of Dominant Species
	= Total CoveFACW	That Are OBL, FACW, or FAC:(A/B)
Sapling/Shrub Stratum (Plot size:) \20'/. 1	5= 24	Prevalence Index worksheet:
2		Total % Cover of: Multiply by:
3		OBL species x 1 =
4		FACW species x 2 =
5		FAC species x 3 =
Herb Stratum (Plot size:) // =	= Total Cover	FACU species x 4 =
1. Artemisia davalasiana 55	X FAC	UPL species x 5 =
	× OBL	Column Totals: (A) (B)
3. Avistolochia californica 20	YPL	Prevalence Index = B/A =
4. Galium aparine 5	UPL	Hydrophytic Vegetation Indicators:
5		✗ Dominance Test is >50%
6		Prevalence Index is ≤3.0 ¹
7		Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8		Problematic Hydrophytic Vegetation ¹ (Explain)
<u>Woody Vine Stratum</u> (Plot size:)	= Total Cover	
1		¹ Indicators of hydric soil and wetland hydrology must
2		be present, unless disturbed or problematic.
	= Total Cover	Hydrophytic
% Bare Ground in Herb Stratum % Cover of Biotic Cru	ust	Vegetation Present? Yes <u>X</u> No
Remarks: Hydrophytic Vegetation likely c events in winter spring 2017,	ame in o	Ater the 3-4 large flow
ingerie projection in the		
events in winter spring 2017.		

SOIL

Sampling Fornt.	Sampling Point:	DP	2	(1	JF	Ľ	1
-----------------	-----------------	----	---	----	----	---	---

ofile Description: (Describe to the depth	Redox Fe			The star a second	1.14
nches) Color (moist) %		% Type ¹	Loc ²	Texture Rema	arks
1-12 1048 312 100		-		oamy sand	
		le march			
	11. 100	101-2.35	-		5) ·
<u></u>				Charles States and	
Type: C=Concentration, D=Depletion, RM=R	Reduced Matrix, CS=Co	overed or Coal	ted Sand Gra	ins. ² Location: PL=Pore Lin	
lydric Soil Indicators: (Applicable to all Li	RRs, unless otherwis	se noted.)		Indicators for Problematic H	ydric Soils':
Histosol (A1)	Sandy Redox (S		24	1 cm Muck (A9) (LRR C)	
Histic Epipedon (A2)	Stripped Matrix			2 cm Muck (A10) (LRR B))
Black Histic (A3)	Loamy Mucky M			Reduced Vertic (F18) Red Parent Material (TF2))
Hydrogen Sulfide (A4)	Loamy Gleyed			Other (Explain in Remark	
Stratified Layers (A5) (LRR C) 1 cm Muck (A9) (LRR D)	Depleted Matrix Redox Dark Su				-,
Depleted Below Dark Surface (A11)	Depleted Dark				
Thick Dark Surface (A12)	Redox Depress	sions (F8)		³ Indicators of hydrophytic veg	
Sandy Mucky Mineral (S1)	Vernal Pools (F	=9)		wetland hydrology must be	present,
Sandy Gleyed Matrix (S4)				unless disturbed or problem	natic.
Restrictive Layer (if present):					
Туре:	-			Hydric Soil Present? Yes	No X
Depth (inches):				HVORIC SOIL Present (Les	
nepth of hole 12 inches	.Water no	ot pond	ed /pre		
create hydric soils. YDROLOGY	.Water no	ot pond	ed /pro		
Remarks: Depth of hole 12 inclus Create hydric soils. IYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required		st pond	ed /pre		gh to
Create hydric soils. YDROLOGY Wetland Hydrology Indicators:			ed /pro	sent long enoug	gh to
Create hydric soils. IYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required	; check all that apply)	.11)	ed /pro	sent long enoug	gh to or more required) Riverine)
Create hydric soils. IYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required Surface Water (A1) High Water Table (A2)	; check all that apply) Salt Crust (B Biotic Crust (.11)		Secondary Indicators (2 Water Marks (B1) (1	gh to or more required) Riverine) (B2) (Riverine)
Create hydric soils. IYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required 	; check all that apply) Salt Crust (B Biotic Crust (Aquatic Inver	11) (B12))	Secondary Indicators (2 Water Marks (B1) (1 Sediment Deposits	gh to or more required) Riverine) (B2) (Riverine) (Riverine)
Create hydric soils. IYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required Surface Water (A1) High Water Table (A2)	; check all that apply) Salt Crust (B Biotic Crust (Aquatic Inver Hydrogen Su	11) (B12) rtebrates (B13))	Secondary Indicators (2 	or more required) Riverine) (B2) (Riverine) (Riverine) (B10)
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Wetland Hydrology Indicators: Primary Indicators (minimum of one required Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine)	; check all that apply) Salt Crust (B Biotic Crust (Aquatic Inver Hydrogen Su Oxidized Rhi Presence of	11) (B12) rtebrates (B13) ulfide Odor (C1 izospheres alo)) ng Living Roo (C4)	Sect long enoug Secondary Indicators (2 Water Marks (B1) (1 X Sediment Deposits Drift Deposits (B3) X Drainage Patterns (Dts (C3) Dry-Season Water Crayfish Burrows (0	or more required) Riverine) (B2) (Riverine) (Riverine) (B10) Table (C2)
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Create hydric soils. YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one required	; check all that apply) Salt Crust (B Biotic Crust (Aquatic Inver Hydrogen Su Oxidized Rhi Presence of Recent Iron I 7) Thin Muck S	11) (B12) rtebrates (B13) ulfide Odor (C1 izospheres alo Reduced Iron Reducetion in T)) ng Living Roo (C4) iilled Soils (C6	Secondary Indicators (2 	or more required) Riverine) (B2) (Riverine) (Riverine) (B10) Table (C2) C8) on Aerial Imagery (C9) C3)
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Create hydric soils. YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one required	Check all that apply)	11) (B12) rtebrates (B13) ulfide Odor (C1 izospheres alo Reduced Iron Reduction in T Burface (C7) ain in Remarks; mes): nes): ness): notos, previous $gc \sim 11y$ freey like $for so 1freey likefor so 1freey like$)) ng Living Roo (C4) illed Soils (Cd) Wet inspections) Miles y Kely from ~ 64, . This So the	Secut long enoug Secut long enoug Water Marks (B1) (1 Sediment Deposits Drift Deposits (B3) Drift Deposits (B3) Drift Deposits (B3) Drift Deposits (B3) Crayfish Burrows (1 Crayfish Burrows (1 Shallow Aquitard (1 FAC-Neutral Test (1 Index and Hydrology Present? Yes if available: Difteam: Winter 2 high water in 000 - 97,700 cfs DP is located drainage path	or more required) Riverine) (B2) (Riverine) (Riverine) (B10) Table (C2) C8) on Aerial Imagery (C9) D3) D5) S No 2017 high flow 2017. There is from within flow erns lifedu Arid West - Version 2

Transect 2b-2b

Arid West Ephemeral and Intermit	
Project: East Sand Slough Pestoration	Date: 5/1/18 Time: 8:40 AM
Project Number:	Town: Ped Bluff State: CA
Stream: East sand slough	Photo begin file#: Photo end file#:
Investigator(s): Woodward, LeFeyre, Davis,	
	Location Details: NW corner of Del Taco
$Y \bigvee / N \square$ Do normal circumstances exist on the site?	
	Projection: UTM ION Datum: NAD83
$Y \square / N$ \checkmark Is the site significantly disturbed?	
Potential anthropogenic influences on the channel syst	Coordinates: 40.183740 °N; -122.221199 °N
	tem: Hows on Sac. River. Red Buff 012, so flows no longer back up into East Sa Slong
Shasta Dam regulates t	tows on Sac. Fiver Red Bluff
Diversion Damgates decommissioned 20	12, so flows no longer back up into East S
Brief site description:	Slam Slam
Real deal ale and inst hand	4 0 Ald - Plud Rudan
Draided charring just hory	h of thitelope Diva Dhage.
Has low flow termine and	th of Antelope Blud Bridge. Island. Three Ion flow channels alon this transect as well.
Checklist of resources (if available):	this transect as well.
Aerial photography Stream gag	
Topographic mans a Lou March and Period of L	iber: USGS 11377100 (sac R AB Bend Bridge record: 10 (1000- OF sent NR Red Bluff CA)
HOLDIOTTEATTCA	record: 10/64/1988-present NR Red Bloff CA) by of recent effective discharges
Vegetation maps	ts of flood frequency analysis
	recent shift-adjusted rating
	heights for 2-, 5-, 10-, and 25-year events and the
	recent event exceeding a 5-year event
	101/2007 - present
Other studies LiDAR	
Hydrogeomorphic I	Floodplain Units
Active Floodplain	Low Terrace
Low-Flow Channels	OHWM Paleo Channel
Procedure for identifying and characterizing the floor	
1. Walk the channel and floodplain within the study area	to get an impression of the geomorphology and
vegetation present at the site.	
2. Select a representative cross section across the channel.	. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is character	ristic of one of the hydrogeomorphic floodplain units.
a) Record the floodplain unit and GPS position.	
b) Describe the sediment texture (using the Wentworth	h class size) and the vegetation characteristics of the
floodplain unit.	
c) Identify any indicators present at the location.	
4. Repeat for other points in different hydrogeomorphic	floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record	the OHWM position via
	GPS patapoint taken then walked
	Other: across
	GPS Patapoint taken then walked Other: across 1.5-2 year event hydraulic modeling shapefile
	L'étéres de la construction de la constructio
	moduling snaperie

聖子

Project ID: Cross s	ection ID: Transect 2b-2bDate: 5/1/18 Time: 843AM
Cross section drawing: Device of the section drawing: Tow twale Days & grass Facing ferch Upstream frome, Tow Flow Willow OHWM GPS point: 4448429 N, 56	low terrace low terrace brome, it is to the solution of the steries of the ster
Indicators: YY48386 N, 56 ☑ Change in average sedimen ☑ Change in vegetation speci ☑ Change in vegetation cove	es Deter:
Comments:	
Floodplain unit: Low-Flow GPS point: See map for tr	
Characteristics of the floodplain u	nit: <u>10w-cobbl</u> es, upland-Sandy, finer <u>20</u> % Shrub: <u>5</u> % Herb: <u>50</u> % X Mid (herbaceous, shrubs, saplings)
Indicators: Mudcracks Ripples Drift and/or debris Presence of bed and bank Benches	 Soil development Surface relief Other: Other: Other: Other:
Comments:	
3 braiding cha low-terraces/isla from large cobbles in elevation.	innels in active floodplain with nots in the middle. Clear transition to pebbles, sand and silt as moved up

• • •

WETLAND	DETERMINATION DATA	FORM - Arid	West Region
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Project/Site: East Sand Slough ci	ty/County: Red Bluff Sampling Date: 5/1/18
Applicant?: Sureau of Reclamation	State: CA Sampling Point: DP3 (UPL)
Investigator(s): Woodward, Le Ferre, Davis, Pese	ection, Township, Range: 520, T27N, R 2W
Landform (hillslope, terrace, etc.): <u>terrala</u> Marsha	ocal relief (concave, convex, none): Slope (%):
Subregion (LRR): Lat: 40.	184062 °N Long: -122, 222462 °W Datum: NA083
	NWI classification:PFOLA
Are climatic / hydrologic conditions on the site typical for this time of year	? Yes Vo (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly dis	
Are Vegetation, Soil, or Hydrology naturally problem	ematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing s	ampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes No Hydric Soil Present? Yes No	Is the Sampled Area
Hydric Soil Present? Yes No //////////////////////////////	within a Wetland? Yes No

Remarks: Slight depression near upland island area, upstream of bridge. Forested until Feduced water regime from RBDD, and 2013 Remarks: fire

VEGETATION - Use scientific names of plants.

Tree Stratum (Plot size:) 1			Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: (A) Total Number of Dominant
3 4 <u>Sapling/Shrub Stratum</u> (Plot size:) 1	-	= Total Cover	Total Number of Dominant 3 (B) Species Across All Strata: 3 (B) Percent of Dominant Species 3 (A/B) That Are OBL, FACW, or FAC: 3 (A/B) Prevalence Index worksheet: 3 (A/B)
2			Total % Cover of: Multiply by:
3			OBL species O x 1 =
4			FACW species x 2 = a
5			FAC species x3 =
0		= Total Cover	FACU species x 4 =
Herb Stratum (Plot size: 1m ²) 1. <u>Bramus handeaceus</u> 2. <u>Brassica niara</u>	40	× FACU × UPL	UPL species 1 x 5 = 5 Column Totals: (A) (B)
3. Equisetum hyemale.	20	× FACW	Prevalence Index = $B/A = \frac{11/3}{2} = \frac{3}{6}$
45			Hydrophytic Vegetation Indicators: Dominance Test is >50%
6			Prevalence Index is ≤3.0 ¹
7	-		Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8. $5=2/7.5$, $2=1/9$ Woody Vine Stratum (Plot size:)	95	= Total Cover	Problematic Hydrophytic Vegetation ¹ (Explain)
12			¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
% Bare Ground in Herb Stratum % Cove		_= Total Cover	Hydrophytic Vegetation Present? Yes No
Remarks:	colo	nd hadde	
smounded by invasive some interspersed,	but	less tha	n 5% cover,

US Army Corps of Engineers

Arid West - Version 2.0

SOIL

Sampling Point: DP3 (UPL)

rofile Description: (Describe to the dep		x Features			Service (L).	1 2 - C	
Depth Matrix Inches) Color (moist) %	Color (moist)		Type ¹	Loc ²	Texture	Remarks	-
1-12 104R4/3 100	0.00				road	that silt 6a	m
					5		
				1.1			
	Careford and the second se			15		- 15	
- to at a second						A ALCE COLOR	
				-	-		
			_	-			
Type: C=Concentration, D=Depletion, RM	M=Reduced Matrix, C	S=Covered	or Coate	ed Sand G		ocation: PL=Pore Lining, M=N	
Hydric Soil Indicators: (Applicable to a	II LRRs, unless othe	erwise note	d.)			s for Problematic Hydric So	ils":
Histosol (A1)	Sandy Red					Muck (A9) (LRR C)	
Histic Epipedon (A2)	Stripped M		(54)			Muck (A10) (LRR B) Iced Vertic (F18)	
Black Histic (A3)	Loamy Mu Loamy Gle					Parent Material (TF2)	
Hydrogen Sulfide (A4) Stratified Layers (A5) (LRR C)	Depleted N		(12)			r (Explain in Remarks)	
1 cm Muck (A9) (LRR D)		rk Surface (F6)			, (,,, -, -, -, -, -, -, -, -, -, -	
Depleted Below Dark Surface (A11)		Dark Surfac					
Thick Dark Surface (A12)	Redox Dep	pressions (F	-8)		³ Indicator	rs of hydrophytic vegetation an	nd
Sandy Mucky Mineral (S1)	Vernal Poo	ols (F9)				d hydrology must be present,	
Sandy Gleyed Matrix (S4)					unless	disturbed or problematic.	
Restrictive Layer (if present):							
Туре:					10050000		
Depth (inches):							
	inclus. Soil	1 map	shows, th	ns a		contain River drains affi	
Remarks: depth of how 12 Likely saturated fro	inclus. Soil	1 map	sho s, th	ns a en a			
Remarks: depth of how 12 Likely saturated fro HYDROLOGY	inclus. Soil	1 map	sho s, th	ns a			
Remarks: depth of how 12 Likely saturated fro HYDROLOGY Wetland Hydrology Indicators:			sho s, th	ns a	urea te quickly		rwash, er.
Remarks: depth of how 12 Likely saturated fro HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one requ	ired; check all that ap	oply)	sha s, th	ns a	urea te quickly	, contain Pive drains aft	rwash, er.
Remarks: depth of how 12 Likely saturated fro HYDROLOGY Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one requ</u> Surface Water (A1)	ired; check all that ap Salt Cru	oply) st (B11)	shoi 5, th	ns a en a	urea te quickly	contain Pive drains affi	rwash, er. required)
Remarks: depth of how 12 Likely saturated fro HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one requ Surface Water (A1) High Water Table (A2)	ired; check all that ap Salt Cru: Biotic Cr	oply)		vs a	urea te quickly	contain Pive drains affi condary Indicators (2 or more Water Marks (B1) (Riverine Sediment Deposits (B2) (Riv	required)) verine)
Remarks: depth of how 12 Likely saturated fro HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one requ Surface Water (A1) High Water Table (A2) Saturation (A3)	ired; check all that ap Salt Cru: Biotic Cr Aquatic	oply) st (B11) rust (B12)	es (B13)		urea te quickly	contain Pive drains affi condary Indicators (2 or more Water Marks (B1) (Riverine	required)) verine)
Remarks: depth of how 12 Likely saturated for HYDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one requ Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine)	ired; check all that ap Salt Cru Biotic Cr Aquatic Hydroge	oply) st (B11) rust (B12) Invertebrate	es (B13))dor (C1)		urea te quictly	contain Pive drains affe condary Indicators (2 or more Water Marks (B1) (Riverine Sediment Deposits (B2) (Riverine Drift Deposits (B3) (Riverine	required) verine)
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Remarks: depth of how 12 Likely saturated for Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one requ</u> 	ired; check all that ap Salt Cru: Biotic Cru: Aquatic Hydroge Hydroge NoPresend Recent NoDepth NoDepth	st (B11) rust (B12) Invertebrate en Sulfide O d Rhizosphe ce of Reduct Iron Reduct uck Surface Explain in R (inches): (inches):	es (B13) Odor (C1) eres alor red Iron (tion in Til (C7) remarks)	g Living F C4) Ied Soils	Roots (C3)	contain Pive drains affe Water Marks (B1) (Riverine Sediment Deposits (B2) (Riverine Drainage Patterns (B10) Dry-Season Water Table (C Crayfish Burrows (C8) Saturation Visible on Aerial Shallow Aquitard (D3) FAC-Neutral Test (D5)	required) (verine) a) 2)
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WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: East Sand Slough City/County: Red Bluff Sampling Date: 5/1/18
Applicant: Bureau of Redamations - State: (A Sampling Deint O DULLIN)
Investigator(s): Mondhiard, LeFevre, Pernh, Marshall, Davis Section, Township, Range: <u>S20, T27N, R3W</u>
Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): Concave Slope (%): 2.5%
Subregion (LRR): Lat: 40.183885°N Long: -122.222452°W Datum: NAD83
Soil Map Unit Name: Rr - Rivernash NWI classification: PFOIA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed? Are "Normal Circumstances" present? Yes No
Are Vegetation, Soil, or Hydrology naturally problematic? (If needed, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes No Is the Sampled Area

Wetland Hydrology Present?	Yes	No	within a Wetland?	Yes	NoX
Remarks:			1		
Slight depre	ssion	near	DP3(40)	on yold	andisland
ypstream		snidge	e see notes	A 1-	3.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute	Dominant Species?	Indicator	Dominance Test worksheet	
1	_		1.1.1.7	Number of Dominant Species That Are OBL, FACW, or FAC	
2 3	<u> </u>			Total Number of Dominant Species Across All Strata:	-) (B)
4		= Total Co		Percent of Dominant Species That Are OBL, FACW, or FAC	1/1 = 100%
Sapling/Shrub Stratum (Plot size:)				the second s	
1				Prevalence Index workshee	
2				Total % Cover of:	
3				OBL species	
4				FACW species	x 2 =
5			(<u></u>)	FAC species	x 3 =
1002		= Total Co	over	FACU species	x 4 =
Herb Stratum (Plot size:)	25			UPL species	x 5 =
	95		and the second sec	Column Totals:	(A) (B)
2. Geranium dissectum					
3				Prevalence Index = B//	and the second se
4				Hydrophytic Vegetation Inc	MTETTTTT
5				Dominance Test is >50%	
6				Prevalence Index is ≤3.0	
7				Morphological Adaptation data in Remarks or or	ns ¹ (Provide supporting
	-			Problematic Hydrophytic	
Woody Vine Stratum (Plot size:)	100	= Total Co	over		(Explain)
1				¹ Indicators of hydric soil and	wetland hydrology must
2				be present, unless disturbed	or problematic.
		= Total Co		Hydrophytic	
% Bare Ground in Herb Stratum % Cove	er of Biotic C	rust		Vegetation Present? Yes	No
Remarks:	1.0				

SOIL

Sampling Point: _______

pth Matrix	Redox	ent the indicator or Features		Ser B. A. Artes. I L.
	6 Color (moist)	%Type1	Loc ² Textu	A.
12 10/R 3/2 10	σ		Sil	ty loam
<u> </u>				•
		110-1	1.1	
pe: C=Concentration, D=Depletion	- PM-Reduced Matrix CS	S=Covered or Coater	I Sand Grains.	² Location: PL=Pore Lining, M=Matrix.
dric Soil Indicators: (Applicable	to all LRRs, unless other	wise noted.)	Indic	ators for Problematic Hydric Soils ³ :
Histosol (A1)	Sandy Redo			1 cm Muck (A9) (LRR C)
Histic Epipedon (A2)	Stripped Ma			2 cm Muck (A10) (LRR B)
Black Histic (A3)		ky Mineral (F1)		Reduced Vertic (F18)
Hydrogen Sulfide (A4)	Loamy Gley	yed Matrix (F2)		Red Parent Material (TF2)
Stratified Layers (A5) (LRR C)	Depleted M			Other (Explain in Remarks)
_ 1 cm Muck (A9) (LRR D)		k Surface (F6)		
_ Depleted Below Dark Surface (A		ark Surface (F7)	31	cators of hydrophytic vegetation and
_ Thick Dark Surface (A12)	Redox Dep Vernal Poo	ressions (F8)		etland hydrology must be present,
Sandy Mucky Mineral (S1) Sandy Gleyed Matrix (S4)	Veniai Poo	is (F9)		nless disturbed or problematic.
estrictive Layer (if present):				
Type:				
Depth (inches):			Hydr	ic Soil Present? Yes No
Бериі (inenes):				
Hole to 12". 5		jani's	. z ch	arcoal in top
Hole to 12" : noot larger YDROLOGY		jani's	. \$ ch	arcoal in top
Hole to 12" 5 Not larger (DROLOGY Vetland Hydrology Indicators:	<u>.</u>		. z ch	
	<u>.</u>		. z ch	Secondary Indicators (2 or more required)
Hole to 12". S <u>Moot</u> larger YDROLOGY Wetland Hydrology Indicators: <u>Primary Indicators (minimum of one I</u> Surface Water (A1)	required; check all that app Salt Crus	oly) st (B11)	. z ch	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine)
Hole to 12". S <u>noot</u> larger YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one interview)	required; check all that app Salt Crus Biotic Cru	oly) st (B11) ust (B12)	. z ch	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine)
Hole to 12" 5 <u>Moot</u> larger YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one I 	required; check all that app Salt Crus Biotic Cru Aquatic I	oly) st (B11) ust (B12) nvertebrates (B13)	. z ch	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine)
Hole to 12" 5 <u>Mot layer</u> YDROLOGY Vetland Hydrology Indicators: <u>Primary Indicators (minimum of one normalized second secon</u>	required; check all that app Salt Crus Biotic Cru Aquatic I) Hydroge	bly) st (B11) ust (B12) nvertebrates (B13) n Sulfide Odor (C1)		Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Variange Patterns (B10)
Hole to 12" 5 <u>Mot layer</u> YDROLOGY Wetland Hydrology Indicators: Primary Indicators (minimum of one I Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine Sediment Deposits (B2) (Nonriverine	required; check all that app Salt Crus Biotic Cru Aquatic I) Hydroge verine) Oxidized	oly) st (B11) ust (B12) nvertebrates (B13) n Sulfide Odor (C1) I Rhizospheres along	J Living Roots (C3	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)
Hole to 12" 5 <u>Noot</u> Lawyey YDROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one I Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine Sediment Deposits (B2) (Nonriverine Drift Deposits (B3) (Nonriverine	required; check all that app Salt Crus Biotic Cru Aquatic I) Hydroge verine) Oxidized e) Presence	oly) st (B11) ust (B12) nvertebrates (B13) n Sulfide Odor (C1) I Rhizospheres along e of Reduced Iron (C	J Living Roots (C3	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) Crayfish Burrows (C8)
Hole to 12" 5 <u>hoot</u> layer (DROLOGY Vetland Hydrology Indicators: Primary Indicators (minimum of one of 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)	required; check all that app Salt Crus Biotic Cru Aquatic I) Hydroge verine) Oxidized e) Presence Recent I	bly) st (B11) ust (B12) nvertebrates (B13) n Sulfide Odor (C1) I Rhizospheres along e of Reduced Iron (C ron Reduction in Tille	J Living Roots (C3	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) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (0
Hole to 12" 5 <u>Noot</u> layer <u>IDROLOGY</u> <u>Vetland Hydrology Indicators:</u> <u>rimary Indicators (minimum of one I</u> <u>Surface Water (A1)</u> <u>High Water Table (A2)</u> <u>Saturation (A3)</u> <u>Water Marks (B1) (Nonriverine</u> <u>Sediment Deposits (B2) (Nonriverine</u> <u>Surface Soil Cracks (B6)</u> <u>Inundation Visible on Aerial Ima</u>	required; check all that app Salt Crus Biotic Crus Aquatic I) Hydroge verine) Oxidized e) Presence Recent I agery (B7) Thin Mut	oly) st (B11) ust (B12) nvertebrates (B13) n Sulfide Odor (C1) I Rhizospheres along e of Reduced Iron (C ron Reduction in Tille ck Surface (C7)	J Living Roots (C3	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Crainage Patterns (B10) Dry-Season Water Table (C2) Crayfish Burrows (C8) Saturation Visible on Aerial Imagery (Shallow Aquitard (D3)
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Transect 2c-2c

Arid West Ephemeral and Intermit	ttent Streams OHWM Datasheet
Project: East sand Slough Restoration	Date: 5/1/18 Time: 11:45 AM
Project Number:	Town: Red Bluff State: CA
Stream: East sand slough	Photo begin file#: Photo end file#:
Investigator(s): Woodward, Le Feure, Davis,	Perrin, Marshall
$Y \square / N \square$ Do normal circumstances exist on the site?	Location Details: Left bank froing upstream,
	immediately south of Bridge
$Y \square / N \square$ Is the site significantly disturbed?	Projection: UTM ION Datum: NAD B3
	Coordinates: 40.181455 °N; -122.222376 °W
Potential anthropogenic influences on the channel syst	tem:
Shasta Dam regulates San Blud bridge channelized slo Brief site description:	cramento Biller. Antelono
Plub a born a grad a	the end proof, moscope
Diva bridge channelized sic	van
Brief site description: 0	hidre chan hidres
Immediately abunsmean of	bhage, channel witcens a
Brief site description: Immediately downstream of bit and flattens more, with som	ne small Islands.
Checklist of resources (if available):	
Aerial photography Stream gas	ge data
Dates: see previous form Gage num	ber: USGS 11377100 Sac River AB Bend Buidge
Topographic maps Red Bluff East, CA Period of 1 Geologic maps 7.5' Quad Histor	record: near Real Bluff, CA
Geologic maps 7.5' Quad Histor	y of recent effective discharges
	ts of flood frequency analysis
	recent shift-adjusted rating
	heights for 2-, 5-, 10-, and 25-year events and the
	recent event exceeding a 5-year event
Global positioning system (GPS)	0/01/2007 - present
Other studies Li DAR	
Hydrogeomorphic	Floodplain Units
Active Floodplain	Low Terrace
	1 Le la contra c
Low-Flow Channels	OHWM Paleo Channel
Procedure for identifying and characterizing the floor	dulain units to assist in identifying the OHWM.
1. Walk the channel and floodplain within the study area	to get an impression of the geomorphology and
vegetation present at the site.	Drow the proper section and label the flood plain write
 Select a representative cross section across the channel. Determine a point on the cross section that is characte 	그는 그는 것이 같은 것이 같은 것 같아요. 이 것이 같이 것 같은 것은 것을 만들어야 한다. 그는 것은 것은 것을 가지 않는 것 같아요. 나는 것 같아요. 나는 것 같아요. 나는 것 같아요. 나는 것
a) Record the floodplain unit and GPS position.	insite of one of the hydrogeomorphic hoodplain diffs.
b) Describe the sediment texture (using the Wentworth	h class size) and the vegetation characteristics of the
floodplain unit.	in class size, and the vegetation characteristics of the
c) Identify any indicators present at the location.	
4. Repeat for other points in different hydrogeomorphic	floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record	the OHWM position via
	J GPS Datapoint taken, then walked
Digitized on computer	
	IF 2 year landwarlic modeling
	1.3- 2 year buyan and
	Shapet le

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Cross section drawing:	Facilian	ransect 2c-2c Date: 5/1/18	Time: 11:45 AM sandbarwillow field mustard
Black locust as	rading	vpstriam vm-422°	field mustard megrass & brome
R Wisser	0171		
5 HUUNAN C	V	Field mustars we	ASP.
P 10w terracity so	andy plow-flow.	- Ward We low -flow	WALTER AND
ap sandy Isilty	and the second	and the stand off	Als terms
-1 A	- cours - c	cabbles	
OHWM HUHRIUZ	N; 566276	E	
GPS point: <u>4448188</u>	N: 566204 5	-	
ars pome. <u>-1010100</u>	N, 50020-12		
Indicators:			
Change in average		Break in bank slope	
Change in vegetati		Other: Other:	_
— c o			_
Comments:		1 1 sta	and louidad
Lower OHWA	1 compa	and flattens her	and phage
cian claude	midens	and flattens has	~ Finar
since sloge	i widdins i	and statione ve	
sediment sho	ins eposio	on and cut book a	A DAMW
Flooduloin unite II			T T
Floodplain unit: 🗌 I	Low-Flow Channel	Active Floodplain	Low Terrace
Floodplain unit: 🗌 I GPS point:	Low-Flow Channel	Active Floodplain	Low Terrace
GPS point:			
GPS point:			
GPS point:			
GPS point: Characteristics of the flood Average sediment texture: Total veg cover: <u>20</u> % Community successional s		flow channels; silty, hrub: <u>8</u> % Herb: <u>22</u> %	landy islands terrace.
GPS point: Characteristics of the flood Average sediment texture: Total veg cover: 20 % Community successional s	dplain unit: bbllow Tree:% Si .tage:	Alow channels; silty, hrub: <u>8</u> % Herb: <u>22</u> % Mid (herbaceous, shrubs, sap	Isandy islands terrace.
GPS point: Characteristics of the flood Average sediment texture: Total veg cover: <u>20</u> % Community successional s	dplain unit: bbllow Tree:% Si .tage:	flow channels; silty, hrub: <u>8</u> % Herb: <u>22</u> %	lsandy islands terrace.
GPS point: Characteristics of the flood Average sediment texture: Total veg cover: 20% Community successional s NA Early (herbaceous Indicators:	dplain unit: bbllow Tree:% Si .tage:	How channels; silty, hrub: <u>&</u> % Herb: <u>7</u> % Mid (herbaceous, shrubs, sap Late (herbaceous, shrubs, ma	lsandy islands terrace.
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GPS point: Characteristics of the flood Average sediment texture: Total veg cover: 20 % Community successional s NA Early (herbaceous Indicators: Mudcracks Ripples	dplain unit: <u>Cabbles low-</u> Tree: <u>0</u> % Si stage: s & seedlings)	How channels; silty) hrub: <u>&</u> % Herb: <u>22</u> % Mid (herbaceous, shrubs, sap Late (herbaceous, shrubs, ma Soil development Surface relief	Isandy islands terrace. lings) ture trees)
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GPS point: Characteristics of the flood Average sediment texture: Total veg cover: 20 % Community successional s NA Early (herbaceous Indicators: Mudcracks Ripples Drift and/or debris Presence of bed an Benches Comments:	dplain unit: <u>Cabble 10m</u> Tree: <u>0</u> % Si stage: s & seedlings) s nd bank	How channels; silty/ hrub: <u>&</u> % Herb: <u>22%</u> Mid (herbaceous, shrubs, sap Late (herbaceous, shrubs, ma Soil development Surface relief Other: Other:	Isandy islands terrace. lings) ture trees)
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Transect 2d-2d

	attent Streams OHWM Datasheet
Project: East Sand Slough Restoration	7 Date: 5/1/18 Time: 1:28 PM
Project Number:	Town: Red Bluff State: CA
Stream: East sand Slough	Photo begin file#: Photo end file#:
Investigator(s): Wood ward, Le Feure, Davis	s, Perrin, Marshall
Y 💭 / N 🗌 Do normal circumstances exist on the site?	prage, side channel
Y \square / N 🔀 Is the site significantly disturbed?	Projection: UTM 10N Datum: NAD83 Coordinates: 40.180687°N; -122.222535°W
Potential anthropogenic influences on the channel sy	rstem:
Shasta Dam regulates sacramento Antelope Blud upstream	
Antelope Blud upstream	
Brief site description:	
facing upstream intermittent chan	melleft side
0	
Checklist of resources (if available):	
A amial mhata anomhra	age data
Dates: See previous forms Gage nur	mber: USGS 11377100 Sac River AB Bend Br frecord: Near Red Bluff, CA pry of recent effective discharges
Topographic maps Ped Bluff East, CA Period of Geologic maps 7.5' Quad Histo	frecord: near Red Bluff, CA
Geologic maps 7.5' Quad Histo	ory of recent effective discharges
Vegetation maps	lts of flood frequency analysis
	t recent shift-adjusted rating
	e heights for 2-, 5-, 10-, and 25-year events and the
Existing delineation(s) for site most Global positioning system (GPS)	t recent event exceeding a 5-year event
\square Other studies L_1 DAR	10/01/2007 - present
Hydrogeomorphic	- Eloodolain I Inits
Active Floodplair	
•	h Low Terrace
*	
a sure sure	
Low-Flow Channels	OHWM Paleo Channel
Low-Flow Channels Procedure for identifying and characterizing the flow	OHWM Paleo Channel odplain units to assist in identifying the OHWM:
Low-Flow Channels Procedure for identifying and characterizing the floo 1. Walk the channel and floodplain within the study are	OHWM Paleo Channel odplain units to assist in identifying the OHWM:
Low-Flow Channels Procedure for identifying and characterizing the flow 1. Walk the channel and floodplain within the study are vegetation present at the site.	OHWM Paleo Channel odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and
 Low-Flow Channels Procedure for identifying and characterizing the flow 1. Walk the channel and floodplain within the study are vegetation present at the site. 2. Select a representative cross section across the channel 	OHWM Paleo Channel OHWM Paleo Channel odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units.
Low-Flow Channels Procedure for identifying and characterizing the flow 1. Walk the channel and floodplain within the study are vegetation present at the site.	OHWM Paleo Channel OHWM Paleo Channel odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units.
 Low-Flow Channels Procedure for identifying and characterizing the floot 1. Walk the channel and floodplain within the study are vegetation present at the site. 2. Select a representative cross section across the channel 3. Determine a point on the cross section that is charact a) Record the floodplain unit and GPS position. 	OHWM Paleo Channel OHWM Paleo Channel odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units.
 Low-Flow Channels Procedure for identifying and characterizing the floot 1. Walk the channel and floodplain within the study are vegetation present at the site. 2. Select a representative cross section across the channel 3. Determine a point on the cross section that is charact a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentwor floodplain unit. 	OHWM Paleo Channel OHWM Paleo Channel odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units. teristic of one of the hydrogeomorphic floodplain units.
 Low-Flow Channels Procedure for identifying and characterizing the flow 1. Walk the channel and floodplain within the study are vegetation present at the site. 2. Select a representative cross section across the channel 3. Determine a point on the cross section that is charact a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentwor floodplain unit. c) Identify any indicators present at the location. 	OHWM Paleo Channel OHWM Paleo Channel Odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units. teristic of one of the hydrogeomorphic floodplain units.
 Low-Flow Channels Procedure for identifying and characterizing the flow 1. Walk the channel and floodplain within the study are vegetation present at the site. 2. Select a representative cross section across the channel 3. Determine a point on the cross section that is charact a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentwor floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic 	OHWM Paleo Channel OHWM Paleo Channel Odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units. teristic of one of the hydrogeomorphic floodplain units.
 Low-Flow Channels Procedure for identifying and characterizing the flow 1. Walk the channel and floodplain within the study are vegetation present at the site. 2. Select a representative cross section across the channel 3. Determine a point on the cross section that is charact a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentwor floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic 5. Identify the OHWM and record the indicators. Record 	OHWM Paleo Channel OHWM Paleo Channel Odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units. teristic of one of the hydrogeomorphic floodplain units. eth class size) and the vegetation characteristics of the c floodplain units across the cross section. rd the OHWM position via:
 Low-Flow Channels Procedure for identifying and characterizing the flow 1. Walk the channel and floodplain within the study are vegetation present at the site. 2. Select a representative cross section across the channel 3. Determine a point on the cross section that is charact a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentwor floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic 5. Identify the OHWM and record the indicators. Record 	OHWM Paleo Channel OHWM Paleo Channel Odplain units to assist in identifying the OHWM: ea to get an impression of the geomorphology and el. Draw the cross section and label the floodplain units. teristic of one of the hydrogeomorphic floodplain units.

4. - 2.

Project ID: Cross section ID: Tra	insect 2d-2d Date: 5/1/18 Time: 1:28 PM
Cross section drawing:	
facing up stream and grasses migues	Sand hor il
OHWM VTM	
GPS point: 4448101 N; 566188	E
Indicators: Change in average sediment texture Change in vegetation species Change in vegetation cover	Break in bank slope Other: Other:
Comments: Mostly Silty Dam in	channel with losse sand
as brome and me throw	channel with losse sand s. Similar Veg. species, such ghout due to introgent Mows,
Floodplain unit: Low-Flow Channel	
GPS point:	
Characteristics of the floodplain unit: Average sediment texture: <u>Savada Si</u> Total veg cover: <u>95</u> % Tree: <u>9</u> % Shr Community successional stage: NA Early (herbaceous & seedlings)	ub: <u>5</u> % Herb: <u>1</u>)% Mid (herbaceous, shrubs, saplings) Late (herbaceous, shrubs, mature trees)
Indicators: Mudcracks Ripples Drift and/or debris Presence of bed and bank Benches	Soil development Surface relief Other: Other: Other: Other:
Comments:	
· · · · · · · · · · · · · · · · · · ·	

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: East Sand Slough City/County:	Red Bluff- Sampling Date: 5/2/18
Applicant: Bureau of Redamation -	States CA- Complex DPE [Cours)
Investigator(s): hoodward, Le Feure, Pavis, Penin, Section, Town	ship, Range: S20, T27N, R3W
Landform (hillslope, terrace, etc.):Local relief (co	oncave, convex, none): roncave Slope (%): 5%
Subregion (LRR): Lat: 40, 172540°	N Long: -122. 221104 °W Datum: NIAP83
Soil Map Unit Name: CmA- Columbia fine sandy loam, 0-3	7. Slopes NWI classification: PSSIA
Are climatic / hydrologic conditions on the site typical for this time of year? Yes	No (If no, explain in Remarks.)
Are Vegetation, Soil, or Hydrology significantly disturbed?	Are "Normal Circumstances" present? Yes No No
Are Vegetation, Soil, or Hydrology naturally problematic?	(If needed, explain any answers in Remarks.)

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

Hydrophytic Vegetation Present? Hydric Soil Present? Wetland Hydrology Present?	Yes <u> </u>	Is the Sampled Area within a Wetland? Yes No
Remarks: Facing ypstream	, left nillside d	lepression/drainage

VEGETATION - Use scientific names of plants.

T	Absolute	Dominant Indicator	Dominance Test worksheet:
Tree Stratum (Plot size: _r = 30) 1. Conid Illingensis	<u>% Cover</u>	Species? Status	Number of Dominant Species
2. Fraxinus latifolia	- 12	× FAC	That Are OBL, FACW, or FAC: 314 (A)
	- 18_	X FACW	Total Number of Dominant
3. quercus lobata		FACW	Species Across All Strata: (B)
45=20 .2=8	-		Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)	40	= Total Cover	That Are OBL, FACW, or FAC: <u>34 = 75/(A/B)</u>
1			Prevalence Index worksheet:
2			Total % Cover of: Multiply by:
3			OBL species x 1 =
4			FACW species x 2 =
5			FAC species x 3 =
Herb Stratum (Plot size: 1m ²)		_ = Total Cover	FACU species x 4 =
1. Carex Senta	60	v net	UPL species x 5 =
2. Cardys pychocephalus	30	X OBE	Column Totals: (A) (B)
			Describer 1.1 Dit
3. Galium appanne		A REAL PROPERTY OF THE PARTY OF	Prevalence Index = B/A =
4			Hydrophytic Vegetation Indicators:
5			Dominance Test is >50%
6			Prevalence Index is ≤3.0 ¹
7			Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8	_	· · · · · · · · · · · · · · · · · · ·	
	110	= Total Cover	Problematic Hydrophytic Vegetation ¹ (Explain)
Woody Vine Stratum (Plot size:)			1
1	_	·	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2	-		
		_ = Total Cover	Hydrophytic Vegetation
% Bare Ground in Herb Stratum % Cove	er of Biotic C	Crust	Present? Yes <u>V</u> No
Remarks:			
	1 1	the set of the law	= 11 11
More densely Tores	red	as mon	ic south I downstream
5			

s	O	I	Ł

	h needed to document the indicator or co	nfirm the absence of indicators.)
pth Matrix	Redox Features	
ches) Color (moist) %	Color (moist) % Type ¹ Lo	
-6 10YR 4/2 100.		<u>silt loam</u>
15 2.5YR 4/4 100		loam
pe: C=Concentration, D=Depletion, RM=	Reduced Matrix, CS=Covered or Coated Sa	and Grains. ² Location: PL=Pore Lining, M=Matrix. Indicators for Problematic Hydric Soils ³ :
Iric Soil Indicators: (Applicable to all		1 cm Muck (A9) (LRR C)
Histosol (A1)	Sandy Redox (S5) Stripped Matrix (S6)	2 cm Muck (A10) (LRR B)
Histic Epipedon (A2) Black Histic (A3)	Supped Matrix (So) Loamy Mucky Mineral (F1)	Reduced Vertic (F18)
Hydrogen Sulfide (A4)	Loamy Gleyed Matrix (F2)	Red Parent Material (TF2)
Stratified Layers (A5) (LRR C)	Depleted Matrix (F3)	Other (Explain in Remarks)
1 cm Muck (A9) (LRR D)	Redox Dark Surface (F6)	
Depleted Below Dark Surface (A11)	Depleted Dark Surface (F7)	3
Thick Dark Surface (A12)	Redox Depressions (F8)	³ Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1) Sandy Gleyed Matrix (S4)	Vernal Pools (F9)	wetland hydrology must be present, unless disturbed or problematic.
trictive Layer (if present):		
Туре:		
Depth (inches):		Hydric Soil Present? Yes No
ery crimby, d	<i>ч</i> у.	
DROLOGY		
etland Hydrology Indicators:	ed; check all that apply)	Secondary Indicators (2 or more required)
etland Hydrology Indicators: imary indicators (minimum of one require	ed; check all that apply) Salt Crust (B11)	Secondary Indicators (2 or more required)
etland Hydrology Indicators: rimary Indicators (minimum of one require Surface Water (A1)		
etland Hydrology Indicators: imary Indicators (minimum of one require _ Surface Water (A1) _ High Water Table (A2)	Salt Crust (B11)	Water Marks (B1) (Riverine)
etland Hydrology Indicators: rimary Indicators (minimum of one require Surface Water (A1)	Salt Crust (B11) Biotic Crust (B12)	Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine)
etland Hydrology Indicators: imary Indicators (minimum of one require _ Surface Water (A1) _ High Water Table (A2) _ Saturation (A3)	Sait Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Water Marks (B1) (RiverIne) Sediment Deposits (B2) (RiverIne) Drift Deposits (B3) (RiverIne) ↓ Drainage Pattems (B10)
etland Hydrology Indicators: imary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine)	Sait Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1)	Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) / Drainage Patterns (B10) ring Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8)
etland Hydrology Indicators: imary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine	Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv	Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) ✓ Drainage Patterns (B10) ✓ Dry-Season Water Table (C2) Crayfish Burrows (C8) Soils (C6) Saturation Visible on Aerial Imagery (C9)
tland Hydrology Indicators: mary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine Drift Deposits (B3) (Nonriverine)	 Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled S (B7) Thin Muck Surface (C7) 	Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) ✓ Drainage Pattems (B10) ✓ Dry-Season Water Table (C2) Crayfish Burrows (C8) Soils (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
etland Hydrology Indicators: mary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine Drift Deposits (B3) (Nonriverine) Surface Scil Cracks (B6)	 Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled S 	Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) ✓ Drainage Patterns (B10) ving Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Soils (C6) Saturation Visible on Aerial Imagery (C9)
etland Hydrology Indicators: mary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine Drift Deposits (B3) (Nonriverine) Surface Scil Cracks (B6) Inundation Visible on Aerial Imagery (Water-Stained Leaves (B9) eld Observations:	Sait Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled S (B7) Thin Muck Surface (C7) Other (Explain in Remarks)	Water Marks (B1) (RiverIne) Sediment Deposits (B2) (RiverIne) Drift Deposits (B3) (RiverIne) Drainage Patterns (B10) ring Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Soils (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
etland Hydrology Indicators: imary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine) Drift Deposits (B3) (Nonriverine) Surface Scil Cracks (B6) Inundation Visible on Aerial Imagery (Water-Stained Leaves (B9) Held Observations: Urface Water Present? Yes	Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled S [B7) Thin Muck Surface (C7) Other (Explain in Remarks) No Depth (inches):	Water Marks (B1) (RiverIne) Sediment Deposits (B2) (RiverIne) Drift Deposits (B3) (RiverIne) Drainage Patterns (B10) ring Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Soils (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
etland Hydrology Indicators: mary Indicators (minimum of one require Surface Water (A1) High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine) Drift Deposits (B3) (Nonriverine) Surface Scil Cracks (B6) Inundation Visible on Aerial Imagery (Water-Stained Leaves (B9) eld Observations: urface Water Present? Yes	Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled S [B7) Thin Muck Surface (C7) Other (Explain in Remarks) No Depth (inches):	Water Marks (B1) (RiverIne) Sediment Deposits (B2) (RiverIne) Drift Deposits (B3) (RiverIne) Drainage Patterns (B10) ring Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) Soils (C6) Shallow Aquitard (D3) X FAC-Neutral Test (D5)
Vetland Hydrology Indicators: Primary Indicators (minimum of one required)	Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled S [B7) Thin Muck Surface (C7) Other (Explain in Remarks) No Depth (inches):	Water Marks (B1) (RiverIne) Sediment Deposits (B2) (RiverIne) Drift Deposits (B3) (RiverIne) Drainage Patterns (B10) // Drainage Patterns (B10) // Drainage Patterns (B10) // Orainage Patterns (C3) // Saturation Visible on Aerial Imagery (C9) // Shallow Aquitard (D3) // FAC-Neutral Test (D5) // Wetland Hydrology Present? Yes // No //
High Water Table (A2) Saturation (A3) Water Marks (B1) (Nonriverine) Sediment Deposits (B2) (Nonriverine) Drift Deposits (B3) (Nonriverine) Surface Scil Cracks (B6) Inundation Visible on Aerial Imagery (Water-Stained Leaves (B9) Field Observations: Surface Water Present? Yes Water Table Present? Yes Saturation Present? Yes Saturation Present? Yes (includes capillary fringe) Describe Recorded Data (stream gauge, in Remarks:	Salt Crust (B11) Biotic Crust (B12) Aquatic Invertebrates (B13) Hydrogen Sulfide Odor (C1) Oxldized Rhizospheres along Liv Presence of Reduced Iron (C4) Recent Iron Reduction in Tilled S (B7) Thin Muck Surface (C7) Other (Explain in Remarks) No Depth (inches): No Depth (inches): No Depth (inches): No Depth (inches): No Depth (inches):	Water Marks (B1) (RiverIne) Sediment Deposits (B2) (RiverIne) Drift Deposits (B3) (RiverIne) Drainage Patterns (B10) // Drainage Patterns (B10) // Drainage Patterns (B10) // Orainage Patterns (C3) // Saturation Visible on Aerial Imagery (C9) // Shallow Aquitard (D3) // FAC-Neutral Test (D5) // Wetland Hydrology Present? Yes // No //

WETLAND DETERMINATION DATA FORM -	- Arid West Region
Project/Site: East Sand Slough City/County: Red	1 PLUAC 5/2/12
Applicant: Bycan of Reclamation	State: CA: Sampling Date: 0/2/10
Applicant: <u>Bureau of Reclamation</u> Investigator(s): <u>Noodward</u> , <u>Le Fevre</u> , <u>Davis</u> , <u>Pemin</u> , <u>Marshall</u> Section, Township, Rar	State CA Sampling Point PF 6 (PISV-6)
Landform (hillslope, terrace, etc.): temace Local relief (concave, concerned)	NOVAY DODA): COACONIS SIGNATION IEV
Subregion (LRR): (ノ Lat: 40.169994 ° ト	long: =122.2.19/448°1A Datum: ALAD 22
Collinson Holinson Collinson Collinson	NWI classification: PEMIC
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No No	
	Normal Circumstances" present? Yes Ves
Are Venetation Orit	eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling point lo	ocations, transects, important features, etc.
Hydrophytic Vegetation Present? Yes <u>No X</u> Is the Sampled	Area
Hydric Soil Present? Yes No within a Watter	d? Yes No X
Sacramento River used to back up into s Damgates were down. This operation stoppe up to create the features as other as ind	slough when Red Bluff Diversion
Damgates were down. This operation stoppe	d in 2012, 50 water no longer have
up to weate the features as other as ind	Ucated on NWI maps 9 ours
VEGETATION – Use scientific names of plants.	
Tree Stratum (Plot size:) Absolute Dominant Indicator % Cover Species? Status	Dominance Test worksheet:
1,	Number of Dominant Species (A)
2	Total Number of Dominant
3	Species Across All Strata: (B)
4 = Total Cover	Percent of Dominant Species
Sapling/Shrub Stratum (Plot size:)	That Are OBL, FACW, or FAC: $1/7 = 50$ (A/B)
1	Prevalence Index worksheet:
2	Total % Cover of: Multiply by:
3 4	OBL species x 1 = FACW species x 2 =
5.	FAC species x2 = FAC species x3 =3
= Total Cover	FACU species $2 \times 4 = 8$
Herb Stratum (Plot size: 10) 1. Lalium multiflorum 65 X FAC	UPL species x 5 =
2. Hordeum depression 35 x FAC	Column Totals: (A)3 (B)
3. Medicago polymorpha 55 FACU	Prevalence Index = $B/A = \frac{13}{4} = 3.25$
4. Leontodon taraxacoides 10 FACU	Hydrophytic Vegetation Indicators:
5	Dominance Test is >50%
6	Prevalence Index is ≤3.0 ¹
7	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8	Problematic Hydrophytic Vegetation ¹ (Explain)
Woody Vine Stratum (Plot size:)	
1	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2 = Total Cover	Hydrophytic
% Bare Ground in Herb Stratum % Cover of Biotic Crust	Vegetation
Remarks:	Present? Yes No
See Hydrology Pemarks.	

US Army Corps of Engineers

SOIL

Sampling Point: DPb(P/Sv-6)

ofile Desc	ription: (Describe t	o the depti	n needed to docum	ent the ir	idicator o	r confirm	the absence of	indicators.)	
epth	Matrix	· ·		Features			1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		
nches)	Color (moist)		Color (moist)	%	Type ¹		Texture	Rem	arks
-2.5	104R.3/4	100			<u> </u>		Jean		
5-7	7,5YR 5/1	85	107R 5/8	15	_ <u>C_</u>	<u>_M</u>	loam_		
	- -								
	<u></u>					·			
			<u> </u>					· · · · · · · · · · · · · · · · · ·	·
									·
						<u> </u>			
pe: C=C	Concentration, D=Dep	letion, RM=	Reduced Matrix, CS	S=Covered	i or Coate	d Sand Gr		ion: PL=Pore Lin	
dric Soll	Indicators: (Applic	able to all			ed.)			r Problematic H	iydric Solis":
Histoso	• •		Sandy Red	• •				ck (A9) (LRR C)	`
•	Epipedon (A2)		Stripped Ma Loamy Muc	• •	1/64)			ck (A10) (LRR B Vertic (F18))
•	listic (A3) en Sulfide (A4)		Loamy Gle	•	• •			ent Material (TF2	2)
	ed Layers (A5) (LRR	C)	Depleted N		. (/		—	xplain in Remark	
-	luck (A9) (LRR D)	•	Redox Dar	• •	(F6)		•		
-	ed Below Dark Surfac	:e (A11)	Depleted D		•		, 1		
_	Dark Surface (A12)		Redox Dep		F8)			hydrophytic veg	
	Mucky Mineral (S1)		Vernal Poo	is (F9)				/drology must be turbed or probler	
	Gleyed Matrix (S4) Layer (if present):								
	cobbles								/
••	inches):ih						Hydric Soil P	resent? Yes	V No
marks:							1		
DROL									
	iydrology Indicators dicators (minimum of		d: check all that an	-tv)			Secon	tary Indicators (2	or more required)
	ce Water (A1)	Une require	Salt Crus					ater Marks (B1) (
-	Nater Table (A2)			ust (B12)				• • •	(B2) (Riverine)
	ation (A3)			nvertebra	tes (B13)			ift Deposits (B3)	
	Marks (B1) (Nonrive	erine)	— ·	n Sulfide (• •			ainage Patterns	
	nent Deposits (B2) (N					g Living Ro	ots (C3) Di	y-Season Water	Table (C2)
	Deposits (B3) (Nonriv		Y Presenc	e of Redu	ced Iron (C4)	C	rayfish Burrows (C8)
🖌 Surfa	ce Soil Cracks (B6)		Recent !	ron Reduc	tion in Til	ed Soils (C	• —		on Aerial Imagery (C
Inund	lation Visible on Aeria	l Imagery (I	•	ck Surface				allow Aquitard (
	r-Stained Leaves (B9)	Other (E	xplain in F	Remarks)		F/	AC-Neutral Test	(U5)
- 10 Inter-	servations:	N/		1					1
	Vater Present?		No Depth (
iurface W		Yes	No 📈 Depth (inches): _				. Data ant 0 Va	
Surface W Water Tat	ble Present?	~	N . / D			VV0		v Presente te	S NO
urface W Vater Tat aturatior	n Present?	Yes	No <u>I</u> Depth (inches): _			tland Hydrolog		
urface W Vater Tat aturatior includes					previous i				
Surface W Vater Tat Saturatior includes	n Present? capillary fringe)				previous i				
Surface W Vater Tat Saturatior includes Describe Remarks:	n Present? capillary fringe) Recorded Data (strea	am gauge, r	nonitoring well, aeria	al photos,		nspections), if available:	· · · · · · · · · · · · · · · · · · ·	
Surface W Vater Tat Saturatior includes Describe Remarks:	n Present? capillary fringe) Recorded Data (strea	am gauge, r	nonitoring well, aeria	al photos,		nspections), if available:	· · · · · · · · · · · · · · · · · · ·	nd slough
Surface W Water Tat Saturatior <u>includes</u> Describe Remarks: Tト と	n Present? capillary fringe) Recorded Data (streat : NWI MAP	am gauge, r indic	nonitoring well, aeria	al photos, ars a	long	nspections), if available:	East Sa	nd Slough
Surface W Vater Tat Saturation includes Describe Remarks: The	n Present? capillary fringe) Recorded Data (strea : NWI MAP C, which I	indic	nonitoring well, aeria ates area e is based	al photos, as a on h	long	the e), if available: Ldge sf	East Sa Arequen	#4 flooded
Surface W Water Tat Saturation (includes) Describe Remarks: The $^{\circ}EMI$	n Present? <u>capillary fringe)</u> Recorded Data (strea : NWI MAP C, which I water wit	indic belieur	ates are tis based DD gate a	al photos, ans a on h opero	long hen	the e ESS v S. This), if available: Edge of Vas more DP site	East Sa Avequen is a lit	the higher
Surface W Water Tat Saturatior includes Describe Remarks: The Remarks: The Che K	n Present? <u>capillary fringe</u>) Recorded Data (streat : NWI Map C, which I water with <u>cmaining</u> (indic belieur chann	ates are tes are to based DD gate a d with a s	al photos, and a on h opero	long hen tion.	the e ESS v s. This cssign), if available: Edge of Var mom DP site Land Lik	East Sa Avequen is a lit ely poole	the flooded the higher id water (
Surface W Vater Tat Saturation includes Describe Remarks: The The $^{2}EMI^{3}EMI^{3}EMI^{4}he^{4}he^{4}he$	n Present? <u>capillary fringe</u>) Recorded Data (streat NWI Map C, which I water with <u>cmaining</u> (n to grow e	indic belieur chann	ates are tes are to based D gate a d with a t vigetatio	al photos, and a on h slight	long hen tion. t dep	ESS v ESS v s. This ressian), if available: Lodge of VAS moments DP site Lond Like Lond Like	East Sa Arequen is a lit ely poole	the higher
urface W Vater Tat aturation ncludes escribe escribe he he he he he he he he	n Present? <u>capillary fringe</u>) Recorded Data (streat NWI Map C, which I water with <u>cmaining</u> (n to grow e Corps of Engineers v	indic belieur - h RBI - h RBI	nonitoring well, aeria ates area c is based D gate a d with a s it vegetation only flow	al photos, and a on h operations h. Siv s thu	long hen tion. t dep ne t	the e ESS r s. This ression the en), if available: edge of vas mom DP site 2 and like d of RB g high f	East Sa Arequen is a lit ely poole DD gate ilons, av	Hy flooded the higher d water (operation Arid West-Version & Dooling
Surface W Vater Tat Saturation includes Describe Remarks: The PEMIDSACKMOVGSArmy C	n Present? <u>capillary fringe</u>) Recorded Data (streat NWI Map C, which I water with <u>cmaining</u> (n to grow e Corps of Engineers v	indic belieur - h RBI - h RBI	nonitoring well, aeria ates area c is based D gate a d with a s it vegetation only flow	al photos, and a on h operations h. Siv s thu	long hen tion. t dep ne t	the e ESS r s. This ression the en), if available: edge of vas mom DP site 2 and like d of RB g high f	East Sa Arequen is a lit ely poole DD gate ilons, av	Hy flooded the higher d water (operation Arid West-Version & Dooling
urface W /ater Tat aturation ncludes lescribe temarks: The EMIE EMIE AcKi $bc rKovgl S Army C$	n Present? <u>capillary fringe</u>) Recorded Data (streat NWI Map C, which I water with <u>cmaining</u> (n to grow e	indic belieur - h RBI - h RBI	nonitoring well, aeria ates area c is based D gate a d with a s it vegetation only flow	al photos, and a on h operations h. Siv s thu	long hen tion. t dep ne t	the e ESS r s. This ression the en), if available: edge of vas mom DP site 2 and like d of RB g high f	East Sa Arequen is a lit ely poole DD gate ilons, av	Hy flooded the higher d water (operation Arid West-Version & Dooling

Transect 3a-3a

Arid West Ephemeral and Intermi	
Project: East Sand Slough Restoration Project Number: Stream: Ephemeral drainage along East Sand Investigator(s): Noodward, Le Feure, Davis, Perri	Town: Red RING State: CA
Investigator(s): Noodward, Le Feure, Davis, Perri Y □ / N □ Do normal circumstances exist on the site?	along 1-5
$Y \square / N \square$ is the site significantly disturbed?	Projection: UTM 10N Datum: NAD83 Coordinates: 40.170490°N; -122.221445°V
Potential anthropogenic influences on the channel syst Interstate - 5 stormwater	whent
Brief site description: Facing ypstream, to Interstate - 5 on west edge to e slope. Forested.	ephemeral drainage parailel je of study Area, along
Checklist of resources (if available): Aerial photography Dates: See previous form Gage num Topographic maps Red Bluff East, CA Period of n	ber:
□ Geologic maps USGS 7.5 ℃ 0.0ad □ Histor ☑ Vegetation maps □ Result ☑ Soils maps □ Most 1	ry of recent effective discharges ts of flood frequency analysis recent shift-adjusted rating heights for 2-, 5-, 10-, and 25-year events and the
	recent event exceeding a 5-year event
Hydrogeomorphic	Floodplain Units
Active Floodplain	OHWM Paleo Channel
Procedure for identifying and characterizing the floor	dplain units to assist in identifying the OHWM:
 Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character 	Draw the cross section and label the floodplain units.
 a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth floodplain unit. c) Identify any indicators present at the location. 4. Repeat for other points in different hydrogeomorphic 5. Identify the OHWM and record the indicators. Record 	floodplain units across the cross section. I the OHWM position via:
Mapping on aerial photograph Digitized on computer	GPS Walked a transect line across Other: 1.5-2 year hydraulic modeling shapefile

 \tilde{g}_{ik}

Project ID: Cross section ID: Transect 3a - 3a Date: 5/2/18 Time: 11:10 AM
Cross section drawing: valley oak intenor live
Cross section drawing: volley oak 1-5 n propulation of the second low terrale ~90 ripropulation of the second low terrale ~90 East sand slough wild oat upland wotch
megrass grass brome, "
Encina vostream cobbles
<u>OHWM</u>
GPS point: <u>see transect on maps</u>
Indicators: Image:
Comments:
see Floodplain unit comments, Culvert-fed.
Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace
GPS point:
Characteristics of the floodplain unit: Average sediment texture: <u>loam in thalweg</u> with nptap on 5lope. Total veg cover: % Tree: % Shrub: % Herb: % Community successional stage: % Mid (herbaceous, shrubs, saplings) NA Mid (herbaceous, shrubs, mature trees)
Indicators: Soil development Mudcracks Soil development Ripples Surface relief Drift and/or debris Other: <u>culvert from voad</u> Presence of bed and bank Other: <u>culvert from voad</u> Benches Other: <u>culvert from voad</u>
Comments:
Herbaceous (rye, oat, thiste) throughout most of drainage, with interior live oak, valley oak, ornamental plum,
cottonwood scattered throughout 50'-wide drainage.

Transect Ze-Ze

Arid West Ephemeral and Intermi	ittent Streams OHWM Datasheet
Project: East Sand Slough Restoration	Date: 5/2/18 Time: 1:53 PM
Project Number:	Town: Red Bluff State: CA
Stream: East sand slough	Photo begin file#: Photo end file#:
Investigator(s): Woodward, LeFerve, Davi	
$Y \times / N \square$ Do normal circumstances exist on the site?	Location Details: Low terrale, west bank
	nor riparian connection to Sac R.
$Y \square / N $ Is the site significantly disturbed?	Projection: UTM ION Datum: NAP83
	Coordinates: 40, 167140°N; -122. 218900°W
Potential anthropogenic influences on the channel sys	stem: varnents River; stopped cause backwater in Ess in 2012.
shasta Dam regulates sac	varians of the start of the start 2012
putting RBDD gates down to	cause bactmater in ESS In 2012.
Brief site description:	
Brief site description: Near middle edge of viparia bank of ESS, 1-5, and connection	n forested area along SW
I I EX I-E and connection	to sacramento River
bank of cos, 1 5, min convarion	
Checklist of resources (if available):	
Aerial photography Stream ga	ge data
_ Dates: See previous form Gage num	aber: USGS 11377100 Sac River AB Bend Brid record: rear Red Bluff, CA
	record: near Red Bluff, CA
Geologic maps USGS 7.5' Quad Histor	ry of recent effective discharges 10/4/1988 - present
	Its of flood frequency analysis
	recent shift-adjusted rating
	heights for 2-, 5-, 10-, and 25-year events and the recent event exceeding a 5-year event
\checkmark Other studies $\downarrow; DAR$	10/01/2007 - present
Hydrogeomorphic	Floodplain Linits
Active Floodplain	Low Terrace
	故
the state of the	and the second second
Low-Flow Channels	/ / OHWM Paleo Channel
Procedure for identifying and characterizing the floo	odplain units to assist in identifying the OHWM:
1. Walk the channel and floodplain within the study area	a to get an impression of the geomorphology and
vegetation present at the site.	
2. Select a representative cross section across the channel	이것은 것은 것에서 이렇게 집에서 집에서 집에 가장 좀 잘 못했다. 영국에 가장 것은 것은 것은 것은 것을 가지 않는 것을 수 있는 것이 집에서 집에 가지 않는 것이 없다.
3. Determine a point on the cross section that is character	eristic of one of the hydrogeomorphic floodplain units.
a) Record the floodplain unit and GPS position.	holoconica) and the constantian characteristics of the
b) Describe the sediment texture (using the Wentwort	in class size) and the vegetation characteristics of the
floodplain unit. c) Identify any indicators present at the location.	
4. Repeat for other points in different hydrogeomorphic	floodplain units across the cross section
5. Identify the OHWM and record the indicators. Record	
Mapping on aerial photograph	XT GPS Took datapoint & walked transect
\square Digitized on computer	A GPS Took datapoint & walked transect Dother: 1.5-2 year hydraulic modeling shapefile
	in stilling sharefile
	mouning starpetto

• • • •

Project ID: Cross section ID: Transect 2e-2e Date: 5/2/18 Time: 1:53 PM Cross section drawing: 226 Facing potneam
Cross section drawing: 226 Friding upstream
TO TOW towale - 230'
valley oak tree of reaven upland 2 enconconcertifield box walking elderberry browe, mustard, vetch,
OHWM MTY rye,
GPS point: 4446601 N ; 566510E
Indicators: 4446576 N; 566390E
Change in average sediment texture Break in bank slope Change in vegetation species Other: Change in vegetation cover Other:
Comments:
See Active Plouplain comments.
Floodplain unit: Low-Flow Channel Active Floodplain Director Low Terrace
GPS point: 4446585 N; 566367 E
Characteristics of the floodplain unit: Average sediment texture: 0 avv Total veg cover: 0 avv Total veg cover: 0 avv Community successional stage: NA NA Mid (herbaceous, shrubs, saplings) Early (herbaceous & seedlings) Late (herbaceous, shrubs, mature trees)
Indicators: Soil development Mudcracks Soil development Ripples Surface relief Drift and/or debris Other: Presence of bed and bank Other: Benches Other:
Comments:
Low terrale has lower channel depression along
Low terrale has lower channel depression along hillslope of 1-5 where collects upbermental drainage.

Project ID: Cross section ID: Transect 2e-2e Date: 5/2/18 Time: 2:23PM
Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace
GPS point: <u>See OHWM transect on map</u>
Characteristics of the floodplain unit: Average sediment texture: Total veg cover: 0 % Marceristics of the floodplain unit: NA NA Early (herbaceous & seedlings) Mid (herbaceous, shrubs, saplings) Late (herbaceous, shrubs, mature trees)
Indicators: Soil development Mudcracks Surface relief Drift and/or debris Other: Presence of bed and bank Other: Benches Other:
Comments: 102 flow channels in active floodplain here concentrate
more to center as approach sac River downstream
Low flow channels in active floodplain here concentrate more to center as approach sac River downstream. All invasive ydand/FAC herbaceas. Pettle/Cobbles in low-flow channel & sand/loam in active floodplain.
Floodplain unit: Low-Flow Channel Active Floodplain Low Terrace
GPS point:
Characteristics of the floodplain unit: Average sediment texture: Total veg cover: % Tree: % Shrub: % Herb: Community successional stage: NA Mid (herbaceous, shrubs, saplings) Early (herbaceous & seedlings) Late (herbaceous, shrubs, mature trees)
Indicators: Soil development Mudcracks Soil development Ripples Surface relief Drift and/or debris Other: Presence of bed and bank Other: Benches Other: Comments: Other:
Comments:
and and a station of the second station of the second state

Transect 16-16

Arid West Ephemeral and Intermit	tent Streams OH wivi Datasneet
Project: East Sand Slough	Date: 5/2/18 Time: 3:37PM
Project Number:	Town: Pal QL State: CA
Stream: East sand slough sacraments River	Photo begin file#: Photo end file#:
Investigator(s): Woodward, Le Feure, Davis.	
	Location Details: Downstream bend
Y \square N \square Do normal circumstances exist on the site?	where ESS meets Sac. River
$Y \square / N$ Is the site significantly disturbed?	Projection: UTM ION Datum: NAP83
	Coordinates: 40.163984 °N; -122.217568 °W
Potential anthropogenic influences on the channel syst	
Potential anthropogenic influences on the channel syst Shasta Dam vegulates 5 gates no longer used since Brief site description:	sacramento Fiver. FBDD
gates no longer used since	2012 to backwater ESS.
Brief site description:	inter a marte & Pius an
pounstream pend of C>>	, where we as sac. Aver
opstream of RBDD mitige	tion site.
Checklist of resources (if available):	
Aerial photography Stream gag	
Dates: See previous form Gage numb	ber: USGS 11377100 Sac River AB Bend Bridge ecord: hear ked Bluff, CA
Topographic maps USGS 7.5° Quad Period of r	ecord: very fear bluff, Cft
Geologic maps Red Bluff East CA History	y of recent effective discharges 10/04/1988 - present
	s of flood frequency analysis
	ecent shift-adjusted rating
	neights for 2-, 5-, 10-, and 25-year events and the
	ecent event exceeding a 5-year event
Global positioning system (GPS)	0/01/2007-present
Other studies LiDAR	0/01/2007-present
Other studies LiDAR	
Other studies LiDAR Hydrogeomorphic F	Floodplain Units
Other studies LiDAR Hydrogeomorphic F	Floodplain Units
Other studies LiDAR Hydrogeomorphic F	Floodplain Units
Other studies Li DAR Hydrogeomorphic F	Floodplain Units
Other studies Li DAR Hydrogeomorphic F	Floodplain Units
Other studies LiDAR Hydrogeomorphic F Active Floodplain	Floodplain Units
Other studies Li DAR Hydrogeomorphic F	Floodplain Units
Other studies LiDAR Hydrogeomorphic F Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood	Floodplain Units Low Terrace OHWM Paleo Channel Iplain units to assist in identifying the OHWM:
Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood 1. Walk the channel and floodplain within the study area	Floodplain Units Low Terrace OHWM Paleo Channel Iplain units to assist in identifying the OHWM:
Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood 1. Walk the channel and floodplain within the study area vegetation present at the site.	Floodplain Units Low Terrace OHWM Paleo Channel Iplain units to assist in identifying the OHWM: to get an impression of the geomorphology and
Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood 1. Walk the channel and floodplain within the study area vegetation present at the site. 2. Select a representative cross section across the channel.	Floodplain Units Constrained OHWM Paleo Channel Aplain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units.
Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood 1. Walk the channel and floodplain within the study area vegetation present at the site. 2. Select a representative cross section across the channel. 3. Determine a point on the cross section that is character	Floodplain Units Constrained OHWM Paleo Channel Aplain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units.
Other studies LiDAR Hydrogeomorphic F Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood 1. Walk the channel and floodplain within the study area vegetation present at the site. 2. Select a representative cross section across the channel. 3. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position.	Floodplain Units Low Terrace OHWM Paleo Channel Iplain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units. istic of one of the hydrogeomorphic floodplain units.
 Other studies LiDAR Hydrogeomorphic F Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position. b) Describe the sediment texture (using the Wentworth) 	Floodplain Units Low Terrace OHWM Paleo Channel Iplain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units. istic of one of the hydrogeomorphic floodplain units.
 Other studies LiDAR Hydrogeomorphic F Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position. Describe the sediment texture (using the Wentworth floodplain unit. 	Floodplain Units Low Terrace OHWM Paleo Channel Iplain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units. istic of one of the hydrogeomorphic floodplain units.
 Other studies LiDAR Hydrogeomorphic F Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position. Describe the sediment texture (using the Wentworth floodplain unit. Identify any indicators present at the location. 	Floodplain Units Low Terrace Control of the second plain units to assist in identifying the OHWM: The plain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units. The plain units of one of the hydrogeomorphic floodplain units. The class size) and the vegetation characteristics of the
 Other studies LiDAR Hydrogeomorphic F Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position. Describe the sediment texture (using the Wentworth floodplain unit. c) Identify any indicators present at the location. Repeat for other points in different hydrogeomorphic for the sediment is character in the sediment is character. 	Floodplain Units Low Terrace Low Terrace OHWM Paleo Channel DHWM Paleo Channel Iplain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units. istic of one of the hydrogeomorphic floodplain units. istic of one of the hydrogeomorphic floodplain units.
 Other studies LiDAR Hydrogeomorphic F Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position. Describe the sediment texture (using the Wentworth floodplain unit. Identify any indicators present at the location. Repeat for other points in different hydrogeomorphic ff Identify the OHWM and record the indicators. Record 	Floodplain Units
 Other studies LiDAR Hydrogeomorphic F Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position. Describe the sediment texture (using the Wentworth floodplain unit. Identify any indicators present at the location. Repeat for other points in different hydrogeomorphic ff Identify the OHWM and record the indicators. Record 	Floodplain Units Low Terrace Low Terrace OHWM Paleo Channel DHWM Paleo Channel Iplain units to assist in identifying the OHWM: to get an impression of the geomorphology and Draw the cross section and label the floodplain units. istic of one of the hydrogeomorphic floodplain units. istic of one of the hydrogeomorphic floodplain units. I class size) and the vegetation characteristics of the floodplain units across the cross section.
 Other studies Lipte Hydrogeomorphic F Active Floodplain Active Floodplain Low-Flow Channels Procedure for identifying and characterizing the flood Walk the channel and floodplain within the study area vegetation present at the site. Select a representative cross section across the channel. Determine a point on the cross section that is character a) Record the floodplain unit and GPS position. Describe the sediment texture (using the Wentworth floodplain unit. Identify any indicators present at the location. Repeat for other points in different hydrogeomorphic f Identify the OHWM and record the indicators. Record Mapping on aerial photograph Digitized on computer 	Floodplain Units

Project ID: Cross section ID: Transect 16-16 Date: 5/2/18 Time: 3:37 PM
<u>Cross section drawing</u> : facing up structure Sac nur
OHWM Sand Willow GPS point: <u>(1111 (0251 N) 5666627 E</u>) 5
Indicators: Image: In average sediment texture Image: Break in bank slope Image: In vegetation species Image: Other: Image:
Comments: Offwom determined by: Change from cobbles to Sand/silt Change in Veg mustard > willows > Cottonwoods & oregon as hot blackberry debris in willows.
Floodplain unit: Dow-Flow Channel Active Floodplain Dow Terrace GPS point: <u>See map for transect</u>
Characteristics of the floodplain unit: Average sediment texture: 5 and cobble Total veg cover: 30 % Tree: 7 % Herb: 7 % Total veg cover: 30 % Tree: 7 % Herb: 7 % Community successional stage: Mid (herbaceous, shrubs, saplings) NA Mid (herbaceous, shrubs, saplings) Early (herbaceous & seedlings) Late (herbaceous, shrubs, mature trees)
Indicators: Soil development Mudcracks Soil development Ripples Surface relief Drift and/or debris Other: Presence of bed and bank Other: Benches Other:
Comments:
Across loner band of ESS and Sac. River,

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WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: East Sand Slough City/County: Red	
Applicants: Burcan of Redamation	State: CA Sampling Point: DP 7 (SSW-33)
Investigator(s): Woodward, Le Feure, Davis Section, Township, Ran	
Landform (hillslope, terrace, etc.): foot of embankment Local relief (concave, co	
Subregion (LRR): Lat: 40.166508 ° N	
Soil Map Unit Name: Water / Rr - Rivernash	
Are climatic / hydrologic conditions on the site typical for this time of year? Yes No	
	Normal Circumstances" present? Yes Vo
	eded, explain any answers in Remarks.)
SUMMARY OF FINDINGS – Attach site map showing sampling point lo	
Hydrophytic Vegetation Present? Yes No Is the Sampled Hydric Soil Present? Yes No ★ Is the Sampled	Area Asee Remarks for Problematic Soils Test results.
Hydric Soil Present? Yes No 🔭 within a Wetland	d? 🛠 Yes No
Wetland Hydrology Present? Yes Ves No	
Remarks: Scrub-shub wetland below OHWM. Located wi	thin sachamento River floodplain,
Lifely a rounth developed wetland site stand dreating long	ig water atter high flows recede 3 rain wents.
Bluff Diversion Dam decommissioning. Drought through 2016	, then high flows winter 2016/17, the events
Remarks: Scrub-Shub wetland below OHWM. Located with in a slight depression at toe of bank slope, likely poolir Likely a rewritig developed wetland. Site stopped receiving long Bluff Diversion Dam decommissioning. Drought through 2016 VEGETATION - Use scientific names of plants. and haven't been Absolute Dominant Indicator	osited new soils (3 layers in soils section),
	Dominance Test worksheet:
Tree Stratum (Plot size:) % Cover Species? Status	Number of Dominant Species
1	That Are OBL, FACW, or FAC: (A)
2	Total Number of Dominant
4	Species Across All Strata: (B)
= Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC: 1607. (A/B)
Sapling/Shrub Stratum (Plot size: $\gamma = 15$)	
1. Salix exigua 25 FACW	Prevalence Index worksheet: Total % Cover of:Multiply by:
3	OBL species x 1 =
4	FACW species x 2 =
5.	FAC species x 3 =
·5=12.572=5% 2 25% = Total Cover	FACU species x 4 =
Herb Stratum (Plot size:)	UPL species x 5 =
1. Equisation hypernale 30 V FACW 2. Lolium multiflorum 25 V FAC	Column Totals: (A) (B)
3. Brassica nigra 5 UPL	Prevalence Index = B/A =
4. Hordeum depressum 5 FACU	Hydrophytic Vegetation Indicators:
5	✓ Dominance Test is >50%
6	Prevalence Index is ≤3.0 ¹
7	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
8. $.5 = 32.57. \cdot 2 = 137.$ $.657. = Total Cover$	Problematic Hydrophytic Vegetation ¹ (Explain)
$\cdot 5 = 32.57. \cdot 2 = 137.$ Woody Vine Stratum (Plot size:)	
1	¹ Indicators of hydric soil and wetland hydrology must
2.	be present, unless disturbed or problematic.
= Total Cover	Hydrophytic
% Bare Ground in Herb Stratum 25% % Cover of Biotic Crust	Vegetation Present? Yes No
Remarks:	
As more up bank to the OHWM, the field mustard.	une is more sodao d
Provid management	stores and stores of a
The Anostara.	

C	2	ı	
Э	U	I	_

Sampling Point: DP7 (SSW-33)

ofile Description: (Describe to the depth needed to document the indicator or confirment the indicator or confirment the indicator or confirment to the second seco	in the aborned of maleaterely
	and the second s
ches) Color (moist) % Color (moist) % Type ¹ Loc ²	Texture Remarks
-3.5 10YR 3/2 100	loam
5-7.5 10 YR 3/2 100	sand more change in texter
5-15.5 2.5 Y 4/3 90 10 YR 5/8 10	sitt learn
2-0.3 2.3 1.13 10 10 115 10 10	
	a second and a second s
/pe: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand G	
dric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
Histosol (A1) Sandy Redox (S5)	1 cm Muck (A9) (LRR C)
Histic Epipedon (A2) Stripped Matrix (S6)	2 cm Muck (A10) (LRR B)
Black Histic (A3) Loamy Mucky Mineral (F1)	Reduced Vertic (F18)
_ Hydrogen Sulfide (A4) Loamy Gleyed Matrix (F2)	Red Parent Material (TF2)
_ Stratified Layers (A5) (LRR C) Depleted Matrix (F3)	Other (Explain in Remarks)
1 cm Muck (A9) (LRR D) Redox Dark Surface (F6)	The second s
Depleted Below Dark Surface (A11) Depleted Dark Surface (F7)	Constitutions The St Unicopes and
Thick Dark Surface (A12) Redox Depressions (F8)	³ Indicators of hydrophytic vegetation and
Sandy Mucky Mineral (S1) Vernal Pools (F9)	wetland hydrology must be present,
Sandy Gleyed Matrix (S4)	unless disturbed or problematic.
estrictive Layer (if present):	
Туре:	
Depth (inches):	Hydric Soil Present? Yes No
emarks:	
in profile) which haven't been preser	it long enough to show high
rifely new soils deposited in high 2016 (ayers in protile), which haven't been presen ndicators since new flow regime, and com "DROLOGY Columbia fine sandy loam maponit. Di	ing out of drought. Also at ed id Problematic Soils Test in Su
ayers in profile), which haven't been presen ndicators since new flow regime, and com DROLOGY Columbia fine sandy loan maponit. D: retland Hydrology Indicators:	ing out of drought. Also at ed id Problematic Soils Test in Su
DROLOGY Columbia fine sandy loan maponit. Di	ing out of drought. Also at ed id Problematic Soils Test in Su Secondary Indicators (2 or more required)
rDROLOGY Columbia fine sandy ban map onit. Di retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	id Problematic Soils Test in Su
DROLOGY Columbia fine sandy ban maponit. Di retrand Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply) _ Surface Water (A1) Salt Crust (B11)	<u>Secondary Indicators (2 or more required)</u> Water Marks (B1) (Riverine)
POROLOGY Columbia fine sandy loan maponit. Difference Indicators (minimum of one required; check all that apply)	<u>Secondary Indicators (2 or more required)</u> Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine)
rDROLOGY Columbite fine sandy loan map onit. Difference retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine)
POROLOGY Columbite fine sandy learn map onit. Difference retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10)
rDROLOGY Columbite fine sandy loan map onit. Difference retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2)
POROLOGY Columbite fine sandy loan map onit. Difference International Structure Internati	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8)
rDROLOGY Columbite fine sandy loan map onit. Difference retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8)
POROLOGY Columbite fine sandy loan map onit. Difference International Structure Internati	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8)
POROLOGY Columbite fine sandy learn map enit. Difference International problem in the image of the image	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C6) Saturation Visible on Aerial Imagery (C9)
DROLOGY Columbite fine sandy learn map enit. Difference International productions: International productions: International production in the productin the production in the productin the production in th	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
DROLOGY Columbite fine sandy learn map enit. Difference International productions: International productions International productions International production in Tilled Soils (International production production in Remarks) International productions International production in Remarks)	Secondary Indicators (2 or more required)
PROLOGY Columbite fine sandy learn map enit. Difference retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3)
TOROLOGY Columbite fine sandy learn map enit. Difference retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required) Water Marks (B1) (Riverine) Sediment Deposits (B2) (Riverine) Drift Deposits (B3) (Riverine) Drainage Patterns (B10) Roots (C3) Dry-Season Water Table (C2) Crayfish Burrows (C8) (C6) Saturation Visible on Aerial Imagery (C9) Shallow Aquitard (D3) FAC-Neutral Test (D5)
TOROLOGY Columbite fine sandy learn map enit. Difference retiand Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
TOROLOGY Columbite fine sandy learn map enit. Difference retland Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
TOROLOGY Columbite fine sandy learn map enit. Difference retiand Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
DROLOGY Columbite fine sandy learn map enit. Difference retiand Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	<u>Secondary Indicators (2 or more required)</u> <u>Water Marks (B1) (Riverine)</u> <u>Sediment Deposits (B2) (Riverine)</u> <u>Drift Deposits (B3) (Riverine) (Riverine)</u> <u>Drift Deposits (B3) (Riverine) </u>
DROLOGY Columbite fine sandy learn map enit. Difference retiand Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	<u>Secondary Indicators (2 or more required)</u> <u>Water Marks (B1) (Riverine)</u> <u>Sediment Deposits (B2) (Riverine)</u> <u>Drift Deposits (B3) (Riverine) (Riverine)</u> <u>Drift Deposits (B3) (Riverine) </u>
DROLOGY Columbite fine sandy loan map onit. Difference retand Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
DROLOGY Columbite fine sandy learn map enit. Difference retiand Hydrology Indicators: rimary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)

		RM – Arid West Region
pject/site: East Sand Slough Pesti	City/County:	cd_BluffSampling Date: 5/3/18
plicanti Burcan of Fectamatic	2la	State: Sampling Point: DP8(up1)
restigator(s): Woodward, LEFeure, P	AVIS Section, Townshi	p, Range: <u>S28, T27N, R3W</u>
		ave, convex, none): Slope (%):/
		Long: -122.212070 ° W Datum: NAD83
il Map Unit Name: Er - Rivernast		NWI classification: Noko
	/	
e climatic / hydrologic conditions on the site typical for th		
e Vegetation, Soil, or Hydrology		Are "Normal Circumstances" present? Yes No
e Vegetation, Soil, or Hydrology	naturally problematic?	(If needed, explain any answers in Remarks.)
JMMARY OF FINDINGS – Attach site map	showing sampling po	int locations, transects, important features, etc.
lydrophytic Vegetation Present? Yes I		npled Area
lydric Soil Present? Yes I	No within a W	Vetland? Yes No
Vetland Hydrology Present? Yes I	No	
Remarks:	act lacks like 1	sed to be an old access road.
very sign by control in bi	the in House make	and a mas of the Del Di Ma
here are a lot of game tra	a Socomunito P:	and areas of the Red Bluff Regreation ver. These areas either see very tempor
EGETATION – Use scientific names of plan	nts. Ponding or di	rainage as low points on a terrace post within a couple days. Don't feed or cont
	Absolute Dominant Indic	within a couple days. Don't freed or contator Dominance Test worksheet:
	<u>% Cover</u> Species? Stat	
		That Are OBL, FACW, or FAC: (A) wate
		Total Number of Dominant
·	·	Species Across All Strata: (B)
		Bereast of Deminant Species
	= Total Cover	Percent of Dominant Species That Are OBL, FACW, or FAC:Ô -/ (A/B)
apling/Shrub Stratum (Plot size:)		Prevalence Index worksheet:
·		Total % Cover of: Multiply by:
		OBL species x 1 =
		FACW species x 2 =
		FAC species x 3 =
, 2	= Total Cover	FACU species x 4 =
lerb Stratum (Plot size:)		UPL species $3 \times 5 = 15$
Lupinus nanus		Column Totals: (A) (5 (B)
. Acmispon wrangelianus Eriogonum luteolum	<u>5 V U</u>	el -
		PL Prevalence Index = B/A =
		Hydrophytic Vegetation Indicators:
		Dominance Test is >50%
•		Prevalence Index is <3.0 ¹
·		Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
5= 12.5% .2=5%	25% = Total Cover	Problematic Hydrophytic Vegetation ¹ (Explain)
Voody Vine Stratum (Plot size:)		
·		Indicators of hydric soil and wetland hydrology must
2.		be present, unless disturbed or problematic.
	= Total Cover	Hydrophytic /
% Bare Ground in Herb Stratum % Cov	ver of Biotic Crust	Vegetation Present? Yes No
Demedies		
	Antations	or Problematic o hydric soil either.
No morphologicai a	approcisions	or Problemanc

SOIL

Sampling Point: DP8 (UPL)

Profile Description: (Describe to the dep	oth needed to docur	ment the in	dicator o	r confirm	the absence	of indicate	ors.)	3
Depth Matrix		x Features	-	1 2	Tauhum		Remarks	
(inches) Color (moist) %	Color (moist)		Type ¹	Loc ²	Texture	1		
0-4 104R 4/3 100	33.4.55			- usly	sandy	loam	the state of the s	
4-14 104R 4/4 100						COLVE.		
CLARZ -WEUTASIE	-12.2	ALSE.	5.11.2	4			.)	
secol?"					1213 Low	W-9 -	E.	
	the last	N						
						-		
						-		
		'						
¹ Type: C=Concentration, D=Depletion, RM	-Reduced Matrix C	S=Covered	or Coate	d Sand Gr	ains ² l o	cation: Pl	=Pore Lining, Ma	Matrix
Hydric Soil Indicators: (Applicable to al	LRRs, unless othe	rwise note	d.)	d Galid Gi			ematic Hydric S	
Histosol (A1)	Sandy Red		1	~	1 cm	Muck (A9)	LRR C)	
Histic Epipedon (A2)	Stripped M	and the second second				Muck (A10)	the second s	
Black Histic (A3)		cky Mineral	(F1)		Redu	ced Vertic (F18)	
Hydrogen Sulfide (A4)		yed Matrix			Red F	Parent Mate	rial (TF2)	
Stratified Layers (A5) (LRR C)	Depleted N				Other	(Explain in	Remarks)	
1 cm Muck (A9) (LRR D)		k Surface (I	F6)		ANY -UM	48 19	11 0 3	
Depleted Below Dark Surface (A11)	Depleted D	Dark Surface	e (F7)	8-10			12 41-11	121-1-11-11-1
Thick Dark Surface (A12)		pressions (F			³ Indicators	s of hydrop	nytic vegetation	and
Sandy Mucky Mineral (S1)	Vernal Poo		121 101		wetland	hydrology	must be presen	t,
Sandy Gleyed Matrix (S4)					unless	disturbed o	r problematic.	
Restrictive Layer (if present):	5							
Туре:								1
Depth (inches):					Hydric So	I Present?	Yes	No V
Remarks:		-				- 1		
No depleted matri	x and n	n ter	lox -	Fent	2 9-1			
the population is all			NOR	1 aun	acs.			
No depleted matri Dug to 14 inches -	hard grou	nd.						
HYDROLOGY	0							
Wetland Hydrology Indicators:								
	ad aback all that an				Soc	andony Indi	cators (2 or more	a required)
Primary Indicators (minimum of one require						Sector Sector		and the second se
Surface Water (A1)	Salt Crus						ks (B1) (Riverin	
High Water Table (A2)		ust (B12)					Deposits (B2) (R	
Saturation (A3)	Aquatic I	nvertebrate	s (B13)	121	_	Drift Depos	sits (B3) (Riverin	ie)
Water Marks (B1) (Nonriverine)	Hydroge	n Sulfide Od	dor (C1)		3.00	Drainage F	atterns (B10)	BI Day T
Sediment Deposits (B2) (Nonriverine	e) Oxidized	Rhizosphe	res along	Living Ro	oots (C3)	Dry-Seaso	n Water Table (C2)
Drift Deposits (B3) (Nonriverine)	Presenc	e of Reduce	d Iron (C	4)		Crayfish B	urrows (C8)	
Surface Soil Cracks (B6)		ron Reducti			(6)	Saturation	Visible on Aeria	Imagery (C9)
Inundation Visible on Aerial Imagery		ck Surface (uitard (D3)	,
Water-Stained Leaves (B9)		xplain in Re					al Test (D5)	
Field Observations:								
	_ No 📈 Depth (inches):		-				
	No 📈 Depth (- t				GALMEN
	No / Depth (We	tland Hydrold	av Proson	+2 Yos 1	No
(includes capillary fringe)	_ No Depuil	incries).		_ ~	dand Hydroid	gy Flesen	tr res	
Describe Recorded Data (stream gauge,	monitoring well, aeria	al photos, pr	revious in	spections)), if available:			
Remarks:			-			- 9		
Soil cracks li in lower surf	Kely tro	mt	emp	odra	any ro	ainn	iater	pooline
		2 0	0	ash	11		A	
in lower surt	face re	liet	tio	mo	10 031	u as	access	had.
						1 A A A A A A A A A A A A A A A A A A A		
A REPORT OF THE REPORT		= /	,	15Th	rianoi	1 Gall		

Attachment 8

Site Visit Photographs

Legend

Photo GPS location
 Study Area

The pressure of

Site Visit Photographs

East Sand Slough

 Data source: GPS location derived from phone/camera produced images. Note: Location accuracy is unknown.

 0
 0.125
 0.25
 0.5

 Miles

86

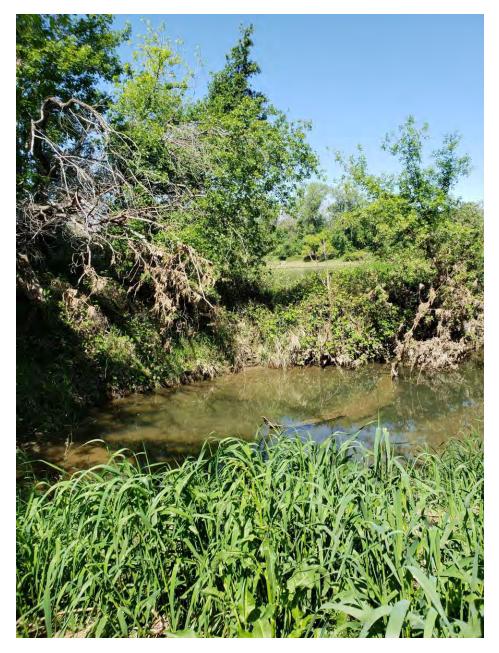
93 92

N

167



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FileName	20180430_110009.jpg



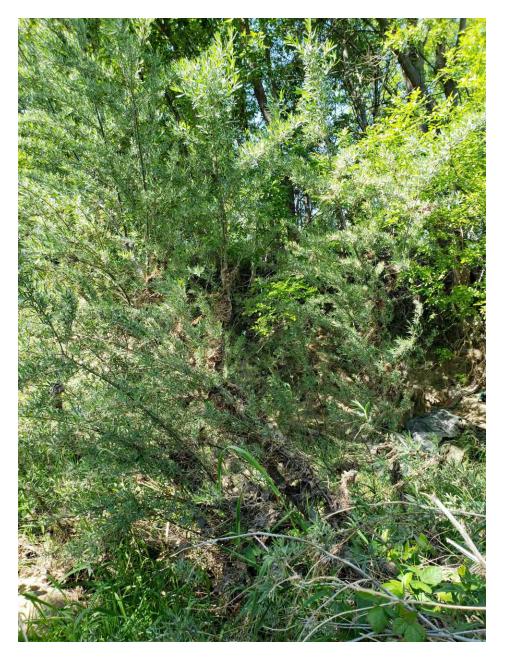
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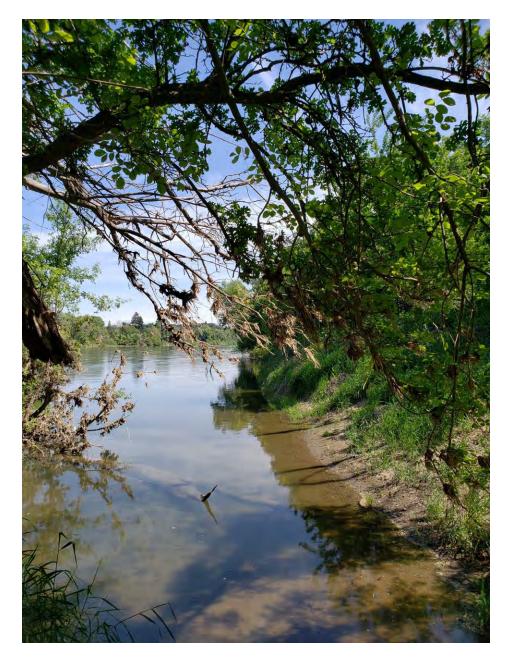
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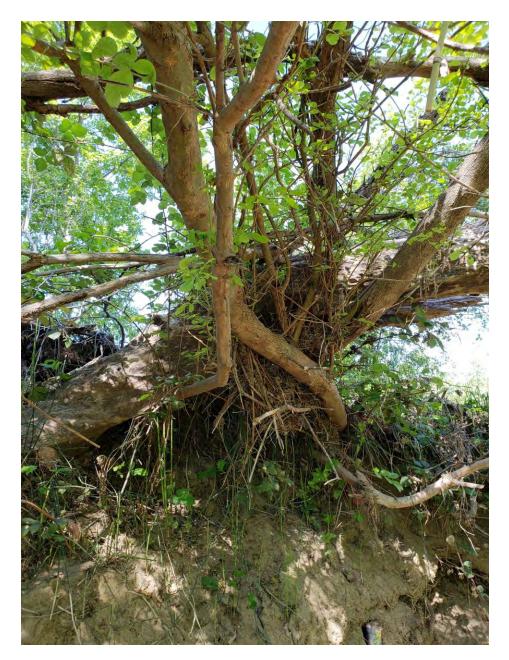
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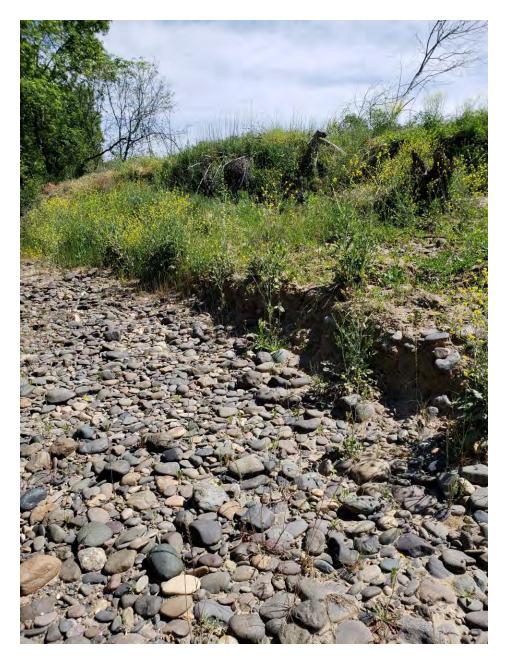
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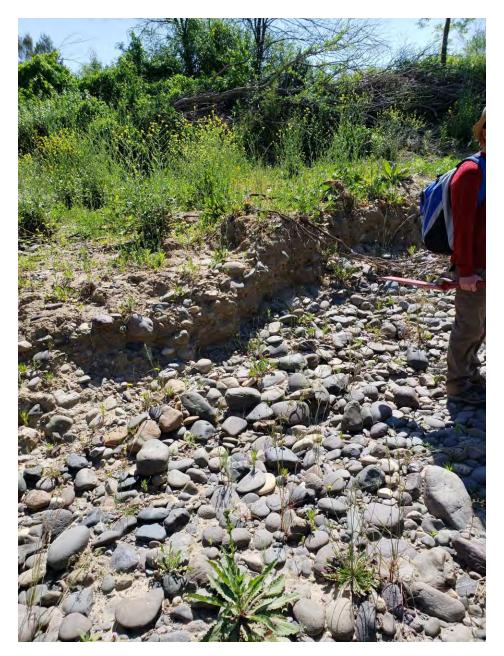
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FileName	20180430_110243.jpg



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Latitude/Longitude	40.187817 / -122.227452972
FileName	20180430_110245.jpg



PhotoID	9
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FileName	20180430_110429.jpg



PhotoID	10
Date Taken	2018:04:30 11:04:31
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FileName	20180430_110431.jpg



PhotoID	11
Date Taken	2018:04:30 11:04:54
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FileName	20180430_110454.jpg



PhotoID	12
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FileName	20180430_112351.jpg



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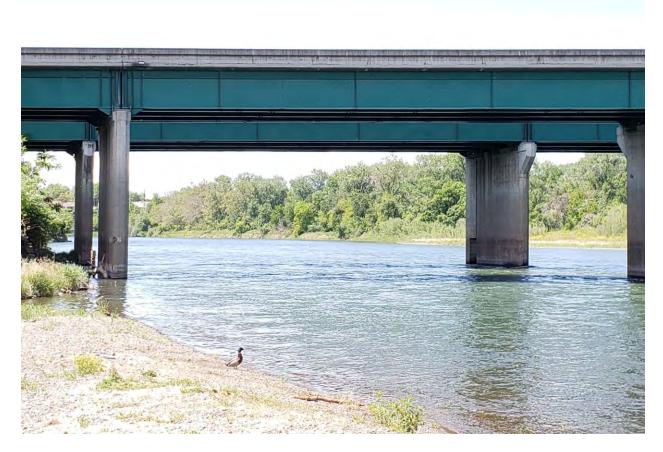
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PhotoID	16
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PhotoID	17
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FileName	20180430_120823.jpg



PhotoID	18
Date Taken	2018:04:30 12:08:37
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FileName	20180430_131528.jpg



PhotoID	22
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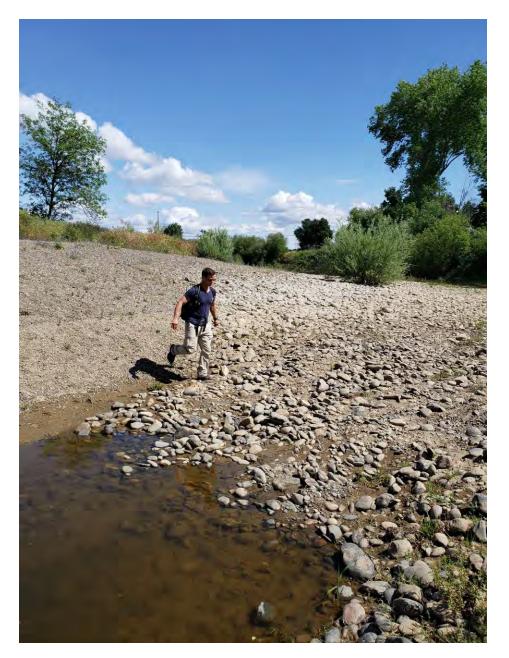
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FileName	20180430_144335.jpg



PhotoID	26
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FileName	20180430_144340.jpg



PhotoID	27
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FileName	20180430_151921.jpg



PhotoID	28
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FileName	20180430_151923.jpg



PhotoID	29
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Latitude/Longitude	40.1840589722 / -122.226437
FileName	20180430_151925.jpg



PhotoID	30
Date Taken	2018:04:30 15:21:30
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FileName	20180430_152130.jpg



PhotoID	31
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FileName	20180430_152133.jpg



PhotoID	32
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FileName	20180430_152149.jpg



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FileName	20180430_154352.jpg



PhotoID	34
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FileName	20180430_160349.jpg



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Latitude/Longitude	40.18527 / -122.220493
FileName	20180501_082735.jpg



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Latitude/Longitude	40.18527 / -122.220493
FileName	20180501_082737.jpg



PhotoID	47
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Latitude/Longitude	40.18527 / -122.220493
FileName	20180501_082740.jpg



PhotoID	48
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Latitude/Longitude	40.1840219722 / -122.222099972
FileName	20180501_085846.jpg



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Date Taken	2018:05:01 08:58:48
Latitude/Longitude	40.1840219722 / -122.222099972
FileName	20180501_085848.jpg



PhotoID	50
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Latitude/Longitude	40.1840219722 / -122.222099972
FileName	20180501_085850.jpg



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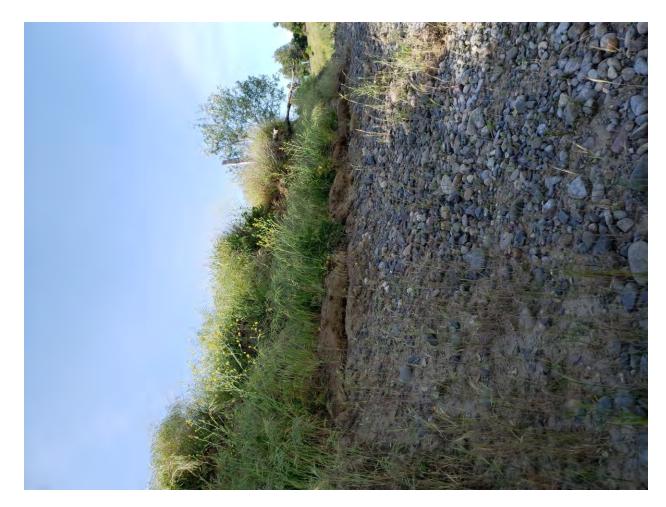
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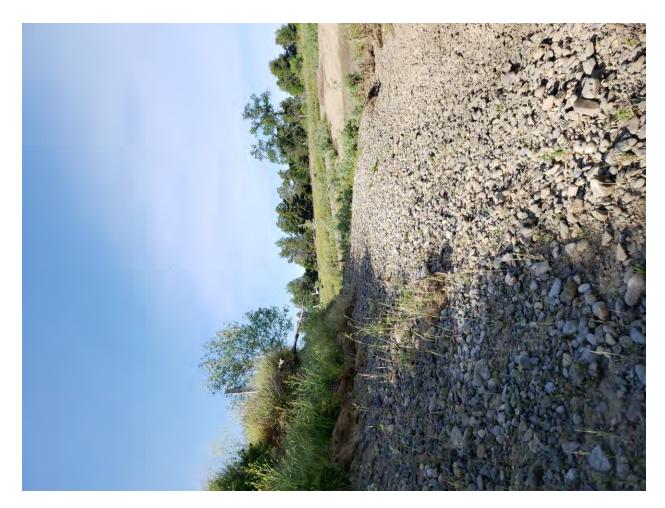
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PhotoID	55
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FileName	20180501_092147.jpg



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PhotoID	58
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FileName	20180501_112009.jpg



PhotoID	59
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Latitude/Longitude	40.182422 / -122.224222972
FileName	20180501_112011.jpg



PhotoID	60
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FileName	20180501_112014.jpg



PhotoID	61
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FileName	20180501_115239.jpg



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FileName	20180501_115243.jpg



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FileName	20180501_115337.jpg



PhotoID	64
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Latitude/Longitude	40.181702 / -122.2219
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PhotoID	65
Date Taken	2018:05:01 11:55:19
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FileName	20180501_115519.jpg



PhotoID	66
Date Taken	2018:05:01 12:00:06
Latitude/Longitude	40.1817599722 / -122.221501
FileName	20180501_120005.jpg



PhotoID	67
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FileName	20180501_120231.jpg



PhotoID	68
Date Taken	2018:05:01 12:02:34
Latitude/Longitude	40.1819429722 / -122.221509972
FileName	20180501_120233.jpg



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Date Taken	2018:05:01 12:02:40
Latitude/Longitude	40.1819429722 / -122.221509972
FileName	20180501_120239.jpg



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Latitude/Longitude	40.1819429722 / -122.221509972
FileName	20180501_120242.jpg



PhotoID	71
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FileName	20180501_133554.jpg



PhotoID	72
Date Taken	2018:05:01 13:35:56
Latitude/Longitude	40.180649 / -122.222544972
FileName	20180501_133556.jpg



PhotoID	73
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Latitude/Longitude	40.180649 / -122.222544972
FileName	20180501_133559.jpg



PhotoID	74
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Latitude/Longitude	40.180649 / -122.222544972
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PhotoID	75
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FileName	20180501_134724.jpg



PhotoID	76
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FileName	20180501_134726.jpg



PhotoID	77
Date Taken	2018:05:01 13:56:24
Latitude/Longitude	40.18122 / -122.220832972
FileName	20180501_135624.jpg



PhotoID	78
Date Taken	2018:05:01 13:56:31
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FileName	20180501_135631.jpg



PhotoID	79
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FileName	20180501_151037.jpg



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FileName	20180501_151045.jpg



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FileName	20180501_151049.jpg



PhotoID	87
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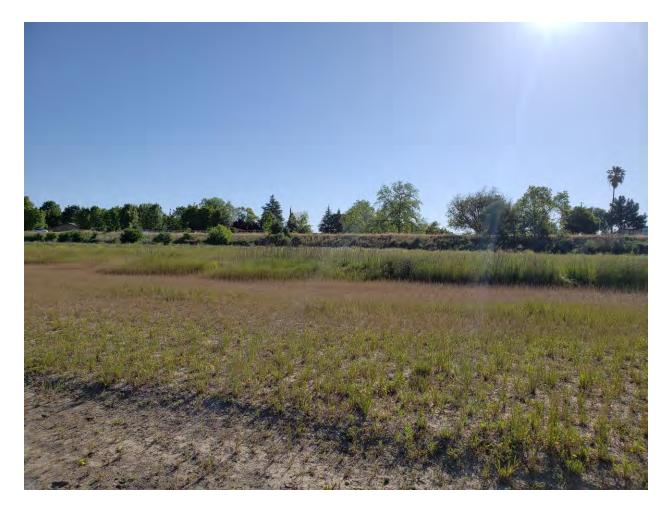
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PhotoID	94
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PhotoID	95
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PhotoID	96
Date Taken	2018:05:02 11:06:53
Latitude/Longitude	40.170568 / -122.221277
FileName	20180502_110652.jpg



PhotoID	97
Date Taken	2018:05:02 11:06:55
Latitude/Longitude	40.170568 / -122.221277
FileName	20180502_110654.jpg



PhotoID	98
Date Taken	2018:05:02 11:06:57
Latitude/Longitude	40.170568 / -122.221277
FileName	20180502_110656.jpg



PhotoID	99
Date Taken	2018:05:02 11:06:59
Latitude/Longitude	40.170568 / -122.221277
FileName	20180502_110658.jpg



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FileName	20180502_112858.jpg



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FileName	20180502_114900.jpg



PhotoID	102
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FileName	20180502_114902.jpg



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PhotoID	106
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PhotoID	108
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FileName	20180502_133137.jpg



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PhotoID	113
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PhotoID	114
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FileName	20180502_151235.jpg



PhotoID	115
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FileName	20180502_151354.jpg



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PhotoID	117
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FileName	20180502_151359.jpg



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 118

 Date Taken
 2018:05:02 15:14:01

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 FileName
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FileName	20180502_152211.jpg



PhotoID	121
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FileName	20180502_152216.jpg



PhotoID	122
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FileName	20180502_153456.jpg



PhotoID	123
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FileName	20180502_153458.jpg



PhotoID	124
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FileName	20180502_153501.jpg



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FileName	20180503_083541.jpg



PhotoID	126
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FileName	20180503_083545.jpg



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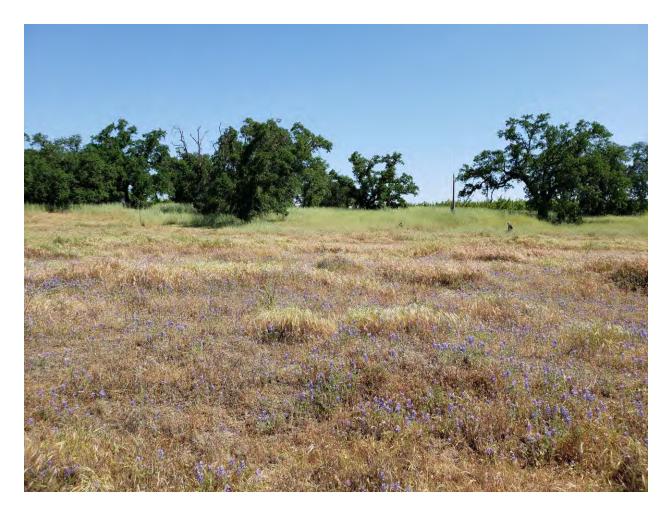
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FileName	20180503_110109.jpg



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Latitude/Longitude	40.162472 / -122.213166
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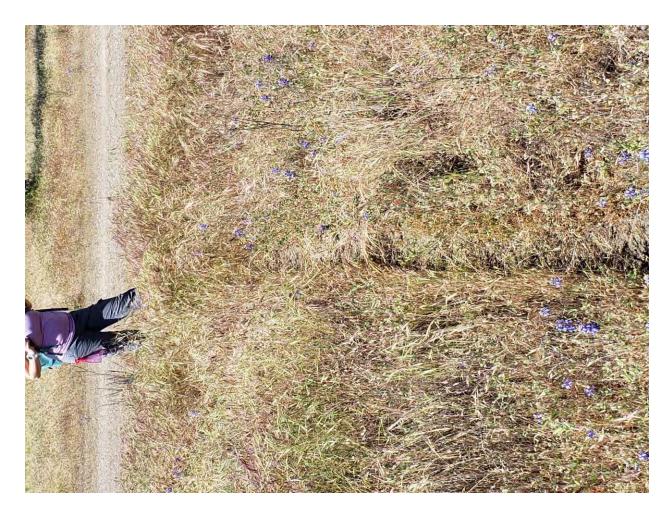
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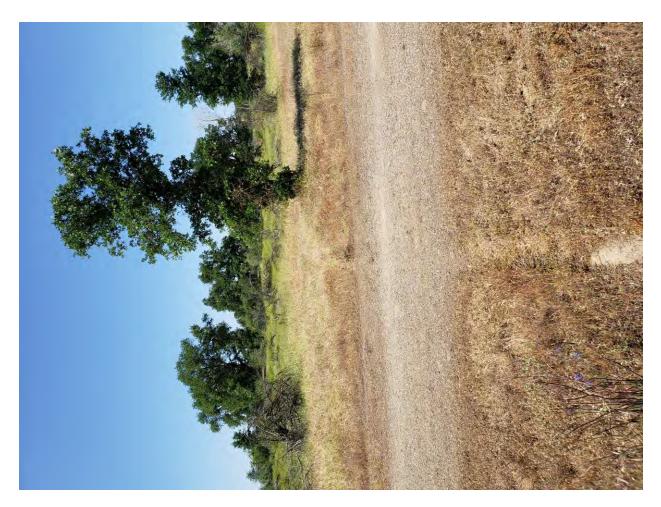
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FileName	20180503_111242.jpg



PhotoID	137
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FileName	20180503_111246.jpg



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2018:05:03 11:37:38 40.1623719722 / -122.212532972 20180503_113738.jpg



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FileName	20180503_113803.jpg



PhotoID	142
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FileName	20180503_113829.jpg



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 144

 Date Taken
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FileName	20180503_115958.jpg



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PhotoID	150
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FileName	20180503_131851.jpg



PhotoID	153
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FileName	20180503_131853.jpg



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FileName	20180503_133738.jpg



PhotoID	155
Date Taken	2018:05:03 13:37:41
Latitude/Longitude	40.157724 / -122.199768
FileName	20180503_133741.jpg



PhotoID	156
Date Taken	2018:05:03 13:37:46
Latitude/Longitude	40.1572329722 / -122.20207
FileName	20180503_133746.jpg



PhotoID	157
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Latitude/Longitude	40.157724 / -122.199768
FileName	20180503_134402.jpg



PhotoID	158
Date Taken	2018:05:03 13:44:04
Latitude/Longitude	40.157724 / -122.199768
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FileName	20180503_140806.jpg



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Latitude/Longitude	40.161875 / -122.201802972
FileName	20180503_140807.jpg



PhotoID	166
Date Taken	2018:05:03 14:08:09
Latitude/Longitude	40.1604159722 / -122.201696972
FileName	20180503_140809.jpg



PhotoID	167
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FileName	20180503_141137.jpg



PhotoID	168
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FileName	20180503_141144.jpg



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PhotoID	170
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PhotoID	171
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FileName	20180503_142100.jpg



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FileName	20180503_143940.jpg



PhotoID	173
Date Taken	2018:05:03 14:39:56
Latitude/Longitude	40.16131 / -122.209087972
FileName	20180503_143956.jpg



PhotoID	174
Date Taken	2018:05:03 14:40:03
Latitude/Longitude	40.16131 / -122.209087972
FileName	20180503_144003.jpg



PhotoID	175
Date Taken	2018:05:03 14:47:14
Latitude/Longitude	40.16131 / -122.209087972
FileName	20180503_144714.jpg

Attachment 9

Aerial Photography



