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OFFICE OF ENVIRONMENT, HEALTH AND SAFETY  
UNIVERSITY HALL, 3<sup>rd</sup> FLOOR

BERKELEY, CALIFORNIA 94720-1150

March 6, 2012

Ryan Olah  
U.S. Fish and Wildlife Service  
2800 Cottage Way, Room W-2605  
Sacramento, CA 95825

Christina Cavett-Cox  
U.S. Army Corps of Engineers  
1455 Market Street  
San Francisco, CA 94103

Subject: University of California, Berkeley, Richmond Field Station  
Wetland Determination, Western Stege Marsh

Dear Mr. Olah and Ms. Cavett-Cox:

Tetra Tech EM Inc. (Tetra Tech) was contracted by the University of California, Berkeley, to conduct a wetland determination at the Western Stege Marsh located at the Richmond Field Station (RFS), in Richmond, California. This wetland delineation report was completed to fulfill a request by the U.S. Army Corps of Engineers (USACE) following the submission of the Year 5 Monitoring Report for the Western Stege Marsh Restoration Project, dated September 30, 2010. The Year 5 Report included a signed copy of the Certification of Compliance for Nationwide Permit (NWP) 38 #28135S, which required five years of restoration monitoring of remediated marsh areas. The Year 5 Report concluded that the Western Stege Marsh is progressing toward the functions of a tidal marsh typical of San Francisco Bay and no further remediation or monitoring activities were recommended.

Following a site visit on October 13, 2011, in an email dated October 31, 2011 the USACE requested a wetland delineation report which was to include: a map with clear study boundaries; wetland and/or other water acreage amounts clearly identified and calculated; the mean high tide line (MHTL) and tide line (HTL) as they relate to USACE regulations under Section 10 of the Rivers and Harbors Act (RHA) and Section 404 of the Clean Water Act (CWA); and a brief summary of the environmental settings of the site, methods used, and conclusions.

Please find enclosed the February 29, 2012 Wetland Determination report (two copies on paper and disc). If you have any questions or need further information regarding this submittal, please contact me ([gjhaet@berkeley.edu](mailto:gjhaet@berkeley.edu) , 510-642-4848) or Karl Hans ([khans@berkeley.edu](mailto:khans@berkeley.edu), 510-643-9574).

Sincerely,

Greg Haet  
EH&S Associate Director

Enclosure

cc:

Lynn Nakashima, Department of Toxic Substance Control  
Bill Marsh, Edgcomb Law Group  
Anthony Garvin, UC Office of the General Counsel

# Wetland Determination, Western Stege Marsh

University of California, Berkeley

Richmond Field Station, Richmond, California

*Prepared for*

Office of Environment, Health and Safety

University of California, Berkeley

317 University Hall, No. 1150

Berkeley, California 94720

March 6, 2012

*Prepared by*



**TETRA TECH EM INC.**

1999 Harrison Street, Suite 500

Oakland, California 94612

A handwritten signature in black ink, appearing to read 'Jason Brodersen'.

Jason Brodersen, P.G., No 6262

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### **Figure**

- 1 WESTERN STEGE MARSH WETLAND DELINEATION MAP
- 2 WESTERN STEGE MARSH WETLAND DELINEATION MAP  
(BLACK AND WHITE)

### **Attachment**

- 1 USACE WETLAND DETERMINATION DATA SHEETS
- 2 PHOTOGRAPHIC LOG

## 1.0 INTRODUCTION

This wetland delineation report for the Western Stege Marsh at the University of California (UC), Berkeley, Richmond Field Station (RFS), has been prepared on behalf of The Regents of the University of California.

The purpose of this delineation is to fulfill a request by the U.S. Army Corps of Engineers (USACE) following the submission of the Year 5 Monitoring Report for the Western Stege Marsh Restoration Project, dated September 30, 2010 ([Tetra Tech EM Inc \[Tetra Tech\] 2010](#)). The report included a signed copy of the Certification of Compliance for Nationwide Permit (NWP) 38 #28135S. The Year 5 Report and Certificate of Compliance were submitted with the intention of closing the NWP issued for the Western Stege Marsh requiring five years of restoration monitoring of remediated marsh areas. The Year 5 Report stated, “Overall, based on data obtained in Years 1 through 5, the Western Stege Marsh Restoration Project (WSMRP) site is progressing toward providing the functions of a tidal marsh typical of San Francisco Bay. Based on this trajectory and evaluation against the project targets, no further remediation or monitoring activities are recommended in the WSMRP area” ([Tetra Tech 2010](#)).

Following a visit to the Western Stege Marsh on October 13, 2011, the USACE requested additional information to complete the NWP closure process. In an email dated October 31, 2011, Christina Cavett-Cox of the USACE requested a wetland delineation report which was to include: a map with clear study boundaries; wetland and/or other water acreage amounts clearly identified and calculated; the mean high tide line (MHTL) and tide line (HTL) as they relate to USACE regulations under Section 10 of the Rivers and Harbors Act (RHA) and Section 404 of the Clean Water Act (CWA); and a brief summary of the environmental settings of the site, methods used, and conclusions. The results of the wetland delineation for Western Stege Marsh are summarized in this technical memorandum. The delineation methodology is explained in [Section 2.0](#). A site description, including vegetation, hydrology, and soils, is presented in [Section 3.0](#). Conclusions are presented in [Section 4.0](#), and references are included in [Section 5.0](#).

Following the report are [Figure 1](#), illustrating the project area and the wetland delineation results, [Figure 2](#), which shows the same information as Figure 1 without the background of the aerial printed in black and white, [Attachment 1](#), the wetland determination data sheets, and [Attachment 2](#), a photographic log.

## 2.0 DELINEATION METHODOLOGY

Site-specific information was reviewed prior to conducting the on-site investigation of the wetlands at Western Stege Marsh. The following documents were reviewed to verify the wetland location and to assist in determining the field work approach:

- Aerial photographs
- Project Restoration Reports
- “National List of Plant Species that Occur in Wetlands: California (Region 10)” ([U.S. Department of the Interior, Fish and Wildlife Service \[FWS\] 1988](#))
- Western Stege Marsh Flora List Recorded June and October 2009 ([Tetra Tech 2010](#))
- Section 404 Clean Water Act Jurisdictional Delineation Letter ([Nichols and Carson 2002](#))

Wetland boundaries were delineated using the routine on-site inspection method outlined in the 1987 USACE Wetland Delineation Manual, updated in the Interim Draft 2008 Arid West Regional Supplement. In accordance with the 1987 manual and 2008 regional supplements, under normal circumstances, hydrophytic (wetland) vegetation, hydric soils, and wetland hydrology must all be present for an area to be considered a wetland. Soils at the Western Stege Marsh are primarily dredged Bay sediment placed on site as backfill between 2002 and 2004 following excavation activities; sufficient time has not passed to allow the soils in the less frequently inundated areas near the high tide line to become hydric.

Wetland boundaries were delineated on November 21, 2011 by visually observing soil, vegetation, and hydrology characteristics along a transect line perpendicular to site contours and potential representative wetlands and uplands. Soil was first characterized for hydric features in an area of the site with wetland vegetation and hydrology. Soils were then collected upslope until an upland soil was encountered. The boundary of the wetland was surveyed using a hand-held Global Positioning System (TopCon model GMS-2Pro). This information, along with a 2008 aerial and associated topographic map, was used to produce a map of the wetland boundaries, as shown on [Figure 1](#). This same information is also shown on [Figure 2](#), which was printed in black and white at the request of the USACE. The following subsections present the approach to the vegetation, soil, hydrologic, and topographic surveys for conducting this wetland determination. [Attachment 2](#) contains photographs of the wetland boundary.

### **3.0 SITE DESCRIPTION**

The RFS is bordered by Meade Street off Interstate 580 to the north, by South 46th Street to the east, by the East Bay Regional Park District Bay Trail (Bay Trail) to the south, and by Meeker Slough and Regatta Boulevard to the west. The RFS consists of (1) the Upland Area, containing areas developed for academic teaching and research and a remnant coastal terrace prairie; (2) a tidal salt marsh known as Western Stege Marsh; and (3) a Transition Area between the Upland Area and Western Stege Marsh. Western Stege Marsh extends across the southern portion of the RFS and the adjacent properties between the Transition Area and the Bay Trail (a former rail spur). Most of the inboard (north of the Bay Trail) portion of Western Stege Marsh is located within the RFS property boundary

The California Cap Company owned the property and used it for industrial manufacturing of explosives from the late 1800s until 1948. In 1950, UC purchased the property, primarily for research facilities for the College of Engineering; later, other campus departments used portions of the RFS. Historical industrial operations conducted at the RFS before UC ownership, and historical industrial operations conducted at adjacent properties, caused contamination of sediments in the Western Stege Marsh. As a result, UC Berkeley implemented and completed remediation activities at the Western Stege Marsh.

Remediation activities were performed in three phases beginning in 2002 in response to the Regional Water Quality Control Board (Water Board) Order (No. 01-102) issued to UC Berkeley and Zeneca in October 2001, rescinded in October 2005. The construction schedule was designed to avoid disturbing the site during the breeding season (February 1 to August 31) of the California clapper rail. Remediation activities consisted of excavating contaminated sediment and backfilling with dewatered clean sediment dredged from the Martinez marina. Remediation within Western Stege Marsh was completed in 2004. Section 5.16 of the current California Department of Toxic Substances Control (DTSC) Site Investigation and Remediation Order I/SE-RAO 06/07-004 for the RFS, issued September 15, 2006, required continued implementation of post-remediation monitoring and restoration for 5 years. The portions of the marsh subject to this monitoring program were the marsh and adjacent ecotone and upland restoration areas remediated in 2002 to 2004. Habitat restoration work began following the excavation and backfilling activities and continued through 2009, with a primary focus on invasive non-native plant control and revegetation with native plants.

### **3.1 VEGETATION**

The marsh habitat in the project area consists of tidal sloughs, low marsh, middle to high marsh within Western Stege Marsh, and an ecotone transition from marsh to upland coastal prairie and coastal scrub.

Low marsh is typically dominated by Pacific cordgrass (*Spartina foliosa*), which grows from above the mean tide line (0.43 feet National Geodetic Vertical Datum 1929 [NGVD]) to slightly above the mean high tide line (2.75 feet NGVD 29). Middle marsh is typically dominated by pickleweed (*Salicornia virginica*), which grows between the mean high tide line (2.75 feet NGVD 29) and the mean higher high water line (3.37 feet NGVD 29). High marsh is typically dominated by salt grass (*Distichlis spicata*), marsh gum plant (*Grindelia stricta angustifolia*), pickleweed, and jaumea (*Jaumea carnosa*) at an elevation ranging from 3.37 to 5.0 feet NGVD 29. The ecotone is a strip about 10 to 30 feet wide between the edge of the marsh and the upland habitat that provides cover habitat for the California clapper rail during high tides. It is vegetated with transitional plant species such as coyote bush (*Baccharis pilularis*), marsh gum plant and gum plant (*Grindelia hirsutula* var. *hirsutula*), salt grass, and lizard tail (*Oenothera curtiflora*). The surrounding uplands are mostly ruderal except for the island, which was restored in 2005 and 2006, and a 100-foot-wide section in the Transition Area that was planted with native vegetation in 2006 and 2007, and was expanded in 2008.

A walkthrough of the study area was performed to assess the dominant vegetation types. Dominant plant species observed at the site were identified and characterized as obligate (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), or upland species according to the “National List of Plant Species that Occur in Wetlands: California (Region 10)” (Reed 1988). Vegetation information was recorded on USACE wetland determination data sheets, which are included as Attachment 1.

Wetland vegetation consisted of mostly halophytic (salt-tolerant) plant species typically associated with tidal salt marsh. The following table lists wetland plant species observed at the site and the regional indicator status from the “National List of Plant Species that Occur in Wetlands: California (Region 10)” (Reed 1988).

Common Name	Scientific Name	Dominant Plant Species	Regional Indicator Status
Alkali heath	<i>Frankenia salina</i> (synonym is <i>Frankenia grandifolia</i> )	No	FACW
Common Pickleweed	<i>Salicornia virginica</i>	Yes	OBL
Dense Sedge	<i>Carex densa</i>	No	OBL
Fat Hen	<i>Atriplex triangularis</i> (synonym is <i>Atriplex patula</i> )	No	FACW
Jaumea	<i>Jaumea carnosa</i>	No	OBL
Marsh Gumplant	<i>Grindelia stricta</i> var. <i>angustifolia</i> (synonym is <i>Grindelia latifolia</i> )	Yes	FACW
Marsh Rosemary	<i>Limonium californicum</i>	No	OBL

Common Name	Scientific Name	Dominant Plant Species	Regional Indicator Status
Meadow Barley	<i>Hordeum brachyantherum</i>	No	FACW
Mugwort	<i>Artemisia douglasiana</i>	No	FACW
Pacific Cordgrass	<i>Spartina foliosa</i>	Yes	OBL
Salt Grass	<i>Distichlis spicata</i>	Yes	FACW
Seaside Arrowgrass	<i>Triglochin maritimum</i>	No	OBL
Small-Bract Sedge	<i>Carex subbracteata</i>	No	FACW

**Note:**

Not all of these species listed above were identified within the areas directly associated with the sampling plots. Species identified for wetland vegetation determination are listed on the data forms in Attachment 1. Dominant species are species that account for at least 20 percent of the total percent cover.

Vegetation within sampling plot RFS1A included marsh gum plant, salt grass, pickleweed, and jaumea, while vegetation within sampling plot RFS2A included salt grass and pickleweed only.

Wetland vegetation appeared generally healthy and vigorous throughout most of the area. Mudflats and tidal channels were present in the central portion of the study area.

Upland vegetation was mostly halophytic native and non-native planted vegetation. Dominant upland species include coyote bush, gum plant, California sagebrush (*Artemisia californica*), yellow bush lupine (*Lupinus arboreus*), lizard tail, and bristly ox-tongue (*Picris echioides*). Vegetation within the upland sampling plots, which were positioned just above the high tide line, included similar vegetation due to the restoration work by UC Berkeley. Sampling plot RFS1B included marsh gumplant, salt grass, pickleweed, and jaumea, while sampling plot RFS2B included marsh gumplant, salt grass, jaumea, and rip gut brome (*Bromus diandrus*).

Vegetation in the wetland portion of the non-contiguous portion of the project study area along Meeker Slough consists of Pacific cordgrass and prairie bulrush (*Scirpus maritimus*).

### 3.2 HYDROLOGY

Hydrology was assessed by a visual observation of primary wetland hydrology indicators. Primary hydrologic indicators observed during the field investigation included drift deposits (plastic, trash, and wood), crustacean deposits (crabs), oxidized rhizospheres along living roots, and observations of tidal



inundation at high tide. The hydrology indicators were recorded on the USACE data sheets ([Attachment 1](#)). Photographs of the hydrology indicators are presented in [Attachment 2](#).

Western Stege Marsh is hydraulically connected to San Francisco Bay via Meeker Creek. The marsh is regularly inundated by tidal action. The outer jurisdictional boundary coincides with the HTL, which is at 4.5 feet NGVD 29, approximately 1 foot above the toe of the embankments on the south and east sides of the marsh. The marsh on the northern side of the tidal channels within the study area is sloped at an angle of approximately 1 percent, creating a gradual transition between low marsh and high marsh. The jurisdictional determination of the marsh coinciding with the HTL is consistent with the jurisdiction delineation conducted in January 2002, before the marsh remediation occurred ([Nichols and Carson 2002](#)). The jurisdictional boundary is shown on [Figure 1](#). This line was created by walking the marsh-edge in the field with a hand-held Global Positioning System (TopCon model GMS-2Pro). This information, along with a 2008 professional topographic survey, was used to approximate a 4.5-foot NGVD 29 contour. The MHTL is approximately 2.75 feet NGVD 29, calculated using data from the National Oceanic and Atmospheric Administration (NOAA) Richmond Inner Harbor tidal station (Station ID 9414849) ([Tetra Tech 2010](#)). This elevation is not shown on [Figure 1](#) because it has not been surveyed. The 2008 survey provides bracketing contours at 2 feet and 4 feet, but due to the irregularity of the marsh topography a 2.75-foot contour cannot be reliably estimated.

On the day of the field investigation (November 21, 2011), high tide was 3.79 feet NGVD 29, based on the verified tide data from the NOAA tidal gauge in Richmond, California (Station ID 9414863), and occurred at 8:00 Pacific Daylight Time (PDT) ([NOAA 2011](#)). Data was unavailable from the Richmond Inner Harbor tidal station, as it does not currently operate. Low tide occurred at 14:42 PDT and was -2.38 feet NGVD 29. During the wetland delineation, the majority of the site was inundated at the morning high tide and saturated during the low tide. The maximum high tide is approximately 4.5 feet; thus, the tidal influence would extend up another 0.7 feet in elevation. During storm events, the water level has been observed to be higher than the maximum high tide due to wind surge and atmospheric conditions.

### **3.3 SOILS**

Soils at Western Stege Marsh were altered during the wetland restoration conducted from 2002 to 2004. Aerial photographs dated before the remediation reveal that Eastern and Western Stege Marsh were formed around 1900 as a result of sedimentation ([Nichols and Carson 2002](#)). Based on the county soils map prepared by the U.S. Department of Agriculture, one soil mapping unit and urban land

characterization were historically present within the project area ([USDA 2011](#)). The soil mapping unit identified was the Reyes silty clay series, which consist of deep somewhat poorly drained soils that formed in alluvium from mixed sources. Reyes soils are present in reclaimed and protected salt marsh areas and have slopes of 0 to 2 percent.

Soils were characterized by (1) digging four 6-inch diameter soil pits with a shovel and (2) inspecting the upper 12 inches of the soil profile for hydric soil indicators; a soil core of 18 inches was not able to be obtained because of the compact soil conditions. Soil pits were located within the sample plot area, shown on [Figure 1](#). Soil color was described using the Munsell Soil Color Chart ([Kollmorgen Corporation 1992](#)) for soil texture, organic content, consistency, moisture content, and special soil characteristics such as mottling and gleyed conditions. The soil profile descriptions were recorded on USACE data sheets ([Attachment 1](#)).

Hydric soil indicators, such as low chroma soil and mottles were observed in soil pits RFS1A and RFS2A. Sandy redox conditions were observed at soil pit RFS1A. The soil layer between 4 to 8 inches had a matrix with 97 percent of the soil having a chroma of 2, with 3 percent distinct redox concentrations occurring as soft masses and pore linings.

Soil pit RFS2A comprises clay (0 to 4 inches) and loam (4 to 10 inches) matrices, with approximately 1 percent dark-colored redox depletions within the 4 to 10 inch depth interval. None of the hydric soil indicators were formally met; however, the soils at Western Stege Marsh are primarily fill materials transported to the site in 2005, and therefore it is not expected that field indicators of hydric soils would be clearly observed in the fill soils. Tidal inundation occurs during high tide at this sampling plot, therefore it is inferred that hydric soils will more fully develop over time.

Soil pits RFS1B and RFS2B, upslope of RFS1A and RFS2A, were primarily made up of sandy clays and clay, and did not show any hydric soil indicators.

#### **4.0 CONCLUSIONS**

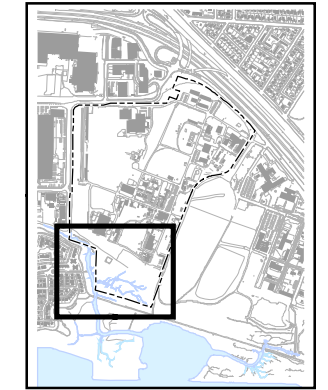
Based on the presence of wetland vegetation, hydrology, and soils, 3.1 acres within the project boundary are considered USACE CWA Section 404 jurisdictional wetlands, as indicated on [Figures 1 and 2](#). In addition, 1.1 acres within the project boundary are mudflats, and are considered “other waters” under Section 10 of the Rivers and Harbors Act. The total created habitat within the Western Stege Marsh Restoration Project Area is 6.8 acres, as shown on [Figures 1 and 2](#).

## 5.0 REFERENCES

- Kollmorgen Corporation. 1992. "Munsell Soil Color Charts." MacBeth Division. Newburg, New York.
- National Oceanic Atmospheric Administration. 2011. Tides and Currents. Richmond, CA Station ID 9414863. Historic Tide Data. Available on-line at:  
[http://tidesandcurrents.noaa.gov/data\\_menu.shtml?stn=9414863%20Richmond,%20CA&type=Historic+Tide+Data](http://tidesandcurrents.noaa.gov/data_menu.shtml?stn=9414863%20Richmond,%20CA&type=Historic+Tide+Data)
- Nichols, Richard A. and William L. Carson. 2002. Letter Regarding Section 404 Clean Water Act Jurisdictional Delineation, Zeneca Richmond Facility, UC Berkeley Richmond Field Station, and East Bay Regional Parks District Property (USACE File No 26417S). January 14.
- Reed, P.B. 1988. National list of plant species that occur in wetlands: California (Region 10). Biological Report 88 (26.10). Fish and Wildlife Service, US Fish and Wildlife Service, Washington, DC.
- Tetra Tech EM Inc. 2010. Year 5 Monitoring Report for the Western Stege Marsh Restoration Project, University of California, Berkeley, Richmond Field Station, Richmond, California. September 30.
- U.S. Army Corps of Engineers (USACE). 1987. "Corps of Engineers Wetland Delineation Manual, Final Report." Wetlands Research Program. Technical Report Y-87-1. January.
- USACE. 2008. "Draft Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region." June 1. Washington D.C. 104 pp. Available Online at:  
<http://www.usace.army.mil/CECW/Documents/cecwo/reg/trel08-28.pdf>
- U.S. Department of Agriculture. Natural Resources Conservation Service. Web Soil Survey. Accessed November 25, 2011. Available Online at:  
<http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx>
- U.S. Department of the Interior, Fish and Wildlife Service. 1988. "National List of Plant Species that Occur in Wetlands: California (Region 10)". September.

## **FIGURES**

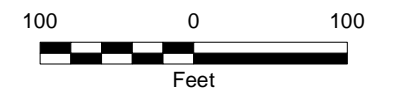
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- Property Boundary
- Wetland Delineation Sample Plots
- Mudflat
- 2011 Jurisdictional Marsh Boundary within Project Area (HTL 4.5 feet NGVD29)
- Pre-remediation (2004) wetland within project area
- Project Area

Acreages within the Project Area:  
 6.7 acres of habitat restored by UC Berkeley (total Project Area acreage)  
 3.1 acres of wetland (area below HTL of 4.5 ft NGVD 29 - excludes mudflat area)  
 1.1 acres of mudflat or other tidal water

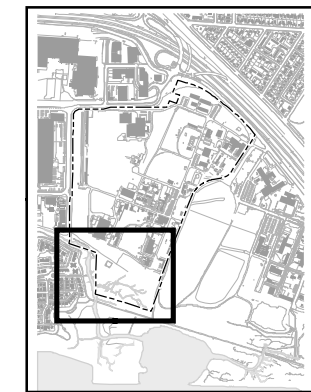
Notes:  
 NGVD29 National Geodetic Vertical Datum of 1929  
 HTL High Tide Line  
 Image date March 2008, courtesy of Muir Consulting



Richmond Field Station  
 University of California, Berkeley

**FIGURE 1  
 WESTERN STEGE MARSH  
 WETLAND DELINEATION MAP**

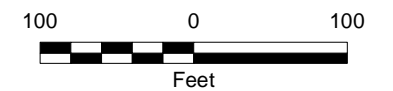
Western Stege Marsh Restoration Project



- Property Boundary
- Wetland Delineation Sample Plots
- Mudflat
- Surface Water
- 2011 Jurisdictional Marsh Boundary within Project Area (HTL 4.5 feet NGVD29)
- Pre-remediation (2004) wetland within project area
- Project Area

Acreages within the Project Area:  
 6.8 acres of habitat restored by UC Berkeley (total Project Area acreage)  
 3.1 acres of wetland (area below HTL of 4.5 ft NGVD 29 - excludes mudflat area)  
 1.1 acres of mudflat or other tidal water

Notes:  
 NGVD29 National Geodetic Vertical Datum of 1929  
 HTL High Tide Line  
 Image date March 2008, courtesy of Muir Consulting



Richmond Field Station  
 University of California, Berkeley

**FIGURE 2  
 WESTERN STEGE MARSH  
 WETLAND DELINEATION MAP**

Western Stege Marsh Restoration Project

**ATTACHMENT 1**

**USACE WETLAND DETERMINATION DATA SHEETS**

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## WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Western Stege Marsh City/County: Richmond/Contra Costa County Sampling Date: 11/21/11  
 Applicant/Owner: UC Berkeley State: CA Sampling Point: RFS1A  
 Investigator(s): Dayna Yocum, Cindi Rose Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1  
 Subregion (LRR): LRRC-Mediterranean California Lat: 37.911567 Long: -122.344757 Datum: NAD 83, State Plane CA Zone III  
 Soil Map Unit Name: Reves Silty Clay NWI classification: E2EMP

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 <input checked="" type="checkbox"/>	No <input type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Remarks: Soil is primarily bay mud fill placed during marsh restoration in 2005.					

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. <u>N/A</u>	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>2</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	<u>2</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u> (A/B)
4. _____	_____	_____	_____		
50% = _____, 20% = _____	_____	= Total Cover			
<b>Sapling/Shrub Stratum (Plot size: _____)</b>				<b>Prevalence Index worksheet:</b>	
1. <u>N/A</u>	_____	_____	_____	Total % Cover of :	Multiply by:
2. _____	_____	_____	_____	OBL species <u>8</u>	x1 = <u>8</u>
3. _____	_____	_____	_____	FACW species <u>80</u>	x2 = <u>160</u>
4. _____	_____	_____	_____	FAC species <u>0</u>	x3 = _____
5. _____	_____	_____	_____	FACU species <u>0</u>	x4 = _____
50% = _____, 20% = _____	_____	= Total Cover		UPL species _____	x5 = _____
<b>Herb Stratum (Plot size: 5 ft)</b>				Column Totals:	<u>88</u> (A) <u>168</u> (B)
1. <u>Grindelia stricta (latifolium)</u>	<u>20</u>	<u>yes</u>	<u>FACW</u>	Prevalence Index = B/A = <u>1.9</u>	
2. <u>Distichlis spicata</u>	<u>60</u>	<u>yes</u>	<u>FACW</u>	<b>Hydrophytic Vegetation Indicators:</b>	
3. <u>Jaumea carnosa</u>	<u>3</u>	<u>no</u>	<u>OBL</u>		
4. <u>Salicornia virginica</u>	<u>5</u>	<u>no</u>	<u>OBL</u>		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
50% = _____, 20% = _____	<u>88</u>	= Total Cover			
<b>Woody Vine Stratum (Plot size: _____)</b>				<input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
50% = _____, 20% = _____	_____	= Total Cover		<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
% Bare Ground in Herb Stratum <u>10</u>		% Cover of Biotic Crust <u>0</u>			

Remarks:

Project Site: Western Stege Marsh

Sampling Point: RFS1A

**SOIL**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-4	10YR 4/2	100	N/A	---	---	---	Sandy Clay	---
4-8	10YR 4/2	97	7YR 3/3	3	C	PL	Sandy Clay	---
8-12	2YR 4/2	97	7.5YR 3/4	3	C	PL	Sand	---
---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---
---	---	---	---	---	---	---	---	---

<sup>1</sup>Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

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

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

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
 Depth (Inches): \_\_\_\_\_

**Hydric Soils Present?** Yes  No

Remarks:

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- |   |   |  |
|---|---|--|
| <input type="checkbox"/> Surface Water (A1)                           | <input type="checkbox"/> Salt Crust (B11)   | <input type="checkbox"/> Water Marks (B1) (Riverine)               |
| <input type="checkbox"/> High Water Table (A2)                        | <input type="checkbox"/> Biotic Crust (B12)                                       | <input type="checkbox"/> Sediment Deposits (B2) (Riverine)         |
| <input type="checkbox"/> Saturation (A3)                              | <input type="checkbox"/> Aquatic Invertebrates (B13)                              | <input type="checkbox"/> Drift Deposits (B3) (Riverine)            |
| <input type="checkbox"/> Water Marks (B1) (Nonriverine)               | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                               | <input type="checkbox"/> Drainage Patterns (B10)                   |
| <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)         | <input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Dry-Season Water Table (C2)               |
| <input checked="" type="checkbox"/> Drift Deposits (B3) (Nonriverine) | <input type="checkbox"/> Presence of Reduced Iron (C4)                            | <input type="checkbox"/> Crayfish Burrows (C8)                     |
| <input type="checkbox"/> Surface Soil Cracks (B6)                     | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)               | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)    | <input type="checkbox"/> Thin Muck Surface (C7)                                   | <input type="checkbox"/> Shallow Aquitard (D3)                     |
| <input type="checkbox"/> Water-Stained Leaves (B9)                    | <input checked="" type="checkbox"/> Other (Explain in Remarks)                    | <input type="checkbox"/> FAC-Neutral Test (D5)                     |

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

**Wetland Hydrology Present?** Yes  No

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

Remarks: Tidal inundation apparent in this area during high tide. Drift deposits include plastic, styrafoam, and woody debris.

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: 2 City/County: Richmond/Contra Costa County Sampling Date: 11/21/11  
 Applicant/Owner: UC Berkeley State: CA Sampling Point: RFS2A  
 Investigator(s): Dayna Yocum, Cindi Rose Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1  
 Subregion (LRR): LRRC-Mediterranean California Lat: 37.9108570 Long: -122.344339 Datum: NAD 83, State Plane CA Zone III  
 Soil Map Unit Name: Reves Silty Clay/ NWI classification: E2EMP  
 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 <input checked="" type="checkbox"/>	No <input type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Remarks: Soil is primarily bay mud fill placed during marsh restoration in 2005.					

**VEGETATION – Use scientific names of plants.**

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <u>N/A</u>	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A)  Total Number of Dominant Species Across All Strata: <u>1</u> (B)  Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100</u> (A/B)
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
50% = _____, 20% = _____	_____	= Total Cover	_____	
<b>Sapling/Shrub Stratum (Plot size: _____)</b>				<b>Prevalence Index worksheet:</b> Total % Cover of : _____ Multiply by: OBL species <u>50</u> x1 = <u>50</u> FACW species <u>15</u> x2 = <u>30</u> FAC species <u>0</u> x3 = _____ FACU species <u>0</u> x4 = _____ UPL species _____ x5 = _____ Column Totals: <u>65</u> (A) <u>85</u> (B) Prevalence Index = B/A = <u>1.3</u>
1. <u>N/A</u>	_____	_____	_____	
2. _____	_____	_____	_____	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
50% = _____, 20% = _____	_____	= Total Cover	_____	
<b>Herb Stratum (Plot size: 5 ft)</b>				<b>Hydrophytic Vegetation Indicators:</b> <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <u>Salicornia virginica</u>	<u>50</u>	<u>yes</u>	<u>OBL</u>	
2. <u>Distichlis spicata</u>	<u>15</u>	<u>no</u>	<u>FACW</u>	
3. _____	_____	_____	_____	
4. _____	_____	_____	_____	
5. _____	_____	_____	_____	
6. _____	_____	_____	_____	
7. _____	_____	_____	_____	
8. _____	_____	_____	_____	
50% = _____, 20% = _____	<u>65</u>	= Total Cover	_____	
<b>Woody Vine Stratum (Plot size: _____)</b>				
1. _____	_____	_____	_____	
2. _____	_____	_____	_____	
50% = _____, 20% = _____	_____	= Total Cover	_____	
% Bare Ground in Herb Stratum <u>35</u>	% Cover of Biotic Crust <u>0</u>			

Remarks:

Project Site: Western Stege Marsh

Sampling Point: RFS2A

**SOIL**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-4	2.5Y 4/1	99.5	10YR 2.5/1	0.5	C	M	Clay	
4-10	10YR 3/1	99	7.5YR 4/3	1	C	M	Loam	Redox depletions
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

<sup>1</sup>Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

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

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

**Indicators for Problematic Hydric Soils<sup>3</sup>:**

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

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

**Restrictive Layer (if present):**

Type: \_\_\_\_\_  
 Depth (Inches): \_\_\_\_\_

**Hydric Soils Present?** Yes  No

Remarks: Some redox depletions are present in clay soils.

**HYDROLOGY**

**Wetland Hydrology Indicators:**

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

- |  |  |  |
|--|--|--|
| <input type="checkbox"/> Surface Water (A1)                                  | <input type="checkbox"/> Salt Crust (B11)                              | <input type="checkbox"/> Water Marks (B1) <b>(Riverine)</b>        |
| <input type="checkbox"/> High Water Table (A2)                               | <input type="checkbox"/> Biotic Crust (B12)                            | <input type="checkbox"/> Sediment Deposits (B2) <b>(Riverine)</b>  |
| <input checked="" type="checkbox"/> Saturation (A3)                          | <input type="checkbox"/> Aquatic Invertebrates (B13)                   | <input type="checkbox"/> Drift Deposits (B3) <b>(Riverine)</b>     |
| <input type="checkbox"/> Water Marks (B1) <b>(Nonriverine)</b>               | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                    | <input type="checkbox"/> Drainage Patterns (B10)                   |
| <input type="checkbox"/> Sediment Deposits (B2) <b>(Nonriverine)</b>         | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) | <input type="checkbox"/> Dry-Season Water Table (C2)               |
| <input checked="" type="checkbox"/> Drift Deposits (B3) <b>(Nonriverine)</b> | <input type="checkbox"/> Presence of Reduced Iron (C4)                 | <input type="checkbox"/> Crayfish Burrows (C8)                     |
| <input checked="" type="checkbox"/> Surface Soil Cracks (B6)                 | <input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)    | <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)           | <input type="checkbox"/> Thin Muck Surface (C7)                        | <input type="checkbox"/> Shallow Aquitard (D3)                     |
| <input type="checkbox"/> Water-Stained Leaves (B9)                           | <input checked="" type="checkbox"/> Other (Explain in Remarks)         | <input type="checkbox"/> FAC-Neutral Test (D5)                     |

**Field Observations:**

Surface Water Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Water Table Present? Yes  No  Depth (inches): \_\_\_\_\_  
 Saturation Present? (includes capillary fringe) Yes  No  Depth (inches): \_\_\_\_\_

**Wetland Hydrology Present?** Yes  No

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

Remarks: Location is below the high tide line. Saturation was observed during morning high tide.

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Western Stege Marsh City/County: Richmond/Contra Costa County Sampling Date: 11/21/11  
 Applicant/Owner: UC Berkeley State: CA Sampling Point: RFS1B  
 Investigator(s): Dayna Yocum, Cindi Rose Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1  
 Subregion (LRR): LRRC-Mediterranean California Lat: 37.911603 Long: -122.344687 Datum: NAD 83, State Plane CA Zone III  
 Soil Map Unit Name: Reves Silty Clay NWI classification: E2EMP

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 <input checked="" type="checkbox"/>	No <input type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>		Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>			
Remarks: Soil is primarily bay mud fill placed during marsh restoration in 2005.					

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. <u>N/A</u>	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>2</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	<u>2</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u> (A/B)
4. _____	_____	_____	_____		
50% = _____, 20% = _____	_____	= Total Cover			
<u>Sapling/Shrub Stratum (Plot size: _____)</u>				<b>Prevalence Index worksheet:</b>	
1. <u>N/A</u>	_____	_____	_____	Total % Cover of :	Multiply by:
2. _____	_____	_____	_____	OBL species <u>12</u>	x1 = <u>12</u>
3. _____	_____	_____	_____	FACW species <u>80</u>	x2 = <u>160</u>
4. _____	_____	_____	_____	FAC species <u>0</u>	x3 = _____
5. _____	_____	_____	_____	FACU species <u>0</u>	x4 = _____
50% = _____, 20% = _____	_____	= Total Cover		UPL species _____	x5 = _____
<u>Herb Stratum (Plot size: 5 ft)</u>				Column Totals:	<u>92</u> (A) <u>172</u> (B)
1. <u>Grindelia stricta (latifolium)</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>	Prevalence Index = B/A = <u>1.9</u>	
2. <u>Distichlis spicata</u>	<u>40</u>	<u>yes</u>	<u>FACW</u>		
3. <u>Jaumea carnosa</u>	<u>2</u>	<u>no</u>	<u>OBL</u>		
4. <u>Salicornia virginica</u>	<u>10</u>	<u>no</u>	<u>OBL</u>		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
50% = _____, 20% = _____	<u>88</u>	= Total Cover			
<u>Woody Vine Stratum (Plot size: _____)</u>				<b>Hydrophytic Vegetation Indicators:</b>	
1. _____	_____	_____	_____	<input checked="" type="checkbox"/> Dominance Test is >50%	
2. _____	_____	_____	_____	<input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup>	
50% = _____, 20% = _____	_____	= Total Cover		<input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)	
% Bare Ground in Herb Stratum <u>10</u>		% Cover of Biotic Crust _____		<input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
Remarks:				<b>Hydrophytic Vegetation Present?</b>	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Project Site: Western Stege Marsh

Sampling Point: RFS1B

**SOIL**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-9	2.5Y 6/3	100	N/A	_____	_____	_____	Sandy Clay	_____
9-12	2.5Y 3/2	100	N/A	_____	_____	_____	Clay	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

<sup>1</sup>Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

<b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b>		<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b>	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 1 cm Muck (A9) ( <b>LRR C</b> )	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 2 cm Muck (A10) ( <b>LRR B</b> )	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Reduced Vertic (F18)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5) ( <b>LRR C</b> )	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 1 cm Muck (A9) ( <b>LRR D</b> )	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Vernal Pools (F9)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if present):</b>	<b>Hydric Soils Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Type: _____	
Depth (Inches): _____	

Remarks: No hydric soil indicators present.

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b>	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1) ( <b>Nonriverine</b> )	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2) ( <b>Nonriverine</b> )	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input checked="" type="checkbox"/> Drift Deposits (B3) ( <b>Nonriverine</b> )	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input checked="" type="checkbox"/> Other (Explain in Remarks)
	<input type="checkbox"/> Water Marks (B1) ( <b>Riverine</b> )
	<input type="checkbox"/> Sediment Deposits (B2) ( <b>Riverine</b> )
	<input type="checkbox"/> Drift Deposits (B3) ( <b>Riverine</b> )
	<input type="checkbox"/> Drainage Patterns (B10)
	<input type="checkbox"/> Dry-Season Water Table (C2)
	<input type="checkbox"/> Crayfish Burrows (C8)
	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
	<input type="checkbox"/> Shallow Aquitard (D3)
	<input type="checkbox"/> FAC-Neutral Test (D5)

<b>Field Observations:</b>		<b>Wetland Hydrology Present?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	

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

Remarks: Location is below the high tide line, however drift deposits (styrafoam, plastic, woody debris) are the only indicator present.

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project Site: Western Stege Marsh City/County: Richmond/Contra Costa County Sampling Date: 11/21/11  
 Applicant/Owner: UC Berkeley State: CA Sampling Point: RFS2B  
 Investigator(s): Dayna Yocum, Cindi Rose Section, Township, Range: \_\_\_\_\_  
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1  
 Subregion (LRR): LRRC-Mediterranean California Lat: 37.910839 Long: -122.344272 Datum: NAD 83 State Plane CA Zone III  
 Soil Map Unit Name: Reves Silty Clay NWI classification: E2EMP

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 <input checked="" type="checkbox"/>	No <input type="checkbox"/>	<b>Is the Sampled Area within a Wetland?</b>	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Wetland Hydrology Present?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>			
Remarks: Soil is primarily bay mud fill placed during marsh restoration in 2005.					

### VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. <u>N/A</u>	_____	_____	_____	Number of Dominant Species That Are OBL, FACW, or FAC:	<u>1</u> (A)
2. _____	_____	_____	_____	Total Number of Dominant Species Across All Strata:	<u>1</u> (B)
3. _____	_____	_____	_____	Percent of Dominant Species That Are OBL, FACW, or FAC:	<u>100</u> (A/B)
4. _____	_____	_____	_____		
50% = _____, 20% = _____	_____	= Total Cover			
Sapling/Shrub Stratum (Plot size: _____)				<b>Prevalence Index worksheet:</b>	
1. <u>N/A</u>	_____	_____	_____	Total % Cover of :	Multiply by:
2. _____	_____	_____	_____	OBL species <u>1</u>	x1 = <u>1</u>
3. _____	_____	_____	_____	FACW species <u>65</u>	x2 = <u>130</u>
4. _____	_____	_____	_____	FAC species <u>0</u>	x3 = _____
5. _____	_____	_____	_____	FACU species <u>0</u>	x4 = _____
50% = _____, 20% = _____	_____	= Total Cover		UPL species _____	x5 = _____
Herb Stratum (Plot size: 5 ft)				Column Totals:	<u>66</u> (A) <u>131</u> (B)
1. <u>Grindelia stricta (latifolium)</u>	<u>15</u>	<u>yes</u>	<u>FACW</u>	Prevalence Index = B/A = <u>2.0</u>	
2. <u>Distichlis spicata</u>	<u>50</u>	<u>yes</u>	<u>FACW</u>	<b>Hydrophytic Vegetation Indicators:</b>	
3. <u>Jaumea carnosa</u>	<u>1</u>	<u>no</u>	<u>OBL</u>		
4. <u>Bromus diandrus</u>	<u>10</u>	<u>no</u>	<u>UPL</u>		
5. _____	_____	_____	_____		
6. _____	_____	_____	_____		
7. _____	_____	_____	_____		
8. _____	_____	_____	_____		
50% = _____, 20% = _____	<u>66</u>	= Total Cover			
Woody Vine Stratum (Plot size: _____)				<input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)	
1. _____	_____	_____	_____		
2. _____	_____	_____	_____		
50% = _____, 20% = _____	_____	= Total Cover		<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
% Bare Ground in Herb Stratum <u>30</u>	% Cover of Biotic Crust <u>0</u>				

Remarks:

Project Site: Western Stege Marsh

Sampling Point: RFS2B

**SOIL**

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

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-8	10YR 4/4	99	gley 2 2.5%PB	1	RM	M	Sandy Clay	
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____	_____	_____	_____

<sup>1</sup>Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. <sup>2</sup>Location: PL=Pore Lining, M=Matrix.

<b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b>		<b>Indicators for Problematic Hydric Soils<sup>3</sup>:</b>	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 1 cm Muck (A9) ( <b>LRR C</b> )	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> 2 cm Muck (A10) ( <b>LRR B</b> )	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1)	<input type="checkbox"/> Reduced Vertic (F18)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Stratified Layers (A5) ( <b>LRR C</b> )	<input type="checkbox"/> Depleted Matrix (F3)	<input type="checkbox"/> Other (Explain in Remarks)	
<input type="checkbox"/> 1 cm Muck (A9) ( <b>LRR D</b> )	<input type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Depressions (F8)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Vernal Pools (F9)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)			

<sup>3</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<b>Restrictive Layer (if present):</b>	<b>Hydric Soils Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Type: _____	
Depth (Inches): _____	

Remarks: No hydric soil indicators present.

**HYDROLOGY**

<b>Wetland Hydrology Indicators:</b>	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Water Marks (B1) ( <b>Nonriverine</b> )	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Sediment Deposits (B2) ( <b>Nonriverine</b> )	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Drift Deposits (B3) ( <b>Nonriverine</b> )	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Thin Muck Surface (C7)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Other (Explain in Remarks)
	<input type="checkbox"/> Water Marks (B1) ( <b>Riverine</b> )
	<input type="checkbox"/> Sediment Deposits (B2) ( <b>Riverine</b> )
	<input type="checkbox"/> Drift Deposits (B3) ( <b>Riverine</b> )
	<input type="checkbox"/> Drainage Patterns (B10)
	<input type="checkbox"/> Dry-Season Water Table (C2)
	<input type="checkbox"/> Crayfish Burrows (C8)
	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
	<input type="checkbox"/> Shallow Aquitard (D3)
	<input type="checkbox"/> FAC-Neutral Test (D5)

<b>Field Observations:</b>		<b>Wetland Hydrology Present?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____	

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

Remarks: Location is just above high tide line and drift line.



**ATTACHMENT 2**

**PHOTOGRAPHIC LOG**

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Photograph 2-1: Panorama of Study Area – Photographed from the East Side of the Site on the Connector Trail



Photograph 2-2: Inundation of Lower Marsh during High Tide, November 21, 2011



Photograph 2-3: Drift Deposits of Plastic at High Tide Line



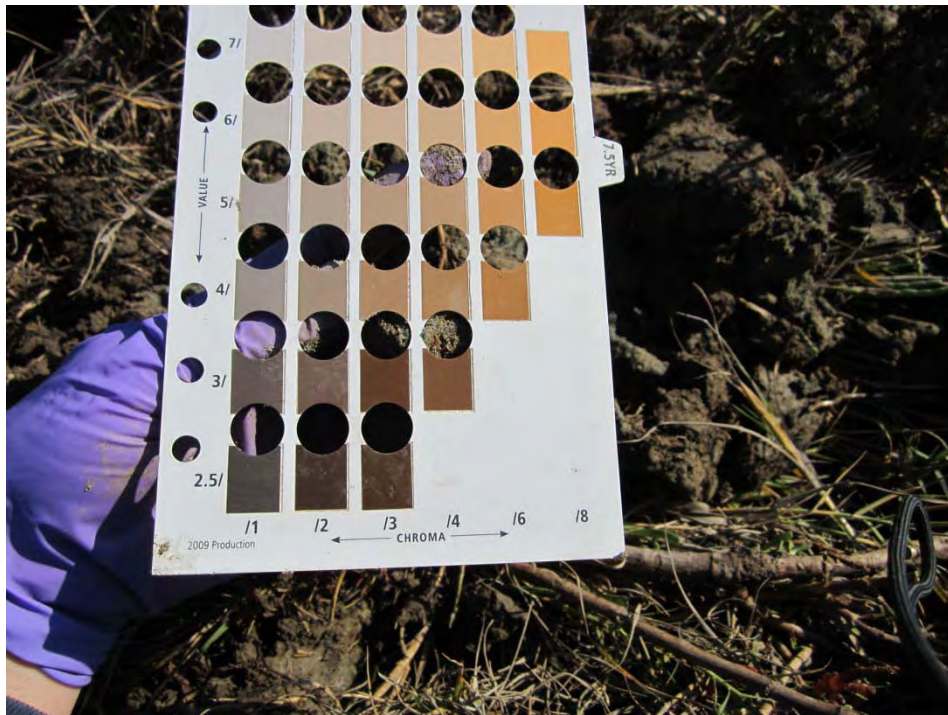
Photograph 2-4: Drift Deposits of Plastic and other Trash below High Tide Line



Photograph 2-5: Aquatic Invertebrates below High Tide Line



Photograph 2-6: Sample Location RFS1A – Sandy Redox Conditions



Photograph 2-7: Sample Location RFS1A – Classifying Soil Color of Redox Concentrations



Photograph 2-8: Sample Location RFS1A – Vegetation Plot



Photograph 2-9: Sample Location RFS1B – Soil Core



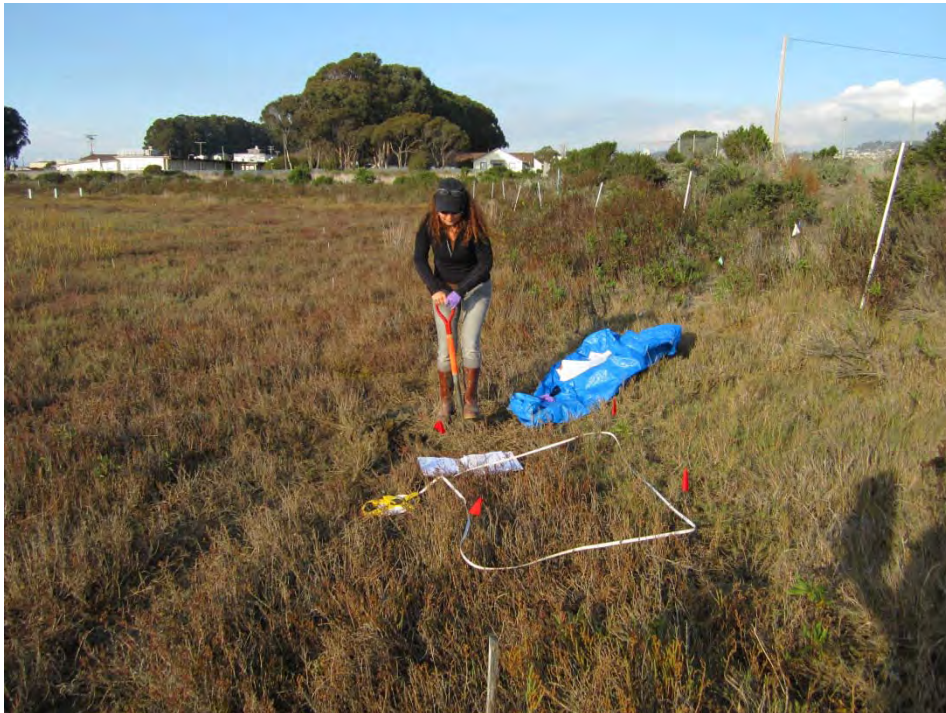
Photograph 2-10: Sample Location RFS1B – Vegetation Plot in Relation to Soil Sampling Point



Photograph 2-11: Sample Locations RFS1A and RFS1B



Photograph 2-12: Sample Location RFS2A – Mottling in Soil Core



Photograph 2-13: Sample Location RFS2A – Vegetation Plot in Relation to Soil Sampling Point





Photograph 2-14: Sample Location RFS2B –Soil Core



Photograph 2-15: Sample Location RFS2B – Vegetation Plot in Relation to Soil Sampling Point



Photograph 2-16: Mudflat in the Northeast Project Area Site – from Southeast