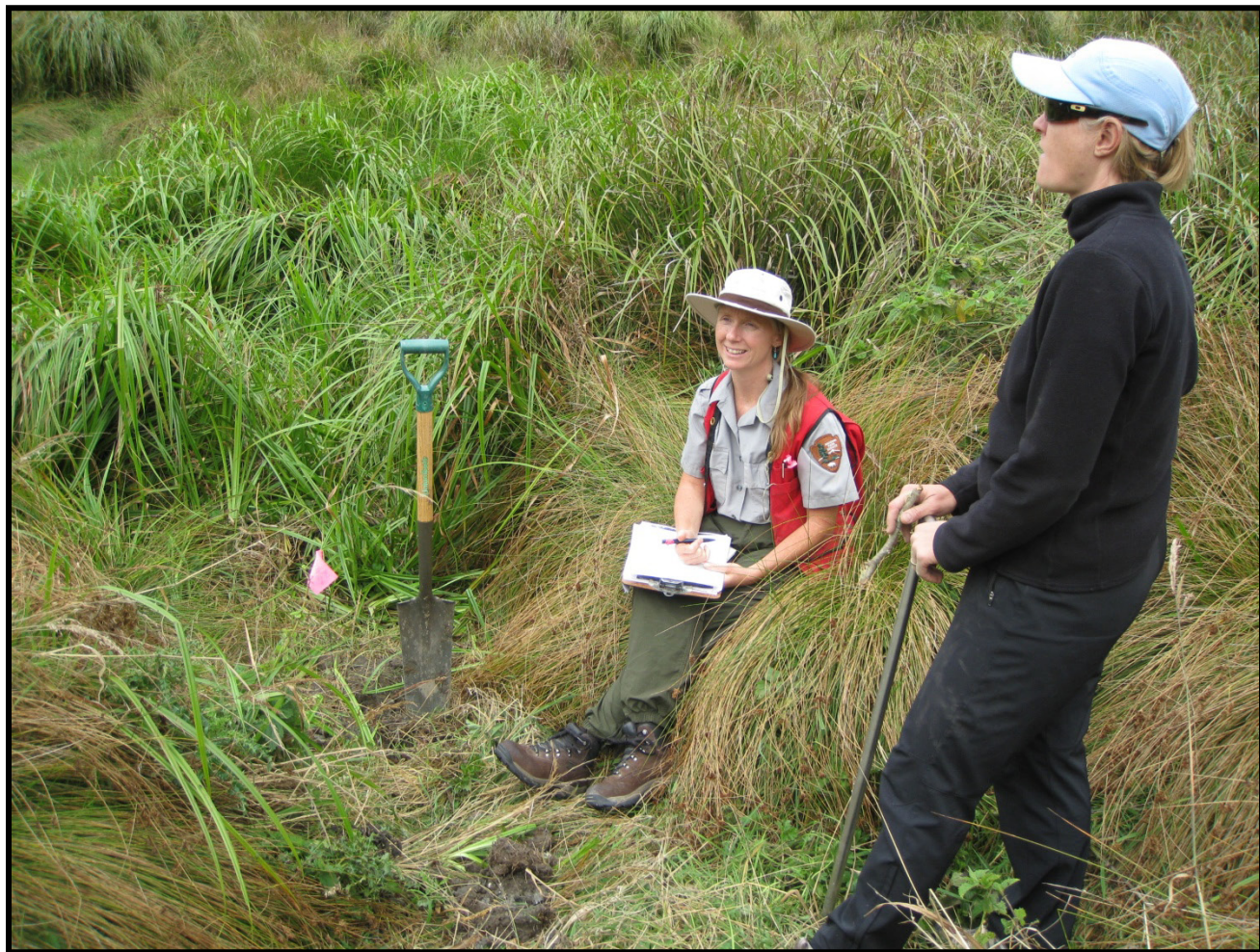




Wetland Mapping and Assessment at the Strawberry Creek Restoration Site

Redwood National and State Parks, California

Natural Resource Report NPS/NRPC/NRTR-2011/415



ON THE COVER

Collecting soil, hydrology and vegetation data at a wetland delineation sample plot.
Photograph by: Joel Wagner, NPS-NRPC, Water Resources Division, 2009

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January 2011

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Fort Collins, Colorado

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Please cite this publication as:

Denn, M. and J. Wagner. 2011. Wetland mapping and assessment at the Strawberry Creek Restoration Site: Redwood National and State Parks, California. Natural Resource Technical Report NPS/NRPC/NRTR—2011/415. National Park Service, Fort Collins, Colorado.

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Executive Summary

Redwood National and State Parks (REDW) staff members are preparing an Environmental Assessment for reestablishing the Strawberry Creek channel and restoring a naturally functioning stream and riparian ecosystem near the old REDW South Operations Center. The park requested assistance from the NPS Water Resources Division (WRD) in mapping wetlands at the site as part of the anticipated compliance requirements for the project. WRD and REDW staff conducted field work for wetlands mapping at this location during September 1-2, 2009.

This report presents the wetland maps that were requested by the park. Data forms that document the vegetation, soil, and hydrology findings and analyses we used to support our wetland boundary determinations are included in the Appendix. We also discuss potential effects of the proposed creek restoration on adjacent wetlands, and provide recommendations for additional analyses that may be necessary to evaluate these effects.

The wetland maps and data will help REDW staff evaluate stream and riparian restoration alternatives through the NEPA process. They also can be used for wetland compliance, including application for a Section 404 permit under the Clean Water Act, compliance with NPS Director's Order #77-1: Wetland Protection, and compliance with California Game and Fish Department regulations.

Acknowledgments

REDW staff members Darci Short, David Anderson and Stassia Samuels provided assistance with logistics, project site orientation, field sampling, plant identification and data interpretation during our site visit. Deanna Greco of the NPS Natural Resources Program Center, Geologic Resources Division also helped with field work. Joe Seney, REDW Geological Services Branch Chief, reviewed a draft of this report and his comments improved the final product. We thank all of these participants, who were very professional and a pleasure to work with.

Introduction

Redwood National and State Parks (REDW) is preparing an Environmental Assessment to consider alternatives for reestablishing the Strawberry Creek channel and restoring a naturally functioning stream and riparian ecosystem near the old South Operations Center (see Figure 1). As part of the evaluation of potential project impacts, the National Park Service (NPS) and its partners will examine effects that the alternatives may have on wetlands. In preparation for this evaluation NPS staff visited the old South Operations Center site on September 1-2, 2009 to inventory wetland resources.

The NPS policy for wetlands (Director's Order #77-1, NPS 2002) requires REDW staff to evaluate park activities for potential adverse impacts to wetlands and to follow specific procedures for protecting and restoring wetlands (Procedural Manual #77-1, NPS 2008). Any area that is defined as a wetland according to the U.S. Fish and Wildlife Service definition in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979) is subject to DO 77-1 and PM 77-1.

In addition to complying with DO 77-1, park managers must comply with the federal Clean Water Act (CWA), which requires disclosure and mitigation of any potential impacts to wetlands or other regulated "Waters of the United States." The US Army Corps of Engineers (USACOE or "Corps") regulates wetlands and other waters under section 404 of the CWA. The Corps defines "wetlands" as those areas that exhibit hydric soils, hydrophytic vegetation, and wetland hydrology, as described in the Corps' 1987 Wetland Delineation Manual and the 2008 Western Mountains, Valleys and Coast Region supplemental delineation manual (Environmental Laboratories 1987, USACOE 2008). The Corps may decline to take jurisdiction over isolated wetlands that do not have a "significant nexus" to "traditionally navigable waters" as defined by recent US Supreme Court decisions (see <http://www.usace.army.mil/cw/cecwo/reg/index.html> for up-to-date information on this evolving issue). For purposes of identifying wetlands protected under the CWA when requesting a Nationwide or Individual CWA Permit from the Corps, wetland maps should be no more than five years old (USACOE 2008). The Army Corps of Engineers also has jurisdiction and permit authority over other "Waters of the US" - those additional aquatic systems such as streams, rivers, and mudflats that are also protected by the CWA.

Because the NPS and the Corps have slightly different definitions of wetlands, any project that may impact wetlands on NPS lands requires compilation of two sets of maps - one map delineating the potentially more-expansive wetlands that fall under the protection of DO 77-1 ("Cowardin" wetlands), and another map delineating wetlands and Waters of the United States that fall under the protection of section 404 of the Clean Water Act ("Corps" wetlands).

In addition, because the proposed project will be completed in close collaboration with the California Department of Fish and Game (CDFG) and may be partially funded through a CDFG Fisheries Restoration Grant, for this project NPS staff prepared a map of lands which exhibit only one wetland characteristic - in accordance with CDFG regulatory requirements. For the lands within the Surveyed Area, this "One Parameter" map includes lands that currently support a preponderance of hydrophytic vegetation but that may lack wetland hydrology, wetland soils, or both.

The Surveyed Area designated on maps in this report is based on initial discussions between REDW and NPS Water Resources Division staff regarding the potential boundary of project actions and their impacts. This boundary is subject to revision. Any expansion of the area potentially affected by the project may create a need for additional field-based wetland mapping..

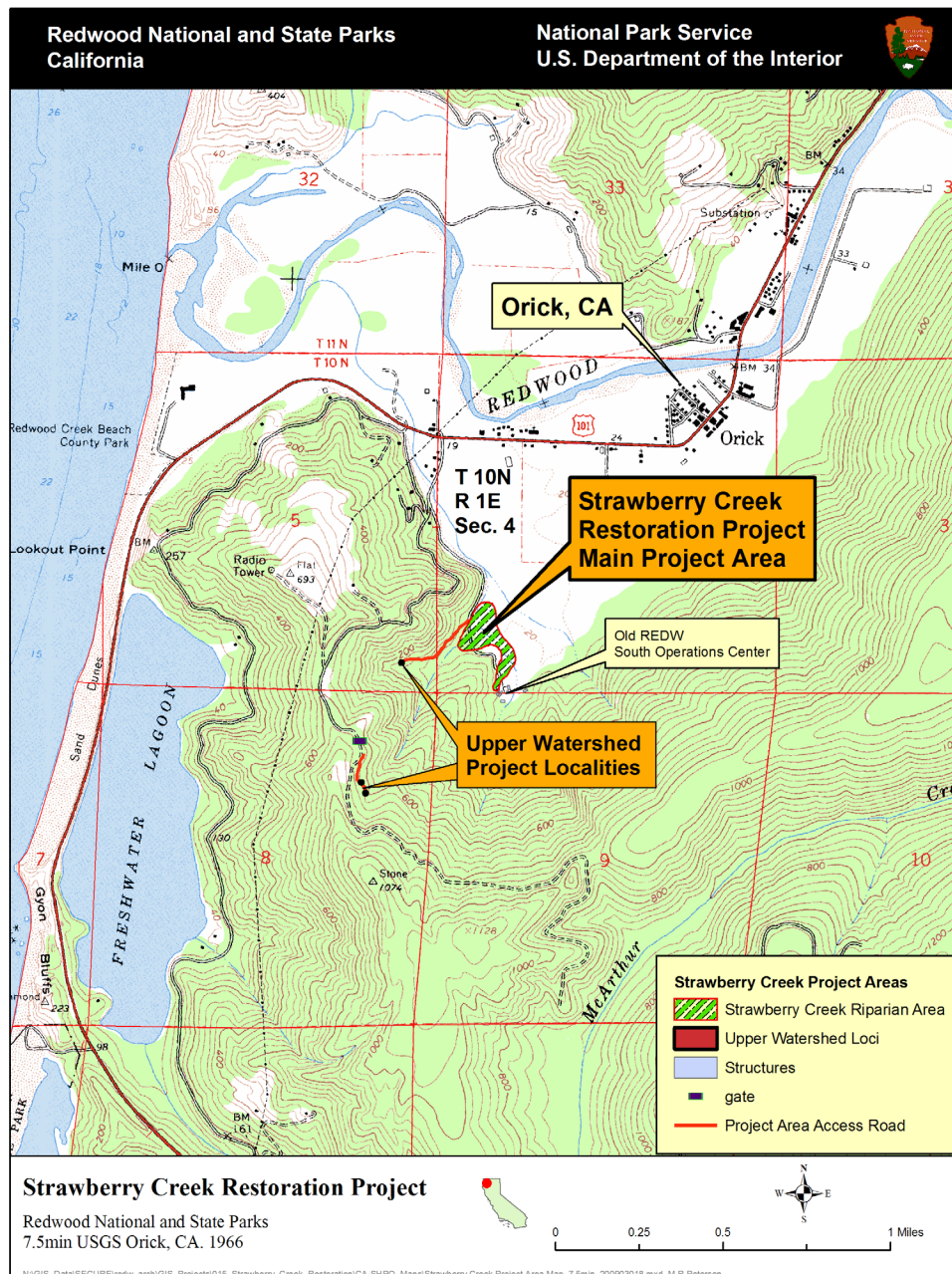


Figure 1: Strawberry Creek restoration project location.

Soils within the Surveyed Area

Hydric soils are one of the three primary characteristics of wetland habitats. Hydric soils are those that are "saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic vegetation" (USDA-NRCS 2010). The 1987 Manual for Wetlands Delineation (Environmental Laboratory 1987) suggests evaluating existing soil maps before conducting in-field wetland delineations. For the project area, the most recent and complete soil map was created by the Natural Resources Conservation Service in 2008 (USDA-NRCS 2008). The soil map is at a scale of 1:24,000 (Order 3 mapping level), and identifies four soil map units in the project area (Figure 2). Each soil map unit is named for the dominant soil type(s), and includes other soil types that are called minor components, which are of limited extent (Table 1). Two of these soil map units; soil map units 119 and 171 are primarily composed (85 to 100 percent) of soils that meet the hydric soils criteria.

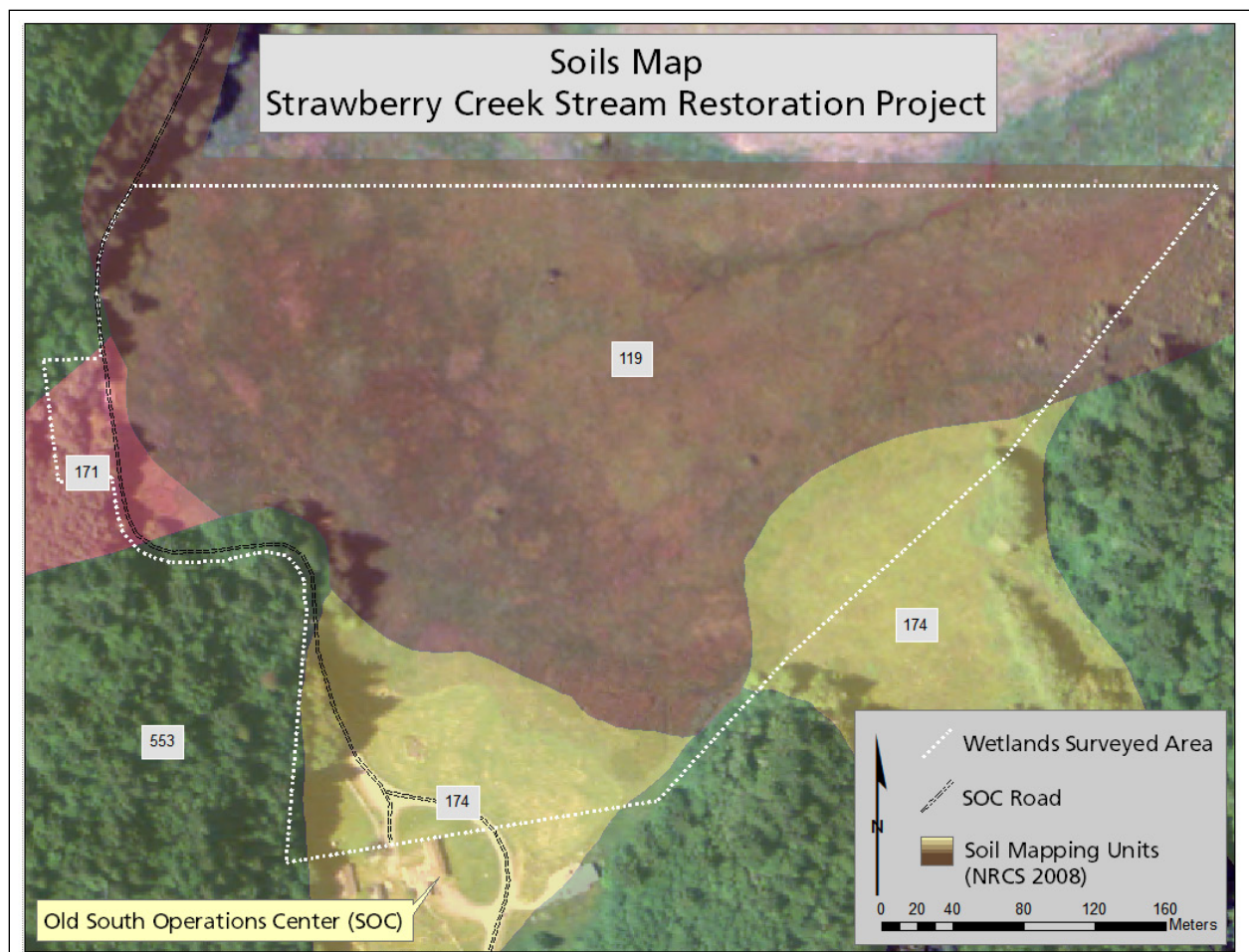


Figure 2: Soils mapped in and around the Surveyed Area (NRCS 2008).

Table 1. Soil map units and soil components for the project area.

Map Unit Symbol	Soil Components	Dominant or Minor	Composition (percent)	Landform	Hydric Status
119	Arlynda	Dominant	85	Backwater channels, meander scars	Hydric
	Weott & Worswick	Minor	15	Adjacent to channels, levees	Hydric
171	Arlynda	Dominant	40	Floodplain	Hydric
	Worswick	Dominant	35	Floodplain	Hydric
	Dystrudepts, Humults	Minor	10	Lower mountain slopes, terraces	Non-hydric
	Endoaquepts	Minor	10	Floodplains	Hydric
174	Bigtree	Dominant	50	Alluvial fans	Non-hydric
	Mystery	Dominant	25	Alluvial fans	Non-hydric
	Dystrudepts, Humults	Minor	10	Alluvial fans	Non-hydric
	Endoaquepts Fluvents	Minor	15	Channels and depressions on fans	Hydric
553	Ladybird	Dominant	60	Mountain slopes	Non-hydric
	Stonehill	Dominant	20	Mountain slopes	Non-hydric
	Udepts	Minor	15	Unstable positions on mtn slopes	Non-hydric
	Fluvents	Minor	5	Active channels on mtn slopes	Hydric

WRD and park staff observed an unidentified soil within the 119 mapping unit that is not evident on the NRCS soils map or the descriptions in Table 1. For a large portion of this polygon (more than 50% within the Surveyed Area), we observed a floating mat of poorly-decomposed, graminoid (grass and sedge) fiber. A sample taken near the center of the floating mat indicated an approximate depth of 40 centimeters of organic matter floating on approximately 45 centimeters of free water over a highly-reduced mineral soil. This unusual feature is discussed in greater depth later in this report.

Hydric soils exhibit identifiable morphological characteristics that develop in waterlogged or saturated, low-oxygen conditions. The National Technical Committee for Hydric Soils has developed “field indicators of hydric soils” based on these characteristic morphologies (USDA Natural Resources Conservation Service 2010). These have been incorporated into the Corps wetland delineation manual supplement for this region as a means of confirming the presence or absence of hydric soils at specific field sample sites. The data sheets in Appendix A provide the characteristics of the soils we examined and justifications for hydric or non-hydric determinations at each sample site.

Vegetation within the Surveyed Area

Predominance of "hydrophytic" (wetland) vegetation is one of the three parameters used to identify wetlands. According to Corps of Engineers wetland delineation procedures, calls regarding presence or absence of hydrophytic vegetation are based on the "wetland indicator status" of each dominant species in the plant community being evaluated. Reed (1988) classifies plant species into indicator status categories ranked from wettest to driest as follows: obligate (OBL), facultative wetland (FACW), facultative (FAC), facultative upland (FACU), and upland (not listed). Plant communities are considered to be hydrophytic (wetland vegetation) if greater than 50% of the dominant species are ranked as OBL, FACW, or FAC.

The vegetation sections of the data sheets in Appendix A list each plant species identified in the plot, its indicator status, and whether or not it was considered to be a dominant species according to Corps manual procedures. Documentation is provided on the data sheets for each hydrophytic vegetation determination.

Wetlands and Waters within the Surveyed Area

On September 1-2, 2009 WRD and park staff visited the Strawberry Creek Restoration Project Area to conduct field surveys necessary to create wetland maps for the 38.30-acre area that may be affected by future ecological restoration actions. These maps include Cowardin wetlands (Figure 3), Corps wetlands (Figure 4), and "one-parameter" lands (Figure 5). Within this Surveyed Area, 31.70 acres are Cowardin and Corps wetlands, an additional 0.02 acre of riverine habitat qualifies as Cowardin wetland (but not Corps wetland), and a total of 33.90 acres meet the one-parameter wetland concept recognized by the CDFG (Table 2). We also identified 122 meters of stream channel within the Surveyed Area as "Waters of the US" - that is, a stream channel with a bed and banks that is potentially subject to Corps of Engineers jurisdiction under Section 404 of the Clean Water Act (Figures 4 and 5).

Table 2. Acres of wetlands within the Surveyed Area.

	Acres
Cowardin Wetlands	31.72
<i>Palustrine Emergent</i>	30.69
<i>Palustrine Forested</i>	0.87
<i>Palustrine Scrub-shrub</i>	0.14
<i>Riverine Upper Perennial</i>	0.02
¹Corps (Three-Parameter) Wetlands	31.70
²One-Parameter Lands	33.90

¹ For this study, Cowardin wetlands and Corps three-parameter wetlands coincide except for 0.02 acres of riverine upper perennial (stream) habitat, which the Corps does not recognize as wetland.

² Includes all Corps wetlands plus an additional 2.2 acres that had hydrophytic vegetation but did not meet hydric soil or wetland hydrology criteria.

The Cowardin wetland map (Figure 3) for the Project Area delineates four types of Cowardin wetlands: Palustrine Emergent Wetlands, Palustrine Forested Wetlands, Palustrine Scrub-shrub Wetlands and Riverine Upper Perennial Wetlands. These are described below:

Palustrine Wetlands are non-tidal and typically dominated by trees, shrubs, or persistent herbaceous vegetation (commonly known as marshes or swamps). These areas generally exhibit high year-round ground or surface water.

Palustrine Emergent Wetlands are areas with high year-round ground or surface water that support herbaceous vascular plants at 30% or greater cover in most years, with a tree and shrub cover of less than 30%. Generally in the Project Area palustrine emergent wetlands represent the peat-forming "floating mat" grass and sedge community described in this report, and also grass, sedge and rush communities on the fringe of the "floating mat" community.

Palustrine Forested Wetlands are areas with high year-round groundwater that support a tree canopy of 30% cover or more. In the Project Area the two palustrine forested polygons have an overstory of Douglas fir (*Pseudotsuga menziesii*). The palustrine forested polygon on the west side of the Surveyed Area has a dominant understory of skunk cabbage (*Lysichiton americanum*), while the palustrine forested polygon on the east side has a dominant understory of mixed shrub species including California wild rose (*Rosa californica*) and California blackberry (*Rubus ursinus*).

Palustrine Scrub-shrub Wetlands are areas with high year-round ground or surface water that are dominated by woody vegetation less than 6 meters tall. Within the Surveyed Area this wetland type is represented by two polygons; these are on disturbed road shoulders and are dominated by non-native Himalayan blackberry (*Rubus discolor*).

Riverine Upper Perennial Wetlands are shallow (less than 2 meters deep at low water), fresh water systems in channels with relatively steep gradients and year-round flow. Within the Surveyed Area, this wetland type is restricted to the 400-foot long channel of Strawberry Creek immediately west of the old SOC. Habitat on the creek's 20th-century levee (east bank) and the creek's west bank (against the valley hillslope) is not wetland as it lacks wetland soils and hydrology (see wetland data sheets 4 and 5 in Appendix A).

Classification of Strawberry Creek within the Surveyed Area - a water of the United States - as either "relatively permanent" or not "relatively permanent" may need to be finalized in order to evaluate whether or not some of the wetlands mapped in Figure 5 below will fall under the regulatory jurisdiction of the US Army Corps of Engineers. Because guidance on this issue is currently evolving (USACOE 2008), resolution of the status of Strawberry Creek should wait until the park applies for a Nationwide Permit under Section 404 of the federal Clean Water Act.

These maps are appropriate for use in evaluating potential impacts to wetland resources in the upcoming Environmental Assessment, for compliance with NPS DO 77-1 and Section 404 of the Clean Water Act, and to meet CDFG regulations. Depending on the final extent of the Project Area, additional field surveys may be needed to cover areas that were not surveyed during the September 2009 site visit.

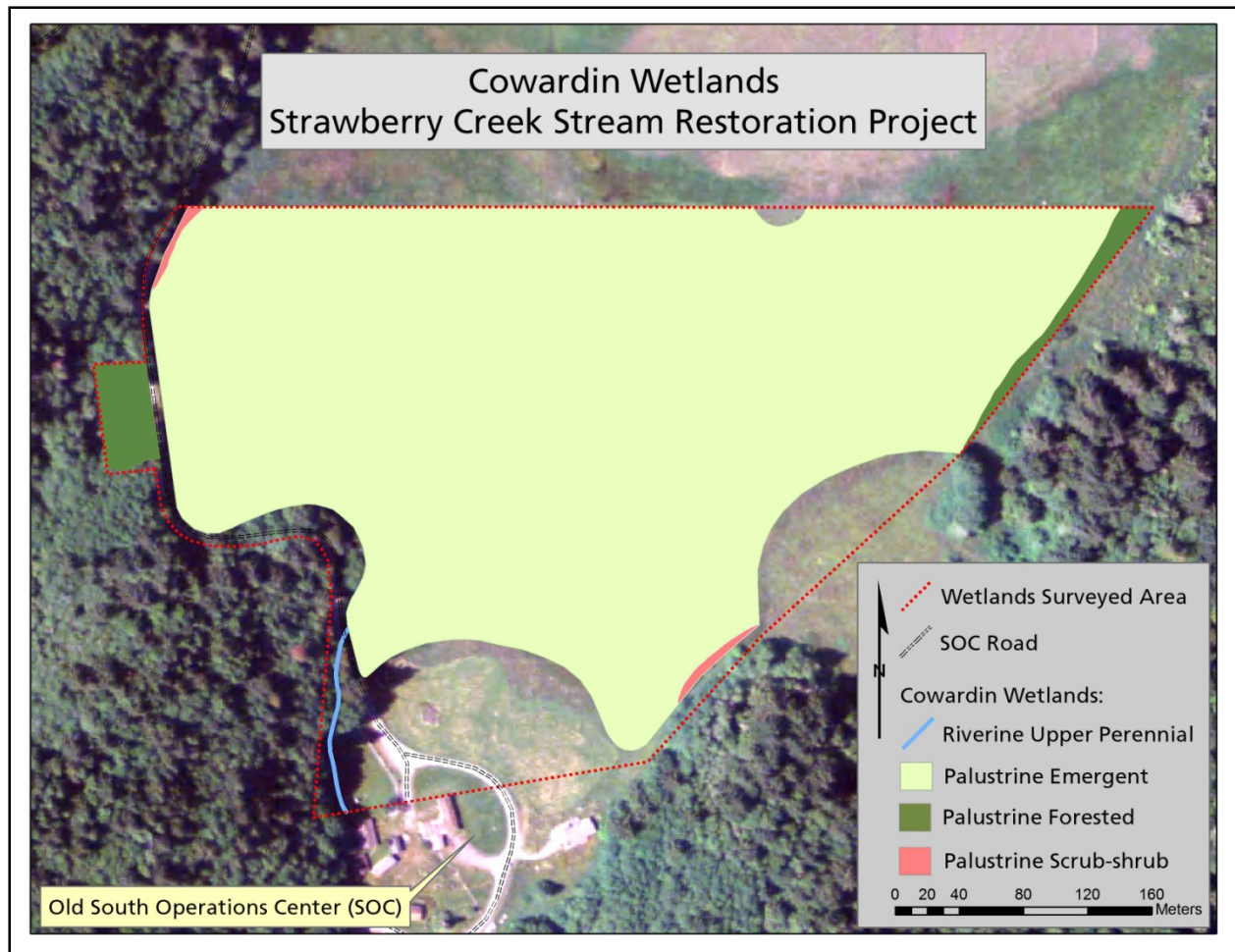


Figure 3: Cowardin wetlands within the Surveyed Area.

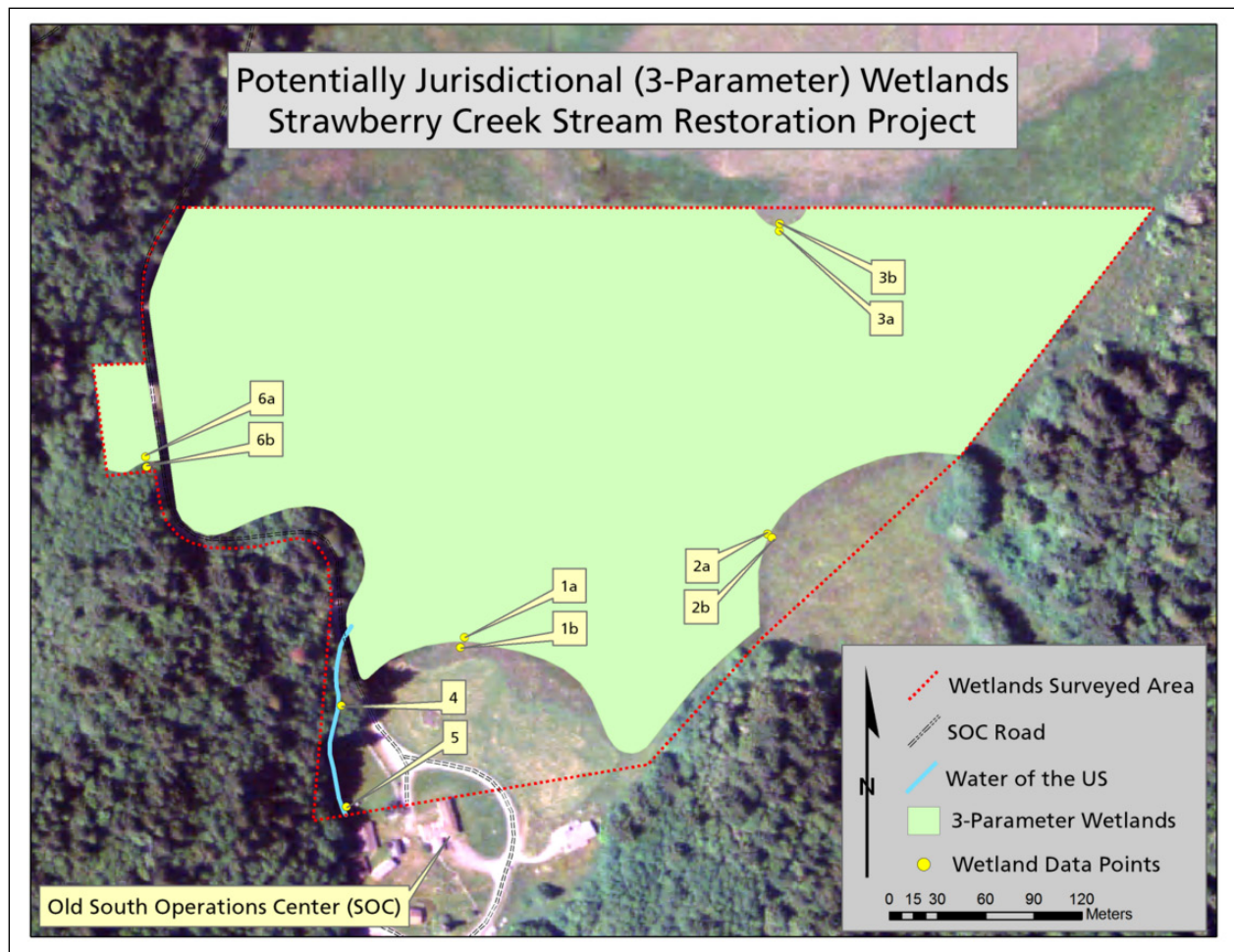


Figure 4: Potential “jurisdictional wetlands” (subject to Section 404 of the federal Clean Water Act) within the Surveyed Area.

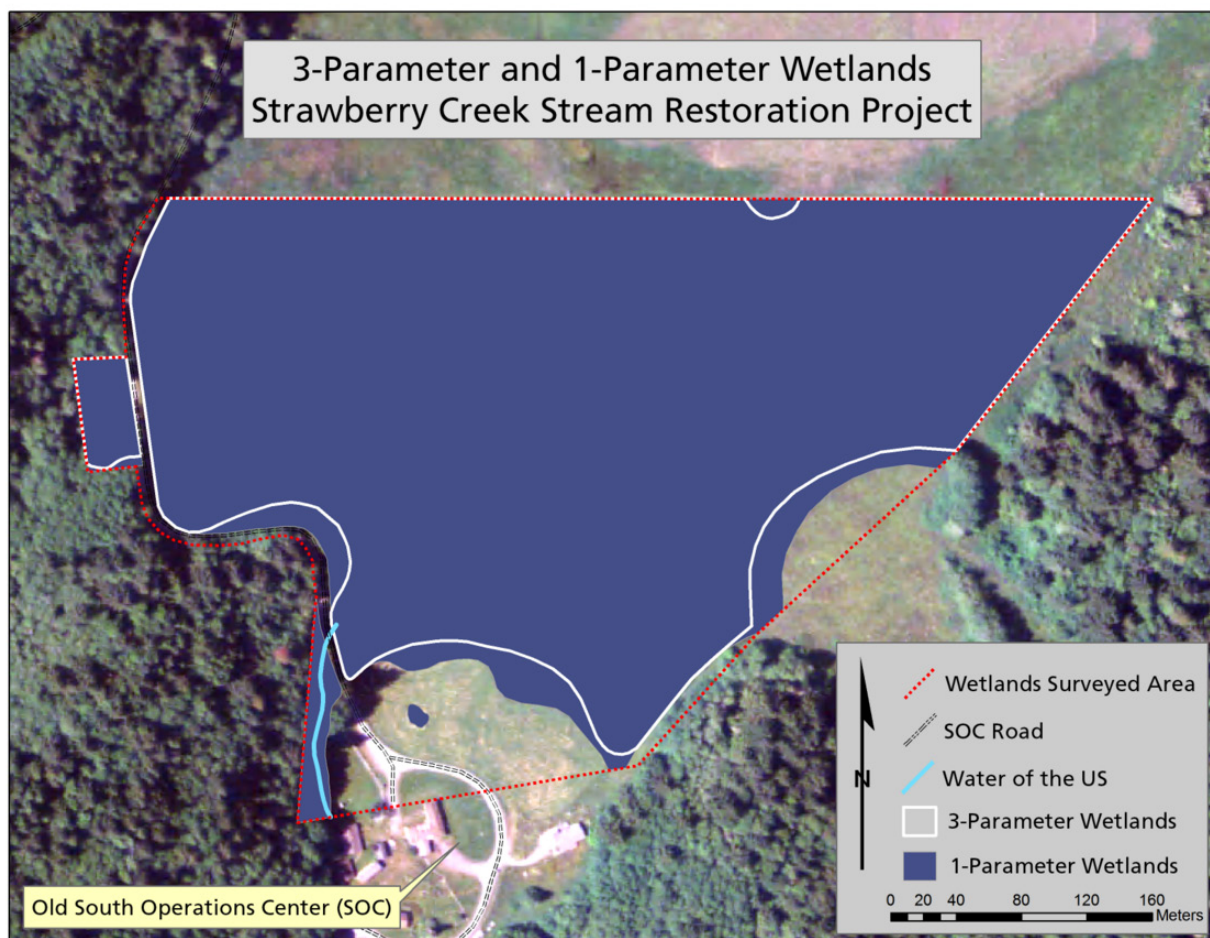


Figure 5: Three-parameter and one-parameter wetlands within the Surveyed Area.

Potential Impacts of Strawberry Creek Restoration on Adjacent Wetlands

In March 2008, Michael Love and Associates completed a “Lower Strawberry Creek Restoration Planning Report.” Figure 2.1 in that report is a 1936 aerial photo showing a “mixed height canopy” in the area of the present floating mat below the SOC tributary alluvial fan. The report states on page 45 that “over the long term, the biologically rich and productive wetland habitat that once existed in Lower Strawberry Creek ... may be reestablished” as a result of the proposed restoration. However, there isn’t really much analysis (other than the 1936 aerial photo) to support that statement. Do we really know what was there historically in terms of vegetation community, soils and wetland functions such as carbon storage, wildlife habitat, nutrient cycling, flood storage, and so on, and do we know that the proposed channel and riparian area restoration actions would reestablish them? The Environmental Assessment would need to include a much more thorough description of the historic wetland habitat, the hydrologic effects of the channel restoration on this area, and the methods and prospects for successful restoration.

The Love and Associates report refers to a “thick floating mat of reed canary grass that covers vast areas of the historic wetland complex” (p. 6). However, our preliminary observations at one central location on the floating mat (within the 119 soil mapping unit discussed in the soils section above) indicated the possibility of a different mat composition and origin. This preliminary investigation revealed approximately 40 centimeters of peat floating on approximately 45 centimeters of free water with a gray mineral soil below. The peat, free water, and mineral soil all smelled strongly of reduced sulfur. With the help of REDW botanist Stassia Samuels, we observed that *Glyceria* sp. (manna grass) was a dominant component of the vegetation community at this sample site, with minor components of *Scirpus microcarpus* (panicled bulrush), *Holcus lanatus* (velvet grass) and *Phalaris arundinacea* (reed canary grass). Stassia is working with a herbarium to determine the *Glyceria* species.

Pete Biggam (NPS-NRPC Soils Program Manager) examined a close-up photo (Figure 6) of the soil sample we extracted from the floating marsh. He agreed that this sample doesn’t appear to be from a mass of floating litter, but is much more indicative of an organic soil (histosol) or a histic epipedon that could have been established over centuries or millennia. It is unknown whether 40 centimeters of peat could have accumulated here since changes in the watershed created a backwater effect and elevated water levels. The mixed-height canopy evident in the 1936 photo is not inconsistent with the presence of a historic peat substrate, since relatively sparse canopy cover is known to exist in other peatland systems in the northwestern U.S.

Given our preliminary observations, we think it would be very informative to map vegetation in the marsh, identify the underlying organic matter composition, age the organic material, and determine effects of the predicted drawdown associated with creek restoration on this wetland ecosystem. According to Figures 2.9 and 3.4 in the 2008 report, there will be a significant lowering of water levels in the adjacent floating marsh if the proposed restoration proceeds. Figure 3.4 indicates that reed-canary grass in the Strawberry Creek channel is holding winter water levels 3 feet higher than the model shows would be the case if the channel was cleared and restored. REDW should consider having the contractor evaluate the expected drop in the adjacent marsh water level (i.e., develop an estimated new hydrograph for a few locations in the

adjacent wetland with respect to the organic soil surface) and discuss changes that can be expected in the marsh plant community and organic soil. Even more significant is that the 2008 report recommended removing the floating mat from the wetlands (p.45). It is critical to verify the nature of the historic wetlands on the site, including determining the age and composition of the organic mat, before proposing mat removal or modification.

Some questions to ask in an analysis of the environmental impacts of the proposed Strawberry Creek restoration plan include:

- What is the vegetation community composition and structure in the adjacent wetland areas?
- What is the nature of the organic mat (e.g., species composition, origin, age) in the adjacent wetlands? Is it a remnant of a historic peatland?
- What are the expected impacts of the project on the historic wetland characteristics, including the peat substrate?
- Will the water levels drop to the extent that historic peat will dry and oxidize (including burning)?
- Will water levels drop, but still be sufficiently high to maintain a peat-accumulating system with its associated benefits, including carbon sequestration?
- What will likely happen to the vegetation community under either scenario?
- Do there need to be revegetation or other restoration/management strategies for the historic wetlands under these scenarios, such as planting of herbaceous or woody species?

Dating the Organic Mat

Methods are available to age the organic layer and determine if it has been deposited since Strawberry Creek became clogged, or if it is a much older peat body that existed long before the anthropogenic effects. Dating the organic mat would help determine what impacts could be expected after Strawberry Creek is restored. If most of the organic mat is very recent, much of it may dry and oxidize, and possibly need to be removed to restore the native plant community. On the other hand if most of it is old (hundreds or thousands of years), REDW staff should determine if, even after the proposed creek restoration, the water table would be high enough to sustain a permanently saturated, peat-accumulating wetland. Possible dating methods include:

1) Radiocarbon dating: This method uses the loss of C-14 isotopes over time in dead organic matter to age the samples (roughly, probably within +/- 50 to 100 years). The idea would be to properly prepare samples from several depths within the peat body and have them analyzed at a reliable lab (such as Beta Analytic in Miami, FL). The cost for dating a sample would be about \$275 - \$300.

2) Cesium analysis: Atmospheric nuclear bomb testing in the 1950's left a layer of elevated Cesium in soils worldwide. A qualified lab could take Cesium measurements on a peat core every cm or so until the spike is evident. We could see what was deposited after the 1950's and what was deposited before, and get some idea of the rates of accumulation. This would let us know if this material was deposited long ago (Cs spike is very near the top of the peat column), whether it was deposited after the 1950's (no Cs spike), or if the great majority was deposited after the 1950's.



Figure 6: An organic soil sample from the floating marsh. Photo by Joel Wagner, NPS.

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Appendix A: Wetland delineation field data sheets

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SOIL

Sampling Point: **1A****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 ¹	Loc ²		
0-0.5"	surface organic							
0.5"-3'4"	10YR 3/1	85%	10R 4/8 (iron oxide)	15%	C	PL&M	Loam	No water or saturation present.

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☒ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?

Yes

☒

No

☐

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

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

- | | |
|--|---|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) |
| ☐ High Water Table (A2) | (except MLRA 1, 2, 4A, and 4B) |
| ☐ Saturation (A3) | ☐ Salt Crust (B11) |
| ☐ Water Marks (B1) | ☐ Aquatic Invertebrates (B13) |
| ☐ Sediment Deposits (B2) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Drift Deposits (B3) | ☒ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Algal Mat or Crust (B4) | ☐ Presence of Reduced Iron (C4) |
| ☐ Iron Deposits (B5) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Surface Soil Cracks (B6) | ☐ Stunted or Stresses Plants (D1) (LRR A) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- | |
|--|
| ☐ Water-Stained Leaves (B9) |
| (MLRA 1, 2, 4A, and 4B) |
| ☐ Drainage Patterns (B10) |
| ☐ Dry-Season Water Table (C2) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Geomorphic Position (D2) |
| ☐ Shallow Aquitard (D3) |
| ☒ FAC-Neutral Test (D5) |
| ☐ Raised Ant Mounds (D6) (LRR A) |
| ☐ Frost-Heave Hummocks (D7) |

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: **Strawberry Creek** City/County: **Orick/Humbolt** Sampling Date: **09/01/09**
 Applicant/Owner: **National Park Service, Redwood National and State Parks** State: **CA** Sampling Point: **1B**
 Investigator(s): **J. Wagner, M. Denn, S. Samuels, D. Anderson** Section, Township, Range: **T10N R1E**
 Landform (hillslope, terrace, etc.): **Alluvial Fan** Local relief (concave, convex, none): **Convex (slight)** Slope (%): **2%**
 Subregion (LRR): **LRR A** UTM Northing: **4569835.8** UTM Easting: **410238.1** Datum: **NAD83**
 Soil Map Unit Name: **Bigtree** NWI classification:
 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 Sampling Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Investigation at end of dry season.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. None				Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2.				Total Number of Dominant Species Across All Strata:	3 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	100% (A/B)
4.					
	0%		= Total Cover		
Sapling/Shrub Stratum (Plot Size: 2 meter radius)					
1. None				Prevalence Index worksheet:	
2.				<u>Total % Cover of:</u>	<u>Multiply by:</u>
3.				OBL species	x1 =
4.				FACW species	x2 =
5.				FAC species	x3 =
	0%		= Total Cover	FACU species	x4 =
				UPL species	x5 =
Herb Stratum (Plot Size: 2 meter radius)				Column Totals:	(A) (B)
1. Juncus effusus	40%	Yes	OBL	Prevalence Index = B/A =	
2. Glyceria occidentalis	25%	Yes	OBL		
3. Ranunculus occidentalis	20%	Yes	FACW		
4. Agrostis stolonifera	10%	No	FACW		
5. Holcus lanatus	5%	No	FAC		
6.					
7.					
8.					
9.					
10.					
11.					
	100%		= Total Cover		
Woody Vine Stratum (Plot Size: 2 meter radius)					
1. None					
2.					
	0%		= Total Cover		
% Bare Ground in Herb Stratum: 0%					
Remarks:				Hydrophytic Vegetation Present? Yes ☒ No ☐	

SOILSampling Point: **1B**

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-0.5"	surface organic							
0.5"-1'6"	10YR 4/2+	100%					Loam	No water or saturation present.
¹ Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)							Indicators for Problematic Hydric Soils³:	
☐	Histosol (A1)		☐	Sandy Redox (S5)		☐	2 cm Muck (A10)	
☐	Histic Epipedon (A2)		☐	Stripped Matrix (S6)		☐	Red Parent Material (TF2)	
☐	Black Histic (A3)		☐	Loamy Mucky Mineral (F1) (except MLRA 1)		☐	Other (Explain in Remarks)	
☐	Hydrogen Sulfide (A4)		☐	Loamy Gleyed Matrix (F2)		³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
☐	Depleted Below Dark Surface (A11)		☐	Depleted Matrix (F3)				
☐	Thick Dark Surface (A12)		☐	Redox Dark Surface (F6)				
☐	Sandy Mucky Mineral (S1)		☐	Depleted Dark Surface (F7)				
☐	Sandy Gleyed Matrix (S4)		☐	Redox Depressions (F8)				
Restrictive Layer (if present):								
Type: None								
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)	
☐	Surface Water (A1)		☐	Water-Stained Leaves (B9)	
☐	High Water Table (A2)		☐	(except MLRA 1, 2, 4A, and 4B)	
☐	Saturation (A3)		☐	Salt Crust (B11)	
☐	Water Marks (B1)		☐	Aquatic Invertebrates (B13)	
☐	Sediment Deposits (B2)		☐	Hydrogen Sulfide Odor (C1)	
☐	Drift Deposits (B3)		☐	Oxidized Rhizospheres along Living Roots (C3)	
☐	Algal Mat or Crust (B4)		☐	Presence of Reduced Iron (C4)	
☐	Iron Deposits (B5)		☐	Recent Iron Reduction in Tilled Soils (C6)	
☐	Surface Soil Cracks (B6)		☐	Stunted or Stresses Plants (D1) (LRR A)	
☐	Inundation Visible on Aerial Imagery (B7)		☐	Other (Explain in Remarks)	
☐	Sparsely Vegetated Concave Surface (B8)		☐	Frost-Heave Hummocks (D7)	
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: Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff					
Remarks:					

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: **Strawberry Creek** City/County: **Orick/Humbolt** Sampling Date: **09/01/09**
 Applicant/Owner: **National Park Service, Redwood National and State Parks** State: **CA** Sampling Point: **2A**
 Investigator(s): **J. Wagner, M. Denn, S. Samuels, D. Anderson** Section, Township, Range: **T10N R1E**
 Landform (hillslope, terrace, etc.): **Alluvial Fan** Local relief (concave, convex, none): **Convex (slight)** Slope (%): **1%**
 Subregion (LRR): **LRR A** UTM Northing: **4569906.4** UTM Easting: **410429.3** Datum: **NAD83**
 Soil Map Unit Name: **Arlynda** NWI classification: **Palustrine Emergent, Seasonally Saturated**
 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 Sampling Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Investigation at end of dry season.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. None				Number of Dominant Species That Are OBL, FACW, or FAC:	4 (A)
2.				Total Number of Dominant Species Across All Strata:	4 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	100% (A/B)
4.					
	0%		= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 2 meter radius)				Prevalence Index worksheet:	
1. None				<u>Total % Cover of:</u>	<u>Multiply by:</u>
2.				OBL species	x1 =
3.				FACW species	x2 =
4.				FAC species	x3 =
5.				FACU species	x4 =
	0%		= Total Cover	UPL species	x5 =
<u>Herb Stratum</u> (Plot Size: 2 meter radius)				Column Totals:	(A) (B)
1. Juncus effusus ssp. brunneus	25%	Yes	OBL	Prevalence Index = B/A =	
2. Scirpus microcarpus	15%	Yes	OBL	Hydrophytic Vegetation Indicators:	
3. Holcus lanatus	15%	Yes	FAC	X Dominance Test is >50%	
4. Ranunculus occidentalis	15%	Yes	FACW	Prevalence Index is ≤3.0 ¹	
5. Agrostis stolonifera	10%	No	FACW	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
6. Glyceria occidentalis	10%	No	OBL	Wetland Non-Vascular Plants ¹	
7. Urtica dioica	5%	No	FACW	Problematic Hydrophytic Vegetation ¹ (Explain)	
8. Cirsium arvense	5%	No	FAC	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
9.					
10.					
11.					
	100%		= Total Cover		
<u>Woody Vine Stratum</u> (Plot Size: 2 meter radius)					
1. None				Hydrophytic Vegetation Present?	
2.				Yes ☒ No ☐	
	0%		= Total Cover		
% Bare Ground in Herb Stratum: 0%					
Remarks:					

SOIL

Sampling Point: **2A****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 ¹	Loc ²		
0-0.5"	surface organic							
0.5"-1'6"	10YR 4/1	65%	10R 4/8 (iron oxide)	35%	C	PL&M	Loam	No water or saturation present.

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☒ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?

Yes

☒

No

☐Remarks: **Numerous oxidized rhizospheres in 0.5"-1'16" soil horizon**

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) |
| ☐ High Water Table (A2) | (except MLRA 1, 2, 4A, and 4B) |
| ☐ Saturation (A3) | ☐ Salt Crust (B11) |
| ☐ Water Marks (B1) | ☐ Aquatic Invertebrates (B13) |
| ☐ Sediment Deposits (B2) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Drift Deposits (B3) | ☒ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Algal Mat or Crust (B4) | ☐ Presence of Reduced Iron (C4) |
| ☐ Iron Deposits (B5) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Surface Soil Cracks (B6) | ☐ Stunted or Stresses Plants (D1) (LRR A) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)
- (MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: **Strawberry Creek** City/County: **Orick/Humbolt** Sampling Date: **09/01/09**
 Applicant/Owner: **National Park Service, Redwood National and State Parks** State: **CA** Sampling Point: **2B**
 Investigator(s): **J. Wagner, M. Denn, S. Samuels, D. Anderson** Section, Township, Range: **T10N R1E**
 Landform (hillslope, terrace, etc.): **Abandoned Alluvial Fan** Local relief (concave, convex, none): **Convex (slight)** Slope (%): **1%**
 Subregion (LRR): **LRR A** UTM Northing: **4569904.0** UTM Easting: **410432.2** Datum: **NAD83**
 Soil Map Unit Name: **Arlynda** NWI classification:
 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 Sampling Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Investigation at end of dry season.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A) Total Number of Dominant Species Across All Strata: 3 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)
1. None				
2.				
3.				
4.				
	0%		= Total Cover	
Sapling/Shrub Stratum (Plot Size: 2 meter radius)				
1. None				Prevalence Index worksheet: <u>Total % Cover of:</u> <u>Multiply by:</u> OBL species x1 = FACW species x2 = FAC species x3 = FACU species x4 = UPL species x5 = Column Totals: (A) (B) Prevalence Index = B/A =
2.				
3.				
4.				
5.				
	0%		= Total Cover	
Herb Stratum (Plot Size: 2 meter radius)				
1. Juncus effusus spp. brunnei	30%	Yes	OBL	Hydrophytic Vegetation Indicators: X Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. Holcus lanatus	20%	Yes	FAC	
3. Ranunculus occidentalis	15%	Yes	FACW	
4. Glyceria occidentalis	10%	No	OBL	
5. Cirsium arvense	10%	No	FAC	
6. Urtica dioica	5%	No	FACW	
7. Scirpus microcarpus	5%	No	OBL	
8. Agrostis stolonifera	5%	No	FACW	
9.				
10.				
11.				
	100%		= Total Cover	
Woody Vine Stratum (Plot Size: 2 meter radius)				
1. None				Hydrophytic Vegetation Present? Yes ☒ No ☐
2.				
	0%		= Total Cover	
% Bare Ground in Herb Stratum: 0%				
Remarks:				

SOIL

Sampling Point: **2B****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 ¹	Loc ²		
0-0.5"	surface organic							
0.5"-1'6"	10YR 4/1	90%	10R 4/8 (iron oxide)	10%	C	PL&M	Loam	No water or saturation present.

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?**Yes**☒**No**☐

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

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

☐ Surface Water (A1)	☐ Water-Stained Leaves (B9)
☐ High Water Table (A2)	(except MLRA 1, 2, 4A, and 4B)
☐ Saturation (A3)	☐ Salt Crust (B11)
☐ Water Marks (B1)	☐ Aquatic Invertebrates (B13)
☐ Sediment Deposits (B2)	☐ Hydrogen Sulfide Odor (C1)
☐ Drift Deposits (B3)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Algal Mat or Crust (B4)	☐ Presence of Reduced Iron (C4)
☐ Iron Deposits (B5)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Surface Soil Cracks (B6)	☐ Stunted or Stresses Plants (D1) (LRR A)
☐ Inundation Visible on Aerial Imagery (B7)	☐ Other (Explain in Remarks)
☐ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9)
(MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D7)

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: **Strawberry Creek** City/County: **Orick/Humbolt** Sampling Date: **09/01/09**
 Applicant/Owner: **National Park Service, Redwood National and State Parks** State: **CA** Sampling Point: **3A**
 Investigator(s): **J. Wagner, M. Denn, S. Samuels, D. Anderson** Section, Township, Range: **T10N R1E**
 Landform (hillslope, terrace, etc.): **Depression** Local relief (concave, convex, none): **None** Slope (%): **0%**
 Subregion (LRR): **LRR A** UTM Northing: **4570094.7** UTM Easting: **410436.7** Datum: **NAD83**
 Soil Map Unit Name: **Arlynda** NWI classification: **Palustrine Emergent, Seasonally Saturated**
 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 Sampling Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Investigation at end of dry season.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. None				Number of Dominant Species That Are OBL, FACW, or FAC:	4 (A)
2.				Total Number of Dominant Species Across All Strata:	4 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	100% (A/B)
4.					
	0%		= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 2 meter radius)				Prevalence Index worksheet:	
1. None				<u>Total % Cover of:</u>	<u>Multiply by:</u>
2.				OBL species	x1 =
3.				FACW species	x2 =
4.				FAC species	x3 =
5.				FACU species	x4 =
	0%		= Total Cover	UPL species	x5 =
<u>Herb Stratum</u> (Plot Size: 2 meter radius)				Column Totals:	(A) (B)
1. Glyceria occidentalis	50%	Yes	OBL	Prevalence Index = B/A =	
2. Juncus effusus	15%	Yes	OBL	Hydrophytic Vegetation Indicators:	
3. Holcus lanatus	15%	Yes	FAC	X Dominance Test is >50%	
4. Scirpus microcarpus	15%	Yes	OBL	Prevalence Index is ≤3.0 ¹	
5. Agrostis stolonifera	5%	No	FACW	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
6.				Wetland Non-Vascular Plants ¹	
7.				Problematic Hydrophytic Vegetation ¹ (Explain)	
8.				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
9.					
10.					
11.					
	100%		= Total Cover		
<u>Woody Vine Stratum</u> (Plot Size: 2 meter radius)					
1. None				Hydrophytic Vegetation Present?	
2.				Yes ☒ No ☐	
	0%		= Total Cover		
% Bare Ground in Herb Stratum: 0%					
Remarks:					

SOIL

Sampling Point: **3A****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 ¹	Loc ²		
0-0.25"	surface organic							
0.25"-1'6"	2.5YR 4/0	95%	10R 4/8 (iron oxide)	5%	C	PL&M	Clay loam	No water or saturation present.

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☒ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?**Yes**☒**No**☐

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

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

- | | |
|--|---|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) |
| ☐ High Water Table (A2) | (except MLRA 1, 2, 4A, and 4B) |
| ☐ Saturation (A3) | ☐ Salt Crust (B11) |
| ☐ Water Marks (B1) | ☐ Aquatic Invertebrates (B13) |
| ☐ Sediment Deposits (B2) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Drift Deposits (B3) | ☒ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Algal Mat or Crust (B4) | ☐ Presence of Reduced Iron (C4) |
| ☐ Iron Deposits (B5) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Surface Soil Cracks (B6) | ☐ Stunted or Stresses Plants (D1) (LRR A) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- | |
|--|
| ☐ Water-Stained Leaves (B9) |
| (MLRA 1, 2, 4A, and 4B) |
| ☐ Drainage Patterns (B10) |
| ☐ Dry-Season Water Table (C2) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Geomorphic Position (D2) |
| ☐ Shallow Aquitard (D3) |
| ☒ FAC-Neutral Test (D5) |
| ☐ Raised Ant Mounds (D6) (LRR A) |
| ☐ Frost-Heave Hummocks (D7) |

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: **Strawberry Creek** City/County: **Orick/Humbolt** Sampling Date: **09/01/09**
 Applicant/Owner: **National Park Service, Redwood National and State Parks** State: **CA** Sampling Point: **3B**
 Investigator(s): **J. Wagner, M. Denn, S. Samuels, D. Anderson** Section, Township, Range: **T10N R1E**
 Landform (hillslope, terrace, etc.): **Depression** Local relief (concave, convex, none): **None** Slope (%): **0%**
 Subregion (LRR): **LRR A** UTM Northing: **4570099.2** UTM Easting: **410437.1** Datum: **NAD83**
 Soil Map Unit Name: **Arlynda** NWI classification:
 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 Sampling Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Investigation at end of dry season.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:			
1. None				Number of Dominant Species That Are OBL, FACW, or FAC:	1		(A)
2.				Total Number of Dominant Species Across All Strata:	2		(B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	50%		(A/B)
4.	0%		= Total Cover				
<u>Sapling/Shrub Stratum</u> (Plot Size: 2 meter radius)				Prevalence Index worksheet:			
1. None				<u>Total % Cover of:</u>		<u>Multiply by:</u>	
2.				OBL species	40	x1 =	40
3.				FACW species	15	x2 =	30
4.				FAC species	5	x3 =	15
5.				FACU species	40	x4 =	160
	0%		= Total Cover	UPL species	0	x5 =	0
<u>Herb Stratum</u> (Plot Size: 2 meter radius)				Column Totals:	100	(A)	245 (B)
1. Trifolium repens	40%	Yes	FACU	Prevalence Index = B/A = 2.45			
2. Juncus effusus	30%	Yes	OBL				
3. Agrostis stolonifera	10%	No	FACW				
4. Glyceria occidentalis	10%	No	OBL				
5. Holcus lanatus	5%	No	FAC				
6. Ranunculus occidentalis	5%	No	FACW				
7.							
8.							
9.							
10.							
11.							
	100%		= Total Cover				
<u>Woody Vine Stratum</u> (Plot Size: 2 meter radius)							
1. None							
2.							
	0%		= Total Cover				
% Bare Ground in Herb Stratum: 0%							
Remarks:				Hydrophytic Vegetation Present? Yes ☒ No ☐			

SOIL

Sampling Point: **3B****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 ¹	Loc ²		
0"-1'6"	10YR 4/1	80%	10R 4/8 (iron oxide)	20%	C	M	Clay loam	No water or saturation present.
¹ Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² 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) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☒ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?

Yes

☒

No

☐

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

☐ Surface Water (A1)	☐ Water-Stained Leaves (B9)
☐ High Water Table (A2)	(except MLRA 1, 2, 4A, and 4B)
☐ Saturation (A3)	☐ Salt Crust (B11)
☐ Water Marks (B1)	☐ Aquatic Invertebrates (B13)
☐ Sediment Deposits (B2)	☐ Hydrogen Sulfide Odor (C1)
☐ Drift Deposits (B3)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Algal Mat or Crust (B4)	☐ Presence of Reduced Iron (C4)
☐ Iron Deposits (B5)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Surface Soil Cracks (B6)	☐ Stunted or Stresses Plants (D1) (LRR A)
☐ Inundation Visible on Aerial Imagery (B7)	☐ Other (Explain in Remarks)
☐ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9)
(MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D7)

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	Strawberry Creek		City/County:	Orick/Humbolt	Sampling Date:	09/02/09	
Applicant/Owner:	National Park Service, Redwood National and State Parks		State:	CA	Sampling Point:	4	
Investigator(s):	J. Wagner, M. Denn, S. Samuels, D. Anderson		Section, Township, Range:	T10N R1E			
Landform (hillslope, terrace, etc.):	Base of colluvium	Local relief (concave, convex, none):	Convex	Slope (%):	4%		
Subregion (LRR):	LRR A	UTM Northing	4569736.8	UTM Easting:	410167.0	Datum:	NAD83
Soil Map Unit Name:	Bigtree		NW1 classification:				

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 Sampling Area within a Wetland?	Yes	☐	No	☒
Hydric Soil Present?	Yes	☐	No	☒					
Wetland Hydrology Present?	Yes	☐	No	☒					
Remarks: Investigation at end of dry season. This site is on the right bank of Strawberry Creek (looking downstream), just upstream of the culvert for the creek within the project area. Soil is disturbed by intrusions of fill.									

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. <i>Alnus rubra</i>	10%	Yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2.				Total Number of Dominant Species Across All Strata:	3 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	100% (A/B)
4.					
	10%	= Total Cover			
<u>Sapling/Shrub Stratum (Plot Size: 2 meter radius)</u>					
1. <i>Rubus armeniacus</i>	85%	Yes	FACW	Prevalence Index worksheet:	
2.				<u>Total % Cover of:</u>	<u>Multiply by:</u>
3.				OBL species	x1 =
4.				FACW species	x2 =
5.				FAC species	x3 =
	85%	= Total Cover		FACU species	x4 =
				UPL species	x5 =
<u>Herb Stratum (Plot Size: 2 meter radius)</u>				Column Totals:	(A) (B)
1. <i>Phalaris arundinacea</i>	80%	Yes	OBL	Prevalence Index = B/A =	
2. <i>Urtica dioica</i>	15%	No	FACW		
3. <i>Ranunculus occidentalis</i>	5%	No	FACW		
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
	100%	= Total Cover			
<u>Woody Vine Stratum (Plot Size: 2 meter radius)</u>					
1. None					
2.					
	0%	= Total Cover			
% Bare Ground in Herb Stratum: 0%					
Hydrophytic Vegetation Indicators: X Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.					
Hydrophytic Vegetation Present? Yes ☒ No ☐					
Remarks:					

SOIL

Sampling Point: **4****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 ¹	Loc ²		
0-8"	10YR 2/2	98%	10R 4/8 (iron oxide)	2%	C	M	Clay loam	Very faint, sparse redox conc. in matrix.
8"-1'1"	7.5YR 3/2	100%					Loam	
1'1"-2'	10YR 3/3	100%					Loam	No water or saturation present.

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- ☐ 2 cm Muck (A10)
- ☐ Red Parent Material (TF2)
- ☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?

Yes

☐

No

☒

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) |
| ☐ High Water Table (A2) | (except MLRA 1, 2, 4A, and 4B) |
| ☐ Saturation (A3) | ☐ Salt Crust (B11) |
| ☐ Water Marks (B1) | ☐ Aquatic Invertebrates (B13) |
| ☐ Sediment Deposits (B2) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Drift Deposits (B3) | ☐ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Algal Mat or Crust (B4) | ☐ Presence of Reduced Iron (C4) |
| ☐ Iron Deposits (B5) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Surface Soil Cracks (B6) | ☐ Stunted or Stresses Plants (D1) (LRR A) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- ☐ Water-Stained Leaves (B9)
- (MLRA 1, 2, 4A, and 4B)**
- ☐ Drainage Patterns (B10)
- ☐ Dry-Season Water Table (C2)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☒ FAC-Neutral Test (D5)
- ☐ Raised Ant Mounds (D6) **(LRR A)**
- ☐ Frost-Heave Hummocks (D7)

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site:	Strawberry Creek		City/County:	Orick/Humbolt	Sampling Date:	09/02/09	
Applicant/Owner:	National Park Service, Redwood National and State Parks		State:	CA	Sampling Point:	5	
Investigator(s):	J. Wagner, M. Denn, S. Samuels, D. Anderson		Section, Township, Range:	T10N R1E			
Landform (hillslope, terrace, etc.):	Alluvial fan	Local relief (concave, convex, none):	Convex	Slope (%):	2%		
Subregion (LRR):	LRR A	UTM Northing	4569736.8	UTM Easting:	410167.0	Datum:	NAD83
Soil Map Unit Name:	Bigtree		NW1 classification:				

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 Sampling Area within a Wetland?	Yes	☐	No	☒
Hydric Soil Present?	Yes	☐	No	☒					
Wetland Hydrology Present?	Yes	☐	No	☒					
Remarks: Investigation at end of dry season. Site 300' upstream of Strawberry Creek road culvert on right bank. 4' from streambank.									

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A) Total Number of Dominant Species Across All Strata: 5 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)	
1. <i>Alnus rubra</i>	40%	Yes	FACW		
2.					
3.					
4.					
	40%	= Total Cover			
Sapling/Shrub Stratum (Plot Size: 2 meter radius)					
1. <i>Rubus armeniacus</i>	25%	Yes	FACW	Prevalence Index worksheet: <u>Total % Cover of:</u> <u>Multiply by:</u> OBL species x1 = FACW species x2 = FAC species x3 = FACU species x4 = UPL species x5 = Column Totals: (A) (B) Prevalence Index = B/A =	
2. <i>Rubus spectabilis</i>	20%	Yes	FAC		
3.					
4.					
5.					
	45%	= Total Cover			
Herb Stratum (Plot Size: 2 meter radius)					
1. <i>Phalaris arundinacea</i>	50%	Yes	OBL		
2. <i>Holcus lanatus</i>	10%	Yes	FAC		
3. <i>Ranunculus occidentalis</i>	5%	No	FACW		
4. <i>Brassica nigra</i>	5%	No	UPL		
5. <i>Stachys ajugoides ssp. rigida</i>	5%	No	OBL		
6. <i>Urtica dioica</i>	2%	No	FACW		
7. <i>Tolmiea menziesii</i>	2%	No	OBL		
8. <i>Athyrium filix-femina</i>	2%	No	FAC		
9.				Hydrophytic Vegetation Indicators: X Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
10.					
11.					
	76%	= Total Cover			
Woody Vine Stratum (Plot Size: 2 meter radius)					
1. None				Hydrophytic Vegetation Present? Yes ☒ No ☐	
2.					
	0%	= Total Cover			
% Bare Ground in Herb Stratum: 24%					
Remarks:					

SOIL

Sampling Point: **5****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 ¹	Loc ²		
0-8"	10YR 3/3	100%					Clay loam	No redox concentrations.
8"-1'6"	7.5YR 3/2	25%					Sandy clay	
8"-1'6"	10YR 3/3	75%					Clay loam	Faint redox concentrations (<1%).
1'6"-2'	5YR 5/1	>98%	10R 4/8 (iron oxide)	<2%	C	M	Sandy clay loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☐ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?

Yes

☐

No

☒Remarks: **Soil appears disturbed. Possibly tilled or placed as levee material.**

HYDROLOGY

Wetland Hydrology Indicators:

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

- | | |
|--|---|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) |
| ☐ High Water Table (A2) | (except MLRA 1, 2, 4A, and 4B) |
| ☐ Saturation (A3) | ☐ Salt Crust (B11) |
| ☐ Water Marks (B1) | ☐ Aquatic Invertebrates (B13) |
| ☐ Sediment Deposits (B2) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Drift Deposits (B3) | ☐ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Algal Mat or Crust (B4) | ☐ Presence of Reduced Iron (C4) |
| ☐ Iron Deposits (B5) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Surface Soil Cracks (B6) | ☐ Stunted or Stresses Plants (D1) (LRR A) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- | |
|--|
| ☐ Water-Stained Leaves (B9) |
| (MLRA 1, 2, 4A, and 4B) |
| ☐ Drainage Patterns (B10) |
| ☐ Dry-Season Water Table (C2) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Geomorphic Position (D2) |
| ☐ Shallow Aquitard (D3) |
| ☒ FAC-Neutral Test (D5) |
| ☐ Raised Ant Mounds (D6) (LRR A) |
| ☐ Frost-Heave Hummocks (D7) |

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: **Strawberry Creek** City/County: **Orick/Humbolt** Sampling Date: **09/02/09**
 Applicant/Owner: **National Park Service, Redwood National and State Parks** State: **CA** Sampling Point: **6A**
 Investigator(s): **J. Wagner, M. Denn, S. Samuels, D. Anderson** Section, Township, Range: **T10N R1E**
 Landform (hillslope, terrace, etc.): **Alluvium** Local relief (concave, convex, none): **None** Slope (%): **0%**
 Subregion (LRR): **LRR A** UTM Northing: **4569954.3** UTM Easting: **410042.2** Datum: **NAD83**
 Soil Map Unit Name: **Arlynda** NWI classification: **Palustrine Emergent, Permanently Saturated**
 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 Sampling Area within a Wetland?	Yes ☒ No ☐
Hydric Soil Present?	Yes ☒ No ☐		
Wetland Hydrology Present?	Yes ☒ No ☐		
Remarks: Investigation at end of dry season.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. <i>Alunus rubra</i>	80%	Yes	FACW	Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2.				Total Number of Dominant Species Across All Strata:	3 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	100% (A/B)
4.					
	80%	= Total Cover			
<u>Sapling/Shrub Stratum</u> (Plot Size: 2 meter radius)				Prevalence Index worksheet:	
1. <i>Rubus spectabilis</i>	15%	Yes	FAC	<u>Total % Cover of:</u>	<u>Multiply by:</u>
2.				OBL species	x1 =
3.				FACW species	x2 =
4.				FAC species	x3 =
5.				FACU species	x4 =
	15%	= Total Cover		UPL species	x5 =
<u>Herb Stratum</u> (Plot Size: 2 meter radius)				Column Totals:	(A) (B)
1. <i>Phalaris arundinaceae</i>	70%	Yes	OBL	Prevalence Index = B/A =	
2. <i>Carex obnupta</i>	8%	No	OBL	Hydrophytic Vegetation Indicators:	
3. <i>Lysichiton americanus</i>	8%	No	OBL	X Dominance Test is >50%	
4. <i>Ranunculus occidentalis</i>	5%	No	FACW	Prevalence Index is ≤3.0 ¹	
5. <i>Scirpus microcarpus</i>	5%	No	OBL	Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
6. <i>Oenanthe sarmentosa</i>	4%	No	OBL	Wetland Non-Vascular Plants ¹	
7.				Problematic Hydrophytic Vegetation ¹ (Explain)	
8.				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
9.					
10.					
11.					
	100%	= Total Cover			
<u>Woody Vine Stratum</u> (Plot Size: 2 meter radius)					
1. None				Hydrophytic Vegetation Present?	
2.				Yes ☒ No ☐	
	0%	= Total Cover			
% Bare Ground in Herb Stratum: 0%					
Remarks:					

SOIL

Sampling Point: **6A****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 ¹	Loc ²		
0-0.75"	surface organic							
0.75"-2'	10YR 3/2	85%	10R 4/8 (iron oxide)	15%	C	M	Clay loam	Water table in top 18"; no oxidized rhizospheres present.

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1) |
| ☐ Hydrogen Sulfide (A4) | ☐ Loamy Gleyed Matrix (F2) |
| ☐ Depleted Below Dark Surface (A11) | ☐ Depleted Matrix (F3) |
| ☐ Thick Dark Surface (A12) | ☒ Redox Dark Surface (F6) |
| ☐ Sandy Mucky Mineral (S1) | ☐ Depleted Dark Surface (F7) |
| ☐ Sandy Gleyed Matrix (S4) | ☐ Redox Depressions (F8) |

Indicators for Problematic Hydric Soils³:

- | |
|---|
| ☐ 2 cm Muck (A10) |
| ☐ Red Parent Material (TF2) |
| ☐ Other (Explain in Remarks) |

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?

Yes

☒

No

☐

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

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

- | | |
|--|---|
| ☐ Surface Water (A1) | ☐ Water-Stained Leaves (B9) |
| ☒ High Water Table (A2) | (except MLRA 1, 2, 4A, and 4B) |
| ☒ Saturation (A3) | ☐ Salt Crust (B11) |
| ☐ Water Marks (B1) | ☐ Aquatic Invertebrates (B13) |
| ☐ Sediment Deposits (B2) | ☐ Hydrogen Sulfide Odor (C1) |
| ☐ Drift Deposits (B3) | ☐ Oxidized Rhizospheres along Living Roots (C3) |
| ☐ Algal Mat or Crust (B4) | ☐ Presence of Reduced Iron (C4) |
| ☐ Iron Deposits (B5) | ☐ Recent Iron Reduction in Tilled Soils (C6) |
| ☐ Surface Soil Cracks (B6) | ☐ Stunted or Stresses Plants (D1) (LRR A) |
| ☐ Inundation Visible on Aerial Imagery (B7) | ☐ Other (Explain in Remarks) |
| ☐ Sparsely Vegetated Concave Surface (B8) | |

Secondary Indicators (2 or more required)

- | |
|--|
| ☐ Water-Stained Leaves (B9) |
| (MLRA 1, 2, 4A, and 4B) |
| ☒ Drainage Patterns (B10) |
| ☒ Dry-Season Water Table (C2) |
| ☐ Saturation Visible on Aerial Imagery (C9) |
| ☐ Geomorphic Position (D2) |
| ☐ Shallow Aquitard (D3) |
| ☒ FAC-Neutral Test (D5) |
| ☐ Raised Ant Mounds (D6) (LRR A) |
| ☐ Frost-Heave Hummocks (D7) |

Field Observations:

Surface Water Present?	Yes	☐	No	☒	Depth (inches):	
Water Table Present?	Yes	☒	No	☐	Depth (inches):	18"
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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: **Strawberry Creek** City/County: **Orick/Humbolt** Sampling Date: **09/02/09**
 Applicant/Owner: **National Park Service, Redwood National and State Parks** State: **CA** Sampling Point: **6B**
 Investigator(s): **J. Wagner, M. Denn, S. Samuels, D. Anderson** Section, Township, Range: **T10N R1E**
 Landform (hillslope, terrace, etc.): **Alluvium** Local relief (concave, convex, none): **Convex (slight)** Slope (%): **1%**
 Subregion (LRR): **LRR A** UTM Northing: **4569947.1** UTM Easting: **4100043.3** Datum: **NAD83**
 Soil Map Unit Name: _____ NWI classification: _____
 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 Sampling Area within a Wetland?	Yes ☐ No ☒
Hydric Soil Present?	Yes ☐ No ☒		
Wetland Hydrology Present?	Yes ☐ No ☒		
Remarks: Investigation at end of dry season.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2 meter radius)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A) Total Number of Dominant Species Across All Strata: 2 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)
1. <i>Alnus rubra</i>	85%	Yes	FACW	
2.				
3.				
4.				
	85%	= Total Cover		
Sapling/Shrub Stratum (Plot Size: 2 meter radius)				
1. None				Prevalence Index worksheet: <u>Total % Cover of:</u> _____ <u>Multiply by:</u> _____ OBL species x1 = _____ FACW species x2 = _____ FAC species x3 = _____ FACU species x4 = _____ UPL species x5 = _____ Column Totals: (A) _____ (B) _____ Prevalence Index = B/A = _____
2.				
3.				
4.				
5.				
	0%	= Total Cover		
Herb Stratum (Plot Size: 2 meter radius)				
1. <i>Phalaris arundinaceae</i>	75%	Yes	OBL	Hydrophytic Vegetation Indicators: X Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
2. <i>Scirpus microcarpus</i>	15%	No	OBL	
3. <i>Ranunculus occidentalis</i>	8%	No	FACW	
4. <i>Lysichiton americanus</i>	2%	No	OBL	
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	100%	= Total Cover		
Woody Vine Stratum (Plot Size: 2 meter radius)				
1. None				Hydrophytic Vegetation Present? Yes ☒ No ☐
2.				
	0%	= Total Cover		
% Bare Ground in Herb Stratum: 0%				
Remarks:				

SOIL

Sampling Point: **6B****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 ¹	Loc ²		
0-0.5"	surface organic							
0.5"-1'6"	10YR 3/1+	100%					Clay loam	No water or saturation present.

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: 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) (except MLRA 1)
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)
☐ Depleted Below Dark Surface (A11)	☐ Depleted Matrix (F3)
☐ Thick Dark Surface (A12)	☐ Redox Dark Surface (F6)
☐ Sandy Mucky Mineral (S1)	☐ Depleted Dark Surface (F7)
☐ Sandy Gleyed Matrix (S4)	☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils³:

☐ 2 cm Muck (A10)
☐ Red Parent Material (TF2)
☐ Other (Explain in Remarks)

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.**Restrictive Layer (if present):**Type: **None**

Depth (Inches):

Hydric Soils Present?

Yes

☐

No

☒

Remarks:

HYDROLOGY**Wetland Hydrology Indicators:**

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

☐ Surface Water (A1)	☐ Water-Stained Leaves (B9)
☐ High Water Table (A2)	(except MLRA 1, 2, 4A, and 4B)
☐ Saturation (A3)	☐ Salt Crust (B11)
☐ Water Marks (B1)	☐ Aquatic Invertebrates (B13)
☐ Sediment Deposits (B2)	☐ Hydrogen Sulfide Odor (C1)
☐ Drift Deposits (B3)	☐ Oxidized Rhizospheres along Living Roots (C3)
☐ Algal Mat or Crust (B4)	☐ Presence of Reduced Iron (C4)
☐ Iron Deposits (B5)	☐ Recent Iron Reduction in Tilled Soils (C6)
☐ Surface Soil Cracks (B6)	☐ Stunted or Stresses Plants (D1) (LRR A)
☐ Inundation Visible on Aerial Imagery (B7)	☐ Other (Explain in Remarks)
☐ Sparsely Vegetated Concave Surface (B8)	

Secondary Indicators (2 or more required)

☐ Water-Stained Leaves (B9)
(MLRA 1, 2, 4A, and 4B)
☐ Drainage Patterns (B10)
☐ Dry-Season Water Table (C2)
☐ Saturation Visible on Aerial Imagery (C9)
☐ Geomorphic Position (D2)
☐ Shallow Aquitard (D3)
☒ FAC-Neutral Test (D5)
☐ Raised Ant Mounds (D6) (LRR A)
☐ Frost-Heave Hummocks (D7)

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:**Aerial photo in time series since 1936, NRCS soils map, previous inspections by park staff**

Remarks:

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 167/106415, January 2011

National Park Service
U.S. Department of the Interior



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