Delineation of Waters of the United States for Lawrence Livermore National Laboratory, Site 300

Robert E. Preston, Ph.D.

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Delineation of Waters of the United States for Lawrence Livermore National Laboratory, Site 300

Prepared for:

Lawrence Livermore National Laboratory
7000 East Avenue
P.O. Box 808
Livermore, CA 94550
Contact: Michael van Hattem
925/424-6795

Prepared by:

Jones & Stokes
2600 V Street
Sacramento, CA 95818-1914
Contact: Robert E. Preston, Ph.D.
916/503-6681

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Executive Summary

This report presents the results of a delineation of waters of the United States, including wetlands, for Lawrence Livermore National Laboratory’s Site 300 in Alameda and San Joaquin Counties, California. Jones & Stokes mapped vegetation at Site 300 in August, 2001, using Global Positioning System (GPS) data recorders to collect point locations and to record linear features and map unit polygons. We identified wetlands boundaries in the field on the basis of the plant community present. We returned to collect additional information on wetland soils on July 3, 2002. Forty-six wetlands were identified, with a total area of 3.482 hectares (8.605 acres). The wetlands include vernal pools, freshwater seeps, and seasonal ponds. Wetlands appearing to meet the criteria for federal jurisdictional total 1.776 hectares (4.388 acres). A delineation map is presented and a table is provided with information on the type, size, characteristic plant species of each wetland, and a preliminary jurisdictional assessment).
Introduction

This report presents the results of a delineation of waters of the United States, including wetlands, for Lawrence Livermore National Laboratory's (LLNL's) Site 300 in Alameda and San Joaquin Counties, California. The purpose of this study was to identify and characterize wetlands occurring on the site that may be subject to federal jurisdiction and regulation under Section 404 of the Clean Water Act.

Project Location and Description

Site 300 occupies approximately 2,800 hectares (7,000 acres) straddling the border between Alameda and San Joaquin Counties, approximately 24 kilometers southeast of the City of Livermore (Figure 1). Site 300 is a U.S. Department of Energy experimental test site operated by the University of California and is used primarily for high explosives testing (U.S. Department of Energy and University of California 1992). Test facilities located on the site include remote firing areas, storage magazines, and a chemistry processing area. Administrative facilities include a fire station, medical services, a cafeteria, maintenance and storage buildings, security facilities, offices, wastewater facilities, and roads that occur primarily in the southern half of the property. A controlled burning program has been carried out annually on Site 300 since 1960, primarily in the northern half of the site and perimeter areas. Numerous unpaved fire roads traverse the site.

Environmental Setting

Vegetation

The vegetation at Site 300 was mapped during two separate studies in 1986 (BioSystems 1986) and 2001 (Jones & Stokes 2002). In addition, wetlands were...
Figure 1
Site 300 Location, Lawrence Livermore National Laboratory, Alameda/San Joaquin County, California

The vegetation at Site 300 primarily consists of grassland, both native grassland and California annual grassland. Stands of coastal scrub and woodland are scattered across the site, mostly in the southern half. Riparian vegetation is present along Corral Hollow Creek, where the creek crosses the southeastern corner of the property, and along some of the drainages that traverse Site 300, mostly from north to south. Within the developed facilities, areas are either disturbed (paved, occupied by buildings, or otherwise cleared of vegetation) or landscaped with ornamental trees and shrubs.

Grasslands are present in all portions of Site 300. Most of the grassland consists of California annual grassland, a community dominated by annual grasses that were introduced from Mediterranean Europe during the Spanish colonial era, including wild oats, brome grasses, and annual fescues. Native grassland is a community dominated by native grasses, primarily one-sided bluegrass and needlegrass.

Coastal scrub is a shrub-dominated community occurring in the Coast Ranges in areas influenced by a maritime climate. Most of the coastal scrub at Site 300 is a sparse scrub that occurs in rocky areas with shallow soils and dominated by California matchweed. Coastal scrub types at Site 300 with higher shrub cover include California sagebrush scrub, in which California sagebrush is the dominant shrub, and California sagebrush-black sage scrub, in which California sagebrush and black sage are both dominant species. A few other small areas of scrub are dominated by bush lupine and poison oak.

Woodlands at Site 300 consist primarily of small stands of blue oak woodland, valley oak woodland, or California juniper woodland. In blue oak woodland, blue oak is the dominant canopy species, and the understory is dominated by annual grasses. Juniper-oak cismontane woodland is dominated by California juniper and blue oak. Two stands of valley oak woodlands are present. There, valley oak is the dominant species, and Fremont cottonwood and red willow are present in the canopy. California juniper woodland and scrub includes areas dominated by California juniper with a shrubby understory of coastal scrub species.

A few small stands of riparian woodland are present at Site 300. Fremont cottonwood riparian woodland occurs along Corral Hollow Creek in the ecological reserve at the southeast corner of Site 300. The dominant species is Fremont cottonwood. The shrubby understory is open to dense, consisting primarily of mulefat and red willow. Riparian scrub is present along sections of stream channel along Elk Ravine dominated by willows and along small sections of other drainages dominated by mulefat.

In the previous wetland study (U. S. Department of Energy and University of California 1992), sixteen wetlands or wetland complexes were mapped and characterized by the vegetation and hydrology present. These wetlands were reported to be generally isolated and scattered across Site 300. Vernal pools occur in the northwest corner of the site. Freshwater seeps occur in the bottoms.
of stream channels and on hillsides. Seeps with a perennial water source are dominated by cattails. A few seasonal ponds are present. These are areas that are seasonally inundated but do not have native wetland or vernal pool vegetation. The vegetation is sparse and consists of weedy wetland or ruderal species.

**Soils**

Site 300 consists primarily of steep mountainous terrain. Slope gradients typically range from 5% or less in alluvial valleys to 75% or greater on surrounding hill slopes.

Soils at Site 300 have been mapped and described by the U.S. Soil Conservation Service during its survey of the Alameda area and San Joaquin County (Welch et al. 1966, McEliney 1992). The general soil map compiled by McEliney indicates that the Calla-Carbona-Wisflat association is the dominant soil association on the San Joaquin County portion of Site 300. The Calla-Carbona-Wisflat Association is characterized by well-drained, moderately coarse textured and moderately fine textured soils formed from mixed alluvium and weathered sandstone bedrock. The Alameda County portion of Site 300 is mapped as the Vallecitos-Parish Association, which is characterized by well-drained to excessively drained, moderately coarse textured, shallow to deep soils formed from hard sandstone and shale (Welch et al. 1966).

**Hydrology**

Site 300 is an arid site with no perennial streams or perennial water bodies, although perennial seeps and springs are present. Most of the wetlands are supported by groundwater springs and seeps. Some of the wetlands were originally created by releases of cooling tower surface water and are currently maintained with potable water. Vernal pools receive and collect rainfall.

**Methods**

Wetlands were delineated using the routine onsite determination procedure described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Although the study site is larger than 5 acres, the routine determination procedure was used, rather than the comprehensive determination procedure, because the areas of potential wetlands were small and widely scattered across the site. Sampling along regular transects would not have been an effective or efficient means for determining wetland boundaries.

During the vegetation mapping study conducted by Jones & Stokes in August 2001, field surveys were done to characterize the vegetation types and verify the map unit boundaries. The wetlands identified during the previous 1991 study were visited to verify their presence and to remap their boundaries. Additional
wetlands were identified by consulting with LLNL wildlife biologists familiar with Site 300 and by walking transects along the canyons. To delineate more accurately the wetlands, Global Positioning System (GPS) data recorders were used to collect point locations and to record linear features and map unit polygons. Wetlands boundaries were identified in the field on the basis of the plant community present. Areas of hydrophytic vegetation, composed of green, growing perennials, were readily differentiated from the adjacent upland vegetation composed of brown, dried annual grasses.

Additional information on wetland soils was collected on July 3, 2002. Because of the overall similarity of wetlands at Site 300, only a limited number of representative sample points were examined. At each data point, paired soil pits were excavated, one on the wetland side of the wetland boundary, the other on the upland side of the boundary. A shallow soil pit was excavated by hand to compare soil characteristics with the mapped units and to determine whether soils exhibited redoximorphic features. Data from each sample point were recorded on standard data forms, which are included as Appendix A.

Geographic Information System (GIS) files were created from field delineated maps, GPS data, and field notes. The map units delineated on aerial photographs were digitized in AutoCAD R14. The GPS data were differentially corrected and the topology was cleaned up for positional errors.

Problem Areas

Specific problems encountered during the delineation included absence of wetland hydrology, probably due to the summer timing of the field surveys. Many of the fire trails at Site 300 are impassible during the rainy season, and regular maintenance of the fire trails does not occur until late May or June. Wetland hydrology in the vernal pools is seasonal, with water present only during the rainy season. Wetland hydrology in many of the seeps also appears to be seasonal, with reduced or no water flow during the summer months. These areas were delineated primarily on the basis of the vegetation.

Results and Discussion

Forty-six wetlands were identified during this study, with a total area of 3.482 hectares (8.605 acres). Wetlands appearing to meet the criteria for federal jurisdictional total 1.776 hectares (4.388 acres). The delineation is shown in Figures 2 and 3. The wetlands include vernal pools, freshwater seeps, and seasonal ponds. Table 1 provides information on the type, size, characteristic plant species of each wetland, and a preliminary jurisdictional assessment.

The previous delineation (U.S. Department of Energy and University of California 1992) identified 2.74 hectares (6.76 acres) of wetlands at Site 300, including 2.35 hectares (5.80 acres) of herbaceous wetlands, 0.26 hectare (0.64
<table>
<thead>
<tr>
<th>Wetland</th>
<th>Wetland Type</th>
<th>Characteristic Species</th>
<th>Acreage</th>
<th>Jurisdictional Assessment</th>
<th>Jurisdictional Acreage</th>
</tr>
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<td>1</td>
<td>vernal pool</td>
<td><em>Crypsis schoenoides</em>, <em>Gnaphalium palustre</em>, <em>Amaranthus albus</em>, <em>Polypogon monspeliensis</em>, <em>Epilobium cleistogamum</em></td>
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<td>RLF breeding site</td>
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<td>vernal pool</td>
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<td>Tributary, RLF breeding site</td>
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<td>Wetland</td>
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<td>Jurisdictional Assessment</td>
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<tr>
<td></td>
<td></td>
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<td>3.192</td>
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<td>RLF breeding site</td>
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<td>46</td>
<td>seasonal pond</td>
<td><em>Lepidium latifolium, Heliotropium curassavicum</em> (sparse vegetation)</td>
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<td><em>Wetlands, Total</em></td>
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</table>
Figure 3.4
Wetland Delineation – Lawrence Livermore National Laboratory Site 300
Figure 3.28
Wetland Delineation - Lawrence Livermore National Laboratory Site 300
Wetland Delineation - Lawrence Livermore National Laboratory Site 300

Legend:
- Vernal Pool
- Freshwater Seep
- Cattail Wetland
- Great Valley Willow Riparian
- Seasonal Pond
- Soil Data Point

Scale: approx. 1:2,400 (1 inch = approx. 200 feet)

Figure 3.29
acre) of woody riparian wetland, and 0.13 hectare (0.32 acre) of vernal pool wetland. Of these wetlands, 0.76 hectares (1.88 acres) were characterized as artificial. Most of these wetlands are still present and were delineated in 2001. An artificial wetland that was mapped near Building 827 and that was supported by cooling tower water, is no longer present. Some of the areas mapped as creeping ryegrass-dominated wetlands, such as one near the pistol range, no longer exhibit wetland characteristics. Many wetlands were mapped in 2001 that were not mapped in the previous delineation, including the larger vernal pool (Wetland 1) and many small wetlands supported by seeps. The greater number of wetlands delineated in the present study probably reflects a greater familiarity with Site 300 developed by LLNL wildlife biologists since the previous delineation.

A description of the wetland types present at Site 300 is presented below. The scientific names and wetland indicator status of plant species mentioned in the text are provided in Table 2.

### Vernal Pools

#### Vegetation

Vernal pools provide habitat for numerous endemic plant species and are known for their colorful spring floral displays. Vernal pools at Site 300 are not typical and do not fit any of the current vernal pool classifications (e.g., Sawyer and Keeler-Wolf 1995). Unlike typical vernal pools, in which many of the species are endemic to vernal pool habitats, the three vernal pools at Site 300 (Wetlands 1–3) have vegetation composed mostly of wetland generalists that are often found in but not restricted to vernal pools, including stipitate-popcorn flower, annual hair grass, cleistogamous spike-primrose, and creeping spikerush. The dominant plants in the vernal pools are usually or almost always found in wetlands. The smaller pool appears to have a much shorter period of inundation, as Mediterranean barley is the dominant species. Therefore, vernal pools meet the hydrophytic vegetation criterion.

#### Soils

The vernal pools at Site 300 are located in small basins where the soils are mapped as Diablo clay, 30–45% slopes (McEliney 1992). The texture, structure, and low chroma matrix of the soil at data point 2A are characteristics of the Diablo clay soil, which is a well-drained, non-hydric Vertisol. However, when considered in conjunction with the topography and landscape position of the vernal pool features, the low matrix chroma was considered sufficient to qualify the soil at data point 2A as hydric. The soil matrix at data point 2B also has a low chroma, but was determined to be hydric based primarily on the presence of redoximorphic iron-oxide concentrations (i.e., mottles) in the surface horizon.
<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Wetland Indicator Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>White amaranth</td>
<td>Amaranthus albus</td>
<td>FACU</td>
</tr>
<tr>
<td>California sagebrush</td>
<td>Artemisia californica</td>
<td>---</td>
</tr>
<tr>
<td>Narrow-leaved milkweed</td>
<td>Asclepias fascicularis</td>
<td>FAC</td>
</tr>
<tr>
<td>Slender wild oat</td>
<td>Avena barbata</td>
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</tr>
<tr>
<td>Wild oat</td>
<td>Avena fatua</td>
<td>---</td>
</tr>
<tr>
<td>Ripgut brome</td>
<td>B. diandrus</td>
<td>---</td>
</tr>
<tr>
<td>Red brome</td>
<td>B. madritensis subsp. rubens</td>
<td>---</td>
</tr>
<tr>
<td>Mulefat</td>
<td>Baccharis salicifolius</td>
<td>FACW</td>
</tr>
<tr>
<td>Soft chess</td>
<td>Bromus hordeaceus</td>
<td>FACU</td>
</tr>
<tr>
<td>Italian thistle</td>
<td>Carduus pychoncephalus</td>
<td>---</td>
</tr>
<tr>
<td>Horseweed</td>
<td>Conyza canadensis</td>
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</tr>
<tr>
<td>Swamp timothy</td>
<td>Cryptis schoenoides</td>
<td>OBL</td>
</tr>
<tr>
<td>Umbrella sedge</td>
<td>Cyperus eragrostis</td>
<td>FACW</td>
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<tr>
<td>Annual hairgrass</td>
<td>Deschampsia danthonioides</td>
<td>FACW</td>
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<tr>
<td>Saltgrass</td>
<td>Distichlis spicata</td>
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<td>Creeping spikerush</td>
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<tr>
<td>Cleistogamous spike-primrose</td>
<td>Epilobium cleistogatum</td>
<td>OBL</td>
</tr>
<tr>
<td>Marsh cudweed</td>
<td>Gnaphalium palustre</td>
<td>FACW</td>
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<tr>
<td>California matchwood</td>
<td>Gutierrezia californica</td>
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</tr>
<tr>
<td>Salt heliotrope</td>
<td>Heliotropium curassavicum</td>
<td>OBL</td>
</tr>
<tr>
<td>Foxtail barley</td>
<td>Hordeum murinum subsp. leporinum</td>
<td>NI</td>
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<tr>
<td>Baltic rush</td>
<td>Juncus balticus</td>
<td>OBL</td>
</tr>
<tr>
<td>California juniper</td>
<td>Juniperus californicus</td>
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</tr>
<tr>
<td>Perennial peppercress</td>
<td>Lepidium latifolium</td>
<td>FACW</td>
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<tr>
<td>Creeping wildrye</td>
<td>Leymus triticoides</td>
<td>FAC+</td>
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<tr>
<td>Bush lupine</td>
<td>Lupinus albifrons</td>
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</tr>
<tr>
<td>Horehound</td>
<td>Marrubium vulgare</td>
<td>FAC</td>
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<tr>
<td>Nodding needlegrass</td>
<td>Nassella cernua</td>
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</tr>
<tr>
<td>Needlegrass</td>
<td>Nassella pulchra</td>
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<td>Watercress</td>
<td>Nasturtium officinale</td>
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<tr>
<td>Tree tobacco</td>
<td>Nicotiana glauca</td>
<td>FAC</td>
</tr>
<tr>
<td>Stipitate popcorn-flower</td>
<td>Plagiobothrys stipitatus</td>
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</tr>
<tr>
<td>One-sided bluegrass</td>
<td>Poa secunda</td>
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</tr>
<tr>
<td>Annual rabbit's-foot grass</td>
<td>Polypogon monspeliensis</td>
<td>FACW+</td>
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<tr>
<td>Fremont cottonwood</td>
<td>Populus fremontii</td>
<td>FACW</td>
</tr>
<tr>
<td>Blue oak</td>
<td>Quercus douglasii</td>
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</tr>
<tr>
<td>Valley oak</td>
<td>Quercus lobata</td>
<td>FAC</td>
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<tr>
<td>Curly dock</td>
<td>Rumex crispus</td>
<td>FACW-</td>
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<tr>
<td>Red willow</td>
<td>Salix laevigata</td>
<td>FACW+ [FACW+]</td>
</tr>
<tr>
<td>Black sage</td>
<td>Salvia melliifera</td>
<td>---</td>
</tr>
<tr>
<td>White hedgenettle</td>
<td>Stachys albens</td>
<td>OBL</td>
</tr>
<tr>
<td>Poison oak</td>
<td>Toxicodendron diversilobum</td>
<td>---</td>
</tr>
<tr>
<td>Narrow-leaved cattail</td>
<td>Typha angustifolia</td>
<td>OBL</td>
</tr>
<tr>
<td>Broad-leaved cattail</td>
<td>Typha latifolia</td>
<td>OBL</td>
</tr>
<tr>
<td>Hoary nettle</td>
<td>Urtica dioica</td>
<td>FACW</td>
</tr>
<tr>
<td>Foxtail fescue</td>
<td>Vulpia bromoides</td>
<td>FACW</td>
</tr>
<tr>
<td>Rattle fescue</td>
<td>Vulpia myuros</td>
<td>FACU</td>
</tr>
<tr>
<td>Common cocklebur</td>
<td>Xanthium strumarium</td>
<td>FAC+</td>
</tr>
</tbody>
</table>
Hydrology

Wetland hydrology in vernal pools is dependent on rainfall. Vernal pools typically are inundated for 4–12 weeks. However, berms have been constructed at the outlet end of each vernal pool at Site 300, an action which has resulted in deeper water and a longer period of inundation. The two larger pools (Wetlands 1 and 2) are inundated for a period sufficient for the breeding of California tiger salamander; the larger pool remains inundated long enough to provide breeding habitat for California red-legged frog (Jones & Stokes 2001). The longer inundation regime is likely responsible for the prevalence of wetland generalist plants, rather than vernal pool endemics. The smaller pool (Wetland 3), which occurs where a swale was bermed by a fire trail, appears to have a shorter period of inundation, because the vegetation is less hydrophytic.

Seasonal Ponds

Seasonal ponds at Site 300 have seasonal wetland hydrology, similar to vernal pools, but vernal pool endemics and wetland generalist species characteristic of vernal pools are absent. These seasonal pools are Wetlands 16, 26, 40, 41, and 46. Vegetation in the seasonal ponds is absent to sparse and is composed of ruderal hydrophytic species, including annual rabbit’s-foot grass, horseweed, perennial peppergrass, and salt heliotrope. Wetland hydrology in the seasonal ponds is dependent on rainfall. Two of the seasonal ponds (Wetlands 16 and 26) were formed where fire trails berm ed swales. Wetland 46 was originally constructed as an overflow pond for the sewage treatment facility, but now ponds independently. Wetlands 40 and 46 are inundated for a period sufficient for the breeding of California red-legged frog (Jones & Stokes 2001). Soils in these wetlands were not investigated but were presumed to be hydric on the basis of an aquic moisture regime present during the rainy season.

Freshwater Seeps and Springs

Vegetation

Vegetation in the freshwater seeps is generally dominated by herbaceous perennial hydrophytes, although riparian scrub is also associated with seeps at several locations. Where perennial soil moisture is present, the dominant species is usually narrow-leaved cattail, although broad-leaved cattail is also present. Other common species in the seeps include creeping wildrye, hoary nettle, saltgrass, Baltic rush, white hedgenettle, and annual rabbit’s-foot grass. Woody vegetation is associated with freshwater seeps in some areas. Red willows are present along Wetland 31, in Elk Ravine. Scattered Fremont cottonwood and willows are present along the downstream portion of Wetland 20, and valley oak and Fremont cottonwood are present adjacent to the upstream end of Wetland 12. Mulefat is present at scattered locations in seeps that occur along the bottoms of drainages.
Soils

Information on soils in seeps was collected at four sites (Data Points 1A, 1C, 3A, 4A, 4C, and 5B). Soils in seeps at Site 300 consist of sandy loams, silt loams, clay loams, silty clay loams, and clays that frequently contain accumulations of carbonate salts below the surface soil horizon. Soils in seep wetlands were determined to be hydric based on the presence of gleyed or low chroma matrix colors and the presence of redoximorphic iron-oxide concentrations (i.e., mottles).

Soils at Data Points 4A and 4C were problematic. Although soils at these points exhibited no hydric soil indicators, the points were placed where the vegetation was clearly hydrophytic and either in a stream channel (4A) or in a hillside swale (4C). A possible explanation for the absence of redoximorphic features may be that water flows primarily above ground at these locations and remains relatively well oxygenated.

Hydrology

Wetland hydrology in many of the wetlands at Site 300 is provided by natural seeps and springs that occur where water-bearing sandstone crops out in the canyon bottoms. Other seeps are associated with superficial slope failures or “slumps” induced in part by excess moisture where the water-bearing bedrock is near the surface. Most of these wetlands are confined to small areas immediately adjacent to the seeps. Flows at the seeps appear to vary throughout the year; some seeps were dry during our surveys, and others exhibited saturated soils in only part of the seep.

In contrast, more extensive wetlands are present where perennial springs provide water for wetlands that extend for a considerable distance downstream from the spring source. Perennial springs are present in portions of Wetlands 4, 7, 12, 28, and 31. Wetland 12 is supported by a spring that flows from an abandoned mine shaft. The spring at Wetland 28 was exposed during excavation of sediments and bedrock during construction of a facility in a small canyon at that location. The spring at Wetland 31 in Elk Ravine is a natural groundwater spring that occurs where the bed of the stream channel intercepts a groundwater aquifer.

Uplands

Vegetation

Uplands adjacent to the wetlands consist of annual grassland dominated by oats and brome grasses.
Soils

Information on soils in uplands adjacent to wetlands was collected at Data Points 1B, 3B, 4B, and 5A. Upland soils located adjacent to vernal pools and seep wetlands at Site 300 consisted of silt loams, sandy loams, and clays that were found to be non-hydric based on topography, landscape position, and the absence of hydric soil indicators.

Hydrology

No evidence of wetland hydrology was found outside of the vernal pools and seeps. Annual grasslands are usually not inundated and have saturated soils only for short periods during or immediately following rainfall. This period of saturation is not sufficiently long to inhibit the growth of upland species or to promote the growth of plants adapted to grow under saturated soil conditions.

Jurisdictional Assessment

This section provides an assessment of the aquatic habitats that may be subject to regulation by the U.S. Army Corps of Engineers (USACE). USACE regulates many wetlands, streams, and water bodies. It generally regulates wetlands that cross state boundaries, that have an interstate or foreign commerce connection, that are adjacent to regulated waters, or that are habitat for endangered species. It may make a non-jurisdictional determination for wetlands that lack an interstate or foreign commerce connection, or that are artificial. Such artificial features include nontidal drainage and irrigation ditches excavated on dry land or artificial lakes created by excavating and/or diking dry land to collect and retain water and used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.

Almost all of the wetlands on Site 300 appear to be isolated. The streams at Site 300 are ephemeral, and most lack an ordinary high water mark. Only Corral Hollow Creek, an intermittent stream that crosses the southeastern edge of Site 300 in the Ecological Reserve, possesses an ordinary high water mark. Water typically is present in the channels only after storms or where seeps and springs are present. Most of the streams lack a channel confluent with Corral Hollow Creek; stream flows drain into the soil before reaching the end of the channels. Only Elk Ravine and the unnamed stream in the western portion of the site have channels confluent with Corral Hollow Creek. Wetlands in Elk Ravine (Wetland 31) are supported by a perennial spring, but stream flows sufficient to reach Corral Hollow Creek do not ordinarily occur. The unnamed stream in the west side of Site 300 has a well-defined bed and banks, but stream flow primarily occurs in Wetland 12, which is supported by a perennial spring. Therefore, only Wetlands 4, 5, 7, and 12 appear to be associated with a stream tributary to a regulated water.
Wetlands 1, 40, and 46, and portions of Wetlands 7, 12, and 27 are known breeding sites for California red-legged frog, which is listed under the federal Endangered Species Act as threatened (Jones & Stokes 2001). Wetlands 2, 4, 20, and 26, and portions of Wetlands 12, 17, and 31 are known nonbreeding sites for California red-legged frog (Jones & Stokes 2001).

Several wetlands at Site 300 are artificial. Wetland 27 was originally created by releases of cooling tower water at Building 865 and is currently maintained with potable water. Wetlands 14 and 15 appear to be maintained by runoff from Building 825, and wetlands 29 and 30 appear to be maintained by runoff from Building 801. These wetlands would likely not persist if their artificial water source was discontinued. Wetlands 3, 16, and 26 were formed by impoundment of water in swales behind berms created by fire trails. These wetlands would likely persist as long as the berms remain intact. Wetland 46 was excavated on dry land to retain wastewater overflow. This pond persists as a seasonal pond, although it is no longer used for wastewater retention.

Table 1 indicates which wetlands may be subject to USACE regulation. This assessment is preliminary and subject to verification by USACE, which may make jurisdictional determinations on a case-by-case basis.

References


McElney, M. A. 1992. Soil survey of San Joaquin County, California. U.S. Department of Agriculture Soil Conservation Service, in cooperation with the Regents of the University of California (Agricultural Experiment Station) and the California Department of Conservation. Washington, D.C.


Environmental Impact Statement and Environmental Impact Report for
Continued Operation of Lawrence Livermore National Laboratory and
Sandia National Laboratories, Livermore. DOE EIS/0157.

Department of Agriculture Soil Conservation Service in cooperation with the
University of California Agricultural Experiment Station. Washington, D.C.
Appendix A
Data Forms
DATA FORM
ROUTINE WETLAND DETERMINATION

Project/Site: LLNL Site 300
Applicant/Owner: US DOE
Investigator(s): Preston & Frazier
Date: 07/03/02

Do normal circumstances exist on the site? [ ] YES [ ] NO Community ID: slope/steep wetland
Is the site significantly disturbed (atypical situation)? [ ] YES [ ] NO Transect ID: 1
Is the area a potential problem area? [ ] YES [ ] NO Plot ID: 1A
(If needed, explain below)

VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leymus tridicoides</td>
<td>herb</td>
<td></td>
<td>FAC+</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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</tr>
</tbody>
</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC+): 100%
Total vegetation cover: _%_

☐ Morphological Adaptations
☐ Physiological/Reproductive Adaptations
☐ Visual Observation of Plant Species Growing in Areas of
  Prolonged Inundation/Saturation
☐ Personal Knowledge of Regional Plant Communities
☐ Technical Literature
☐ Other (explain below)

Hydrophytic Vegetation Present? [ ] YES [ ] NO

Remarks:

HYDROLOGY

Is it the growing season? [ ] YES [ ] NO
Based On: [ ] Soil Temp (record) Other (explain)
Typical length: __________ Days 5% = __________

Recorded Data (describe below):
[ ] Stream, Lake, or Tide Gauge
[ ] Aerial Photographs
[ ] Other
[ ] None Available

Field Observations:
Depth of Surface Water: __________ inches
Depth to Standing Water in Pit: __________ inches
Depth to Saturated Soil: __________ inches

Wetland Hydrology Present? [ ] YES [ ] NO

Remarks:
No wetland indicators observed.
SOILS

Map Unit Name (series and phase): Wisfla-Arbusa-San Tomote complex, 50-75% slopes
Drainage Class: well to somewhat excessively drained
Taxonomy (subgroup): See remarks below

Is data point located within a hydric inclusion? YES NO
Field observations confirm mapped type?

Profile Description

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance, Size, Contrast</th>
<th>Type, location</th>
<th>Color (moist)</th>
<th>Other</th>
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<tr>
<td>A1</td>
<td>0-7</td>
<td>silt</td>
<td>1mm68</td>
<td>1.0F1G</td>
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<tr>
<td>A2</td>
<td>7-13</td>
<td>silt</td>
<td>massive</td>
<td>2.5F1S</td>
<td>none</td>
<td></td>
<td></td>
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<tr>
<td>C</td>
<td>13-21+</td>
<td>silt+</td>
<td>massive</td>
<td>2.0F2.5H</td>
<td>note</td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Hydric Soil Indicators (check all that apply):
- Histosol
- Histic Epipedon
- Sulfacic Odor
- Aquic Moisture Regime
- Reducing Conditions ( \( \sigma, \alpha^2 \): dipyrtd test)
- Gleyed or Low-Chroma (<1 matrix
- Matrix Chroma <2 with Redoximorphic Concentrations and/or Depletions

Hydric Soils Present? YES NO

Remarks:
Wisfla (subgroup taxonomy): Lihla Xerorthent; Arbusa (subgroup taxonomy): Typic Xerorthent; San Tomote (subgroup taxonomy): Typic Xerorthent. Data point located on the downslope side of an apparent debris bench created by an old stump.

WETLAND DETERMINATION:

Hydrophytic vegetation present? YES NO
Wetland hydrology present? YES NO
Hydric soils present? YES NO Is the sampling point within a wetland? YES NO

Remarks:
Hillside seep; hydrology on perimeter appears to be seasonal and not evident in July.

Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fractions</th>
</tr>
</thead>
<tbody>
<tr>
<td>coa - coarse sand</td>
<td>vfl - very fine sandy loam</td>
</tr>
<tr>
<td>s - sand</td>
<td>f - fine</td>
</tr>
<tr>
<td>fs - fine sand</td>
<td>sfs - very fine sand</td>
</tr>
<tr>
<td>fs - loamy coarse sand</td>
<td>sl - sandy clay loam</td>
</tr>
<tr>
<td>fs - loamy sandy loam</td>
<td>sic - sandy clay</td>
</tr>
<tr>
<td>fs - sandy loam</td>
<td>c - clay</td>
</tr>
<tr>
<td>fs - fine sandy loam</td>
<td>v - very fine sand</td>
</tr>
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</table>

Redoximorphic Feature Morphology

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<thead>
<tr>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
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</thead>
<tbody>
<tr>
<td>F - few</td>
<td>Fe - iron concentration (soft mass)</td>
</tr>
<tr>
<td>c - common</td>
<td>Fe-nc - iron nodule or concretion</td>
</tr>
<tr>
<td>m - many</td>
<td>Mn - manganese concentration (soft mass)</td>
</tr>
<tr>
<td>d - depletion</td>
<td>Mn-nc - manganese nodule or concretion</td>
</tr>
<tr>
<td>Size</td>
<td>Location</td>
</tr>
<tr>
<td>1 - fine (&lt;2mm)</td>
<td>mat - soil matrix</td>
</tr>
<tr>
<td>2 - medium (2-5mm)</td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>3 - coarse (5-20mm)</td>
<td>por - soil pores</td>
</tr>
<tr>
<td>4 - very coarse (20-76mm)</td>
<td>acl - other</td>
</tr>
<tr>
<td>5 - extremely coarse (&gt;76mm)</td>
<td></td>
</tr>
</tbody>
</table>
VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
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<td>UPL</td>
<td></td>
<td></td>
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<tr>
<td>Avena barbata</td>
<td>herb</td>
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<td>UPL</td>
<td></td>
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<td>Hordeum murinum</td>
<td>herb</td>
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<td>UPL</td>
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</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC): 6%
Total vegetation cover: %

- Morphological Adaptations
- Physiological/Reproductive Adaptations
- Visual Observation of Plant Species Growing in Areas of Prolonged Inundation/Saturation
- Personal Knowledge of Regional Plant Communities
- Technical Literature
- Other (explain below)

Hydrophytic Vegetation Present? YES NO

Remarks: California annual grassland

HYDROLOGY

Is it the growing season? YES NO
Based On: Soil Temp (record) Other (explain)
Typical length: ________ Days 5% =

Recorded Data (describe below):
- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- None Available

Field Observations:
- Depth of Surface Water: 0 inches
- Depth to Standing Water in Pit: >20 inches
- Depth to Saturated Soil: >20 inches

Wetland Hydrology Present? YES NO

Remarks:
No evidence of wetland hydrology observed.

Wetland Hydrology Indicators:
Primary Indicators:
- Inundated
- Saturated Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Rhizospheres in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (explain below)
SOILS

Plot ID:

Map Unit Name (series and phase): Wilsfl-Arbusa-San Timoteo complex, 50-75% slopes Drainage Class: well to somewhat excessively drained

Taxonomy (subgroup): See remarks below

Field observations confirm mapped type? [ ] YES [ ] NO

Is data point located within a hydric inclusion? [ ] YES [ ] NO

Profile Description

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance, Size, Contrast</th>
<th>Type, Location</th>
<th>Color (moist)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0-10</td>
<td>sil</td>
<td>2gpr</td>
<td>10YR3/1</td>
<td>none</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2/Bk</td>
<td>10-20+</td>
<td>all</td>
<td>2mshbl</td>
<td>2.5Y3/1</td>
<td>none</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Redoximorphic Features

WETLAND DETERMINATION:

Hydrophytic vegetation present? [ ] YES [ ] NO

Wetland hydrology present? [ ] YES [ ] NO

Hydric soils present? [ ] YES [ ] NO Is the sampling point within a wetland? [ ] YES [ ] NO

Hydric Soil Indicators (check all that apply)

- [ ] History
- [ ] High Organic Content in Surface Layer of Sandy Soils
- [ ] Sulphur Oxidation
- [ ] Aquatic Moisture Regime
- [ ] Reducing Conditions (H2S or Fe redoximorphic reactions)
- [ ] Greyed or Low-Chroma (<1) matrix
- [ ] Matrix Chroma <2 with Redoximorphic Concentrations and/or Depletions

Hydric Soils Present? [ ] YES [ ] NO

Remarks:

Wilsfl (subgroup taxonomy): Lithic Xerorthent; Arbusa (subgroup taxonomy): Typic Xerorthents; San Timoteo (subgroup taxonomy): Typic Xerorthent. Data points located on the downslope side of an apparent debris bench created by an old slump.

Texture and Rock Fragment Content

Texture

col - coarse sand
c - sand
fs - fine sand
vsfs - very fine sand
loca - loamy coarse sand
ls - loamy sand
fs - loamy fine sand
vsfsc - very fine sandy loam
col - coarse sandy loam
sl - sandy loam
fs - fine sandy loam

Rock Fragments

vsf - very fine sandy loam
t - loam	sil - silt loam
sd - sandy loam
ss - silty loam
sl - silty clay loam
sc - sandy clay
s - sandy
cl - clay
sl - silty clay
vcl - very claysilt
vcl - very silt
vvcl - very very silt
c - clay

Abundance

Fe-oxides
Fec oxide
Fe-moxy
Fe-oxides
Mn
Mn-oxides
Mn-oxides
Si02
Si02
Al2O3
Al2O3
Fe3+ Fe3+
Fe3+ Fe3+

Type

1 - fine (<2mm)
2 - medium (2-6mm)
3 - coarse (5-20mm)
4 - very coarse (20-76mm)
5 - extremely coarse (>76mm)

Contrast

1 - faint
2 - distinct
3 - prominent

Location

mat - soil matrix
ped - ped surface
por - soil pores
air - other

Redoximorphic Feature Morphology
<table>
<thead>
<tr>
<th>Project/Site:</th>
<th>LLNL Site 300</th>
<th>State:</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant/Owner:</td>
<td>US DOE</td>
<td>County:</td>
<td>San Joaquin</td>
</tr>
<tr>
<td>Investigator(s):</td>
<td>Preston &amp; Frazier</td>
<td>IST/R</td>
<td></td>
</tr>
<tr>
<td>Date:</td>
<td>07/03/02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Do normal circumstances exist on the site? [ ] YES [ ] NO
Is the site significantly disturbed (atypical situation)? [ ] YES [ ] NO
Is the area a potential problem area? [ ] YES [ ] NO

Hydrophytic Vegetation Present? [ ] YES [ ] NO

### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leymus triticiodes</td>
<td>herb</td>
<td>FAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Juncus effusus</td>
<td>herb</td>
<td>OBL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC-): 100%
Total vegetation cover: %

- Morphological Adaptations
- Physiological/Reproductive Adaptations
- Visual Observation of Plant Species Growing in Areas of Prolonged Inundation/Saturation

Hydrophytic Vegetation Present? [ ] YES [ ] NO

Remarks:

### HYDROLOGY

Is it the growing season? [ ] YES [ ] NO

Based On: [ ] Soil Temp (record) [ ] Other (explain)

Typical length: _____ Days 5% = _____

Recorded Data (describe below):
- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- None Available

Field Observations:
- Depth of Surface Water: ____ inches
- Depth to Standing Water in Pit: ____ inches
- Depth to Saturated Soil: ____ inches

Wetland Hydrology Present? [ ] YES [ ] NO

Remarks:

Wetland Hydrology Indicators:

**Primary Indicators:**
- Inundated
- Saturated Upper 12 Inches
- Water Marks
- Drain Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

**Secondary Indicators (2 or more required):**
- Oxidized Rhizospheres in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (explain below)
### Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
</tr>
</thead>
<tbody>
<tr>
<td>coarse sand</td>
<td>very fine sandy loam</td>
</tr>
<tr>
<td>s- sand</td>
<td>fine loam</td>
</tr>
<tr>
<td>fs- fine sand</td>
<td>silt loam</td>
</tr>
<tr>
<td>vfs- very fine sand</td>
<td>silt</td>
</tr>
<tr>
<td>loam- loamy coarse sand</td>
<td>sandy clay loam</td>
</tr>
<tr>
<td>ls- loamy sand</td>
<td>clay loam</td>
</tr>
<tr>
<td>ls- loamy fine sand</td>
<td>silt - sandy clay</td>
</tr>
<tr>
<td>Ms- loamy very fine sand</td>
<td>sandy clay</td>
</tr>
<tr>
<td>cost- coarse sandy loam</td>
<td>silt - clay</td>
</tr>
<tr>
<td>sl- sandy loam</td>
<td>clay</td>
</tr>
<tr>
<td>sf- fine sandy loam</td>
<td>clay</td>
</tr>
</tbody>
</table>

### Redoximorphic Feature Morphology

<table>
<thead>
<tr>
<th>Abundance</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>f - few</td>
<td>Fe-x - iron concentration (solid mass)</td>
</tr>
<tr>
<td>c - common</td>
<td>Fe-nx - iron oxide or iron oxyhydroxide</td>
</tr>
<tr>
<td>m - many</td>
<td>Mn-x - manganese concentration (solid mass)</td>
</tr>
<tr>
<td>d - depletion</td>
<td>Mn-nx - manganese oxide or iron oxide or chromium</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - fine 2mm</td>
<td>mud - mud matrix</td>
</tr>
<tr>
<td>2 - medium 2-5mm</td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>3 - coarse 5-20mm</td>
<td>por - soil pores</td>
</tr>
<tr>
<td>4 - very coarse (20-76mm)</td>
<td>cl - other</td>
</tr>
<tr>
<td>5 - extremely coarse (&gt;76mm)</td>
<td>other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contrast</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>f - faint</td>
<td>other</td>
</tr>
<tr>
<td>d - distinct</td>
<td>other</td>
</tr>
<tr>
<td>p - prominent</td>
<td>other</td>
</tr>
</tbody>
</table>
### DATA FORM

**ROUTINE WETLAND DETERMINATION**

**Project/Site:** LLNL Site 300  
**Applicant/Owner:** US DOE  
**Investigator(s):** Preston & Frazier  
**Date:** 07/03/02

<table>
<thead>
<tr>
<th>Do normal circumstances exist on the site?</th>
<th>YES</th>
<th>NO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the site significantly disturbed (atypical situation)?</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>Is the area a potential problem area?</td>
<td>YES</td>
<td>NO</td>
</tr>
</tbody>
</table>

**COMMUNITY ID:** Yamal Pool/Seasonal Wetland  
**TRANSECT ID:** 2  
**PLOT ID:** 2A

### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plagiotrochis stipulatus</td>
<td>herb</td>
<td>75%</td>
<td>OBL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Percent of dominants that are OBL, FACW, or FAC (excluding FAC-):** Total vegetation cover __________ %

- Morphological Adaptations
- Physiological/Reproductive Adaptations
- Visual Observation of Plant Species Growing in Areas of Prolonged inundation/Saturation

### HYDROLOGY

**Is it the growing season?** YES NO

**Based On:** Soil Temp (record) Other (explain)

**Typical length:** __________ Days 5% = __________

**Recorded Data (describe below):**
- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- None Available

**Field Observations:**
- Depth of Surface Water: __________ inches
- Depth to Standing Water in Pit: __________ inches
- Depth to Saturated Soil: __________ inches

**Wetland Hydrology Indicators:**

<table>
<thead>
<tr>
<th>Wetland Hydrology Indicators:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Indicators:</td>
</tr>
<tr>
<td>Inundated</td>
</tr>
<tr>
<td>Saturated Upper 12 Inches</td>
</tr>
<tr>
<td>Water Marks</td>
</tr>
<tr>
<td>Drift Lines</td>
</tr>
<tr>
<td>Sediment Deposits</td>
</tr>
<tr>
<td>Drainage Patterns in Wetlands</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Secondary Indicators (2 or more required):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oxidized Rhizospheres in Upper 12 Inches</td>
</tr>
<tr>
<td>Water-Stained Leaves</td>
</tr>
<tr>
<td>Local Soil Survey Data</td>
</tr>
<tr>
<td>FAC-Neutral Test</td>
</tr>
<tr>
<td>Other (explain below)</td>
</tr>
</tbody>
</table>

**Wetland Hydrology Present?** YES NO

**Remarks:**

No evidence of wetland hydrology observed, but is in shallow basin with berm and staff gauge at east end.
SOILS

Map Unit Name (series and phase): Diablo Clay, 30 to 45% stones, eroded
Drainage Class: well drained

Taxonomy (subgroup): Aridic Hapludoll

Field observations confirm mapped type?

Profile Description

Redoximorphic Features

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (mol)</th>
<th>Abundance, Size, Content</th>
<th>Type, Location</th>
<th>Color (mol)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0-15</td>
<td>clay</td>
<td>35d</td>
<td>2:1 (NY 3/1)</td>
<td>none</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Bkss</td>
<td>15-28+</td>
<td>clay</td>
<td>35d</td>
<td>2:1 (NY 3/1)</td>
<td>none</td>
<td>--</td>
<td>--</td>
<td>Thin A horizon - not described</td>
</tr>
</tbody>
</table>

Hydric Soil Indicators (check all that apply):
- Histosol
- Organic Content in Surface Layer of Sandy Soils
- Soil Staining
- Organic Staining in Sandy Soils
- Reducing Conditions (Fe, C4, & Cu - dipyrilor test)
- Other (explain below)

Hydric Soils Present? ☐ YES ☐ NO

Remarks:
Low chroma (i.e., 5Y 3/1) matrix colors are characteristic of non-hydric soils in the vicinity (e.g., Diablo series), but were thought to be indicative of hydric soils at this location based on topography (depressions) and landscape position (basin).

WETLAND DETERMINATION:

Hydrophytic vegetation present? ☐ YES ☐ NO

Wetland hydrology present? ☐ YES ☐ NO

Hydric soils present? ☐ YES ☐ NO

Is the sampling point within a wetland? ☐ YES ☐ NO

Remarks:
Vernal pool. We assume has seasonal wetland hydrology - wet during the rainy season, dry during the summer.

Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>coarse sand</td>
<td>vst - very fine sandy loam</td>
<td>g - gravel</td>
<td>Type: Fe - iron concentration (soft mass)</td>
</tr>
<tr>
<td>s - sand</td>
<td>l - loam</td>
<td>vgr - very gravel</td>
<td>Fe = iron nodule or concretion</td>
</tr>
<tr>
<td>ls - fine sand</td>
<td>sl - silt</td>
<td>cgr - extremely gravel</td>
<td>Mn = manganese concentration (soft mass)</td>
</tr>
<tr>
<td>lco - loamy coarse sand</td>
<td>sc - sandy clay loam</td>
<td>cb - cobbly</td>
<td>Mn-v = manganese nodule or concretion</td>
</tr>
<tr>
<td>ls - loamy sand</td>
<td>sl - silt</td>
<td>c - clay</td>
<td>d - depletion</td>
</tr>
<tr>
<td>lvs - loamy fine sand</td>
<td>sc - sandy clay</td>
<td>xct - extremely cobbly</td>
<td>Location: matrix - soil matrix</td>
</tr>
<tr>
<td>lvs - very fine sand</td>
<td>sld - silt clay loam</td>
<td>1 - fine (2mm)</td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>cos - coarse sandy loam</td>
<td>sic - silty clay</td>
<td>2 - medium (2-5mm)</td>
<td>pgr - soil pores</td>
</tr>
<tr>
<td>sl - sandy loam</td>
<td>c - clay</td>
<td>3 - coarse (5-20mm)</td>
<td>ok - other</td>
</tr>
<tr>
<td>tlf - fine sandy loam</td>
<td>c - clay</td>
<td>4 - very coarse (20-76mm)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5 - extremely coarse (&gt;76mm)</td>
<td></td>
</tr>
</tbody>
</table>

Contrast
- f = faint
- d = distinct
- p = prominent
**DATA FORM**

**ROUTINE WETLAND DETERMINATION**

<table>
<thead>
<tr>
<th>Project/Site:</th>
<th>LLNL Site 300</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant/Owner:</td>
<td>US-DOE</td>
</tr>
<tr>
<td>Investigator(s):</td>
<td>Preston &amp; Frazier</td>
</tr>
<tr>
<td>Date:</td>
<td>07/03/02</td>
</tr>
<tr>
<td>State:</td>
<td>CA</td>
</tr>
<tr>
<td>County:</td>
<td>Alameda</td>
</tr>
</tbody>
</table>

**Remarks:**

No evidence of wetland hydrology observed.

---

**VEGETATION**

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromus hordeaceus</td>
<td>herb</td>
<td>FACU</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bromus rubens</td>
<td>herb</td>
<td>UPL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Percent of dominants that are OBL, FACW, or FAC (excluding FAC):**

<table>
<thead>
<tr>
<th>Morphological Adaptations</th>
<th>0%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiological/Reproductive Adaptations</td>
<td></td>
</tr>
<tr>
<td>Visual Observation of Plant Species Growing in Areas of Prolonged Inundation/Saturation</td>
<td></td>
</tr>
</tbody>
</table>

**Hydrophytic Vegetation Present?**

- YES
- NO

---

**HYDROLOGY**

**Is it the growing season?**

- YES
- NO

**Based On:**

- Soil Temp (record)
- Other (explain)  

**Typical length:**

- Days 5%

**Recorded Data (describe below):**

- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- None Available

**Field Observations:**

- Depth of Surface Water: 0 inches
- Depth to Standing Water in Pit: >18 inches
- Depth to Saturated Soil: >18 inches

**Wetland Hydrology Present?**

- YES
- NO

**Wetland Hydrology Indicators:**

**Primary Indicators:**

- Inundated
- Saturated Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

**Secondary Indicators (2 or more required):**

- Oxidized Rhizospheres in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (explain below)
SOILS

Map Unit Name (series and phase): Diablo Clay, 30 to 45% slopes, eroded
Drainage Class: well drained

Taxonomy (subgroup): Aridic Haploxerolls

Field observations confirm mapped type? □ YES □ NO

Is data point located within a hydric inclusion? □ YES □ NO

Profile Description

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moll)</th>
<th>Abundance, Size, Contrast</th>
<th>Type, location</th>
<th>Color (moll)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0-10</td>
<td>c</td>
<td>2-gp</td>
<td>2.5Y 3/1-2.5Y 1/2</td>
<td>f, f, p</td>
<td>Fd, do</td>
<td>7.5YR 4/6</td>
<td>Fe in root channel</td>
</tr>
<tr>
<td>Bkss</td>
<td>10-18+</td>
<td>c</td>
<td>1-coo</td>
<td>2.5Y 3/1</td>
<td>none</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Hydric Soil Indicators (check all that apply):
- Histosol
- Histic Epipedon
- Sulfic Odor
- Aquic Moisture Regime
- Reducing Conditions (α, α' - dipyrldyl test)
- Gleyed or Low-Chroma (≤1) matrix
- Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions

Hydric Soils Present? □ YES □ NO

Remarks:

Redoximorphic Features

<table>
<thead>
<tr>
<th>Abundance, Size, Contrast</th>
<th>Type, location</th>
<th>Color (moll)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>f, f, p</td>
<td>Fd, do</td>
<td>7.5YR 4/6</td>
<td>Fe in root channel</td>
</tr>
</tbody>
</table>

Hydric Determination:

Hydrophytic vegetation present? □ YES □ NO

Wetland hydrology present? □ YES □ NO

Hydric Soils present? □ YES □ NO

Is the sampling point within a wetland? □ YES □ NO

Remarks:

- Data point is an depressional wetland. Presence of hydric soil suggests that this point may exhibit wetland hydrology or hydric vegetation during a year with greater precipitation.

Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse Sand</td>
<td>Very Fine Sand</td>
<td>gravelly</td>
<td>F - few</td>
</tr>
<tr>
<td>Sand</td>
<td>Clay</td>
<td>very gravelly</td>
<td>F - iron concentration (soft mass)</td>
</tr>
<tr>
<td>Fine Sand</td>
<td>Silt</td>
<td>extremely gravelly</td>
<td>M - many, manganese concentration (soft mass)</td>
</tr>
<tr>
<td>Very Fine Sand</td>
<td>Clay</td>
<td>clay</td>
<td>Mn - Mn concentration (soft mass)</td>
</tr>
<tr>
<td>Loamy Coarse Sand</td>
<td>Sandy Clay</td>
<td>very cobbly</td>
<td>d - depletion</td>
</tr>
<tr>
<td>Loamy Sand</td>
<td>Clay</td>
<td>extremely cobbly</td>
<td>Location</td>
</tr>
<tr>
<td>Loamy Fine Sand</td>
<td>Silty Clay</td>
<td>very sandy</td>
<td>mat - soil matrix</td>
</tr>
<tr>
<td>Very Loamy Sand</td>
<td>Clay</td>
<td>extremely sandy</td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>Coarse Sand Loam</td>
<td>Silty Clay</td>
<td></td>
<td>por - soil pores</td>
</tr>
<tr>
<td>Loamy Sand Loam</td>
<td>Clay</td>
<td></td>
<td>or - other</td>
</tr>
</tbody>
</table>

Contrast:
- f - faint
- d - distant
- p - prominent

Texture:
- Coarse Sand
- Sand
- Fine Sand
- Very Fine Sand
- Loamy Coarse Sand
- Loamy Sand
- Loamy Fine Sand
- Very Loamy Sand
- Coarse Sand Loam
- Loamy Sand Loam

Rock Fragments:
- Vfs - Very Fine Sand
- Vs - Very Silt
- Sld - Sandy Clay
- Cl - Clay Loam
- Scl - Silt Clay
- Ls - Loamy Sand

Location:
- Mat - soil matrix
- Ped - ped surface
- Por - soil pores
- Or - other
### Data Form: Routine Wetland Determination

**Project/Site:** LLNL Site 300  
**State:** CA  
**County:** San Joaquin  
** Applicant/Owner:** US DOE  
**Investigator(s):** Preston & Frazier  
**Date:** 07/03/02

**Do normal circumstances exist on the site?**  
- [ ] Yes  
- [ ] No  
**Community ID:** slope/step wetland

**Is the site significantly disturbed (atypical situation)?**  
- [ ] Yes  
- [ ] No  
**Transact ID:** 3

**Is the area a potential problem area?**  
- [ ] Yes  
- [ ] No  
**Plot ID:** 3A

---

### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urtica dioica</strong></td>
<td>herb</td>
<td></td>
<td>FACW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Mammiium vulgaris</strong></td>
<td>herb</td>
<td></td>
<td>FAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Percent of dominants that are OBL, FACW, or FAC (excluding FAC):** 100%  
**Total vegetation cover: %**

- [ ] Morphological Adaptations  
- [ ] Physiological/Reproductive Adaptations  
- [ ] Visual Observation of Plant Species Growing in Areas of Prolonged Inundation/Saturation

**Hydrophytic Vegetation Present?**  
- [ ] Yes  
- [ ] No

**Remarks:**

---

### HYDROLOGY

**Is it the growing season?**  
- [ ] Yes  
- [ ] No  
**Based On:**  
- [ ] Soil Temp (record)  
- [ ] Other (explain)  
**Typical length:**  
- [ ] 5% = Days

**Recorded Data (describe below):**  
- [ ] Stream, Lake, or Tide Gauge  
- [ ] Aerial Photographs  
- [ ] Other  
- [ ] None Available

**Field Observations:**  
- **Depth of Surface Water:** 0 inches  
- **Depth to Standing Water In Pit:** >10 inches  
- **Depth to Saturated Soil:** >15 inches

**Wetland Hydrology Present?**  
- [ ] Yes  
- [ ] No

**Remarks:** No evidence of wetland hydrology observed.

---

**Wetland Hydrology Indicators:**  
**Primary Indicators:**  
- [ ] Inundated  
- [ ] Saturated Upper 12 inches  
- [ ] Water Marks  
- [ ] Drift Lines  
- [ ] Sediment Deposits  
- [ ] Drainage Patterns In Wetlands

**Secondary Indicators (2 or more required):**  
- [ ] Oxidized Rhizospheres in Upper 12 inches  
- [ ] Water-Stained Leaves  
- [ ] Local Soil Survey Data  
- [ ] FAC-Neutral Test  
- [ ] Other (explain below)
SOILS

Map Unit Name (series and phase): Ajo-Vaquero complex, 30 to 50% slopes
Drainage Class: well drained

Taxonomy (subgroup): Aridic Haploxererts-Aridic Haploxererts
Field observations confirm mapped type?

Is data point located within a hydric inclusion?

Profile Description

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance, Size, Contrast</th>
<th>Type, location</th>
<th>Color (moist)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>d</td>
<td>2mg</td>
<td>10YR3/2</td>
<td>none</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-15+</td>
<td>fsl</td>
<td>massive</td>
<td>5YR 8/2-8/3 &amp; 5YR4/2</td>
<td>vs, 1, d</td>
<td>Fe-R, mat</td>
<td>2.5Y 5/6</td>
<td>variegated colors in matrix</td>
<td></td>
</tr>
</tbody>
</table>

Hydric Soil Indicators (check all that apply):

- Histosol
- Histic Epipedon
- Sulfidic Odor
- Aquic Moisture Regime
- Listed on National and Local Hydric Soils List
- Reducing Conditions (α, α' - diphydride test)
- Other (explain below)
- Gleyed or Low-Chroma (≤1) matrix
- Matrix Chroma <2 with Redoximorphic Concentrations and/or Depletions

WETLAND DETERMINATION:

Hydric vegetation present?

Hydric hydrology present?

Hydric soils present?

Is the sampling point within a wetland?

Remarks:

Hillside seep; assumed to have seasonal wetland hydrology that is not evident during July.

Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
</tr>
</thead>
<tbody>
<tr>
<td>COs - Coarse sand</td>
<td>gr - gravelly</td>
</tr>
<tr>
<td>s - Sand</td>
<td>vgr - very gravelly</td>
</tr>
<tr>
<td>FS - Fine sand</td>
<td>xgr - extremely gravelly</td>
</tr>
<tr>
<td>Vs - Very fine sand</td>
<td>db - cobbly</td>
</tr>
<tr>
<td>LCs - Loamy coarse sand</td>
<td>vb - very cobbly</td>
</tr>
<tr>
<td>ls - Loamy sand</td>
<td>xcb - extremely cobbly</td>
</tr>
<tr>
<td>FS - Loamy fine sand</td>
<td>SI - Story</td>
</tr>
<tr>
<td>Vfs - Very fine sandy loam</td>
<td>vst - very stony</td>
</tr>
<tr>
<td>Cfs - Coarse sandy loam</td>
<td>xsi - extremely stony</td>
</tr>
<tr>
<td>Sl - Sandy loam</td>
<td>c - clay</td>
</tr>
<tr>
<td>Fts - Fine sandy loam</td>
<td></td>
</tr>
</tbody>
</table>

Redoximorphic Feature Morphology

<table>
<thead>
<tr>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>T - few</td>
<td>Fe-x - iron concentration (soft mass)</td>
</tr>
<tr>
<td>C - common</td>
<td>Fe-mn - iron nodule or concretion</td>
</tr>
<tr>
<td>M - many</td>
<td>Mn-x - manganese concentration (soft mass)</td>
</tr>
<tr>
<td>Size</td>
<td>Mn-mn - manganese nodule or concretion</td>
</tr>
<tr>
<td>Location</td>
<td>d - depletion</td>
</tr>
<tr>
<td>Contrast</td>
<td>Location</td>
</tr>
<tr>
<td>1 - fine</td>
<td>Mat - soil matrix</td>
</tr>
<tr>
<td>2 - medium</td>
<td>Ped - ped surface</td>
</tr>
<tr>
<td>3 - coarse (5-20mm)</td>
<td>Por - soil pores</td>
</tr>
<tr>
<td>4 - very coarse (20-76mm)</td>
<td>Ot - other</td>
</tr>
<tr>
<td>5 - extremely coarse (&gt;76mm)</td>
<td></td>
</tr>
</tbody>
</table>
**DATA FORM**

**ROUTINE WETLAND DETERMINATION**

**Project/Site:** LLNL Site 300  
**State:** CA  
**Applicant/Owner:** US DOE  
**County:** San Joaquin  
**Investigator(s):** Preston & Frazier  
**Date:** 07/03/02  
**Do normal circumstances exist on the site?**  
**Community ID:** Upland/annul grassland  
**Is the site significantly disturbed (atypical situation)?**  
**Plot ID:** 38

### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromus hordeaceus</td>
<td>herb</td>
<td></td>
<td>FACU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bromus diandrus</td>
<td>herb</td>
<td></td>
<td>UPL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mentzelium vulgarum</td>
<td>herb</td>
<td></td>
<td>FAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC): 35%  
Total vegetation cover: %

- Morphological Adaptations
- Physiological/Reproductive Adaptations
- Visual Observation of Plant Species Growing in Areas of Prolonged Inundation/Saturation
- Personal Knowledge of Regional Plant Communities
- Technical Literature
- Other (explain below)

**Hydrophytic Vegetation Present?**  
**YES**  
**NO**

**Remarks:**

---

### HYDROLOGY

**Is it the growing season?**  
**YES**  
**NO**

**Based On:**  
- Soil Temp (record)  
- Other (explain)  

Typical length: _________ Days  
5% =

**Recorded Data (describe below):**  
- Stream, Lake, or Tide Gauge  
- Aerial Photographs  
- Other  
- None Available

**Field Observations:**  
- Depth of Surface Water: 0 inches  
- Depth to Standing Water in Pit: >17 inches  
- Depth to Saturated Soil: >17 inches

**Wetland Hydrology Indicators:**

**Primary Indicators:**  
- Inundated  
- Saturated Upper 12 Inches  
- Water Marks  
- Drift Lines  
- Sediment Deposits  
- Drainage Patterns in Wetlands

**Secondary Indicators (2 or more required):**  
- Oxidized Rhizospheres in Upper 12 Inches  
- Water-Stained Leaves  
- Local Soil Survey Data  
- FAC-Neutral Test  
- Other (explain below)

**Wetland Hydrology Present?**  
**YES**  
**NO**

**Remarks:**  
No evidence of wetland hydrology observed.
SOILS

Map Unit Name (series and phase): Abo-Vaquero complex, 30 to 50% slopes
Drainage Class: well drained

Taxonomy (subgroup): Acidic Haploxeris-Acidic Haploxeris
Field observations confirm mapped type? □ YES □ NO

Is data point located within a hydric inclusion? □ YES □ NO

Profile Description

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance, Size, Contrast</th>
<th>Type, location</th>
<th>Color (moist)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0-7</td>
<td>vfsl</td>
<td>--</td>
<td>10YR3/2</td>
<td>none</td>
<td>--</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>A2/Bx</td>
<td>7-17</td>
<td>sil</td>
<td>--</td>
<td>10YR2/1</td>
<td>none</td>
<td>--</td>
<td>--</td>
<td>few, fine carbonate masses</td>
</tr>
</tbody>
</table>

Hydric Soil Indicators (check all that apply):

- Histosol
- Histic Epipedon
- Sulfic Odor
- Aquic Moisture Regime
- Reducing Conditions (α, α' dipyril test)
- Glyed or Low-Chroma (c1) matrix
- Matrix Chroma ≥2 with Redoximorphic Concentrations and/or Depletions

Hydric Soils Present? □ YES □ NO

Remarks:
Soil test pit located on debris bench of an old slump.

WETLAND DETERMINATION:

Hydrophytic vegetation present? □ YES □ NO

Wetland hydrology present? □ YES □ NO

Hydric soils present? □ YES □ NO Is the sampling point within a wetland? □ YES □ NO

Remarks:

Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
</tr>
</thead>
<tbody>
<tr>
<td>cc - coarse sand</td>
<td>vfa - very fine sandy loam</td>
</tr>
<tr>
<td>s - sand</td>
<td>f - loam</td>
</tr>
<tr>
<td>fs - fine sand</td>
<td>s - silty loam</td>
</tr>
<tr>
<td>vfs - very fine sand</td>
<td>s - all</td>
</tr>
<tr>
<td>lcs - loamy coarse sand</td>
<td>sdc - sandy clay loam</td>
</tr>
<tr>
<td>ls - loamy sand</td>
<td>sl - loamy clay</td>
</tr>
<tr>
<td>vfs - very fine sand</td>
<td>sdc - sandy clay</td>
</tr>
<tr>
<td>ccs - coarse sandy loam</td>
<td>sic - silty clay</td>
</tr>
<tr>
<td>al - sandy loam</td>
<td>c - clay</td>
</tr>
<tr>
<td>ffl - fine sandy loam</td>
<td></td>
</tr>
</tbody>
</table>

Redoximorphic Feature Morphology

<table>
<thead>
<tr>
<th>Abundance</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - few</td>
<td>Fe-s - iron concentration (soft mass)</td>
</tr>
<tr>
<td>c - common</td>
<td>Fe-n - iron nodule or concretion</td>
</tr>
<tr>
<td>m - mery</td>
<td>Mn-x - manganese concentration (soft mass)</td>
</tr>
<tr>
<td>n - Mn - manganese nodule or concretion</td>
<td></td>
</tr>
<tr>
<td>d - depletion</td>
<td></td>
</tr>
</tbody>
</table>

Size

1 - fine (<2mm)
2 - medium (2-5mm)
3 - coarse (5-20mm)
4 - very coarse (20-76mm)
5 - extremely coarse (>76mm)

Contrast

1 - faint
d - distinctp - prominent
### DATA FORM

**Routine Wetland Determination**

**Project/Site:** LLNL Site 300  
**Applicant/Owner:** US DOE  
**Investigator(s):** Preston & Frazier  
**Date:** 07/03/02

**Do normal circumstances exist on the site?**  
- [ ] Yes  
- [ ] No  
**Community ID:** Intermittent stream channel (fed by seep)

**Is the site significantly disturbed (atypical situation)?**  
- [ ] Yes  
- [ ] No

**Is the area a potential problem area?**  
- [ ] Yes  
- [ ] No

**Percentage of Dominants that are OBL, FACW, or FAC (excluding FAC):** **66.67%**  
**Total Vegetation Cover:** **66.67%**

**Morphological Adaptations**  
- [ ] Yes  
- [ ] No  
**Visual Observation of Plant Species Growing in Areas of Prolonged Submersion/Saturation**  
- [ ] Yes  
- [ ] No

**Hydrophytic Vegetation Present?**  
- [ ] Yes  
- [ ] No

**Remarks:**

### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Leymus triticioides</em></td>
<td>herb</td>
<td>FAC+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Urtica dioica</em></td>
<td>herb</td>
<td>FACW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### HYDROLOGY

**Is it the growing season?**  
- [ ] Yes  
- [ ] No

**Typical length:** **45** days

**Recorded Data (describe below):**  
- [ ] Stream, Lake, or Tide Gauge  
- [ ] Aerial Photographs  
- [ ] Other  
- [ ] None Available

**Field Observations:**  
- [ ] Depth of Surface Water: **0** inches  
- [ ] Depth to Standing Water in Pit: **>17** inches  
- [ ] Depth to Saturated Soil: **>17** inches

**Wetland Hydrology Present?**  
- [ ] Yes  
- [ ] No

**Remarks:** Data point is in stream channel; otherwise no evidence of wetland hydrology observed.
## SOILS

### WETLAND DETERMINATION:

**Hydrophytic vegetation present?** □ YES □ NO  
**Wetland hydrology present?** □ YES □ NO  
**Hydric soils present?** □ YES □ NO  
**Is the sampling point within a wetland?** □ YES □ NO

### Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse sand</td>
<td>Very fine sandy loam</td>
<td>Few</td>
<td>Fe - iron concentration  (soft mass)</td>
</tr>
<tr>
<td>Fine sand</td>
<td>Fine sand</td>
<td>Many</td>
<td>Mn - manganese concentration  (soft mass)</td>
</tr>
<tr>
<td>Very fine sand</td>
<td>-</td>
<td>-</td>
<td>Fe-nc - iron nodule or concretion</td>
</tr>
<tr>
<td>Loamy coarse sand</td>
<td>Clay loam</td>
<td>-</td>
<td>Mn-nc - manganese nodule or concretion</td>
</tr>
<tr>
<td>Loamy sand</td>
<td>Clay loam</td>
<td>-</td>
<td>d - depletion</td>
</tr>
<tr>
<td>Loamy fine sand</td>
<td>Silty loam</td>
<td>-</td>
<td>Location</td>
</tr>
<tr>
<td>Loamy very fine sand</td>
<td>Cl - clay loam</td>
<td>-</td>
<td>mat - soil matrix</td>
</tr>
<tr>
<td>Coarse sandy loam</td>
<td>Silty clay</td>
<td>-</td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>Clay</td>
<td>-</td>
<td>por - soil pores</td>
</tr>
<tr>
<td>Fine sandy loam</td>
<td>Clay</td>
<td>-</td>
<td>or - other</td>
</tr>
<tr>
<td>Fine loam</td>
<td>Clay</td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

### Redoximorphic Features

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance</th>
<th>Type, location</th>
<th>Color (moist)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0-17</td>
<td>Sand</td>
<td>-</td>
<td>10YR 3/2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Hydric Soil Indicators (check all that apply):

- Histosol
- High Organic Content In Surface Layer of Sandy Soils
- Organic Streaking In Sandy Soils
- Listed on National/Local Hydric Soils List
- Other (explain below)
- Gray or Low-Chroma (<1) matrix
- Matrix Chroma <2 with Redoximorphic Concentrations and/or Depletions

### Texture Description

- Organic content
- Fe oxides
- Mn oxides
- Carbonates
- Clay minerals

### Redoximorphic Feature Morphology

- 1 - fine (<2mm)
- 2 - medium (2-5mm)
- 3 - coarse (5-20mm)
- 4 - very coarse (20-76mm)
- 5 - extremely coarse (>76mm)

### Profile Description

- Soil profile
- Horizon identification
- Depth measurement

### Remarks

- Lithic Xerorthent
- Aridic Xerorthent
- Typic Xerorthent
- Salic Xerorthent

---

**Data Table:**

<table>
<thead>
<tr>
<th>Horizons</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance</th>
<th>Type, location</th>
<th>Color (moist)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0-17</td>
<td>Sand</td>
<td>-</td>
<td>10YR 3/2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

---

**Map Unit Name (series and phase):** Wetland-Aridic-San Timoteo complex, 30-50% slopes  
**Drainage Class:** well to somewhat excessively drained

---

**Taxonomy (subgroup):** See remarks below  
**Field observations confirm mapped type?** □ YES □ NO

**Is data point located within a hydric inclusion?** □ YES □ NO

---

**Remarks:**

- Lithic Xerorthent
- Aridic Xerorthent
- Typic Xerorthent
- Salic Xerorthent

---

**Hydric Soil Indicators (check all that apply):**

- Histosol
- High Organic Content In Surface Layer of Sandy Soils
- Organic Streaking In Sandy Soils
- Listed on National/Local Hydric Soils List
- Other (explain below)
- Gray or Low-Chroma (<1) matrix
- Matrix Chroma <2 with Redoximorphic Concentrations and/or Depletions

---

**Hydric Soils Present?** □ YES □ NO

---

**Hydrophytic vegetation present?** □ YES □ NO  
**Wetland hydrology present?** □ YES □ NO  
**Hydric soils present?** □ YES □ NO  
**Is the sampling point within a wetland?** □ YES □ NO

---

**Texture and Rock Fragment Content**

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coarse sand</td>
<td>Very fine sandy loam</td>
<td>Few</td>
<td>Fe - iron concentration  (soft mass)</td>
</tr>
<tr>
<td>Fine sand</td>
<td>Fine sand</td>
<td>Many</td>
<td>Mn - manganese concentration  (soft mass)</td>
</tr>
<tr>
<td>Very fine sand</td>
<td>-</td>
<td>-</td>
<td>Fe-nc - iron nodule or concretion</td>
</tr>
<tr>
<td>Loamy coarse sand</td>
<td>Clay loam</td>
<td>-</td>
<td>Mn-nc - manganese nodule or concretion</td>
</tr>
<tr>
<td>Loamy sand</td>
<td>Clay loam</td>
<td>-</td>
<td>d - depletion</td>
</tr>
<tr>
<td>Loamy fine sand</td>
<td>Silty clay</td>
<td>-</td>
<td>Location</td>
</tr>
<tr>
<td>Loamy very fine sand</td>
<td>Cl - clay loam</td>
<td>-</td>
<td>mat - soil matrix</td>
</tr>
<tr>
<td>Coarse sandy loam</td>
<td>Silty clay</td>
<td>-</td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>Sandy loam</td>
<td>Clay</td>
<td>-</td>
<td>por - soil pores</td>
</tr>
<tr>
<td>Fine sandy loam</td>
<td>Clay</td>
<td>-</td>
<td>or - other</td>
</tr>
</tbody>
</table>

---

**Hydric Soil Indicators (check all that apply):**

- Histosol
- High Organic Content In Surface Layer of Sandy Soils
- Organic Streaking In Sandy Soils
- Listed on National/Local Hydric Soils List
- Other (explain below)
- Gray or Low-Chroma (<1) matrix
- Matrix Chroma <2 with Redoximorphic Concentrations and/or Depletions

---

**Hydric Soils Present?** □ YES □ NO

---

**Hydrophytic vegetation present?** □ YES □ NO  
**Wetland hydrology present?** □ YES □ NO  
**Hydric soils present?** □ YES □ NO  
**Is the sampling point within a wetland?** □ YES □ NO
DATA FORM
ROUTINE WETLAND DETERMINATION

<table>
<thead>
<tr>
<th>Project/Site: LLNL Site 300</th>
<th>State: CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant/Owner: US DOE</td>
<td>County: San Joaquin</td>
</tr>
<tr>
<td>Investigator(s): Preston &amp; Frazier</td>
<td></td>
</tr>
<tr>
<td>Date: 07/03/02</td>
<td>Community ID: Upland (annual grassland)</td>
</tr>
</tbody>
</table>

Do normal circumstances exist on the site? [ ] YES [ ] NO
Is the site significantly disturbed (atypical situation)? [ ] YES [ ] NO
Is the area a potential problem area? [ ] YES [ ] NO
(If needed, explain below)

VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bromus hordeaeus</td>
<td>herb</td>
<td></td>
<td>FACU</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bromus diandrus</td>
<td>herb</td>
<td></td>
<td>UPL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC-): [ ] YES [ ] NO
Total vegetation cover: [ ]

- Morphological Adaptations
- Physiological/Reproductive Adaptations
- Visual Observation of Plant Species Growing in Areas of Prolonged Inundation/Saturation
- Personal Knowledge of Regional Plant Communities
- Technical Literature
- Other (explain below)

Hydrophytic Vegetation Present? [ ] YES [ ] NO

Remarks:
California annual grassland.

HYDROLOGY

Is it the growing season? [ ] YES [ ] NO
Based On: [ ] Soil Temp (record) [ ] Other (explain)
Typical length: [ ] Days 5% = [ ]

Recorded Data (describe below):
- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- None Available

Field Observations:
- Depth of Surface Water: [ ] inches
- Depth to Standing Water in Pit: [ ] inches
- Depth to Saturated Soil: [ ] inches

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Rhizospheres in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (explain below)

Wetland Hydrology Present? [ ] YES [ ] NO

Remarks:
No evidence of wetland hydrology observed.
### Soil Description

**Horizon** | **Depth (inches)** | **Texture** | **Structure** | **Matrix Color (moist)** | **Abundance, Size, Contrast** | **Type, Location** | **Color (moist)** | **Other** |
--- | --- | --- | --- | --- | --- | --- | --- | --- |
**A** | 0-18 | sL | -- | 10YR 2/1 | none | -- | -- | 39% gravel, 5% cobble |

### Hydric Soil Indicators

- [ ] Histosol
- [ ] Histic Epepidon
- [ ] Sulfacic Ochre
- [ ] Aquatic Moisn Rejime
- [ ] Reducing Conditions (α , α' - dipyrrol test)
- [ ] Gleyed or Low-Chroma (≤1) matrix
- [ ] Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions

### WETLAND DETERMINATION:

- **Hydrophytic vegetation present?** [ ] YES [ ] NO
- **Wetland hydrology present?** [ ] YES [ ] NO
- **Hydric soils present?** [ ] YES [ ] NO
  - **Is the sampling point within a wetland?** [ ] YES [ ] NO

### Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
</tr>
</thead>
<tbody>
<tr>
<td>cos- coarse sand</td>
<td>vbl - very fine sandy loam, gr - gravelly</td>
</tr>
<tr>
<td>s - sand</td>
<td>l - loam, vgr - very gravelly</td>
</tr>
<tr>
<td>fS - fine sand</td>
<td>sL - silt loam, xgr - extremely gravelly</td>
</tr>
<tr>
<td>vs - very fine sand</td>
<td>sL - silt loam, cb - cobbly</td>
</tr>
<tr>
<td>kcs - loamy coarse sand</td>
<td>sc - sandy clay loam, xcb - extremely cobbly</td>
</tr>
<tr>
<td>lc - loamy sand</td>
<td>cl - clay loam, st - stony</td>
</tr>
<tr>
<td>fs - loamy fine sand</td>
<td>sL - silt loam, ves - very stony</td>
</tr>
<tr>
<td>lvSs - loamy very fine sand</td>
<td>sc - sandy clay, xbl - extremely stony</td>
</tr>
<tr>
<td>cs - coarse sandy loam</td>
<td>sc - sandy clay, c - clay</td>
</tr>
<tr>
<td>st - sandy loam</td>
<td>sc - sandy clay, p - prominent</td>
</tr>
</tbody>
</table>

### Redoximorphic Feature Morphology

<table>
<thead>
<tr>
<th>Abundance</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - few</td>
<td>Fe-x - iron concentration (soft mass)</td>
</tr>
<tr>
<td>c - common</td>
<td>Fe-nx - iron nodule or concentration</td>
</tr>
<tr>
<td>m - many</td>
<td>Mn-x - manganese concentration (soft mass)</td>
</tr>
<tr>
<td>d - depletion</td>
<td>Mn-nx - manganese nodule or concentration</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Size</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - fine (≤2mm)</td>
<td>mat - soil matrix</td>
</tr>
<tr>
<td>2 - medium 2-5mm</td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>3 - coarse (5-20mm)</td>
<td>por - soil pores</td>
</tr>
<tr>
<td>4 - very coarse 20-78mm</td>
<td>or - other</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>f - faint</td>
</tr>
<tr>
<td>d - distinct</td>
</tr>
<tr>
<td>p - prominent</td>
</tr>
</tbody>
</table>
DATA FORM
ROUTINE WETLAND DETERMINATION

---

Project/Site: LLNL Site 300  
Applicant/Owner: US DOE  
Investigator(s): Preston & Frazier  
Date: 07/03/02

---

Do normal circumstances exist on the site?  
Yes  
No  
Are the site significantly disturbed?  
Yes  
No  
Is the area a potential problem area?  
Yes  
No

---

VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Juncus balbicus</td>
<td>herb</td>
<td></td>
<td>OBL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urtica dioica</td>
<td>herb</td>
<td></td>
<td>FACW</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asclepias fasciculata</td>
<td>herb</td>
<td></td>
<td>FAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC): 100%  
Total vegetation cover __________ %

- Morphological Adaptations  
- Physiological/Reproductive Adaptations  
- Visual Observation of Plant Species Growing in Areas of Prolonged inundation/Saturation  
- Personal Knowledge of Regional Plant Communities  
- Technical Literature  
- Other (explain below)

- Hydrophytic Vegetation Present?  
  Yes  
  No

Remarks:

---

HYDROLOGY

Is it the growing season?  
Yes  
No

Based On: Soil Temp (record)  
Other (explain)

Typical length: __________ Days  
5% = __________

Recorded Data (describe below):  
Stream, Lake, or Tide Gauge  
Aerial Photographs  
Other  
None Available

Field Observations:  
Depth of Surface Water: __________ inches  
Depth to Standing Water in Pit: __________ inches  
Depth to Saturated Soil: __________ inches

Wetland Hydrology indicators:

Primary Indicators:  
- Inundated  
- Saturated Upper 12 Inches  
- Water Marks  
- Drift Lines  
- Sediment Deposits  
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):  
- Oxidized Rhizospheres in Upper 12 Inches  
- Water-Stained Leaves  
- Local Soil Survey Data  
- FAC-Neutral Test  
- Other (explain below)

Wetland Hydrology Present?  
Yes  
No

Remarks:  
No direct evidence of wetland hydrology observed, although data point is in swale; water stains/salt deposits on adjacent rock outcrop that is also part of seep.

---
SOILS

Map Unit Name (series and phase): Wisflat-Arborus-San Timoteo complex, 30-50% slopes
Taxonomy (subgroup): See remarks below

Is data point located within a hydric inclusion? □ YES □ NO

Profile Description

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance, Size, Contrast</th>
<th>Type, location</th>
<th>Color (moist)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0-16</td>
<td>silt</td>
<td></td>
<td>10YR 3/1</td>
<td>none</td>
<td></td>
<td>8% gravel, 3% cobble</td>
<td></td>
</tr>
</tbody>
</table>

Hydric Soil Indicators (check all that apply):

□ Histosol
□ Arctic Epepod
□ Sulfic Odor
□ Aquic Moisture Regime
□ Reducing Conditions (α, α² - dipyril test)
□ Glycol or Low-Chroma (≤1) matrix
□ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions

Hydric Soils Present? □ YES □ NO

Remarks:
Wisflat (subgroup taxonomy): Lithic Xerorthent; Arborus (subgroup taxonomy): Typic Xerorthent; San Timoteo (subgroup taxonomy): Typic Xerorthent.

WETLAND DETERMINATION:

Hydrophytic vegetation present? □ YES □ NO
Wetland hydrology present? □ YES □ NO
Hydric soils present? □ YES □ NO

Is the sampling point within a wetland? □ YES □ NO

Remarks:

Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
<th>Abundance</th>
<th>Type</th>
<th>Size</th>
<th>Location</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>coarse sand</td>
<td>vfd - very fine sandy loam</td>
<td>gr - gravel</td>
<td>Fe-NC - iron concentration (soft mass)</td>
<td>1 - fine (&lt;2mm)</td>
<td>mat - soil matrix</td>
<td>f - faint</td>
</tr>
<tr>
<td>sand</td>
<td>l - loam</td>
<td>vgr - very gravelly</td>
<td>Fe-NC - iron nodule or concretion</td>
<td>2 - medium (2-5mm)</td>
<td>ped - ped surface</td>
<td>d - distinct</td>
</tr>
<tr>
<td>very fine sand</td>
<td>a - silt</td>
<td>xgr - extremely gravelly</td>
<td>Mn-NC - manganese concretion (soft mass)</td>
<td>3 - coarse (5-20mm)</td>
<td>por - soil pores</td>
<td>p - prominent</td>
</tr>
<tr>
<td>loamy fine sand</td>
<td>s - sandy loam</td>
<td>cb - cobble</td>
<td>Mn-NC - manganese nodule or concretion</td>
<td>4 - very coarse (20-76mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sandy loam</td>
<td>sc - sandy clay</td>
<td></td>
<td>d - depletion</td>
<td>5 - extremely coarse (&gt;76mm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>loamy very fine sand</td>
<td>sc - sandy clay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>clay</td>
<td>c - clay</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Redoximorphic Feature Morphology

<table>
<thead>
<tr>
<th>Type</th>
<th>Abundance</th>
<th>Location</th>
<th>Contrast</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fe-NC - iron concentration (soft mass)</td>
<td>1 - fine (&lt;2mm)</td>
<td>mat - soil matrix</td>
<td>f - faint</td>
</tr>
<tr>
<td>Mn-NC - iron nodule or concretion</td>
<td>2 - medium (2-5mm)</td>
<td>ped - ped surface</td>
<td>d - distinct</td>
</tr>
<tr>
<td>Mn-NC - manganese concretion (soft mass)</td>
<td>3 - coarse (5-20mm)</td>
<td>por - soil pores</td>
<td>p - prominent</td>
</tr>
</tbody>
</table>
### Data Form

**Routine Wetland Determination**

<table>
<thead>
<tr>
<th>Project/Site</th>
<th>LLNL Site 300</th>
<th>State</th>
<th>CA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applicant/Owner</td>
<td>US DOE</td>
<td>County</td>
<td>Alameda</td>
</tr>
<tr>
<td>Investigator(s)</td>
<td>Preston &amp; Frazier</td>
<td>S/T/R</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>07/03/02</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Do normal circumstances exist on the site?
- Yes [ ]
- No [ ]

#### Is the site significantly disturbed (atypical situation)?
- Yes [ ]
- No [ ]

#### Is the area a potential problem area?
- Yes [ ]
- No [ ]

(If needed, explain below)

---

### Vegetation

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distichlis spicata</td>
<td></td>
<td></td>
<td>FACW</td>
<td>Bromus diandrus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC): 100%

Total vegetation cover: %

- Morphological Adaptations
- Physiological/Reproductive Adaptations
- Visual Observation of Plant Species Growing in Areas of
- Prolonged Inundation/Saturation

**Hydrophytic Vegetation Present?**
- Yes [ ]
- No [ ]

### Hydrology

#### Is it the growing season? [ ] Yes [ ] No

Based On:
- Soil Temp (record) [ ]
- Other (explain) [ ]

Typical length: ___________ Days

5% =

Recorded Data (describe below):
- Stream, Lake, or Tide Gauge [ ]
- Aerial Photographs [ ]
- Other [ ]
- None Available [ ]

Field Observations:
- Depth of Surface Water: ___ inches
- Depth to Standing Water in Pit: ___ inches
- Depth to Saturated Soil: ___ inches

**Wetland Hydrology Indicators:**

Primary Indicators:
- Inundated [ ]
- Saturated Upper 12 Inches [ ]
- Water Marks [ ]
- Drift Lines [ ]
- Sediment Deposits [ ]
- Drainage Patterns in Wetlands [ ]

Secondary Indicators (2 or more required):
- Oxidized Rhizospheres in Upper 12 Inches [ ]
- Water-Stained Leaves [ ]
- Local Soil Survey Data [ ]
- FAC-Neutral Test [ ]
- Other (explain below) [ ]

**Wetland Hydrology Present?**
- Yes [ ]
- No [ ]

Remarks:

---

07/07/92

Data Point 6A vs.
**SOILS**

Plot ID:  

**Map Unit Name (series and phase):** Diablo clay, 30 to 45% slopes  
*Drainage Class:* well drained

**Taxonomy (subgroup):** Arctic Hapludands  
*Field observations confirm mapped type?*  
☐ YES  ☐ NO

**Is data point located within a hydric inclusion?**  
☐ YES  ☐ NO

**Profile Description**

<table>
<thead>
<tr>
<th>Horizon</th>
<th>Depth (inches)</th>
<th>Texture</th>
<th>Structure</th>
<th>Matrix Color (moist)</th>
<th>Abundance, Size, Contrast</th>
<th>Type, Location</th>
<th>Color (moist)</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>0-7</td>
<td>cl</td>
<td>--</td>
<td>2.5Y 3/2</td>
<td>none</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>A2/mk</td>
<td>7-19+</td>
<td>cl</td>
<td>--</td>
<td>2.5Y 3/1. 4/2</td>
<td>none</td>
<td>--</td>
<td>--</td>
<td>carbonates masses near bottom of horizon</td>
</tr>
</tbody>
</table>

**Hydric Soil Indicators (check all that apply):**

☐ Histosol  
☐ Historic Epipedon  
☐ High Organic Content in Surface Layer of Sandy Soils  
☐ Sulfitic Odor  
☐ Organic Streaking in Sandy Soils  
☐ Aquic Moisture Regime  
☐ Listed on National/Local Hydric Soils List  
☐ Reducing Conditions (\(\alpha_a\), \(a^2\), -di-pydy test)  
☐ Other (explain below)  
☐ Clayed or Low-Chroma (<1) matrix  
☐ Matrix Chroma <2 with Redoximorphic Concentrations and/or Depletions

**Hydric Soils Present?**  
☐ YES  ☐ NO

**Remarks:**

**WETLAND DETERMINATION:**

**Hydrophytic vegetation present?**  
☐ YES  ☐ NO

**Wetland hydrology present?**  
☐ YES  ☐ NO

**Hydric soils present?**  
☐ YES  ☐ NO  
*Is the sampling point within a wetland?*  
☐ YES  ☐ NO

**Remarks:**

*Distichlis growing on a hill slope in a position where wetland hydrology would not be expected. Presence of Distichlis in this position probably explained by rhizomatous growth, with plants on slope connected with plants in wetland/stream channel via rhizomes.*

---

**Texture and Rock Fragment Content**

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>co = coarse sand</td>
<td>vfe - very fine sandy loam</td>
<td>f - few</td>
<td>Type</td>
</tr>
<tr>
<td>s = sand</td>
<td>l - loam</td>
<td>c - common</td>
<td>Fe+ - iron concentration (soft mass)</td>
</tr>
<tr>
<td>fs = fine sand</td>
<td>s - silt loam</td>
<td>m - many</td>
<td>Fe-nc - iron nodule or concretion</td>
</tr>
<tr>
<td>vfs = very fine sand</td>
<td>s - silt</td>
<td></td>
<td>Mn+ - manganese concentration (soft mass)</td>
</tr>
<tr>
<td>lks = loamy coarse sand</td>
<td>s - sandy clay</td>
<td></td>
<td>Mn+nc - manganese nodule or concretion</td>
</tr>
<tr>
<td>lks = loamy sand</td>
<td>c - clay</td>
<td></td>
<td>d - depletion</td>
</tr>
<tr>
<td>lbs = loamy fine sand</td>
<td>s - silt loam</td>
<td></td>
<td>Location</td>
</tr>
<tr>
<td>lvfs = loamy very fine sand</td>
<td>s - silt clay</td>
<td></td>
<td>mat - soil mats</td>
</tr>
<tr>
<td>lfs = loamy sand</td>
<td>s - sandy clay</td>
<td></td>
<td>ped - ped surface</td>
</tr>
<tr>
<td>lbs = loamy fine sand</td>
<td>s - silt clay</td>
<td></td>
<td>por - soil pores</td>
</tr>
<tr>
<td>lfs = loamy sand</td>
<td>s - sandy clay</td>
<td></td>
<td>ot - other</td>
</tr>
<tr>
<td>co = coarse sand</td>
<td>vfe - very fine sandy loam</td>
<td>f - few</td>
<td></td>
</tr>
<tr>
<td>s = sand</td>
<td>l - loam</td>
<td>c - common</td>
<td></td>
</tr>
<tr>
<td>fs = fine sand</td>
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<td>lfs = loamy sand</td>
<td>s - sandy clay</td>
<td></td>
<td>ot - other</td>
</tr>
</tbody>
</table>
### VEGETATION

<table>
<thead>
<tr>
<th>Dominant Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
<th>Associate Plant Species</th>
<th>Strata</th>
<th>% Rel. Cover</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Distichlis spicata</td>
<td>herb</td>
<td></td>
<td>FACW</td>
<td>Cardioglossa pycnocephal</td>
<td>herb</td>
<td></td>
<td>OBL</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Typha angustifolia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bromus diandrus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Percent of dominants that are OBL, FACW, or FAC (excluding FAC): 100% Total vegetation cover: %

- Morphological Adaptations
- Physiological/Reproductive Adaptations
- Visual Observation of Plant Species Growing in Areas of
- Prolonged Inundation/Saturation

Hydrophytic Vegetation Present? [ ] YES [ ] NO

Remarks: Freshwater (saline?) seep

### HYDROLOGY

Is it the growing season? [ ] YES [ ] NO

Based On: [ ] Soil Temp (record) [ ] Other (explain)

Typical length: Days 5% =

Recorded Data (describe below):
- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- None Available

Field Observations:
- Depth of Surface Water: 0 inches
- Depth to Standing Water in Pit: >15 inches
- Depth to Saturated Soil: >15 inches

Wetland Hydrology Indicators:

Primary Indicators:
- Inundated
- Saturated Upper 12 Inches
- Water Marks
- Drift Lines
- Sediment Deposits
- Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- Oxidized Rhizospheres in Upper 12 Inches
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (explain below)

Wetland Hydrology Present? [ ] YES [ ] NO

Remarks:
No direct evidence of wetland hydrology observed. Data point in stream channel.
### SOILS

**Plot ID:**

<table>
<thead>
<tr>
<th>Map Unit Name (series and phase):</th>
<th>Diablo clay, 30 to 45% silt &lt;br&gt;Diablo clay, 30 to 45% silt &lt;br&gt;Diablo clay, 30 to 45% silt &lt;br&gt;Diablo clay, 30 to 45% silt</th>
<th>Drainage Class:</th>
<th>well drained</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taxonomy (subgroup):</td>
<td>Artic Haploxerolls</td>
<td>Field observations confirm mapped type?</td>
<td>YES</td>
</tr>
<tr>
<td>Is data point located within a hydric inclusion?</td>
<td>YES</td>
<td>NO</td>
<td></td>
</tr>
<tr>
<td>Profile Description</td>
<td></td>
<td>Redoximorphic Features</td>
<td></td>
</tr>
<tr>
<td>Horizon</td>
<td>Depth (inches)</td>
<td>Texture</td>
<td>Structure</td>
</tr>
<tr>
<td>A1</td>
<td>0-9</td>
<td>c</td>
<td>~</td>
</tr>
<tr>
<td>A2/6k</td>
<td>5-15</td>
<td>c</td>
<td>~</td>
</tr>
</tbody>
</table>

**Hydric Soil Indicators (check all that apply):**
- Histosol
- Humic Epipedon
- Sulfatic Color
- Acute Moisture Regime
- Reducing Conditions (\( \alpha, \alpha' \) - dipyrrolyl test)
- Gleyed or Low-Chroma (51) matrix
- Matrix Chroma ≤ 2 with Redoximorphic Concentrations and/or Depositions

**WETLAND DETERMINATION:**

- Hydrophytic vegetation present? YES NO
- Wetland hydrology present? YES NO
- Hydric soils present? YES NO

**Remarks:**

### Texture and Rock Fragment Content

<table>
<thead>
<tr>
<th>Texture</th>
<th>Rock Fragments</th>
<th>Abundance</th>
<th>Redoximorphic Feature Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td>gravel</td>
<td>- very fine sandy loam</td>
<td>19.2%</td>
<td>Fo = iron concentration (soft mass)</td>
</tr>
</tbody>
</table>
| sandy            | - loam              | 32.4%     | Fe-

### Redoximorphic Feature Morphology

- **Type:**
  - Fo = iron concentration (soft mass)
  - Fe-
  - Mn-
  - Mn-
  - d = depletion

- **Size:**
  - 1 = fine (<2mm)
  - 2 = medium (2-5mm)
  - 3 = coarse (5-20mm)
  - 4 = very coarse (20-75mm)
  - 5 = extremely coarse (>75mm)

- **Contrast:**
  - f = faint
  - d = distinct
  - p = prominent

- **Location:**
  - mai = salt marsh
  - ped = peat surface
  - por = soil pores
  - or = other

---

8/17/02 Data Point 58.84 m