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UCRL-TR-224909

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

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October 2, 2006

This work was performed under the auspices of the U.S. Department of Energy by University of California, Lawrence Livermore National Laboratory under Contract W-7405-Eng-48.

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September 2002

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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).

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

## 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.

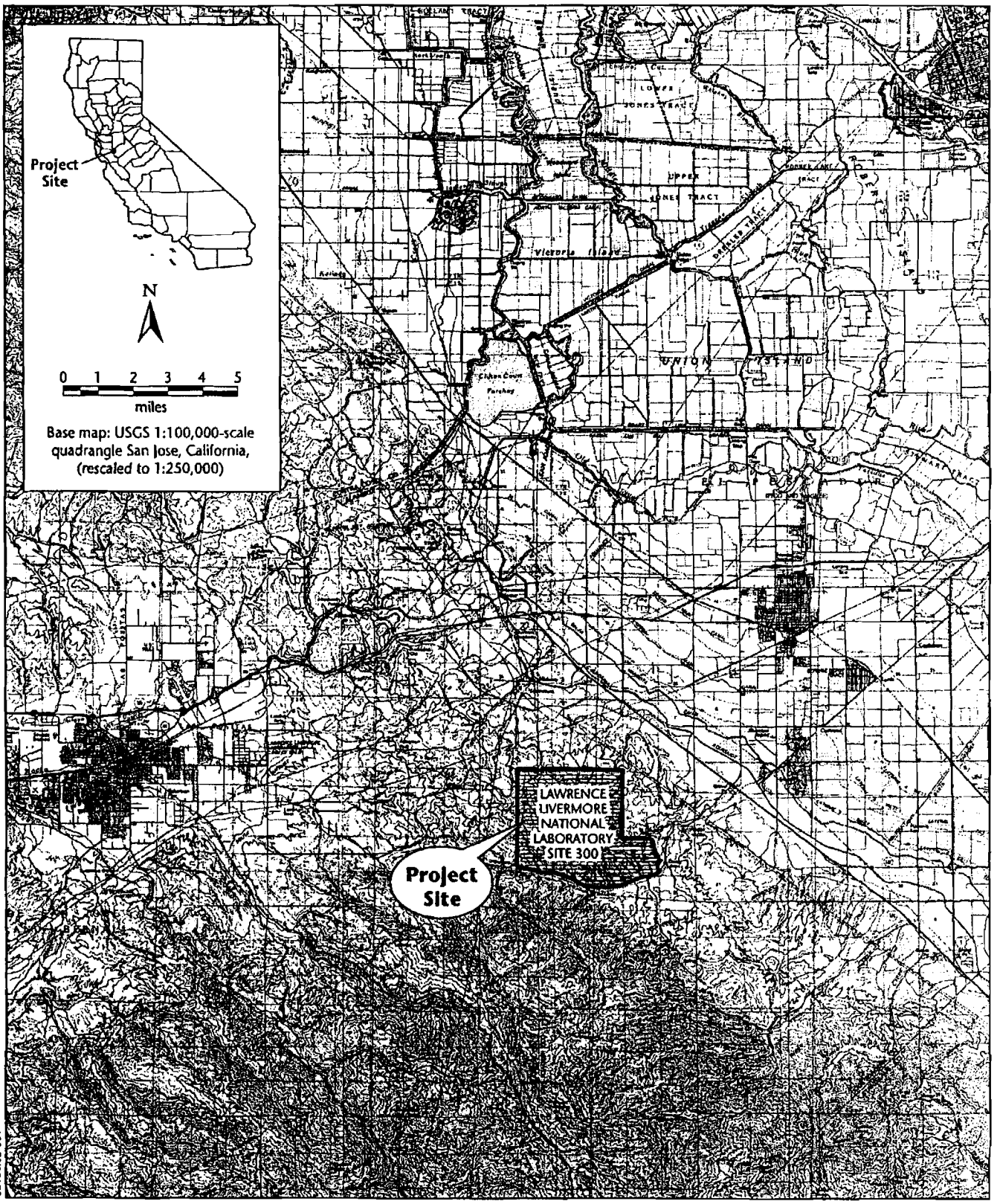
## Project Location and Description

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




Jones & Stokes

**Figure 1**
**Site 300 Location, Lawrence Livermore National Laboratory, Alameda/San Joaquin County, California**

mapped at Site 300 in 1991 (U. S. Department of Energy and University of California 1992).

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 1.** Characteristics of Site 300 Wetlands



| Wetland | Type | Characteristic Species | Acreage | Jurisdictional Assessment | Jurisdictional Acreage |
|---|---|---|---|---|---|
| 1 | vernal pool | *Crypsis schoenoides, Gnapahalium palustre, Amaranthus albus, Polypogon monspeliensis, Epilobium cleistogamum* | 0.597 | RLF breeding site | 0.597 |
| 2 | vernal pool | *Plagiobothrys stipitatus, Deschampsia danthonioides, Epilobium cleistogamum, Eleocharis macrostachya* | 0.325 | RLF breeding site | 0.325 |
| 3 | vernal pool | *Hordeum marinum* ssp. *gussoneanum, Polypogon monspeliensis* | 0.018 | Isolated | |
| | | **Vernal pool acreage, subtotal** | **0.94** | | **0.922** |
| 4 | freshwater seep | | 0.199 | Tributary | 0.199 |
| 5 | freshwater seep | *Baccharis salicifolius, Leymus triticoides* | 0.017 | Tributary | 0.017 |
| 6 | freshwater seep | *Leymus triticoides* | 0.054 | RLF non-breeding site | 0.054 |
| 7 | freshwater seep | *Polypogon monspeliensis, Leymus triticoides, Typha angustifolia* | 0.101 | Tributary, RLF breeding site | 0.101 |
| 8 | freshwater seep | *Utica dioica, Polypogon onspeliensis, Typha angustifolia* | 0.023 | Isolated | |
| 9 | freshwater seep | *Urtica dioica* | 0.033 | Isolated | |
| 10 | freshwater seep | *Typha angustifolia, Distichlis spicata* | 0.443 | Isolated | |
| 11 | freshwater seep | *Typha angustifolia, Polypogon monspeliensis* | 0.025 | Isolated | |
| 12 | freshwater seep | *Typha angustifolia, Stachys albens, Distichlis spicata, Leymus triticoides, Baccharis salicifolius, Urtica urens* | 1.141 | Tributary, RLF breeding & non-breeding sites | 1.141 |
| 13 | freshwater seep | *Urtica dioica* | 0.099 | Isolated | |

**Table 1.** Characteristics of Site 300 Wetlands



| Wetland | Type | Characteristic Species | Acreage | Jurisdictional Assessment | Jurisdictional Acreage |
|---|---|---|---|---|---|
| 14 | freshwater seep | | 0.008 | Artificial | |
| 15 | freshwater seep | | 0.013 | Artificial | |
| 17 | freshwater seep | *Leymus triticoides, Baccharis salicifolius* | 0.217 | RLF nonbreeding site | 0.217 |
| 18 | freshwater seep | *Typha angustifolia, Leymus triticoides* | 0.078 | Isolated | |
| 19 | freshwater seep | *Baccharis salicifolius, Leymus triticoides* | 0.111 | Isolated | |
| 20 | freshwater seep | *Typha angustifolia, Baccharis salicifolius, Leymus triticoides, Salix laevigata, Populus fremontii* | 0.689 | RLF non-breeding site | 0.689 |
| 21 | freshwater seep | *Typha angustifolia, Baccharis salicifolius, Leymus triticoides, Nicotiana glauca* | 0.288 | Isolated | |
| 22 | freshwater seep | *Typha angustifolia, Stachys albens, Leymus triticoides* | 0.147 | Isolated | |
| 23 | freshwater seep | *Typha angustifolia, Stachys albens, Leymus triticoides* | 0.118 | Isolated | |
| 24 | freshwater seep | *Typha angustifolia, Leymus triticoides* | 0.082 | Isolated | |
| 25 | freshwater seep | *Typha angustifolia, Leymus triticoides* | 0.026 | Isolated | |
| 27 | freshwater seep | *Typha angustifolia, T. latifolia* | 0.575 | Artificial, RLF breeding sites | |
| 28 | freshwater seep | *Salix laevigata, Typha angustifolia, Uritica dioica, Nasturtium officinale* | 0.056 | Isolated | |
| 29 | freshwater seep | *Typha angustifolia, Polypogon monspeliensis* | 0.031 | Artificial | |
| 30 | freshwater seep | *Polypogon monspeliensis, Baccharis salicifolius* | 0.043 | Artificial | |

**Table 1.** Characteristics of Site 300 Wetlands



| Wetland | Type | Characteristic Species | Acreage | Jurisdictional Assessment | Jurisdictional Acreage |
|---|---|---|---|---|---|
| 31 | freshwater seep/Great Valley willow scrub | *Typha angusutifolia/latifolia, Urtica dioica, Salix laevigata, Nasturtium officinale* | 0.774 | RLF non-breeding site | 0.774 |
| 32 | freshwater seep | *Typha angustifolia, Urtica dioica, Leymus triticoides* | 0.076 | Isolated | |
| 33 | freshwater seep | *Typha angustifolia, Urtica dioica, Leymus triticoides* | 0.029 | Isolated | |
| 34 | freshwater seep | *Typha angustifolia, Urtica dioica, Leymus triticoides* | 0.018 | Isolated | |
| 35 | freshwater seep | *Utica dioica, Marrubium vulgare* | 0.046 | Isolated | |
| 36 | freshwater seep | *Utica dioica, Marrubium vulgare, Polypogon monspeliensis, Typha angustifolia, Cyperus eragrostis* | 0.048 | Isolated | |
| 37 | freshwater seep | *Baccharis salicifolius, Polypogon monspeliensis, Typha angustfolia* | 0.071 | Isolated | |
| 38 | freshwater seep | *Leymus triticoides, Typha angustifolia, Polypogon monspeliensis* | 0.034 | Isolated | |
| 39 | freshwater seep | *Typha angustifolia, Urtica dioica, Polypogon monspeliensis, Xanthium strumarium, Leymus triticoides* | 0.498 | Isolated | |
| 42 | freshwater seep | *Typha angustifolia, Polypogon monspeliensis, Rumex crispus, Asclepias fascicularis, Carduus pycnocephalus* | 0.036 | Isolated | |
| 43 | freshwater seep | *Typha angustifolia, Salix laevigata, Polypogon monspeliensis, Baccharis salicifolius, Leymus triticoides* | 0.492 | Isolated | |
| 44 | freshwater seep | *Typha angustifolia, Leymus triticoides, Distichlis spicata* | 0.266 | Isolated | |

**Table 1.** Characteristics of Site 300 Wetlands



| Wetland | Type | Characteristic Species | Acreage | Jurisdictional Assessment | Jurisdictional Acreage |
|---|---|---|---|---|---|
| 45 | freshwater seep | *Leymus triticoides, Juncus balticus* | 0.153 | Isolated | |
| | | **Freshwater seep, subtotal** | **7.158** | | **3.192** |
| 16 | seasonal pond | *Conyza canadensis, Leymus triticoides, Baccharis salicifolius* | 0.094 | Isolated | |
| 26 | seasonal pond | *Polypogon monspeliensis* | 0.018 | RLF nonbreeding site | 0.018 |
| 40 | seasonal pond | bare | 0.029 | RLF breeding site | 0.029 |
| 41 | seasonal pond | bare | 0.139 | Isolated | |
| 46 | seasonal pond | *Lepidium latifolium, Heliotropium curassavicum* (sparse vegetation) | 0.227 | RLF breeding site | 0.227 |
| | | **Seasonal pond, subtotal** | **0.507** | | **0.274** |
| | | **Wetlands, Total** | **8.605** | | **4.388** |

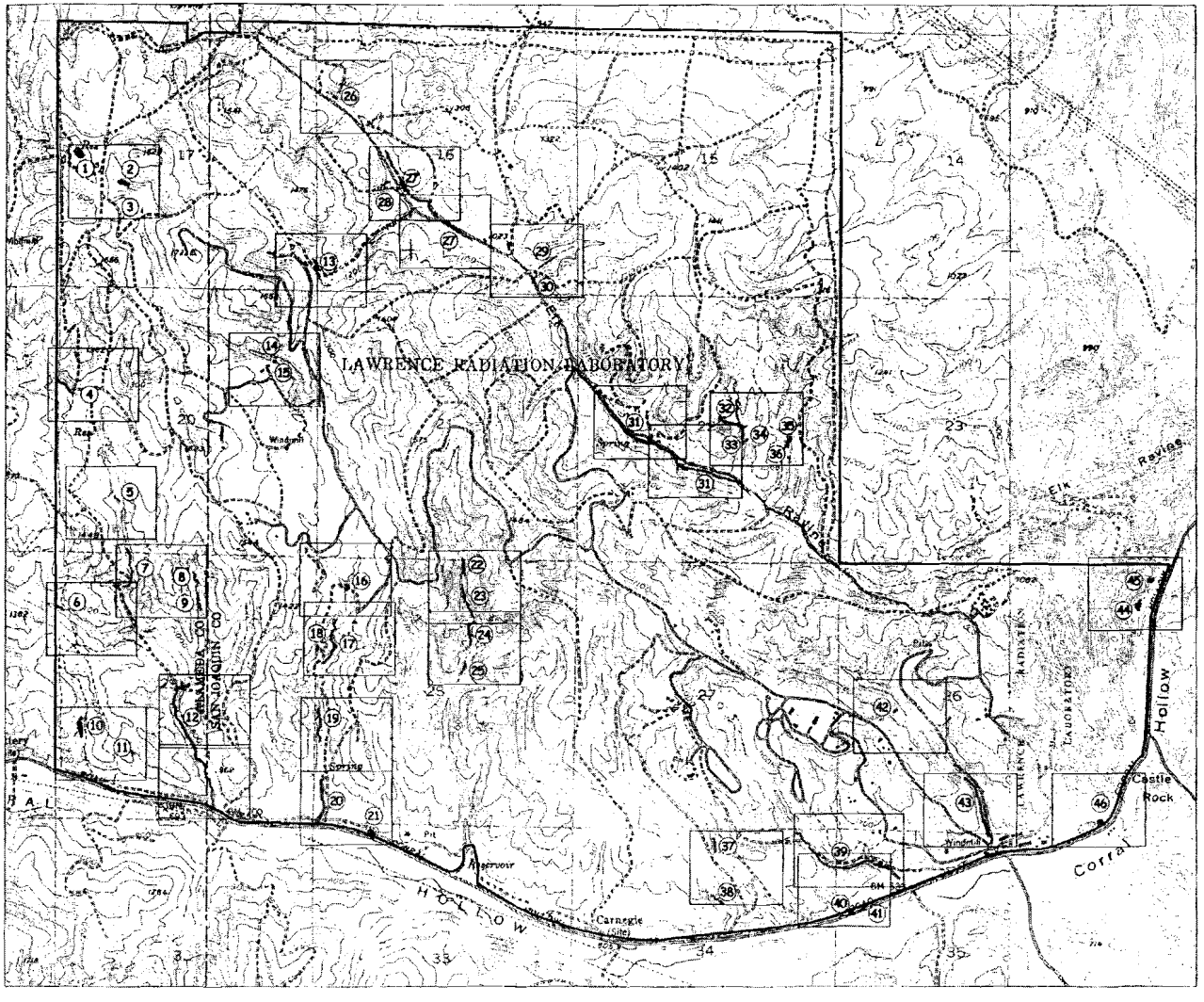
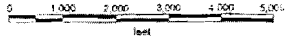



Figure 2
Index to Wetland Locations at Site 300

KEY TO WETLAND SITES

| | | | |
|---|---|---|---|
| 1 | vernal pool | 24 | freshwater seep |
| 2 | vernal pool | 25 | freshwater seep |
| 3 | vernal pool | 26 | seasonal pond |
| 4 | freshwater seep | 27 | cattail wetland |
| 5 | freshwater seep | 28 | freshwater seep |
| 6 | freshwater seep | 29 | freshwater seep |
| 7 | freshwater seep | 30 | freshwater seep |
| 8 | freshwater seep | 31 | freshwater seep/ Great Valley willow scrub |
| 9 | freshwater seep | | |
| 10 | freshwater seep | 32 | freshwater seep |
| 11 | freshwater seep | 33 | freshwater seep |
| 12 | freshwater seep | 34 | freshwater seep |
| 13 | freshwater seep | 35 | freshwater seep |
| 14 | freshwater seep | 36 | freshwater seep |
| 15 | freshwater seep | 37 | freshwater seep |
| 16 | seasonal pond | 38 | freshwater seep |
| 17 | freshwater seep | 39 | freshwater seep |
| 18 | freshwater seep | 40 | seasonal pond |
| 19 | freshwater seep | 41 | seasonal pond |
| 20 | freshwater seep/ cattail wetland | 42 | freshwater seep |
| | | 43 | freshwater seep |
| 21 | freshwater seep | 44 | freshwater seep |
| 22 | freshwater seep | 45 | freshwater seep |
| 23 | freshwater seep | 46 | seasonal pond |

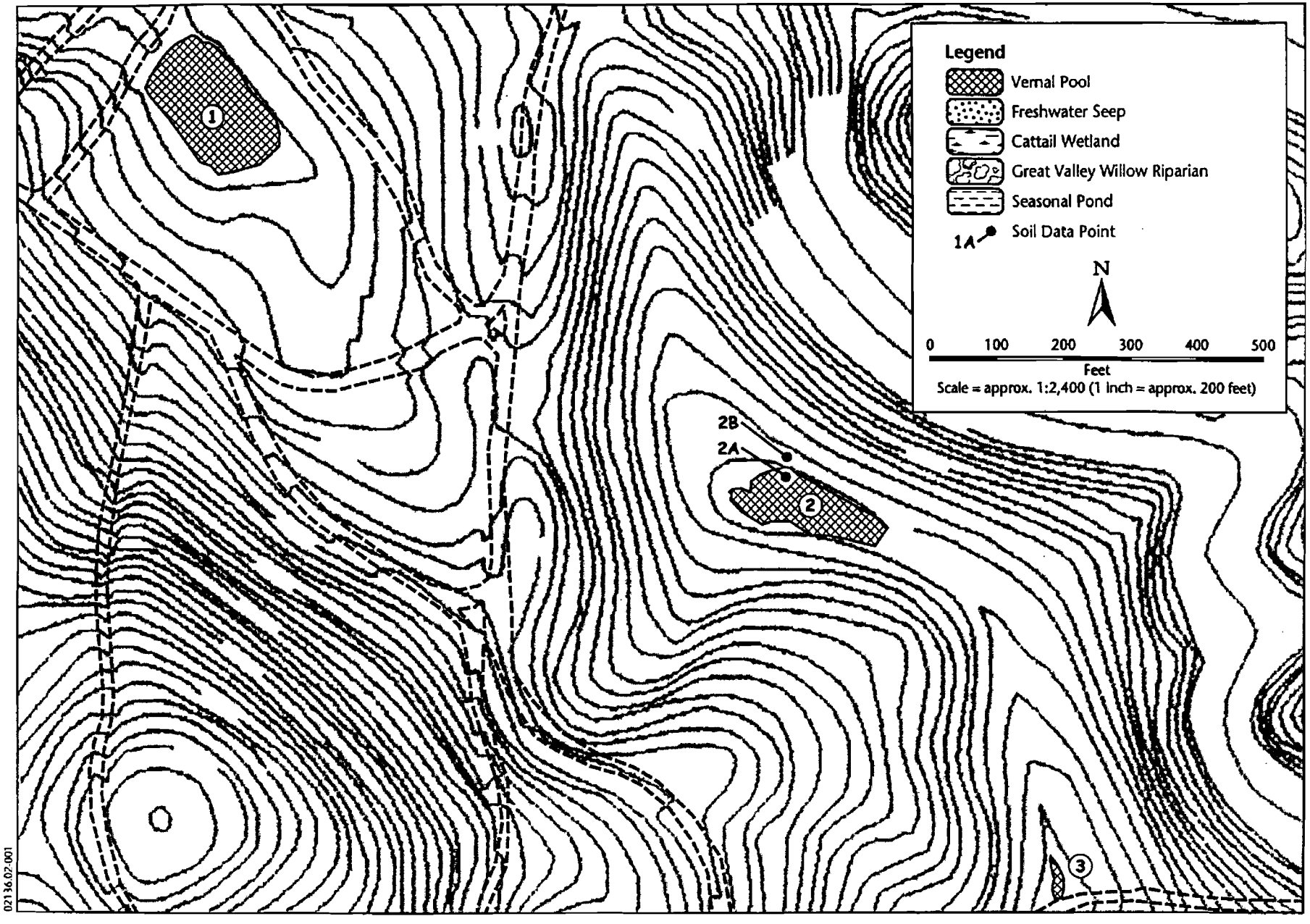





Scale = 1:24,000

Base maps: USGS 7.5' series Midway (1955, PR 1980) and Tracy (1954, PR 1981), California, quadrangles
Township 3 South, Range 4 East

Jones & Stokes

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Jones & Stokes

**Figure 3.1**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

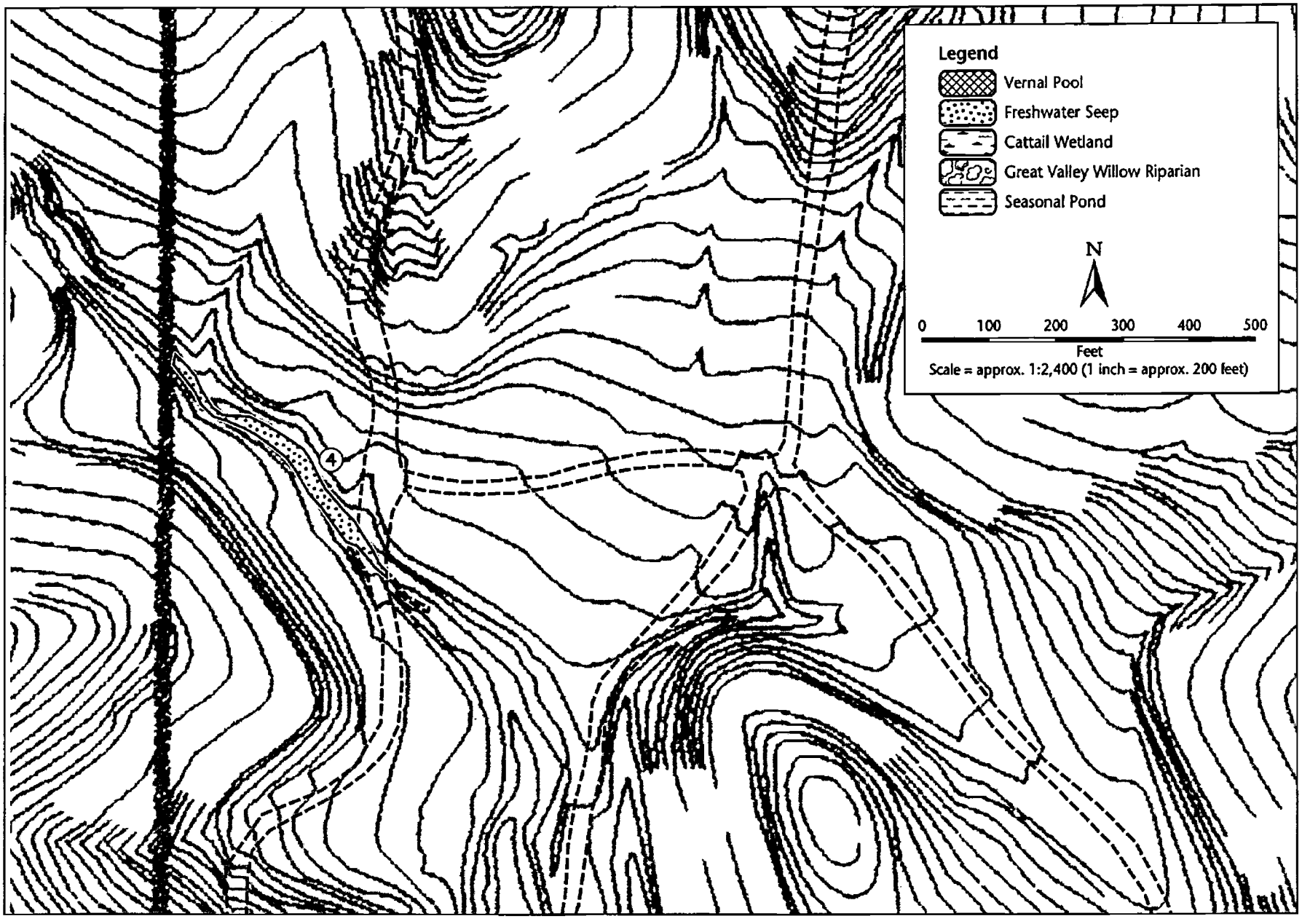


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**Figure 3.2**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

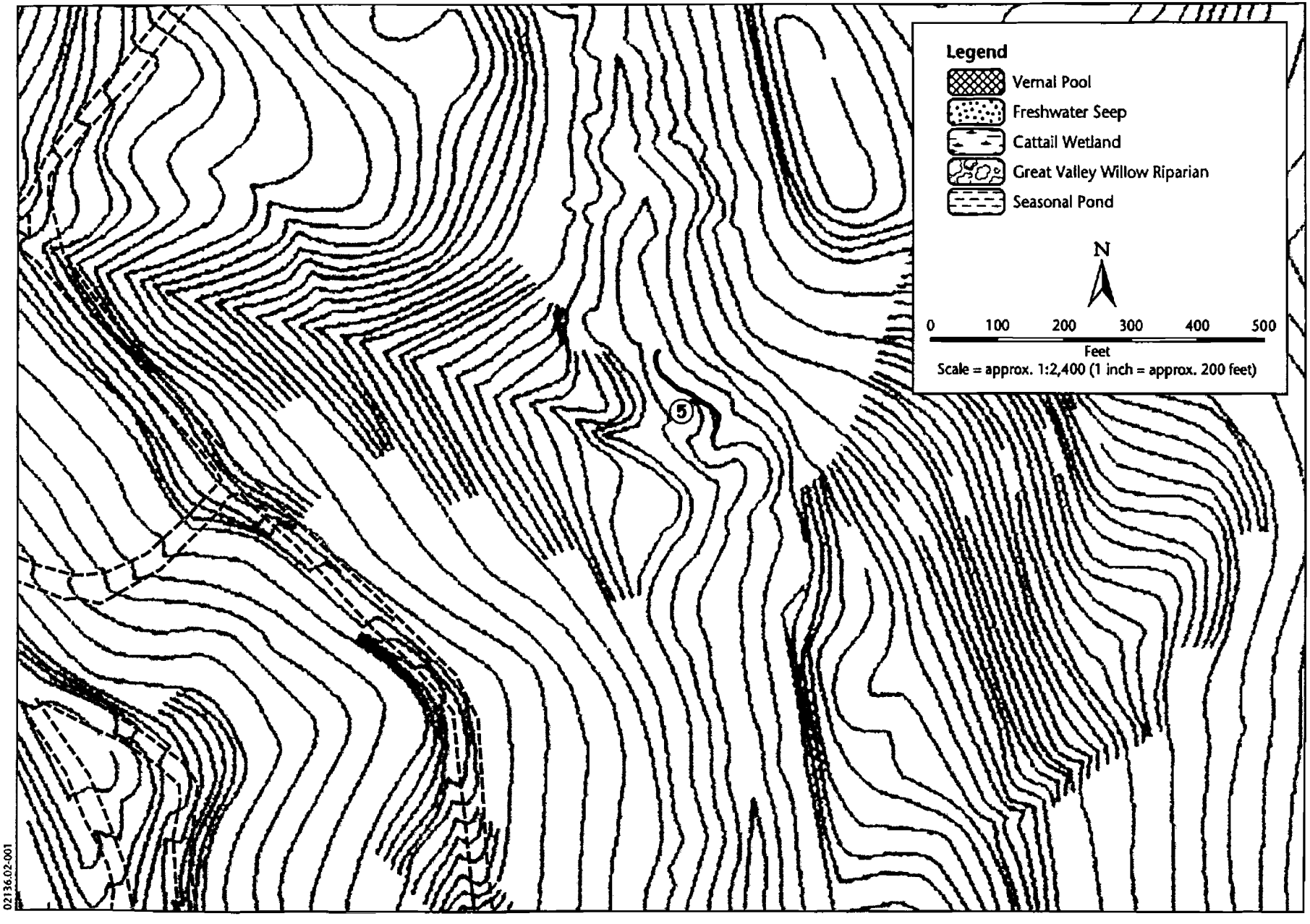


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**Figure 3.3**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

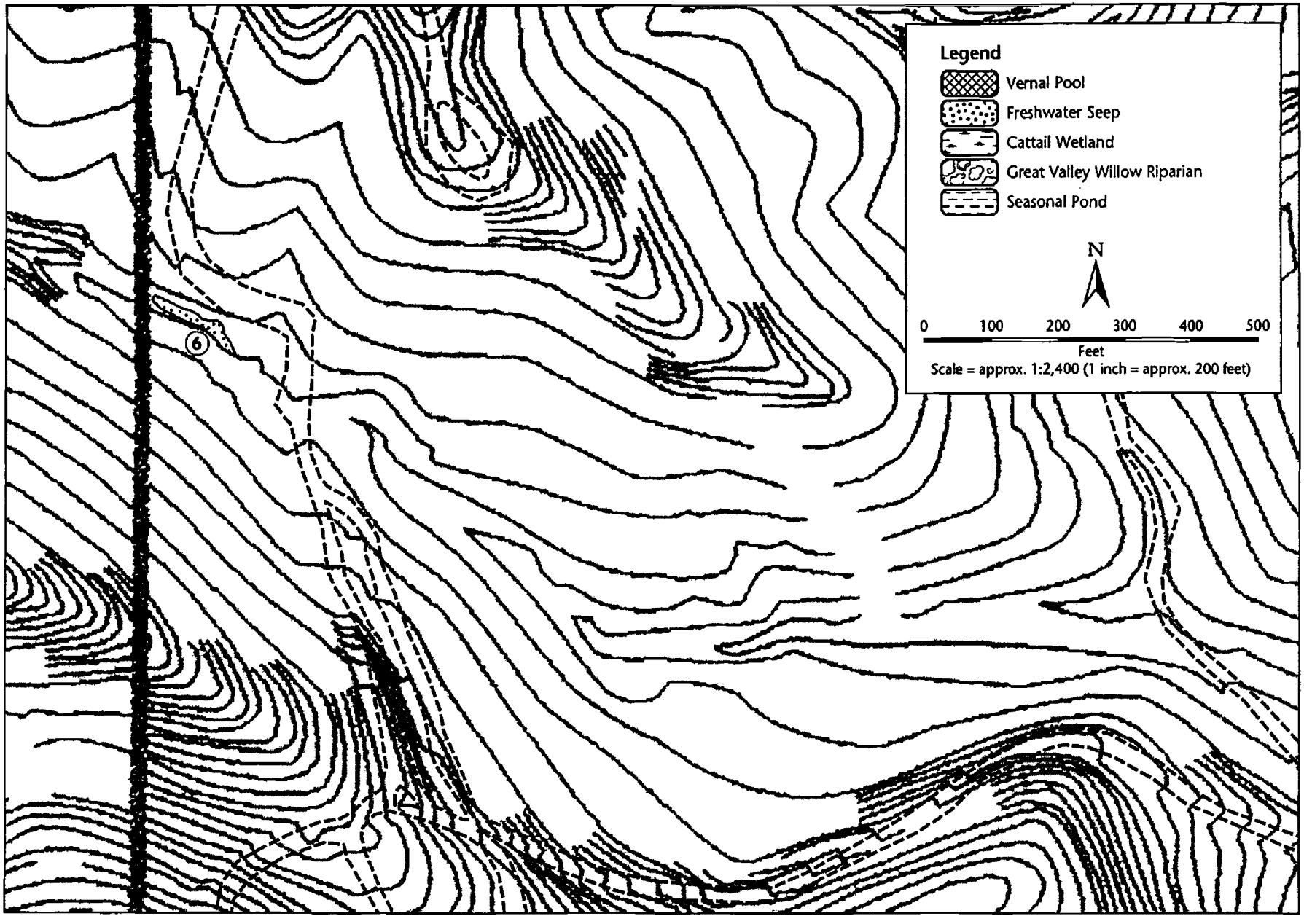


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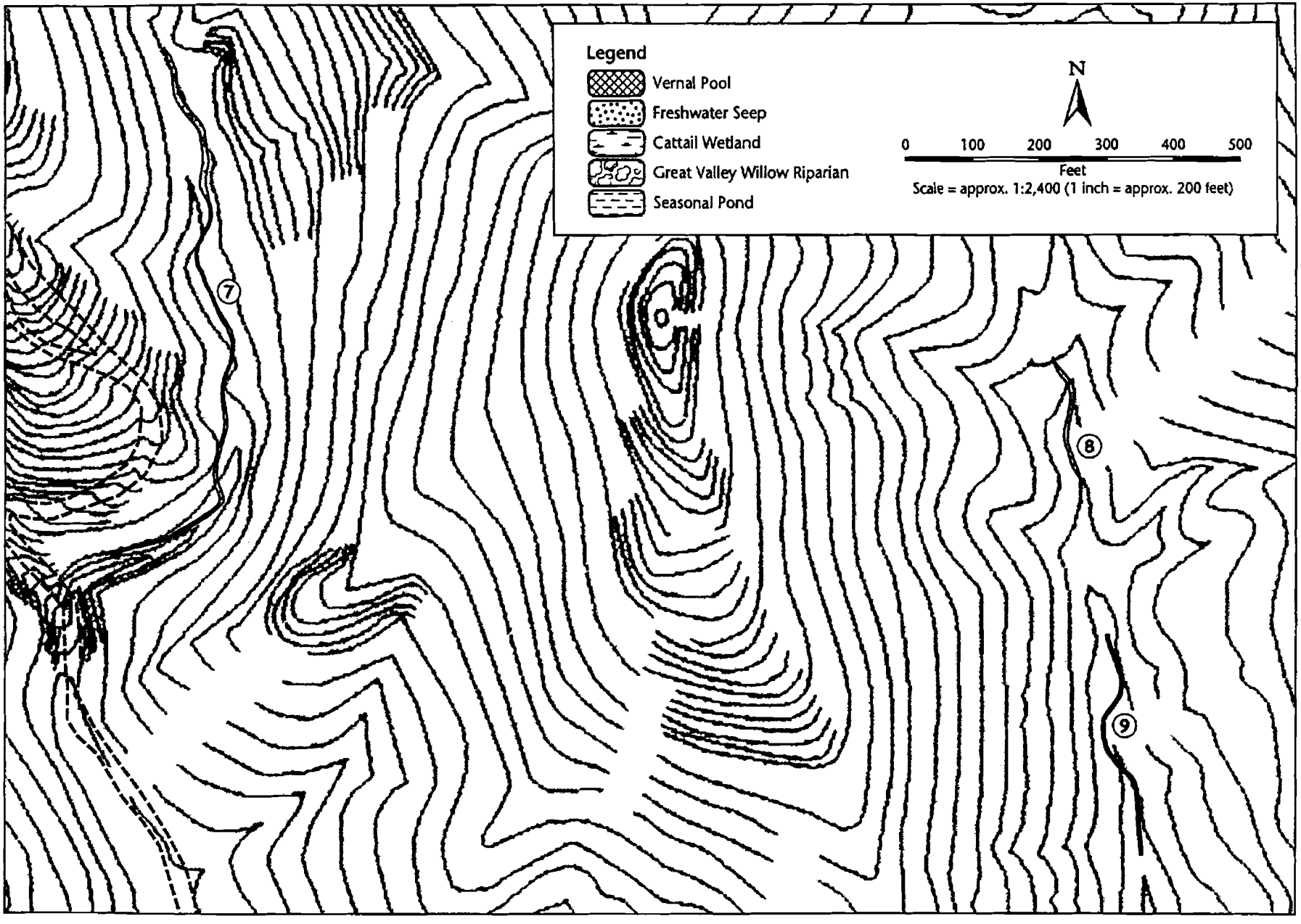
**Figure 3.4**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

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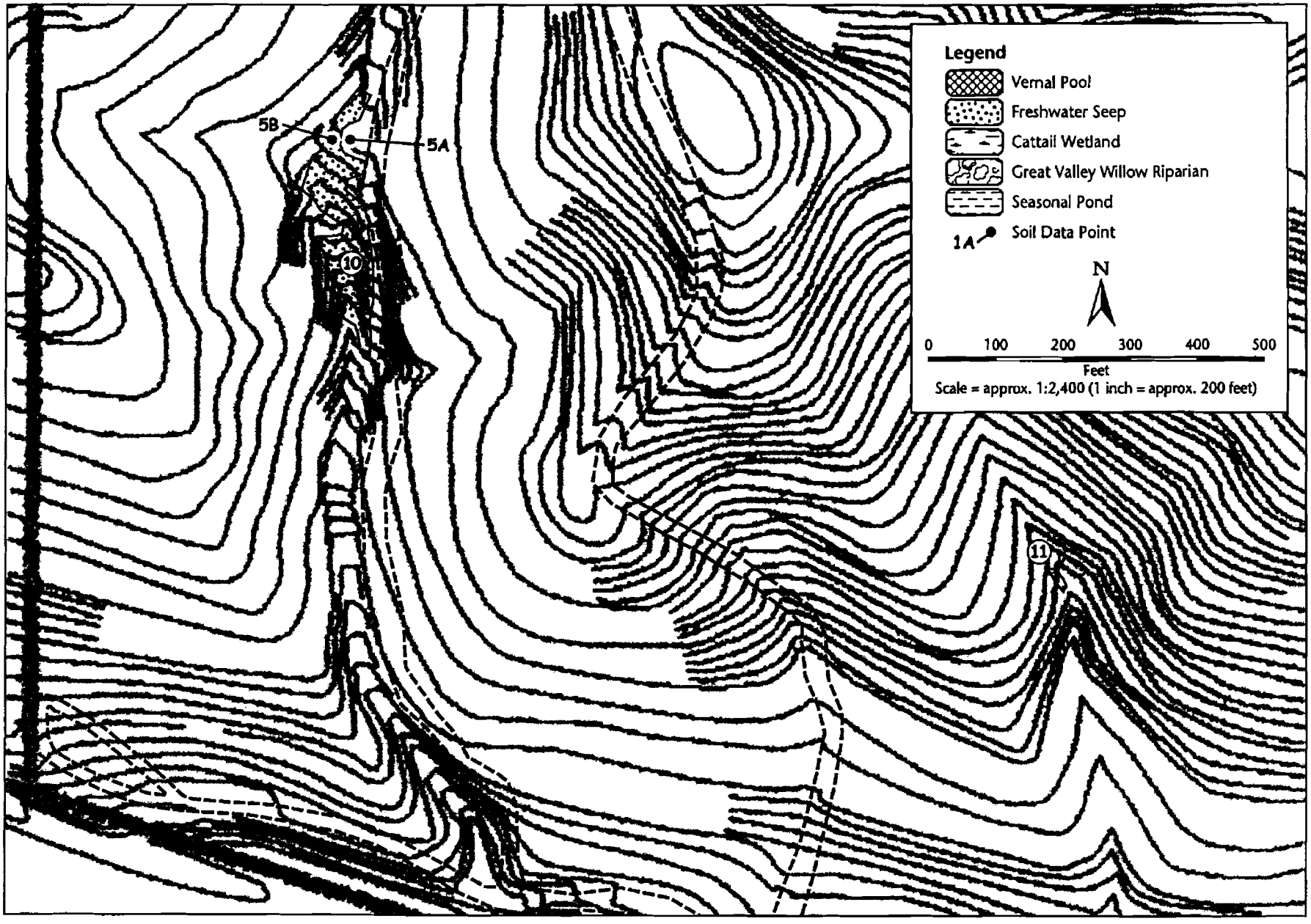
Jones & Stokes

**Figure 3.5**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

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Jones & Stokes

**Figure 3.6**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

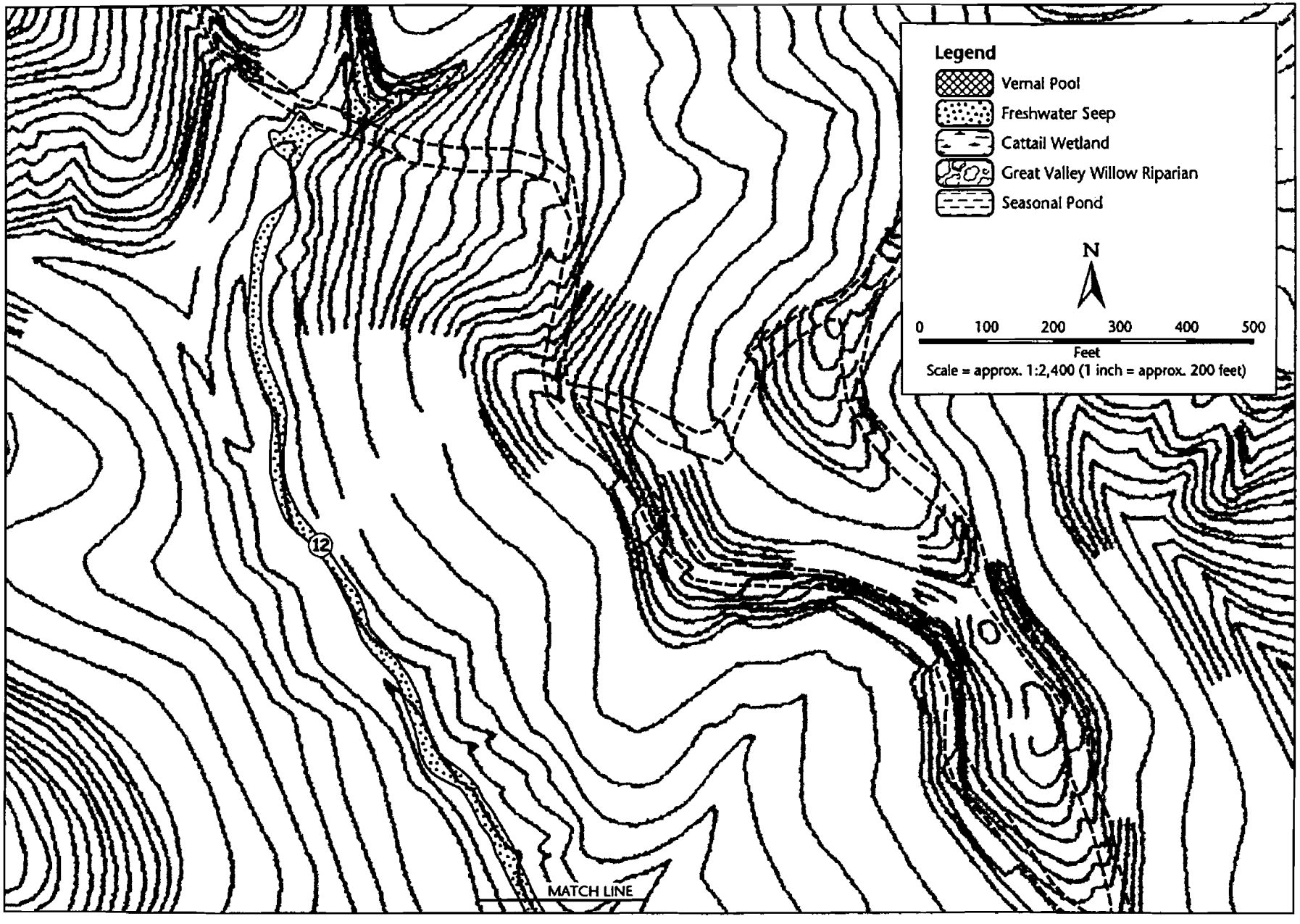


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**Figure 3.7**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

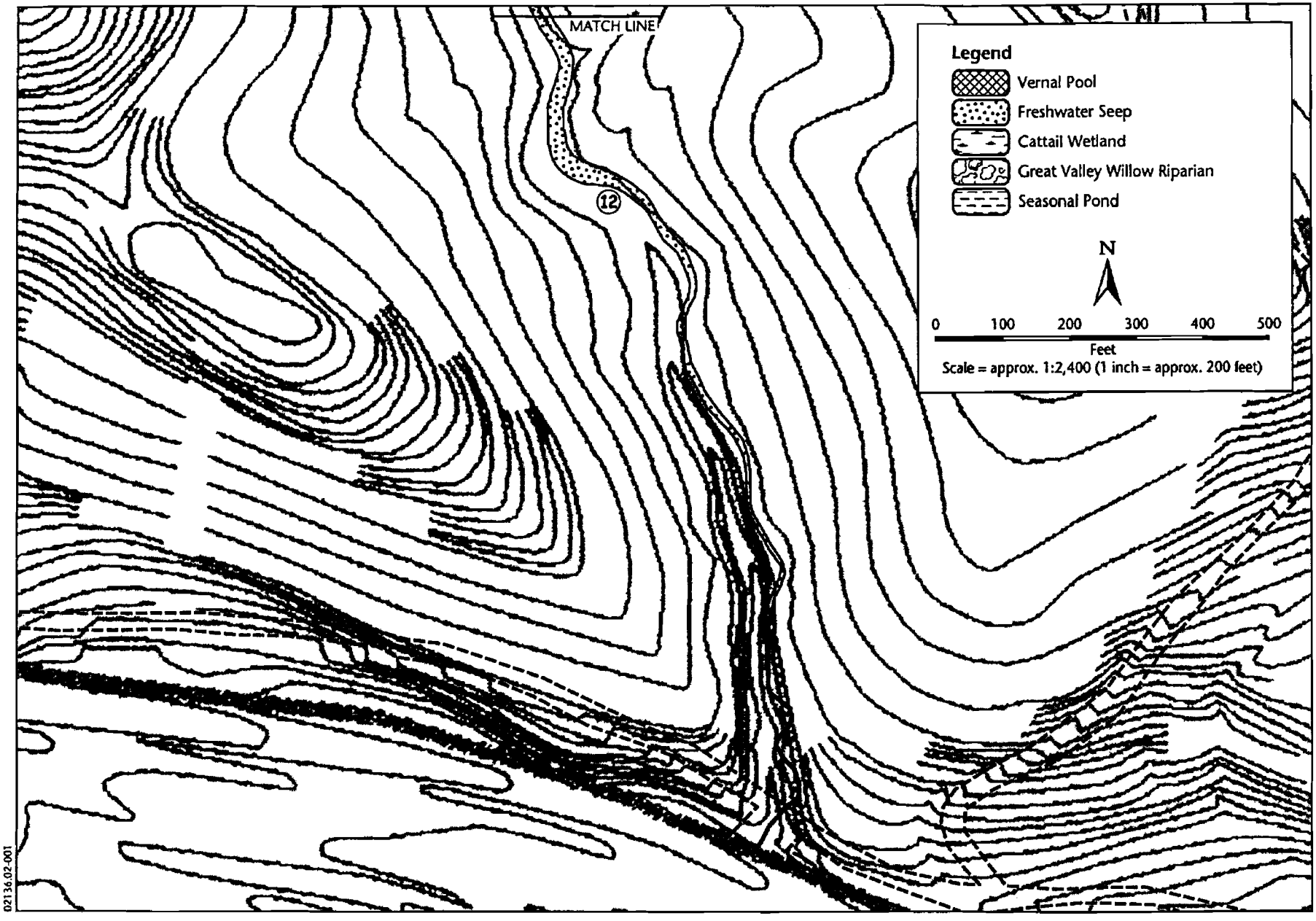


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**Figure 3.8**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

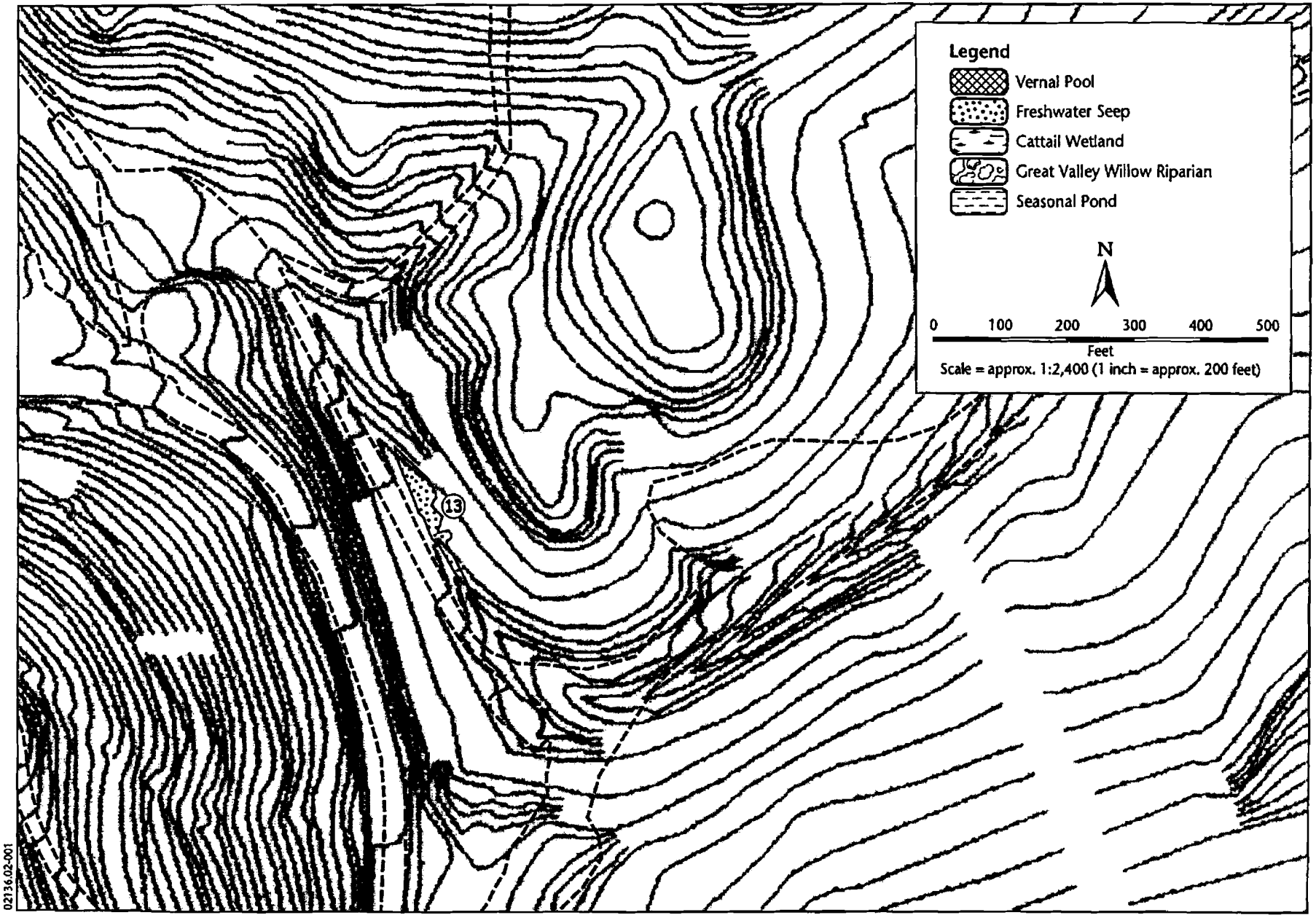


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**Figure 3.9**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

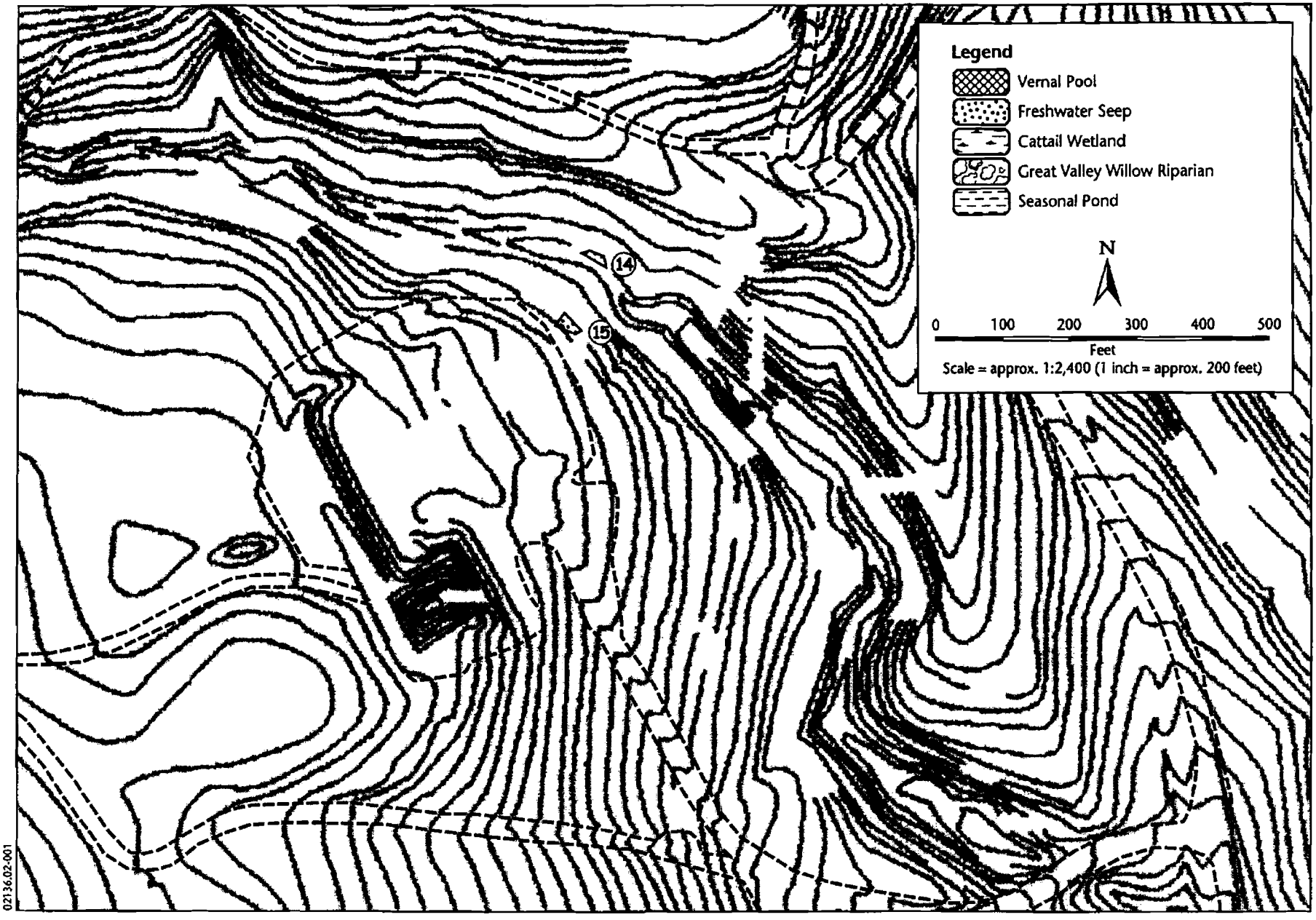


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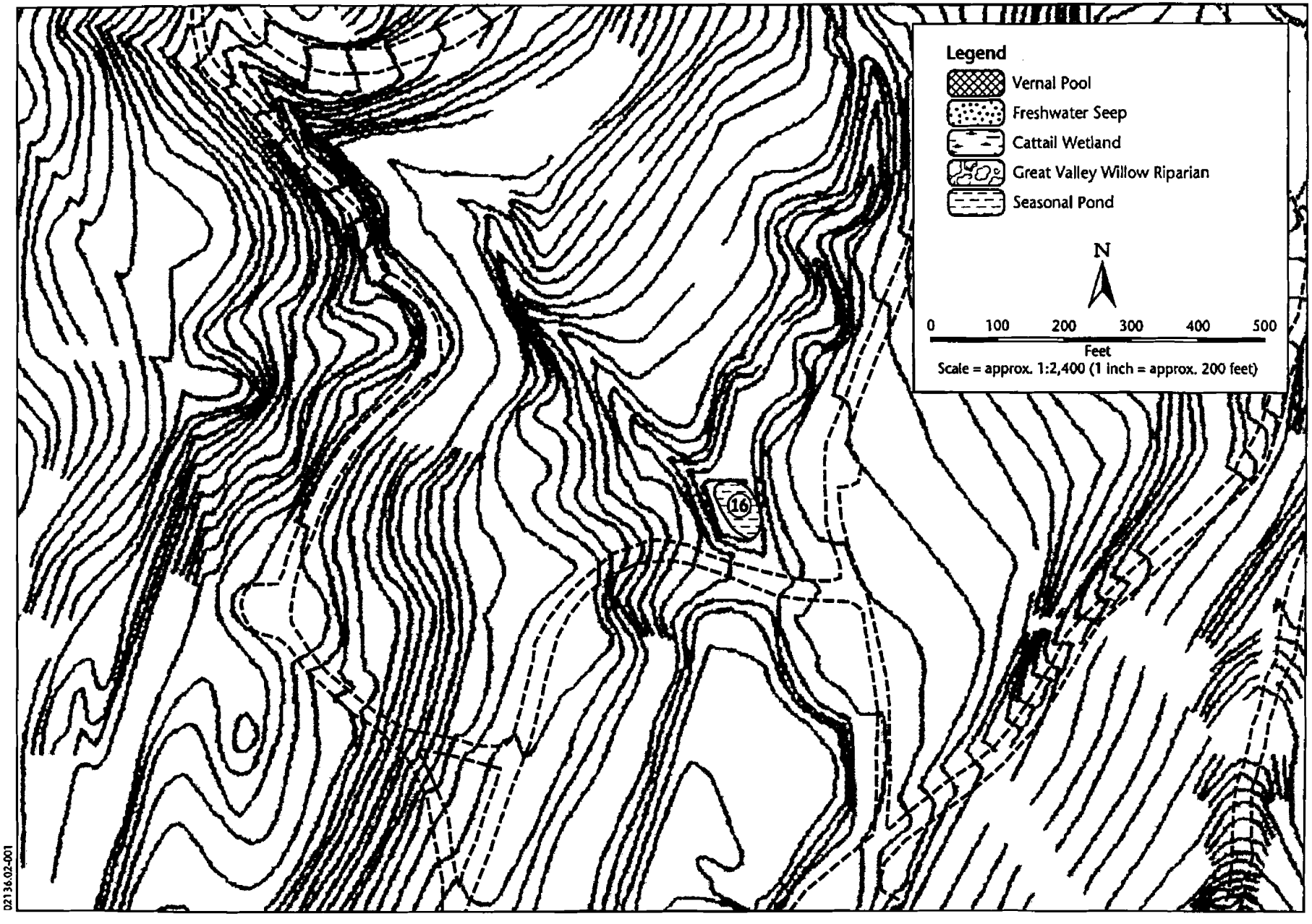
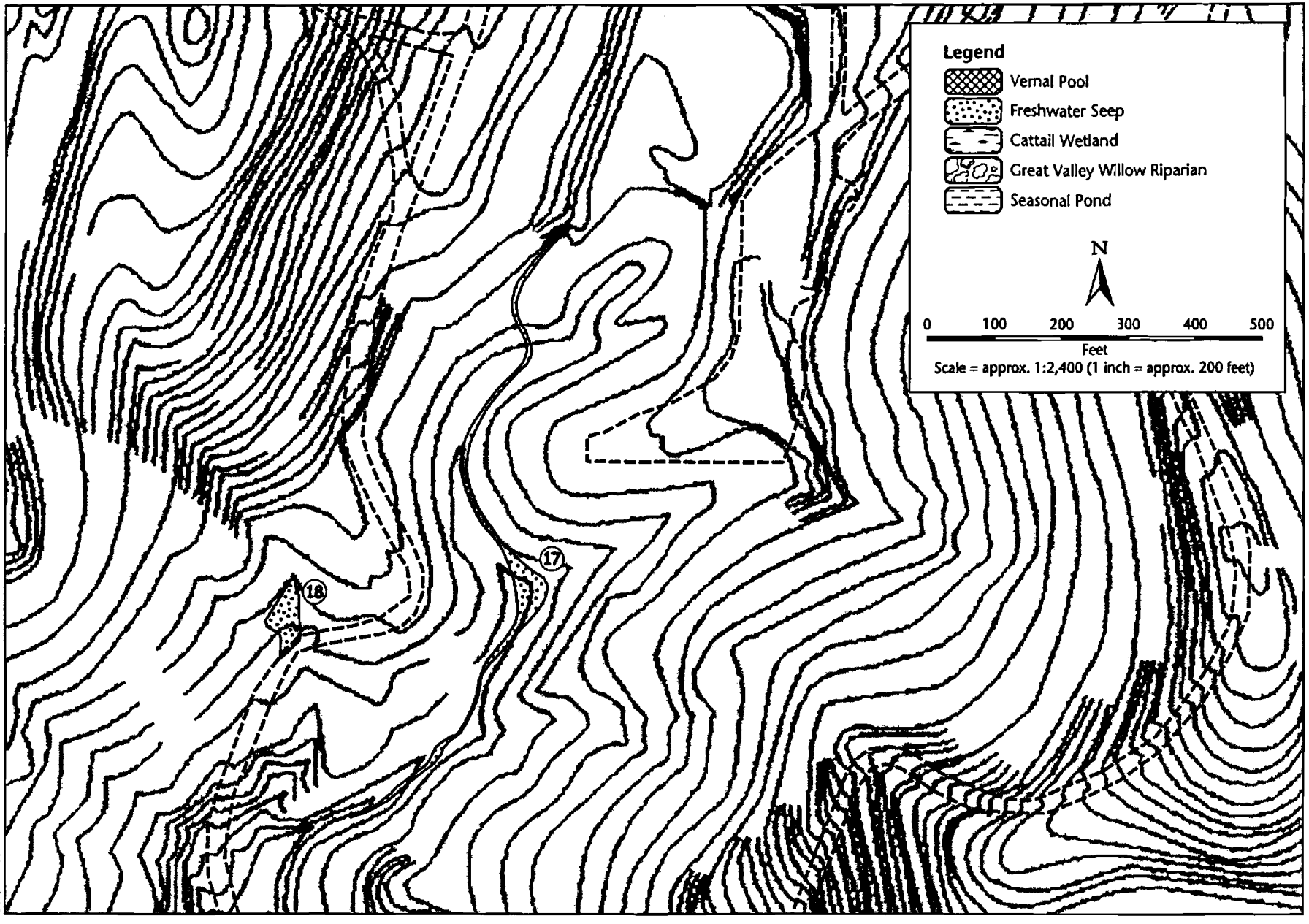
**Figure 3.10**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




Jones & Stokes

**Figure 3.11**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

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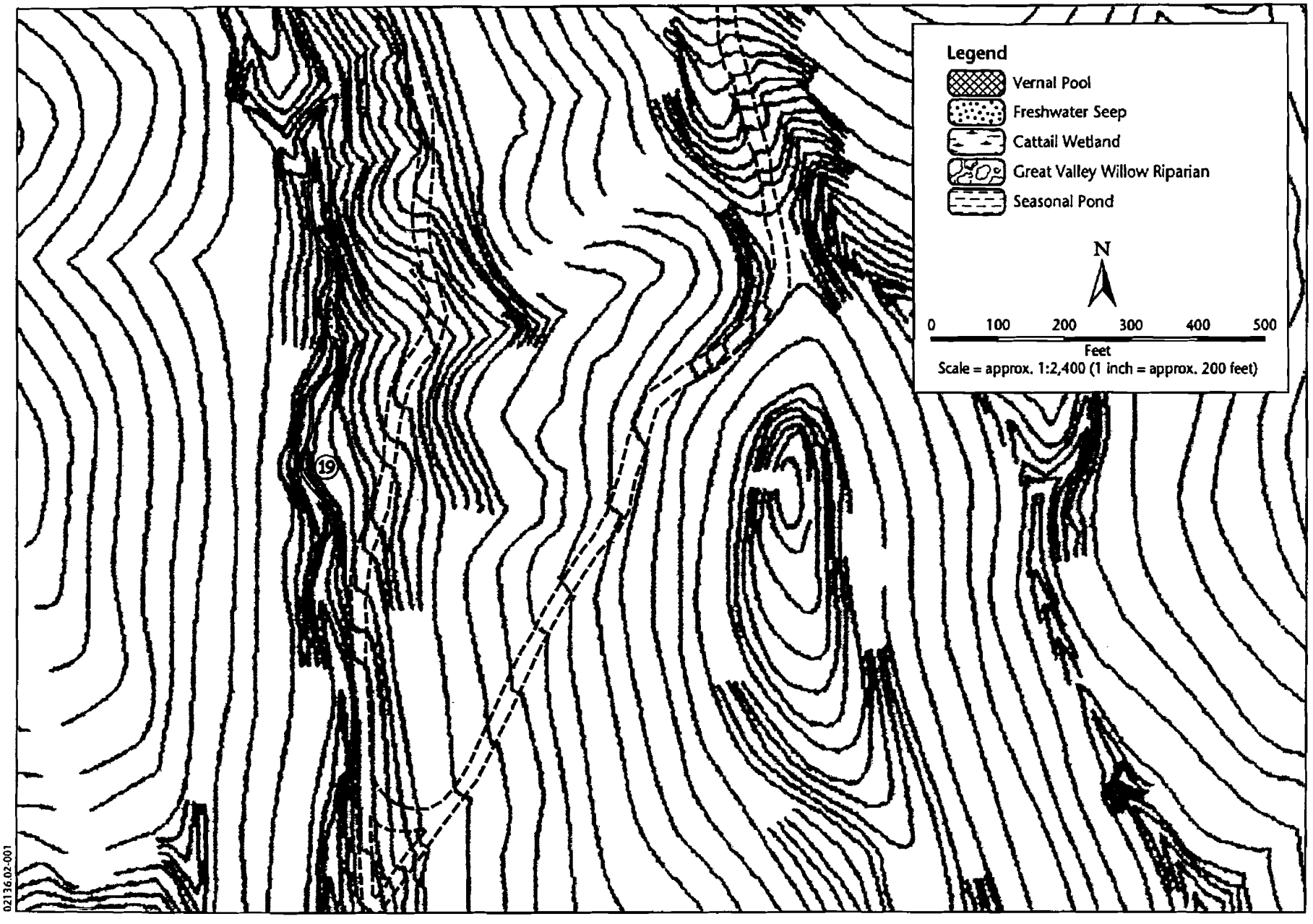
Jones & Stokes

**Figure 3.12**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

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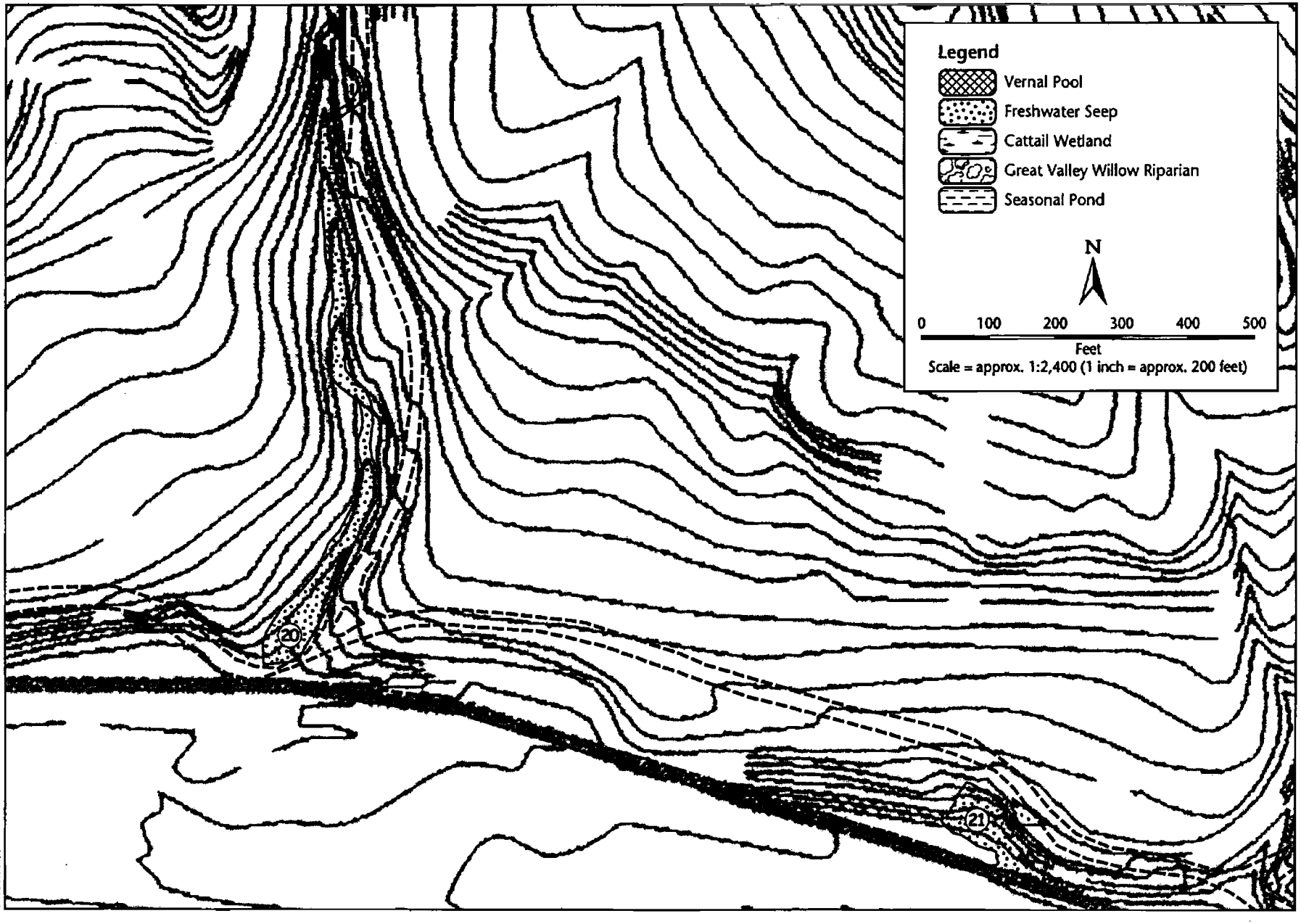
Jones & Stokes

**Figure 3.13**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

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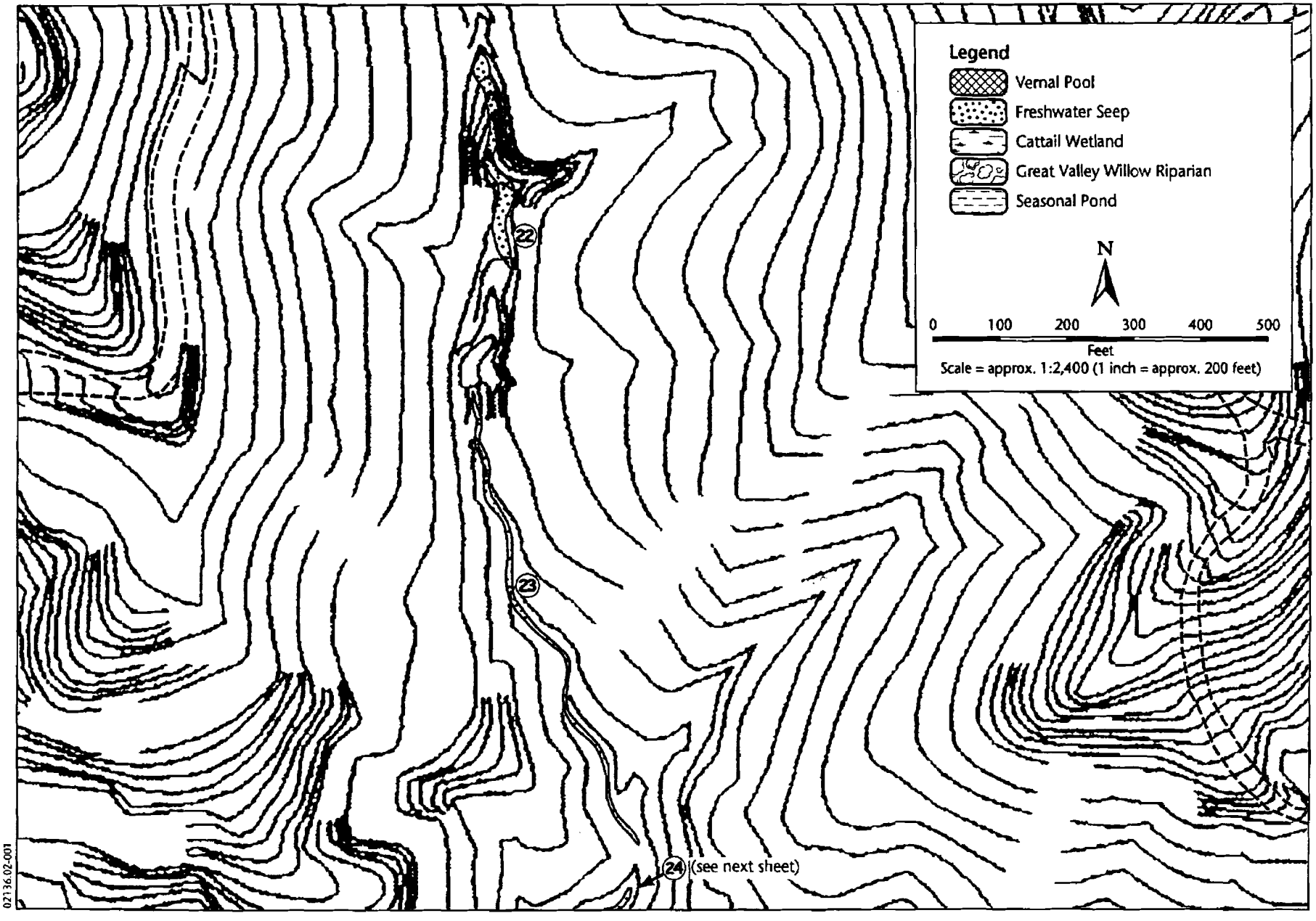
Jones & Stokes

**Figure 3.14**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

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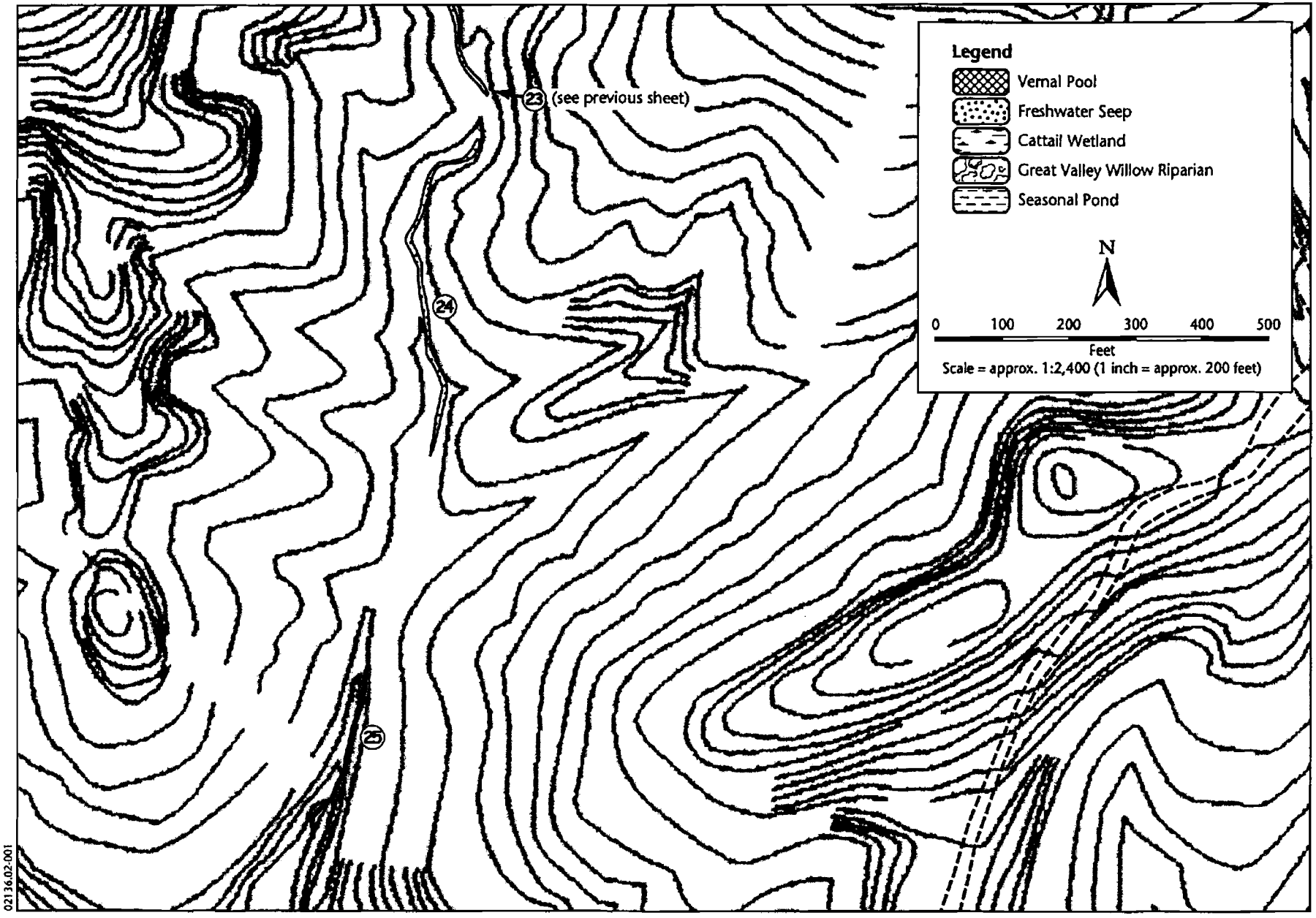
Jones & Stokes

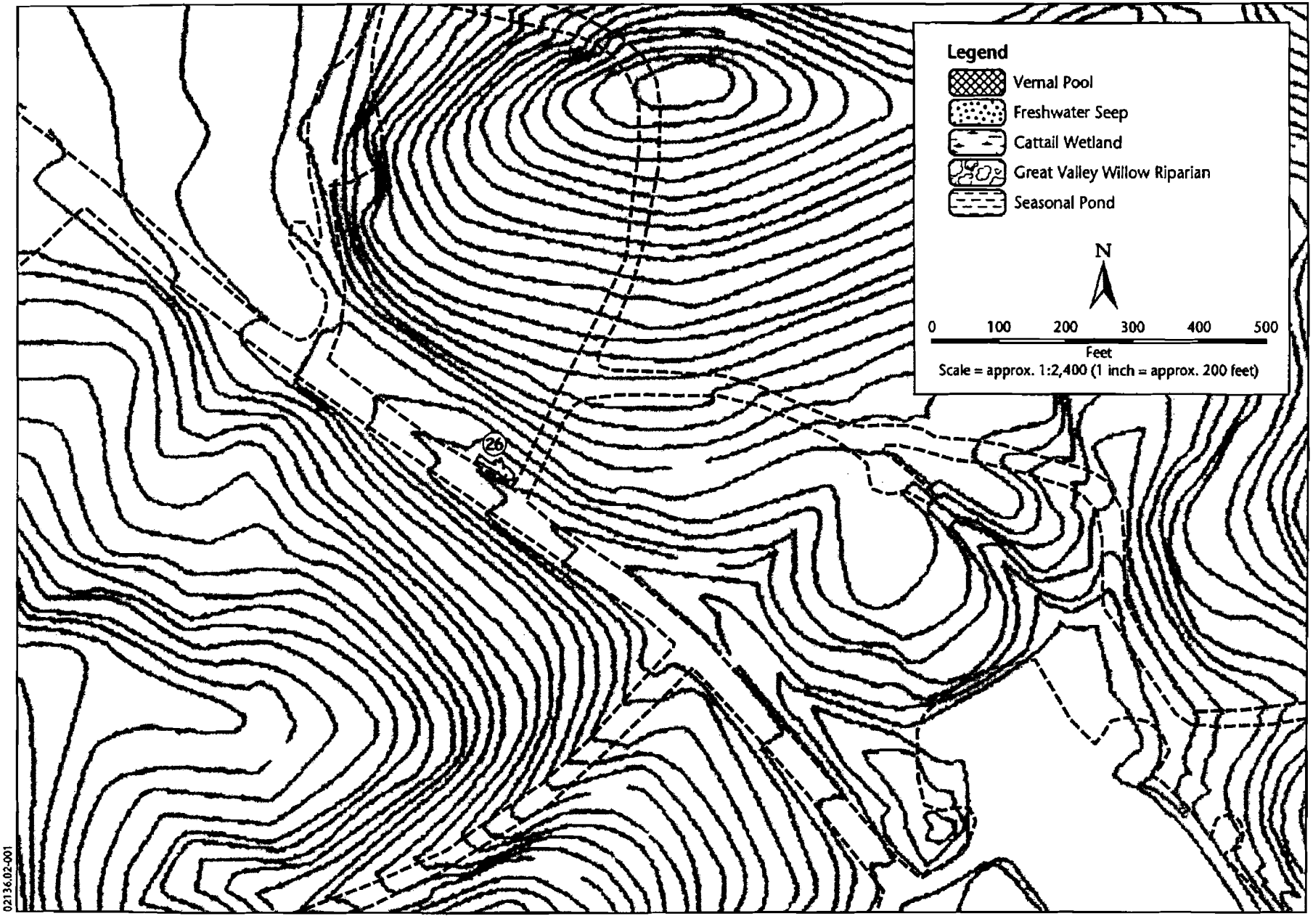
**Figure 3.15**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




02136.02-001

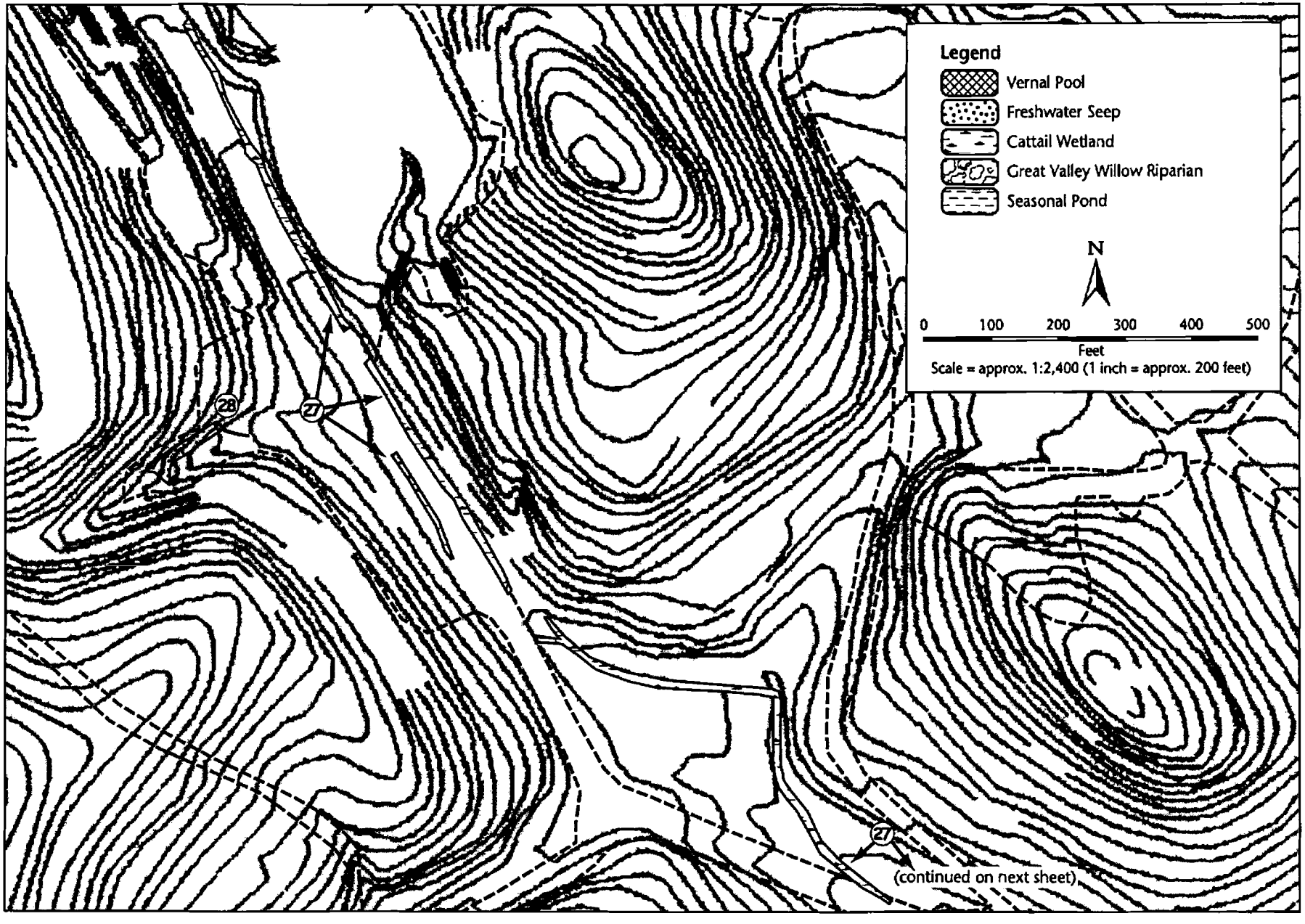
Jones & Stokes

**Figure 3.16**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




Jones & Stokes

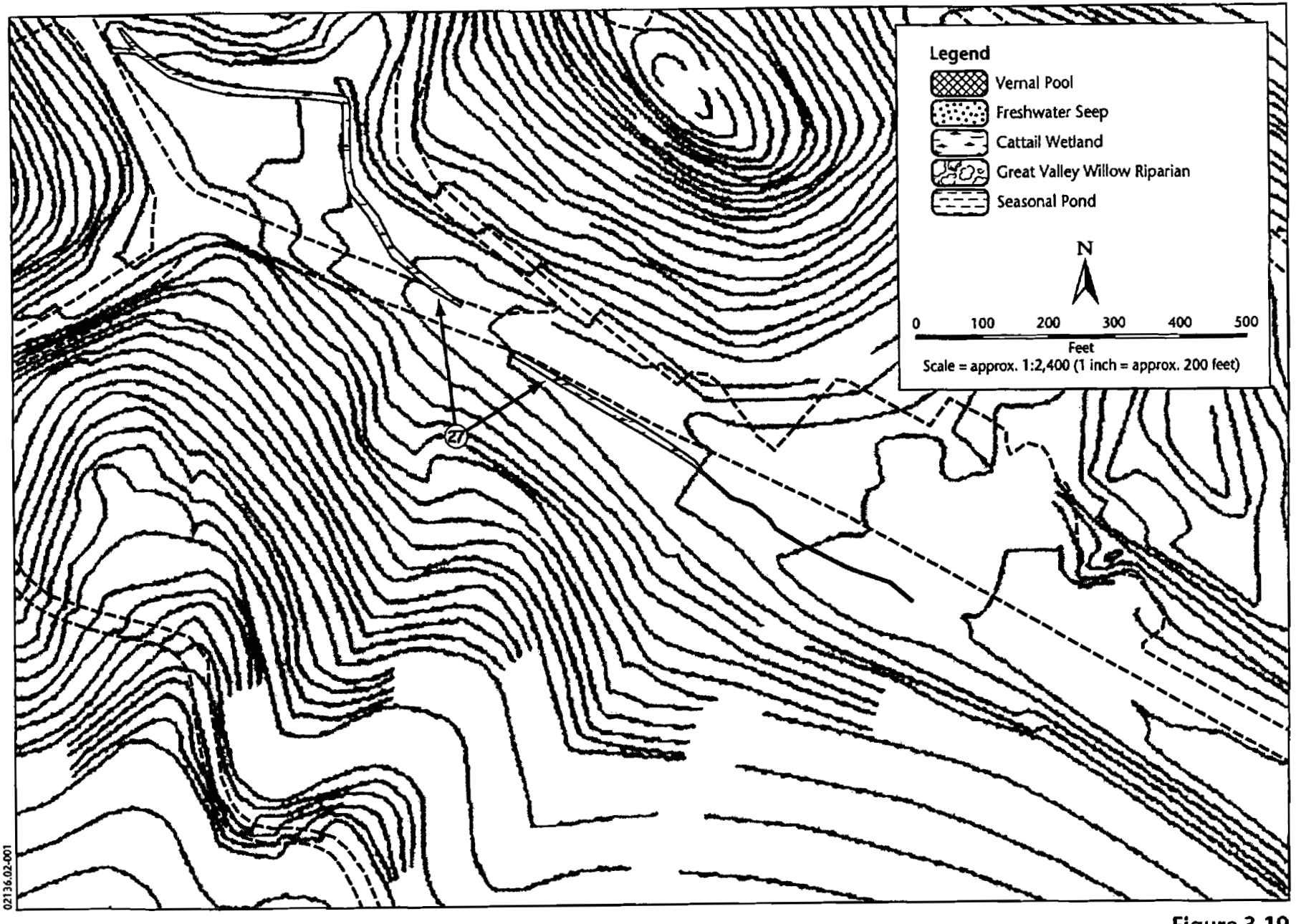
**Figure 3.17**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




02136.02-001

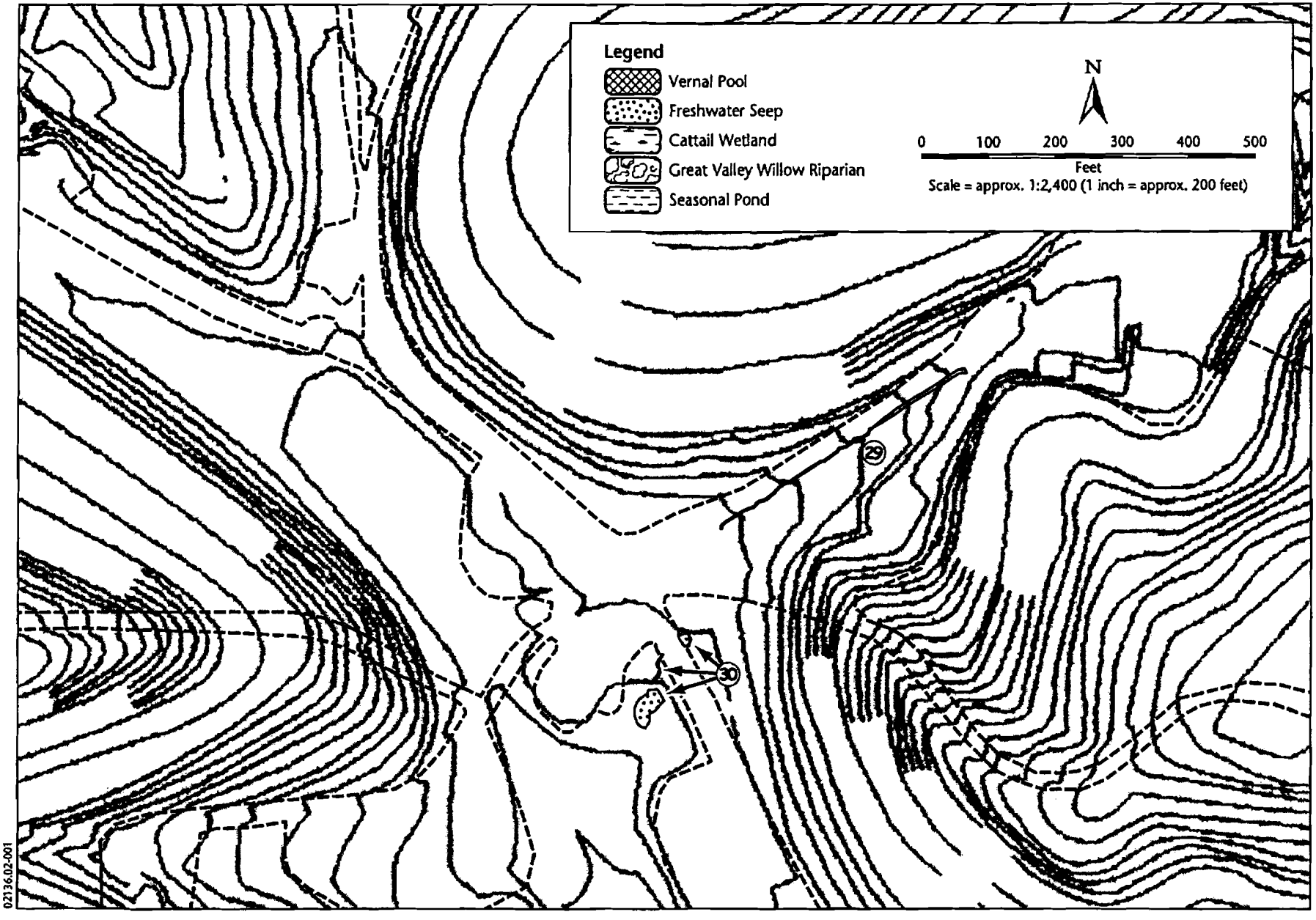
Jones & Stokes

**Figure 3.18**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




Jones & Stokes

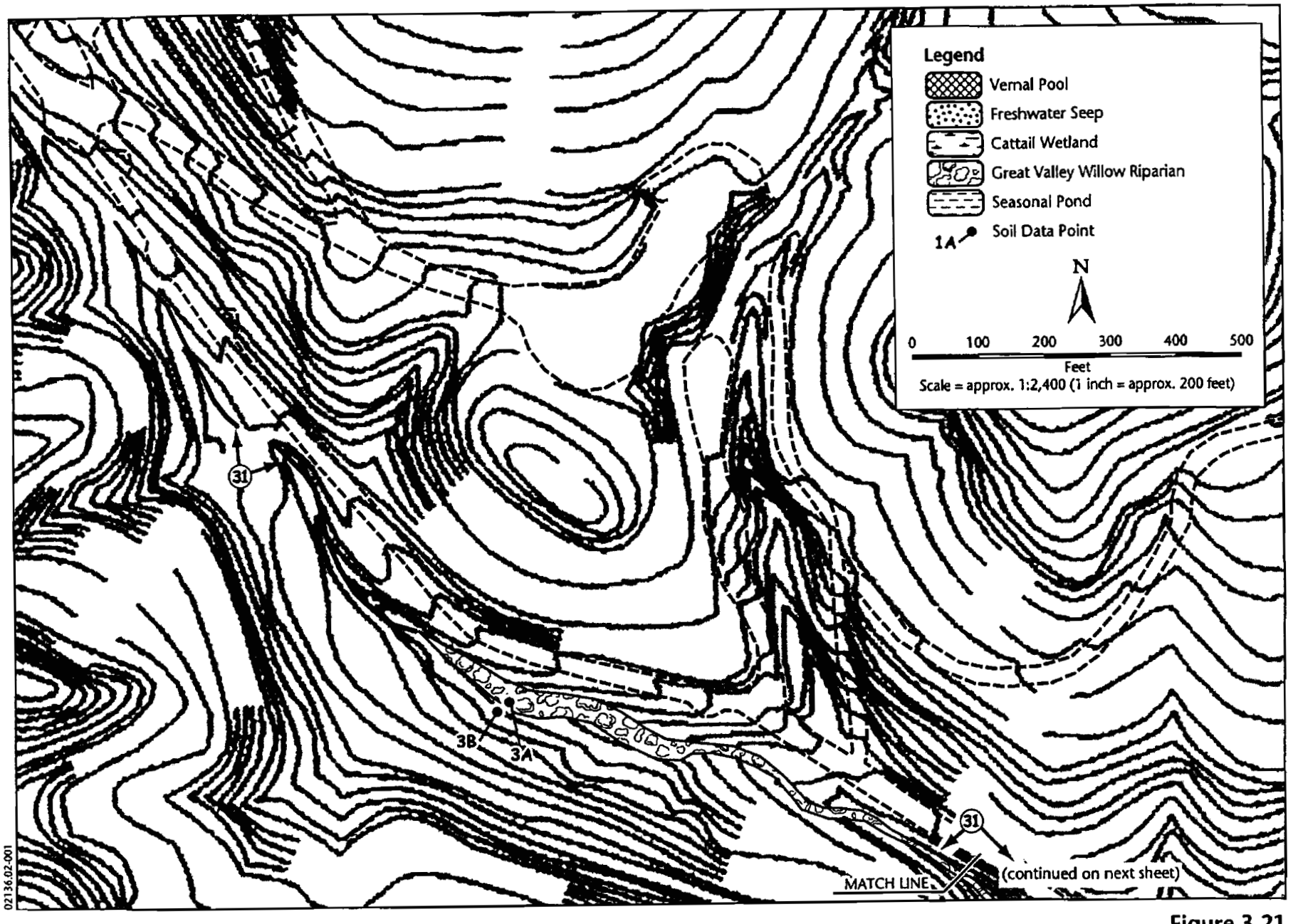
**Figure 3.19**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




02136.02-001

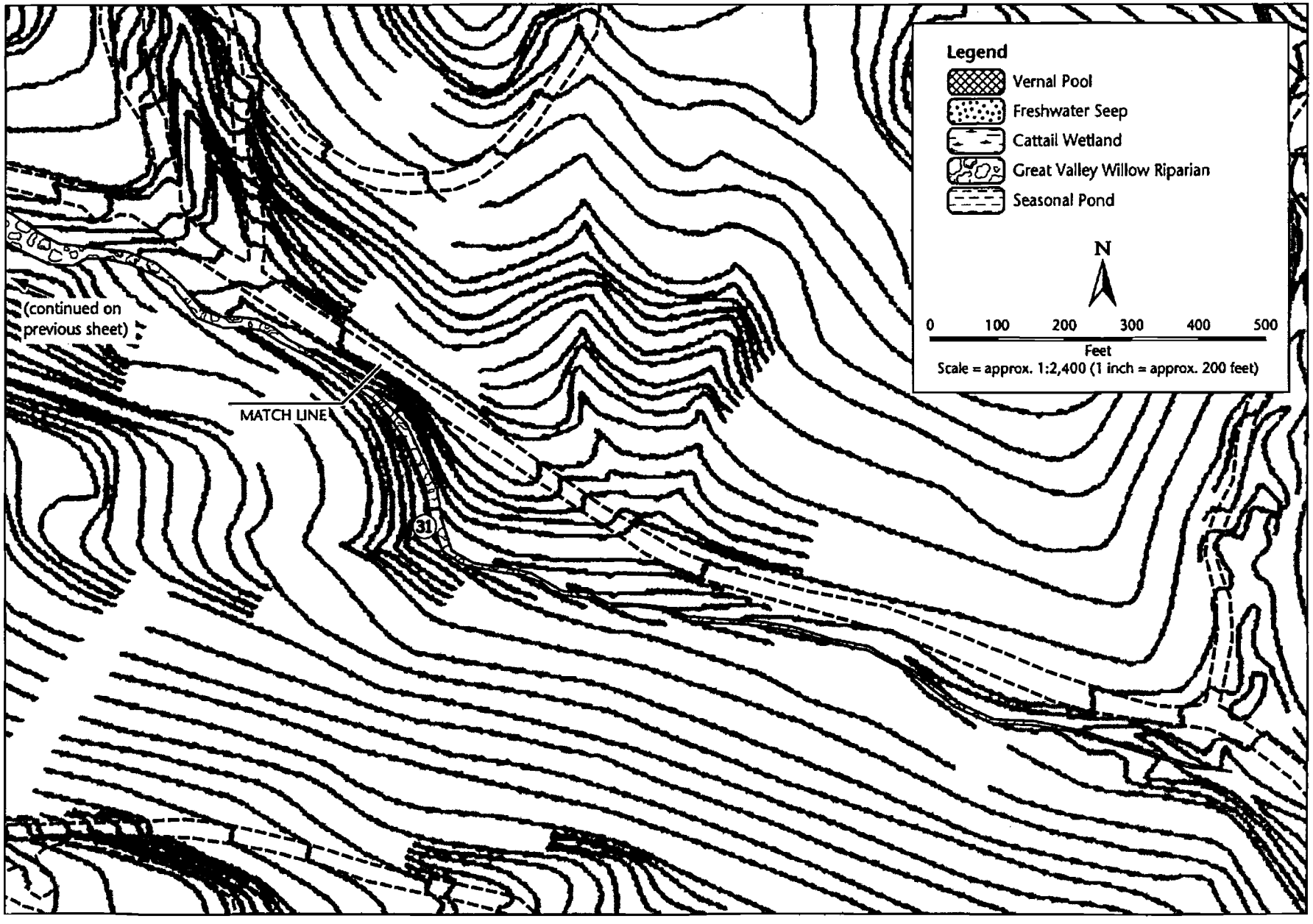
Jones & Stokes

**Figure 3.20**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




Jones & Stokes

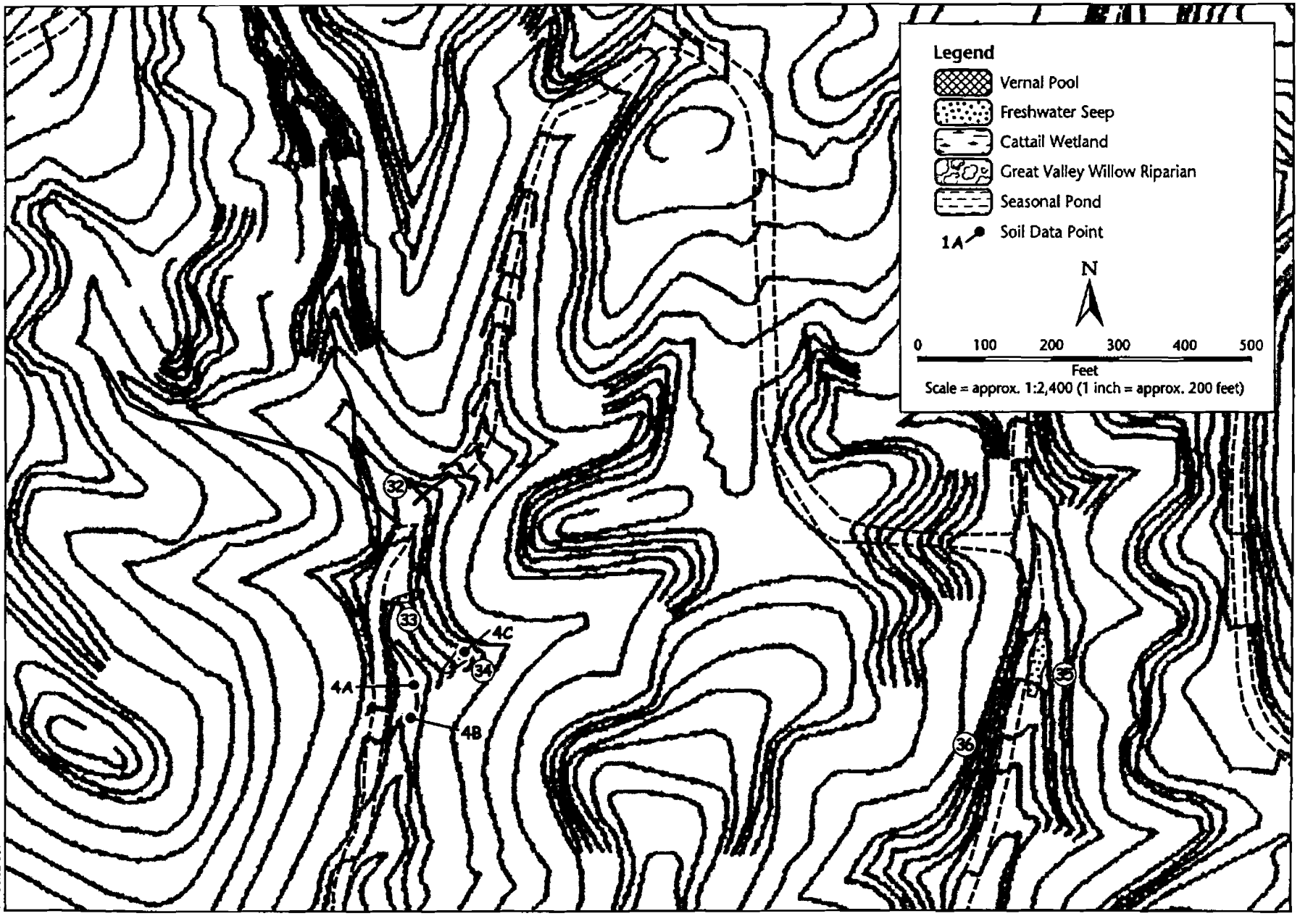
**Figure 3.21**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




02136.02-001

Jones & Stokes

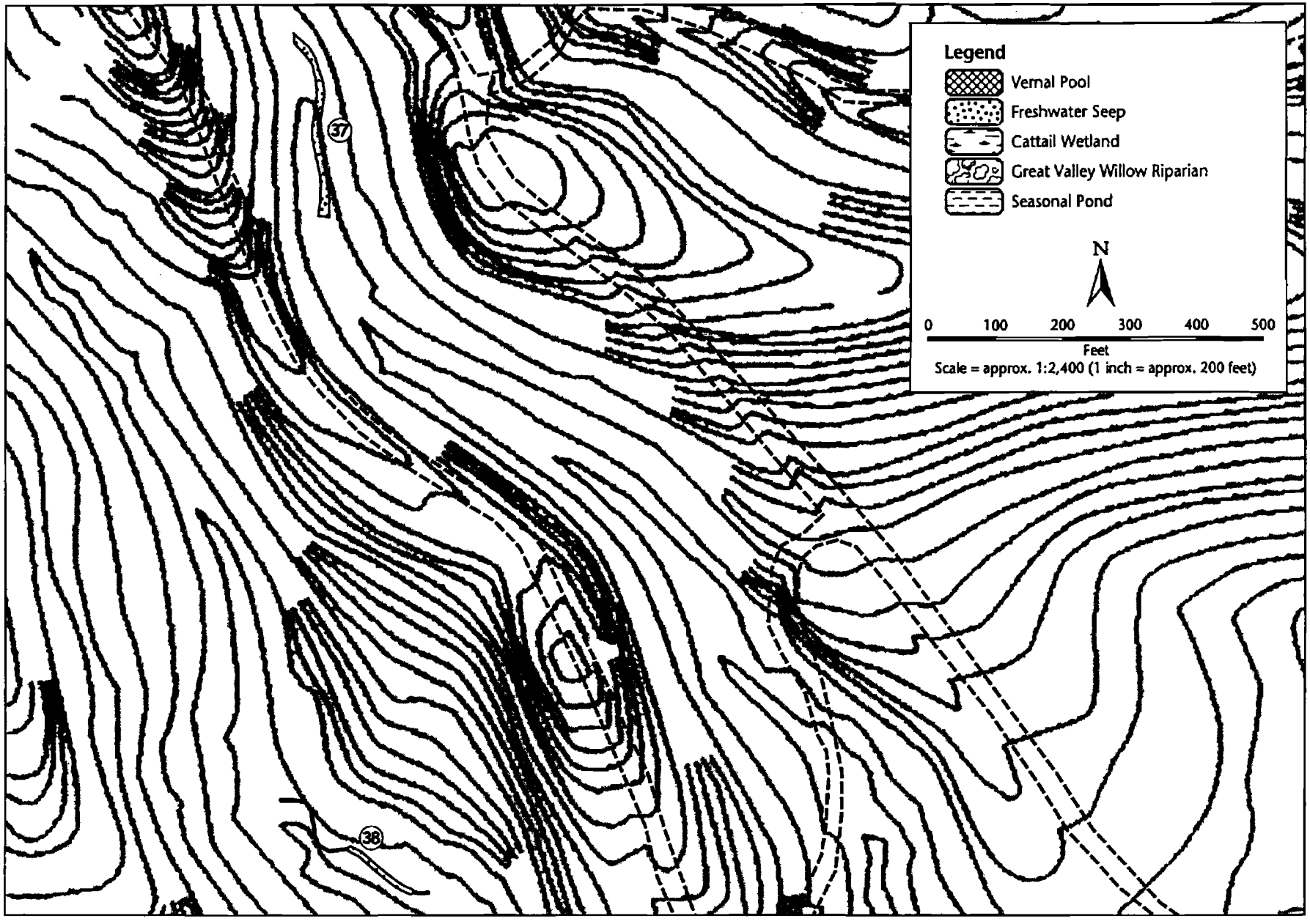
**Figure 3.22**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




021136.02-001

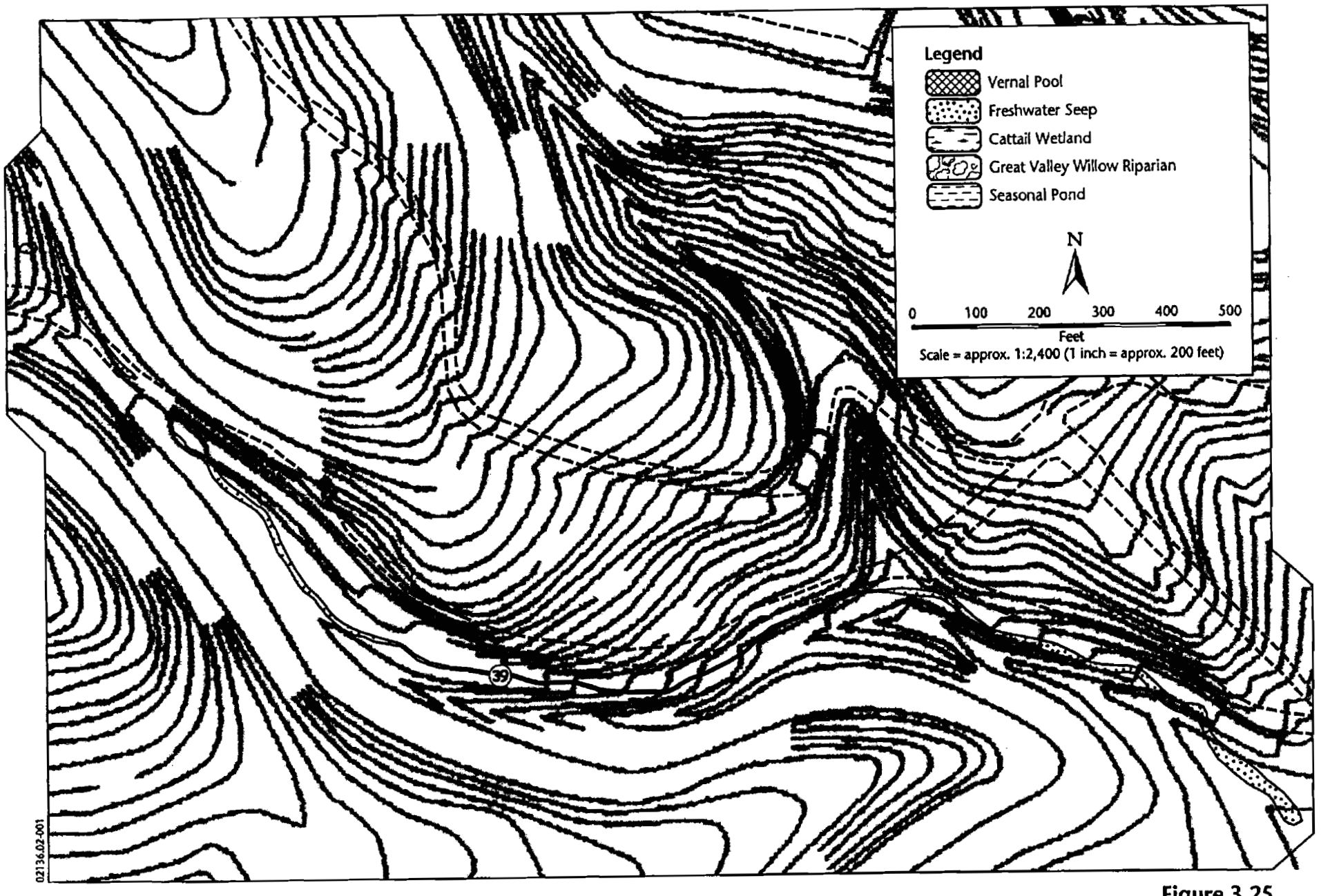
Jones & Stokes

**Figure 3.23**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**



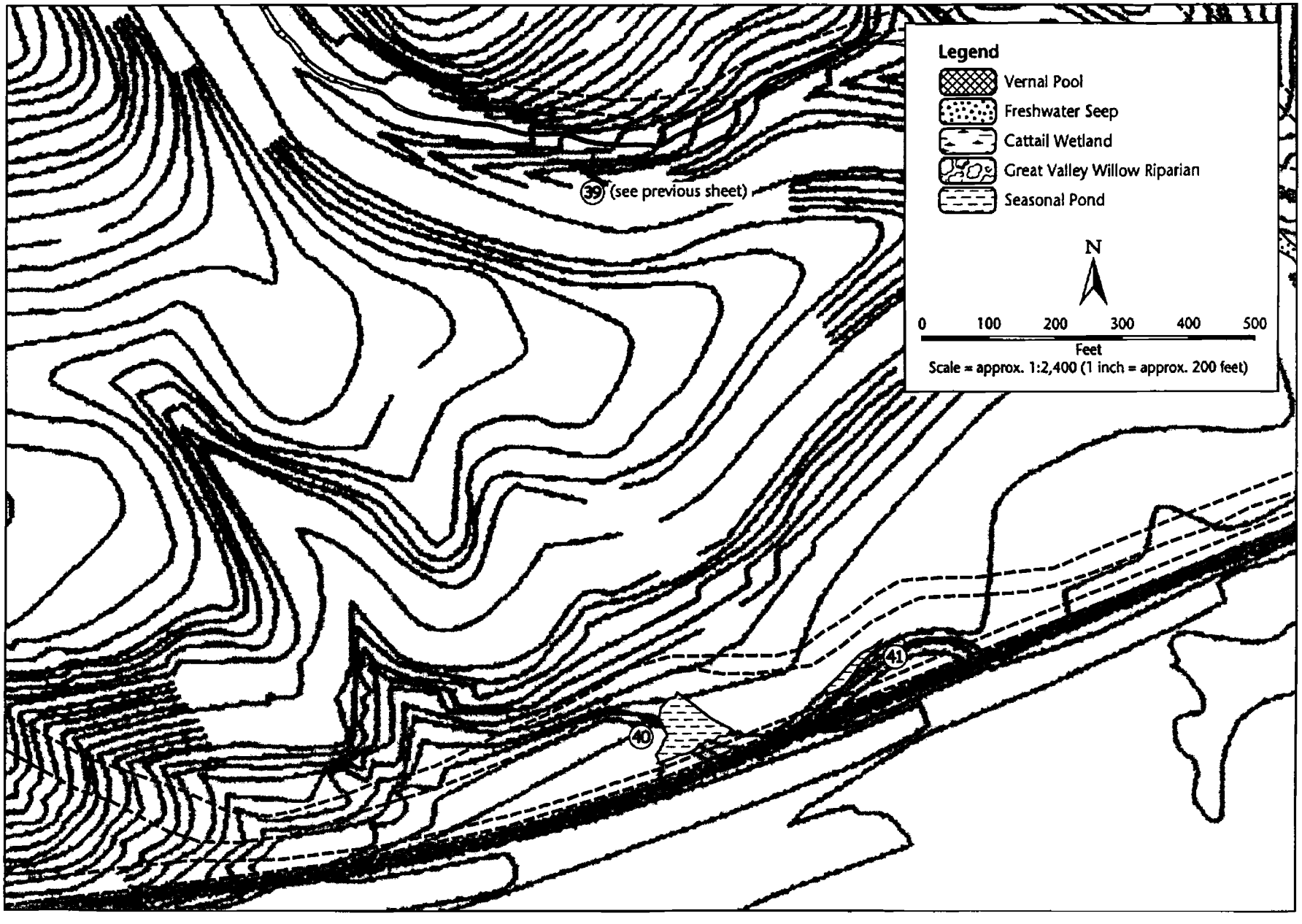

Jones & Stokes

**Figure 3.24**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**



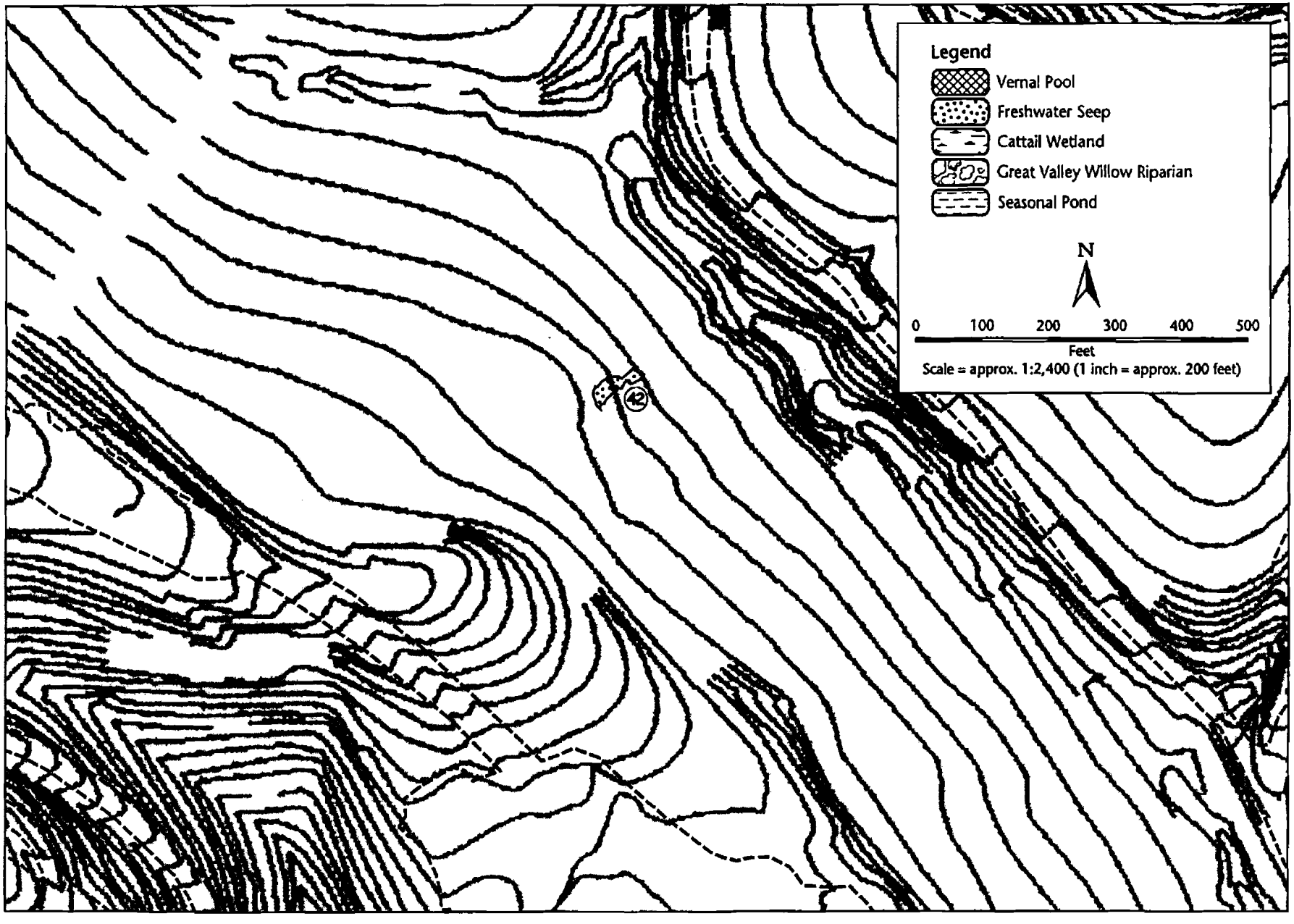

Jones & Stokes

**Figure 3.25**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**



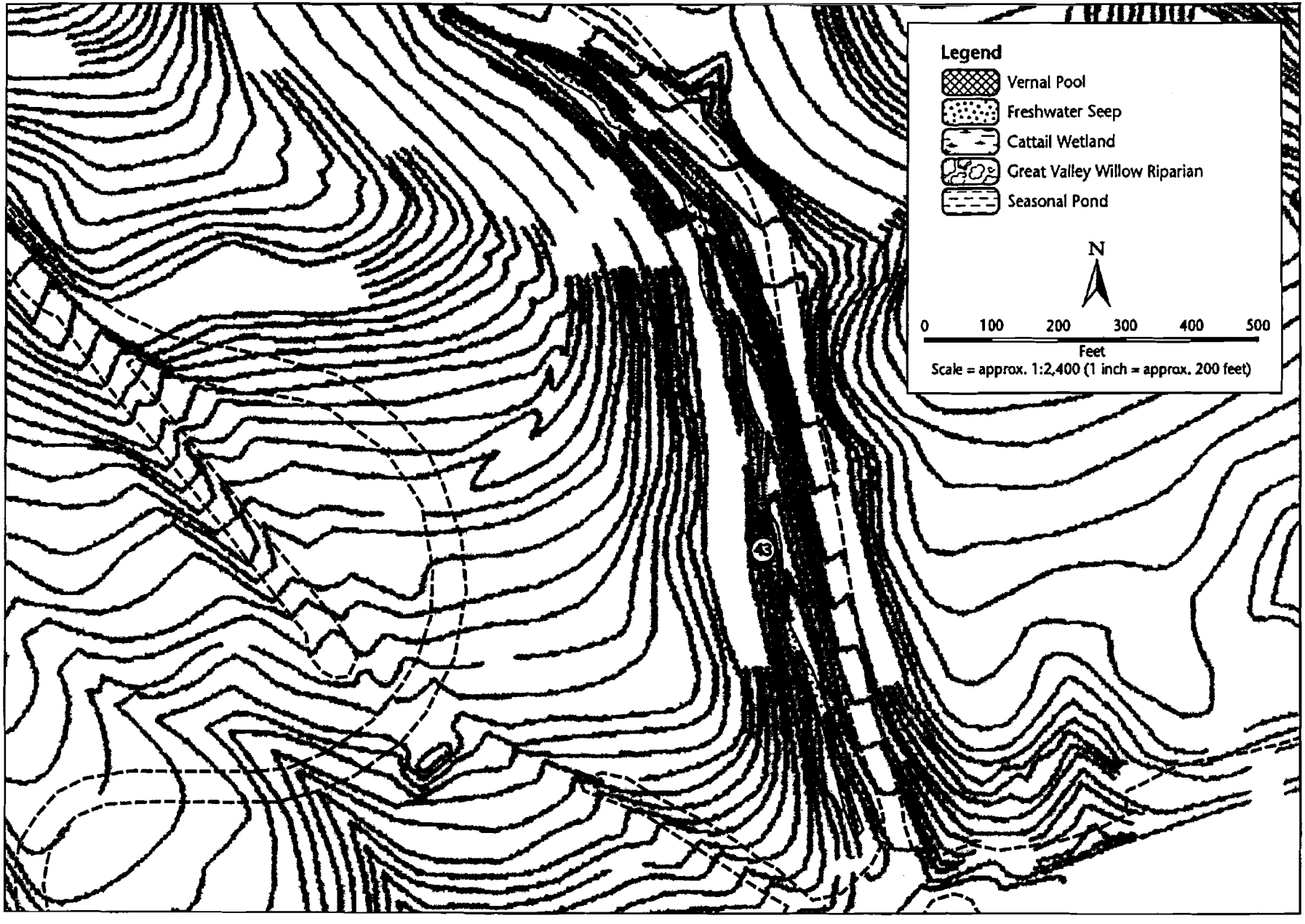

Jones & Stokes

**Figure 3.26**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**



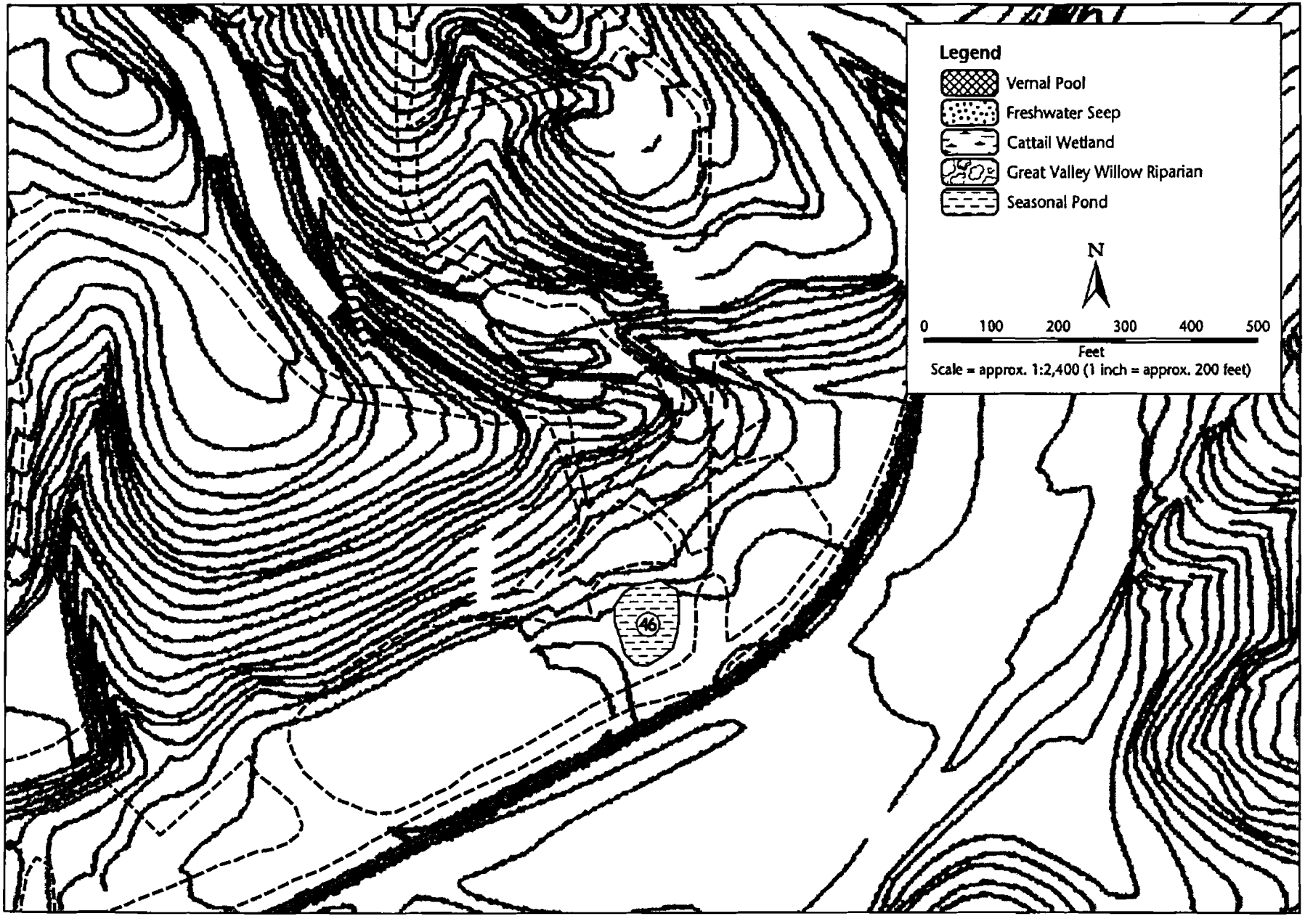

Jones & Stokes

**Figure 3.27**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**



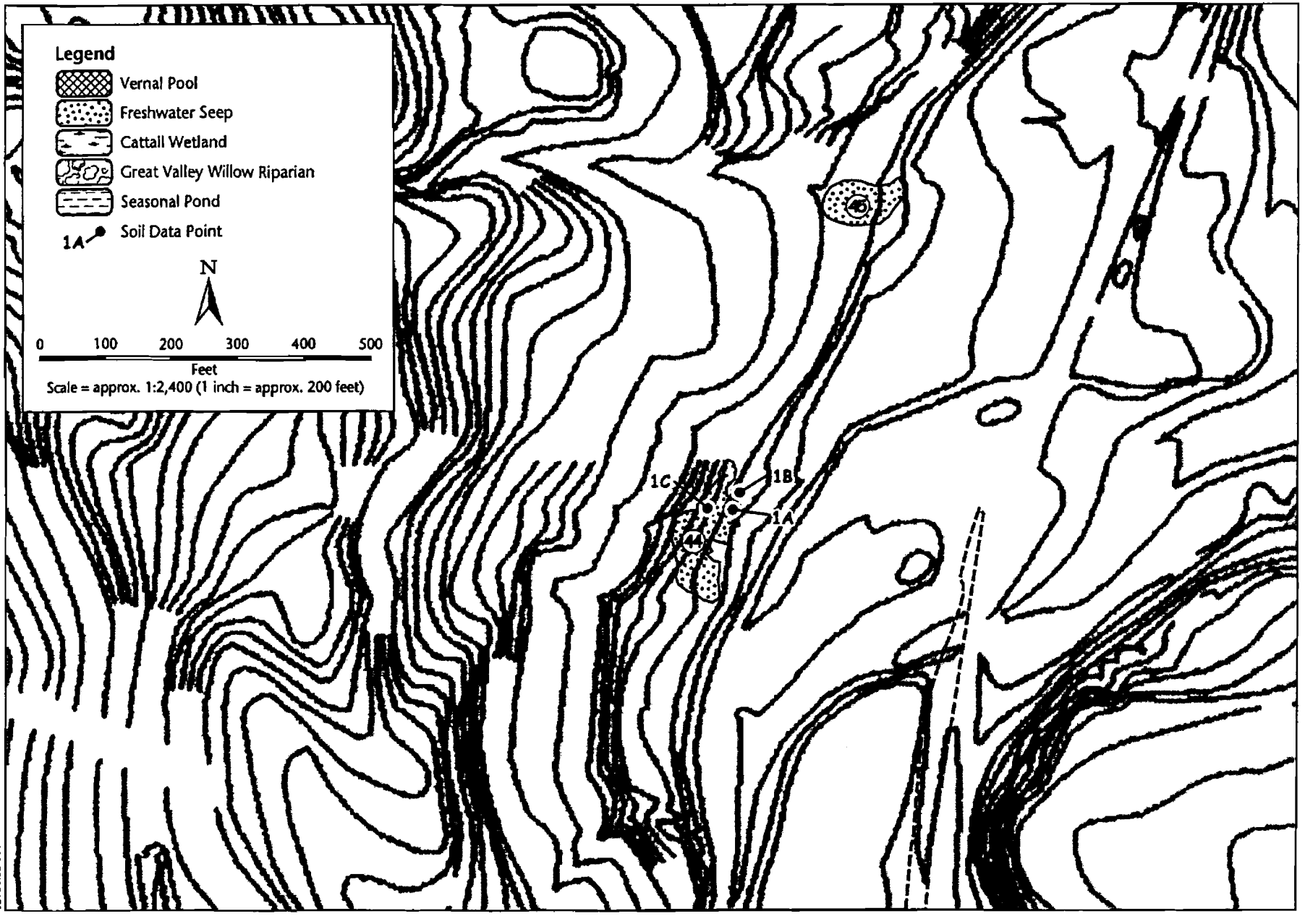

Jones & Stokes

**Figure 3.28**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




Jones & Stokes

**Figure 3.30**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**




Jones & Stokes

**Figure 3.29**
**Wetland Delineation – Lawrence Livermore National Laboratory Site 300**

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 2.** Plant Species Observed During Wetland Delineation at Lawrence Livermore National Laboratory, Site 300



| Common Name | Scientific Name | Wetland Indicator Status |
|---|---|---|
| White amaranth | *Amaranthus albus* | FACU |
| California sagebrush | *Artemisia californica* | --- |
| Narrow-leaved milkweed | *Asclepias fascicularis* | FAC |
| Slender wild oat | *Avena barbata* | --- |
| Wild oat | *Avena fatua* | --- |
| Ripgut brome | *B. diandrus* | --- |
| Red brome | *B. madritensis* subsp. *rubens* | --- |
| Mulefat | *Baccharis salicifolius* | FACW |
| Soft chess | *Bromus hordeaceus* | FACU |
| Italian thistle | *Carduus pycnocephalus* | --- |
| Horseweed | *Conyza canadensis* | FAC |
| Swamp timothy | *Crypsis schoenoides* | OBL |
| Umbrella sedge | *Cyperus eragrostis* | FACW |
| Annual hairgrass | *Deschampsia danthonioides* | FACW |
| Saltgrass | *Distichlis spicata* | FACW |
| Creeping spikerush | *Eleocharis macrostachya* | OBL |
| Cleistogamous spike-primrose | *Epilobium cleistogamum* | OBL |
| Marsh cudweed | *Gnaphalium palustre* | FACW |
| California matchweed | *Gutierrezia californica* | --- |
| Salt heliotrope | *Heliotropium curassavicum* | OBL |
| Foxtail barley | *Hordeum murinum* subsp. *leporinum* | NI |
| Baltic rush | *Juncus balticus* | OBL |
| California juniper | *Juniperus californicus* | --- |
| Perennial peppercress | *Lepidium latifolium* | FACW |
| Creeping wildrye | *Leymus triticoides* | FAC+ |
| Bush lupine | *Lupinus albifrons* | --- |
| Horehound | *Marrubium vulgare* | FAC |
| Nodding needlegrass | *Nassella cernua* | --- |
| Needlegrass | *Nassella pulchra* | --- |
| Watercress | *Nasturtium officinale* | OBL |
| Tree tobacco | *Nicotiana glauca* | FAC |
| Stipitate popcorn-flower | *Plagiobothrys stipitatus* | OBL |
| One-sided bluegrass | *Poa secunda* | --- |
| Annual rabbit's-foot grass | *Polypogon monspeliensis* | FACW+ |
| Fremont cottonwood | *Populus fremontii* | FACW |
| Blue oak | *Quercus douglasii* | --- |
| Valley oak | *Quercus lobata* | FAC |
| Curly dock | *Rumex crispus* | FACW- |
| Red willow | *Salix laevigata* | [FACW+] |
| Black sage | *Salvia mellifera* | --- |
| White hedgenettle | *Stachys albens* | OBL |
| Poison oak | *Toxicodendron diversilobum* | --- |
| Narrow-leaved cattail | *Typha angustifolia* | OBL |
| Broad-leaved cattail | *Typha latifolia* | OBL |
| Hoary nettle | *Urtica dioica* | FACW |
| Foxtail fescue | *Vulpia bromoides* | FACW |
| Rattail fescue | *Vulpia myuros* | FACU |
| Common cocklebur | *Xanthium strumarium* | FAC+ |

### 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 peppercress, 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 bermed 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 are isolated, 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.

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Welch, L. E., Huff, R. C., Dierking, R. A., Cook, T. D., Bates, L. A., and W. F. Andrews. 1966. Soil survey of the Alameda area, California. U.S. Department of Agriculture Soil Conservation Service in cooperation with the University of California Agricultural Experiment Station. Washington, D.C.

# Appendix A
# Data Forms

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | slope/seep wetland |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 1 |
| Is the area a potential problem area? (If needed, explain below) | ☑ YES ☐ NO | Plot ID: | 1A |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Leymus triticoides* | herb | | FAC+ | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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: 0 inches
- Depth to Standing Water in Pit: >21 inches
- Depth to Saturated Soil: >21 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 wetland indicators observed.

## SOILS

Plot ID:

Map Unit Name (series and phase): Wisflat-Arburua-San Timoteo complex, 50-75% slopes  Drainage Class: well to somewhate 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

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A1 | 0-7 | sil | 1msbk | 10YR3/1 | none | – | – | – |
| A2 | 7-13 | sicl | massive | 2.5Y3/1 | none | – | – | – |
| C | 13-21+ | sicl+ | massive | 2.5Y2.5/1 | none | – | – | Carbonate masses & coats. |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☑ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**Hydric Soils Present?** ☑ YES ☐ NO

**Remarks:**

Wisflat (subgroup taxonomy): Lithic Xerorthent; Arburua (subgroup taxonomy): Typic Xerorthents; San Timoteo (subgroup taxonomy): Typic Xerorthent. Data point located on the downslope side of an apparent debris bench created by 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:**

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

### Texture and Rock Fragment Content

| Texture | | Rock Fragments |
|---|---|---|
| cos - coarse sand | vfsl - very fine sandy loam | gr - gravelly |
| s - sand | l - loam | vgr - very gravelly |
| fs - fine sand | sil - sill loam | xgr - extremely gravelly |
| vfs - very fine sand | si - silt | cb - cobbly |
| lcos - loamy coarse sand | scl - sandy clay loam | vcb - very cobbly |
| ls - loamy sand | cl - clay loam | xcb - extremely cobbly |
| lfs - loamy fine sand | sicl - silty clay loam | st - stony |
| lvfs - loamy very fine sand | sc - sandy clay | vst - very stony |
| cosl - coarse sandy loam | sic - silty clay | xst - extremely stony |
| sl - sandy loam | c - clay | |
| fsl - fine sandy loam | | |

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**Size**

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

**Contrast**

f - faint
d - distinct
p - prominent

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | upland |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 1 |
| Is the area a potential problem area? (If needed, explain below) | ☐ YES ☑ NO | Plot ID: | 1B |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Bromus diandrus* | herb | | UPL | | | | |
| *Avena barbata* | herb | | UPL | | | | |
| *Hordeum murinum* | herb | | UPL | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Percent of dominants that are OBL, FACW, or FAC (excluding FAC-): 0% 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 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

Plot ID:

Map Unit Name (series and phase): Wisflat-Arburua-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

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A1 | 0-10 | sil | 2cgr | 10YR3/1 | none | -- | -- | -- |
| A2/Bk | 10-20+ | sil | 2msbk | 2.5Y3/1 | none | -- | -- | carbonate masses & coats. |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**Hydric Soils Present?** ☐ YES ☑ NO

**Remarks:**

Wisflat (subgroup taxonomy): Lithic Xerorthent; Arburua (subgroup taxonomy): Typic Xerorthents; San Timoteo (subgroup taxonomy): Typic Xerorthent. Data point located on the downslope side of an apparent debris bench created by 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

**Texture**

cos - coarse sand
s - sand
fs - fine sand
vfs - very fine sand
lcos - loamy coarse sand
ls - loamy sand
lfs - loamy fine sand
lvfs - loamy very fine sand
cosl - coarse sandy loam
sl - sandy loam
fsl - fine sandy loam
vfsl - very fine sandy loam
l - loam
sil - silt loam
si - silt
scl - sandy clay loam
cl - clay loam
sicl - silty clay loam
sc - sandy clay
sic - silty clay
c - clay

**Rock Fragments**

gr - gravelly
vgr - very gravelly
xgr - extremely gravelly
cb - cobbly
vcb - very cobbly
xcb - extremely cobbly
st - stony
vst - very stony
xst - extremely stony

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**Size**

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

**Contrast**

f - faint
d - distinct
p - prominent

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | slope/seep wetland |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 1 |
| Is the area a potential problem area? | ☐ YES ☑ NO | Plot ID: | 1C |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Leymus triticoides* | herb | | FAC+ | | | | |
| *Juncus balticus* | herb | | OBL | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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: 0 inches
- Depth to Standing Water in Pit: >15 inches
- Depth to Saturated Soil: 2 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:**

## SOILS

Plot ID:

Map Unit Name (series and phase): Wisflat-Arburua-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

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A | 0-15 | sicl | massive/1csbk | 10Y 3/1 - 10GY 3/1 | f, m, p | Mn-x | black | – |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☑ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☑ Gleyed or Low-Chroma (≤1) matrix
- ☑ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**Hydric Soils Present?** ☑ YES ☐ NO

**Remarks:**

Wisflat (subgroup taxonomy): Lithic Xerorthent; Arburua (subgroup taxonomy): Typic Xerorthents; San Timoteo (subgroup taxonomy): Typic Xerorthent. Data point located near seep on a debris bench created by 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

| Texture | | Rock Fragments |
|---|---|---|
| cos - coarse sand | vfsl - very fine sandy loam | gr - gravelly |
| s - sand | l - loam | vgr - very gravelly |
| fs - fine sand | sil - silt loam | xgr - extremely gravelly |
| vfs - very fine sand | si - silt | cb - cobbly |
| lcos - loamy coarse sand | scl - sandy clay loam | vcb - very cobbly |
| ls - loamy sand | cl - clay loam | xcb - extremely cobbly |
| lfs - loamy fine sand | sicl - silty clay loam | st - stony |
| lvfs - loamy very fine sand | sc - sandy clay | vst - very stony |
| cosl - coarse sandy loam | sic - silty clay | xst - extremely stony |
| sl - sandy loam | c - clay | |
| fsl - fine sandy loam | | |

### Redoximorphic Feature Morphology

**Abundance**

- f - few
- c - common
- m - many

**Size**

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

**Contrast**

- f - faint
- d - distinct
- p - prominent

**Type**

- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | Alameda |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | Vernal Pool/Seasonal Wetland |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 2 |
| Is the area a potential problem area? | ☑ YES ☐ NO | Plot ID: | 2A |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Plagiobothrys stipitatus* | herb | 75% | OBL | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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
- ☑ Personal Knowledge of Regional Plant Communities
- ☐ Technical Literature
- ☐ Other (explain below)

**Hydrophytic Vegetation Present?** ☑ YES ☐ NO

**Remarks:**
Data point located in and near the edge of a shallow depression.

## 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: >26 inches
- Depth to Saturated Soil: >26 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, but is in shallow basin with berm and staff gauge at east end.

## SOILS

Plot ID:

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

Taxonomy (subgroup): Aridic Haploxererts — Field observations confirm mapped type? ☐ YES ☑ NO

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

Profile Description

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A | 0-15 | c | 3cpr | 2.5-5Y 3/1 | none | -- | -- | Thin A horizon- not described |
| Bkss | 15-28+ | c | 2cabk | 5Y 3/1 | none | -- | -- | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ 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 (depressional) 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

**Texture**

cos - coarse sand
s - sand
fs - fine sand
vfs - very fine sand
lcos - loamy coarse sand
ls - loamy sand
lfs - loamy fine sand
lvfs - loamy very fine sand
cosl - coarse sandy loam
sl - sandy loam
fsl - fine sandy loam
vfsl - very fine sandy loam
l - loam
sil - silt loam
si - silt
scl - sandy clay loam
cl - clay loam
sicl - silty clay loam
sc - sandy clay
sic - silty clay
c - clay

**Rock Fragments**

gr - gravelly
vgr - very gravelly
xgr - extremely gravelly
cb - cobbly
vcb - very cobbly
xcb - extremely cobbly
st - stony
vst - very stony
xst - extremely stony

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**Size**

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

**Contrast**

f - faint
d - distinct
p - prominent

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | Alameda |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | upland/seasonal wetland edge |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 2 |
| Is the area a potential problem area? (If needed, explain below) | ☐ YES ☑ NO | Plot ID: | 2B |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Bromus hordeaceus* | herb | | FACU | | | | |
| *Bromus rubens* | herb | | UPL | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Percent of dominants that are OBL, FACW, or FAC (excluding FAC-): 0% 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: >18 inches
- Depth to Saturated Soil: >18 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

Plot ID:

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

Taxonomy (subgroup): Ardic Haploxererts — Field observations confirm mapped type? ☐ YES ☑ NO

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

Profile Description

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A1 | 0-10 | c | 2cpr | 2.5Y 3/1-2.5/1 | f, 1, p | Fe-x, otr | 7.5YR 4/6 | Fe-x in root channel |
| | | " | " | " | f, 1, f | d, mat | 2.5Y5/2 | d may be CaCO3 masses |
| Bkss | 10-18+ | c | 1-2cabk | 2.5Y 3/1 | none | -- | -- | -- |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha, \alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☑ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**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:**

Data point is on vernal pool margin. 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

| Texture | | Rock Fragments |
|---|---|---|
| cos - coarse sand | vfsl - very fine sandy loam | gr - gravelly |
| s - sand | l - loam | vgr - very gravelly |
| fs - fine sand | sil - silt loam | xgr - extremely gravelly |
| vfs - very fine sand | si - silt | cb - cobbly |
| lcos - loamy coarse sand | scl - sandy clay loam | vcb - very cobbly |
| ls - loamy sand | cl - clay loam | xcb - extremely cobbly |
| lfs - loamy fine sand | sicl - silty clay loam | st - stony |
| lvfs - loamy very fine sand | sc - sandy clay | vst - very stony |
| cosl - coarse sandy loam | sic - silty clay | xst - extremely stony |
| sl - sandy loam | c - clay | |
| fsl - fine sandy loam | | |

### Redoximorphic Feature Morphology

**Abundance**
- f - few
- c - common
- m - many

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

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

**Type**
- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- d - depletion

**Location**
- mat - soil matrix
- ped - ped surface
- por - soil pores
- otr - other

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | slope/seep wetland |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 3 |
| Is the area a potential problem area? | ☑ YES ☐ NO | Plot ID: | 3A |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Urtica dioica* | herb | | FACW | | | | |
| *Marrubium vulgare* | herb | | FAC | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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: 0 inches
- Depth to Standing Water in Pit: >16 inches
- Depth to Saturated Soil: >16 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

Plot ID:

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

Taxonomy (subgroup): Aridic Haploxererts-Aridic Haploxererts  Field observations confirm mapped type? ☐ YES ☑ NO

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

Profile Description

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| | 0-10 | cl | 2mgr | 10YR3/2 | none | -- | -- | -- |
| | 10-16+ | fsl | massive | 5Y 6/2-6/3 & 5Y4/2 | vf, 1, d | Fe-x, mat | 2.5Y 5/6 | variegated colors in matrix |
| | | | | | | | | most of matrix is 5Y 6/3 |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha, \alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☑ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**Hydric Soils Present?** ☑ YES ☐ NO

**Remarks:**

Soil test pit located on debris bench of an old slump. Fe-xpresent in <1% of matrix (i.e., very few).

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

### Texture and Rock Fragment Content

**Texture**

cos - coarse sand
s - sand
fs - fine sand
vfs - very fine sand
lcos - loamy coarse sand
ls - loamy sand
lfs - loamy fine sand
lvfs - loamy very fine sand
cosl - coarse sandy loam
sl - sandy loam
fsl - fine sandy loam
vfsl - very fine sandy loam
l - loam
sil - silt loam
si - silt
scl - sandy clay loam
cl - clay loam
sicl - silty clay loam
sc - sandy clay
sic - silty clay
c - clay

**Rock Fragments**

gr - gravelly
vgr - very gravelly
xgr - extremely gravelly
cb - cobbly
vcb - very cobbly
xcb - extremely cobbly
st - stony
vst - very stony
xst - extremely stony

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**Size**

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

**Contrast**

f - faint
d - distinct
p - prominent

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | upland/annul grassland |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 3 |
| Is the area a potential problem area? | ☐ YES ☑ NO | Plot ID: | 3B |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Bromus hordeaceus* | herb | | FACU | | | | |
| *Bromus diandrus* | herb | | UPL | | | | |
| *Marrubium vulgare* | herb | | FAC | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Percent of dominants that are OBL, FACW, or FAC (excluding FAC-): 33% 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

Plot ID:

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

Taxonomy (subgroup): Aridic Haploxererts-Aridic Haploxererts  Field observations confirm mapped type? ☐ YES ☑ NO

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

Profile Description

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A1 | 0-7 | vfsl | -- | 10YR3/2 | none | -- | -- | -- |
| A2/Bk | 7-17+ | sil | -- | 10YR2/1 | none | -- | -- | few, fine carbonate masses |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**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

**Texture**

cos - coarse sand
s - sand
fs - fine sand
vfs - very fine sand
lcos - loamy coarse sand
ls - loamy sand
lfs - loamy fine sand
lvfs - loamy very fine sand
cosl - coarse sandy loam
sl - sandy loam
fsl - fine sandy loam
vfsl - very fine sandy loam
l - loam
sil - silt loam
si - silt
scl - sandy clay loam
cl - clay loam
sicl - silty clay loam
sc - sandy clay
sic - silty clay
c - clay

**Rock Fragments**

gr - gravelly
vgr - very gravelly
xgr - extremely gravelly
cb - cobbly
vcb - very cobbly
xcb - extremely cobbly
st - stony
vst - very stony
xst - extremely stony

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**Size**

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

**Contrast**

f - faint
d - distinct
p - prominent

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| 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 | Transect ID: | 4 |
| Is the area a potential problem area? | ☑ YES ☐ NO | Plot ID: | 4A |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Leymus triticoides* | herb | | FAC+ | | | | |
| *Urtica dioica* | herb | | FACW | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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

## SOILS

Plot ID:

Map Unit Name (series and phase): Wisflat-Arburua-San Timoteo complex, 30-50% slopes  Drainage Class: well to somewhate 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

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A | 0-17 | sl | -- | 10YR 3/2 | none | -- | -- | 10% gravel |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**Hydric Soils Present?** ☐ YES ☑ NO

**Remarks:**

Wisflat (subgroup taxonomy): Lithic Xerorthent; Arburua (subgroup taxonomy): Typic Xerorthents; 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

| Texture | | Rock Fragments |
|---|---|---|
| cos - coarse sand | vfsl - very fine sandy loam | gr - gravelly |
| s - sand | l - loam | vgr - very gravelly |
| fs - fine sand | sil - silt loam | xgr - extremely gravelly |
| vfs - very fine sand | si - silt | cb - cobbly |
| lcos - loamy coarse sand | scl - sandy clay loam | vcb - very cobbly |
| ls - loamy sand | cl - clay loam | xcb - extremely cobbly |
| lfs - loamy fine sand | sicl - silty clay loam | st - stony |
| lvfs - loamy very fine sand | sc - sandy clay | vst - very stony |
| cosl - coarse sandy loam | sic - silty clay | xst - extremely stony |
| sl - sandy loam | c - clay | |
| fsl - fine sandy loam | | |

### Redoximorphic Feature Morphology

| Abundance | Type |
|---|---|
| f - few | Fe-x - iron concentration (soft mass) |
| c - common | Fe-nc - iron nodule or concretion |
| m - many | Mn-x - manganese concentration (soft mass) |
| **Size** | Mn-nc - manganese nodule or concretion |
| 1 - fine (<2mm) | d - depletion |
| 2 - medium 2–5mm) | **Location** |
| 3 - coarse (5–20mm) | mat - soil matrix |
| 4 - very coarse (20–76mm) | ped - ped surface |
| 5 - extremely coarse (>76mm) | por - soil pores |
| **Contrast** | otr - other |
| f - faint | |
| d - distinct | |
| p - prominent | |

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | Upland (annual grassland) |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 4 |
| Is the area a potential problem area? | ☐ YES ☑ NO | Plot ID: | 4B |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Bromus hordeaceus* | herb | | FACU | | | | |
| *Bromus diandrus* | herb | | UPL | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

Percent of dominants that are OBL, FACW, or FAC (excluding FAC-): 0% 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: >16 inches
- Depth to Saturated Soil: >16 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

Plot ID:

Map Unit Name (series and phase): Wisflat-Arburua-San Timoteo complex, 30-50% slopes  Drainage Class: well to somewhate 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

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A | 0-16 | sl | -- | 10YR2/1 | none | -- | -- | 30% gravel, 5% cobble |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha, \alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**Hydric Soils Present?** ☐ YES ☑ NO

**Remarks:**

Wisflat (subgroup taxonomy): Lithic Xerorthent; Arburua (subgroup taxonomy): Typic Xerorthents; 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

**Texture**

cos - coarse sand
s - sand
fs - fine sand
vfs - very fine sand
lcos - loamy coarse sand
ls - loamy sand
lfs - loamy fine sand
lvfs - loamy very fine sand
cosl - coarse sandy loam
sl - sandy loam
fsl - fine sandy loam
vfsl - very fine sandy loam
l - loam
sil - silt loam
si - silt
scl - sandy clay loam
cl - clay loam
sicl - silty clay loam
sc - sandy clay
sic - silty clay
c - clay

**Rock Fragments**

gr - gravelly
vgr - very gravelly
xgr - extremely gravelly
cb - cobbly
vcb - very cobbly
xcb - extremely cobbly
st - stony
vst - very stony
xst - extremely stony

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**Size**

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

**Contrast**

f - faint
d - distinct
p - prominent

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | San Joaquin |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | Slope/seep wetland |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 4 |
| Is the area a potential problem area? | ☑ YES ☐ NO | Plot ID: | 4C |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Juncus balticus* | herb | | OBL | | | | |
| *Urtica dioica* | herb | | FACW | | | | |
| *Asclepias fascicularis* | herb | | FAC | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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: 0 inches
- Depth to Standing Water in Pit: >19 inches
- Depth to Saturated Soil: >19 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

Plot ID:

Map Unit Name (series and phase): Wisflat-Arburua-San Timoteo complex, 30-50% slopes  Drainage Class: well to somewhate 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

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A | 0-19 | sl | -- | 10YR2/1 | none | -- | -- | 8% gravel, 3% cobble |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**Hydric Soils Present?** ☐ YES ☑ NO

**Remarks:**

Wisflat (subgroup taxonomy): Lithic Xerorthent; Arburua (subgroup taxonomy): Typic Xerorthents; 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

| Texture | | Rock Fragments |
|---|---|---|
| cos - coarse sand | vfsl - very fine sandy loam | gr - gravelly |
| s - sand | l - loam | vgr - very gravelly |
| fs - fine sand | sil - silt loam | xgr - extremely gravelly |
| vfs - very fine sand | si - silt | cb - cobbly |
| lcos - loamy coarse sand | scl - sandy clay loam | vcb - very cobbly |
| ls - loamy sand | cl - clay loam | xcb - extremely cobbly |
| lfs - loamy fine sand | sicl - silty clay loam | st - stony |
| lvfs - loamy very fine sand | sc - sandy clay | vst - very stony |
| cosl - coarse sandy loam | sic - silty clay | xst - extremely stony |
| sl - sandy loam | c - clay | |
| fsl - fine sandy loam | | |

### Redoximorphic Feature Morphology

**Abundance**
- f - few
- c - common
- m - many

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

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

**Type**
- Fe-x - iron concentration (soft mass)
- Fe-nc - iron nodule or concretion
- Mn-x - manganese concentration (soft mass)
- Mn-nc - manganese nodule or concretion
- d - depletion

**Location**
- mat - soil matrix
- ped - ped surface
- por - soil pores
- otr - other

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | Alameda |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | perennial grassland (*Distichilis*) |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 5 |
| Is the area a potential problem area? (If needed, explain below) | ☑ YES ☐ NO | Plot ID: | 5A |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Distichlis spicata* | | | FACW | *Bromus diandrus* | | | |
| | | | | | | | |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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: 0 inches
- Depth to Standing Water in Pit: >19 inches
- Depth to Saturated Soil: >19 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:**

## SOILS

Plot ID:

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

Taxonomy (subgroup): Ardic Haploxererts  Field observations confirm mapped type? ☑ YES ☐ NO

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

Profile Description

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A1 | 0-7 | cl | -- | 2.5Y 3/2 | none | -- | -- | -- |
| A2/Bk | 7-18+ | cl | -- | 2.5Y 3/1- 4/2 | none | -- | -- | carbonates masses near bottom of horizon |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha,\alpha'$ - dipyridyl test)
- ☐ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**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 rhizomal growth, with plants on slope connected with plants in wetland/stream channel via rhizomes.

### Texture and Rock Fragment Content

**Texture**

cos - coarse sand
s - sand
fs - fine sand
vfs - very fine sand
cos - loamy coarse sand
ls - loamy sand
lfs - loamy fine sand
lvfs - loamy very fine sand
cosl - coarse sandy loam
sl - sandy loam
fsl - fine sandy loam
vfsl - very fine sandy loam
l - loam
sil - silt loam
si - silt
scl - sandy clay loam
cl - clay loam
sicl - silty clay loam
sc - sandy clay
sic - silty clay
c - clay

**Rock Fragments**

gr - gravelly
vgr - very gravelly
xgr - extremely gravelly
cb - cobbly
vcb - very cobbly
xcb - extremely cobbly
st - stony
vst - very stony
xst - extremely stony

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**Size**

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

**Contrast**

f - faint
d - distinct
p - prominent

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
d - depletion

**Location**

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

Jones & Stokes

DATA FORM
ROUTINE WETLAND DETERMINATION

| | | | |
|---|---|---|---|
| Project/Site: | LLNL Site 300 | State: | CA |
| Applicant/Owner: | US DOE | County: | Alameda |
| Investigator(s): | Preston & Frazier | S/T/R | |
| Date: | 07/03/02 | | |
| Do normal circumstances exist on the site? | ☑ YES ☐ NO | Community ID: | Intermittent Stream Channel (spring fed) |
| Is the site significantly disturbed (atypical situation)? | ☐ YES ☑ NO | Transect ID: | 5 |
| Is the area a potential problem area? | ☑ YES ☐ NO | Plot ID: | 5B |
| (If needed, explain below) | | | |

## VEGETATION

| Dominant Plant Species | Strata | % Rel. Cover | Indicator | Associate Plant Species | Strata | % Rel. Cover | Indicator |
|---|---|---|---|---|---|---|---|
| *Distichlis spicata* | herb | | FACW | *Typha angustifolia* | herb | | OBL |
| | | | | *Carduus pycnocephalus* | herb | | UPL |
| | | | | *Bromus diandrus* | herb | | UPL |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

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:**
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:

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

Taxonomy (subgroup): Ardic Haploxererts  Field observations confirm mapped type? ☐ YES ☑ NO

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

Profile Description

| Horizon | Depth (inches) | Texture | Structure | Matrix Color (moist) | Redoximorphic Features: Abundance, Size, Contrast | Redoximorphic Features: Type, location | Redoximorphic Features: Color (moist) | Other |
|---|---|---|---|---|---|---|---|---|
| A1 | 0-9 | c | -- | 2.5Y 3/1 | none | -- | -- | -- |
| A2/Bk | 9-15 | c | -- | 2.5Y 4/1-5/1 | none | -- | -- | carbonates masses near bottom of horizon |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

Hydric Soil Indicators (check all that apply):

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic Moisture Regime
- ☐ Reducing Conditions ( $\alpha, \alpha'$ - dipyridyl test)
- ☑ Gleyed or Low-Chroma (≤1) matrix
- ☐ Matrix Chroma ≤2 with Redoximorphic Concentrations and/or Depletions
- ☐ Mn or Fe Concretions or Nodules
- ☐ High Organic Content in Surface Layer of Sandy Soils
- ☐ Organic Streaking in Sandy Soils
- ☐ Listed on National/Local Hydric Soils List
- ☐ Other (explain below)

**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:**

### Texture and Rock Fragment Content

| Texture | | Rock Fragments |
|---|---|---|
| cos - coarse sand | vfsl - very fine sandy loam | gr - gravelly |
| s - sand | l - loam | vgr - very gravelly |
| fs - fine sand | sil - silt loam | xgr - extremely gravelly |
| vfs - very fine sand | si - silt | cb - cobbly |
| lcos - loamy coarse sand | scl - sandy clay loam | vcb - very cobbly |
| ls - loamy sand | cl - clay loam | xcb - extremely cobbly |
| lfs - loamy fine sand | sicl - silty clay loam | st - stony |
| lvfs - loamy very fine sand | sc - sandy clay | vst - very stony |
| cosl - coarse sandy loam | sic - silty clay | xst - extremely stony |
| sl - sandy loam | c - clay | |
| fsl - fine sandy loam | | |

### Redoximorphic Feature Morphology

**Abundance**

f - few
c - common
m - many

**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

**Type**

Fe-x - iron concentration (soft mass)
Fe-nc - iron nodule or concretion
Mn-x - manganese concentration (soft mass)
Mn-nc - manganese nodule or concretion
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**Location**

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