APPENDIX F

USACE Correspondence Letter and Identification of Waters of the U.S.: Madera Site

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

January 10, 2006

Regulatory Branch (200501033)

Brian B. Boroski
H.T. Harvey Ecological Consultants
San Joaquin Valley Regional Office
423 W. Fallbrook Avenue, Suite 200
Fresno, California 93711

Dear Mr. Boroski:

We are responding to your consultant's request for an approved jurisdictional determination for the Brown Property Development Project site. This approximately 350 acre site is located on or near Schmidt Creek in Section 4, Township 10 South, Range 17 East, MDB&M, Latitude 37° 0′ 24.3″, Longitude 120° 7′ 11.8″, Madera County, California.

Based on available information, we concur with the estimate of waters of the United States, as depicted on the **22 April 2005 delineation drawing, titled, Brown Property, Identification of Waters of the U.S.**, prepared by **H.T. Harvey & Associates**. Approximately 8.51 acres of waters of the United States, including wetlands, are present within the survey area. These waters are regulated under Section 404 of the Clean Water Act since they are tributary and/or adjacent to Schmidt Creek, a tributary to Dry Creek, a water of the United States, in accordance with 33 CFR 328.3 (a)(5).

This verification is valid for five years from the date of this letter, unless new information warrants revision of the determination before the expiration date. A *Notification of Administrative Appeal Options and Process and Request for Appeal* form is enclosed. If you wish to appeal this approved jurisdictional determination, please follow the procedures on the form. You should provide a copy of this letter and notice to all other affected parties, including any individual who has an identifiable and substantial legal interest in the property.

This determination has been conducted to identify the limits of Corps of Engineers' Clean Water Act jurisdiction for the particular site identified in this request. This determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

Please refer to identification number 200501033 in any correspondence concerning this project. If you have any questions, please contact me at the San Joaquin Valley Office, 1325 J Street, Room 1480, Sacramento, California 95814-2922, email *Kevin.J.Roukey@usace.army.mil*, or telephone 916-557-5266. You may also use our website: *www.spk.usace.army.mil/regulatory.html*.

Sincerely,

Kevin J. Roukey
Chief, San Joaquin Valley Office

Enclosure(s)

Copy furnished without enclosure(s):

Dale Harvey, California Regional Water Quality Control Board, 1685 E Street, Fresno, California 93706-2020

U.S. Fish and Wildlife Service, Wetlands Branch, 2800 Cottage Way, Suite W2605, Sacramento, California 95825-3901

H.T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

received 9/12/05 MB

TRANSMITTAL MEMORANDUM

TO: Chad Broussard
Analytical Environmental Associates
2021 N Street
Sacramento, CA 95814

FROM: Brian Boroski

DATE: September 9, 2005

PROJECT NAME: Brown Property Identification of Waters of the U.S.

PROJECT NUMBER: 2410-02

WE ARE TRANSMITTING:

☒ Herewith ☒ Via Mail ☐ Via Fax #of pages: _____
☐ Under Separate Cover ☐ To Be Picked Up ☐ Fed Ex (including cover letter)

THE FOLLOWING:

Technical report: *Brown Property Identification of Waters of the U.S.* and copy of cover letter to U.S. Army Corps of Engineers

☐ As Requested ☐ For Payment ☐ For Review And Comments
☐ For Signature/Return ☐ For Approval ☐ Returned For Corrections
☒ For Your Use/Information ☐ For Your Records ☐ CONFIDENTIAL!

REMARKS:

Dear Chad,

Please find enclosed a copy of the report titled *Brown Property Identification of Waters of the U.S.* and a copy of the letter sent to the U.S. Army Corps of Engineers. Please feel welcome to call if you should have any questions.

Sincerely,

Brian Boroski
Ext. 507

COPIES TO:

Fresno Office
423 W. Fallbrook Ave • Suite 202
Fresno, CA 93711 • 559-449-1423 • Fax: 559-449-8248

BROWN PROPERTY
IDENTIFICATION OF WATERS OF THE U.S.

Prepared by:

H. T. HARVEY & ASSOCIATES

Patrick J. Boursier, Ph.D., Principal, Senior Plant Ecologist
Brian B. Boroski, Ph.D. Project Manager
Andrew Dilworth, B.S., Wetland Ecologist

Prepared for:

Chad Broussard
Analytical Environmental Services
2021 N. Street, Suite 200
Sacramento, CA 95814

September 9, 2005

Project No. 2410-02

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EXECUTIVE SUMMARY

H. T. Harvey & Associates surveyed the 305-acre Brown Property on April 13, 2005 for areas meeting the regulatory definition of Waters of the U.S. Potentially jurisdictional waters were identified within the project boundaries and included approximately 6.82 acres of "other waters", and 1.69 acres of wetlands. The remainder of the study area (296.49 acres) was entirely upland in character.

INTRODUCTION

PROJECT AREA DESCRIPTION

The Brown Property is located approximately seven miles north of Madera, California, between Avenue 17 and Avenue 18, and Road 23 and Highway 99 (Figure 1). The majority of the 305-acre property is dominated by dryland wheat except within a few disturbed and developed areas of the property, and within the current alignment of Schmidt Creek. The developed areas and Schmidt Creek ditch are dominated by ruderal herbaceous habitat. Adjacent land uses include different forms of agriculture including production of dryland crops, vineyards, and orchards.

The site occurs on the U.S. Geological Survey (U.S.G.S.) quadrangle maps Kismet and Berenda (1961), California (Figure 2; township 10 south; range 17 east; section 4). The elevation on site is approximately 250 feet National Geodetic Vertical Datum. The average annual precipitation for this area of Madera County is approximately 10 to 12 inches per year (Soil Conservation Service; SCS 1990) and the average annual temperature is 62°-Fahrenheit (F). There are 308 days in the growing season in the Madera area, based on the 28° F freezing temperature. Therefore, the minimum number of consecutive days required to meet soil saturation criteria is 15.4, based on the 5 percent minimum number of days for saturation during the growing season.

The site is underlain by four soil series (Figure 3) including San Joaquin and Hanford sandy loams, and Atwater and Tujunga loamy sands, all having 0 to 3 percent slopes (SCS 1990); a complex of San Joaquin and Alamo soils also occurs in a highly limited area of the property. The San Joaquin sandy loam covers most of the site and is moderately well-drained and rapidly permeable, but has very slow permeability deeper in the profile due to an unrelated iron-silica hardpan between 19 and 23 inches below the surface. The Hanford sandy loam is highly similar to the San Joaquin soil except that the depth to the hardpan is at least 36 inches. The Atwater and Tujunga loamy sands occur along present and historic watercourses, and are also well to excessively drained, and rapidly permeable. The Tujunga loamy sand typically occurs along more narrow watercourses such as depicted on the soils map for Brown property (Figure 3), and may also be underlain by the same unrelated hardpan as the San Joaquin sandy loam. All of these soils are used for dry farming and range, and where the underlying hardpan has been broken and/or removed they are often used for irrigated pasture and crops.

Of these four series, only the Atwater and San Joaquin series occurring on site are listed as being hydric soils in Madera County (Natural Resource Conservation Service; NRCS 2004). Specifically, the Atwater loamy sand is considered hydric when it is subject to prolonged flooding during the growing season. Such conditions may occur when this soil type underlies watercourses. The San Joaquin sandy loam is considered hydric when the depth to the water table is less than one foot from the soil surface during the growing season. Other phases of the Tujunga and Hanford series are also considered hydric but none of these have been mapped as occurring on the site. Finally, the U.S. Fish and Wildlife Service has not classified any wetland resources on site under the National Wetland Inventory (NWI) System for the Berenda and Kismet quadrangles on which the property occurs (Figure 4). This is despite the fact that active hydrology is known to occur in upstream reaches of Schmidt Creek, east of Highway 99, as well as in Dry Creek downstream of the Brown Property.

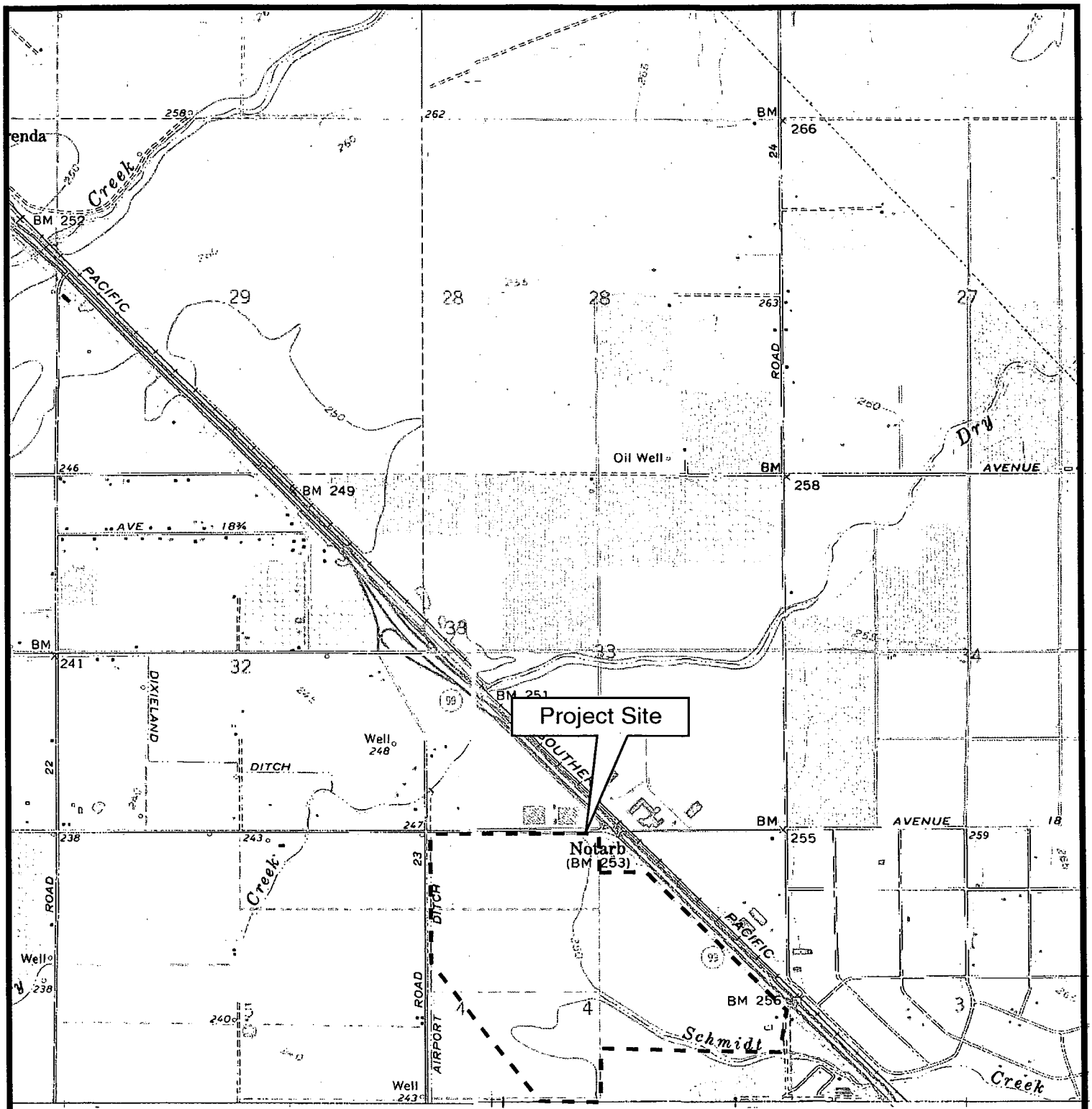
SURVEY PURPOSE

H. T. Harvey & Associates' biologists conducted reconnaissance-level surveys of the Brown Property on 16 and 24 June 2004 to assess the extent of active hydrology on the site at that time. Enhanced-level field surveys were subsequently conducted on 13 April 2005 to further document field characteristics used in the determination of potential jurisdictional waters. The primary purpose of our work was to identify the extent and location of potential jurisdictional waters within the project boundaries under conditions existing at the time of the survey.

H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Brown Property: Site / Vicinity Map

File No. 2410-02	Date 4/22/05	Figure 1



0 2000 feet

approximate scale in feet

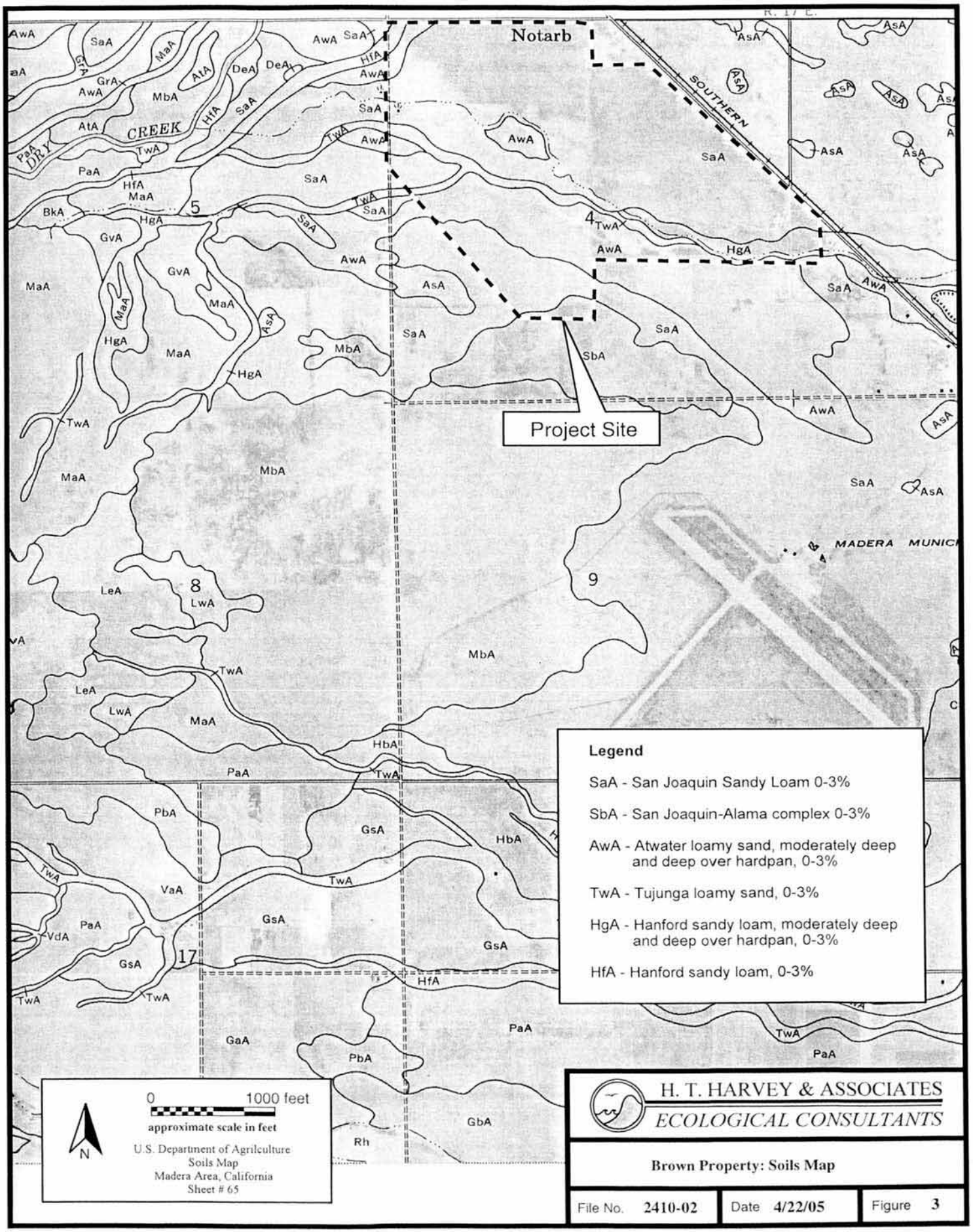
N

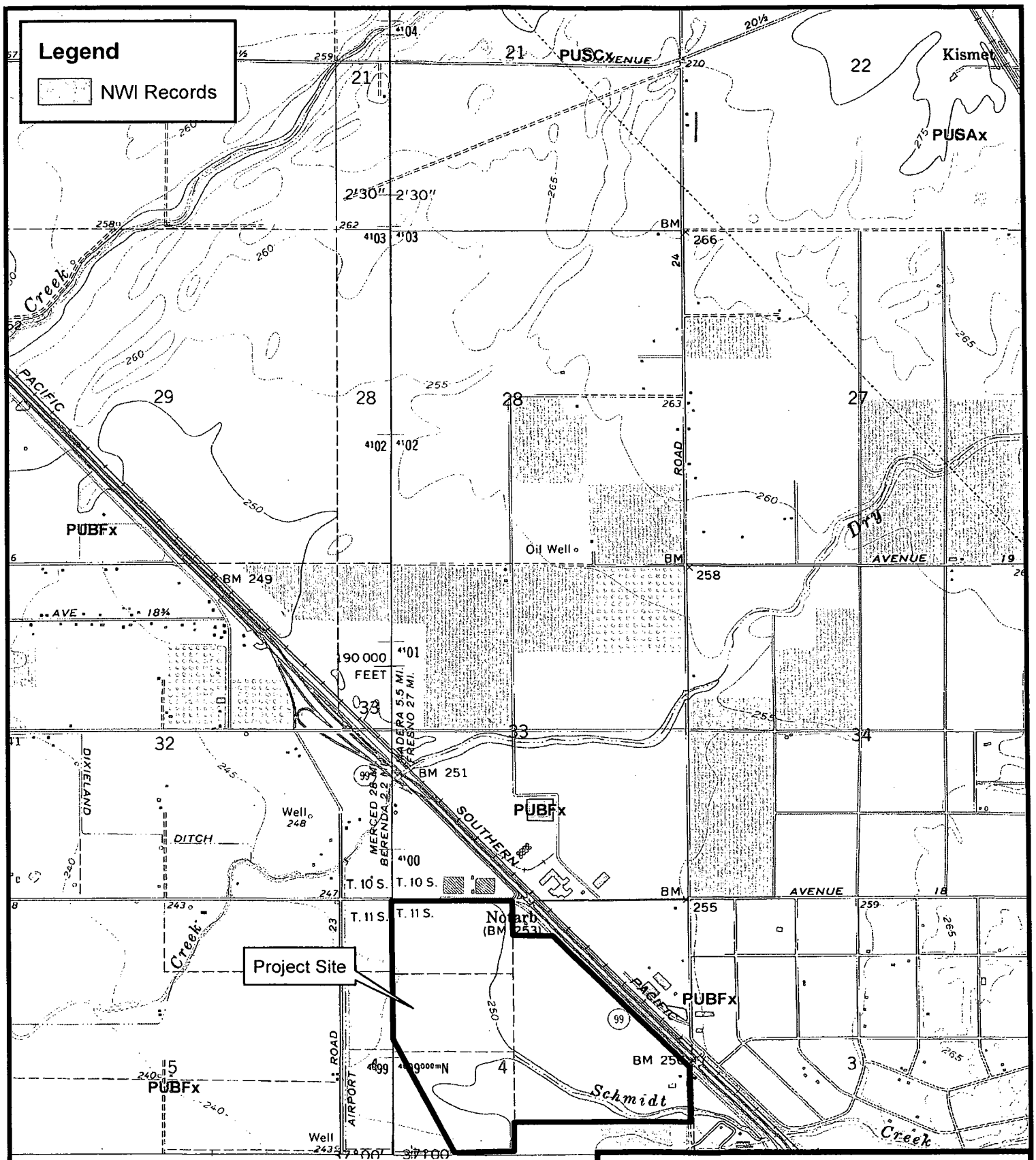
USGS Quadrangle Map
7.5 Minute Series
Kismet and Berenda Quad

H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Brown Property: USGS Quad Map

File No. 2410-02	Date 4/22/05	Figure 2

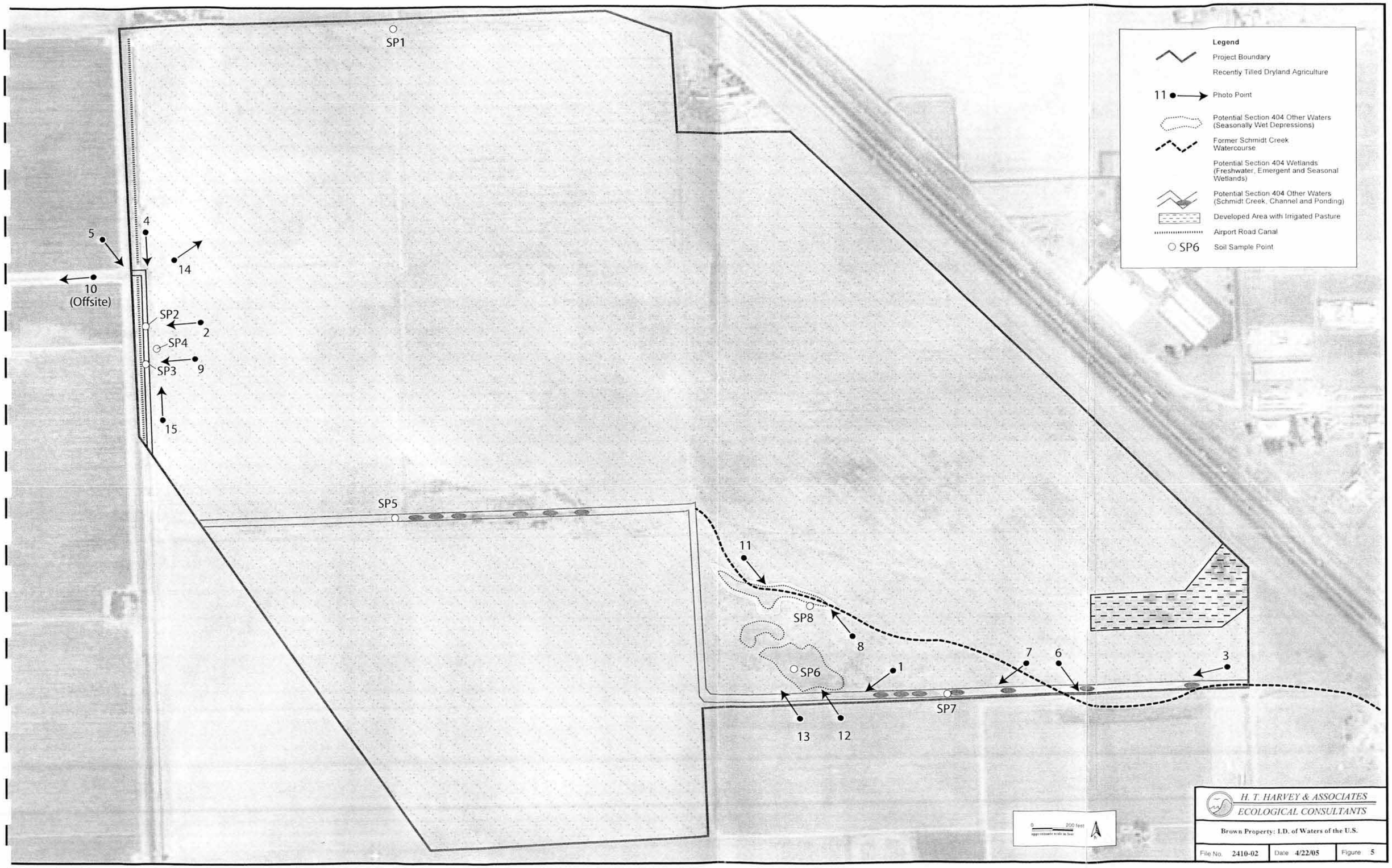

Notarb
SOUTHERN
DRY CREEK
Project Site
MADERA MUNIC
Legend
SaA - San Joaquin Sandy Loam 0-3%
SbA - San Joaquin-Alama complex 0-3%
AwA - Atwater loamy sand, moderately deep and deep over hardpan, 0-3%
TwA - Tujunga loamy sand, 0-3%
HgA - Hanford sandy loam, moderately deep and deep over hardpan, 0-3%
HfA - Hanford sandy loam, 0-3%
0 1000 feet
approximate scale in feet
N
U.S. Department of Agriculture
Soils Map
Madera Area, California
Sheet # 65
H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS
Brown Property: Soils Map
File No. 2410-02
Date 4/22/05
Figure 3



H.T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS

Brown Property Project EA Biological Section: NWI Map

File No. 2410-02	Date 4/21/05	Figure 4


Legend
Project Boundary
Recently Tilled Dryland Agriculture
Photo Point
Potential Section 404 Other Waters (Seasonally Wet Depressions)
Former Schmidt Creek Watercourse
Potential Section 404 Wetlands (Freshwater, Emergent and Seasonal Wetlands)
Potential Section 404 Other Waters (Schmidt Creek, Channel and Ponding)
Developed Area with Irrigated Pasture
Airport Road Canal
SP6 Soil Sample Point
SP1
SP2
SP3
SP4
SP5
SP6
SP7
SP8
1
2
3
4
5
6
7
8
9
10 (Offsite)
11
12
13
14
15
0 200 feet
approximate scale in feet
H. T. HARVEY & ASSOCIATES
ECOLOGICAL CONSULTANTS
Brown Property: I.D. of Waters of the U.S.
File No. 2410-02
Date 4/22/05
Figure 5

SOIL SURVEY

Madera Area California

OUR SOIL ★ OUR STRENGTH

THIS SURVEY IS AN EXACT REPRODUCTION OF THE PREVIOUS ISSUE. NO NEW INFORMATION HAS BEEN ADDED.

ALL SCS PROGRAMS AND SERVICES ARE OFFERED ON A NONDISCRIMINATORY BASIS, WITHOUT REGARD TO RACE, COLOR, NATIONAL ORIGIN, RELIGION, SEX, AGE, MARITAL STATUS, OR HANDICAP.

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with
CALIFORNIA AGRICULTURAL EXPERIMENT STATION

SURVEY METHODS

Surveys for field characteristics used in the identification of jurisdictional waters were conducted on 13 April 2005 using methodologies approved by the U.S. Army Corps of Engineers (USACE). The survey was conducted by H. T. Harvey & Associates' wetland ecologist Andrew Dilworth (B.S.). Field studies were conducted at a level of effort sufficient for review by the USACE.

Generally, surveys conducted on non-disturbed sites examine the vegetation, soils, and hydrology using the "Routine Determination Method, On-Site Inspection Necessary" (Section D) outlined in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). This multi-parameter approach to identifying wetlands is based upon the presence of hydrophytic vegetation, hydric soils, and wetland hydrology. This report was compiled for the Sacramento District of the USACE using guidance contained in *Information Needed for Verification of Corps Jurisdiction* (February 2000).

Alternatively, upland sites (non-wetlands) that subsequently developed some characteristics of wetlands, due to intentional or incidental human activities, are examined for wetlands using the techniques described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) for "Atypical Situations: Man-Induced Wetlands" (Part IV, Section F, Subsection 4). An example of an atypical situation is "man-induced" wetlands created by purposeful or incidental impoundment of water, which lack hydric soil indicators. The majority of such wetlands involve a significant change in the hydrologic regime, which may either increase or decrease the wetness of an area.

Prior to site surveys, topographic maps, and aerial photos of the project area were obtained. These sources included the U.S.G.S. Quadrangle Maps and the National Wetlands Inventory Map for the Kismet and Berenda quadrangles in California, an aerial photo provided by the client, and aerial photograph soil map sheets from the *Soil Survey, Madera Area, California* (SCS 1990).

A brief overview of the USACE regulations specifically applicable to the identification of jurisdictional waters on the project site is summarized below.

WATERS OF THE UNITED STATES REGULATIONS OVERVIEW

Areas meeting the regulatory definition of "Waters of the United States" are subject to the regulatory jurisdiction of the USACE. The USACE, under provisions of Section 404 of the Clean Water Act (1972), has jurisdiction over "Waters of the United States" (jurisdictional waters). These waters may include all waters used, or potentially used, for interstate commerce, including all waters subject to the ebb and flow of the tide, all interstate waters, all other waters (intrastate lakes, rivers, streams, mudflats, sandflats, playa lakes, natural ponds, etc.), all impoundments of waters otherwise defined as "Waters of the U.S.," tributaries of waters otherwise defined as "Waters of the U. S.," the territorial seas, and wetlands adjacent to "Waters of the U.S." (33 CFR, Part 328, Section 328.3).

Areas not considered to be jurisdictional waters include non-tidal drainage and irrigation ditches excavated on dry land, artificially irrigated areas, artificial lakes or ponds used for irrigation or stock watering, small artificial water bodies such as swimming pools, and water-filled depressions (33 CFR, Part 328). This definition may also include wetland areas subject to artificial irrigation that would revert to upland if the irrigation ceased.

IDENTIFICATION OF JURISDICTIONAL WATERS

Below we provide a detailed description of the methodology used in the identification of jurisdictional waters, having the potential of occurring on site, including Section 404 jurisdictional wetlands and other waters.

A) Identification of Section 404 Jurisdictional Wetlands (Special Aquatic Sites)

Surveys were conducted within the project boundaries for areas that meet the technical criteria of jurisdictional wetlands. The vegetation, soils, and hydrology of the site were examined following the guidelines outlined in the "Routine Determination Method" and/or "Atypical Situation" (Section F) in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

The property was examined for topographic features, drainages, alterations to site hydrology, and areas of significant recent disturbance by hiking the entire site. A determination was then made as to whether normal environmental conditions were present at the time of the field surveys. Data were used to document which portions of the site were wetlands.

Vegetation. Plants observed at each of the sample sites were identified to species using *The Jepson Manual* (Hickman 1993). Additional references included *A Flora of the Marshes of California* (Mason 1969), *Manual of the Grasses of the United States* (Hitchcock 1971), and *Weeds of California* (Robbins, *et al.* 1970). The wetland indicator status of each species was obtained from the 1987 Wetland Plant List, California (Reed 1988). The names of plants generally were not taken from *The Jepson Manual* (Hickman 1993) because not all of these names are consistent with scientific names used in the *1988 Wetland Plant List, California* (Reed 1988), and the *National List of Scientific Plant Names* (Smithsonian Inst. 1982). A list of species for each observation area was then compiled and an assessment of the dominant species made (Appendix A). It was then determined which of the observation areas supported wetland vegetation.

Wetland indicator species are so designated according to their frequency of occurrence in wetlands. For instance, a species with a presumed frequency of occurrence of 67 percent to 99 percent in wetlands is designated a facultative wetland indicator species. The wetland indicator groups, indicator symbol, and the frequency of occurrence of species within them in wetlands are as follows:

Table 1. Wetland Indicator Status Categories for Vascular Plants.*

INDICATOR CATEGORY	SYMBOL	FREQUENCY OF OCCURRENCE
OBLIGATE	OBL	greater than 99%
FACULTATIVE WETLAND	FACW	67 - 99%
FACULTATIVE	FAC	34 - 66%
FACULTATIVE UPLAND	FACU	1 - 33%
UPLAND	UPL	less than 1%

*Based upon information contained in *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). "NOL" = not on the list; "NI" = not an indicator.

Obligate and facultative wetland indicator species are hydrophytes that occur "in areas where the frequency and duration of inundation or soil saturation produce permanently or periodically saturated soils of sufficient duration to exert a controlling influence on the plant species present" (Environmental Laboratory 1987). Facultative indicator species may be considered wetland indicator species when found growing in hydric soils that experience periodic saturation. A complete list of the vascular plants of the project site, and their current indicator status has been provided in Appendix A.

Soils. Where possible, the top 22 inches of the soil profile was examined for hydric characteristics. Such characteristics include the presence of organic soils (Histosols), histic epipedons, aquic or peraquic moisture regime, presence of soil on hydric soil list, and mottling indicated by the presence of gleyed or bright spots of colors (in the former case, blue grays; in the latter case, orange red, or red brown) within the soil horizons observed. Mottling of soils usually indicates poor aeration and lack of good drainage. Munsell Soil Notations (Kollmorgen Instr. Corp. 1990) were recorded for the soil matrix for each soil sample. The last digit of the Munsell Soil Notation refers to the chroma of the sample. This notation consists of numbers beginning with 0 for neutral grays and increasing at equal intervals to a maximum of about 20. Chroma values of the soil matrix which are one (1) or less, or of two (2) or less when mottling is present, are typical of soils which have developed under anaerobic conditions.

In sandy soils, such as alluvial deposits in the bottom of drainage channels, hydric soil indicators include high organic matter content in the surface horizon and streaking of subsurface horizons by organic matter. All soil colors indicated in this report were taken under clear, sunny skies using moistened soil samples.

The *Soil Survey, Madera Area, California* (SCS 1990) was consulted in order to determine which soil types have been mapped on the project site. Descriptions of soil mapping units and the list of hydric soils in the Madera Area, California (NRCS 2004) are included in Appendix B.

Hydrology. Each of the sample sites was examined for positive field indicators of wetland hydrology. Such indicators might include visual observation of inundation and/or soil saturation, seeping or flowing water, water marks on sandstone rock and physical structures, drift lines, water-borne sediment deposits, water-stained leaves, and drainage patterns within wetlands.

B) Identification of Other Waters

"Other waters" include lakes, seasonal ponds, channels, tributary waters, and seasonal springs. Such areas are identified by the presence of standing or running water and generally lack hydrophytic vegetation. The regulatory jurisdiction within "Other waters" extends to the ordinary high water (OHW) mark on opposing channel banks in non-tidal areas and to the high tide line in tidal areas. The OHW mark is typically indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in character of soil, destruction of vegetation, exposed roots on the bank, deposition of leaf litter and other debris materials or lower limit of moss growth on channel banks. The project site was surveyed for areas meeting the regulatory definition of "other waters."

SURVEY RESULTS

Potential jurisdictional waters subject to provisions of Section 404 of the Clean Water act were identified within the project boundaries (Figure 5). This includes approximately 1.69 acres of potentially jurisdictional wetlands in the northwest corner of the site. A total of eight sample points (Appendix C) were taken throughout the project site and adjacent areas (Figure 5). In addition, approximately 6.82 acres of "other waters" were identified on site. Information pertinent to the identification of jurisdictional waters assembled during the investigations is presented in appendixes attached to the rear of this report and comprises:

- Appendix A – Plant List
- Appendix B – Soils Information
- Appendix C – Field Data Forms
- Appendix D – Photographs

OBSERVATIONS/RATIONALE/APPROACH/ASSUMPTIONS

- The wetland delineation was performed throughout the project site according to the "Routine Method of Determination" utilizing three parameters, as outlined in the 1987 Corps of Engineers Wetland Delineation Manual. Normal conditions were assumed.
- Schmidt Creek originates in gently sloping, valley watershed topography beginning at Road 600, approximately 6 miles northeast of Madera. The creek flows to the southwest through a residential neighborhood north of Madera, until it crosses under Highway 99, then turns toward the northwest and transects the Brown Property. Schmidt Creek historically transected the property as a wash entering the property at the southeast corner of the site, continuing on northwest towards Dry Creek. That reach of the Schmidt Creek watercourse on site is a channelized earthen ditch, excavated in uplands, which parallels part of the southern and western boundaries of the site and continues under Road 23 towards its confluence with Dry Creek (Photo 1). An irrigation canal also occurs along the western boundary of the site but it flows under Schmidt Creek through a vault structure and is therefore not connected to the creek.
- Dry Creek is a perennial watercourse which flows through its historic watercourse and irrigation canals towards its confluence with the Fresno River approximately 6 miles to the southwest.
- According to the 1962 aerial photo from the *Madera Area Soil Survey*, Schmidt Creek is portrayed as an unnamed intermittent stream that may have been contiguous with Dry Creek (Figure 3). The actual course of the stream may have flowed through various washes across the property, based on the distribution of Tujunga soils on site. Schmidt Creek appeared to terminate on the Brown Property according to the 1961 Kismet USGS quadrangle map, further suggesting the creek flows were highly ephemeral or that the creek course separated into various washes. The larger scale (1:250,000) Monterey USGS quadrangle also depicts Schmidt Creek as an unnamed watercourse which terminated just upstream of Highway 99. Despite the previously isolated nature of Schmidt Creek, it is now connected to downstream Waters of the U.S., and is expected to flow up to 20 cubic feet per second following winter

storms (pers. comm. Dennis Savala, Madera Irrigation District). The flows in Schmidt Creek are expected to be largely attributable to storm water runoff from the adjacent development upstream of the property, as well as irrigation runoff.

- An iron-silica hardpan underlies the entire site (Photo 2) and forms the ditch bottom which lies approximately three feet below the surrounding grade and is bordered by sandy spoils dredged from the creek course (Photo 3). The hardpan is partially obscured in reaches of the creek by sands deposited up to 18 inches deep. The hardpan slows or prevents downward percolation of incident rainfall, and storm water and irrigation runoff. This causes saturation and inundation to occur in areas of the site where the depth to the hardpan is relatively shallow.
- Schmidt Creek is transected by at least two irrigation canals, including the Airport Road ditch along Road 23 forming the western project boundary (Photo 4), and the 24-2 canal that is located approximately one mile upstream of the Brown Property. The Airport Road ditch passes under Schmidt Creek through a concrete vault structure (Photo 5), while the 24-2 canal is siphoned under the creek; the 24-2 canal is depicted on the Kismet quadrangle (Figure 2). Therefore, neither the Airport Road ditch nor the 24-2 canal is contiguous with Schmidt Creek (pers. comm. Dennis Savala, Madera Irrigation District).

AREAS MEETING THE REGULATORY DEFINITION OF JURISDICTIONAL WATERS

A) Identification of Section 404 Potential Jurisdictional Wetlands (Special Aquatic Sites)

Potential Section 404 jurisdictional wetlands (approximately 1.69 acres) were identified and mapped within various sections of Schmidt Creek, and along a portion of the former Schmidt Creek watercourse (Figure 5). The potential wetlands within Schmidt Creek comprise low freshwater emergent marsh, while the potential wetlands outside the creek course are seasonal in nature. For the purpose of this delineation, wetland determination was based on the three parameters of hydrophytic vegetation, wetland hydrology, and hydric soils, as per the methods for delineating under "normal circumstances," as described above. As such, all three parameters identifying Section 404 wetlands were observed at four out of eight sample points (SP) including SP2, SP3, SP7, and SP8 (Appendix C). Hydrophytic vegetation was absent in the remaining sample point areas, though indicators of wetland hydrology and/or hydric soils were sometimes present. The eight sample point locations are depicted in Figure 5.

Vegetation. Approximately 0.95 acres of freshwater emergent marsh wetland habitat is present in two reaches of Schmidt Creek. These include the north-south reach parallel to Road 23, and in the eastern-third of the creek alignment (Photo 6). These reaches are dominated by creeping spikerush (*Eleocharis macrostachya*; OBL), Baltic rush (*Juncus balticus*; OBL), and watercress (*Rorippa nasturtium-aquatica*; OBL). Less dominant hydrophytic species occurring within the creek bed include common monkeyflower (*Mimulus guttatus*; OBL), coast popcorn-flower (*Plagiobothrys undulatus*; FACW+), and Himalayan knotweed (*Polygonum polystachyum*; FAC). Sandbar willows (*Salix exigua*; OBL) and Fremont cottonwoods (*Populus fremontii*; FACW) are also growing in a few areas of the creek bottom but do not form contiguous riparian habitat (Photo 7). Approximately 0.74 acres of seasonal wetland occurs within a low area of the historical creek course, and is dominated by Mediterranean barley (*Hordeum marinum* ssp.

gussoneanum; FAC), toad rush (*Juncus bufonius*; FACW+), and slender popcorn-flower (*Plagiobothrys stipitatus*; OBL) (Photo 8).

Hydrology. Standing water was observed as isolated ponds in the creek bed and was up to 24 inches deep (Photo 3). The water is perched by the underlying hardpan, and causes adjacent areas of deposited sands to remain saturated for extended periods during the winter, allowing hydrophytes to become established (Photo 9). Drift lines and water marks also exist within the creek bed, but water is only expected to flow in the creek temporarily following storm events. Scouring and shifting of deposited sands in the creek bed during flash flows may cause the distribution of wetlands within the creek to change from year to year. Elsewhere, areas of the former creek course supporting seasonal wetland habitat were found to be highly saturated, and have standing water in the soil sample pits. These areas were somewhat lower in elevation compared to the rest of the project site, and only lie approximately 1-foot above the elevation of the creek bed. As such, the depth to the hardpan is relatively shallow, and the saturation of these areas is attributable to the perching of incident rainfall by the underlying hardpan.

Soils. The presence of the underlying dark brown (7.5YR 3/4) iron-silica hardpan (Photo 2) served as the primary hydric soil criteria, since the soils are subject to long duration flooding, particularly where the hardpan depth is shallower (NRCS 2004). While the sandy loams and loamy sands on site were predominantly light brownish gray to very dark grayish brown (10YR 6/2 to 10YR 3/2), many of the areas of potential wetlands have been saturated long enough during the growing season to develop sulfidic odor, also implying the presence of reducing conditions and aquic moisture regime (Photo 9). In addition, the wetlands in Schmidt Creek mostly correspond to the Atwater and San Joaquin soil phases on site, which are considered hydric, were found overlying unbroken hardpan (NRCS 2004). The seasonal wetlands along the former creek course are primarily underlain by the Tujunga soil series that is also considered hydric when overlying hardpan. The soils survey does not identify the Tujunga soil phase occurring on site as having an underlying hardpan, but the presence of one was confirmed in the field, which meets the hydric soil criteria for wetlands occurring along the former creek course.

B) Identification of Other Waters

The ditch across the property is a realignment of the historic Schmidt Creek watercourse that was formerly a natural tributary of Dry Creek. Dry Creek occurs approximately one-half mile to the west of the edge of the property (Figure 2). According to the *Madera Area Soil Survey* aerial photo from 1946, the watercourse was depicted as being contiguous with Dry Creek (Figure 3). However, the 1985 USGS Kismet quadrangle depicts Schmidt Creek as a blue-line stream course terminating on the Brown property. Nevertheless, Schmidt Creek has since been channelized through uplands; it flows into a Waters of the U.S. downstream. Dry Creek has running water at least two feet deep and abundant wetland vegetation year-round (Photo 10).

Schmidt Creek is mostly dry upstream of the project site, except within the long box culvert under Highway 99 which has standing water year-round. As mentioned above, the creek is expected to flow up to 20 cubic feet per second following winter storms (pers. comm. Dennis Savala, Madera Irrigation District). In addition, Schmidt Creek is expected to receive regular stormwater runoff during the winter from upstream residential areas and may occasionally be used to deliver irrigation water as evidenced by two pump stations along its alignment. Because

the realigned course of Schmidt Creek connects two well-defined watercourses, and has an ordinary high water mark, the ditch on site is considered a potential 'other waters.'

Finally, the depth to the underlying hardpan in the former Schmidt Creek low-flow channel (Photos 8 and 11) and adjacent wash areas (Photo 12) of the former watercourse are shallow enough to result in seasonal ponding. The seasonal ponds persist long enough to inhibit the establishment of both hydrophytes and upland species, and prohibit annual tillage (Photo 13), and are therefore also considered potential 'other waters.' The signature of these ponded areas is evident in the photo contained in the soil survey (Figures 3 and 5).

AREAS NOT MEETING THE REGULATORY DEFINITION OF JURISDICTIONAL WATERS

The remainder of the site (approximately 296.49 acres) met none of the regulatory definitions of jurisdictional waters. At the time of the delineation, most of the site had been recently tilled (Figure 5). During the June 2004 site visit, the field was planted to dryland wheat (*Triticum aestivum*) (Photo 14). The density of the wheat precluded the establishment of herbaceous grassland species, though various invasive annual forbs formed large patches within the fields later in the season. These forbs included black mustard (*Brassica nigra*; NOL), charlock (*Sinapsis arvensis*; NOL), wild radish (*Raphanus sativus*; NOL), and rancher's fireweed (*Amsinckia menziesii*; NOL). The perimeter of the property (Photo 15), and untilled irrigation pipe alignments transecting the site were clearly dominated by upland species at the time of the delineation including California brome (*Bromus californicus*; NOL), ripgut brome (*Bromus diandrus*; NI), cheeseweed (*Malva parviflora*; NOL), white-leaf filaree (*Erodium moschatum*; NOL), and Italian rye (*Lolium multiflorum*).

Two isolated depressions underlain by the Atwater and Hanford soils were found in the southern half of the property during the June 2004 site visit. These depressions were previously dominated by seasonal hydrophytes including toad rush, slender popcorn-flower, and rabbitsfoot grass (*Polypogon monspeliensis*; FAC), as well as wheat and other annual grasses and forbs. These areas have since been plowed and are no longer present. A similar area was observed during the delineation at SP 4 that was dominated by Mediterranean barley and Italian rye, and had algal matting over a widespread area (Photo 15). Elsewhere, a small area of irrigated pasture is located next to the ranch home at the east end of the property. This area is also dominated by seasonal hydrophytes, but is expected to revert to uplands in the absence of continued irrigation. Temporary ponding capable of supporting seasonal wetland vegetation or algal matting may occur in isolated upland areas where the depth to the hardpan is slightly reduced due to uneven tillage from year to year, but these areas are not expected to persist. Therefore, no evidence of active hydrology was observed in any of the agricultural areas of the site at the time of the delineation.

Finally, the "Airport Ditch" parallel to Road 23 is an irrigation canal located just inside the western property boundary (Photo 4). The reach of this canal on site is excavated in uplands and is only expected to have artificial hydrology. Standing water was observed in the canal at the time of the survey. The water in this canal is siphoned underneath Schmidt Creek through a vault structure and is not hydrologically connected to the ditch (Photo 5). For these reasons, the canal is not considered potentially jurisdictional.

CONCLUSION

Currently, the 305-acre Brown property includes approximately 8.51 acres of jurisdictional waters. These jurisdictional waters include 0.95 acres of potentially jurisdictional wetlands located in various sections of Schmidt Creek, and 0.74 acres of seasonal wetland habitat in the former Schmidt Creek watercourse. In addition, potentially jurisdictional "other waters" occur as tributary water habitat throughout Schmidt Creek (4.55 acres). Ponding within the former Schmidt Creek watercourse and adjacent "wash" areas (2.27 acres) was observed in these areas. The hydrology supporting these areas is due to perching of incident rainfall, storm water runoff, and ordinary high water flows in various areas of the current and former Schmidt Creek watercourses. Specifically, the underlying hardpan forms the bed of the creek causing areas of deposited sands within the creek to remain saturated for extended periods during the winter, sustaining emergent species well into the growing season. The depth to the underlying hardpan has also remained shallow under the former watercourse since it was dewatered, resulting in extended saturation of these areas that support seasonal hydrophytes. The depth to the hardpan underlying the rest of the site is sufficiently deep enough to prevent perched hydrology from supporting wetland vegetation.

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APPENDIX A.

PLANTS OBSERVED ON THE BROWN PROPERTY

Appendix A. Plants Observed on the Brown Property, Madera County, California.			
FAMILY NAME	**SCIENTIFIC NAME**	**COMMON NAME**	**INDICATOR STATUS**
Boraginaceae	*Amsinckia menziesii*	rancher's fireweed	NOL
	Plagiobothrys stipitatus	slender popcorn-flower	OBL
	Plagiobothrys undulatus	coast popcorn-flower	FACW+
Brassicaceae	*Brassica nigra*	black mustard	NOL
	Raphanus sativus	wild radish	NOL
	Rorippa nasturtium-aquaticum	watercress	OBL
	Sinapis arvensis	charlock	NOL
Cyperaceae	*Eleocharis macrostachya*	creeping spikerush	OBL
Geraniaceae	*Erodium moschatum*	white-leaf filaree	NOL
Juncaceae	*Juncus balticus*	Baltic rush	OBL
	Juncus bufonius	toad rush	FACW
Lythraceae	*Lythrum portula*	water purslane	NOL
Malvaceae	*Malva parviflora*	cheeseweed	NOL
Poaceae	*Avena* sp.	oats	---
	Bromus californicus	California brome	NOL
	Bromus diandrus	ripgut brome	NI
	Hordeum marinum ssp. *gussoneanum*	Mediterranean barley	FAC
	Lolium multiflorum	Italian ryegrass	FAC
	Polypogon monspeliensis	rabbitsfoot grass	FAC
	Triticum aestivum	dryland wheat	NOL
Polygonaceae	*Polygonum polystachyum*	Himalayan knotweed	FAC
	Rumex crispus	curly dock	FACW-
Salicaceae	*Populus fremontii* spp. *fremontii*	Fremont cottonwood	FACW
	Salix exigua	sandbar willow	OBL
Scrophulariaceae	*Mimulus guttatus*	common monkeyflower	OBL

The species are arranged alphabetically by family name for all vascular plants encountered during the plant survey. Plants are also listed alphabetically within each family. In some cases, it was not possible to accurately identify a particular plant to the species level due to the absence of specific anatomic structures required for identification.
NOL = Not on List

APPENDIX B.

SOILS OF THE BROWN PROPERTY

unit IIIw-5; natural land type C_{14}; Storie index rating 13)

Atwater Series

The soils of the Atwater series are well drained and very deep. They were derived from somewhat older, wind-reworked, granitic alluvium and typically occur on the leeward side of present or abandoned stream courses, principally on low terraces. The slopes are typically undulating to gently sloping. The surface soil is coarse textured, but there is enough clay in the subsoil to increase the water-holding capacity and fertility. In places, a hardpan substratum of an older, unrelated soil underlies the profile. Annual grasses and herbs are the principal vegetation.

The related but more recent Delhi soils have no accumulation of clay in the subsoil. They are more rapidly permeable than the Atwater soils and consequently are droughty.

The Atwater soils are used mainly for dryfarmed grain and for range. Wind erosion of fallow fields is a problem. Small areas have been planted to irrigated crops, including cotton, barley, alfalfa, grain sorghum, grapes, and orchard crops.

Atwater loamy sand, 3 to 8 percent slopes (AtB).—This gently sloping soil is found principally along Berenda Creek, but smaller areas are scattered throughout the low terraces and alluvial fans of the Fresno and Chowchilla River systems.

Representative profile:

0 to 24 inches, pale-brown and soft (dark-brown and very friable when moist) loamy sand; slightly acid; very weak, very fine, granular structure when moist, and essentially massive when dry; very low in organic matter.

24 to 39 inches, pale-brown and hard (dark-brown and friable when moist) heavy sandy loam with colloidal coatings; neutral; weak, medium, subangular blocky structure.

39 to 60 inches +, yellowish-brown and slightly hard (dark yellowish-brown and very friable when moist) sandy loam; neutral; massive.

The principal variations are in the depth to and the clay content of the subsoil. The texture of the subsoil ranges from heavy sandy loam to heavy loam or light sandy clay loam.

This soil is well drained. Runoff is slow, and internal drainage is moderately rapid. The rooting zone is very deep, and the available water holding capacity and the natural fertility are moderate. The hazard of erosion, principally by wind, is severe if the soil is improperly cultivated. The soil is free of excess salts and alkali.

Use and management.—This soil is used mostly for dryfarmed grain, principally barley, and for range. A small area is irrigated and used chiefly for cotton, barley, alfalfa, grain sorghum, grapes, and orchard crops.

If dryfarmed this soil is not subject to water erosion, because of the rapid infiltration, but while the soil is fallow wind erosion is frequently severe, and adjacent roads are sometimes covered with sand. In spite of this, surface mulching is not a general practice, apparently because the soil is commonly used in conjunction with soils less susceptible to wind erosion. Wherever surface mulching to control soil drifting is possible, it should prove beneficial.

Commonly, dryfarmed small grain is not fertilized, but in extensive fertilization trials on Atwater soils it has generally shown a response to phosphorus. Nitrogen alone has not increased yields, but small amounts of nitrogen added to phosphorus have resulted in profitable yield increases. Potash has not increased yields.

Irrigated crops on Atwater soils are most likely to respond to nitrogen. If legumes have been turned under recently, the response to nitrogen is less. Phosphorus has not increased yields of nonleguminous crops, but it and sulfur may benefit legumes. Large heads of water are needed to irrigate this soil; consequently, care is needed to prevent erosion. The contour check method of irrigation is least likely to cause erosion. (Capability unit IIe-4; natural land type A_5; Storie index rating 68)

Atwater loamy sand, 0 to 3 percent slopes (AtA).—This soil is similar to Atwater loamy sand, 3 to 8 percent slopes, except for having more gentle slopes. Runoff is very slow.

Use and management.—This soil is used for the same crops as Atwater loamy sand, 3 to 8 percent slopes, but a larger proportion has been leveled and irrigated. Deep cuts have been made in places. As a result, the surface soil is variable in thickness, and the subsoil and, in places, the parent material are exposed. Because of this, the growth of crops is uneven, and such differences may persist for a considerable period after leveling. (Capability unit IIe-4; natural land type A_5; Storie index rating 76)

Atwater loamy sand, moderately deep and deep over hardpan, 3 to 8 percent slopes (AwB).—This soil is similar to Atwater loamy sand, 3 to 8 percent slopes, except that it is underlain, generally at depths of 40 to 50 inches, by a hardpan, or semiconsolidated substratum, similar to that underlying the San Joaquin and Madera soils. In a few places, the depth to the hardpan is as little as 18 inches, usually as a result of leveling. The root zone is moderately deep to deep. Where the hardpan is at a moderate depth, the water-holding capacity is somewhat reduced.

Use and management.—This soil is used in much the same way as Atwater loamy sand, 3 to 8 percent slopes. It cannot be leveled and irrigated so readily, because of the restricted depth to the hardpan. Yields are more variable. Care must be taken to prevent overirrigation, which can result in waterlogging and the formation of a temporary perched water table. (Capability unit IIIe-4; natural land type A_{11}; Storie index rating 65)

Atwater loamy sand, moderately deep and deep over hardpan, 0 to 3 percent slopes (AwA).—Except for having gentler slopes, this soil is similar to Atwater loamy sand, moderately deep and deep over hardpan, 3 to 8 percent slopes. Runoff is very slow.

Use and management.—This soil is used in about the same way as Atwater loamy sand, moderately deep and deep over hardpan, 3 to 8 percent slopes. Many areas have been leveled and irrigated. This soil is best suited to shallow-rooted row and forage crops. Trees and vines grow somewhat unevenly because of the variable depth to the unrelated substratum. Care must be taken when irrigating to prevent waterlogging. (Capability unit IIIe-4; natural land type A_{11}; Storie index rating 72)

Chino soils. They are more strongly calcareous and more strongly affected by salts and alkali than the Temple soils. They lack the lime-silica hardpan that is typical of the Pozo soils. They have a thinner surface soil than the Chino soils, are more strongly affected by salts and alkali, and have more lime in the subsoil.

These soils are used mostly for range, but some areas have been leveled and planted to cotton, alfalfa, and grain sorghum. Yields are fair except where all the surface soil has been removed by leveling and the light-colored, very strongly calcareous subsoil is exposed.

Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes (RtA).—This dark-colored basin soil occupies a considerable acreage at a slightly higher elevation than the Temple soils and at a slightly lower elevation than the Pozo, Chino, and Fresno soils.

Representative profile:

0 to 3 inches, gray and very hard (very dark gray and friable when moist) silt loam; slightly calcareous; mildly alkaline; weak, fine, granular structure; moderately high in organic matter.

3 to 14 inches, gray and very hard (very dark gray and very firm when moist) clay loam; slightly calcareous; moderately alkaline; weak, medium, prismatic and strong, medium, subangular blocky structure; some segregated lime in small nodules and along root channels, the amount increasing with depth; a few strong-brown mottles in places.

14 to 38 inches, light-gray and hard (gray and firm when moist) clay loam; moderately alkaline; weak, fine, subangular blocky structure to massive; very strongly calcareous; hard nodules of lime, mainly at depths of more than 30 inches.

38 to 66 inches +, pale-yellow and slightly hard (light yellowish-brown and friable when moist) stratified loam and sandy loam; moderately calcareous; moderately alkaline; massive.

The thickness and color of the surface soil are somewhat variable. Typically, the surface soil is slightly calcareous, but it is noncalcareous in places. In number and size, the lime nodules in the lower part of the subsoil are variable.

Although this soil developed under poor drainage, almost all of it is now imperfectly drained as the result of the general lowering of the water table by extensive pumping for irrigation. Surface runoff is very slow, and internal drainage is slow. The root zone is deep. The water-holding capacity is high, and natural fertility is moderate. The erosion hazard is slight.

Use and management.—Range is the principal use. Because of the salts and alkali, only the most tolerant grasses, herbs, and shrubs will grow. Reclamation requires large quantities of water to leach the salts from the profile.

If reclaimed, this soil can be used for irrigated pasture and probably for salt- and alkali-tolerant crops, such as cotton, alfalfa, and sugar beets. Nonleguminous crops probably benefit most from nitrogen, and legumes from phosphorus. Leveling that exposes the light-colored, very strongly calcareous lower subsoil is not advisable. Crops growing on exposed subsoil are likely to require large amounts of both nitrogen and phosphorus, and some crops, such as grain sorghum, are likely to be chlorotic because of iron deficiency. (Capability unit IVw–6; natural land type $B_{2\text{-}2a}$; Storie index rating 26)

Rossi silt loam, moderately saline-alkali, 0 to 1 percent slopes (RsA).—This soil is like Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes, except that the concentrations of salts and alkali are only moderate.

Use and management.—This soil is used in about the same way as Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes, and has similar management problems. Somewhat smaller quantities of water are sufficient to leach the excess salts. (Capability unit IVw–6; natural land type $B_{2\text{-}2m}$; Storie index rating 51)

Rossi silt loam, slightly saline-alkali, 0 to 1 percent slopes (RrA).—Slight concentrations of salts and alkali characterize this soil, which is otherwise similar to Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes.

Use and management.—This soil is used in about the same way as Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes. The same methods of reclamation are applicable, but somewhat smaller amounts of water are sufficient. Some of the more salt- and alkali-tolerant crops, such as cotton, alfalfa, and sugar beets, can be grown, but irrigated pasture is probably the best use. (Capability unit IIIs–6; natural land type $B_{2\text{-}2s}$; Storie index rating 73)

Rossi clay loam, slightly saline-alkali, 0 to 1 percent slopes (RoA).—This soil has slower infiltration and slower internal drainage than Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes.

Use and management.—This soil is used in about the same way as Rossi silt loam, slightly saline-alkali, 0 to 1 percent slopes, and has similar management and reclamation problems. Because of the somewhat slower infiltration, however, somewhat larger quantities of water and a longer period of time are required for reclamation. (Capability unit IIIs–6; natural land type $B_{2\text{-}2s}$; Storie index rating 62)

Rossi clay loam, strongly saline-alkali, 0 to 1 percent slopes (RpA).—Except for finer surface texture and somewhat slower infiltration, this soil is similar to Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes; and, except for stronger salt and alkali concentration, it is similar to Rossi clay loam, slightly saline-alkali, 0 to 1 percent slopes.

Use and management.—This soil is all in range. It is managed in the same way as Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes, and can be reclaimed by the same methods. Because of finer surface texture and slower infiltration, reclamation is somewhat slower. Improvement of this soil should only be undertaken under the most favorable economic conditions. (Capability unit IVw–6; natural land type $B_{2\text{-}2a}$; Storie index rating 22)

San Joaquin Series

The San Joaquin series consists of shallow, iron-silica hardpan soils developed in old alluvium derived mostly from granitic rocks. These soils are extensive. They occupy hummocky, very gently sloping areas and remnants of rolling, dissected alluvial deposits in the old, low terraces. Water may stand in the small intermound areas during wet weather. Internal drainage is restricted by the impervious hardpan. The vegetation is chiefly annual grasses and herbs.

These soils are associated with the much darker colored, fine-textured Alamo soils, which occupy small depressions. They are similar to and associated with the brownish Madera soils. In some places San Joaquin soils

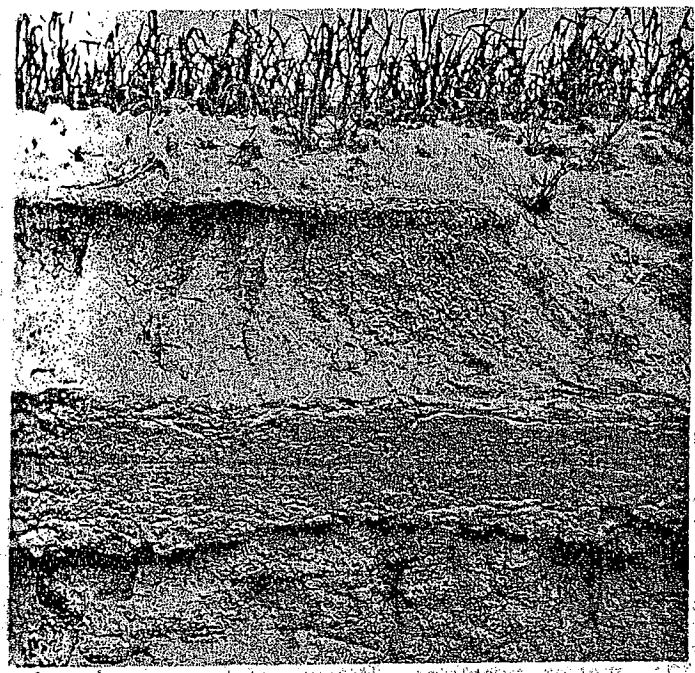

Figure 15.—Profile of San Joaquin sandy loams, 0 to 3 percent slopes.

cap low hills, the side slopes of which are occupied by the Whitney, Rocklin, and Cometa soils.

The San Joaquin soils are used mostly for range and dryfarmed grain. Some areas have been leveled, irrigated, and planted to pasture, cotton, figs, and grapes. Preparing these soils for irrigation is costly because of the hummocky microrelief and the hardpan. Breaking the hardpan is difficult, but in some places it has been broken and removed.

San Joaquin sandy loams, 0 to 3 percent slopes (SoA).—This complex includes fine sandy loam, sandy loam, and coarse sandy loam, so closely associated that separating them was impractical.

Representative profile (fig. 15) of San Joaquin sandy loam:

0 to 5 inches, yellowish-red and very hard (reddish-brown and very friable when moist) sandy loam; medium acid; very weak, very fine, granular structure when moist, and essentially massive when dry; low in organic matter.

5 to 11 inches, yellowish-red and hard (reddish-brown and friable when moist) loam; slightly acid; moderate, fine, subangular blocky structure.

11 to 19 inches, reddish-yellow and extremely hard (yellowish-red and firm when moist) sandy clay with colloidal coatings; slightly acid; medium, fine, blocky structure.

19 to 23 inches, reddish-yellow (red to yellowish-red when moist) hardpan, iron-silica cemented; smooth, very dense, and indurated in upper part; less strongly cemented in lower part; some dark-colored manganese stains; some segregated lime in lower part.

23 to 60 inches, light yellowish-brown and hard (dark yellowish-brown and firm when moist) gritty sandy loam; massive; softly consolidated; neutral to mildly alkaline; few yellowish-red mottles and stains, which are most prominent when soil is moist; less hard and less consolidated with increasing depth.

The color of the surface layer ranges from brown to reddish brown and yellowish red. Because of the hummocky microrelief, the hardpan is variable. It tends to be thinner, softer, and farther below the surface in the mounds and to be thicker, harder, and nearer the surface in the intermound areas. In some intermound areas the soil is finer textured and merges with small bodies of the Alamo soils. Small areas that have a loam surface layer are also included.

Drainage is good; surface runoff is very slow to slow, and internal drainage is very slow. The root zone is shallow, and the moisture-holding capacity and natural fertility are low. The erosion hazard is slight.

Use and management.—Range and dryfarmed grain are the principal uses of these soils. In some places, the surface has been leveled and the hardpan has been broken with heavy equipment or explosives. Such areas are used for irrigated crops, including pasture, alfalfa, cotton, figs, and grapes. Even where the hardpan has been removed, it is best to grow shallow-rooted crops because the substratum is softly consolidated. Pasture of shallow-rooted grasses and legumes is one of the best uses for irrigated areas, and ladino clover is one of the best suited legumes.

Fertility trials indicate that these soils are deficient in nitrogen, phosphorus, and, for legumes, sulfur. Under irrigation, legumes respond to phosphorus and sulfur; other crops respond to nitrogen and probably require phosphorus at the higher levels of production. Dryfarmed grain responds to phosphorus, alone or with small amounts of nitrogen. Range legumes are benefited by applications of phosphorus and sulfur, and the legumes supply the nitrogen needed by the grasses. (Capability unit IVs–3; natural land type C_{18}; Storie index rating 27)

San Joaquin-Alamo complex, 0 to 3 percent slopes (SbA).—This complex consists of small areas of Alamo clay within an area of San Joaquin sandy loams.

Use and management.—These soils are used principally for range and dryfarmed grain. They are extremely difficult to manage because of the wide range in texture of the surface layer. Some of the management practices suggested for San Joaquin sandy loams, 0 to 3 percent slopes, and Alamo clay, 0 to 1 percent slopes, are applicable. In most places, some compromise treatment is necessary.

The cost of preparing these soils for irrigation is high, and the benefits are likely to be small. Leveling is of little use unless the hardpan is broken and removed. Even if that is done, crop production may improve very little, because the substratum is softly consolidated. Substantial amounts of fertilizer, principally nitrogen, phosphorus, and sulfur, and possibly some lime are required.

Leveling tends to fill in the areas of Alamo soil and to make the whole complex more like the San Joaquin soil. (Capability unit IVs–3; natural land types C_{13}, C_{14}; Storie index rating 17)

San Joaquin-Whitney sandy loams, 0 to 8 percent slopes (ScB).—This complex consists of small, nearly level remnants of San Joaquin sandy loams capping gently sloping, low hills of Whitney fine sandy loam. The two soils occur in such a complex pattern that separating them was impractical.

Use and management.—This complex is mostly in range and dryfarmed grain. It is more easily managed

than San Joaquin-Alamo complex, 0 to 3 percent slopes. Generally, the management practices suggested for San Joaquin sandy loams, 0 to 3 percent slopes, and Whitney fine sandy loam, 3 to 8 percent slopes, are applicable, though some compromises are necessary. (Capability unit IVe-3; natural land types C_{13}, E_1; Storie index rating 54)

Sesame Series

The Sesame series consists of well-drained soils in the lower foothills of the Sierra Nevada. The parent material weathered from the underlying coarse-grained granitic rocks. These soils are associated with the Vista soils, from which they differ chiefly in having a moderate amount of clay in the subsoil and a dark grayish-brown surface soil. Rock outcrops occur in places. Slopes are gentle to rolling. The vegetation consists of annual grasses and herbs and, in places, scattered oaks.

These soils are used for dryfarmed grain and for range.

Sesame sandy loam, 3 to 8 percent slopes (SyB).—This gently sloping soil is moderately shallow over granitic bedrock. It occurs principally in association with the Vista soils in the lower foothills of the Sierra Nevada.

Representative profile:

0 to 8 inches, dark grayish-brown and hard (very dark grayish-brown and friable when moist) heavy sandy loam; slightly acid; very weak, very fine, granular structure when moist, and essentially massive when dry; low in organic matter.

8 to 17 inches, dark-brown and very hard (dark yellowish-brown and very firm when moist) light sandy clay loam with colloidal coatings; slightly acid; moderate, medium, blocky structure.

17 to 27 inches, dark-brown and very hard (dark yellowish-brown and very firm when moist) light sandy clay loam with colloidal coatings; slightly acid; weak, medium, blocky structure.

27 to 40 inches +, varicolored, mostly slightly weathered, granitic bedrock with some soil material similar to that in layer above; grades into hard granitic bedrock.

The principal variations are in the depth to the subsoil, the amount of clay in the subsoil, and the depth to the parent rock. In places the lower part of the subsoil is sandy clay.

Drainage is good; surface runoff is slow, and internal drainage is moderately slow. The root zone is moderately deep, and the water-holding capacity and natural fertility are moderate. The erosion hazard is slight.

Use and management.—This soil is used for dryfarmed grain and for range. Dryfarmed grain responds to phosphorus, alone or with small amounts of nitrogen. Phosphorus and sulfur are beneficial to range legumes, and the legumes supply nitrogen for the grasses and herbs, thus increasing the quantity and improving the quality of the forage.

If irrigated, these soils would be best suited to legumes and grasses for hay or pasture. The legumes should respond to phosphorus and sulfur. Irrigated small grain and other nonleguminous field crops should respond to nitrogen. (Capability unit IIIe-1; natural land type E_1; Storie index rating 51)

Sesame rocky sandy loam, 3 to 8 percent slopes (SnB).—Except for having outcrops of granitic bedrock, this soil is like Sesame sandy loam, 3 to 8 percent slopes. The depth to bedrock is more variable, but in the rock-free areas the profiles of the two soils are comparable in depth.

Use and management.—This soil is suitable only for range. Cultivation with most kinds of mechanical equipment is difficult, so the possibilities for range improvements are limited. Range use and management are about the same as on Sesame sandy loam, 3 to 8 percent slopes. (Capability unit VIe-4; natural land type E_4; Storie index rating 32)

Sesame loam, 3 to 8 percent slopes (SeB).—Because of its finer textured surface layer, this soil is slightly higher in moisture-holding capacity and natural fertility than Sesame sandy loam, 3 to 8 percent slopes. The bedrock contains less quartz; this fact may partly account for the finer texture.

Use and management.—This soil is used in much the same way and has much the same management problems as Sesame sandy loam, 3 to 8 percent slopes. (Capability unit IIIe-1; natural land type E_1; Storie index rating 45)

Sesame loam, 8 to 15 percent slopes (SeC).—This soil is slightly shallower to bedrock than Sesame loam, 3 to 8 percent slopes. Runoff is medium, and the erosion hazard is moderate.

Use and management.—This soil is used for dryfarmed grain and for range. Range is probably the best use, because of the difficulties and hazards of cultivation. Considerable care is necessary to control erosion. In cultivation, the contour should be followed as closely as possible. Otherwise, this soil can be managed in about the same way as Sesame loam, 3 to 8 percent slopes. (Capability unit IVe-1; natural land type E_1; Storie index rating 43)

Sesame rocky loam, 8 to 15 percent slopes (SkC).—Except for having rock outcrops, this soil is similar to Sesame loam, 8 to 15 percent slopes. Except for having a finer textured surface soil and steeper slope, it is similar to Sesame rocky sandy loam, 3 to 8 percent slopes. The depth to bedrock is more variable, but in rock-free areas the profiles of the two rocky soils are comparable in depth.

Use and management.—This soil is suitable only for range. It can be managed in about the same way as Sesame rocky sandy loam, 3 to 8 percent slopes. (Capability unit VIe-4; natural land type E_4; Storie index rating 31)

Temple Series

The Temple series consists of dark-colored soils derived from mixed but mostly granitic alluvium. These soils occupy low parts of the valley near the San Joaquin River. Before these soils were farmed, periodic flooding and a high water table favored the accumulation of organic matter in the surface soil. Floods are now well controlled by a system of levees and by Friant Dam and Pine Flat Dam. The water table has been lowered by pumping ground water for irrigation and is in most places now too low to affect the soils. A perched water table occurs locally, however, because of overirrigation or lateral seepage above the slowly permeable substratum. The vegetation is grasses, herbs, and, in the swales, some rushes and tules. The saline spots support saltgrass and some salt-tolerant herbs.

fine sandy loam, 3 to 8 percent slopes. Runoff is medium, and the erosion hazard severe.

Use and management.—This soil is used in about the same way as Trigo fine sandy loam, 3 to 8 percent slopes. Precautions should be taken to minimize erosion. Range is probably the best use. (Capability unit IVe-3; natural land type E_5; Storie index rating 27)

Trigo-Cometa sandy loams, 3 to 8 percent slopes (TvB).—This complex consists of small bodies of Trigo and Cometa soils. It was impractical to separate them. The profiles are similar to those described under Trigo fine sandy loam, 3 to 8 percent slopes, and Cometa sandy loams, 3 to 8 percent slopes, respectively.

Use and management.—This complex is used for range and dryfarmed grain. Both soils are low in moisture-holding capacity and fertility, and hence have similar management problems. Grain is likely to respond to phosphorus, alone or with small amounts of nitrogen, and range legumes respond to phosphorus and sulfur. Responses are likely to be comparatively slight and to vary from year to year, depending on rainfall.

If these soils were irrigated, grass-legume pasture or shallow-rooted row and forage crops would be the best crops to grow. Irrigated legumes would respond to phosphorus and sulfur, and other irrigated crops to nitrogen. (Capability unit IVe-3; natural land type E_5; Storie index rating 34)

Tujunga Series

The Tujunga series consists of pale-brown, noncalcareous, coarse-textured, somewhat excessively drained soils derived from granitic sediments deposited on recent alluvial fans and flood plains. The profile is nearly uniform throughout, except for a small amount of organic matter in the surface layer and textural stratification during deposition of the material by swift-moving streams and flood waters. Although Tujunga soils in other areas contain stones and even boulders, those in the Madera Area contain no coarse fragments, except for gravel in the subsoil and substratum. The vegetation is chiefly annual grasses and herbs. Scattered trees grow along the stream courses. The slopes are typically gentle. The soils are free of excess salts and alkali.

Except for having a coarser texture, a lower organic-matter content, and lower moisture-holding capacity, these soils are similar to the Hanford soils, which formed from material derived from similar sources but of finer texture. In places the Tujunga soils occupy narrow, irregular, winding, present or old stream courses that traverse large bodies of the Hanford soils.

The Tujunga soils are used principally for irrigated pasture and for irrigated row, forage, vine, and orchard crops.

Tujunga loamy sand, 0 to 3 percent slopes (TwA).—This soil is similar to the Hanford fine sandy loams in many respects but is coarser textured, lower in organic matter, and lower in moisture-holding capacity. It usually occurs as narrow streaks traversing more extensive areas of Hanford and other soils.

Representative profile:

0 to 11 inches, pale-brown and loose (brown and loose when moist) loamy sand; neutral; single grained; very low in organic matter.

11 to 24 inches, pale-brown and loose (brown and loose when moist), stratified loamy sand and coarse sand; single grain; neutral.

24 to 60 inches, slightly lighter colored, stratified sand, coarse sand, and gravel; neutral; loose; single grained; generally many feet thick.

There is some variation in color, stratification, and organic-matter content. In places the surface soil and subsoil contain small amounts of gravel.

Natural drainage is somewhat excessive; surface runoff is very slow, and internal drainage is very rapid. The moisture-holding capacity and natural fertility are low. The root zone is very deep. The erosion hazard is severe.

Use and management.—Because most of it occurs in narrow, irregular areas, this soil is seldom farmed separately but is used with the surrounding soils, mostly for irrigated pasture, row, forage, vine, and orchard crops. Some operators carry water across the narrow areas by means of flumes or other bridging devices, but wider areas are difficult to cross in this way.

If the areas are large enough, this soil can be treated to correct its deficiencies, but water and fertilizer are needed in large amounts, and applying them is difficult and expensive. Generally, there is a deficiency of zinc for grapes and tree fruits. Many crops are likely to be damaged by nematodes. (Capability unit IIIe-4; natural land type A_5; Storie index rating 56)

Tujunga loamy sand, 3 to 8 percent slopes (TwB).—This soil consists of terrace facings along the major streams. Except for having steeper slopes, it is similar to Tujunga loamy sand, 0 to 3 percent slopes. Surface runoff is slow.

Use and management.—This soil is used mostly for range, but some of it is irrigated and contour planted to vines. Because of the steeper slopes and the low water-holding capacity, it is more difficult to manage than Tujunga loamy sand, 0 to 3 percent slopes. (Capability unit IIIe-4; natural land type A_5; Storie index rating 49)

Tujunga loamy sand, moderately deep and deep over hardpan, 0 to 3 percent slopes (TxA).—This soil consists of 30 to 50 inches of stratified loamy sand over an unrelated hardpan like that in the Fresno, Madera, and San Joaquin soils. Otherwise, it is similar to Tujunga loamy sand, 0 to 3 percent slopes. The root zone is moderately deep to deep.

Use and management.—This soil is farmed with the surrounding soils because it occurs in narrow, winding bodies within areas of other soils. In use and management it is similar to Tujunga loamy sand, 0 to 3 percent slopes, but the loss of irrigation water and nutrients by percolation is somewhat less serious. The hardpan prevents very rapid percolation and is in that respect an asset instead of a liability. Nevertheless, careful irrigation practices are necessary to prevent waterlogging just above the hardpan. (Capability unit IIIe-4; natural land type A_{11}; Storie index rating 45)

Tujunga and Hanford soils, channeled, 0 to 8 percent slopes (TzB).—These soils occur along the major streams,

in wooded or brushy areas subject to frequent flooding. Both the surface soil and the subsoil have a wide range in texture and vary within short distances. The microrelief is channeled because of the shifting of streams, and slopes are variable. The flood hazard is severe.

Use and management.—These soils are used primarily for grazing, but a few small areas have been leveled and used for irrigated field crops. The severe flood hazard and the wide range in texture limits their value for agriculture. (Capability unit IIIe-4; natural land type A_{5-5ch}; Storie index rating 32)

Tujunga loamy sand, moderately deep and deep over silt, 0 to 3 percent slopes (TyA) [5].—This soil is associated with and is similar to Hanford (Ripperdan) fine sandy loam, moderately deep and deep over silt, 0 to 3 percent slopes. It consists of single-grained loamy sand over a silty substratum. The depth to the silty substratum is normally 30 inches but ranges from 20 to 60 inches. Internal drainage is very rapid to the substratum, then slow to very slow. Surface runoff is very slow. The moisture-holding capacity and natural fertility are low, and the erosion hazard is severe.

Use and management.—This soil is used in much the same way as Hanford (Ripperdan) fine sandy loam, moderately deep and deep over silt, 0 to 3 percent slopes. Because of its low moisture-holding capacity and fertility, it is less productive than the associated soil. It needs smaller and more frequent applications of irrigation water and fertilizer. Such special treatment is usually difficult or impossible, because the areas are small and narrow and are surrounded by the Hanford soil and associated soils. If irrigation water flows across narrow areas of Tujunga soils, large quantities of water can be lost. To minimize the loss of water, fields should be arranged so that it will not be necessary to convey water across the Tujunga soil. If this is not possible, flumes or other bridging devices should be used.

There is generally a deficiency of zinc for grapes and orchard crops. Swabbing the fruiting stubs will correct this deficiency for Malaga grapes but not for the Thompson variety. It is advisable to use special rooting stock to get vines that can obtain moisture and nutrients from a large volume of soil. (Capability unit IIIe-4; natural land type A_{11}; Storie index rating 72)

Visalia Series

The soils of the Visalia series occupy swalelike and other nearly level positions on low, recent alluvial fans and flood plains. These soils were derived from sediments washed from granitic and other micaceous rocks. Under natural conditions they were imperfectly drained and subject to flooding and a periodic high water table, but, as a result of pumping, those in this Area are now mostly moderately well drained. Except for variations resulting from stratification, the profiles are moderately coarse textured and dark colored to considerable depths. The vegetation is mainly annual grasses and herbs and some moisture-loving plants.

These soils are similar to the Grangeville soils but have very little or no mottling in the subsoil and substratum and are typically lime free throughout. They also resemble the Hanford soils in many characteristics but are darker colored, higher in organic matter, and naturally less well drained. In many respects the Visalia soils are transitional between the Grangeville and Hanford soils.

These soils are used extensively for irrigated row, forage, pasture, vine, and orchard crops.

Visalia fine sandy loam, 0 to 1 percent slopes (VcA).—This soil occurs chiefly on low, recent alluvial fans or flood plains, in spots that naturally receive somewhat more moisture than the Hanford and Tujunga soils, the principal associated soils.

Representative profile:

0 to 12 inches, gray to dark-gray and slightly hard (very dark gray to almost black and very friable when moist) fine sandy loam; micaceous; neutral; weak, fine, granular structure when moist, and essentially massive when dry; moderately low in organic matter.

12 to 35 inches, grayish-brown to dark grayish-brown and slightly hard (very dark grayish-brown and very friable when moist) fine sandy loam; micaceous; mildly alkaline; weak, very fine, granular structure when moist, and essentially massive when dry; moderately low in organic matter.

35 to 60 inches, brown and slightly hard (dark-brown and very friable when moist) stratified sandy loam and fine sandy loam; micaceous; moderately alkaline; massive.

Variations in the profile are chiefly the results of stratification. Locally, a very small amount of lime may occur in the subsoil and substratum.

In its natural condition, this soil was imperfectly drained and subject to flooding and periodic high water tables. Extensive pumping has now eliminated the high water tables, and drainage is moderately good. Surface runoff is very slow, and internal drainage is moderately rapid. The root zone is very deep, and the water-holding capacity and natural fertility are moderate. The erosion hazard is slight, and there are no excess salts or alkali.

Use and management.—This soil is suited to many irrigated row, forage, vine, and orchard crops and to irrigated pasture. Legumes respond to phosphorus and sulfur, and other crops to nitrogen. (Capability unit I-1; natural land type A_1; Storie index rating 100)

Visalia sandy loam, 0 to 3 percent slopes (VdA).—This soil is slightly lower in moisture-holding capacity and natural fertility than Visalia fine sandy loam, 0 to 1 percent slopes, but is otherwise similar to it. Internal drainage is rapid.

Use and management.—To compensate for its lower water-holding capacity and natural fertility, this soil needs lighter and more frequent irrigation than Visalia fine sandy loam, 0 to 1 percent slopes, and somewhat more fertilizer. Otherwise, the two soils can be managed in about the same way. (Capability unit I-1; natural land type A_1; Storie index rating 95)

Visalia sandy loam, moderately deep over sand, 0 to 3 percent slopes (VnA).—This soil is similar to Visalia sandy loam, 0 to 3 percent slopes, but it overlies sand at depths of 18 to 36 inches. The water-holding capacity and natural fertility are low.

Use and management.—Managing this soil requires a compromise between the practices suitable for Visalia sandy loam, 0 to 3 percent slopes, and those suitable for

[5] This soil was described under the series name "Ripperdan" in the University of California Soil Survey No. 12, Soils of Madera County, California, and in some other University of California publications.

Hydric Soils

Madera Area, California

[This report lists only those map unit components that are rated as hydric. Dashes (---) in any column indicate that the data were not included in the database. Definitions of hydric criteria codes are included at the end of the report]

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
AsA:					
Alamo clay, 0 to 1 percent slopes	Alamo	85	Depression	Yes	2B3
AwA:					
Atwater loamy sand, moderately deep and deep over hardpan, 0 to 3 percent slopes	Unnamed	2	---	Yes	4
AwB:					
Atwater loamy sand, moderately deep and very deep over hardpan, 3 to 8 percent slopes	Unnamed	2	---	Yes	4
BeA:					
Bear Creek loam, 0 to 3 percent slopes	Unnamed	2	---	Yes	4
BoA:					
Borden loam, slightly saline-alkali, 0 to 1 percent slopes	Unnamed	2	---	Yes	4
BvA:					
Buchenau fine sandy loam, slightly saline-alkali, 0 to 3 percen slopes	Unnamed	2	---	Yes	4
ByA:					
Buchenau fine sandy loam, strongly saline-alkali, 0 to 3 percen slopes	Unnamed	2	---	Yes	4
BzA:					
Buchenau loam, 0 to 3 percent slopes	Unnamed	2	---	Yes	4
CebA:					
Chino clay loam, moderately saline-alkali, 0 to 1 percent slope	Chino	85	Basin floor	Yes	2B3
	Foster	5	---	Yes	2B3
	Rossi	2	---	Yes	2B3, 4
	Temple	2	---	Yes	2B3, 4
CfbA:					
Chino fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes	Chino	85	Basin floor	Yes	2B3
	Rossi	2	---	Yes	2B3, 4
	Temple	2	---	Yes	2B3, 4

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
CgbA: Chino loam, moderately saline-alkali, 0 to 1 percent slopes	Chino	85	Basin floor	Yes	2B3
	Rossi	2	---	Yes	2B3, 4
	Temple	2	---	Yes	2B3, 4
CgcA: Chino loam, strongly saline-alkali, 0 to 1 percent slopes	Chino	85	Basin floor	Yes	2B3
	Rossi	2	---	Yes	2B3, 4
	Temple	2	---	Yes	2B3, 4
CmA: Columbia fine sandy loam, 0 to 1 percent slopes	Columbia	85	Flood plain	Yes	2B3, 4
	Temple	10	---	Yes	2B3, 4
	Riverwash	5	---	Yes	4
CmdA: Columbia fine sandy loam, moderately deep and deep over hardpan 0 to 1 percent slopes	Columbia	85	Flood plain	Yes	2B3, 4
	Riverwash	5	---	Yes	4
CmtA: Columbia fine sandy loam, moderately deep and deep over temple soils, 0 to 1 percent slopes	Columbia	85	Flood plain	Yes	2B3, 4
	Temple	10	---	Yes	2B3, 4
	Riverwaash	5	---	Yes	4
CoA: Columbia loamy sand, 0 to 1 percent slopes	Columbia	85	Flood plain	Yes	2B3, 4
	Tujunga	10	---	Yes	4
	Riverwash	5	---	Yes	4

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
CotA:					
Columbia loamy sand, over temple soils, 0 to 1 percent slopes	Columbia	85	Flood plain	Yes	2B3, 4
	Temple	10	---	Yes	2B3, 4
	Riverwash	5	---	Yes	4
CpA:					
Columbia sandy loam, 0 to 1 percent slopes	Columbia	85	Flood plain	Yes	2B3, 4
	Tujunga	10	---	Yes	4
	Riverwash	5	---	Yes	4
CpdA:					
Columbia sandy loam, moderately deep over sand, 0 to 1 percent slopes	Columbia	85	Flood plain	Yes	2B3, 4
	Tujunga	10	---	Yes	4
	Riverwash	5	---	Yes	4
CrB:					
Columbia soils, channeled, 0 to 8 percent slopes	Columbia soils	75	Flood plain	Yes	2B3, 4
	Riverwash	15	Flood plain	Yes	4
	Tujunga	5	---	Yes	4
CsB:					
Cometa gravelly sandy loam, 3 to 8 percent slopes	Unnamed ponded	2	---	Yes	3
CtB:					
Cometa loam, 3 to 8 percent slopes	Unnamed ponded	2	---	Yes	3
CuA:					
Cometa sandy loams, 0 to 3 percent slopes	Unnamed ponded	2	---	Yes	3
CuB:					
Cometa sandy loams, 3 to 8 percent slopes	Unnamed ponded	2	---	Yes	3
CuC:					
Cometa sandy loams, 8 to 15 percent slopes	Unnamed ponded	2	---	Yes	3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
CwB:					
Cometa-Whitney sandy loams, 3 to 8 percent slopes	Unnamed ponded	2	---	Yes	3
CwC:					
Cometa-Whitney sandy loams, 8 to 15 percent slopes	Unnamed ponded	2	---	Yes	3
CyA:					
Corning gravelly loam, 0 to 3 percent slopes	Unnamed ponded	2	---	Yes	3
CyB:					
Corning gravelly loam, 3 to 8 percent slopes	Unnamed ponded	2	---	Yes	3
DpA:					
Dinuba-El Peco fine sandy loams, slightly saline alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
DsA:					
Dinuba-El Peco fine sandy loams, moderately saline alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
DtA:					
Dinuba-El Peco loams, slightly saline alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
DuA:					
Dinuba-El Peco loams, moderately saline alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
EdA:					
El Peco-Dinuba fine sandy loams, strongly saline alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
FaA:					
Foster clay loam, 0 to 1 percent slopes	Foster	85	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
	Grangeville	5	---	Yes	2A, 4

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
FaaA:					
Foster clay loam, slightly saline-alkali, 0 to 1 percent slopes	Foster	85	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
	Grangeville	5	---	Yes	2A, 4
FabA:					
Foster clay loam, moderately saline-alkali, 0 to 1 percent slopes	Foster	85	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
	Grangeville	5	---	Yes	2A, 4
FacA:					
Foster clay loam, strongly saline-alkali, 0 to 1 percent slopes	Foster	85	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
	Grangeville	5	---	Yes	2A, 4
FbA:					
Foster loams, 0 to 1 percent slopes	Foster	45	Flood plain	Yes	2B3
	Foster	45	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
FbaA:					
Foster loams, slightly saline-Alkali, 0 to 1 percent slopes	Foster	45	Flood plain	Yes	2B3
	Foster	45	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
FbbA:					
Foster loams, moderately saline-Alkali, 0 to 1 percent slopes	Foster	45	Flood plain	Yes	2B3
	Foster	45	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
FbcA:					
Foster loams, strongly saline-Alkali, 0 to 1 percent slopes	Foster	45	Flood plain	Yes	2B3
	Foster	45	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
FbdA:					
Foster loams, sandy substratum, 0 to 1 percent slopes	Foster	45	Flood plain	Yes	2B3
	Foster	45	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
FbeA:					
Foster loams, moderately deep and deep over temple soils, 0 to percent slopes	Foster	45	Flood plain	Yes	2B3
	Foster	45	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4
FcbA:					
Foster loams, moderately deep and deep over temple soils, moderately saline-Alkali, 0 to 1 percent slopes	Foster	45	Flood plain	Yes	2B3
	Foster	45	Flood plain	Yes	2B3
	Chino	5	---	Yes	2B3
	Columbia	5	---	Yes	2B3, 4

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
FdcA:					
Foster-Chino loams, strongly saline alkali, 0 to 1 percent slopes	Chino	40	Basin floor	Yes	2B3
	Foster	40	Flood plain	Yes	2B3
	Columbia	10	---	Yes	2B3, 4
	Grangeville	10	---	Yes	2A, 4
FeaA:					
Fresno and El Peco fine sandy loams, slightly saline-alkali, 0 to 1 percent slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FebA:					
Fresno and El Peco fine sandy loams, moderately saline-alkali, to 1 percent slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FecA:					
Fresno and El Peco fine sandy loams, strongly saline-alkali, 0 to 1 percent slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FfaA:					
Fresno and El Peco loams, slightly saline-alkali, 0 to 1 percen slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FfbA:					
Fresno and El Peco loams, moderately saline-alkali, 0 to 1 percent slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FfcA:					
Fresno and El Peco loams, strongly saline-alkali, 0 to 1 percen slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
FgaA: Fresno, El Peco, and Chino soils, slightly saline-alkali, 0 to percent slopes	Chino	25	Drainageway	Yes	2B3
	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FgbA: Fresno, El Peco, and Chino soils, moderately saline-alkali, 0 t 1 percent slopes	Chino	25	Drainageway	Yes	2B3
	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FhbA: Fresno, El Peco, and Lewis soils, moderately saline-alkali, 0 t 1 percent slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FhcA: Fresno, El Peco, and Lewis soils, strongly saline-alkali, 0 to 1 percent slopes	Pozo	10	---	Yes	2B3
	Playas	1	---	Yes	3
FkaA: Fresno, El Peco, and Pozo soils, slightly saline-alkali, 0 to 1 percent slopes	Pozo	25	Basin floor	Yes	2B3
	Playas	1	---	Yes	3
FkbA: Fresno, El Peco, and Pozo soils, moderately saline-alkali, 0 to 1 percent slopes	Pozo	25	Basin floor	Yes	2B3
	Playas	1	---	Yes	3
GaA: Grangeville fine sandy loam, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GbA: Grangeville fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
GcA:					
Grangeville fine sandy loam, over traver soils, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GdA:					
Grangeville fine sandy loam, over traver soils, slightly saline alkali, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GeA:					
Grangeville fine sandy loam, moderately deep and deep over temple soils, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GfA:					
Grangeville fine sandy loam, deep over hardpan, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GhA:					
Grangeville fine sandy loam, deep over alkali hardpan, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GkA:					
Grangeville fine sandy loam, deep over alkali hardpan, slightly saline-alkali, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GmA:					
Grangeville sandy loam, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
GnA:					
Grangeville sandy loam, slightly saline-alkali, 0 to 1 percent slopes	Grangeville	85	Alluvial fan	Yes	2A, 4
	Foster	5	---	Yes	2B3
HmA:					
Hildreth sandy clay, 0 to 3 percent slopes	Hildreth	85	Fan remnant	Yes	2A, 3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
HnB:					
Hildreth-San Joaquin complex, 0 to 8 percent slopes	Hildreth	35	Fan remnant	Yes	2A, 3
	Unnamed ponded	1	---	Yes	3
HsB:					
Hornitos gravelly sandy loam, 3 to 8 percent slopes	Unnamed	1	---	Yes	3
HsD:					
Hornitos gravelly sandy loam, 8 to 30 percent slopes	Unnamed	1	---	Yes	3
HvD:					
Hornitos very rocky sandy loam, 8 to 30 percent slopes	Unnamed	1	---	Yes	3
JeA:					
Jesbel clay, 0 to 3 percent slopes	Unnamed	1	---	Yes	3
JgB:					
Jesbel gravelly clay, 3 to 8 percent slopes	Unnamed	1	---	Yes	3
JyA:					
Jesbel gravelly clay loam, 0 to 3 percent slopes	Unnamed	1	---	Yes	3
LeA:					
Lewis loam, slightly saline-alkali, 0 to 1 percent slopes	Unnamed	1	---	Yes	3
LwA:					
Lewis loam, moderately saline-alkali, 0 to 1 percent slopes	Unnamed	1	---	Yes	3
MaA:					
Madera fine sandy loam, 0 to 3 percent slopes	Unnamed ponded	1	---	Yes	3
MbA:					
Madera loam, 0 to 3 percent slopes	Unnamed ponded	1	---	Yes	3
McA:					
Madera-Alamo complex, 0 to 1 percent slopes	Alamo	35	Depression	Yes	2B3
	Unnamed ponded	1	---	Yes	3
MdA:					
Madera-Lewis complex, slightly saline alkali, 0 to 1 percent slopes	Unnamed ponded	1	---	Yes	3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
MtB:					
Montpellier coarse sandy loam, 3 to 8 percent slopes	Unnamed ponded	1	---	Yes	3
MtC:					
Montpellier coarse sandy loam, 8 to 15 percent slopes	Unnamed ponded	1	---	Yes	3
PfA:					
Porterville clay, 0 to 3 percent slopes	Unnamed ponded	1	---	Yes	3
PfB:					
Porterville clay, 3 to 8 percent slopes	Unnamed ponded	1	---	Yes	3
PhA:					
Pozo clay loam, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
PkA:					
Pozo clay loam, slightly saline, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
PmA:					
Pozo clay loam, moderately saline, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
PnA:					
Pozo clay loam, strongly saline, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
PoA:					
Pozo loam, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
PsA:					
Pozo loam, slightly saline, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
PtA:					
Pozo loam, moderately saline, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
PvA:					
Pozo loam, strongly saline, 0 to 1 percent slopes	Pozo	85	Basin floor	Yes	2B3
RaA:					
Ramona sandy loam, 0 to 3 percent slopes	Unnamed	1	---	Yes	3
RaB:					
Ramona sandy loam, 3 to 8 percent slopes	Unnamed	1	---	Yes	3
RbA:					
Ramona sandy loam, deep over hardpan, 0 to 3 percent slopes	Unnamed	1	---	Yes	3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
RdA:					
Redding gravelly loam, 0 to 3 percent slopes	Unnamed ponded	1	---	Yes	3
RdC:					
Redding gravelly loam, 3 to 15 percent slopes	Unnamed ponded	1	---	Yes	3
RfC:					
Redding gravelly sandy loam, 3 to 15 percent slopes	Unnamed ponded	1	---	Yes	3
Rh:					
Riverwash	Riverwash	100	Flood plain	Yes	4
RoA:					
Rossi clay loam, slightly saline-alkali, 0 to 1 percent slopes	Rossi	85	Basin floor	Yes	2B3, 4
	Pozo	5	---	Yes	2B3
	Temple	5	---	Yes	2B3, 4
RpA:					
Rossi clay loam, strongly saline-alkali, 0 to 1 percent slopes	Rossi	85	Basin floor	Yes	2B3, 4
	Pozo	5	---	Yes	2B3
	Temple	5	---	Yes	2B3, 4
RrA:					
Rossi silt loam, slightly saline-alkali, 0 to 1 percent slopes	Rossi	85	Basin floor	Yes	2B3, 4
	Pozo	5	---	Yes	2B3
	Temple	5	---	Yes	2B3, 4
RsA:					
Rossi silt loam, moderately saline-alkali, 0 to 1 percent slope	Rossi	85	Basin floor	Yes	2B3, 4
	Pozo	5	---	Yes	2B3
	Temple	5	---	Yes	2B3, 4

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
RtA:					
Rossi silt loam, strongly saline-alkali, 0 to 1 percent slopes	Rossi	85	Basin floor	Yes	2B3, 4
	Pozo	5	---	Yes	2B3
	Temple	5	---	Yes	2B3, 4
SaA:					
San Joaquin sandy loams, 0 to 3 percent slopes	Alamo	4	---	Yes	2B3
	Unnamed ponded	1	---	Yes	3
SbA:					
San Joaquin-Alamo complex, 0 to 3 percent slopes	Alamo	4	---	Yes	2B3
	Unnamed ponded	1	---	Yes	3
ScB:					
San Joaquin-Whitney sandy loams, 0 to 8 percent slopes	Unnamed ponded	1	---	Yes	3
TaA:					
Temple clay, 0 to 1 percent slopes	Temple	85	Basin floor	Yes	2B3, 4
	Columbia	5	---	Yes	4
	Foster	5	---	Yes	2B3
	Rossi	5	---	Yes	2B3, 4
TbA:					
Temple clay loam, 0 to 1 percent slopes	Temple	85	Basin floor	Yes	2B3, 4
	Columbia	5	---	Yes	4
	Foster	5	---	Yes	2B3
	Rossi	5	---	Yes	2B3, 4

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
TcA:					
Temple clay loam, slightly saline, 0 to 1 percent slopes	Temple	85	Basin floor	Yes	2B3, 4
	Columbia	5	---	Yes	4
	Foster	5	---	Yes	2B3
	Rossi	5	---	Yes	2B3, 4
TdA:					
Temple loam, 0 to 1 percent slopes	Temple	85	Basin floor	Yes	2B3, 4
	Columbia	5	---	Yes	4
	Foster	5	---	Yes	2B3
	Rossi	5	---	Yes	2B3, 4
TeA:					
Temple loam, slightly saline, 0 to 1 percent slopes	Temple	85	Basin floor	Yes	2B3, 4
	Columbia	5	---	Yes	4
	Foster	5	---	Yes	2B3
	Rossi	5	---	Yes	2B3, 4
TmA:					
Traver loam, slightly saline-alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
TnA:					
Traver loam, moderately saline alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
ToA:					
Traver loam, strongly saline-alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
TpA:					
Traver-Chino complex, slightly saline alkali, 0 to 1 percent slopes	Chino	40	Basin floor	Yes	2B3
	Playas	1	---	Yes	3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
TrA:					
Traver-Chino complex, moderately saline alkali, 0 to 1 percent slopes	Chino	40	Basin floor	Yes	2B3
	Playas	1	---	Yes	3
TsA:					
Traver, Fresno, and El Peco fine sandy loams, moderately saline alkali, 0 to 1 percent slopes	Playas	1	---	Yes	3
TtA:					
Traver, fresno, el peco fine sandy loams, strongly saline-alkal., 0 to 1 percent slopes	Playas	1	---	Yes	3
TxA:					
Tujunga loamy sand, moderately deep and deep over hardpan, 0 to 3 percent slopes	Unnamed	1	---	Yes	4
TzB:					
Tujunga and Hanford soils, channeled, 0 to 8 percent slopes	Hanford	40	Alluvial fan	Yes	4
	Tujunga	40	Flood plain	Yes	4
VaA:					
Visalia fine sandy loam, 0 to 1 percent slopes	Visalia	85	Alluvial fan	Yes	2A, 4
VdA:					
Visalia sandy loam, 0 to 3 percent slopes	Visalia	85	Alluvial fan	Yes	2A, 4
VnA:					
Visalia sandy loam, moderately deep over sand, 0 to 3 percent slopes	Visalia	85	Alluvial fan	Yes	2A, 4
WfB:					
Whitney fine sandy loam, 3 to 8 percent slopes	Unnamed ponded	1	---	Yes	3
WfC:					
Whitney fine sandy loam, 8 to 15 percent slopes	Unnamed ponded	1	---	Yes	3
WmA:					
Whitney loam, 0 to 3 percent slopes	Unnamed ponded	1	---	Yes	3
WmB:					
Whitney loam, 3 to 8 percent slopes	Unnamed ponded	1	---	Yes	3
WmC:					
Whitney loam, 8 to 15 percent slopes	Unnamed ponded	1	---	Yes	3

Hydric Soils

Madera Area, California

Map symbol and map unit name	Component	Percent of map unit	Landform	Hydric rating	Hydric criteria
WoC:					
Whitney and Rocklin gravelly sandy loams, 3 to 15 percent slope	Unnamed ponded	1	---	Yes	3
WrB:					
Whitney and Rocklin sandy loams, 3 to 8 percent slopes	Unnamed ponded	1	---	Yes	3
WrC:					
Whitney and Rocklin sandy loams, 8 to 15 percent slopes	Unnamed ponded	1	---	Yes	3
WtB:					
Whitney-Trigo fine sandy loams, 3 to 8 percent slopes	Unnamed ponded	1	---	Yes	3
WuA:					
Wunjey very fine sandy loam, slightly saline-alkali, 0 to 1 percent slopes	Unnamed	1	---	Yes	3
WvA:					
Wunjey very fine sandy loam, moderately saline-alkali, 0 to 1 percent slopes	Unnamed	1	---	Yes	3
WxA:					
Wunjey very fine sandy loam, strongly saline-alkali, 0 to 1 percent slopes	Unnamed	1	---	Yes	3
WyB:					
Wunjey very fine sandy loam, strongly saline-alkali, channeled, 1 to 8 percent slopes	Unnamed	1	---	Yes	3, 4

Explanation of hydric criteria codes:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   B. are poorly drained or very poorly drained and have either:
      1.) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
      2.) a water table at a depth of 0.5 foot or less during the growing season if permeability is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
      3.) a water table at a depth of 1.0 foot or less during the growing season if permeability is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

This table lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2002).
The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that

have been converted to other uses should be capable of being restored to wetlands.
Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in "Soil Taxonomy" (Soil Survey Staff, 1999) and "Keys to Soil Taxonomy" (Soil Survey Staff, 1998) and in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).
If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in "Field Indicators of Hydric Soils in the United States" (Hurt and others, 2002).
Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.
Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

References:
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Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.
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Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.
Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.
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APPENDIX C.

USACE DATA FORMS: ROUTINE DETERMINATION FOR THE BROWN PROPERTY

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
1

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Is the area a potential Problem Area? Yes [No]

(If needed, explain on reverse.)

Community ID: Non-native Grassland Perimeter

Transect ID :

Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Bromus californicus*	H	NOL	9.		
2. *Bromus diandrus*	H	NI	10.		
3. *Avena sp.*	H	---	11.		
4. *Sinapis arvensis*	H	NOL	12.		
5. *Malva parviflora*	H	NOL	13.		
6. *Erodium moschatum*	H	NOL	14.		
7. *Lolium multiflorum*	H	NI	15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 0/7 = 0%

Remarks: • Non-native grasses and ruderal species remain around the perimeter of property.
• Vegetation expected to be representative of fields on site, which were recently tilled at the time of the delineation.

HYDROLOGY

Recorded Data (describe in Remarks):

Stream, Lake, or Tide Gauge

Aerial Photographs

Other

No Recorded Data Available

Field Observation:

Depth of Surface Water: none (in.)

Depth to Free Water in Pit: >16 (in.)

Depth to Saturated Soil >16 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

Inundated

Saturated

Water Marks

Drift Lines

Sediment Deposits

Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

Oxidized Root Channels in Upper 12 in.

Water-Stained Leaves

Local Soil Survey Data

FAC-Neutral Test

Other (Explain in Remarks)

Remarks: • No hydrologic indicators observed except very slight ditch/swale topography that does not drain into any particular catchment system.

Sample Number
1

SOILS

Map Unit Name
(Series and Phase) San Joaquin sandy loam, 0-3%

Drainage Class: moderately well drained
Field Observations:
Confirm Mapped Type? [Yes] No

Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-16	Ap	10 YR 3/2	n/a	none	sandy loam

Hydric Soil Indicators:

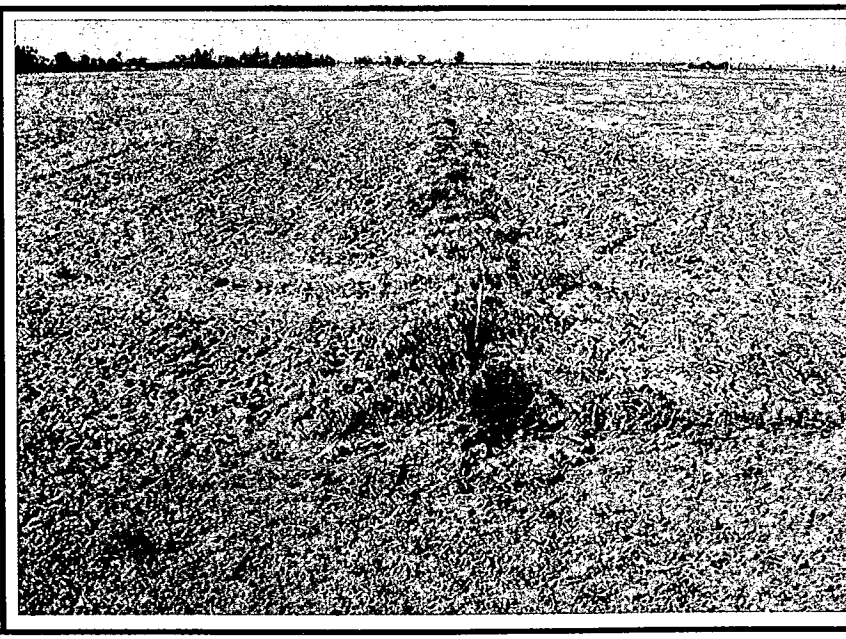
	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions	n/a	Listed on National Hydric Soils List
	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks: • Soil not considered hydric since the depth to hardpan is expected to be too deep to result in extended saturation from perched surface water.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	Yes	[No]
Wetland Hydrology Present?	Yes	[No]
Hydric Soils Present?	Yes	[No]
Is this Sampling Point Within a Wetland?	Yes	[No]

Remarks:
- Sample point located in an area representative of the upland agricultural fields covering most of the site; these fields have been recently tilled but were previously dominated by non-native grasses with some dryland crop species.
- Various strips of agricultural land were avoided during tillage operations in order to avoid damage to underground irrigation pipes.



DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
2

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Community ID: Fresh Water Emergent Wetland in Schmidt Creek Low-flow Channel

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Is the area a potential Problem Area? Yes [No]

(If needed, explain on reverse.)

Transect ID :

Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Eleocharis macrostachya*	H	OBL	9.		
2. *Rumex crispus*	H	FACW-	10.		
3. *Juncus balticus*	H	OBL	11.		
4. *Rorippa nasturtium-aquaticum*	H	OBL	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 4/4 = 100%

Remarks: • Fresh water emergent species scattered to patchy along this north-south reach of Schmidt Creek below OHW mark.
• Polygonum polystachyum occurs within creek, but is not dominant.

HYDROLOGY

Recorded Data (describe in Remarks):

- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observation:

Depth of Surface Water: none (in.)

Depth to Free Water in Pit: 6 (in.)

Depth to Saturated Soil 2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- Inundated
- X Saturated
- X Water Marks
- X Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- Oxidized Root Channels in Upper 12 in.
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- X Other (Explain in Remarks)

Remarks: • Soil is still highly saturated due to presence of underlying hardpan 5 days following last significant rainfall.

Sample Number
2

SOILS

Map Unit Name
(Series and Phase) San Joaquin sandy loam, 0-3%

Drainage Class: moderately well drained
Field Observations:
Confirm Mapped Type? [Yes] No

Taxonomy (Subgroup):

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	A	10 YR 3/2	n/a	none	loamy sand
6+	Cm	7.5 YR 3/4	n/a	none	hardpan

Hydric Soil Indicators:

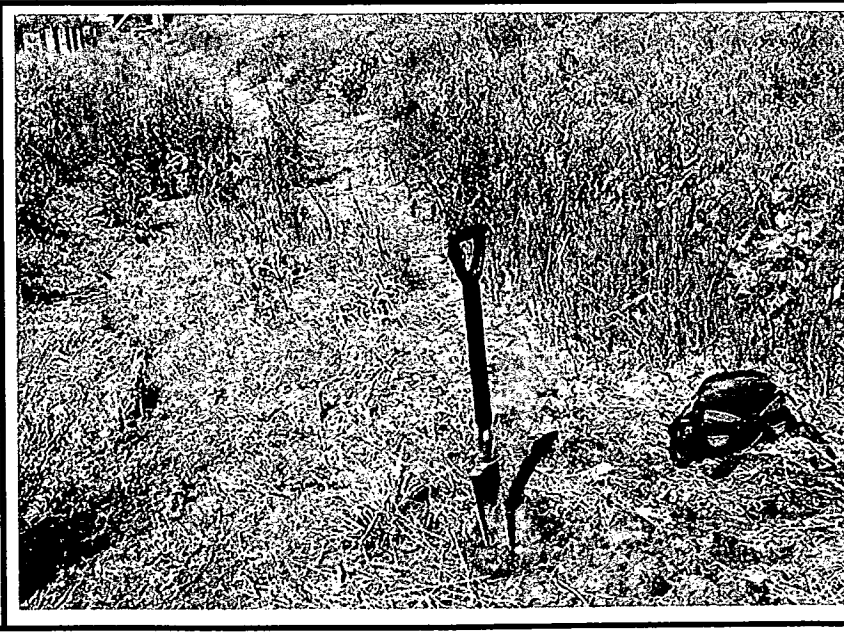
	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions	X	Listed on National Hydric Soils List
	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks:
- Depth to hardpan varies between 2 and 12 inches in this reach of Schmidt Creek, depending on sedimentation.
- Hardpan lies approximately 2 feet below surrounding grade.
- Soil is considered hydric based on capacity of hardpan to cause ponding.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	[Yes]	No
Wetland Hydrology Present?	[Yes]	No
Hydric Soils Present?	[Yes]	No
Is this Sampling Point Within a Wetland?	[Yes]	No

Remarks:
- Sample point located approximately 100 feet upstream of Road 23 Pump Station along creek.
- Despite the flash hydrology that occurs in this creek and its capacity to cause scouring of wetland vegation, the presence of perennial hydrophytes suggests emergent wetland is constantly established even if periodic scouring occurs.
- Fresh water wetland occurring below OHW mark.



DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
3

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Community ID: Fresh Water Emergent Wetland in Schmidt Creek Low-flow Channel

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Is the area a potential Problem Area? Yes [No]

(If needed, explain on reverse.)

Transect ID : _____

Plot ID: _____

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Juncus balticus*	H	OBL	9.		
2. *Salix exigua*	S	OBL	10.		
3. *Rorippa nasturtium-aquaticum*	H	OBL	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 3/3 = 100%

Remarks:
- Fresh water emergent species scattered to patchy along this north-south reach of Schmidt Creek below OHW mark.
- Polygonum polystachyum occurs within creek, but is not dominant.
- Presence of Salix exigua here is isolated and not forming a distinct riparian habitat.

HYDROLOGY

Recorded Data (describe in Remarks):

_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Field Observation:

Depth of Surface Water: none (in.)

Depth to Free Water in Pit: 14 (in.)

Depth to Saturated Soil 2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

_____ Inundated
X Saturated
X Water Marks
X Drift Lines
X Sediment Deposits
X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

_____ Oxidized Root Channels in Upper 12 in.
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
X Other (Explain in Remarks)

Remarks: • Soil is still highly saturated due to presence of underlying hardpan 5 days following last significant rainfall.

Sample Number
3

SOILS

Map Unit Name
(Series and Phase) Atwater loamy sand, moderately deep over hardpan, 0-3%
Taxonomy (Subgroup):

Drainage Class: excessively drained
Field Observations:
Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-3	O	10 YR 2/1	n/a	none	peaty sand
3-16	A	10 YR 4/2	n/a	none	loamy sand

Hydric Soil Indicators:

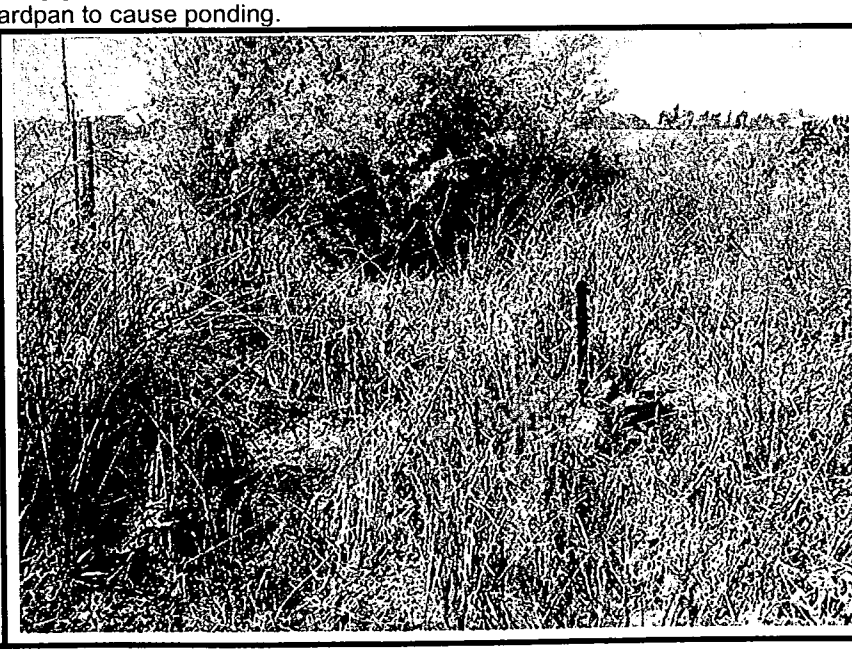
	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime		Listed on Local Hydric Soils List
	Reducing Conditions	X	Listed on National Hydric Soils List
X	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks:
- Presence of humus layer at surface here due to density of fresh water emergent species and annual dieback.
- Depth to hardpan deeper here compared to Sample Point 2. Depth due to increased sedimentation upstream of sandbar willow patch.
- Hardpan lies approximately 2 feet below surrounding grade.
- Soil is considered hydric based on capacity of hardpan to cause ponding.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	[Yes]	No
Wetland Hydrology Present?	[Yes]	No
Hydric Soils Present?	[Yes]	No
Is this Sampling Point Within a Wetland?	[Yes]	No

Remarks:
- Sample point located 300 feet upsream of Road 23 Pump Station.
- Despite the flash hydrology that occurs in this creek and its capacity to cause scouring of wetland vegation, the presence of perennial hydrophytes suggests emergent wetland is constantly established even if periodic scouring occurs.
- Fresh water wetland occurring below OHW mark.



DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
4

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Is the area a potential Problem Area? Yes [No]

(If needed, explain on reverse.)

Community ID: Non-native Grassland

Transect ID :

Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Lolium multiflorum*	H	NI	9.		
2. *Hordeum marinum ssp. gussoneanum*	H	FAC	10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 1/2 = 50%

Remarks: • Mediterranean barley covering large area of single, remaining field in the process of being plowed.

HYDROLOGY

Recorded Data (describe in Remarks):

_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Field Observation:

Depth of Surface Water: none (in.)

Depth to Free Water in Pit: >16 (in.)

Depth to Saturated Soil >16 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

_____ Inundated
_____ Saturated
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
_____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

_____ Oxidized Root Channels in Upper 12 in.
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
X Other (Explain in Remarks)

Remarks: • Algal matting occurs throughout this field, possibly due to temporary ponding above hardpan following significant rainfall events, but the field otherwise has no discernable hydrologic indicators.

Sample Number
4

SOILS

Map Unit Name
(Series and Phase) Atwater loamy sand, moderately deep over hardpan, 0-3%
Taxonomy (Subgroup):

Drainage Class: excessively drained
Field Observations:
Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-6	Ap	10 YR 3/2	n/a	none	sandy loam
6-18+	A	10 YR 4/2	n/a	none	loamy sand

Hydric Soil Indicators:

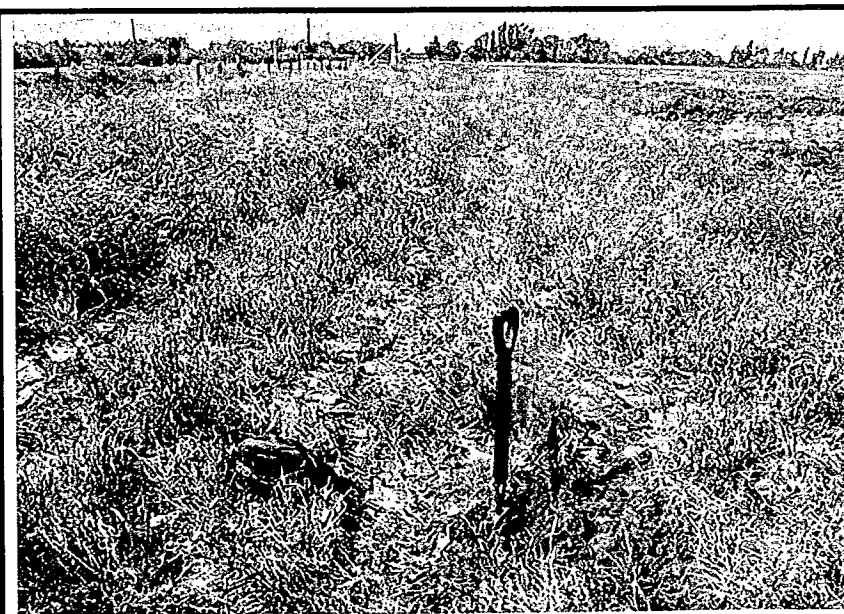
	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
	Sulfidic Odor		Organic Streaking in Sandy Soils
	Aquic Moisture Regime	n/a	Listed on Local Hydric Soils List
	Reducing Conditions		Listed on National Hydric Soils List
	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks: • Soil not considered hydric since the depth to hardpan is expected to be too deep to result in extended saturation from perched surface water.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	Yes	[No]
Wetland Hydrology Present?	Yes	[No]
Hydric Soils Present?	Yes	[No]
Is this Sampling Point Within a Wetland?	Yes	[No]

Remarks: • Sample point located at edge of unplowed field dominated by rye and barley not reminiscent of any wetland habitat.
• Underlying hardpan is sufficiently deep that extended ponding is highly limited.



DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
5

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Is the area a potential Problem Area? Yes [No]

(If needed, explain on reverse.)

Community ID: Schmidt Creek Low-flow Channel

Transect ID :

Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Lythrum portula*	H	NOL	9.		
2. *Mimulus guttatus*	H	OBL	10.		
3. *Plagiobothrys undulatus*	H	FACW+	11.		
4. *Eleocharis macrostachya*	H	OBL	12.		
5. *Polygonum polystachyum*	H	FAC	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). n/a, see remarks

Remarks: • None of the hydrohytic species occurring here are dominant or otherwise forming any contiguous wetland habitat.

HYDROLOGY

Recorded Data (describe in Remarks):

- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observation:

Depth of Surface Water: 24-0 (in.)

Depth to Free Water in Pit: 10 (in.)

Depth to Saturated Soil 2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated
- X Water Marks
- X Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- Oxidized Root Channels in Upper 12 in.
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks: • Isolated ponding in this reach of Schmidt Creek due to perched surface water remaining after upstream flows have ceased since last significant rainfall.
• Algal matting conspicuously absent here.

Sample Number
5

SOILS

Map Unit Name
(Series and Phase) Atwater loamy sand, moderately deep over hardpan, 0-3%
Taxonomy (Subgroup):

Drainage Class: excessively drained
Field Observations:
Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	C	10 YR 4/1	n/a	none	coarse sand
2-16	C	10 YR 6/1	n/a	none	coarse sand
16+	Cm	7.5 YR 3/4	n/a	none	hardpan

Hydric Soil Indicators:

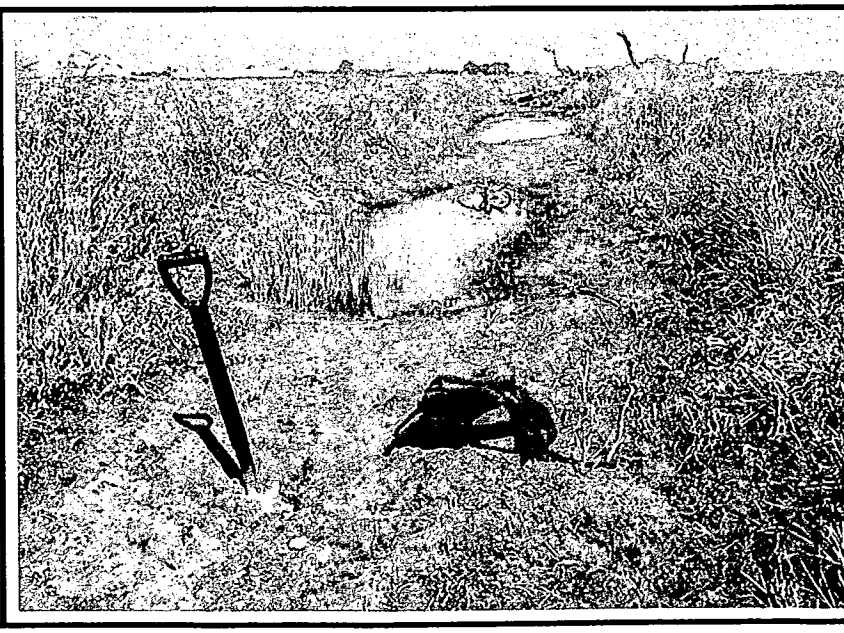
	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
X	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions	X	Listed on National Hydric Soils List
	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks: • This reach of creek bed is subject to longer-duration saturation and ponding, allowing above hydric conditions to develop, but wetland habitat is conspicuously absent, possibly due to low fertility of sands deposited in creek.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	Yes	[No]
Wetland Hydrology Present?	[Yes]	No
Hydric Soils Present?	[Yes]	No
Is this Sampling Point Within a Wetland?	Yes	[No]

Remarks:
- Sample point is located in reach of creek with isolated ponding.
- Hydrophytes are too sparse and scattered to form distinct wetland habitat in this reach of Schmidt Creek.
- There is little evidence that fresh water emergent species have been established here due to paucity of dieback and scoured vegetation. This reach of creek is almost entirely bare with a sandy bottom.



DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
6

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Community ID: Non-native Grassland Depression

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Transect ID : _____

Is the area a potential Problem Area? Yes [No]

Plot ID: _____

(If needed, explain on reverse.)

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1.			9.		
2.			10.		
3.			11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). none

Remarks: • Sample point area is completely devoid of vegation except for Sinapsis arvensis dieback, which is expected to become reestablished later in the season.

HYDROLOGY

Recorded Data (describe in Remarks):

_____ Stream, Lake, or Tide Gauge
_____ Aerial Photographs
_____ Other
_____ No Recorded Data Available

Field Observation:

Depth of Surface Water: none (in.)

Depth to Free Water in Pit: 16 (in.)

Depth to Saturated Soil 6 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

_____ Inundated
X Saturated
_____ Water Marks
_____ Drift Lines
_____ Sediment Deposits
X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

_____ Oxidized Root Channels in Upper 12 in.
_____ Water-Stained Leaves
_____ Local Soil Survey Data
_____ FAC-Neutral Test
X Other (Explain in Remarks)

Remarks: • Hydrology attributable to perching of incident rainfall above underlying hardpan in an isolated depression approximately 1-foot above the elevation of the adjacent creek.
• Extensive algal matting here suggests extending ponding occurred early during season.

Sample Number
6

SOILS

Map Unit Name
(Series and Phase) Atwater loamy sand, moderately deep over hardpan, 0-3%
Taxonomy (Subgroup):

Drainage Class: excessively drained
Field Observations:
Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-4	Ap	10 YR 3/2	n/a	none	loamy sand
4-16+	C	2.5 Y 4/2	n/a	none	coarse sand

Hydric Soil Indicators:

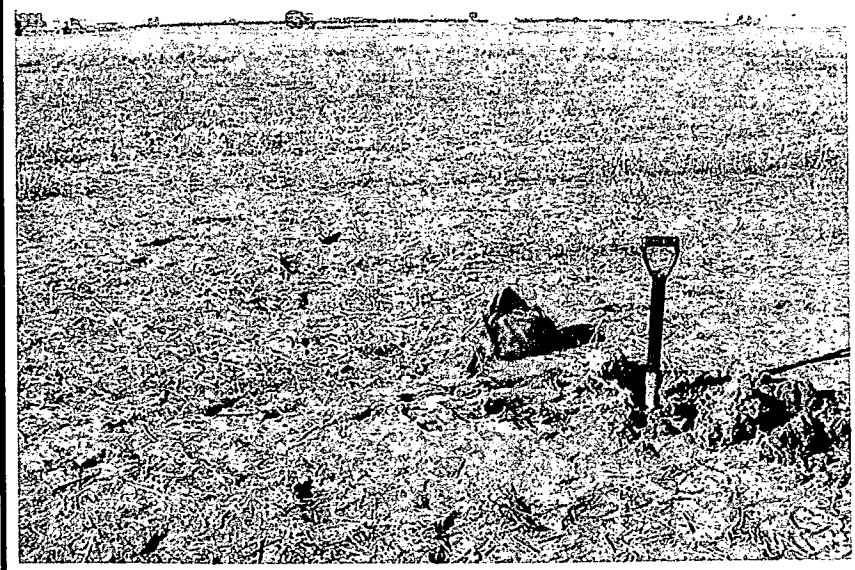
	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
X	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions	X	Listed on National Hydric Soils List
	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks:
- Hydric conditions here similar to those of Sample Point 5.
- This area of ponding is visible in the 1962 soil survey photo of the property.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	Yes	[No]
Wetland Hydrology Present?	[Yes]	No
Hydric Soils Present?	[Yes]	No
Is this Sampling Point Within a Wetland?	Yes	[No]

Remarks:
- Sample point located in an area of Atwater soil slightly lower in elevation than surrounding grade. Lowering of the grade here would result in ponding similar to that currently occurring in the creek.
- Extended duration of saturation in this area combined with infertility of sandy solum likely precludes establishment of wetland vegetation.
- This depressional area has apparently escaped plowing because its texture is unsuitable for tillage and likely remains saturated well into growing season.



DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
7

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Is the area a potential Problem Area? Yes [No]

(If needed, explain on reverse.)

Community ID: Fresh Water Emergent Wetland in Schmidt Creek Low-flow Channel

Transect ID :

Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Eleocharis macrostachya*	H	OBL	9.		
2. *Rumex crispus*	H	FACW-	10.		
3. *Hordeum marinum ssp. gussoneanum*	H	FAC	11.		
4. *Polygonum polystachyum*	H	FAC	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 4/4 = 100%

Remarks:
- Fresh water emergent vegetation is semi-contiguous within the upstream east-west reach of the creek beginning at a small thicket of sandbar willow and Fremont cottonwood growing in the creek bed.
- Willows and cottonwood are not forming contiguous habitat.

HYDROLOGY

Recorded Data (describe in Remarks):

- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observation:

Depth of Surface Water: 12-0 (in.)

Depth to Free Water in Pit: 0 (in.)

Depth to Saturated Soil 0 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated
- X Water Marks
- X Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- Oxidized Root Channels in Upper 12 in.
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- Other (Explain in Remarks)

Remarks:
- Isolated ponding in this reach of Schmidt Creek due to perched surface water remaining after upstream flows have ceased since last significant rainfall.

Sample Number
7

SOILS

Map Unit Name
(Series and Phase) Atwater loamy sand, moderately deep over hardpan, 0-3%
Taxonomy (Subgroup):

Drainage Class: excessively drained
Field Observations:
Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-2	A	10 YR 3/2	n/a	none	loamy sand
2-10	C	2.5 YR 4/2	n/a	none	coarse sand
10+	Cm	7.5 YR 3/4	n/a	none	hardpan

Hydric Soil Indicators:

	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
X	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions	X	Listed on National Hydric Soils List
	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks: • Depth to hardpan more shallow in this reach of Schmidt Creek, and hardpan is entirely exposed in some areas.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	[Yes]	No
Wetland Hydrology Present?	[Yes]	No
Hydric Soils Present?	[Yes]	No
Is this Sampling Point Within a Wetland?	[Yes]	No

Remarks: • Sample point located just upstream of willow/cottonwood thicket, but is representative of most of the upstream east-west reach of the creek, which is variably dominated by fresh water emegent wetlands within the low-flow channel.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Sample Number
8

Project/Site: Brown Property
Applicant/Owner: Analytical Environmental Services
Investigator: A. Dilworth

Date: April 13, 2005
County: Madera
State: California

Do Normal Circumstances exist on the site? [Yes] No

Is the site significantly disturbed (Atypical Situations?) Yes [No]

Is the area a potential Problem Area? Yes [No]

(If needed, explain on reverse.)

Community ID: Seasonal Wetland within Historic Creek Course

Transect ID :

Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Lolium multiflorum*	H	NI	9.		
2. *Hordeum marinum ssp. gussoneanum*	H	FAC	10.		
3. *Plagiobothrys stipitatus*	H	OBL	11.		
4. *Juncus bufonius*	H	FACW+	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 3/4 = 75%

Remarks:
- Former creek course is variable dominated by Lolium multiflorum and Hordeum marinum ssp. gussoneanum with herbaceous wetland species at upper edge of saturated/inundated areas.
- Rumex crispus, Mimulus guttatus, and Lythrum portula all common here, but not dominant.

HYDROLOGY

Recorded Data (describe in Remarks):

- Stream, Lake, or Tide Gauge
- Aerial Photographs
- Other
- No Recorded Data Available

Field Observation:

Depth of Surface Water: 2-0 (in.)

Depth to Free Water in Pit: 10 (in.)

Depth to Saturated Soil 0-2 (in.)

Wetland Hydrology Indicators:

Primary Indicators:

- X Inundated
- X Saturated
- X Water Marks
- Drift Lines
- X Sediment Deposits
- X Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):

- Oxidized Root Channels in Upper 12 in.
- Water-Stained Leaves
- Local Soil Survey Data
- FAC-Neutral Test
- X Other (Explain in Remarks)

Remarks:
- Hydrology attributable to perching of incident rainfall above underlying hardpan in historic creek watercourse approximately 1-foot above the elevation of the adjacent creek.

Sample Number
8

SOILS

Map Unit Name
(Series and Phase) Tujunga loamy sand, 0-3%

Taxonomy (Subgroup):

Drainage Class: excessively drained
Field Observations:
Confirm Mapped Type? [Yes] No

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
0-20	C	10 YR 3/2	n/a	none	coarse sand

Hydric Soil Indicators:

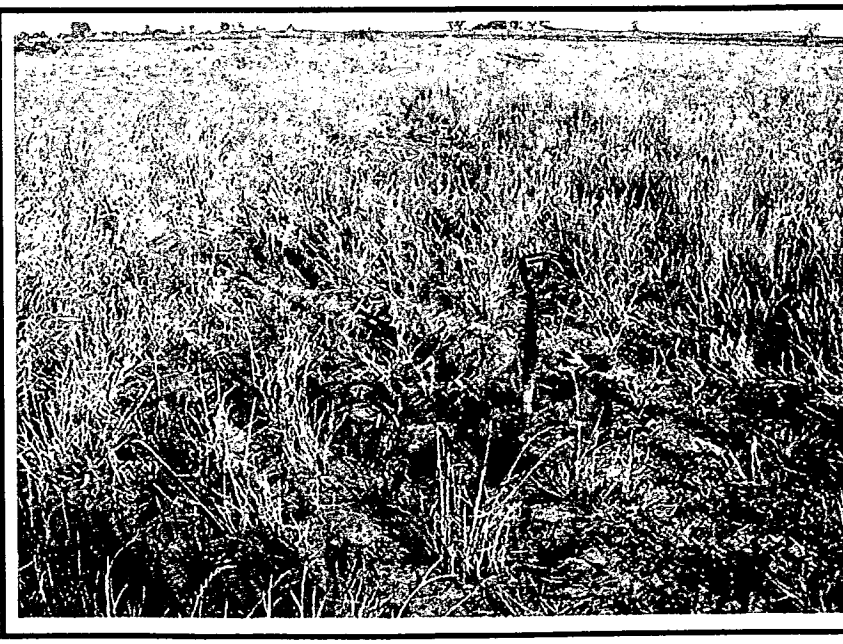
	Histosol		Concretions
	Histic Epipedon		High Organic Content in Surface Layer in Sandy Soils
X	Sulfidic Odor		Organic Streaking in Sandy Soils
X	Aquic Moisture Regime		Listed on Local Hydric Soils List
X	Reducing Conditions	X	Listed on National Hydric Soils List
	Gleyed or Low-Chroma colors		Other (Explain in Remarks)

Remarks:
- Hydric conditions here similar to those of Sample Point 5.
- Historic creek course is visible in the 1962 soil survey photo of the property.

WETLAND DETERMINATION

	(Circle)	
Hydrophytic Vegetation Present?	[Yes]	No
Wetland Hydrology Present?	[Yes]	No
Hydric Soils Present?	[Yes]	No
Is this Sampling Point Within a Wetland?	[Yes]	No

Remarks:
- Sample point located in historic watercourse, which is still evident since the area is unplowable due to soil texture and extended saturation.
- Sample point area is where former creek terminated as a wash on site.
- Extended saturation and inundation combined with soil texture preclude establishment of wetland species along lowest elevation of watercourse.



APPENDIX D.

PHOTOGRAPHS OF THE BROWN PROPERTY

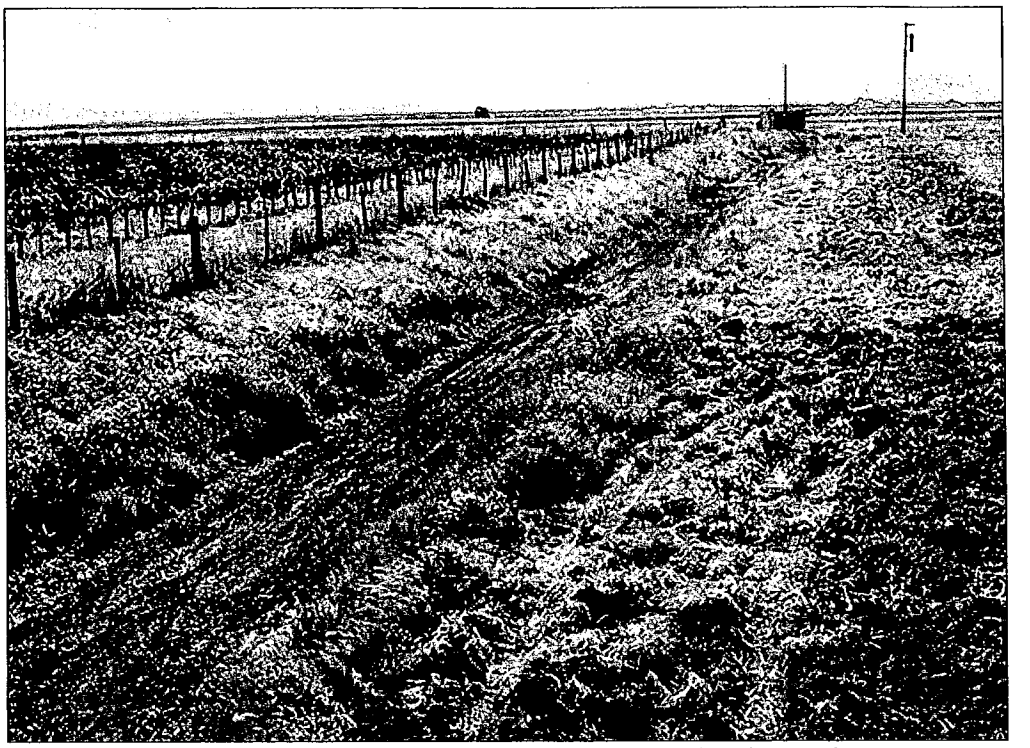


Photo 1. West view of Schmidt Creek channel, along the east-west southern property boundary. The creek bed in this reach of the channel consists of deep sand deposited over an underlying hardpan resulting in perched water with 1 foot of the creek bed.

Photo 2. Close up view of the rusty brown iron-silica hardpan underlying most of the project site. The photo was taken within the Schmidt Creek channel, where the depth to this hardpan varies with the sand deposition.

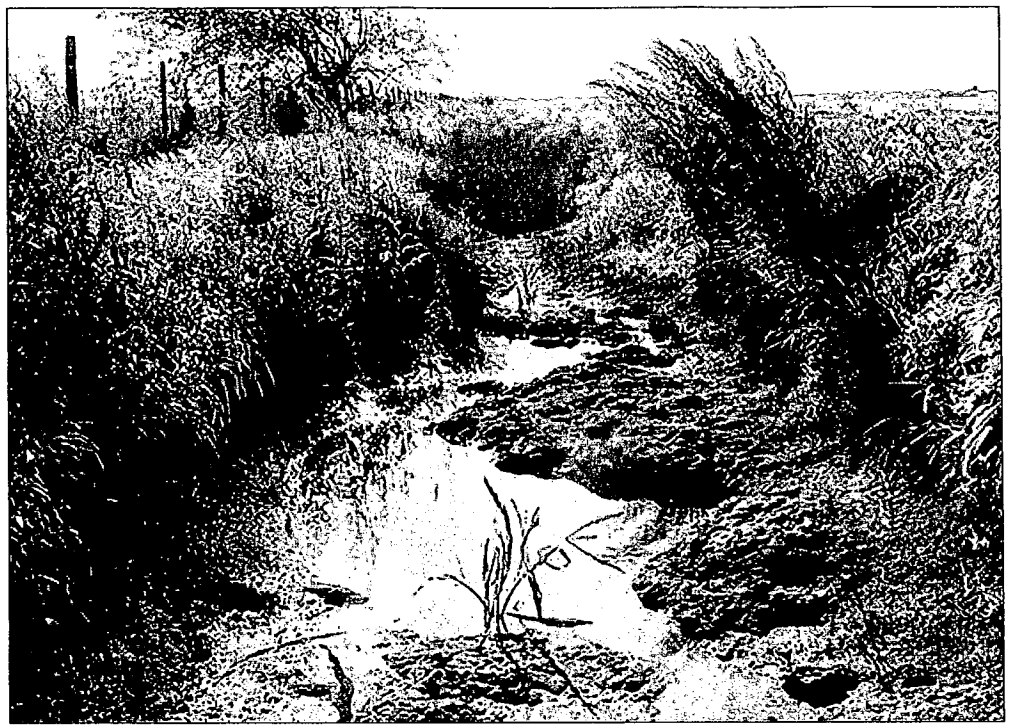


Photo 3. West view of the Schmidt Creek channel, from its upstream end. The hardpan underlying the property is exposed at this location, causing isolated ponding within the channel. Note the freshwater emergent vegetation growing in an area of sand deposition just downstream.

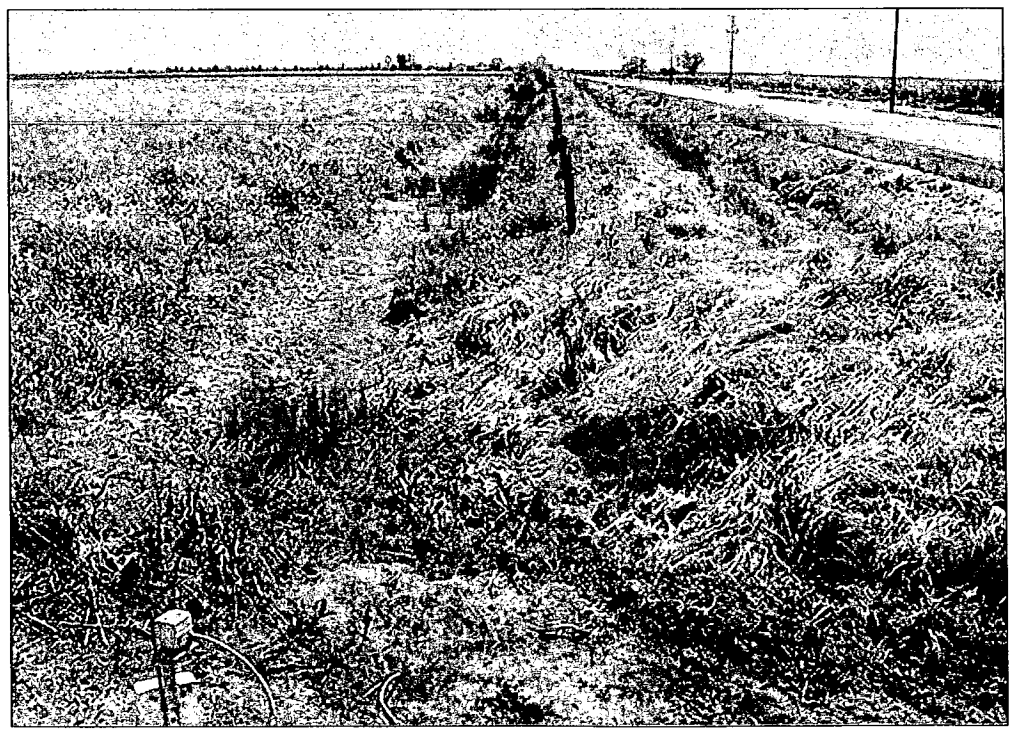


Photo 4. South view of the Schmidt Creek channel (left) and the adjacent Airport Ditch (right), along Road 23. The Airport Ditch is siphoned under the creek through a buried concrete in the right hand side of the photo. Thus, the two features are not contiguous. Note the freshwater emergent vegetation growing in an area of sand deposition just upstream.

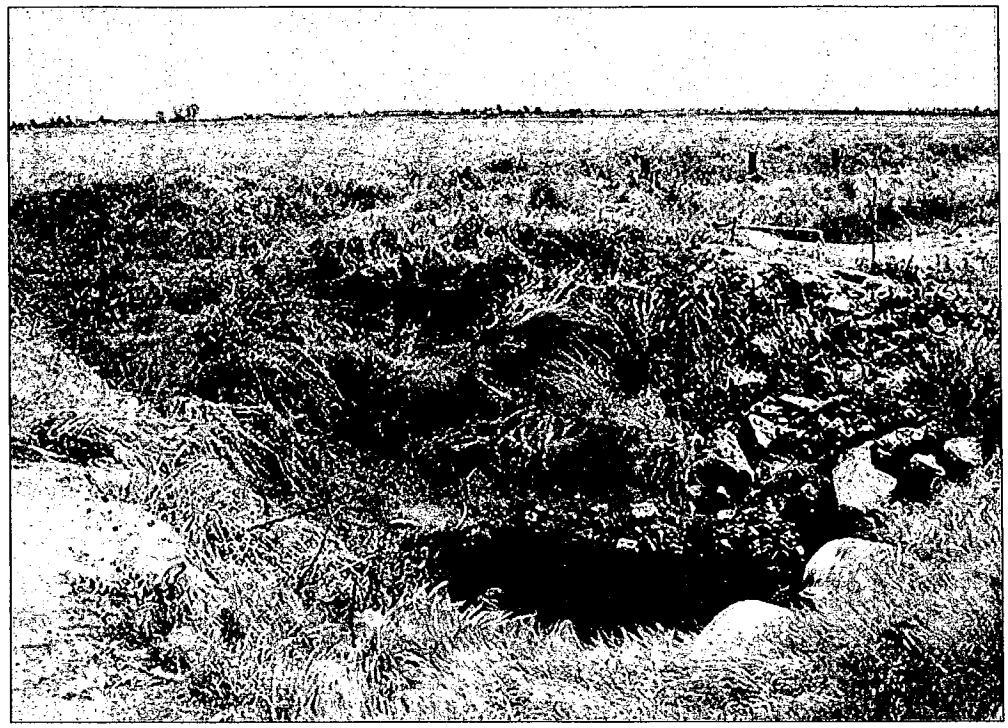


Photo 5. Southeast view of the Schmidt Creek channel as it enters the culverts under Road 23. The headwall of the concrete vault siphon of the Airport Ditch is located in the upper-middle right hand corner of the photo.

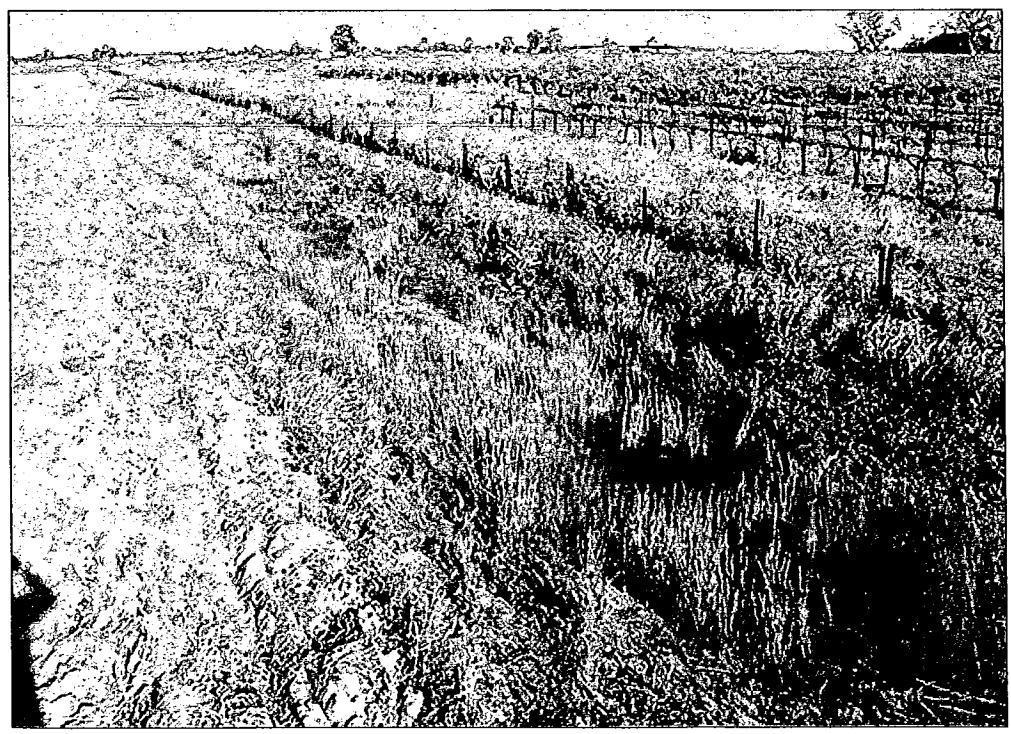


Photo 6. Southeast view of the Schmidt Creek channel, along the east-west southern property boundary. Note the freshwater emergent vegetation and isolated ponding growing in an area of sand deposition throughout this upstream reach of the creek.

Photo 7. Southwest view of the Southeast view of the Schmidt Creek channel, along the east-west southern property boundary. The freshwater emergent vegetation in the channel is a continuation of the wetlands pictures in Photo 6. Note the isolated cottonwood and willow trees in the background. These trees do not form distinct riparian habitat.

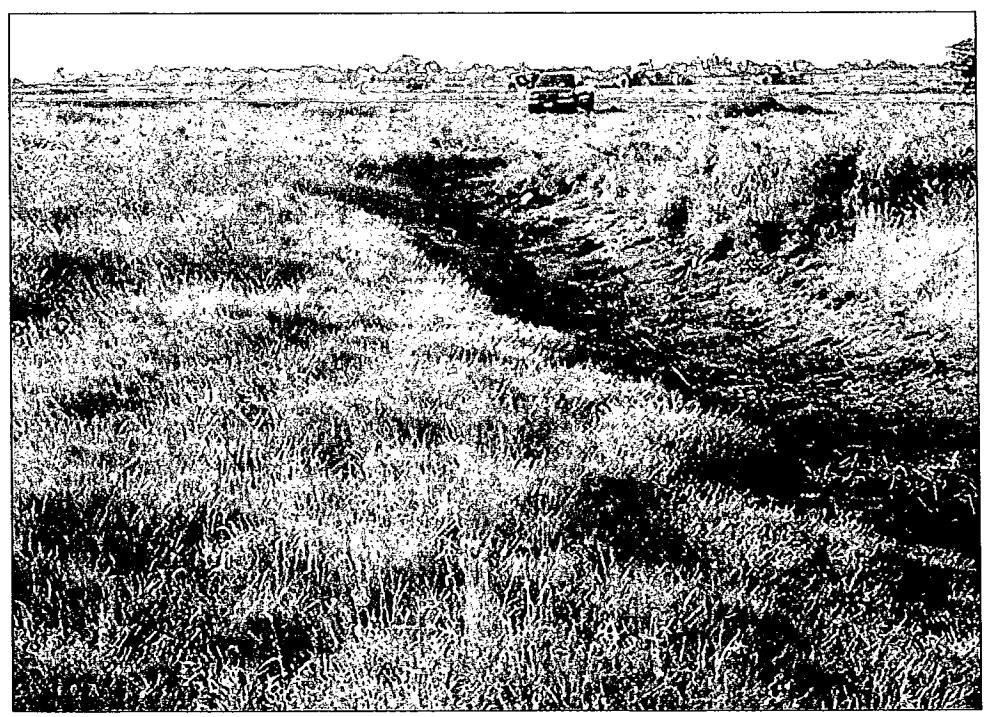


Photo 8. Northwest view of the former watercourse of Schmidt Creek. The edges of the lo-flow channel are dominated by seasonal wetland habitat. The depth to the underlying hardpan has remained shallow in this area, providing adequate hydrology for wetland establishment due to perching of incident rainfall.

Photo 9. Close up view of soil pit of sample point 3, showing perched water and saturated sands which support low freshwater emergent marsh habitat in various reaches of the creek.

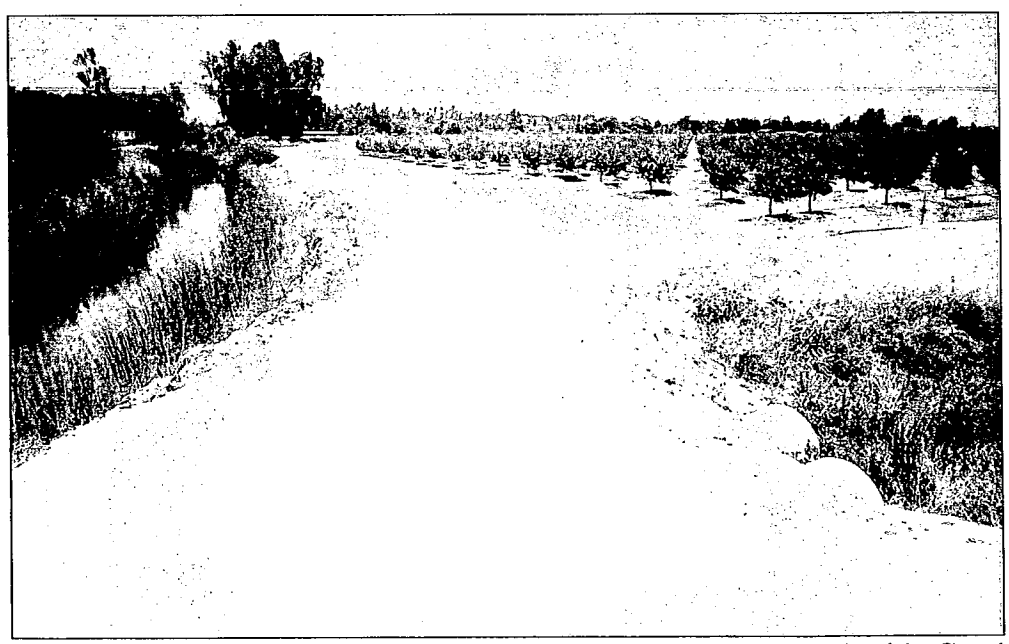


Photo 10. North view of the off-site confluence of the Schmidt Creek channel (right) and Dry Creek (left). Dry Creek is a perennial stream that ultimately flows into the Fresno River.

Photo 11. Southeast view of the former Schmidt Creek watercourse. The low-flow channel is no longer discernable, but the depth to the underlying hardpan remains shallow in this area and the perching of incident rainfall results in extended ponding, inhibiting vegetative growth until much later in the season. Such areas were considered areas of potential 'other water' jurisdiction.

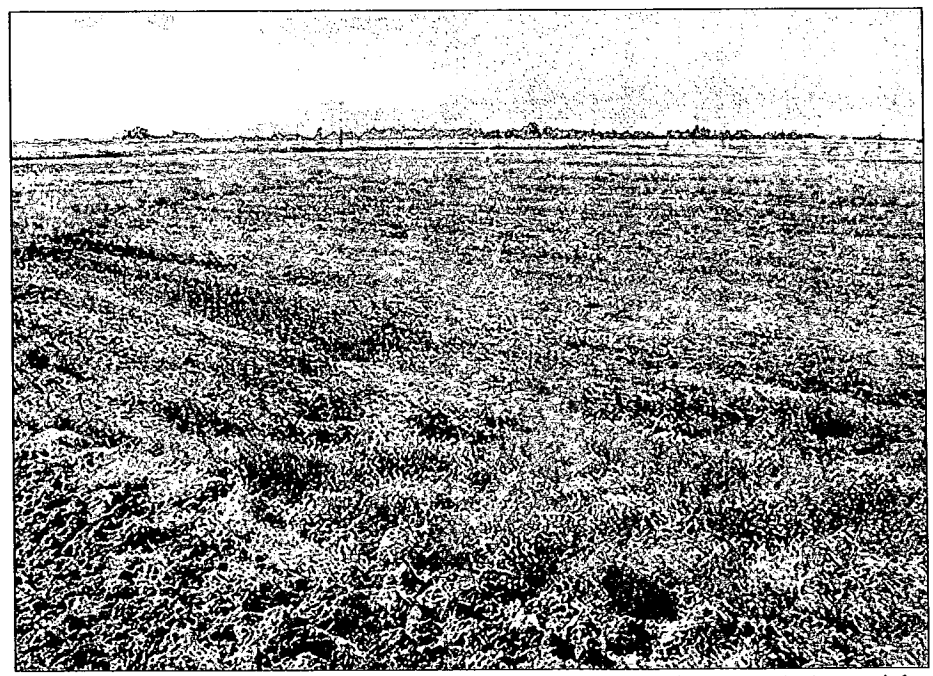


Photo 12. Northwest view of an area of extensive sand deposition (wash), adjacent to the former Schmidt Creek watercourse. This area was completely saturated at the time of the delineation, due to the perching of incident rainfall above the shallow hardpan. Extended ponding is expected to occur in this area during winter. This area was considered potential 'other water' jurisdiction.

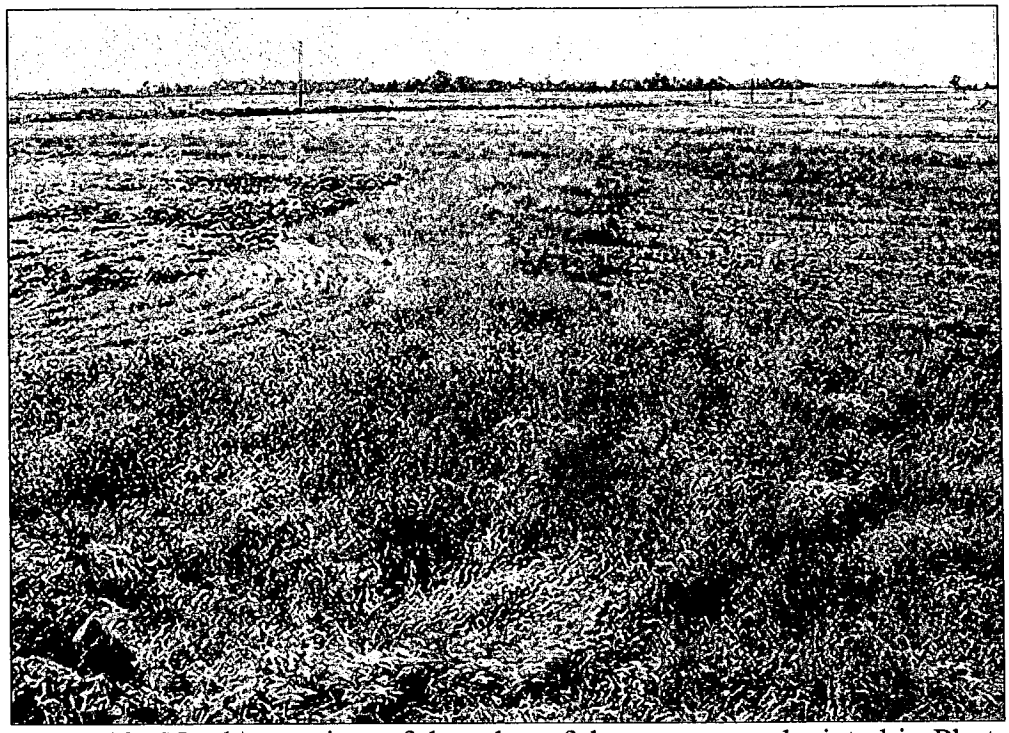


Photo 13. Northwest view of the edge of the same area depicted in Photo 12. Note the break in tillage separating the saturated wash from the adjacent upland. The saturation of the wash prohibits tillage until much later in the year.

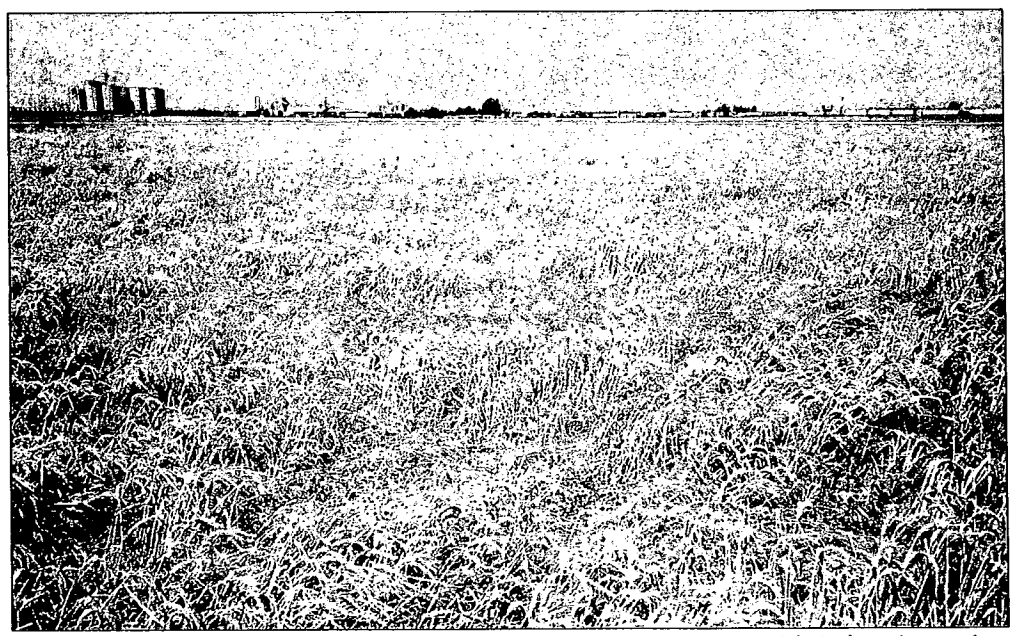


Photo 14. Northeast view of the dryland wheat crop, which is planted to the site later in the spring. This photo was taken in June 2004.

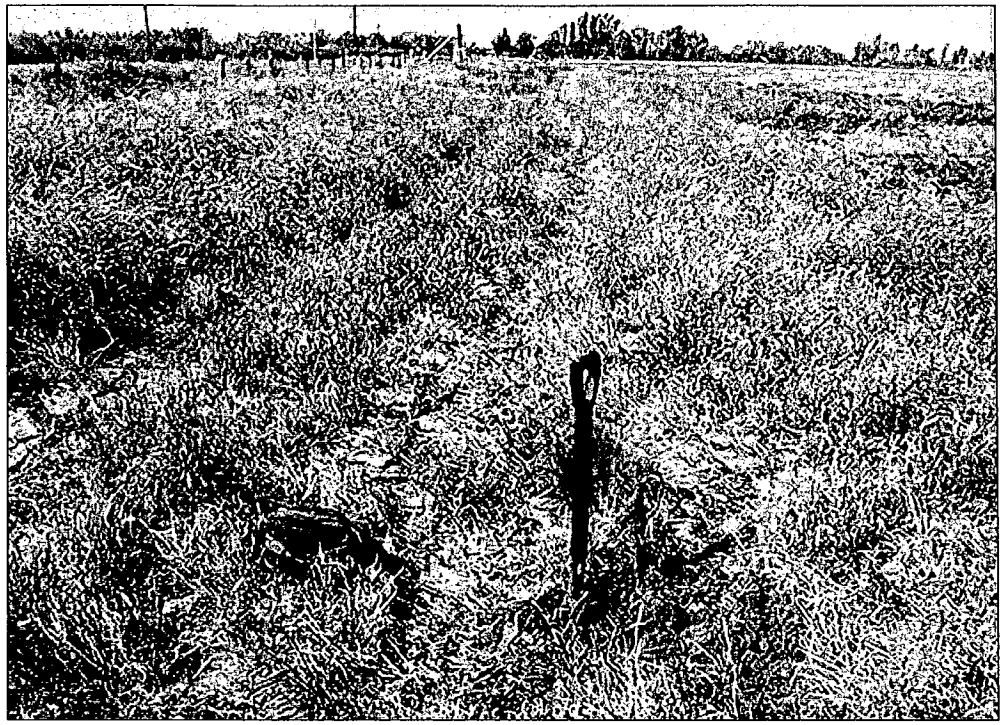


Photo 15. North view of sample point 4. Temporary ponding capable of supporting seasonal wetland vegetation or algal matting may occur in isolated upland areas such as this one where the depth to the hardpan is slightly reduced due to uneven tillage from year to year. These areas are not expected to persist and were not considered potential wetland.