

(DRAFT)
Delineation of Waters of the United States

**Panorama Point
Shasta County, CA**

August 2006



Prepared for:

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DRAFT
DELINEATION OF WATERS OF THE UNITED STATES

Panorama Point
Shasta County, CA
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Introduction and Project Location

As requested, Gallaway Consulting, Inc. performed a delineation of Waters of the U.S. within a 132.3-acre survey area located within Shasta County, California (**Figure 1**). The proposed survey area is located within Section 1, Township 29 North, Range 4 West, of the “Cottonwood, CA” United States Geological Survey (USGS) 7.5-minute quadrangle. Surveys were conducted on June 28 and July 10, 2006 by biologist Chelsea Kramer and botanist Elena Alfieri. The survey involved an examination of botanical resources, soils, hydrological features, and determination of wetland characteristics based on the United States Army Corps of Engineers (COE) Wetlands Delineation Manual (1987).

This report addresses the nature, jurisdictional status, and landscape position of the wetlands on the site; it does not provide information suitable for structural analysis of soils for construction purposes, flood plain delineation, or other purposes not expressly stated. Wetland acreages presented in this report should be considered preliminary, and subject to review and modification by the COE during the wetland delineation verification process.

Site Conditions

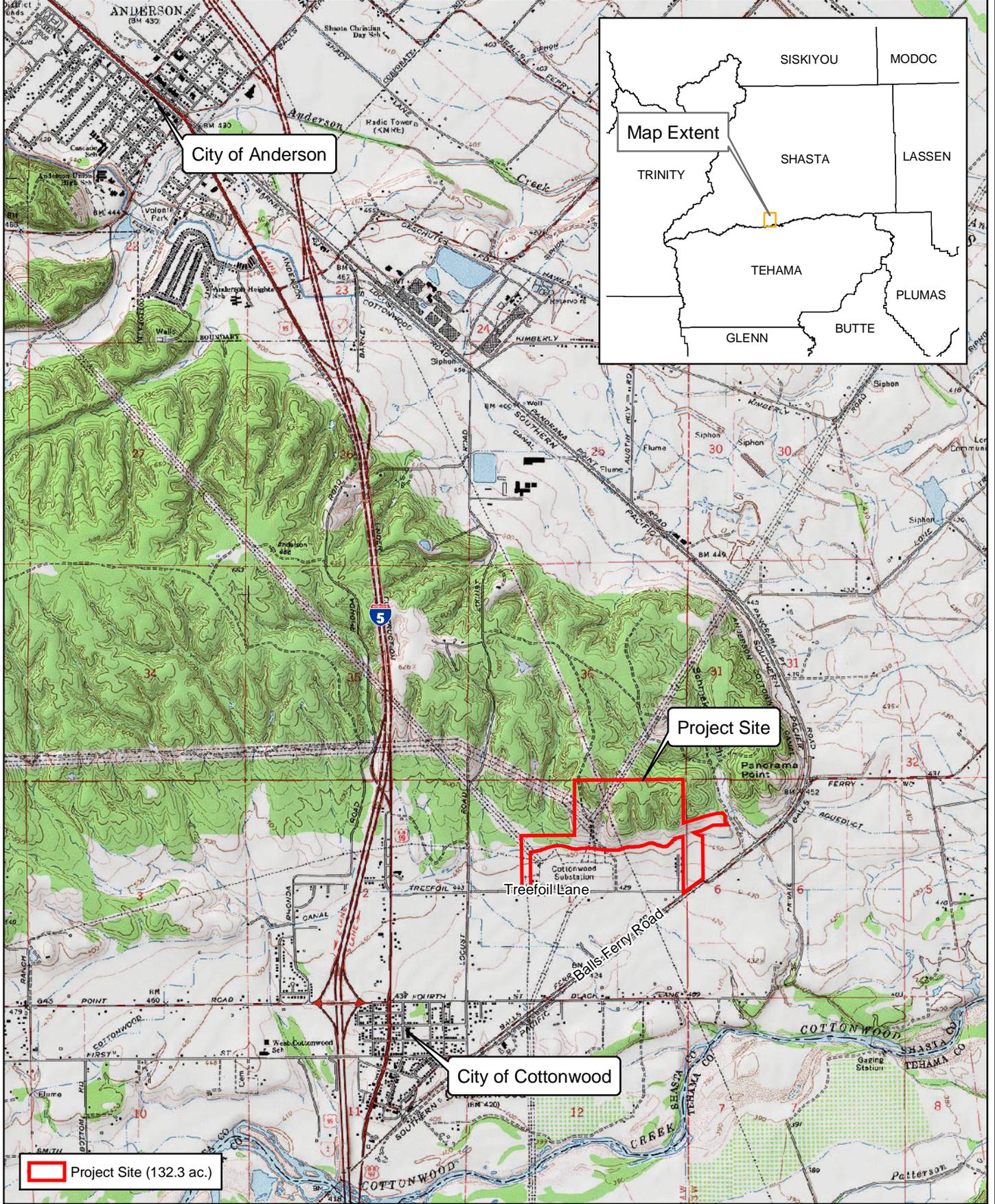
The project site is located within the Cascade Range Foothills Geographic Subdivision of the greater California Floristic Province (Hickman 1993). Topography is composed of sloping terrain with project elevation at approximately 450 to 550 feet above sea level. The site is surrounded by mixed rural development to the south and east and open savannah/woodland to the north and northwest. The habitat is characterized primarily by savannah/oak woodland, which contains riparian habitat, a vernal swale, and seasonal wetlands. Intermittent and ephemeral drainages are found throughout the project site, all flowing in a southerly direction, and are eventually deposited into the Anderson Cottonwood Irrigation District (A.C.I.D.) canal, which runs along the southern extent of the project site (**Attachment A**). Ten distinct soil types exist within the property. The average annual precipitation is approximately 25 inches and the average temperature ranges from 85° F to 35° F (Weather Underground, Inc 2006).

Survey Methodology

Many of the terms used throughout this report have specific meanings relating to the federal wetland delineation process. Term definitions are based on the COE 1987

Panorama Point

Location



Project Site (132.3 ac.)



Within Section 1 of
T29N, R4W Shasta County, CA.
Cottonwood USGS 7.5' Quad.
Map Date: Feb. 28, 2006.

0 0.25 0.5 Miles



Figure 1.

delineation manual (Environmental Laboratory 1987). The terms defined below have specific meaning relating to the delineation of Waters of the U.S. as prescribed by Section 404 of the Clean Water Act (CWA).

Terminology

Atypical situation (significantly disturbed). In an atypical (significantly disturbed) situation, recent human activities or natural events have created conditions where positive indicators for hydrophytic vegetation, hydric soil, or wetland hydrology are not present or observable.

Ephemeral Stream. An ephemeral stream has flowing water only during and for a short duration after, precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Growing season. The growing season is the portion of the year when soil temperatures are above biologic zero (41° F) as defined by soil taxonomy.

Hydric soil. Soil is hydric that is saturated, flooded, or ponded long enough during the growing season to develop anaerobic (oxygen-depleted) conditions in its upper part (*i.e.*, within the shallow rooting zone of herbaceous plants).

Intermittent Stream. An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Jurisdictional wetland. Sites that meet the definition of wetland provided below and that fall under COE regulations pursuant to Section 404 of the CWA are considered jurisdictional wetlands.

Man-induced Wetlands. A man-induced wetland is an area that has developed at least some characteristics of naturally occurring wetlands due to either intentional or incidental human activities.

Normal Circumstances. This term refers to the soil and hydrologic conditions that are normally present, without regard to whether the vegetation has been removed.

Other Waters of the United States. Other Waters of the U.S. are seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other surface water features, that exhibit an ordinary high-water mark but lack positive indicators for one or more of the three wetland parameters (hydrophytic vegetation, hydric soil, and wetland hydrology) (33 CFR 328.4).

Perennial Stream. A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Plant indicator status categories:

Obligate wetland plants (OBL) – plants that occur almost always (estimated probability 99%) in wetlands under normal conditions, but which may also occur rarely (estimated probability 1%) in non-wetlands.

Facultative wetland plants (FACW) - plants that usually occur (estimated probability 67% to 99%) in wetlands under normal conditions, but also occur (estimated probability 1% to 33%) in non-wetlands.

Facultative plants (FAC) – Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and non-wetlands.

Facultative upland plants (FACU) – Plants that occur sometimes (estimated probability 1% to 33%) in wetlands, but occur more often (estimated probability 67% to 99%) in non-wetlands.

Obligate upland plants (UPL) – Plants that occur rarely (estimated probability 1%) in wetlands, but occur almost always (estimated probability 99%) in non-wetlands under natural conditions.

Ponded. Ponding is a condition in which free water covers the soil surface (e.g., in a closed depression) and is removed only by percolation, evaporation, or transpiration.

Problem area. Problem areas are those where one or more wetland parameters may be lacking because of normal seasonal or annual variations in environmental conditions that result from causes other than human activities or catastrophic natural events.

Waters of the United States. This is the encompassing term for areas under federal jurisdiction pursuant to Section 404 of the CWA. Waters of the U.S. are divided into “wetlands” and “Other Waters of the U.S.”

Wetland. Wetlands are defined as “areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions” (33 CFR 328.3 [b], 40 CFR 230.3). To be considered under federal jurisdiction, a wetland must support positive indicators for hydrophytic vegetation, hydric soil, and wetland hydrology.

Determination of Hydrophytic Vegetation

The presence of hydrophytic vegetation was determined using the methods outlined in the COE 1989 manual (*Federal Interagency Committee for Wetland Delineation* 1989), a method approved by the COE for use in conjunction with the 1987 manual. Under this method, areas are considered to have positive indicators of hydrophytic vegetation if more than 50 percent of the dominant species are OBL, FACW, FAC (Reed 1988). Plant species were identifiable by flowering parts and fruits to the lowest taxonomy possible.

Determination of Hydric Soils

Soil survey information was reviewed for the survey area and representatives from Natural Resources Conservation Service (NRCS) in Redding, California were consulted on the local soil conditions. Information regarding local soil and series descriptions is provided in **Appendix A**.

Determination of Wetland Hydrology

Wetland hydrology was determined to be present if a site supported one or more of the following characteristics:

- Landscape position and surface topography (e.g. position of the site relative to an up-slope water source, location within a distinct wetland drainage pattern, and concave surface topography),
- Inundation or saturation for a long duration either inferred based on field indicators or observed during repeated site visits, and
- Residual evidence of ponding or flooding resulting in field indicators such as scour marks, sediment deposits, algal matting, and drift lines.

The presence of water or saturated soil for approximately 5 to 12.5 percent of the growing season typically creates anaerobic conditions in the soil, and these conditions affect the types of plants that can grow and the types of soils that develop (Environmental Laboratory 1987).

Due to the lack of precipitation events for more than two months, intermittent streams were differentiated from ephemeral streams using bed, bank and scour morphology as well as vegetation presence and absence. Streams that had cobbly stream beds with a distinct bank and sparse vegetation were determined to be intermittent, and streams that were more overgrown with vegetation with a less distinct bank and stream bed were determined to be ephemeral.

Determination of Ordinary High Water Mark

The lateral extent of non-tidal water bodies (i.e., intermittent streams, etc.) were based on the ordinary high water mark (OHWM), which is “the line on the shore established by the fluctuations of water” (COE 2005). The OHWM was determined based on physical characteristics of the area, including scour, multiple observed flow events (from current and historical aerial photos), shelving, changes in the character of soil, presence of mature vegetation (i.e., trees with a diameter at breast height larger than 20 inches), deposition, and topography. Due to the wide extent of some floodplains, adjacent riparian areas characterized by hydric soils, hydrophytic vegetation, and hydrology may be included within the OHWM of a non-tidal water body.

Jurisdictional Boundary Determination and Acreage Calculation

The wetland-upland boundary was determined based on the presence or inference of positive indicators of all mandatory criteria. The site was traversed on foot to identify wetlands. Standard data sheets (**Appendix B**) were used to describe plants, soils, and hydrological characteristics. Gallaway Consulting, Inc. performed the field delineation, map, and acreage calculations (**Attachment A**). The spatial data obtained during the preparation of this wetland delineation was collected using a Trimble GeoXT Global Positioning System (GPS) Receiver on June 28 and July 10, 2006. The maximum position dilution of precision (PDOP) during data collection was 7.5. No readings were taken with fewer than 5 satellites. Point data locations were recorded for 25 seconds at a rate of 1 position per second. Area and line data was recorded at a rate of 1 position per second while walking at a slow pace. All GPS data was differentially corrected for maximum accuracy using the nearest National Geodetic Survey’s Continuously Operating Reference Station (CORS).

Results

A total of 2.504 acres of pre-jurisdictional Waters of the U.S. were delineated within the survey area. The types of Waters of the U.S. identified in the survey area are distinguished as riparian habitat, vernal swales, seasonal wetlands, and Other Waters of the U.S., which includes ephemeral drainages, intermittent streams, ponds, and culverts routing flow of these features. A total of 1.849 acres of wetland features occur on-site, including 0.873 acre of seasonal wetlands, 0.017 acre of vernal swales, and 0.959 acre of riparian habitat (**Table 1**). A total of 0.655 acre (10974.0 linear feet) of Other Waters of the U.S. occur on-site, including 0.162 acre of ephemeral drainages, 0.344 acre of intermittent drainages, 0.078 acre of ponds, and 0.071 acre of culverts (**Table 1**). These features are mapped at a 1” to 200” scale and are presented in **Attachment A**. Waters of the U.S. acreages presented in this report should be considered preliminary, subject to review and modification by the COE during the wetland delineation verification process. The wetlands, and the data of interpretation used to delineate their jurisdictional boundaries, are described below.

Table 1. Jurisdictional wetland totals delineated within the proposed Panorama Point Survey Area, Shasta County, CA.

Label	Type	Length (ft.)	Average Width (ft.)	Area (sq.ft.)	Acres
WF01	Seasonal Wetland	n/a	n/a	31213.0	0.71655
WF02	Riparian	n/a	n/a	11504.4	0.26411
WF03	Vernal Swale	n/a	n/a	733.9	0.01685
WF04	Riparian	n/a	n/a	14765.4	0.33897
WF05	Seasonal Wetland	n/a	n/a	1389.1	0.03189
WF06	Seasonal Wetland	n/a	n/a	1359.2	0.03120
WF07	Seasonal Wetland	n/a	n/a	131.6	0.00302
WF08	Seasonal Wetland	n/a	n/a	3933.9	0.09031
WF09	Riparian	n/a	n/a	15510.7	0.35608
	Riparian Total =	n/a	n/a	41780.5	0.95915
	Seasonal Wetland Total =	n/a	n/a	38026.8	0.87298
	Vernal Swale Total =	n/a	n/a	733.9	0.01685
	Total of All Wetland Features =	n/a	n/a	80541.2	1.84897
OW01	Culvert	20.6	3.5	72.2	0.00166
OW02	Ephemeral	178.1	3.5	623.5	0.01431
OW03	Ephemeral	17.6	3.5	61.5	0.00141
OW04	Intermittent	514.9	4.0	2059.8	0.04729
OW05	Intermittent	545.3	3.0	1635.8	0.03755
OW06	Ephemeral	336.0	1.5	504.0	0.01157
OW07	Intermittent	1069.1	2.0	2138.2	0.04909
OW08	Ephemeral	56.7	0.5	28.3	0.00065
OW09	Ephemeral	46.2	1.0	46.2	0.00106
OW10	Ephemeral	88.7	0.5	44.4	0.00102
OW11	Ephemeral	54.3	0.5	27.1	0.00062
OW12	Intermittent	79.0	4.0	315.8	0.00725
OW13	Ephemeral	360.9	1.0	360.9	0.00828
OW14	Intermittent	1134.1	2.0	2268.3	0.05207
OW15	Ephemeral	78.0	1.0	78.0	0.00179
OW16	Ephemeral	138.7	1.5	208.0	0.00478
OW17	Ephemeral	61.8	0.5	30.9	0.00071
OW18	Ephemeral	56.8	0.5	28.4	0.00065
OW19	Ephemeral	96.9	0.5	48.5	0.00111
OW20	Ephemeral	67.0	0.5	33.5	0.00077
OW21	Ephemeral	79.0	1.0	79.0	0.00181
OW22	Ephemeral	176.7	1.0	176.7	0.00406
OW23	Ephemeral	76.4	1.0	76.4	0.00175
OW24	Ephemeral	634.9	1.0	634.9	0.01458
OW25	Ephemeral	61.9	0.5	30.9	0.00071
OW29	Intermittent	268.2	0.0	0.0	0.00000
OW30	Intermittent	219.3	0.0	0.0	0.00000
OW37	Culvert	8.2	0.5	4.1	0.00009
OW39	Culvert	2.9	1.5	3006.9	0.06903
OW40	Intermittent	22.8	4.5	3689.3	0.08470

Label	Type	Length (ft.)	Average Width (ft.)	Area (sq.ft.)	Acres
OW42	Ephemeral	493.6	1.0	493.6	0.01133
OW43	Intermittent	764.3	2.5	1910.7	0.04386
OW44	Ephemeral	640.9	1.5	961.3	0.02207
OW45	Ephemeral	29.4	1.0	29.4	0.00067
OW46	Ephemeral	83.1	1.0	83.1	0.00191
OW47	Ephemeral	69.1	1.0	69.1	0.00159
OW48	Ephemeral	69.9	1.0	69.9	0.00160
OW49	Ephemeral	128.4	1.0	128.4	0.00295
OW50	Intermittent	267.4	1.5	401.1	0.00921
OW51	Ephemeral	31.8	2.0	63.6	0.00146
OW52	Ephemeral	20.5	2.0	41.0	0.00094
OW53	Ephemeral	596.1	1.5	894.1	0.02053
OW54	Ephemeral	314.1	1.0	314.1	0.00721
OW55	Ephemeral	534.5	1.5	801.8	0.01841
OW56	Intermittent	380.0	1.5	569.9	0.01308
OW57	Pond	n/a	n/a	3385.2	0.07771
	Culvert Total =	31.7	n/a	3083.2	0.07078
	Ephemeral Total =	5677.9	n/a	7070.5	0.16232
	Intermittent Total =	5264.4	n/a	14989.0	0.34410
	Pond Total =	n/a	n/a	3385.2	0.07771
	Total of All OWOTUS =	10974.0	n/a	28527.8	0.65491
	Total of All Features =	10974.0	n/a	109069.0	2.50388

Jurisdictional Features

Vernal Swales

Vernal features allow water to pond for a long enough period of time to support hydrophytic vegetation and hydric soils. Vernal swales are often themselves seasonal wetlands that remain inundated with water for much of the wet season, but not long enough to support strong vernal pool characteristics. Vernal pools are defined by the positive indication of three wetland parameters: hydrophytic vegetation specific to vernal pools, hydric soils, and hydrology (*i.e.*, ponding). All three parameters must be present to satisfy the vernal pool/swale definition.

One vernal swale (WF03) was delineated within the survey area totaling 0.017 acre (**Attachment A**). This vernal swale supported positive indicators for all three wetland parameters. Vegetation was mostly dominated by *Lythrum hyssopifolia* (FACW), *Navarretia sp.* (OBL), *Lolium multiflorum* (FAC*), *Juncus bufonius* (FACW), and other unidentifiable forbs. The swale was not inundated and soils were not saturated, but the vegetation present was hydric and there was clear evidence of drainage patterns in the wetland and oxidized root channels in the soil. Wetland boundaries were distinguished from upland boundaries by the presence of obligate plant species and the presence of

mottling, shallow hardpan layer, and obvious reduced conditions within the soil layers. Field delineation data forms for the vernal swale feature is provided in **Appendix B**.

Seasonal Wetlands

Seasonal wetlands are defined by the positive indication of three wetland parameters: hydrophytic vegetation, hydric soils, and hydrology (*i.e.*, ponding). All three parameters must be present to satisfy the wetland definition, which was applied while delineating all seasonal wetlands present on-site. These features allow water to pond for a long enough period of time to support hydrophytic vegetation and hydric soils. Seasonal wetlands tend to support hydrophytic species, such as spike-rush that require longer and typically deeper inundation periods than those of vernal species. Also, seasonal wetlands lack underlying hardpans common with vernal pools and swales.

Five seasonal wetlands were delineated within the survey area, totaling 0.873 acre (**Attachment A**). All seasonal features supported positive indicators for all three wetland parameters. Vegetation was mostly dominated by *Polygonum persicaria* (FACW), *Rumex crispus* (FACW-), *Mentha pulegium* (OBL), *Cyperus eragrostis* (FACW) *Rubus discolor* (FACW), and *Eleocharis macrostachya* (OBL). Seasonal features were either inundated, or soils were saturated ranging from 0 to 3 inches. Wetland boundaries were distinguished from upland boundaries by the presence of obligate plant species and the presence of mottling, shallow hardpan layer, and obvious reduced conditions within the soil layers.

Jurisdictional Riparian

Three (3) valley-foothill riparian wetlands (WF02, WF04, and WF09) totaling 0.959 acre were delineated within the Project Area. These features occur along the banks of the A.C.I.D. canal. This wetland supports cottonwood trees (*Populus fremontii*), valley oak (*Quercus lobata*), and an understory of willows (*salix* sp.) and mixed annual grasses and forbes.

Other Waters of the United States

Other Waters of the U.S. are seasonal or perennial water bodies, including lakes, stream channels, drainages, ponds, and other surface water features, that exhibit an ordinary high-water mark but lack positive indicators for one or more of the three wetland parameters (*i.e.*, hydrophytic vegetation, hydric soil, and wetland hydrology) (33 CFR 328.4). The above definition was applied while delineating all Other Waters of the U.S. on-site. Drainages exhibited an ordinary high water mark and contained bed, bank, and/or scour morphology.

A total of 0.655 acre (10974.0 linear feet) of Other Waters of the U.S. were delineated on-site, including 0.162 acre of ephemeral drainages (5677.9 linear feet), 0.344 acre of

intermittent drainages (5264.4 linear feet), 0.078 acre of ponds, and 0.071 acre of culverts (31.7 linear feet).

Ephemeral and Intermittent Streams

An ephemeral stream has flowing water for a short duration after precipitation events in a typical year. Ephemeral streambeds are located above the water table year-round. Groundwater is not a source of water for the stream and runoff from rainfall is the primary source of water for stream flow. An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

All streams and drainages were defined by obvious channels that were characterized by a distinct bank edge, contained obvious streambed (*i.e.*, river rock and sediment deposits), and contained indicators of the direction of flow (*i.e.*, folded vegetation and observable hydrology). Ephemeral and intermittent determinations were made on July 7, 2006 following a 5-week period of no rainfall; therefore, determinations were based on the bed composition and topography. All intermittent streams had an obvious cobbly bed and contained areas of isolated ponding and somewhat level terrain. Ephemeral streams lacked a cobbly bed and were located in steeper terrain, feeding into the intermittent drainages.

A total of thirty-one (31) ephemeral streams totaling 0.162 acre and eleven (11) intermittent streams totaling 0.344 acre were delineated on-site. The eleven intermittent streams are hydrologically connected to the A.C.I.D. canal that flows east to west along the southern border of the majority of the project site (**Attachment A**).

Ephemeral streams on-site consist mainly of drainages that collect sheet flow from the central areas of the assessment area and direct the flow of water through channelized ditches toward the major intermittent drainages.

Soils

Based on information contained within the U.S. Department of Agriculture (USDA) Soil Conservation Service and Forest Service 1974 *Soil Survey of the Shasta County Area, California*, ten soil types exist within the survey area. The Moda loam (MhA) soil type is the only listed hydric soil occurring within the project boundary and is located in the south-eastern most corner of the project site (**Figure 2**). The majority of the site consists of the non-hydric soil types listed and described in **Table 2**.

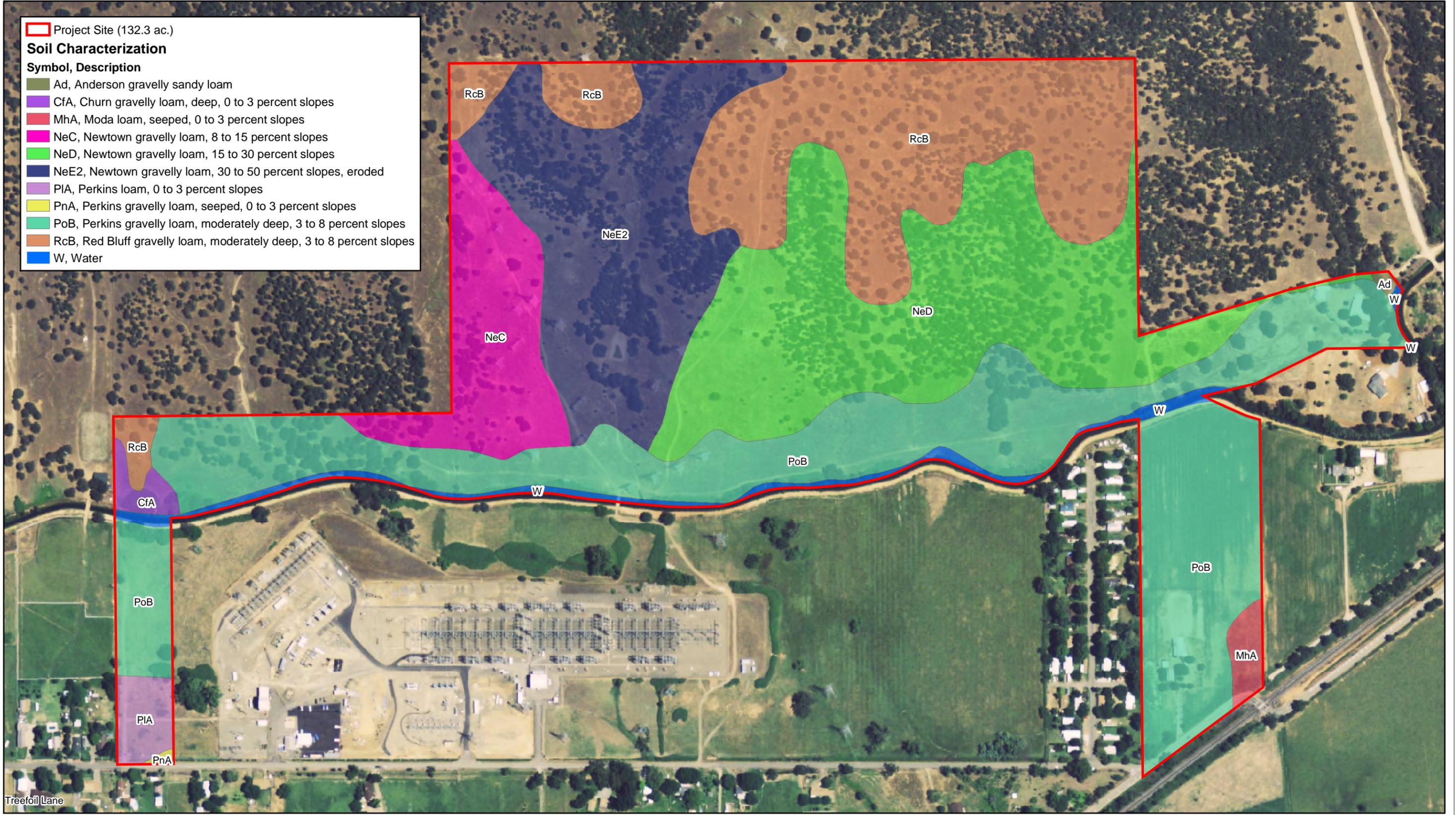
When obligate plants and standing water were present, hydric soils were assumed. In areas with questionable upland/wetland distinction, soil pit samples were observed to determine the presence or absence of hydric soil indicators. Wetland boundaries were

Project Site (132.3 ac.)

Soil Characterization

Symbol, Description

- Ad, Anderson gravelly sandy loam
- CfA, Churn gravelly loam, deep, 0 to 3 percent slopes
- MhA, Moda loam, seeped, 0 to 3 percent slopes
- NeC, Newtown gravelly loam, 8 to 15 percent slopes
- NeD, Newtown gravelly loam, 15 to 30 percent slopes
- NeE2, Newtown gravelly loam, 30 to 50 percent slopes, eroded
- PIA, Perkins loam, 0 to 3 percent slopes
- PnA, Perkins gravelly loam, seeped, 0 to 3 percent slopes
- PoB, Perkins gravelly loam, moderately deep, 3 to 8 percent slopes
- RcB, Red Bluff gravelly loam, moderately deep, 3 to 8 percent slopes
- W, Water



Soil Characterization provided by NRCS
 Aerial provided by USDA (May 2005)
 Map Date: July 28, 2006.



Figure 2.

Table 2. Summary of soil types occurring within the Panorama Point Survey Area, Shasta County, CA (USDA 1974).

Map Symbol	Soil Unit Name	Hydric Soil	Hydric Inclusions Present	Hydric Criteria*	Hydric Landforms
Ad	Anderson gravelly sandy loam	N	Y	4	Floodplains
CfA	Churn gravelly loam, Deep, 0-3% slopes	N	Y	3,4	Drainage ways
MhA	Moda loam, seeped, 0-3% slopes	Y	Y	3,4	Terrace, Marsh
NeC	Newtown gravelly loam, 8-15% slopes	N	N		
NeD	Newtown gravelly loam, 15-30% slopes	N	N		
NeE2	Newtown gravelly loam, 30-50% slopes	N	N		
PIA	Perkins loam, 0-3% slopes	N	N		
PnA	Perkins gravelly loam, seeped, 0-3% slopes	N	Y	3	Depressions
PoB	Perkins gravelly loam, moderately deep, 3-8% slopes	N	N		
RcB	Red Bluff gravelly loam, moderately deep, 3-8% slopes	N	Y	3	Depressions
W	Water	Y		4	Canal

* Hydric Criteria Code:

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.

distinguished from upland boundaries by the presence of concretions, high organic streaking within the sandy soil layers, low-chroma color, reducing conditions, and/or oxidized root channels within the upper 12 inches of soil. Soil series descriptions are presented in **Appendix A** and wetland data sheets are presented in **Appendix B**. We observed saturated soils at depths ranging from 0-12 inches.

Vegetation

The survey area is composed entirely of foothill grassland habitat with inclusions of wetlands and cobble drainageways. Wetland vegetation was present within intermittent drainages, vernal pools, vernal swales, seasonal wetlands, and seasonal swales. Hydrophytic vegetation within seasonal wetlands and swales included *Rubus discolor* (FACW*), *Cyprus eragrostis* (OBL), *Eleocharis macrostachya* (OBL), *Pogogyne douglasii* (OBL), *Polygonum persicaria* (OBL), *Rumex crispus* (FACW-), *Polypogon sp.*

(FACW), *Mentha pulegium* (OBL), *Epilobium sp.* (OBL), *Typha sp.* (OBL), and *Lolium multiflorum* (FAC). Hydrophytic vegetation within vernal pools and swales included *Lythrum hyssopifolia* (FACW), *Lolium multiflorum* (FAC), *Mimulus guttatus* (OBL), *Juncus bufonius* (FACW+), *Navarretia leucoccephala*, and *Plagiobothrys stipitatus* (OBL). All vegetation was identified by Elena Alfieri, botanist, at the time of survey or immediately following field surveys using the Jepson Manual Higher Plants of California (Hickman 1993).

Hydrology

Hydrology on-site consists of localized runoff from precipitation events. Multiple unnamed intermittent drainages flow north to south throughout the extent of the survey area. The drainages flow into the A.C.I.D. canal along the southern border of the project area. The A.C.I.D. canal diverts water from the Sacramento River and carries the water for irrigation purposes through Shasta County and eventually forms another confluence with the Sacramento River further south.

Copies of field data sheets are presented in **Appendix B**. For further explanation of field notes please contact Jody Gallaway at (530) 343-8327.

Site Photos



WF09 (Riparian) looking at the eastern corner



OW06 (Ephemeral Drainage) looking North



OW014 (Intermittent Drainage) looking North



OW57 (Pond) looking South



The confluence between OW04 and OW50 looking South (ACID canal in background)



WF01 (Seasonal Wetland) center of the feature looking South

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Appendix A
Pertinent Soil Information for the Panorama Point Survey
Area in Shasta County, CA
(Available Hard Copy Only)

Appendix B
Field Data Forms for the Panorama Point Survey Area
in Shasta County, CA
(Available Hard Copy Only)

Attachment A
Field Delineation Map for the Panorama Point Survey
Area in Shasta County, CA.

Label	Type	Length (ft.)	Average Width (ft.)	Area (sq.ft.)	Acres
WF01	Seasonal Wetland	n/a	n/a	31213.0	0.71655
WF02	Riparian	n/a	n/a	11504.4	0.26411
WF03	Vernal Swale	n/a	n/a	733.9	0.01685
WF04	Riparian	n/a	n/a	14765.4	0.33897
WF05	Seasonal Wetland	n/a	n/a	1389.1	0.03189
WF06	Seasonal Wetland	n/a	n/a	1359.2	0.03120
WF07	Seasonal Wetland	n/a	n/a	131.6	0.00302
WF08	Seasonal Wetland	n/a	n/a	3953.3	0.09031
WF09	Riparian	n/a	n/a	15510.7	0.35608
Riparian Total =		n/a	n/a	41780.5	0.95915
Seasonal Wetland Total =		n/a	n/a	38026.8	0.87298
Vernal Swale Total =		n/a	n/a	733.9	0.01685
Total of All Wetland Features =		n/a	n/a	80541.2	1.84897
OW01	Culvert	20.6	3.5	72.2	0.00166
OW02	Ephemeral	178.1	3.5	623.5	0.01431
OW03	Ephemeral	17.8	3.5	61.5	0.00141
OW04	Intermittent	514.9	4.0	2059.8	0.04729
OW05	Intermittent	545.3	3.0	1635.9	0.03755
OW06	Ephemeral	336.0	1.5	504.0	0.01157
OW07	Intermittent	1089.1	2.0	2138.2	0.04909
OW08	Ephemeral	56.7	0.5	28.3	0.00065
OW09	Ephemeral	46.2	1.0	46.2	0.00106
OW10	Ephemeral	88.7	0.5	44.4	0.00102
OW11	Ephemeral	54.3	0.5	27.1	0.00062
OW12	Intermittent	79.0	4.0	315.8	0.00725
OW13	Ephemeral	360.9	1.0	360.9	0.00828
OW14	Intermittent	1134.1	2.0	2268.3	0.05207
OW15	Ephemeral	79.0	1.0	79.0	0.00179
OW16	Ephemeral	138.7	1.5	208.0	0.00478
OW17	Ephemeral	61.8	0.5	30.9	0.00071
OW18	Ephemeral	68.8	0.5	34.4	0.00078
OW19	Ephemeral	96.9	0.5	48.5	0.00111
OW20	Ephemeral	67.0	0.5	33.5	0.00077
OW21	Ephemeral	79.0	1.0	79.0	0.00181
OW22	Ephemeral	176.7	1.0	176.7	0.00406
OW23	Ephemeral	76.4	1.0	76.4	0.00175
OW24	Ephemeral	634.9	1.0	634.9	0.01458
OW25	Ephemeral	61.9	0.5	30.9	0.00071
OW26	Intermittent	268.2	0.0	0.0	0.00000
OW27	Intermittent	219.3	0.0	0.0	0.00000
OW28	Culvert	8.2	0.5	4.1	0.00009
OW29	Culvert	2.9	1.5	3006.9	0.06903
OW30	Intermittent	22.8	4.5	3689.3	0.08470
OW31	Ephemeral	493.6	1.0	493.6	0.01133
OW32	Intermittent	764.3	2.5	1910.7	0.04386
OW33	Ephemeral	640.9	1.5	961.3	0.02207
OW34	Ephemeral	23.4	1.0	23.4	0.00057
OW35	Ephemeral	83.1	1.0	83.1	0.00191
OW36	Ephemeral	69.1	1.0	69.1	0.00159
OW37	Ephemeral	69.9	1.0	69.9	0.00160
OW38	Ephemeral	128.4	1.0	128.4	0.00295
OW39	Intermittent	267.4	1.5	401.1	0.00921
OW40	Ephemeral	31.9	2.0	63.8	0.00146
OW41	Ephemeral	20.5	2.0	41.0	0.00094
OW42	Ephemeral	596.1	1.5	894.1	0.02053
OW43	Ephemeral	314.1	1.0	314.1	0.00721
OW44	Ephemeral	534.5	1.5	801.8	0.01841
OW45	Intermittent	380.0	1.5	569.9	0.01308
OW46	Pond	n/a	n/a	3385.2	0.07771
OW47	Culvert Total =	31.7	n/a	3063.2	0.07078
OW48	Ephemeral Total =	5677.9	n/a	7070.5	0.16232
OW49	Intermittent Total =	5264.4	n/a	14889.0	0.34410
OW50	Pond Total =	0.0	n/a	3385.2	0.07771
OW51	Total of All OWOTUS =	10974.0	n/a	28527.8	0.65491
OW52	Total of All Features =	10974.0	n/a	109069.0	2.50388



- Project Site (132.3 ac.)
- 10ft. Contours
- ✕ Feature Transition
- Wetland Features - WF#**
- Riparian
- Seasonal Wetland
- Vernal Swale
- Soil Sample Sites**
- Upland - U#
- Wet - W#
- Other Waters of the U.S. - OW#**
- Culvert
- Ephemeral
- Intermittent
- Pond

The information contained in this figure shall be considered preliminary until written verification by the USACE. Project site derived from parcel map. Survey Dates: June 28 & July 10, 2006/Surveyors: CK, EA. Date of Aerial: Feb. 2005 (USDA)/Contours derived from USGS DEM. Map Date: July 17, 2006

