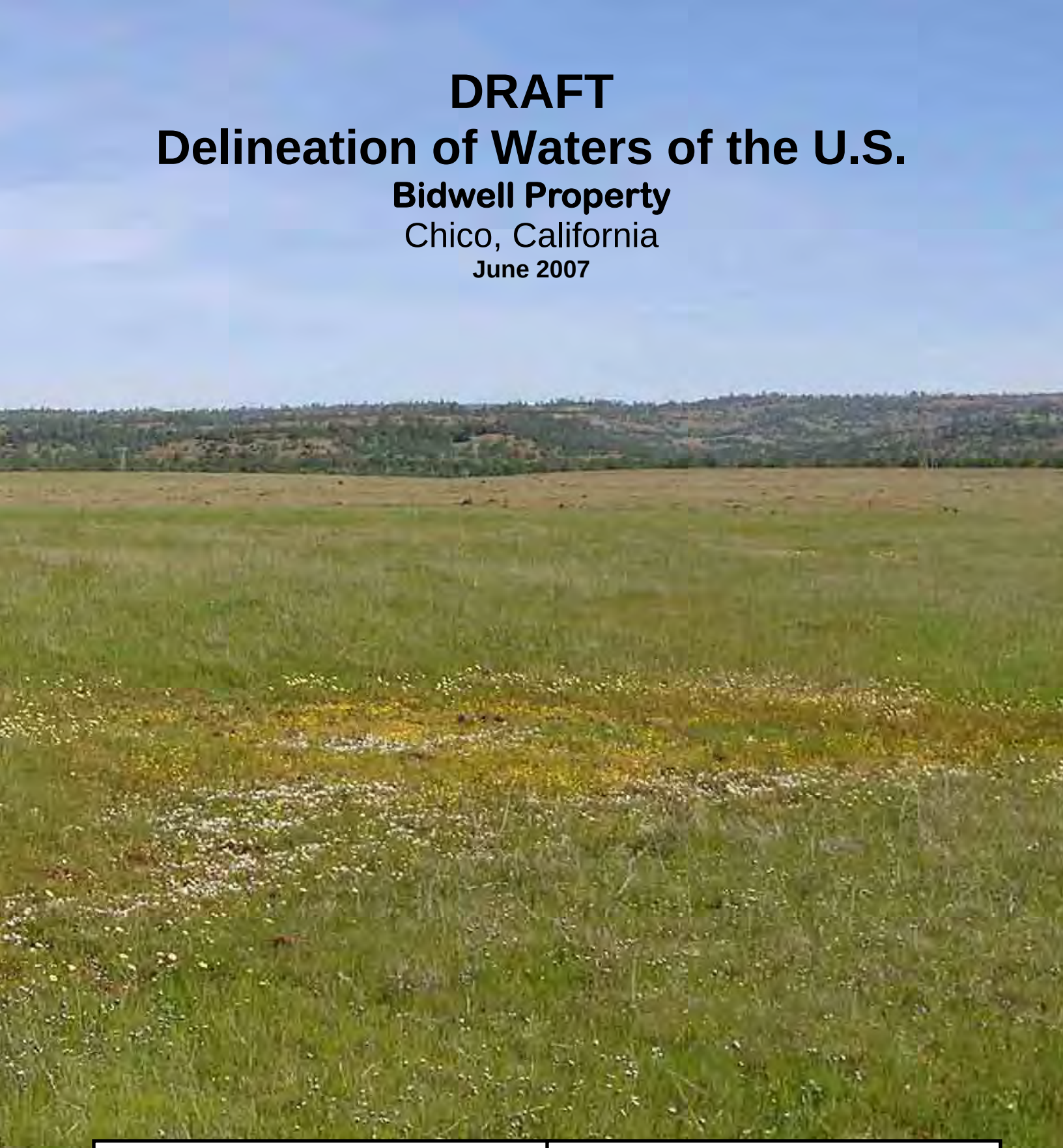
# DRAFT
# Delineation of Waters of the U.S.
## Bidwell Property
Chico, California
**June 2007**



**Prepared for:**

RIVER PARTNERS

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## APPENDICES

# INTRODUCTION

This Delineation of Waters of the U.S. (delineation) was conducted for River Partners by Tehama Environmental Solutions, Inc. (TES) for the Bidwell Ranch Natural Resource Conservation and Mitigation Bank Project (project). The purpose of this delineation is to identify and quantify "Waters of the United States" that may fall within the jurisdiction of the United States Army Corps of Engineers (Corps) under Section 404 of the Clean Water Act. This report follows the *Minimum Standards for Acceptance of Preliminary Wetland Delineations* (U.S. Army Corps of Engineers, 2001). This delineation should be considered preliminary until the results are reviewed and verified by the Corps.

## Study Area Location and Directions

The project site is located in the City of Chico, in Butte County, California (Figure 1). The study area is located on APNs 016-170-002, 016-200-002 and 016-230-010 in the Arroyo Chico Grant MDBM, within the USGS Richardson Springs 7.5 minute quadrangle map (Figure 2). The study area includes approximately 750 acres within the three combined parcels.

To access the site, take the East Avenue Exit from Highway 99 at the north end of Chico. Travel east on East Avenue for approximately 2.7 miles and turn left on Wildwood Avenue. Travel approximately ¼ mile to the entrance of the property at a locked gate on the north side of Wildwood Avenue.

## Proposed Project

The project includes the potential development of a conservation and mitigation bank. The City of Chico is pursuing the possibility of establishing a city-owned conservation and mitigation bank on the approximately 750-acre property through approvals from state and federal agencies. The purpose of the project would be to provide the means to mitigate environmental wetland impacts associated with key City of Chico capital projects, as well as to streamline mitigation requirements for new local development. A Citizens and Stakeholder Advisory Group has been formed to provide input on the project approach and review key documents.

## Contact Information

The study area is located on land owned by the City of Chico. River Partners is representing the City of Chico in the development of the project. Contact information for River Partners and the City of Chico is provided below:


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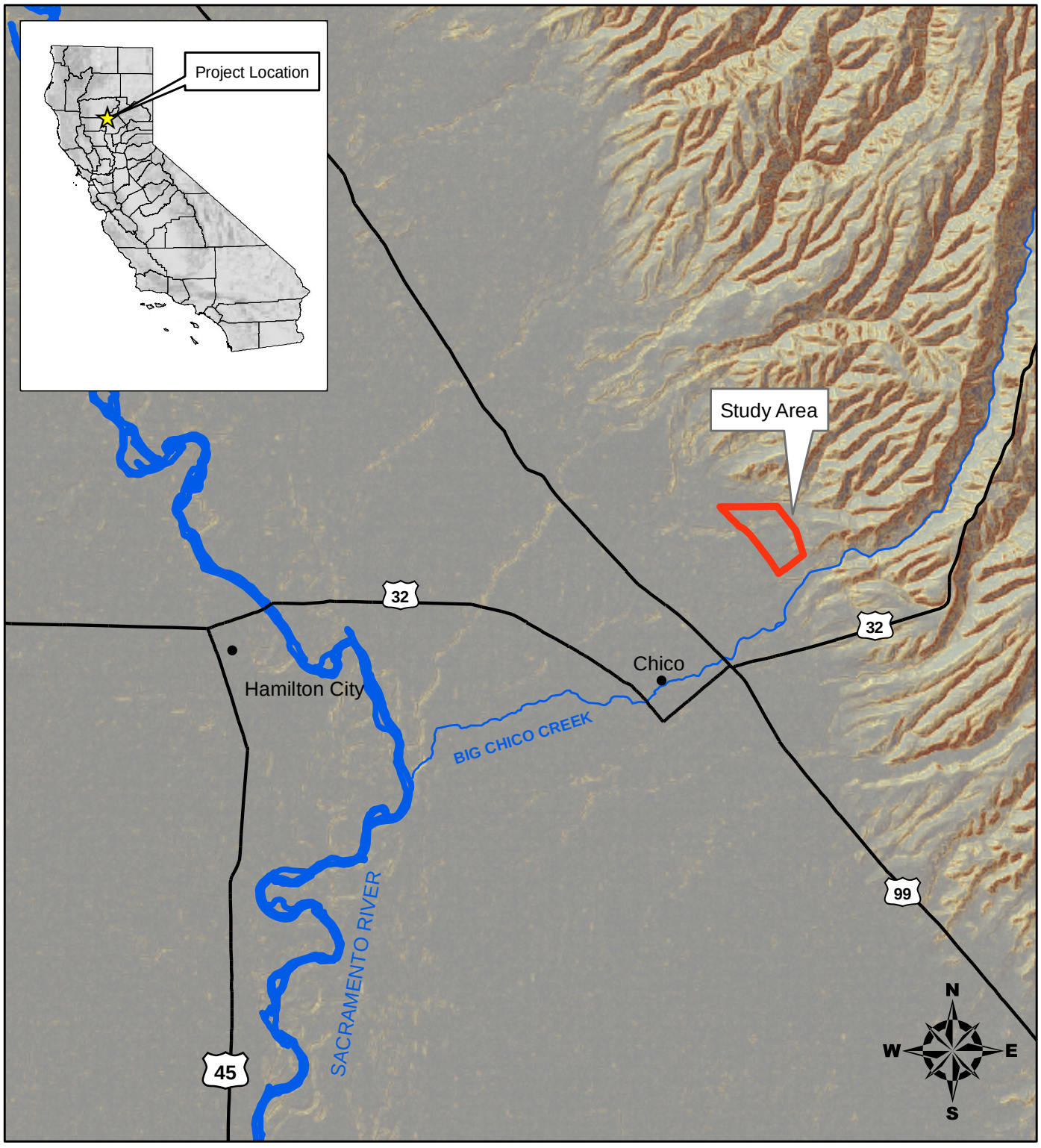


GIS Mapping by 3DF DESIGN PO Box 3734, Stateline NV 89449, 530-725-1218

0 1 2 3 Miles

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**Delineation of Waters of the U.S.**

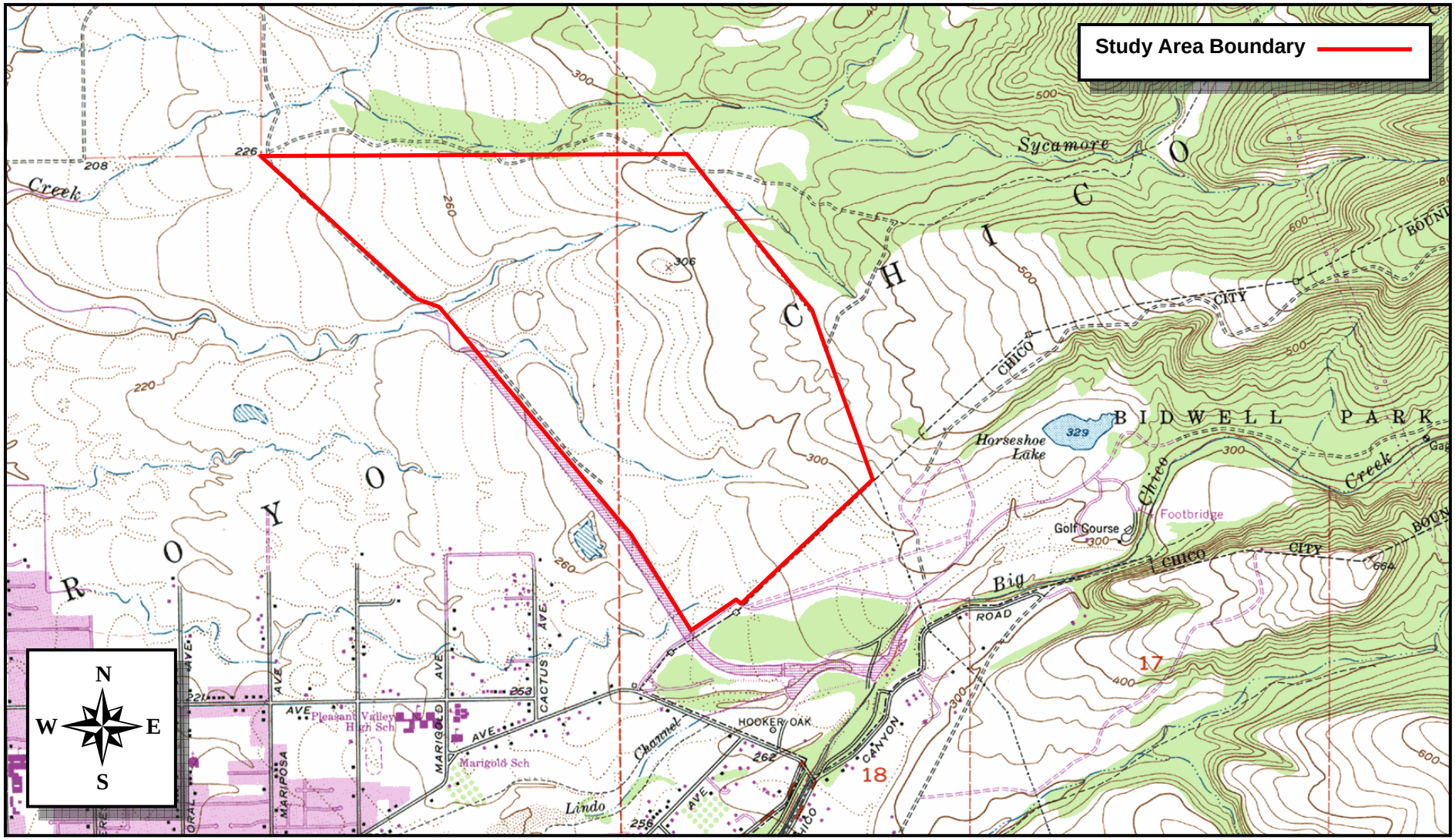
Bidwell Ranch Property

Chico, CA

June, 2007

FIGURE 1

Site Vicinity Map




**Source:** USGS Richardson Springs 7.5' Quadrangle
Maptech, Inc.

**Approximate Scale: 1 inch = 2,200 feet**

2,200 feet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## Bidwell Ranch Property

Chico, California

**FIGURE 2**
**Site Location Map**

**June 2007**

## ENVIRONMENTAL SETTING

### General Site Characteristics

Most of the 750-acre study area is open grassland sloping gently to the west. Situated at the western base of the southern Cascades, elevations range from 240 to 350 feet above sea level. The higher elevation eastern portions of the study area are rocky and have exposed volcanic substrate and shallow soil development. The topography is more pronounced in this area, where water has gradually eroded the rocky basalt to form many narrow and abrubt drainages. Alluvium deposited from this erosion of volcanic material makes up the entire western portion of the property.

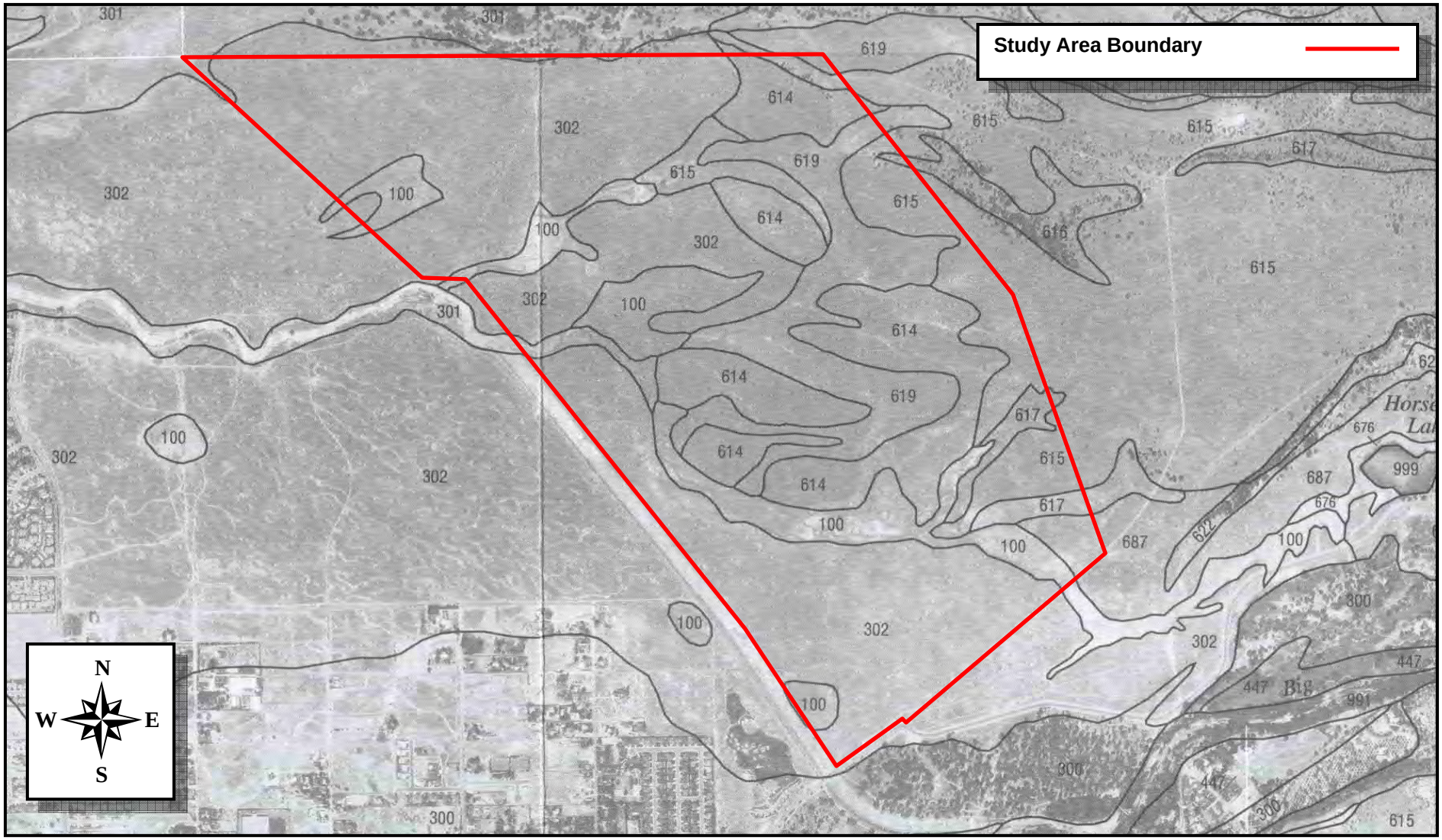
The rare combination of the weathering of volcanic substrate, the amount and type of clay soils derived from this weathering, the shallow aquatards (duripans) and bedrock, and the Mediterranean climate have created the conditions for many rare and beautiful vernal pool species to develop. There are several hundred vernal pool and swale wetlands on this site, in addition to clay flat wetlands and other waters scattered throughout the study area.

### Land use and past impacts

The site has been used for livestock grazing for many decades, and it is the principal use today. Old livestock cross-fencing and watering sites are still in use. Site disturbances in the Anita-Galt complex and Redtough-Redswale complex soils of the southwestern corner of Bidwell Ranch created problem areas for wetland delineation. This area was used for livestock staging and there was a small structure or homesite nearby (Brian Kingman, personal communication). Numerous shallow blade marks from heavy equipment can still be seen in the area. Some of these bladed swaths were for road development, while the purpose of others appears to be improved drainage. Aerial photographs of the study area taken in 1952 show a series of vernal pools and swales that have since been filled. There appears to be one large pool on the very southwest portion of the property that was destroyed when the Sycamore diversion channel was created.

### Geology

Bidwell Ranch lies at the boundary of the Tuscan Formation and associated weathered sediments at the eastern edge of the Sacramento Valley. The Tuscan Formation is a cemented mixture of volcanic materials that flowed westward across the landscape as a series of “mudflows” some five million years ago. These volcanic flows mixed with water and carried with it a wide variety of volcanic rock fragments and soil textures. The Tuscan Formation extends from Chico to Redding, California, and forms most of the rocky foothills of the southern Cascades. The ongoing uplift of the Sierra Nevada Mountain range to the east has gradually increased the westward tilt of the Tuscan. Four million years of Tuscan Formation weathering and sediment transport by Big Chico Creek and other westward-flowing streams of the Cascade foothills, has resulted in extensive alluvial fan development throughout the eastern portions of the Sacramento Valley. This alluvium has covered the western edge of the Tuscan mudflows as it dips below the valley deposits because of its westward tilt. Bidwell Ranch is at this boundary of mostly unweathered and rocky Tuscan mudflows and the high terrace alluvial fans deposited from Tuscan weathering. It is the Tuscan Formation, its landform, slope, aspect, weathering, and soil genesis that plays a pivotal role in the development, type, and location of wetlands on Bidwell Ranch.




**Source:** USDA-Natural Resources Conservation Service
Soil Survey of Butte Area, California, Parts of Butte and Plumas Counties

**Approximate Scale: 1 inch = 1,450 feet**

**1,450 feet**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## Bidwell Ranch Property

Chico, California

**FIGURE 3**
**Soil Survey Map**

**June 2007**

## SOILS

Nine soil map units occur within the study area according to the *Soil Survey of Butte Area, California, Parts of Butte and Plumas Counties* (Natural Resources Conservation Service et al. 2006). A copy of the soil survey map for the study area is included as Figure 3. The nine identified map units are listed and described below:

Anita-Galt complex, 0 to 3 percent slopes (100)
This soil map unit occurs in drainageways and depressions on fan terraces. It is composed of clayey alluvium over cemented, loamy alluvium derived from volcanic rocks. Within the study area, it is present as corridors along portions of several of the ephemeral drainages and in isolated low areas. The soil complex is composed of 60 percent Anita clay, 25 percent Galt clay and 15 percent minor components. The Anita clay component of this complex has a duripan at a depth of 10 to 20 inches while the Galt clay component has duripan at a depth of 20 to 40 inches. Both components are poorly drained, occasionally flooded, frequently ponded and are listed as hydric. Four of the seven minor components are listed as hydric. The taxonomy of the Anita series is clayey, smectitic, thermic, shallow Xeric Duraquert. The taxonomy of the Galt series is fine, smectitic, thermic Aquic Durixerert.

Wafap-Hamslough complex, 0 to 2 percent slopes (301)
This soil map unit occurs on bars and in channels on low stream terraces. It is composed of gravelly and clayey alluvium over gravelly and cobbly alluvium over cemented, cobbly and gravelly alluvium derived from volcanic rocks. Within the study area, it is present primarily within the lower reach of one of the larger ephemeral drainages. The soil complex is composed of 70 percent Wafap gravelly loam, 15 percent Hamslough clay and 15 percent minor components. The Wafap gravelly loam component of this complex is found on bars and is not listed as hydric. This component has a duripan at a depth of 40 to 60 inches, is somewhat poorly drained is rarely flooded and not ponded. The Hamslough clay component of this complex is found in channels and is listed as hydric. This component has a duripan at a depth of 20 to 40 inches, is poorly drained, occasionally flooded and frequently ponded. Two of the eight minor components are listed as hydric. The taxonomy of the Wafap series is clayey-skeletal, mixed, superactive, thermic Oxyaquic Argixeroll. The taxonomy of the Hamslough series is clayey-skeletal, smectitic, thermic Typic Peraquept.

Redtough-Redswale complex, 0 to 2 percent slopes (302)
This soil map unit occurs on mounds and in swales on high fan terraces. It is composed of cobbly and loamy alluvium over cemented, cobbly and gravelly alluvium derived from volcanic rocks. Within the study area, it is present on relatively level high terraces along the western half of the property. The soil complex is composed of 50 percent Redtough loam, 35 percent Redswale cobbly loam and 15 percent minor components. The Redtough loam component of this complex is found on mounds and is not listed as hydric. This component has a duripan at a depth of 10 to 20 inches, is somewhat poorly drained and is not flooded or ponded. The Redswale cobbly loam component of this complex is found in swales and is listed as hydric. This component has a duripan at a depth of 4 to 10 inches, is poorly drained, is not flooded but is frequently ponded. Three of the seven minor components are listed as hydric. The taxonomy of the Redtough series is loamy, mixed, superactive, thermic, shallow Typic Durixeralf. The taxonomy of the Redswale series is loamy-skeletal, mixed, superactive, thermic, shallow Typic Durixeralf.

Doemill-Jokerst complex, 0 to 3 percent slopes (614)
This soil map unit occurs on mounds and in swales on ridgetops and strath terraces on volcanic ridges. It is composed of loamy residuum weathered from volcanic breccia. Within the study area, it is present on gently sloping areas in the eastern portion of the property. The soil complex is made of

50 percent Doemill gravelly loam, 40 percent Jokerst very cobbly loam and 10 percent minor components. The Doemill gravelly loam component of this complex is found on mounds and is not listed as hydric. This component is underlain by lithic bedrock at a depth of 10 to 20 inches, is somewhat poorly drained and is not flooded or ponded. The Jokerst very cobbly loam component of this complex is found in swales and is not listed as hydric. This component is underlain by lithic bedrock at a depth of 2 to 10 inches, is poorly drained, is frequently flooded and is frequently ponded. One of the three minor components is listed as hydric. The taxonomy of both the Doemill and Jokerst series is loamy, mixed, superactive, thermic, Lithic Haploxeralf.

Doemill-Jokerst complex, 3 to 8 percent slopes (615)
This soil map unit is similar to the Doemill-Jokerst complex, 0 to 3 percent slopes described above, but occurs on greater slopes. Within the study area it is present on moderately sloping areas in the eastern portion of the property.

Jokerst-Doemill-Typic Haploxeralfs complex, 8 to 15 percent slopes (616)
This soil map unit occurs on shoulder slopes and backslopes on volcanic ridges. It is composed of loamy residuum weathered from volcanic breccia and loamy colluvium derived from volcanic rocks. Within the study area it is present only within a very small area near the northeast corner of the property. The soil complex is composed of 35 percent Jokerst very cobbly loam, 35 percent Doemill gravelly loam, 15 percent Typic Haploxeralfs gravelly loam and 15 percent minor components. The Jokerst very cobbly loam component of this complex is not listed as hydric. This component is underlain by lithic bedrock at a depth of 2 to 10 inches, is poorly drained, and is not flooded or ponded. The Doemill gravelly loam component of this complex is not listed as hydric. This component is underlain by lithic bedrock at a depth of 10 to 20 inches, is somewhat poorly drained and is not flooded or ponded. The Typic Haploxeralfs gravelly loam component of this complex is not listed as hydric. This component is underlain by lithic and paralithic bedrock at a depth of 20 to 60 inches, is well drained and is not flooded or ponded. Neither of the two minor components is listed as hydric. The taxonomy of both the Doemill and Jokerst series is loamy, mixed, superactive, thermic, Lithic Haploxeralf. The taxonomy of the Typic Haploxeralfs series is thermic, Typic Haploxeralf.

Doemill-Jokerst-Typic Haploxeralfs complex, 15 to 30 percent slopes (617)
This soil map unit occurs on side slopes on volcanic ridges and is similar to the Jokerst-Doemill-Typic Haploxeralfs complex, 8 to 15 percent slopes described above. Within the study area, it is present on moderately-steep sloping areas in the southeast corner of the property. The soil complex is composed of 35 percent Doemill gravelly loam, 30 percent Jokerst very cobbly loam, 20 percent Typic Haploxeralfs gravelly loam and 15 percent minor components.

Carhart taxadjunct, 0 to 2 percent slopes (619)
This soil map unit occurs in clay basins on strath terraces. It is composed of clayey alluvium derived from volcanic rocks. Within the study area, it is present in low gradient areas in the eastern portion of the property. The map unit is listed as hydric. It is underlain by lithic bedrock at a depth of 10 to 20 inches, is poorly drained, is not flooded, but is frequently ponded. Three of the four minor components are listed as hydric. The taxonomy of the Carhart taxadjunct series is clayey, smectitic, thermic, shallow Xeric Endoaquert.

Xerorthents, shallow-Typic Haploxeralfs complex, 2 to 15 percent slopes (687)
This soil map unit occurs on footslopes in canyons. It is composed of loamy residuum, colluvium and/or alluvium derived from volcanic rocks. Within the study area, it is present only within a very small area in the southeast corner of the property. The soil complex is composed of 45 percent Xerorthents, shallow, 40 percent Typic Haploxeralfs gravelly loam and 15 percent minor components.

The Xerorthents, shallow component of this complex is not listed as hydric. This component is underlain by lithic and paralithic bedrock at a depth of 2 to 10 inches, is moderately-well drained, and is not flooded or ponded. The Typic Haploxeralfs gravelly loam component of this complex is not listed as hydric. This component is underlain by lithic and paralithic bedrock at a depth of 20 to 60 inches, is well drained and is not flooded or ponded. Two of the four minor components are listed as hydric. The taxonomy of the Xerorthents, shallow series is thermic Xerorthent. The taxonomy of the Typic Haploxeralfs series is thermic, Typic Haploxeralf.

## Hydrology

### Growing Season

Hydrologic observations pertinent to this delineation must be done during the growing season. A NRCS Wetlands Determination (WETS) database search indicates the growing season begins February 9. Visual wetland indicators can be evaluated and used in determining wetland status beginning on this day.

### Regional Climate and Local Effects

The Mediterranean climate of this region is characterized by seasonal patterns of hot and dry summers with winters that are wet and generally mild. The great majority of precipitation falls as rain from November through April. The 30-year mean monthly precipitation is graphed (line) in Figure 4. This precipitation data was collected from a nearby Western Regional Climate Center weather station (six miles SW of the site). The 30-year mean annual precipitation is 26 inches. Figure 4 also compares (bars) the monthly precipitation for the period of January 2006 through April 2007, with January 1989 through April 1990. The 1989-90 precipitation data is the period during which a previous Corps-verified delineation and hydrologic monitoring was conducted (Jones and Stokes 1990). Monthly precipitation data was available from the Western Regional Climate Center through December 2006. The 2007 precipitation data was collected at the next closest weather station, a California Department of Water Resources Station at Oroville Dam, located 23 miles southeast of Bidwell Ranch. Monthly precipitation preceding this delineation was at, or well below, average for five of the seven months data is available. The precipitation for 2006 was above normal.

Seasonal rains falling on the relatively small watershed above the site are either directed to two main ephemeral drainages that transport water through the property, or to Sycamore Creek on the northern border of the site. Normal cool season precipitation collects and fills the many shallow depressions, with surface and shallow subsurface flows following the mild down-gradient in a westerly and southwesterly direction to the Sacramento Valley. Because the Tuscan mudflows that make up the northeastern portion of the site have only shallow soil development, if any, they collect and hold very little precipitation. Surface water drains from these rocky areas fairly quickly. As the temperature warms in the spring and early summer, the shallow depressions that have retained some water, quickly dry as evaporation and evapo-transpiration increase.

During the field work for this delineation beginning on March 23, 2007 and continuing through April and into early May, no significant surface flows were noted. Only a few pools and swale depressions were inundated and/or saturated to the surface. All of the surface water is gone by July in most years (Brian Kingman, personal communication).

In addition to our field observations during this study, and over twenty years of personal observations of the adjoining Bidwell Park vegetation and hydrology by co-author Greg Treber, two other information sources have been used to assess the site hydrology. The first is the hydrologic studies

and direct observations of Jim Jokerst and Brent Helm, formerly of Jones and Stokes Associates, during their 1990 Corps-verified delineation of the Bidwell Ranch site. Jokerst and Helm studied the hydrology and vegetation during, and prior to, their delineation when drought conditions prevailed. Appendix A graphically presents their precipitation data expressed as the annual number of consecutive storms exceeding 0.5 inches in a 24-hour period and separated by three to four days. Their analysis used this minimum rainfall event within the average growing season as a conservative minimum needed to saturate the soils, fill vernal pools, and begin surface flows in swales and ephemeral drainages. Their hydrologic monitoring showed that these events ponded water for a minimum of three days in-season. Also, Natural Resources Conservation Service soil scientist Andrew Conlin, the principal investigator of the Bidwell Ranch portion of the recently-published soil survey for Butte County, provided personal observations of his hydrologic monitoring of an adjoining site.

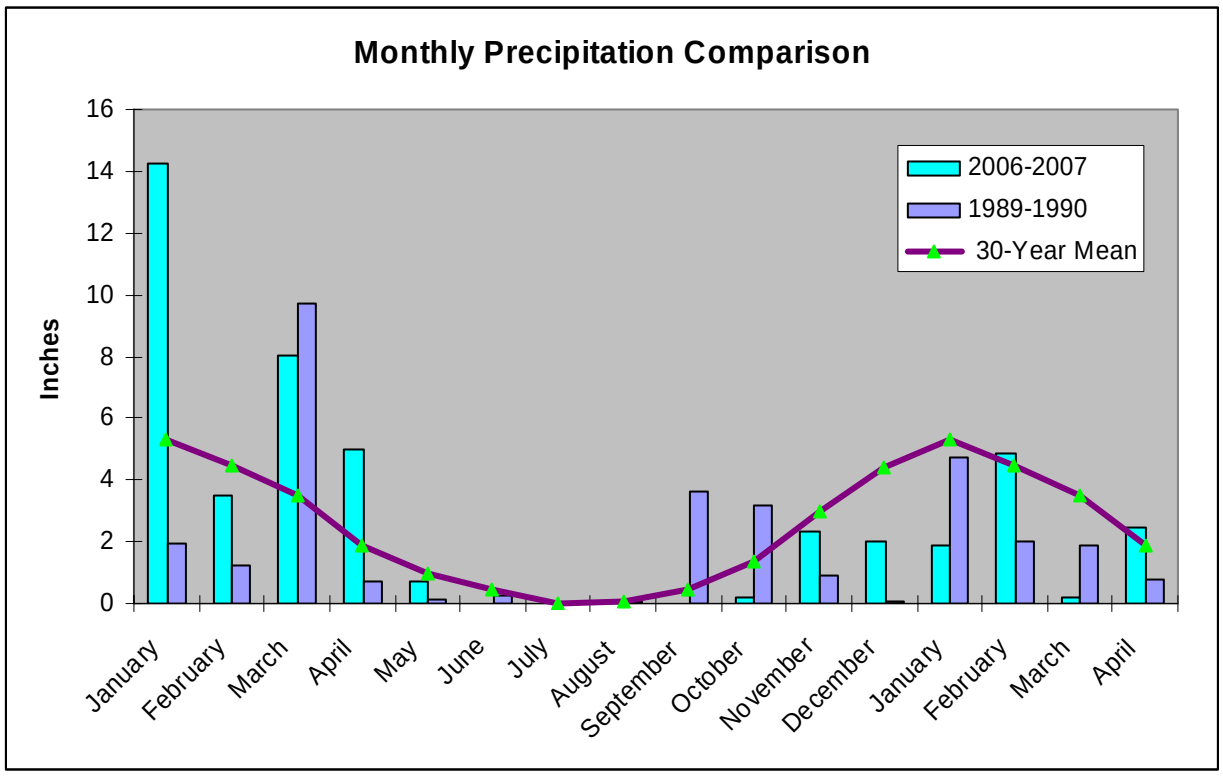


**Figure 4. Monthly precipitation data from the nearest weather stations, Chico and Oroville.**

The hydrology of this topographically complex site will be briefly discussed for several of the larger soil mapping units (SMU's).

The Doemill-Jokerst complex soils (SMU's 614 and 615) are mounds on ridgetops and terraces on volcanic ridges. Slopes are 0 to 8 percent, and surface runoff is very high. Very infrequently within this complex, soils can be found that pond sufficiently to support vernal pools. Several Corps-verified vernal pools were delineated within this complex inclusion in the central eastern part of the study area.

Two ephemeral drainages were delineated within the two small sideslopes of the Jokerst-Doemill-Typic Haploxerals (617) complex found on the eastern portion of the study area. Surface runoff is very high to high in this gravelly-loam and shallow soil group. Surface flows that drain from the

adjoining upland Doemill-Jokerst complex and Xerorthents, shallow-typic haploxeralfs complex (687), pass through these more porous soils with steeper slopes into ephemeral drainages.

Hydrology of the hydric Carhart taxadjunct soil (SMU 619) found in sloping clay basins is poorly drained with very high surface runoff and frequent ponding. Only the ponding and drainage areas within these soils supported jurisdictional waters and some wetlands.

Hydrology of the Redtough-Redswale (SMU 302) complex is poorly drained, has very low available water capacity, and has a very high surface runoff. These soils make up large areas of the southern, western, and northwestern sections of Bidwell Ranch. These soils have a shallow aquatard, sometimes called a duripan, that prevents water from percolating through the profile. Large areas of this soil complex have intermound vernal pool and vernal swale complexes.

Hydrology of the hydric Anita-Galt complex (SMU 100) found in drainages and depressions is a poorly drained clay with frequent ponding and very high surface runoff. Large areas of this soil complex were mapped as jurisdictional clay flat wetlands, within which were found numerous vernal pools and swales.

### Vegetation / Plant Communities

Herbaceous species of the California annual grassland dominate this site, although the brilliant spring and early summer colors of vernal pool and swale flowering plants are what draws the eye. Only a few widely scattered and heavily browsed riparian shrubs were noted in rock crevices within drainages. On the Northeastern corner of the site, a narrow band of blue oak (*Quercus douglasii*) is growing along the northern edge of a low rocky ridge. A narrow section of the floodplain terrace of Sycamore Creek also runs along the northern edge of the study area. A mature stand of blue oak and one large foothill pine (*Pinus sabiniana*) grows here. In the shallow and sloping basins and narrow floodplains, there is a dynamic mixture of annual grassland species with facultative and obligate wetland species. Most of these clay flats and basins have hydric, or at least heavy clay soils that support a constantly fluctuating herbaceous species composition determined by the highly variable weather of this region. Only minor depressions within these clay soils can and do support vernal pool species. Most of the vernal pool and swale complexes found on this site are on the Redtough-Redswale complex soils found along the southern, western, and northwestern portions of the property. The plant community boundaries of these pools and swales also fluctuate annually and seasonally in response to hydrologic conditions and temperature. There are two distinct topographies within this soil complex on Bidwell Ranch. On the southern and southwestern portions of the site, the surface is much more even, with minor depressions and drainages making up the majority of vernal pools and swales. The Redtough-Redswale soils of this southern section are much deeper than those found on the northwestern part of the study area that support extensive intermound ephemeral drainages. In some parts of the study area, previous land owners or managers have used equipment both for improved drainage as well as to make roads and collection basins. The northwestern sections of the property support a large and complex series of depressional and intermound vernal pools and swales.

## METHODS

A delineation of waters of the United States was conducted within the study area by Mr. Jeff Souza, Senior Biologist, Mr. Greg Treber, Senior Botanist, Mr. Robert Feamster, Associate Biologist, Mr. Ben Myhre, Associate Biologist, and Mr. Tom Kraemer, Associate Biologist, of TES. Field studies occurred during the period between March 23, 2007, and May 9, 2007. The study area included the

entire approximately 750-acre property. The delineation of wetlands was conducted in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Environmental Laboratory 2006) using a Routine Determination Method. Ten data points were characterized to determine the presence or absence of the three wetland parameters (vegetation, soils and hydrology). Multiple supplemental soil pits and samples were used to define wetland boundaries but were not documented. The data forms for the ten data points are included in Appendix B. *The Jepson Manual* (Hickman 1993) was used for all taxonomic nomenclature. The wetland indicator status of plant species was based on the *Region 0 (California) National List of Plant Species that Occur in Wetlands* (Reed 1988) and the 1996 Synonymy List (U.S. National Ecology Research Center 1997). Soil colors were measured using the *Munsell Soil Color Charts* (Munsell Color 2000).

The boundaries of other waters of the U.S. were delineated based on the observed Ordinary High Water Mark (OHWM). The delineation of the OHWM was conducted using indications of physical characteristics such as natural lines impressed on the bank, shelving, changes in the character of the soil, the destruction of terrestrial vegetation, debris lines and other appropriate means.

Once delineated, the boundaries of all identified wetlands and other waters of the U.S. were then marked in the field with pin flags or field flagging, along with the location of all data points. The boundaries of all identified wetlands and other waters, and the locations of the data points, were then mapped using a Trimble Pro-XRS Global Positioning System (GPS) unit, capable of sub-meter accuracy. All area features less than two meters in width/diameter were collected as points or lines. Point features were physically measured to determine area data, while lines were assigned an average width and multiplied by the GPS-measured distance.

The Corps-directed methodology for the 1991 delineation of extensive intermound ephemeral drainages of the northern portions of the study area is resubmitted after our 2007 field work indicates there are no significant changes in vegetation, hydrology and soil conditions (see discussions in the hydrology and results sections).

## RESULTS

Based on the presence/absence of indicators of wetland hydrology, hydrophytic vegetation and hydric soils, 45.4 acres of jurisdictional wetlands were identified and delineated within the study area. Another 8.49 acres of previously delineated and Corps-verified (Jones & Stokes Associates 1990), intermound ephemeral drainage wetlands have been added to the TES delineated wetlands. This resulted in a total of 53.89 acres of jurisdictional wetlands. Based on the presence of an OHWM, 8.83 acres of other jurisdictional waters of the U.S. were also identified and delineated within the study area. Table 1 presents a summary of the total acreage of each type of jurisdictional water of the U.S. The classification of wetland communities is based on the descriptions found in *Common Wetland Plants of Central California* (Fiedler 1996). A map of the preliminary delineated boundaries of waters of the U.S. is included as Appendix C. A map of the previously delineated boundaries of waters of the U.S (Jones & Stokes Associates 1990) is included as Appendix D. Site photos of the delineated waters and associated data points are included as Appendix E.

Vernal Pools

A total of 347 vernal pools were delineated within the study area. The total area these relatively small vernal pools occupy is 3.4 acres. Soil depths to the impermeable aquatard vary. We found the aquatard of one sampled vernal pool (VP-250, Appendix C, and Photo 1 of Appendix E) in the deeper Redtough-Redswale complex soils of the southern study area to be 17 inches in depth. This sampled soil had a matrix color of 7.5YR 3/2 with prominent redox features along living roots that clearly indicated a hydric soil. The dominant species was *Deschempsia danthanoides (*FACW*)*. In contrast, another sampled vernal pool (VP-345, Photo 5 in Appendix E) in the Carhart taxadjunct (SMU 619) hydric soil had lithic bedrock at seven inches. Dominants of this pool were *Deschampsia danthanoides* (FACW), *Lolium perenne* (FAC*), and *Navarretia leucocephala* (OBL).

Several pools were found along a road paralleling the western fenceline. Historical road maintenance and repair has impacted some of the pools. Equipment and vehicle compaction has changed pool sizes, shapes, and depths. However, the vernal pool plants in these several pools appear to have easily colonized the impacted areas.

**TABLE 1**
**SUMMARY OF PRELIMINARY DELINEATED WATERS OF THE U. S.**
**Bidwell Ranch Property**

| **Wetlands** | **Total Acreage** |
|---|---|
| Vernal Pools | 3.40 |
| Vernal Swales | 7.89 |
| Clay Flats | 34.10 |
| Intermound Ephemeral Drainage Wetlands | 8.49 |
| **Total Wetlands** | **53.89** |
| | |
| **Other Waters** | **Total Acreage** |
| Ephemeral Creeks | 8.83 |
| **Total Other Waters** | **8.83** |
| | |
| **TOTAL WATERS OF THE U. S.** | **62.72** |

Vernal Swales

A total of 7.89 acres of vernal swales were delineated within the study area. These swale complexes often merge with ephemeral creeks where surface flows begin to establish an ordinary high water mark. Depressions within swales can form vernal pools, and the often gradual side slopes of these swales form a wide bordered continuum of plant species ranging from obligate wetland species to those adapted to upland conditions. In many of the large vernal swales, we found heavy dark clays with deep cracks and large rocks covering the surface. *Eryngium vaseyi* (FACW) dominated many of these swales, along with *Navarettia leucocephala* (OBL), and *Deschampsia danthanoides* (FACW).

A sampled vernal swale (VS-8a) on the very northwestern portion of the study area and within the Redtough-Redswale complex (SMU-302) had an aquatard at nine inches in depth. Matrix chromas were two and three, and redoximorphic features were prominent.

Clay Flats

A total of 34.1 acres of clay flat wetlands were delineated within the study area. These wetlands closely followed the Anita-Galt complex (SMU-100) soils. Clay flat wetlands in the study area occupy relatively large areas with heavy clay soils that have collected in flat, to very gently sloping, basins at the edge of the Tuscan Formation. Dominant species are *Lolium perenne* (FAC*), *Eryngium vaseyi* (FACW), *Pogogyne zizyphoroides* (OBL) and *Hordeum marinum* ssp. *gussoneanum* (FAC), and *Vulpia bromoides* (FACW) (Photos 2 and 4 in Appendix E).

Several clay flats were impacted by heavy equipment, as noted in the Land Use and Past Impacts section above. A review of historical aerial photographs indicates that this area was once a vernal pool and vernal swale complex. The two SMU's in the impacted area are Anita-Galt complex (SMU-100) and the Redtough-Redswale complex (SMU-302). The great majority of delineated wetlands within the study area are on these two SMU's. The past impacted area is relatively level, and the bladed markings cut several inches deep into the clay. Within and near these cuts, vernal pool species have either recruited to or regenerated after being disturbed. The vernal pool plant species growing in these few impacted or created clay flat wetlands very gradually feather out and into an open annual grassland community (Appendix E, Photo 8).

Intermound Ephemeral Drainage Wetlands

A total of 8.49-acres of intermound ephemeral drainage wetlands were delineated within the study area. The northern portion of the study area is laced with intermound ephemeral drainages in addition to the delineated wetlands discussed above. As noted in the Jones and Stokes Associates wetland delineation report, the Corp considered soils within the intermound ephemeral drainages of the Redtough-Redswale complex to be problem areas because they show only limited evidence of hydric soil features despite having wetland hydology and vegetation. The Corps determined that, under these conditions, an aquic moisture regime can be inferred based on the hydrology.

Jones and Stokes scientists conducted hydrologic studies to determine wetland status. Based on both aerial photo interpretation and field studies to correlate hydrology and vegetation, and under direction from the Corps, Jones and Stokes assigned values (Type 1 through 5) to portions of ten measured polygons. Type 4 and 5 drainages were determined to be jurisdictional, while Type 1, 2, and 3 drainages were determined to be non-jurisdictional. The total area of these jurisdictional wetlands in the ten measured polygons was 8.49 acres. TES incorporated the previously delineated intermound ephemeral drainage wetlands into this delineation based on the following rationale:

1) The previous methods used to delineate the intermound ephemeral drainages were Corps directed, and the results were verified.
2) The extent and dynamics of the intermound ephemeral drainages makes it impractical to apply GPS technology to the delineation and mapping process.

3) The present site conditions, including hydrology, vegetation, and soils, have not changed significantly since the Jones and Stokes delineation, based on the following:

a) Recent and historic precipitation data comparison-similar hydrologies (Figure 4, Appendix A)
b) Similar species composition
c) Aerial photograph review
d) Field review
e) Discussions with Jones and Stokes Associates delineators (Brent Helm, personal communication)

Ephemeral Creeks

These riparian features are considered "other waters of the United States". They are seasonal drainages that have an OHWM and generally have flowing water only during, and for a short time after, storm events. Ephemeral creeks can have hydrophytic vegetation throughout, but often lack a vegetated base and hydric soils. There are 8.83 acres of ephemeral creeks that were delineated within the study area. All of the larger drainage systems are classified as ephemeral creeks, as are many of the smaller tributaries that extend the drainage systems eastward and into the rocky and cemented mudflows.

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Mr. Brian Kingman and Mrs. Heather Kingman, neighboring Ranchers.

# APPENDIX A

Historical Precipitation

Source: Jones & Stokes Associates, Inc. 1990

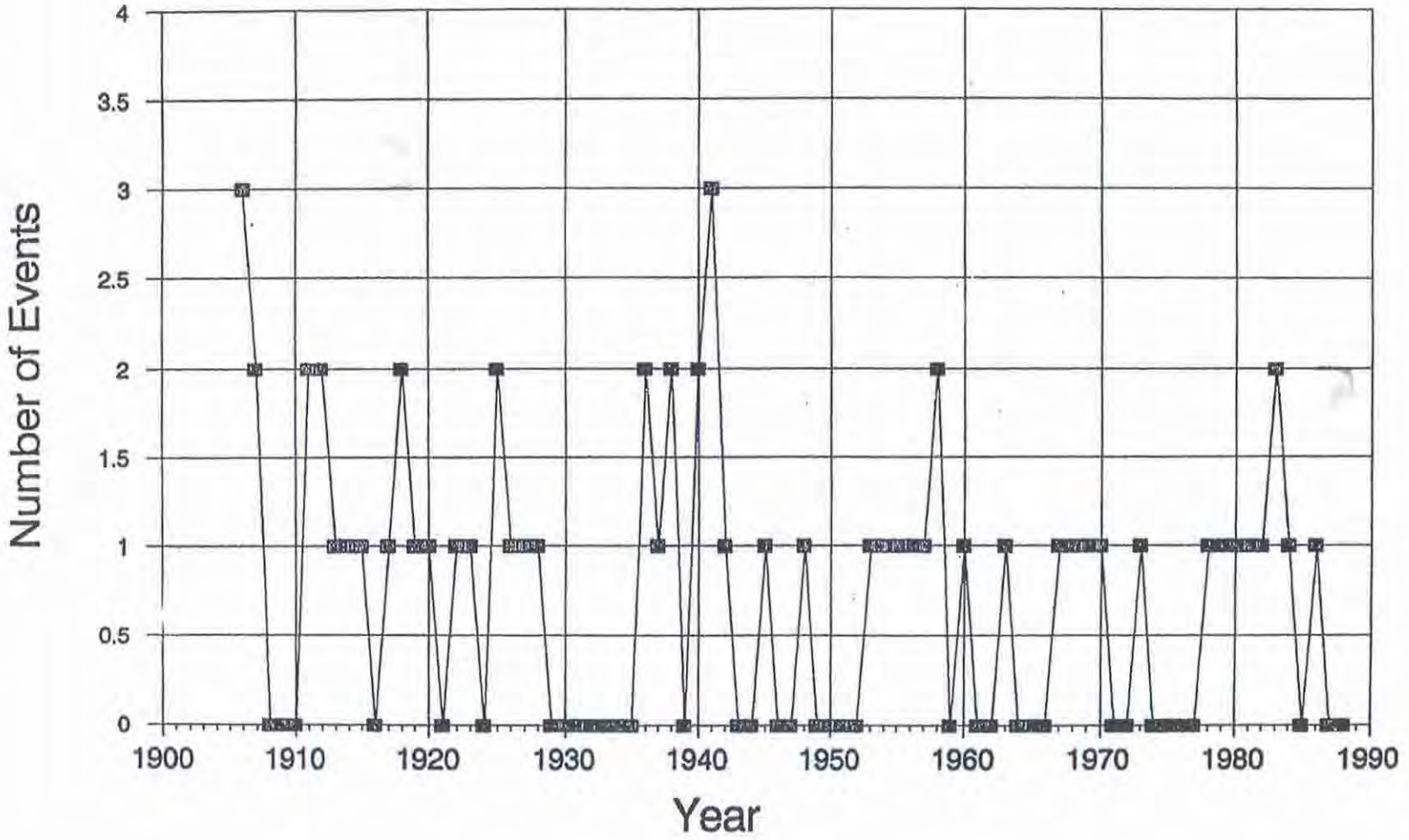


Figure 4. Annual Number of Consecutive Storms Each Exceeding 0.5 Inch (24-Hour Period) and Separated by a Period of 3-4 Days

# APPENDIX B

Routine Wetland Delineation Forms

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 5/9/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-9

Investigator(s): Souza/Feamster Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Doemill-Jokerst complex, 0 to 3 percent slopes (614) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes _____ No X | **Is the Sampled Area within a Wetland?** **Yes _____ No X** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

Site exhibits hydrology and hydric soil indicators but the vegetation is clearly dominated by non-hydrophytic species.

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Taeniatherum caput-medusa | 90 | X | NL |
| 2. Bromus horeaceous | 40 | X | FACU |
| 3. Lolium perenne | 20 | X | FAC* |
| 4. Trifolium depauperatum | 10 | | FAC |
| 5. Lasthenia californica | 5 | | FACU* |
| 6. Lupinus bicolor | 2 | | NL |
| 7. | | | |
| 8. | | | |
| Total Cover: | 131 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 50

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: | |
|---|---|---|
| OBL species | x 1 = | |
| FACW species | x 2 = | |
| FAC species 30 | x 3 = | 90 |
| FACU species 45 | x 4 = | 180 |
| UPL species 92 | x 5 = | 460 |
| Column Totals: 167 (A) | | 730 (B) |

Prevalence Index = B/A = 4.37

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes _____ No X**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

**No morphological adaptations observed.**

## SOIL

Sampling Point: DP-9

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-3 | 7.5YR 3/2 | 100 | | | | | clay/granular | |
| 3-11 | 5YR 3/2 | 100 | | | | | clay/massive | |
| 11+ | | | | | | | | duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: duripan

Depth (inches): 11

**Hydric Soil Present? Yes X No ___**

Remarks:

**Manganese accumulations in the 3-11 inch layer.**

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 5/9/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-8

Investigator(s): Souza/Feamster Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Carhart taxadjunct, 0 to 2 percent slopes (619) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No _____ | **Is the Sampled Area within a Wetland?** **Yes X No _____** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Hordeum marinum ssp. gussoneanum | 50 | X | FAC |
| 2. Lolium perenne | 30 | X | FAC* |
| 3. Medicago polymorpha | 30 | X | NL |
| 4. Navarretia leucocephala | 10 | | OBL |
| 5. Eryngium vaseyi | 20 | X | FACW |
| 6. Pogogyny zizyphoroides | 3 | | OBL |
| 7. | | | |
| 8. | | | |
| Total Cover: | 143 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 10* % Cover of Biotic Crust 20*

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes X No _____**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

***Bare ground is due to livestock hoof disturbance. Biotic crust cover would be higher if not for livestock hoof disturbance.**

## SOIL

Sampling Point: DP-8

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth (inches) | Matrix Color (moist) | Matrix % | Redox Features Color (moist) | Redox Features % | Type[1] | Loc[2] | Text./Struct. | Remarks |
|---|---|---|---|---|---|---|---|---|
| 0-2 | 5YR 3/2 | 99 | 2.5YR 3/4 | 1 | C | RC | clay/granular | |
| 2-12 | 5YR 3/2 | 100 | | | | | clay/massive | |
| 12+ | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: clay

Depth (inches): massive clay at 2 inches

**Hydric Soil Present? Yes X No ___**

Remarks: **Soil is cobbly throughout.**

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

**February 2002 aerial photo; source Butte County Association of Governments**

Remarks:

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 5/9/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-7

Investigator(s): Souza/Feamster Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Carhart taxadjunct, 0 to 2 percent slopes (619) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes _____ No X | **Is the Sampled Area within a Wetland?** **Yes _____ No X** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes _____ No X | |

Remarks:

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Taeniatherum caput-medusa | 90 | X | NL |
| 2. Bromus horeaceous | 25 | X | FACU |
| 3. Lolium perenne | 15 | X | FAC* |
| 4. Unknown | 10 | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 140 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust 0

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes _____ No X**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

## SOIL

Sampling Point: DP-7

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-5 | 5YR 3/2 | 100 | | | | | clay/s.a.blocky | |
| 5-15 | 5YR 3/2 | 100 | | | | | clay/massive | clay hardened |
| 15+ | | | | | | | clay | clay hardened |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: clay

Depth (inches): massive clay at 5 inches

**Hydric Soil Present? Yes X No ___**

Remarks:

**Soil is cobbly throughout**

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present? Yes ___ No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 5/9/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-6

Investigator(s): Souza/Feamster Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Redtough-Redswale complex, 0 to 2 percent slopes (302) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | |
|---|---|
| Hydrophytic Vegetation Present? Yes _____ No X<br>Hydric Soil Present? Yes _____ No X<br>Wetland Hydrology Present? Yes _____ No X | **Is the Sampled Area within a Wetland? Yes _____ No X** |

Remarks:

### VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Taeniatherum caput-medusa | 90 | X | NL |
| 2. Bromus horeaceous | 60 | X | FACU |
| 3. Hypochaeris glabra | 5 | | NL |
| 4. Aira caryophyllea | 5 | | NL |
| 5. Trifolium hirtum | 1 | | NL |
| 6. Lasthenia sp | 15 | | |
| 7. Eremocarpus setigerus | 1 | | NL |
| 8. | | | |
| Total Cover: | 177 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust 0

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present? Yes _____ No X**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

## SOIL

Sampling Point: DP-6

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-3 | 5YR 3/2 | 100 | | | | | g.c.loam/s.a.blocky | |
| 3-13 | 5YR 3/2 | 100 | | | | | g.clay/massive | |
| 13+ | | | | | | | | duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: duripan

Depth (inches): 13

**Hydric Soil Present? Yes _____ No X**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

**Wetland Hydrology Present? Yes _____ No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 5/9/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-5

Investigator(s): Souza/Feamster Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Redtough-Redswale complex, 0 to 2 percent slopes (302) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No _____ | **Is the Sampled Area within a Wetland?** **Yes X No _____** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

## VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Eryngium vaseyi | 30 | X | FACW |
| 2. Lolium perenne | 40 | X | FAC* |
| 3. Deschampsia danthonioides | 5 | | FACW |
| 4. Navarretia leucocephala | 20 | X | OBL |
| 5. Taeniatherum caput-medusa | 10 | | NL |
| 6. Pogogyny zizyphoroides | 1 | | OBL |
| 7. Allium amplectens | 10 | | NL |
| 8. | | | |
| Total Cover: 111 | | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum _____ % Cover of Biotic Crust _____

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** **Yes X No _____**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

## SOIL

Sampling Point: DP-5

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-2 | 7.5YR 3/2 | 100 | | | | | s.loam/gran | |
| 2-7 | 5YR 3/2 | 95 | 5YR 4/6 | 5 | C | RC | c.loam/sa block | |
| 7-9 | 7.5YR 3/3 | 100 | | | | | clay/mass | |
| 9+ | | | | | | | | duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: duripan

Depth (inches): 9

**Hydric Soil Present? Yes X No ___**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- X Sediment Deposits (B2) (**Riverine**)
- X Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Shallow Aquitard (D3)
- X FAC-Neutral Test (D5) **(2:0)**

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

**February 2002 aerial photo; source Butte County Association of Governments**

Remarks:

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 3/30/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-4

Investigator(s): Souza/Treber Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): basin Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Anita-Galt complex, 0 to 3 percent slopes (100) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | |
|---|---|
| Hydrophytic Vegetation Present? Yes _____ No X<br>Hydric Soil Present? Yes _____ No X<br>Wetland Hydrology Present? Yes _____ No X | **Is the Sampled Area within a Wetland? Yes _____ No X** |

Remarks:

### VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Plagiobothrys tenellus | 10 | | FAC* |
| 2. Erodium botrys | 5 | | NL |
| 3. Leontodon taraxacoides | 70 | X | FACU |
| 4. Vulpia myuros var. hirsuta | 20 | X | FACU* |
| 5. Trifolium depauperatum | 5 | | FAC |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 110 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present? Yes _____ No X**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

## SOIL

Sampling Point: DP-4

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-5 | 10YR 4/2 | 95 | | 5 | C | RC | loam/platy | faint redox; not visible when moist |
| 5-14 | 7YR 3/2 | 100 | | | | | f.s.lm/s.a.bl | |
| 14+ | | | | | | | | duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- X Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: duripan

Depth (inches): 14

**Hydric Soil Present? Yes _____ No X**

Remarks:

**Majority of the roots are in the upper five inches.**

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

**Wetland Hydrology Present? Yes _____ No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 3/30/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-3

Investigator(s): Souza/Treber Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Redtough-Redswale complex, 0 to 2 percent slopes (302) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No _____ | **Is the Sampled Area within a Wetland?** **Yes X No _____** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Deschampsia danthonioides | 25 | X | FACW |
| 2. Lolium perenne | 40 | X | FAC* |
| 3. Limnanthes douglasii | 20 | X | OBL |
| 4. Layia fremontii | 2 | | NL |
| 5. Eryngium vaseyi | 2 | | FACW |
| 6. Trifolium depauperatum | 2 | | FAC |
| 7. | | | |
| 8. | | | |
| Total Cover: | 91 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 10* % Cover of Biotic Crust 0

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present? Yes X No _____**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

***Bare ground is due to livestock hoof disturbance.**

## SOIL

Sampling Point: DP-3

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-7 | 7.5YR 3/1 | 95 | 5YR 5/8 | 5 | C | RC | clay/massive | redox mostly along ped faces |
| 7+ | | | | | | | | duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: duripan

Depth (inches): 7

**Hydric Soil Present? Yes X No ___**

Remarks: **Redox in 0-7 inch layer also along living root channels.**

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- X Shallow Aquitard (D3)
- X FAC-Neutral Test (D5) **(2:0)**

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

**February 2002 aerial photo; source Butte County Association of Governments**

Remarks:

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 3/23/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-2

Investigator(s): Souza/Treber Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Redtough-Redswale complex, 0 to 2 percent slopes (302) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | |
|---|---|
| Hydrophytic Vegetation Present? Yes _____ No X<br>Hydric Soil Present? Yes _____ No X<br>Wetland Hydrology Present? Yes _____ No X | **Is the Sampled Area within a Wetland? Yes _____ No X** |

Remarks:

### VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Plagiobothrys tenellus | 10 | | FAC* |
| 2. Erodium botrys | 20 | X | NL |
| 3. Bromus horeaceous | 40 | X | FACU |
| 4. Trifolium depauperatum | 5 | | FAC |
| 5. Plantago erecta | 15 | | NL |
| 6. Lupinus bicolor | 3 | | NL |
| 7. | | | |
| 8. | | | |
| Total Cover: | 93 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: |
|---|---|
| OBL species _____ | x 1 = _____ |
| FACW species _____ | x 2 = _____ |
| FAC species _____ | x 3 = _____ |
| FACU species _____ | x 4 = _____ |
| UPL species _____ | x 5 = _____ |
| Column Totals: _____ (A) | _____ (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present? Yes _____ No X**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

## SOIL

Sampling Point: DP-2

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-8 | 7.5YR 3/3 | 100 | | | | | c. loam/sa blocky | |
| 8+ | | | | | | | | clay duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: clay duripan

Depth (inches): 8

**Hydric Soil Present? Yes _____ No X**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

**Wetland Hydrology Present? Yes _____ No X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 3/23/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-1

Investigator(s): Souza/Treber Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): _____ Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Redtough-Redswale complex, 0 to 2 percent slopes (302) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology X naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No _____ | **Is the Sampled Area within a Wetland?** **Yes X No _____** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Deschampsia danthonioides | 75 | X | FACW |
| 2. Allium amplectens | 30 | X | NL |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 105 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 0 % Cover of Biotic Crust _____

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: | |
|---|---|---|
| OBL species | x 1 = | |
| FACW species 75 | x 2 = | 150 |
| FAC species | x 3 = | |
| FACU species | x 4 = | |
| UPL species 30 | x 5 = | 150 |
| Column Totals: 105 (A) | | 300 (B) |

Prevalence Index = B/A = 2.86

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

X Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present? Yes X No _____**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

## SOIL

Sampling Point: DP-1

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-17 | 7.5YR 3/2 | 98 | 5YR 4/6 | 2 | C | RC | clay/massive | redox prominent along living roots |
| 17+ | | | | | | | | duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- X Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: duripan

Depth (inches): 17

**Hydric Soil Present? Yes X No ___**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

**February 2002 aerial photo; source Butte County Association of Governments**

Remarks:

## WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bidwell Ranch City/County: Chico/Butte Sampling Date: 5/9/07

Applicant/Owner: River Partners/City of Chico State: California Sampling Point: DP-10

Investigator(s): Souza/Feamster Section, Township, Range: Arroyo Chico Land Grant, T22N, R1&2E

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): _____ Slope (%): _____

Subregion (LRR): C-Mediterranean California Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Doemill-Jokerst complex, 0 to 3 percent slopes (614) NWI classification: _____

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes _____ No _____

Are Vegetation X, Soil X, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

### SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

| | | |
|---|---|---|
| Hydrophytic Vegetation Present? | Yes X No _____ | **Is the Sampled Area within a Wetland?** **Yes X No _____** |
| Hydric Soil Present? | Yes X No _____ | |
| Wetland Hydrology Present? | Yes X No _____ | |

Remarks:

### VEGETATION

| Tree Stratum (Use scientific names.) | Absolute % Cover | Dominant Species? | Indicator Status |
|---|---|---|---|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| Total Cover: | | | |
| **Sapling/Shrub Stratum** | | | |
| 1. | | | |
| 2. | | | |
| 3. | | | |
| 4. | | | |
| 5. | | | |
| Total Cover: | | | |
| **Herb Stratum** | | | |
| 1. Hordeum marinum ssp. gussoneanum | 40 | X | FAC |
| 2. Deschampsia danthonioides | 25 | X | FACW |
| 3. Lolium perenne | 50 | X | FAC* |
| 4. Navarretia leucocephala | 40 | X | OBL |
| 5. | | | |
| 6. | | | |
| 7. | | | |
| 8. | | | |
| Total Cover: | 155 | | |
| **Woody Vine Stratum** | | | |
| 1. | | | |
| 2. | | | |
| Total Cover: | | | |

% Bare Ground in Herb Stratum 15* % Cover of Biotic Crust 40*

**Dominance Test worksheet:**

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

**Prevalence Index worksheet:**

| Total % Cover of: | Multiply by: | |
|---|---|---|
| OBL species | x 1 = | |
| FACW species | x 2 = | |
| FAC species | x 3 = | |
| FACU species | x 4 = | |
| UPL species | x 5 = | |
| Column Totals: (A) | | (B) |

Prevalence Index = B/A = _____

**Hydrophytic Vegetation Indicators:**

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present? Yes X No _____**

Remarks: **Annual precipitation was significantly lower than normal. Vegetation is naturally problematic due to temporal shifts in vegetation and grazing. Soils are naturally problematic due to seasonal ponding. Hydrology is naturally problematic due to the unusually dry year.**

***Bare ground is due to livestock hoof disturbance. Biotic crust cover would be higher if not for livestock hoof disturbance.**

## SOIL

Sampling Point: DP-10

**Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)**

| Depth | Matrix | | Redox Features | | | | | |
|---|---|---|---|---|---|---|---|---|
| (inches) | Color (moist) | % | Color (moist) | % | Type[1] | Loc[2] | Text./Struct. | Remarks |
| 0-2 | 5YR 3/2 | 100 | | | | | clay/granular | stony |
| 2-7 | 5YR 3/2 | 100 | | | | | clay/massive | |
| 7+ | | | | | | | | duripan |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

**Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)**

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- X Vernal Pools (F9)

**Indicators for Problematic Hydric Soils[3]:**

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

**Restrictive Layer (if present):**

Type: duripan

Depth (inches): 7

**Hydric Soil Present? Yes X No ___**

Remarks:

## HYDROLOGY

**Wetland Hydrology Indicators:**

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- X Water Marks (B1) (**Nonriverine**)
- X Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- X Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Shallow Aquitard (D3)
- X FAC-Neutral Test (D5) **(2:0)**

**Field Observations:**

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

**Wetland Hydrology Present? Yes X No ___**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

# APPENDIX C

Preliminary Delineation Map

# APPENDIX D

Previously-verified Delineation Map
Source: Jones & Stokes Associates, Inc. 1990

# APPENDIX E

Site Photos

**Photo 1**

View of vernal pool feature VP-250 in the southern portion of the study area, looking east. The white pin flags represent Data Point-1 (left/wetland) and Data Point-2 (right/upland).The pink pin flags represent the delineated wetland boundary.

**Photo 2**

View of clay flat feature CF-1 in the central portion of the study area, looking northeast. The white flags represent Data Point-3 (right/wetland) and Data Point-4 (left/upland). The pink flags represent the delineated wetland boundary.

**Photo 3**

View of vernal swale feature VS-8a in the northwest portion of the study area, looking west. The white flags represent Data Point-5 (shovel/wetland) and Data Point-6 (left/upland). The pink flags represent the delineated wetland boundary.

**Photo 4**

View of clay flat feature CF-10 at the northeast corner of the study area, looking west. The white flags represent Data Point-7 (left/upland) and Data Point-8 (shovel/wetland). The pink flags represent the delineated wetland boundary.

**Photo 5**

View of vernal pool feature VP-345 at the central portion of the study area, looking northeast. The white pin flags represent Data Point-9 (shovel/upland) and Data Point-10 (right/wetland). The pink pin flags represent the delineated wetland boundary.

**Photo 6**

View of ephemeral creek feature EC-16, looking north. The pink pin flags represent the delineated ordinary high water mark.

**Photo 7**

Landscape view of the south-central portion of the study area, looking west from near the east boundary. The channel of ephemeral creek feature EC-5 can be seen in the small valley running right to left.

**Photo 8**

Landscape view of the southern portion of the study area, looking east from the west boundary. Clay flat features CF-20 and CF-21 can be seen in the foreground. This area appears to have been a former vernal pool/vernal swale complex that was significantly altered by past land leveling activities.

**Photo 9**

View of the northwestern portion of the study area, looking north. A total of 8.43 acres of jurisdictional intermound ephemeral drainage wetlands were identified in a previously-verified delineation (Jones & Stokes Associates, Inc. 1990) on this northern terrace (Appendix D).