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FINAL AQUATIC RESOURCE DELINEATION REPORT

Country Club Heights Erosion Control Project
October 2016

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Executive Summary

NCE performed field investigations on August 23 and 24, 2016 evaluating the potential jurisdictional status of waters of the United States for the Country Club Heights Erosion Control Project in El Dorado County, California.

Within the survey area, no streams or intermittent drainages were mapped by the United States Geological Survey and no waters of the United States were recognized by the United States Fish and Wildlife Service National Wetlands Inventory.

NCE surveyed a total of approximately 67 acres. NCE delineated two wetlands that are potentially jurisdictional waters of the United States due to the presence of wetland indicators, and a connection to the Upper Truckee River, which is a tributary to Lake Tahoe, a navigable waterway.

Two potentially jurisdictional features were identified within the survey area:

- Wetland 1 – Highway 50 (Appendix H, Feature 2) contained the presence of wetland vegetation, hydric soils, and wetland hydrology, may be Cowardin classified as palustrine emergent nonpersistent, and is approximately 0.014 acres in size.
- Wetland 2 – Cherry Hills Circle (Appendix H, Feature 3) contained the presence of wetland vegetation, hydric soils, and wetland hydrology, may be Cowardin classified as palustrine emergent persistent, and is approximately 0.573 acres in size.

Four potentially non-jurisdictional features were identified within the survey area:

- Man-Made Swale – Elks Club Drive (Appendix H, Feature 4) is a man-made swale created in an upland to transport storm water, it is approximately 0.099 acres in size.
- Man-Made Swale – Boca Raton Drive (Appendix H, Feature 5) is a man-made swale created in an upland to transport storm water, it is approximately 0.719 acres in size.
- Man-Made Swale – Southern Pines Drive (Appendix H, Feature 6,) is a man-made swale created in an upland to transport storm water, it is approximately 0.223 acres in size.
- The unnamed drainage (Appendix H, Feature 1) was dry during the survey, may be Cowardin classified as Intermittent Riverine, and is approximately 0.007 acres in size. This drainage terminates in a man-made sediment basin with no surface water connection to the Upper Truckee River.

The delineation was conducted in accordance with the:

- 1987 Corps of Engineers Wetland Delineation Manual;
- Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0), May 2010; and
- A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States, August 2008.

These findings should be considered preliminary until the United States Army Corps of Engineers makes a final approved jurisdictional determination in coordination with the United States Environmental Protection Agency.

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Acronyms and Abbreviations

CTC	California Tahoe Conservancy
CALVEG	Classification and Assessment with Landsat of Visible Ecological Groupings
NCIC	North Central Information Center
NHD	National Hydrologic Dataset
NWI	National Wetlands Inventory
NRCS	Natural Resource Conservation Service
OHWM	Ordinary High Water Mark
RPW	Relatively Permanent Water
TNW	Traditional Navigable Waterway
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USFS	United States Forest Service
USGS	United States Geological Survey
WOUS	waters of the United States, including wetlands

1.0 INTRODUCTION

The purpose of this report is to identify and describe aquatic resources and to identify known possible sensitive plant, fish, wildlife species, and cultural/historic resources in the survey area. This report facilitates efforts to:

1. Avoid or minimize impacts to aquatic resources during the erosion control design process.

2. Document aquatic resource boundary determinations for review by the United States Army Corps of Engineers (USACE).

3. Provide early indications of known sensitive species and historic/cultural properties within the survey area.

4. Provide background information.

Dan Kikkert of County of El Dorado, Community Development Agency, Transportation Division, contracted NCE to conduct a formal USACE delineation of waters of the United States, including wetlands (WOUS) at the Country Club Heights Erosion Control Project.

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The Country Club Heights Erosion Control Project is located in the County of El Dorado, California, east of U.S. Highway 50 and west of Pioneer Trail. The Lake Tahoe Airport is north of the project survey area (Appendix A, Figure 1).

The project survey area consisted of approximately 67 acres of roads right-of-ways and a few undeveloped parcels owned by the California Tahoe Conservancy (CTC) and the United States Forest Service (USFS).

The project survey area may be found on United States Geological Survey (USGS) Echo Lake, Freel Peak, and South Lake Tahoe 7.5-minute series topographic quadrangle maps (Appendix A, Figure 2).

The survey area is characterized by predominantly urban development intermixed with fragmented Jeffrey Pine forest. The mapped Classification and Assessment with Landsat of Visible Ecological Groupings (CALVEG) Alliances were found to be consistent with the project location, density, and size; however, the survey area was predominantly residential and does not reflect characteristics associated with these vegetation alliances in most locations in the project area. The project area is composed mainly of Jeffrey Pine and also contains isolated pockets of non-native/ornamental grass, mixed conifer, lodgepole pine, basin sagebrush, perennial grasses, and urban (Appendix A, Figure 3).

2.0 BACKGROUND

The Country Club Heights Erosion Control Project is located in the County of El Dorado, California, east of U.S. Highway 50 and west of Pioneer Trail. The Lake Tahoe Airport is north of the project area (Appendix A, Figure 1). The project area is located in Sections 20, 21, 28, and 29 in Township 12 North and Range 18 East of the Mt. Diablo Meridian which may be found on the following USGS 7.5 minute quadrangle maps: Echo Lake; Freel Peak; and South Lake Tahoe in El Dorado County, California. The town of Meyers is south of the project area and the City of South Lake Tahoe is north of the project area.

At the intersection of Pebble Beach Road and Meadow Vale Drive the latitude is: 38.868159 and the longitude is: -120.002600.

Driving directions from South Lake Tahoe to the survey area are as follows:

> From South Lake Tahoe, continue south on U.S. Highway 50/Lake Tahoe Boulevard to the intersection of U.S. Highway 50/State Route 89/Emerald Bay Road and Lake Tahoe Boulevard. At this intersection, turn south onto U.S. Highway 50/State Route 89/Emerald Bay Road. Travel for approximately 2.8 miles to Elks Club Drive. Elks Club Drive is the northern access into the survey area.

3.0 METHODS

3.1 LITERATURE REVIEW

Available information pertaining to the natural resources of the region was reviewed. References reviewed for this delineation are listed in Section 6.0. Pertinent site-specific reports and general references utilized for the delineation include the following:

- United States Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) mapping.
- USGS National Hydrologic Dataset (NHD) mapping.
- Google Earth.
- United States Department of the Interior, USGS. Echo Lake, Freel Peak, and South Lake Tahoe California 7.5-minute series topographic quadrangles.
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3.2 RESEARCH AND FIELD METHODOLOGY

Prior to the field investigation, USGS topographic maps and NHD mapping, aerial photographs, USFWS NWI mapping, and a NRCS custom soil report of the project survey area were reviewed for indications of ephemeral, intermittent, and perennial drainages as well as mapped wetlands and spring locations.

NCE visited the project survey area on August 23 and 24, 2016 and conducted a formal field investigation to identify possible jurisdictional WOUS (including wetlands). NCE personnel walked all areas possibly containing wetlands and drove all roads in the entire project survey area and identified roadside ditches, man-made swales, an unnamed drainage, and two wetlands within the project survey area.

Roadside Ditches and Man-Made Swales
The team surveyed the entire road system and investigated the presence of the roadside ditches. The roadside ditches were mapped for the presence of a curb and gutter/ac dike conveyance systems or the presence of a swale to better understand the hydrologic flow patterns.

Three man-made swales were identified within the survey area (Appendix H, Features 4-6). The swales were investigated for the presence of ordinary high water mark (OHWM) indicators, some evidence that the drainage experiences surface water flows on a frequent and regular basis, and a connection to a navigable waterway. Two of the three swales were constructed in uplands perpendicular to the slope of the surrounding area.

It appears that the roadside ditches and man-made swales were constructed in uplands to transport storm water downhill or across the slopes, towards the Upper Truckee River.

Unnamed Drainage
The Unnamed Drainage (Appendix H, Feature 1) within the project survey area was assessed for the presence of OHWM indicators, evidence of frequent surface water flows, and a connection to a navigable waterway. These characteristics were considered to be indicative of a jurisdictional WOUS. Arid West Ephemeral and Intermittent Stream OHWM Data Sheets were completed for each drainage with the presence of OHWM indicators. A datasheet for the Unnamed Drainage was labeled CC35/Data Point 11. If the drainage had OHWM indicators present, the drainage was followed to determine if the drainage flowed into another drainage with OHWM indicators or if these indicators terminated. Where the drainage exhibited OHWM indicators, width measurements were taken to be used in determining an average width of the drainage and height measurements from the OHWM to the drainage bottom were taken. When drainages with OHWM indicators left the project survey area, an attempt was made to follow the drainage to determine if OHWM indicators terminated or if there was a connection to a navigable waterway. Ordinary high water mark indicator locations were recorded with a Trimble Geo7x GPS unit and representative photographs were taken.

Representative photographs are provided in Appendix B. The Arid West OHWM data sheets are provided in Appendix C.

Wetlands

Two wetlands within the project survey area were delineated utilizing the USACE 1987 three-parameter (vegetation, hydrology, and soils) methodology (Appendix H, Features 2 and 3). This methodology has been refined in the 2010 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)* and requires the collection of data on soils, vegetation, and hydrology at several locations to establish the potential jurisdictional boundary of wetlands.

The team identified representative locations for data collection. Soil pits were dug and the team collected data on vegetation, hydrology, and soils. Soils were also examined and correlations were developed between the three parameters to make wetland determinations. Data points were evaluated to determine the composition and identification of dominant plant species. The indicator status of all dominant plant species, as determined by the 2016 National Wetland Plant List, version 3.3, was applied and evaluated as part of the vegetation assessment portion of the wetland determination process. Additionally, immediate subsurface soil conditions were examined for hydric attributes or a lack thereof. Observations were made and recorded for both primary and secondary wetland hydrology indicators, if present. Soil pit locations were recorded with a Trimble Geo7x GPS unit and representative photographs were taken.

Representative photographs are provided in Appendix B. The Western Mountains, Valleys, and Coast Region, Wetland Determination data sheets are provided in Appendix D. The plants identified are presented in Appendix E.

3.3 SURVEY DATA INTEGRATION

Boundaries of the potential WOUS within the project survey area were mapped using a Trimble Geo7x GPS unit and digitized in ESRI ArcGIS 10.3 software and by mapping features on aerial photographs as well as topographic basemap.

4.0 RESULTS

4.1 LANDSCAPE SETTING

The project survey area is approximately 67 acres. The entire survey area was delineated by NCE. The survey area includes County of El Dorado road rights of way and undeveloped parcels owned by the CTC and the USFS. The project survey area slopes from the east to the west, with the east being 6520 ft. above mean sea level, and the west being 6280 ft. above mean sea level. The lowest elevation of the project survey area is located in the northwest corner at 6270 ft. above mean sea level.

The project is on the east side of U.S. Highway 50. In the vicinity of the project survey area, the Upper Truckee River begins on the west side of U.S. Highway 50 until crossing under the highway near the northwestern corner of the survey area. The river is not within the survey area.

There are no major water bodies, NWI mapped wetlands, or USGS 'blue line' drainages within the survey area (Appendix A, Figure 4). Outside of the survey area, to the west are two USGS 'blue line' drainages: Meyers Creek and the Upper Truckee River. There are NWI mapped wetlands and drainages to the west of the survey area as well a NWI mapped wetland north of the survey area.

USGS NHD indicated the presence of drainages within the survey area (Appendix A, Figure 4); these features in their entirety were not identified in the field. A portion of one man-made swale and one drainage were identified near the USGS NHD lines (discussed below in Sections 4.2.1 and 4.2.2) and two wetlands were identified near USGS NHD lines (discussed below in Section 4.2.3).

The topography, roadside ditches, and man-made swales within the survey area convey storm water to the west and northwest toward the Upper Truckee River. Two culverts under U.S. Highway 50 were identified within the survey area along the western portion of the project.

Vegetation types were initially identified with the CALVEG GIS data (USDA 2009), and then verified based on a NCE reconnaissance botanical field survey. Vegetation types found in and/or adjacent to the project area are typical of those found in the Lake Tahoe Basin. The project area is composed mainly of Jeffrey Pine. The project area also contains isolated pockets of non-native/ornamental grass, mixed conifer, lodgepole pine, basin sagebrush, perennial grasses, and urban (Appendix A, Figure 3).

Soils within the project survey area have been mapped by the NRCS (NRCS 2016a) (Appendix F). A total of eight types of soil are present; all eight soil types are on the national hydric soils list (NRCS 2016b).

The project area is characterized by predominantly urban development intermixed with fragmented Jeffrey Pine forest. This area produces concentrated storm water runoff that flows from County rights of way to pervious naturally vegetated land and ultimately the Upper Truckee River. Current sediment sources within project area include residential and vehicular traffic, road sand/cinder accumulation from both arterial and collector roadways, and eroding cut slopes and roadside ditches throughout the project area.

Project improvements may include infiltrating and/or treating of storm water from County rights of way, stabilizing eroding cut slopes with vegetation and/or rock protection, stabilizing

existing drainages with rock and/or bio-engineering techniques (where feasible), and disconnecting existing storm drain conveyance systems from directly discharging into the Upper Truckee River. Sediment trapping devices and infiltration basins (on publicly owned parcels) will be used to capture and treat road abrasives and pollutants to reduce the overall storm water volume discharging to the Upper Truckee River.

The overall goal of the project is to design and implement erosion control and water quality improvement measures that will reduce the discharge of sediment and pollutants to Lake Tahoe from County administered rights of way within the Country Club Heights Erosion Control Project area.

A signed statement from the property owner allowing access is not needed because the project survey area is on public property.

4.2 AQUATIC RESOURCES

4.2.1 Roadside Ditches and Man-Made Swales

Roadside Ditches
The majority of the project survey area included roadside ditches. The roadside ditches were investigated to determine if the roadside ditches were potentially federally jurisdictional features. The roadside ditches included ac dike conveyance systems as well as small swales. These features appear to have been constructed in uplands to transport storm water away from development and downhill towards the Upper Truckee River.

A roadside ditch along U.S. Highway 50 on the most western edge of the survey area was identified. The ditch did not show multiple or consistent OHWM indicators along the length of U.S. Highway 50, no NHD data proved that this was once a functioning drainage, and this ditch appears to have been constructed in uplands to transport storm water away from development and the highway.

Due to the ditches being constructed in uplands, NCE determined that the roadside ditches are not federally jurisdictional.

Man-Made Swales
Three man-made swales were identified within the survey area. One at the northern portion of Southern Pines Drive, the second one near the intersection of Meadow Vale Drive and Boca Raton Drive, and one along Elks Club Drive. These swales were constructed perpendicular to the slope of the surrounding area. Appendix A, Figure 2 shows the presence of Southern Pines Drive and Boca Raton Drive, but in the field, portions of these roads are dirt.

Man-Made Swale - Southern Pines Drive: Data Point 12 was collected at the man-made swale near Southern Pines Drive (Appendix A, Figure 5b). Appendix B, Photograph 12 shows a portion of the man-made swale. There is a culvert at the end of Southern Pines Drive, and then the beginning of the man-made swale. The culvert outfall contained water during the investigation, but the water infiltrated into the ground just after the culvert outfall. At the data point location, the man-made swale was dry. The man-made swale is approximately 31 inches wide, with small rocks placed along the edges of the swale. The man-made swale was followed to its end where a sediment basin was constructed. This man-made swale appears to have been constructed in an upland and does not connect to the Upper Truckee River, resulting in this feature being non-federally jurisdictional.

Man-Made Swale – Boca Raton Drive: Data Point 8 was collected at the man-made swale near the intersection of Meadow Vale Drive and Boca Raton Drive (Appendix A, Figure 5a). The feature starts alongside Meadow Vale Drive, then crosses under Meadow Vale Drive with a culvert and continues north along western edge of Boca Raton Drive. Boca Raton Drive pavement stops about 490 feet north of the intersection of Meadow Vale Drive and Boca Raton Drive. The man-made swale continues north under Elks Club Drive near Data Point 4 (OHWM width is 56 inches) and continues to a culvert system near Data Point 5 (OHWM width is 169 inches). The culvert extended to the limits of the project survey area. NCE did not leave the project survey area to determine if there is a surface water connection to the Upper Truckee River due to private land holdings. The Man-Made Swale – Boca Raton Drive contained OHWM widths ranging from 24 inches to 169 inches. Appendix B, Photographs 3, 4, 5, and 7 show this man-made swale.

Man-Made Swale – Elks Club Drive: Data Point 6 was collected at the man-made swale near the intersection of Elks Club Drive and Bel Aire Circle (Appendix A, Figure 5a). The man-made swale contained an OHWM width of 105 inches and is located near a NHD line. The man-made swale followed Elks Club Drive and then turned north to converge with the Boca Raton Drive man-made swale. Appendix B, Photograph 6 shows this man-made swale.

The Man-Made Swales appear to have been constructed in uplands to convey storm water away from the paved roads. Due to the Man-Made Swales being constructed in uplands, NCE determined that the Man-Made Swales are not federally jurisdictional.

Representative photographs are provided in Appendix B (additional photographs are available upon request). The collected data points, and photo-point locations and compass directions are shown on Appendix A, Figures 5a and 5b.

The Arid West OHWM data sheets are provided in Appendix C.

4.2.2 Unnamed Drainage

Unnamed Drainage: One unnamed drainage was identified west of the intersection of Pebble Beach Drive and Boca Raton Road. Within the survey area, Data Point 11 was collected in this drainage and Appendix B, Photograph 11 depicts the upper portion of the drainage. The drainage is mapped on the NHD and had the presence of OHWM indicators. The lower portion of this drainage becomes a man-made swale with check dams and a man-made sediment basin. The drainage was walked to the end where it terminates into a man-made sediment basin in an empty lot of land near U.S. Highway 50. In a large rain event, it appears that the water could overtop and sheet flow into the surrounding landscape with no direct connection to the Upper Truckee River. NCE believes the Unnamed Drainage is not federally jurisdictional.

Representative photographs are provided in Appendix B (additional photographs are available upon request). The collected data points, and photo-point locations and compass directions are shown on Appendix A, Figure 5b.

The Arid West OHWM datasheet is provided in Appendix C.

4.2.3 Wetlands

Two wetlands were delineated within the survey area, one west of Boca Raton Drive and adjacent to U.S. Highway 50 and one north of Cherry Hills Circle.

Wetland 1 – Highway 50: Wetland 1 is west of Boca Raton Drive, and adjacent/east of U.S Highway 50 on the western edge of the project survey area. This wetland is in an undeveloped, publically owned parcel. Data Points 1 and 3 were collected while delineating

the boundary of this wetland; Photographs 1 and 2 were taken (Appendix B). Data Point 1 is in an upland, and Data Point 3 is within the wetland. The wetland had the presence of wetland vegetation, hydric soils, and two secondary hydrology indicators. This area is in a depression just upstream of a culvert under U.S. Highway 50. It appears that in high water years, the wetland would discharge into the culvert and then into the Upper Truckee River. NCE did not confirm the surface water connection due to private land holdings. NCE believes the wetland is federally jurisdictional.

Wetland 2 – Cherry Hills Circle: This wetland is north of Cherry Hills Circle at the northern portion of the project survey area. This wetland is in undeveloped, publically owned parcels. Data Points 9 and 10 were collected while delineating the boundary of this wetland. Data Point 9 is in an upland, and Data Point 10 is within the wetland. Appendix B, Photographs 8, 9, and 10 depict the upland and wetland soil pits, as well as an overview of the wetland. The wetland had the presence of wetland vegetation, hydric soils, and the presence of standing water in the low spots of the wetland. The wetland is hydrologically connected to the NWI mapped wetland north of the survey area. NCE assumes the NWI mapped wetland is hydrologically connected to the Upper Truckee River, resulting in Wetland 2 – Cherry Hills Circle being federally jurisdictional.

Representative photographs are provided in Appendix B (additional photographs are available upon request). The collected data points, and photo-point locations and compass directions are shown on Appendix A, Figures 5a and 5b.

The Western Mountains, Valleys, and Coast Region, Wetland Determination Data Sheets are provided in Appendix C.

The plants identified at the two wetlands are included in Appendix E.

Table 1 below presents the aquatic resources within the survey area.

Table 1. Aquatic Resources within the Survey Area

Aquatic Resource Name	Aquatic Resources Classification		Aquatic Resource Size (acre) Required for all resources	Aquatic Resource Size (linear feet) Required for only stream channels
	Cowardin	Location (Latitude and Longitude)		
Man-Made Swale - Southern Pines Drive	Upland	38.866351, -120.008101	0.223	854
Man-Made Swale – Boca Raton Drive	Upland	38.874472, -120.003164; 38.870223, -120.003968; 38.875724, -120.002807	0.719	2,317
Man-Made Swale – Elks Club Drive	Upland	38.873512, -120.002076	0.099	493
Unnamed Drainage	Intermittent Riverine	38.868561, -120.00527	0.007	309
Wetland 1 – Highway 50	Palustrine Emergent Nonpersistent Wetland	38.868713, -120.006675	0.014	Not Applicable
Wetland 2 – Cherry Hills Circle	Palustrine Emergent Persistent Wetland	38.875466, -119.997785	0.573	Not Applicable
Total			**1.635**	

Table 2 below provides acreage per class and summarizes the total acreage of wetlands and waters in the survey area.

Table 2. Waters of the U.S: Acreage According to Class

Class	Total Acres	Jurisdictional	Non-Jurisdictional
Ditches (Man-Made Swale - Southern Pines Drive)	0.223	0.0	0.223
Ditches (Man-Made Swale - Boca Raton Drive)	0.719	0.0	0.719
Ditches (Man-Made Swale – Elks Club Drive)	0.099	0.0	0.099
Intermittent Drainage (Unnamed Drainage)	0.007	0.0	0.007
Palustrine Emergent Nonpersistent (Wetland 1 – Highway 50)	0.014	0.014	0.0
Palustrine Emergent Persistent (Wetland 2 – Cherry Hills Circle)	0.573	0.573	0.0
TOTAL	**1.635**	**0.587**	**1.048**

4.3 SIGNIFICANT NEXUS

The U.S Army Corps of Engineers Jurisdictional Determination Form Instructional Guidebook (USACE 2007) was consulted to aid the preliminary determination whether an area would be subject to USACE jurisdiction under Section 404 of the Clean Water Act. The significant nexus test, outlined in a memorandum jointly authored by the U.S. Environmental Protection Agency and USACE, was applied to each potentially jurisdictional habitat type (Grumbles and Woodley 2008). To facilitate jurisdictional determination consistent with the guidance, each water body delineated was evaluated as a Traditional Navigable Waterway (TNW), Relatively Permanent Water (RPW), or non-RPW, based on the following definitions:

- TNWs include all waters subject to the ebb and flow the tide, or waters that are presently used, have been used in the past, or may be used in the future to transport interstate or foreign commerce, and all waters that are navigable in fact under federal law for any purpose.
- RPWs are waters that flow continuously at least seasonally (typically at least 3 months of the year) and are not TNWs.
- Non-RPWs are waters that do not have continuous flow at least seasonally.

The following types of water bodies are subject to Clean Water Act jurisdiction:

- All TNWs and adjacent wetlands;
- Relatively permanent tributaries of TNWs and wetlands with a continuous surface connection to such tributaries; and
- Non-relatively permanent tributaries of TNWs and adjacent wetlands if they have a significant nexus to a TNW. Non-RPWs and adjacent wetlands are determined to have a significant nexus to a TNW if they significantly affect the chemical, physical, or biological integrity of a downstream TNW.

NCE's professional opinion is that Wetland 1 and Wetland 2 are hydrologically connected to Meyers Creek and/or the Upper Truckee River which is a tributary to Lake Tahoe, a navigable waterway. Both wetlands have the ability to affect the chemical, physical, and/or biological integrity of Lake Tahoe, resulting in a significant nexus to Lake Tahoe.

Appendix G contains a digital copy of the Aquatic Resource Excel Sheet, the GIS metadata, and a compact disc of Final Aquatic Resources Delineation Report.

Appendix H contains the Aquatic Resource Delineation Maps.

The above findings should be considered preliminary until the USACE makes a final approved jurisdictional determination in coordination with the United States Environmental Protection Agency. Areas deemed jurisdictional will then be subject to the regulatory requirements of the federal Clean Water Act.

5.0 OTHER STUDIES

Database searches, field assessments and surveys were conducted for the presence of species, habitat and range for wildlife, botanical, and invasive weeds. Also, database searches, tribal coordination, and a pedestrian foot survey were/will be conducted for cultural resources.

Botanical

Special status botanical species were not found within the project area during a field survey performed by NCE biologists on August 22, 2016 (NCE 2016a). There is USFS modeled habitat for *Lewisia kellloggii, Peltigera hydrothria, Epilobium howellii, Meesia* spp.*, Helodium blandowii Botrychium* spp.*,* and *Bruchia bolanderi* within the project area; however, the probability for these species occurring is low as the required habitat conditions are marginal in the project vicinity.

Invasive Weeds

Five invasive plant species were found in the project area during a field survey performed by NCE biologists on August 22, 2016 (NCE 2016b). These species are: bull thistle (13 square feet of infested area); oxeye daisy (1.5 square feet of infested area); cheat grass (100 square feet of infested area); poison hemlock (5 square feet of infested area); and yellow toadflax (30 square feet of infested area). There is low risk of new introduction and a moderate risk of spreading invasive plants due to this project.

Wildlife

There are no known occurrences of special status species within the project survey area (NCE 2016c); however, there are recorded occurrences of special status species immediately adjacent to the project survey area and within the project's 0.5 mile buffer. No signs, evidence, or suitable habitat were found for special status species during surveys performed by NCE biologists on August 10, 2016. Furthermore, habitat within the survey area is small, fragmented, and presently highly impacted by human use and disturbance.

Cultural Resources

NCE requested a records search from the North Central Information Center (NCIC) on August 11, 2016 and received results on September 7, 2016. Results indicate that two cultural resources have been previously identified within the project area (300 acres). A search of the USFS cultural resources database indicates that three additional cultural resources, not accounted for by the NCIC, are within the project area.

Inquiry letters are in the process of being mailed to the applicable parties and a pedestrian foot survey will be conducted on September 13, 2016.

These reports are available upon request.

6.0 REFERENCES

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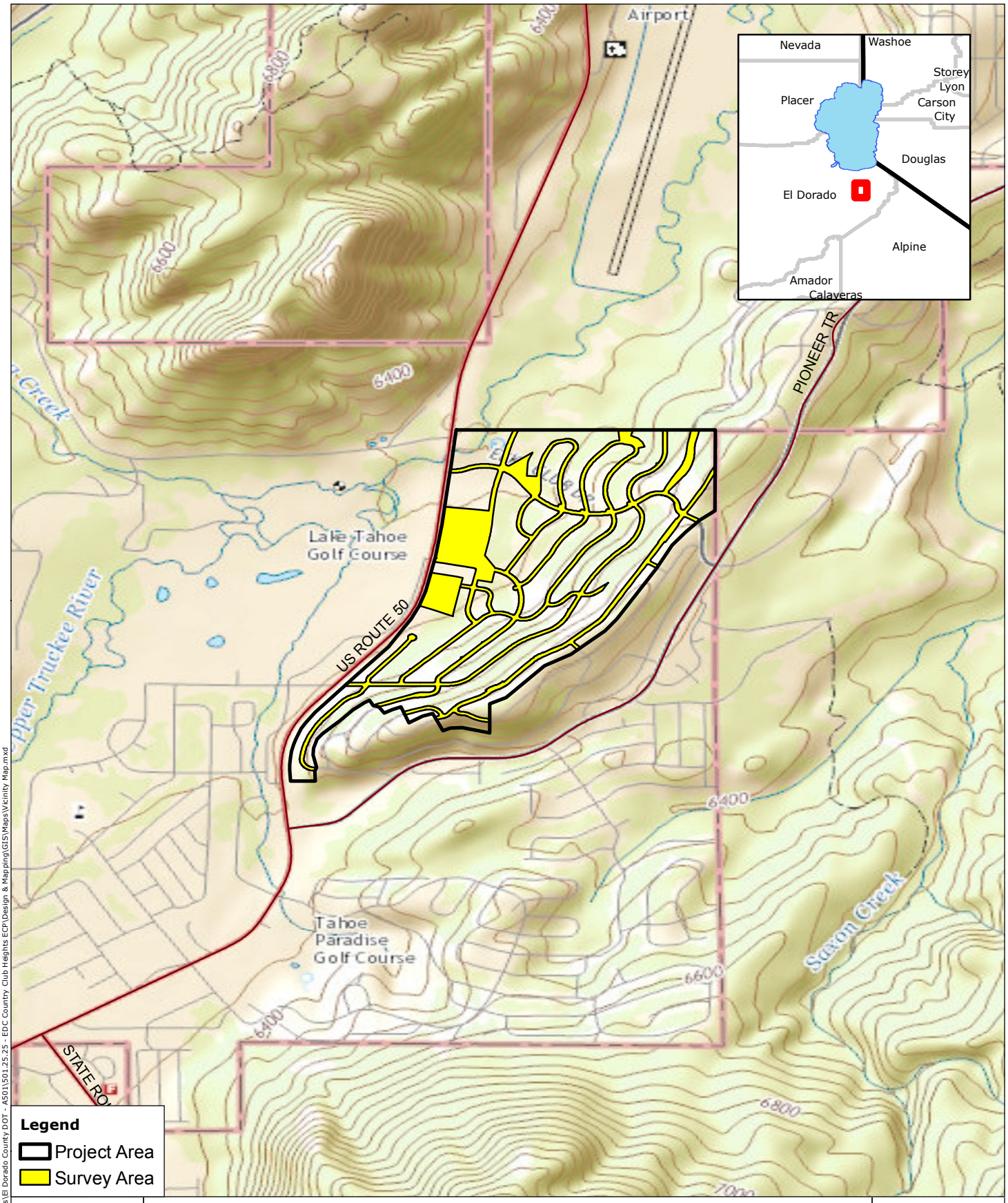
Appendix A

SUPPORTING MAPS



Country Club Heights Erosion Control Project

Vicinity Map

1 in. = 2,000 ft.

0 1,000 2,000 ft.

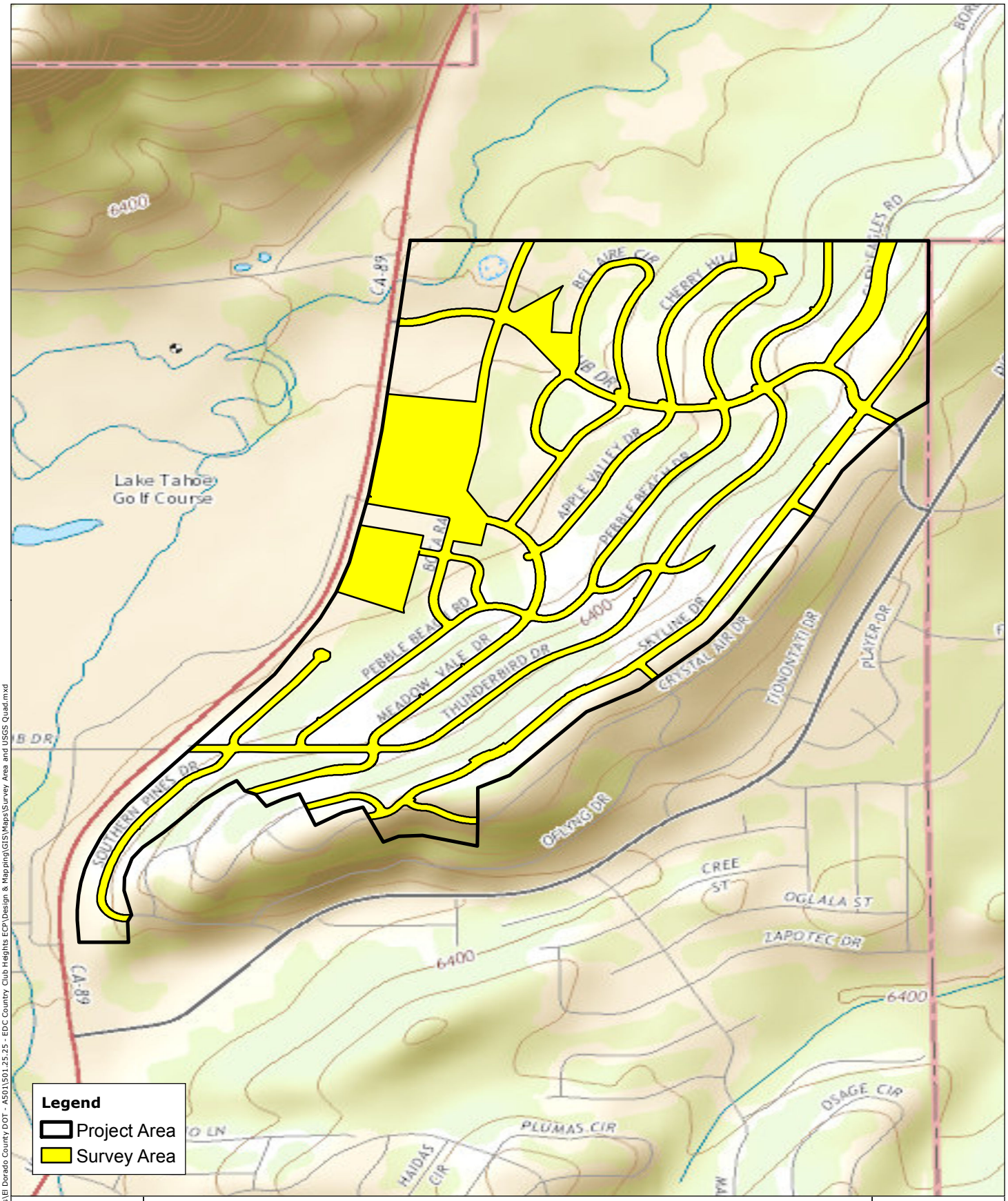
N

Credits: ESRI World Imagery basemap; other data sources

Date: 9/14/2016
Author: kkelso

Figure 1

Document Path: P:\Active Projects\El Dorado County DOT - A501\501.25.25 - EDC Country Club Heights ECP\Design & Mapping\GIS\Maps\Vicinity Map.mxd



Country Club Heights Erosion Control Project

Project Survey Area with USGS Quadrangle

1 in. = 1,000 ft.

0 500 1,000 ft.

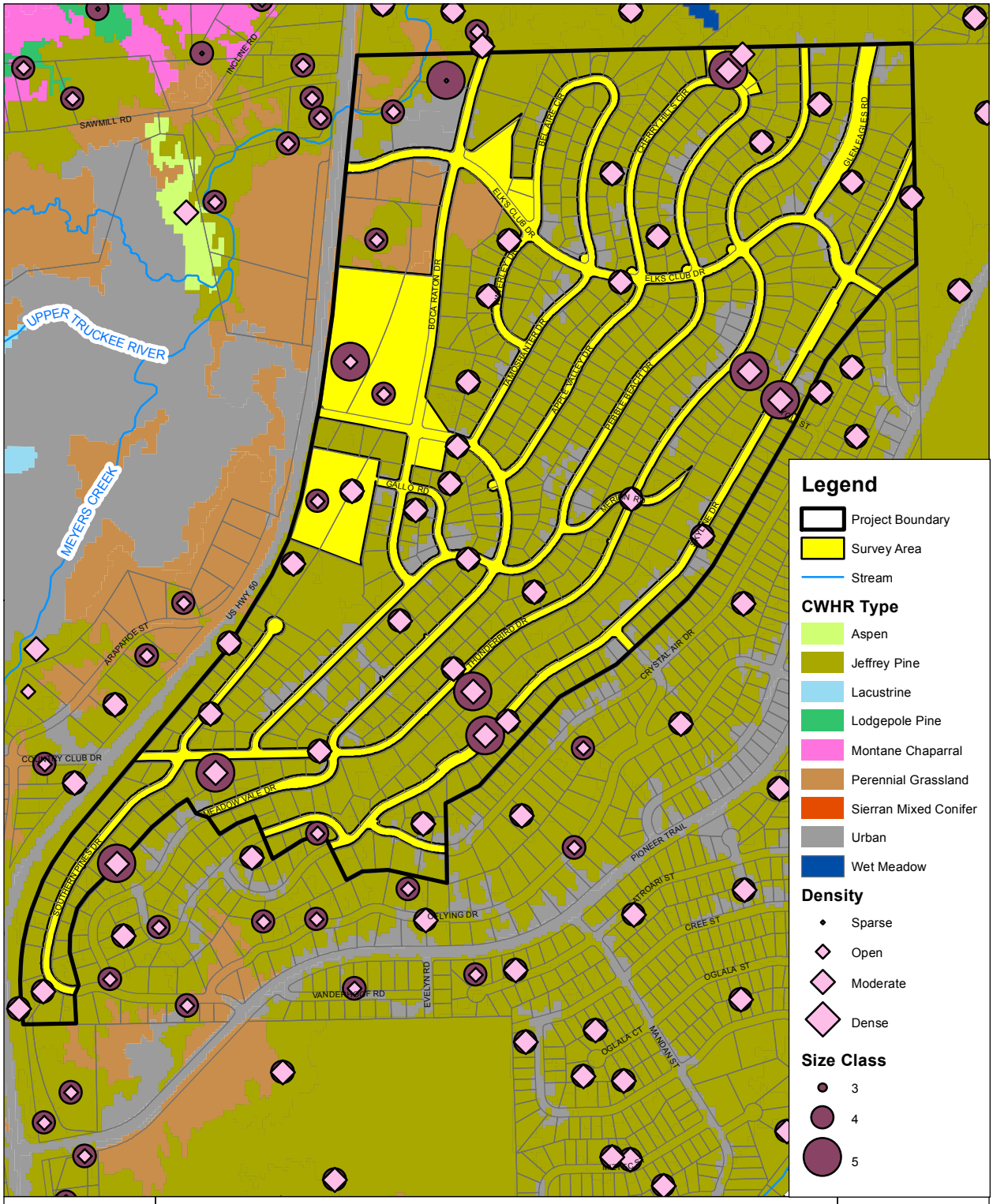
N

Credits: ESRI World Imagery basemap; other data sources

Date: 9/14/2016
Author: kkelso

Figure 2

Document Path: P:\Active Projects\El Dorado County DOT - A501\501.25.25 - EDC Country Club Heights ECP\Design & Mapping\GIS\Maps\Survey Area and USGS Quad.mxd



Country Club Heights ECP

CWHR Type, Size, and Density

1:10,000

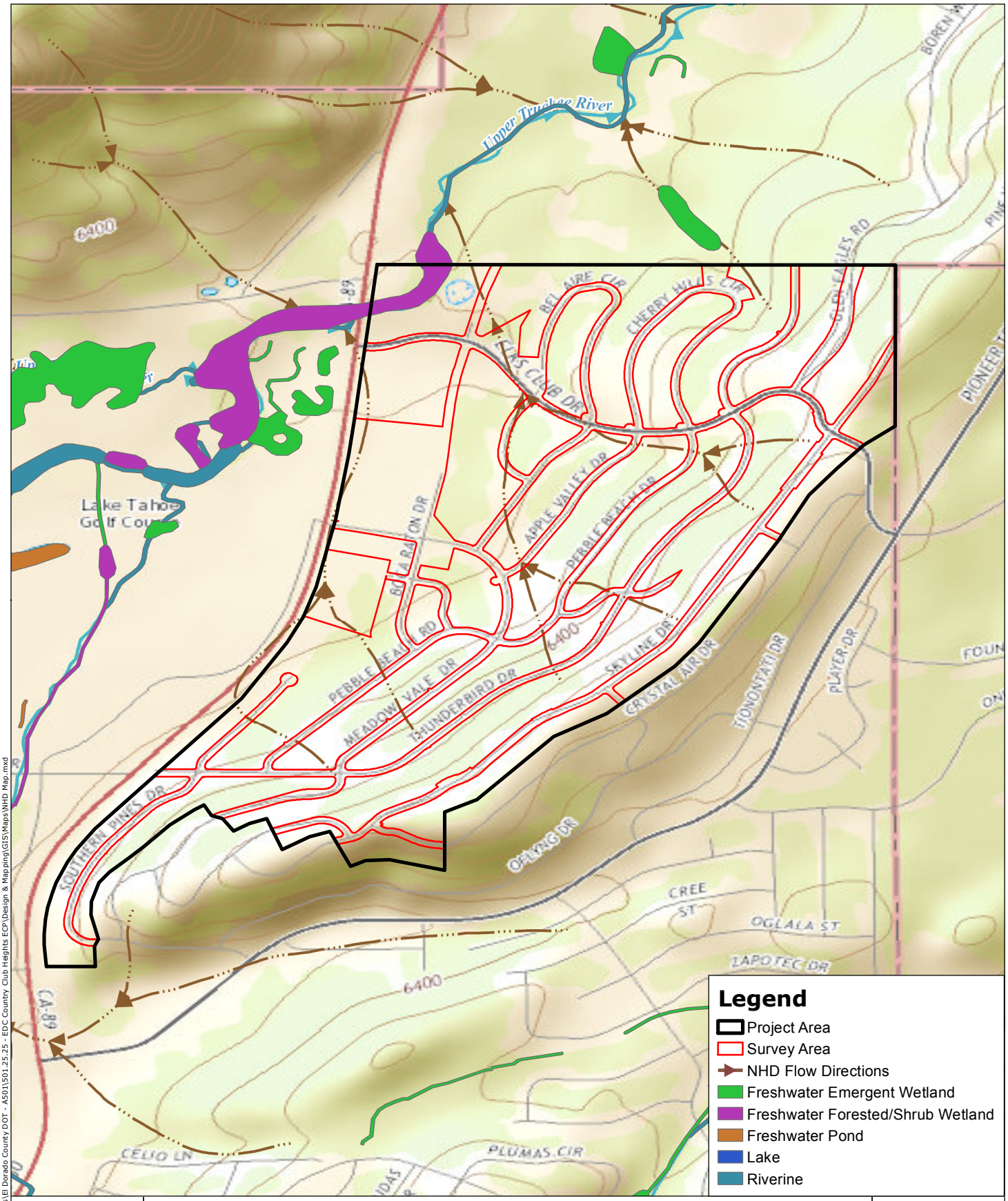
0 500 1,000 ft.

N

Credits: ESRI; El Dorado County; CWHR; TRPA

Date: 9/2/2016
Author: mrios

Figure 3



Legend

- Project Area
- Survey Area
- NHD Flow Directions
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

Country Club Heights Erosion Control Project

USGS Blue Line Drainages, NHD, and NWI Map

1 in. = 1,000 ft.

0 500 1,000 ft.

N

Credits: ESRI World Imagery basemap; other data sources

Date: 9/14/2016
Author: kkelso

Figure 4

NCE

Document Path: P:\Active Projects\El Dorado County DOT - A501\501.25.25 - EDC Country Club Heights ECP\Design & Mapping\GIS\Maps\NHD Map.mxd

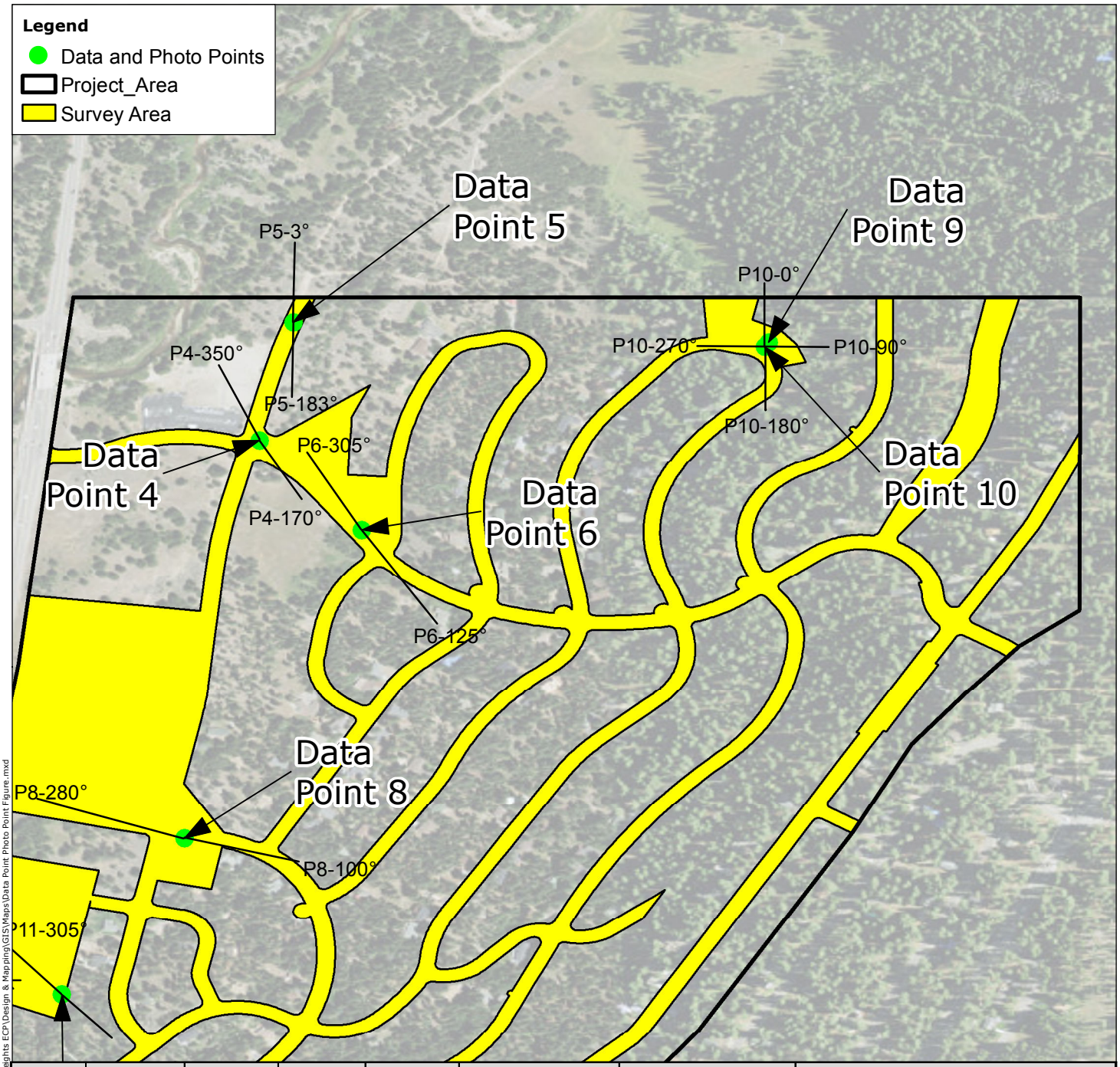


Photo Point	Direction from point (unique name)	Direction from point (unique name)	Direction from point (unique name)	Direction from point (unique name)	Latitude (decimal degrees)	Longitude (decimal degrees)	Relevance
1	320° (P1-320°)	130° (P1-130°)			38.869203	-120.006481	Upland Data Point for Wetland 1 - PEM nonpersistent
3	0° (P3-0°)	90° (P3-90°)	270° (P3-270°)		38.868713	-120.006675	PEM non persistent Data Point
4	350° (P4-350°)	170° (P4-170°)			38.874472	-120.003164	Man Made Swale where Data Point was taken
5	3° (P5-3°)	183° (P5-183°)			38.875724	-120.002807	Man Made Swale where Data Point was taken
6	305° (P6-305°)	125° (P6-125°)			38.873512	-120.002076	Man Made Swale where Data Point was taken
8	280° (P8-280°)	100° (P8-100°)			38.870223	-120.003968	Man Made Swale where Data Point was taken
9	exact point (P9)				38.87551	-119.997744	Upland Data Point for Wetland 2 - PEM persistent
10	0° (P10-0°)	90° (P10-90°)	180° (P10-180°)	270° (P10-270°)	38.875466	-119.997785	Data Point for Wetland 2 - PEM persistent
11	125° (P11-125°)	305° (P11-305°)			38.868561	-120.00527	Intermittent Riverine Data Point
12	20° (P12-20°)	200° (P12-200°)			38.866351	-120.008101	Man Made Swale where Data Point was taken

Country Club Heights Erosion Control Project

Data Point and Photo Point Map - northern portion of survey area

1 in. = 572 ft.

0 310 620 ft.

N

Credits: ESRI World Imagery basemap; other data sources

Date: 9/14/2016
Author: kkelso

Figure 5a

Document Path: P:\Active Projects\El Dorado County DOT - A501\501-25.25 - EDC Country Club Heights ECP\Design & Mapping\GIS\Maps\Data Point Photo Point Figure.mxd

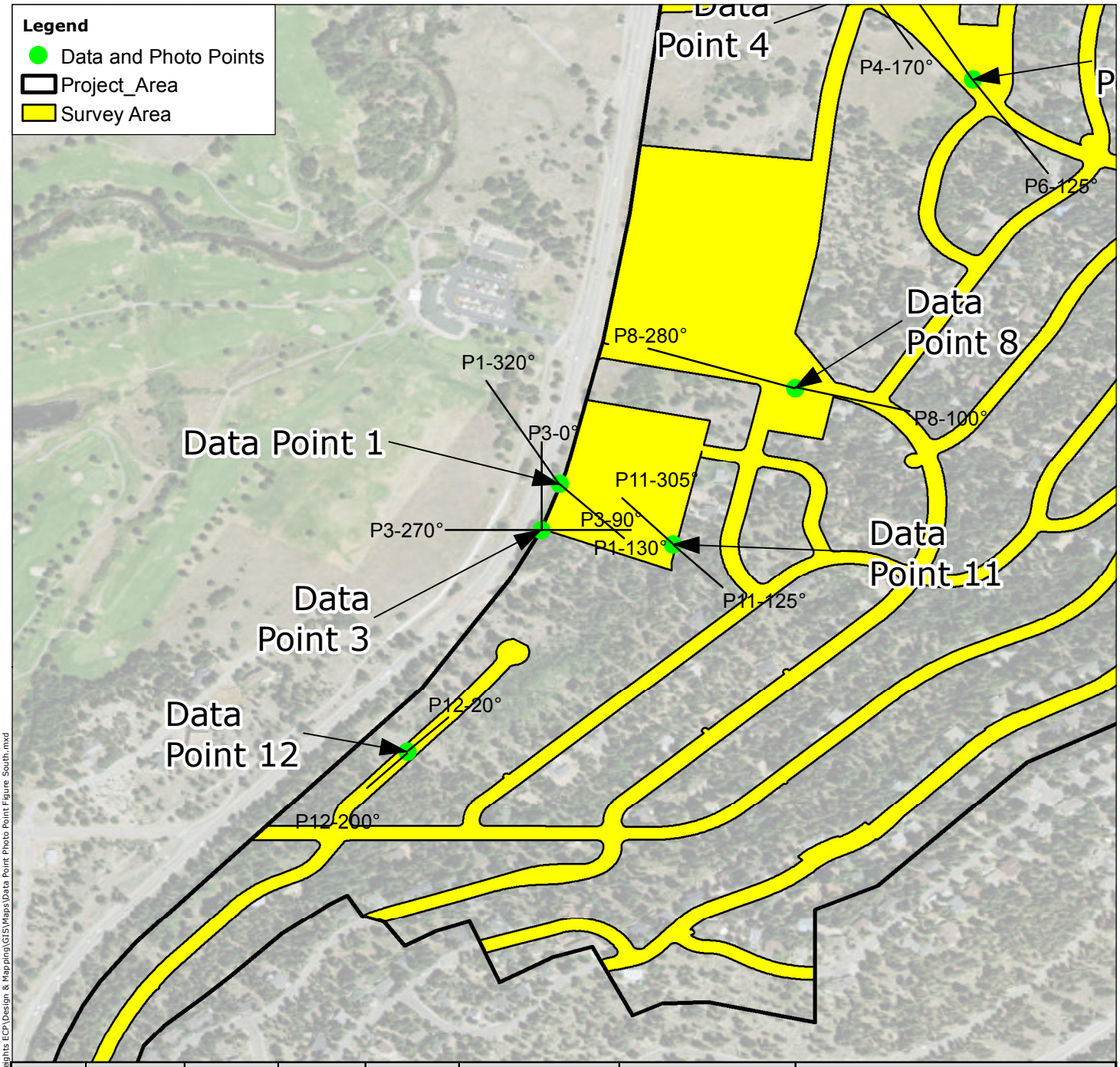


Photo Point	Direction from point (unique name)	Direction from point (unique name)	Direction from point (unique name)	Direction from point (unique name)	Latitude (decimal degrees)	Longitude (decimal degrees)	Relevance
1	320° (P1-320°)	130° (P1-130°)			38.869203	-120.006481	Upland Data Point for Wetland 1 - PEM nonpersistent
3	0° (P3-0°)	90° (P3-90°)	270° (P3-270°)		38.868713	-120.006675	PEM non persistent Data Point
4	350° (P4-350°)	170° (P4-170°)			38.874472	-120.003164	Man Made Swale where Data Point was taken
5	3° (P5-3°)	183° (P5-183°)			38.875724	-120.002807	Man Made Swale where Data Point was taken
6	305° (P6-305°)	125° (P6-125°)			38.873512	-120.002076	Man Made Swale where Data Point was taken
8	280° (P8-280°)	100° (P8-100°)			38.870223	-120.003968	Man Made Swale where Data Point was taken
9	exact point (P9)				38.87551	-119.997744	Upland Data Point for Wetland 2 - PEM persistent
10	0° (P10-0°)	90° (P10-90°)	180° (P10-180°)	270° (P10-270°)	38.875466	-119.997785	Data Point for Wetland 2 - PEM persistent
11	125° (P11-125°)	305° (P11-305°)			38.868561	-120.00527	Intermittent Riverine Data Point
12	20° (P12-20°)	200° (P12-200°)			38.866351	-120.008101	Man Made Swale where Data Point was taken

Country Club Heights Erosion Control Project

Data Point and Photo Point Map - southern portion of survey area

1 in. = 572 ft.

0 310 620 ft.

N

Credits: ESRI World Imagery basemap; other data sources

Date: 9/14/2016
Author: kkelso

Figure 5b

NCE

Document Path: P:\Active Projects\El Dorado County DOT - A501\501.25.25 - EDC Country Club Heights ECP\Design & Mapping\GIS\Maps\Data Point Photo Point Figure South.mxd

Appendix B

REPRESENTATIVE PHOTOGRAPHS

Photo 1: The location of upland Data Point 1 (P1-130°).

Photo 2: Data Point 3, Palustrine Emergent Nonpersistent Wetland (P3-0°).

Photo 3: Man-Made Swale along Boca Raton Drive.

Photo 4: Data Point 4 showing Man-Made Swale near corner of Boca Raton Drive and Elks Club Drive. Photo is taken facing north in downstream direction (P4-350°).

Photo 5: Data Point 5 facing upstream toward the south. The Man-Made Swale is located parallel to the dirt road, Boca Raton Drive (P5-183°).

Photo 6: Data Point 6, a man-made swale facing downstream. Man-made swale is adjacent to Elks Club Road (P6-305°).

Photo 7: Data Point 8 looking upstream of man-made swale along Meadow Vale Drive (P8-100°).

Photo 8: Data Point 9, soil from pit at upland.

Photo 9: Data Point 10, soil from Palustrine Emergent Persistent Wetland. Note visible redox features.

Photo 10: Data Point 10, view of Palustrine Emergent Persistent Wetland (P10-270°).

Photo 11: Data Point 11, upper portion of intermittent drainage facing upstream towards culvert off of Pebble Beach Drive (P11-125°). This drainage terminates into a man-made sediment basin.

Photo 12: Data Point 12, looking downstream at man-made swale which runs along dirt portion of Southern Pines Drive (P12-20°0).

Appendix C

OHWM DATA SHEETS

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Country Club Heights
Project Number: ASD1.25.25
Stream: Swale to Upper Truckee River
Investigator(s): Debra Lemke + Kelley Kelso

Date: 8/23/16 **Time:** 1:00 PM
Town: El Dorado County **State:** CA
Photo begin file#: 21 **Photo end file#:** 22

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: Corner of Elks Club Dr. and Boca Raton Dr.

Projection: 38.874472 **Datum:** NAD 1983
Coordinates: -120.003164

Potential anthropogenic influences on the channel system:
This swale was constructed to convey flows from Elks Club Drive to the Upper Truckee River. Elks Club Drive mimics the natural drainage direction mapped by NHD.

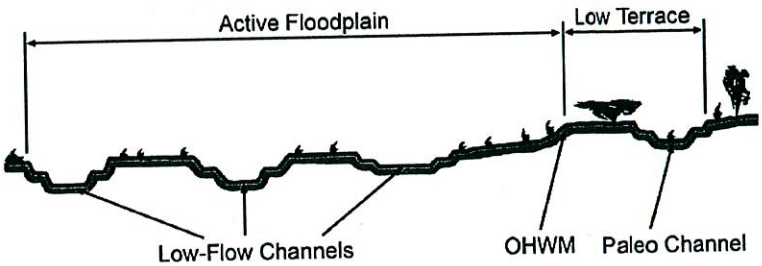
Brief site description:
Site is adjacent to a dirt road (Boca Raton Dr.) and paved road (Elks Club Dr.). A culvert conveys water into swale which discharges into Upper Truckee River. Swale is dry.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 4/16/2015, earliest 12/1940
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

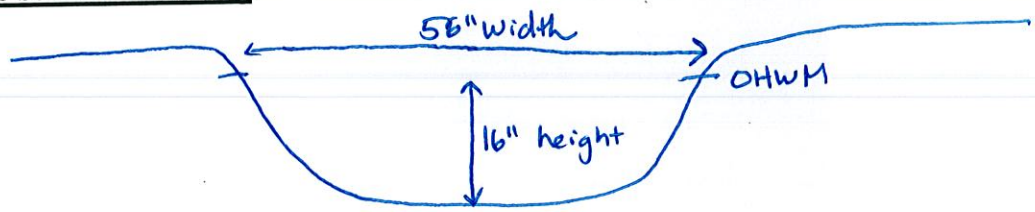


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: A501.25.25 **Cross section ID:** **Date:** 8/23/16 **Time:** 1:00 PM

Cross section drawing:



OHWM

GPS point: CC 11, Data Point 4

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

350°N facing downstream, photo 21

170°S facing upstream, photo 22

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: CC 11

Characteristics of the floodplain unit:

Average sediment texture: loam

Total veg cover: 20 % Tree: 10 % Shrub: — % Herb: 10 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Country Club Heights
Project Number: A 501. 25. 25
Stream: Swale to Upper Truckee River
Investigator(s): Debra Lemke + Kelley Kelso

Date: 8/23/16 **Time:** 1:15 PM
Town: El Dorado County **State:** CA
Photo begin file#: 23 **Photo end file#:** 24

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: swale before 2 culverts draining to Upper Truckee River

Projection: 38.875724 **Datum:** NAD 1983
Coordinates: -120.002807

Potential anthropogenic influences on the channel system:
Dirt road adjacent to channel. Two culverts transport drainage water under dirt road and into continuation of drainage to the Upper Truckee River.

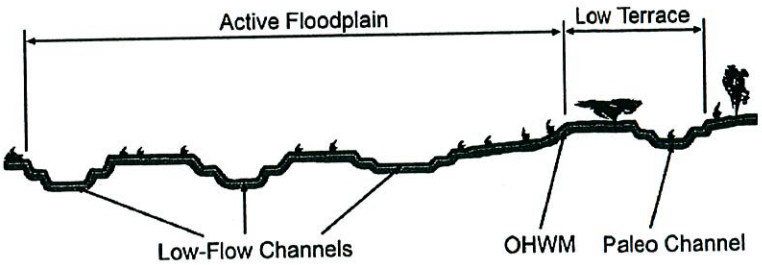
Brief site description:
End of Boca Raton Rd. (dirt road) where culverts convey water under road towards the Upper Truckee River

Checklist of resources (if available):

- ☑ Aerial photography
  Dates: 4/16/2015, earliest 12/1940
- ☑ Topographic maps
- ☑ Geologic maps
- ☑ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
  - ☐ History of recent effective discharges
  - ☐ Results of flood frequency analysis
  - ☐ Most recent shift-adjusted rating
  - ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

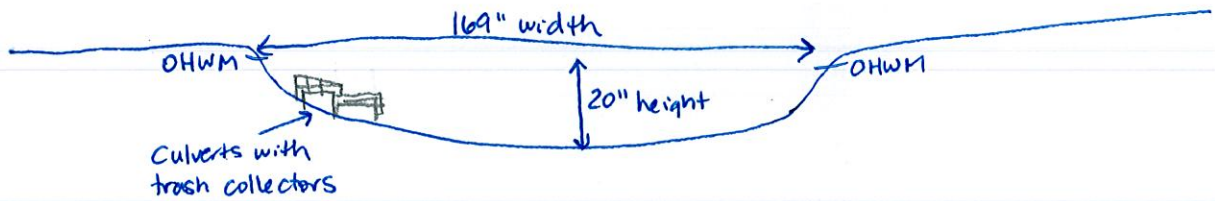


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

Project ID: A501.25.25 **Cross section ID:** **Date:** 8/23/16 **Time:** 1:15 PM

Cross section drawing:



OHWM

GPS point: Data Point 5, cc15

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

3° N facing downstream, photo 23

18~~6~~3° S facing upstream, photo 24

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: cc15

Characteristics of the floodplain unit:

Average sediment texture: _____

Total veg cover: 30 % Tree: — % Shrub: — % Herb: 30 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Country Club Heights
Project Number: A501.25.25
Stream: swale along Elks Club Road at Bel Aire Cir.
Investigator(s): Debra Lemke + Kelley Kelso

Date: 8/23/16
Town: El Dorado Co.
Photo begin file#: 25

Time: 1:33 PM
State: CA
Photo end file#: 26

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: Vegetated swale parallel to Elks Club Road

Projection: 38.873512 **Datum:** NAD 1983
Coordinates: -120.002076

Potential anthropogenic influences on the channel system:
Elks Club Rd. on left when facing down stream, then curb + gutter, then vegetated drainage swale. Curb and gutter may reduce flow to swale.

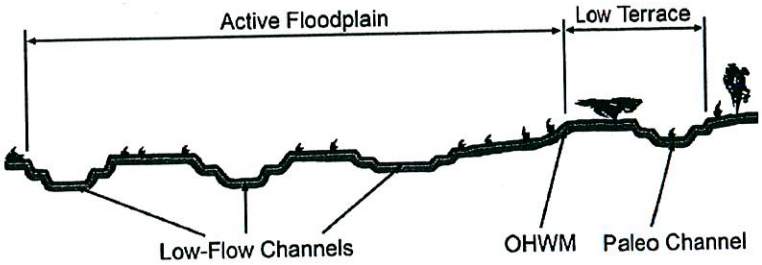
Brief site description: Drainage swale with willow, sedges, grasses, Juncus balticus, bull thistle, and weeds.

Checklist of resources (if available):

- [x] Aerial photography
  Dates: 4/16/2015, earliest 12/1940
- [x] Topographic maps
- [x] Geologic maps
- [x] Vegetation maps
- [x] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [x] Global positioning system (GPS)
- [ ] Other studies

- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

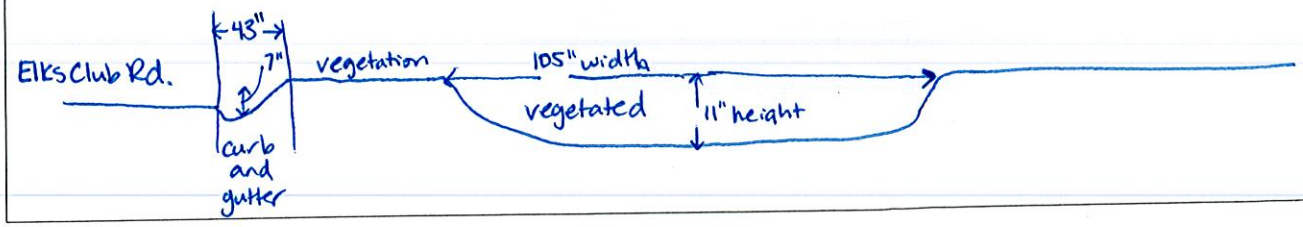


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [x] GPS
   - [ ] Other:

Project ID: A501.25.25 **Cross section ID:** **Date:** 8/23/16 **Time:** 1:33PM

Cross section drawing:



OHWM

GPS point: Data Point 6, CC17

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

305° N facing downstream, photo 25
125° S facing upstream, photo 26

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: CC17

Characteristics of the floodplain unit:

Average sediment texture: _____
Total veg cover: 100 % Tree: ____ % Shrub: 50 % Herb: 50 %
Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Country Club Heights
Project Number: A501.25.25
Stream: Swale along Meadowvale Rd.
Investigator(s): Debra Lemke + Kelley Kelso

Date: 8/23/16 **Time:** 2:15 PM
Town: El Dorado Co. **State:** CA
Photo begin file#: 30 **Photo end file#:** 31

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: Roadside swale on Meadowvale Rd.

Projection: 38.870223 **Datum:** NAD 83
Coordinates: -120.003968

Potential anthropogenic influences on the channel system:
Road side swale constructed adjacent to Meadowvale Road.

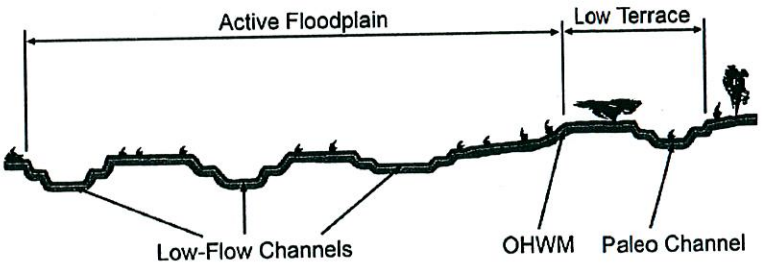
Brief site description:
Vegetated swale constructed in an upland to convey runoff from Meadowvale Rd.

Checklist of resources (if available):

- [x] Aerial photography
  Dates: 4/16/2015, earliest 12/1940
- [x] Topographic maps
- [x] Geologic maps
- [x] Vegetation maps
- [x] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [x] Global positioning system (GPS)
- [ ] Other studies

- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [ ] GPS
   - [ ] Other:

Project ID: A501.25.25 **Cross section ID:** **Date:** 8/23/16 **Time:** 2:15 PM

Cross section drawing:

24" width, 3" height

OHWM

GPS point: CC26, D.P. 8

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

facing upstream, photo 30
facing downstream, photo 31

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: CC 26

Characteristics of the floodplain unit:

Average sediment texture: loam

Total veg cover: 80 % Tree: ____ % Shrub: ____ % Herb: 80 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Country Club Heights
Project Number: A801-25.25
Stream: Unnamed Drainage
Investigator(s): Debra Lemke + Kelley Kelso

Date: 8/24/16 **Time:** 9:24 AM
Town: El Dorado Co. **State:** CA
Photo begin file#: 38 **Photo end file#:** 39

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: Drainage from veg swale from culvert on Pebble Beach Dr.

Projection: 38.868561 **Datum:** NAD 83
Coordinates: -120.00527

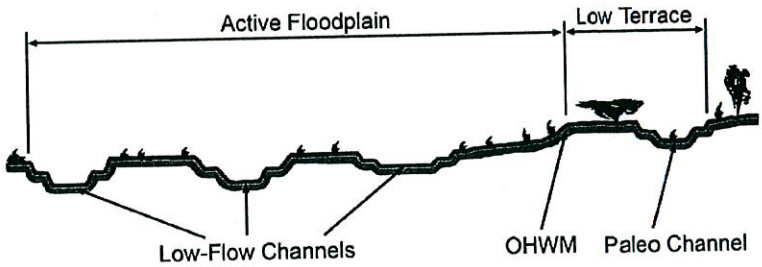
Potential anthropogenic influences on the channel system:
Nearby roads and housing complex. A foot trail crosses drainage. Drainage discharges into man made basin. In large storm event, basin would overflow into culvert system under Hwy 50.

Brief site description:
Dry drainage with grasses, sedges, Equisetum arvense, Juncus spp. Surrounding area Jeffrey pine. Drainage is mapped on NHD.

Checklist of resources (if available):

- [X] Aerial photography
  Dates: 4/16/2015, earliest 12/1940
- [ ] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [ ] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [ ] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [X] GPS
   - [ ] Other:

Project ID: A501.25.25 **Cross section ID:** **Date:** 8/24/16 **Time:** 9:24 AM

Cross section drawing:

26" wide, 7" high

OHWM

GPS point: CC 35 data point 11

Indicators:

- [ ] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments:

305° N facing downstream, photo 38
125° S facing upstream, photo 39

Floodplain unit:

- [x] Low-Flow Channel
- [ ] Active Floodplain
- [ ] Low Terrace

GPS point: CC 35 Data Point 11

Characteristics of the floodplain unit:

Average sediment texture: sandy loam

Total veg cover: 90 % Tree: 10 % Shrub: ____ % Herb: 80 % 10% bare ground

Community successional stage:

- [ ] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [x] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [ ] Other: _____
- [ ] Other: _____
- [ ] Other: _____

Comments:

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Country Club Heights
Project Number: 501.25.25
Stream: roadside swale
Investigator(s): Debra Lemke + Kelley Kelso

Date: 8/24/16
Town: El Dorado Co.
Photo begin file#: 40

Time: 10:00 AM
State: CA
Photo end file#: 42

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: vegetated swale adjacent to dirt portion of southern pines drive.

Projection: 38.866351
Datum: NAD 83
Coordinates: -120.008101

Potential anthropogenic influences on the channel system:
Man made dirt road parallels drainage. Rocks placed along both banks. Culvert at end of road conveys water under road and then surface flows toward Hwy. 50. Housing complex nearby.

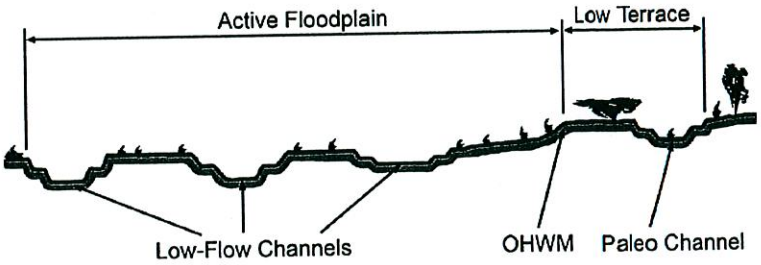
Brief site description:
Swale at corner of Thunderbird and Southern Pines Dr collects drainage from culvert with small amount of flow. Flow soaks into ground and swale is dry further down stream. Swale is vegetated with upland forest on both sides.

Checklist of resources (if available):

- [X] Aerial photography
  Dates: 4/16/15, earliest 12/1940
- [X] Topographic maps
- [X] Geologic maps
- [X] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies

- [ ] Stream gage data
  Gage number:
  Period of record:
  - [ ] History of recent effective discharges
  - [ ] Results of flood frequency analysis
  - [ ] Most recent shift-adjusted rating
  - [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

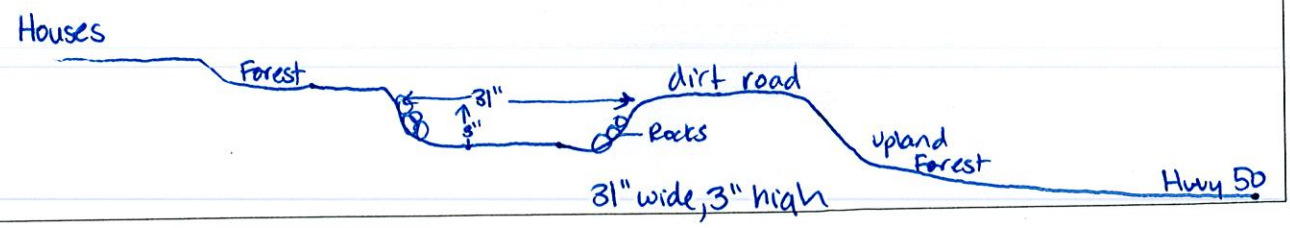


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [ ] Digitized on computer
   - [X] GPS
   - [ ] Other:

Project ID: 501.25.25 **Cross section ID:** **Date:** 8/24/16 **Time:** 10:00 AM

Cross section drawing:



OHWM

GPS point: CC 44, ~~#~~ data point 12

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☐ Other: _____
- ☐ Other: _____

Comments:

20° N facing downstream, photo 42

200° S facing upstream, photo 41

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: CC 44

Characteristics of the floodplain unit:

Average sediment texture: sand

Total veg cover: ____ % Tree: ____ % Shrub: 15 % Herb: 60 % Bare Ground 25%.

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments:

Culvert at Thunderbird and Southern Pines Dr – photo 40

Appendix D

Western Mountains, Valleys, and Coast Region, Wetland Determination Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Country Club Heights City/County: El Dorado County Sampling Date: 8-23-16

Applicant/Owner: El Dorado County State: CA Sampling Point: 1

Investigator(s): Debra Lemke and Kelley Kelso Section, Township, Range: S20, T12N R18E

Landform (hillslope, terrace, etc.): meadow Local relief (concave, convex, none): convex Slope (%): 2%

Subregion (LRR): D; MLRA 22A Lat: 38.868713 Long: -120.006675 Datum: WGS 84

Soil Map Unit Name: Celio loamy coarse sand, 0 to 5% slopes NWI classification: none

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

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

Are Vegetation _____, Soil _____, 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 _____	No x	
Wetland Hydrology Present?	Yes _____	No x	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus contorta	10	Y	FAC
2.			
3.			
4.			
	10 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5 m)			
1. Purshia tridentata	2	Y	UPL
2.			
3.			
4.			
5.			
	2 = Total Cover		
Herb Stratum (Plot size: 1 m)			
1. Elymus glaucus	40	Y	FACU
2. unknown weed species	10	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

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

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

Percent of Dominant Species That Are OBL, FACW, or FAC: 25% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	1	x 3 =	3
FACU species	1	x 4 =	4
UPL species	2	x 5 =	10
Column Totals:	4 (A)		17 (B)

Prevalence Index = B/A = 4.25

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks:

SOIL

Sampling Point: 1

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 %	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 4/3	100					gravelly sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ 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) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

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 – Western Mountains, Valleys, and Coast Region

Project/Site: Country Club Heights City/County: El Dorado County Sampling Date: 8-23-16

Applicant/Owner: El Dorado County State: CA Sampling Point: 3

Investigator(s): Debra Lemke and Kelley Kelso Section, Township, Range: S20, T12N R18E

Landform (hillslope, terrace, etc.): meadow Local relief (concave, convex, none): concave Slope (%): 2%

Subregion (LRR): D; MLRA 22A Lat: 38°52'07.21"N Long: 120°00'24.36"W Datum: WGS 84

Soil Map Unit Name: Celio loamy coarse sand, 0 to 5% slopes NWI classification: none

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

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

Are Vegetation _____, Soil _____, 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: Photo 6.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus contorta	45	Y	FAC
2.			
3.			
4.			
	45 = Total Cover		
Sapling/Shrub Stratum (Plot size: 5 m)			
1. Salix lemmonii	20	Y	FACW
2. Ribes nevadense	5	Y	FAC
3. Amelanchier arborea	5	Y	NL-UPL
4.			
5.			
	30 = Total Cover		
Herb Stratum (Plot size: 1 m)			
1. Juncus spp.	4	N	FACW
2. Agrostis pallens	5	N	UPL
3. Arnica chamissonis	5	N	FACW
4. Carex spp.	86	Y	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60% (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:

___ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks:

SOIL

Sampling Point: 3

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 %	Type[1]	Loc[2]	Texture	Remarks
0-2								Organic Matter
2-6	7.5YR 2/2						loam	
6-12	7.5YR 4/2						sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ 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) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- X Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- X Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

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:

Depression before culvert

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Country Club Heights City/County: El Dorado County Sampling Date: 8-23-16

Applicant/Owner: El Dorado County State: CA Sampling Point: 9

Investigator(s): Debra Lemke and Kelley Kelso Section, Township, Range: S21, T12N R18E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 25%

Subregion (LRR): D; MLRA 22A Lat: 38.87551 Long: -119.997744 Datum: WGS 84

Soil Map Unit Name: Ubaj sandy loam, 0-9% slopes NWI classification: none

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

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

Are Vegetation _____, Soil _____, 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 _____	No x	
Wetland Hydrology Present?	Yes _____	No x	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Pinus jeffreyi	15	Y	UPL
2. Abies concolor	10	Y	UPL
3. Populus tremuloides	5	Y	FACU
4.			
	30	= Total Cover	

Sapling/Shrub Stratum (Plot size: 5 m)			
1. Ribes nevadense	5	Y	FAC
2. Amelanchier spp.	20	Y	UPL
3. Lonicera involucrata	10	Y	FAC
4.			
5.			
	35	= Total Cover	

Herb Stratum (Plot size: 1 m)			
1. Equisetum arvense	7	Y	FAC
2. Lupinus breweri	3	Y	UPL
3. Carex spp.	5	Y	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	15	= Total Cover	

Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 75 (covered in pine needle duff - not bare)

Dominance Test worksheet:

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

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 44% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	4	x 3 =	12
FACU species	1	x 4 =	4
UPL species	4	x 5 =	20
Column Totals:	9 (A)		36 (B)

Prevalence Index = B/A = 4.0

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

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

Remarks:

SOIL

Sampling Point: 9

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 %	Type[1]	Loc[2]	Texture	Remarks
0-16	7.5YR 4/3	100					gravelly sandy loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ 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) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

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

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

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 – Western Mountains, Valleys, and Coast Region

Project/Site: Country Club Heights City/County: El Dorado County Sampling Date: 8-23-16

Applicant/Owner: El Dorado County State: CA Sampling Point: 10

Investigator(s): Debra Lemke and Kelley Kelso Section, Township, Range: S21, T12N R18E

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 25%

Subregion (LRR): D; MLRA 22A Lat: 38.875466 Long: -119.997785 Datum: WGS 84

Soil Map Unit Name: Ubaj sandy loam, 0-9% slopes NWI classification: none

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

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

Are Vegetation _____, Soil _____, 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: A culvert with standing water drains water into the wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 10 m)	Absolute % Cover	Dominant Species?	Indicator Status
1. Abies concolor	10	N	UPL
2. Populus tremuloides	60	Y	FACU
3.			
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 5 m)			
1.			
2.			
3.			
4.			
5.			
	0	= Total Cover	
Herb Stratum (Plot size: 1 m)			
1. Equisetum arvense	60	Y	FAC
2. Juncus spp.	30	Y	FACW
3. Agrostis pallens	2	N	UPL
4. Deschampsia elongata	2	N	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100	= Total Cover	
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
		= Total Cover	

% Bare Ground in Herb Stratum 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:

- ___ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ___ 3 - Prevalence Index is ≤3.0[1]
- ___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ 5 - Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

SOIL

Sampling Point: 10

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]	Texture	Remarks
0-2							organic matter	
2-6	7.5YR 3/2	100%					clay loam	
6-10	7.5YR 5/1	40%	7.5YR 5/8	60%	RM	M	sandy silty clay	
10-18	7.5YR 4/1	50%	7.5YR 5/8	50%	RM	M	sandy silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

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

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
X 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) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Very Shallow Dark Surface (TF12)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

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

Remarks:

Photo 33

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B)**
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plants (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2, 4A, and 4B)**
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 6"

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

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

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

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

Remarks:

Standing water in low spots of wetland.

Culvert carrying water to the wetland.

Appendix E

PLANT LIST

Appendix E, Plant species found within the survey area.

Genus	Species	Common Name	WIS*
Pinus	*contorta*	lodgepole pine	FAC
Pinus	*jeffreyi*	Jeffrey pine	UPL
Abies	*concolor*	white fir	UPL
Populus	*tremuloides*	quaking aspen	FACU
Salix	*lemmonii*	Lemmon's willow	FACW
Ribes	*nevadense*	Sierra currant	FAC
Amelanchier	*arborea*	downy serviceberry	UPL
Lonicera	*involucrata*	twinberry honeysuckle	FAC
Purshia	*tridentata*	antelope bitterbrush	UPL
Equisetum	*arvense*	common horsetail	FAC
Juncus	spp.	unknown rush	FACW
Agrostis	*pallens*	bentgrass	UPL
Deschapsia	*elongata*	slender hairgrass	FACW
Lupinus	*breweri*	Brewer's lupine	UPL
Carex	spp.	unknown sedge	FAC
Elymus	*glaucus*	Blue wild rye	FACU
Arnica	*chamissonis*	Chamisso arnica	FACW

* Wetland Indicator Status (WIS):

OBL = occurs in aquatic resources > 99% of time
FACW = occurs in aquatic resources 67-99% of time
FAC = occurs in aquatic resources 34-66% of time
FACU = occurs in aquatic resources 1-33% of time
UPL = occurs in uplands > 99% of time
NI = indicator status not known in this region
~ = unsure as to FAC or FACU

Appendix F

CUSTOM NRCS SOILS REPORT

United States Department of Agriculture

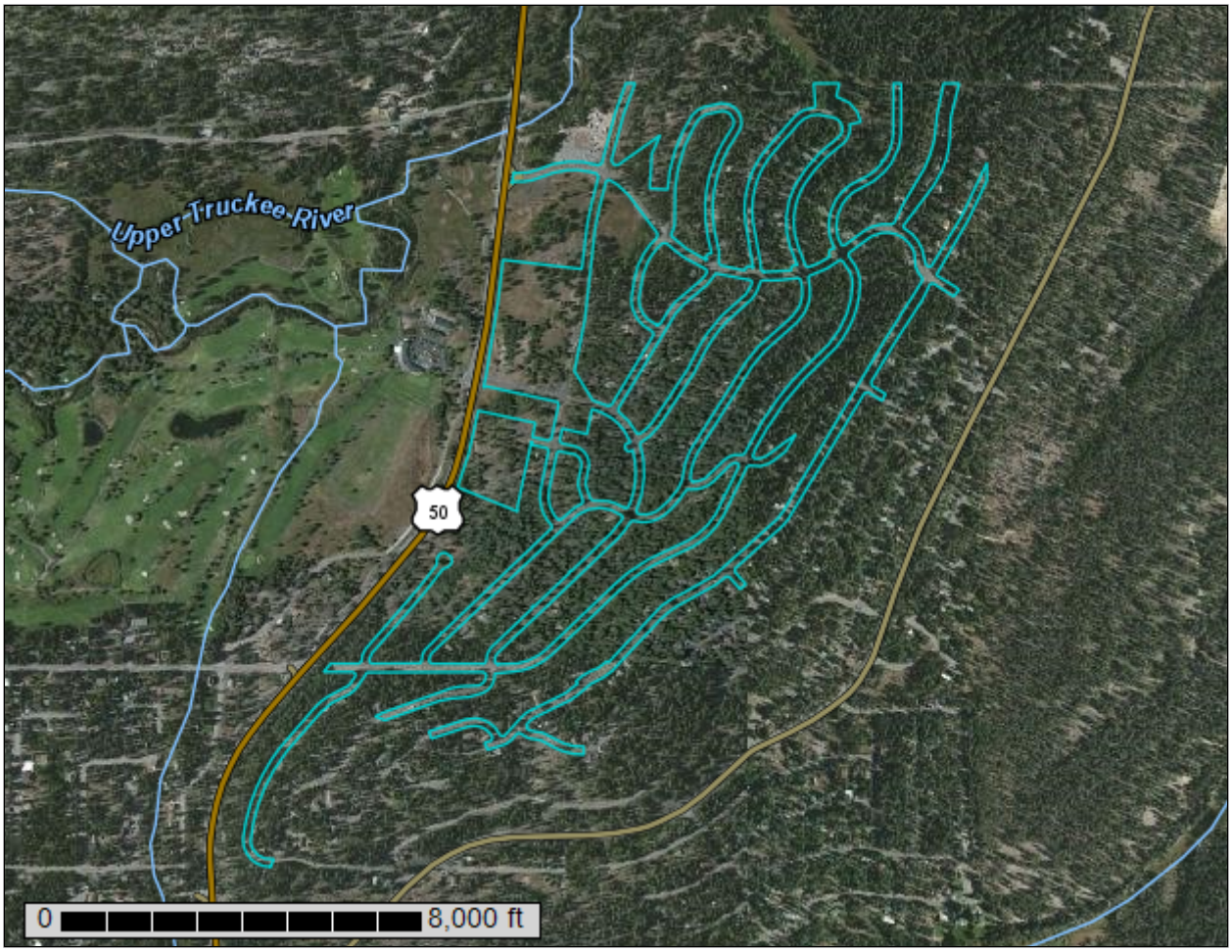
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Tahoe Basin Area, California and Nevada

County Club Heights Erosion Control Project NRCS Soils Report



September 8, 2016

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

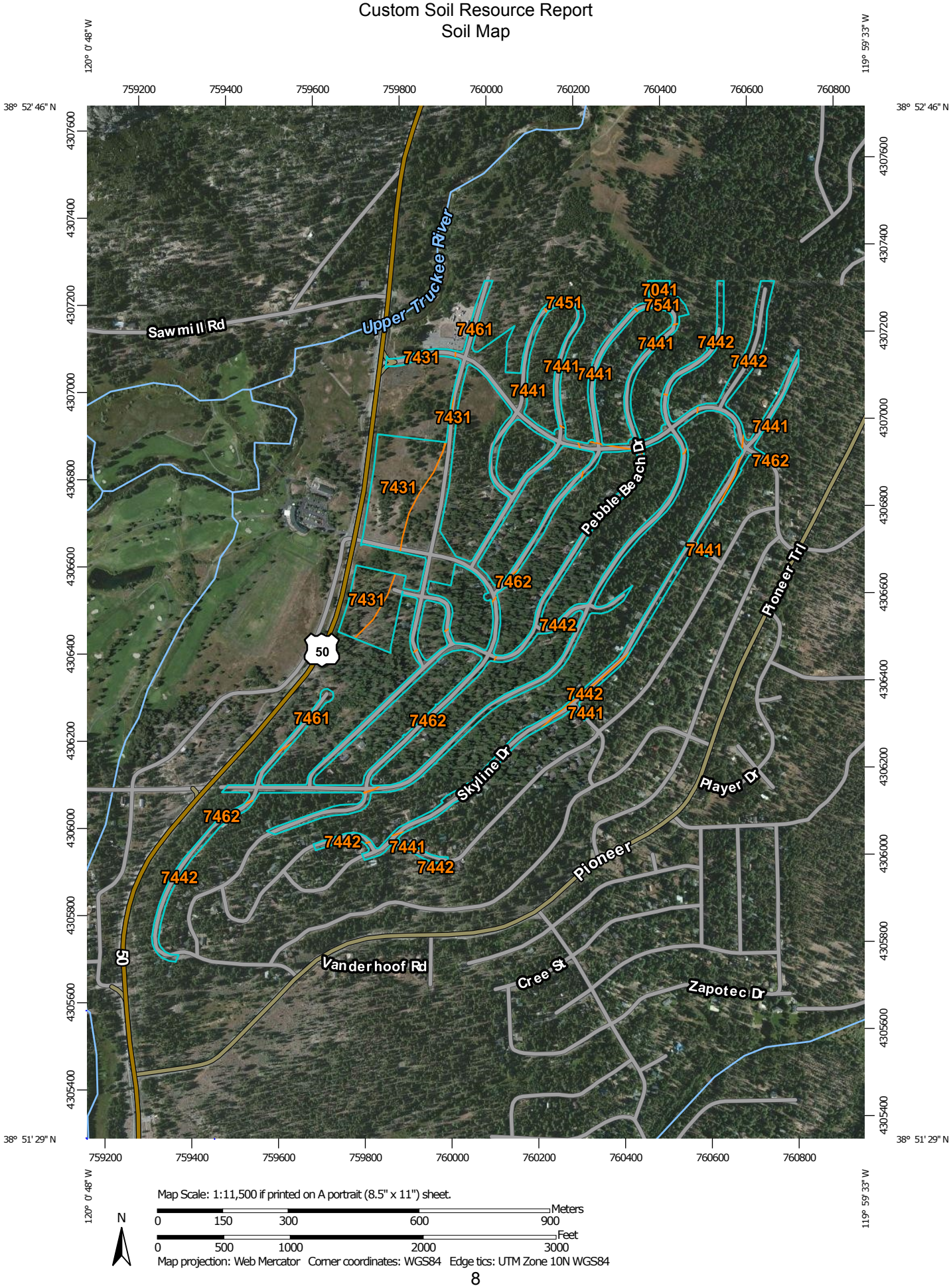
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Unit Polygons

Soil Map Unit Lines

Soil Map Unit Points

Special Point Features

Blowout

Borrow Pit

Clay Spot

Closed Depression

Gravel Pit

Gravelly Spot

Landfill

Lava Flow

Marsh or swamp

Mine or Quarry

Miscellaneous Water

Perennial Water

Rock Outcrop

Saline Spot

Sandy Spot

Severely Eroded Spot

Sinkhole

Slide or Slip

Sodic Spot

Spoil Area

Stony Spot

Very Stony Spot

Wet Spot

Other

Special Line Features

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Tahoe Basin Area, California and Nevada
Survey Area Data: Version 10, Sep 18, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 12, 2010—Oct 30, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Tahoe Basin Area, California and Nevada (CA693)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
7041	Tahoe complex, 0 to 2 percent slopes	0.4	0.6%
7431	Celio loamy coarse sand, 0 to 5 percent slopes	11.2	16.6%
7441	Christopher loamy coarse sand, 0 to 9 percent slopes	8.1	12.0%
7442	Christopher loamy coarse sand, 9 to 30 percent slopes	20.4	30.2%
7451	Gefo gravelly loamy coarse sand, 2 to 9 percent slopes	0.3	0.5%
7461	Jabu coarse sandy loam, 0 to 9 percent slopes	19.2	28.5%
7462	Jabu coarse sandy loam, 9 to 30 percent slopes	6.9	10.2%
7541	Ubaj sandy loam, 0 to 9 percent slopes	1.0	1.4%
Totals for Area of Interest		**67.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified

by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Tahoe Basin Area, California and Nevada

7041—Tahoe complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: 1sg4p
Elevation: 6,220 to 7,970 feet
Mean annual precipitation: 23 to 51 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 20 to 60 days
Farmland classification: Not prime farmland

Map Unit Composition

Tahoe, silt loam, and similar soils: 55 percent
Tahoe, silt loam wet, and similar soils: 25 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tahoe, Silt Loam

Setting

Landform: Valley flats, flood plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from granitic and volcanic rock

Typical profile

Oe - 0 to 3 inches: moderately decomposed plant material
A1 - 3 to 11 inches: mucky silt loam
A2 - 11 to 15 inches: mucky silt loam
A3 - 15 to 20 inches: gravelly coarse sand
A4 - 20 to 30 inches: mucky silt loam
Cg1 - 30 to 49 inches: loam
Cg2 - 49 to 59 inches: loamy sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 1.42 in/hr)
Depth to water table: About 0 to 12 inches
Frequency of flooding: Occasional
Frequency of ponding: Occasional
Available water storage in profile: High (about 9.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: C/D
Ecological site: Frigid E-C Meadow System (R022AX102CA)
Hydric soil rating: Yes

Description of Tahoe, Silt Loam Wet

Setting

Landform: Valley flats, flood plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Parent material: Alluvium derived from granitic and volcanic rock

Typical profile

A1 - 0 to 10 inches: mucky silt loam
A2 - 10 to 27 inches: loam
Cg1 - 27 to 32 inches: loamy fine sand
Cg2 - 32 to 46 inches: fine sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to very high (1.42 to 14.17 in/hr)
Depth to water table: About 0 to 10 inches
Frequency of flooding: Frequent
Frequency of ponding: Frequent
Available water storage in profile: Low (about 5.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: A/D
Ecological site: Frigid E-C Meadow System (R022AX102CA)
Hydric soil rating: Yes

Minor Components

Marla

Percent of map unit: 10 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid E-C Meadow System (R022AX102CA)
Hydric soil rating: Yes

Watah

Percent of map unit: 5 percent
Landform: Valley flats, fens, flood plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Frigid E-C Meadow System (R022AX102CA)
Hydric soil rating: Yes

Tahoe, gravelly

Percent of map unit: 5 percent
Landform: Valley flats, flood plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Frigid E-C Meadow System (R022AX102CA)
Hydric soil rating: Yes

7431—Celio loamy coarse sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1sg31
Elevation: 6,220 to 6,480 feet
Mean annual precipitation: 25 to 47 inches
Mean annual air temperature: 41 to 45 degrees F
Frost-free period: 25 to 75 days
Farmland classification: Not prime farmland

Map Unit Composition

Celio and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Celio

Setting

Landform: Outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or outwash

Typical profile

A1 - 0 to 8 inches: loamy coarse sand
A2 - 8 to 16 inches: gravelly loamy coarse sand
BA - 16 to 23 inches: gravelly loamy coarse sand
Bw - 23 to 45 inches: extremely gravelly coarse sand
2Bqm - 45 to 56 inches: material
2Bg - 56 to 80 inches: extremely gravelly coarse sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: 39 to 59 inches to duripan
Natural drainage class: Somewhat poorly drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)

Depth to water table: About 12 to 30 inches
Frequency of flooding: Rare
Frequency of ponding: Occasional
Available water storage in profile: Very low (about 1.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A/D
Ecological site: Frigid Sandy Outwash Plain Gentle Slopes (F022AF001CA)
Hydric soil rating: No

Minor Components

Meeks, stony

Percent of map unit: 7 percent
Landform: Moraines
Landform position (two-dimensional): Backslope, summit, shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moraines And Hill Slopes (F022AE007CA)
Hydric soil rating: No

Tahoe, gravelly

Percent of map unit: 5 percent
Landform: Valley flats, flood plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Frigid C Channel System (R022AX107CA)
Hydric soil rating: Yes

Marla

Percent of map unit: 4 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: Yes

Watah

Percent of map unit: 4 percent
Landform: Valley flats, fens, flood plains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Concave
Ecological site: Frigid E-C Meadow System (R022AX102CA)
Hydric soil rating: Yes

7441—Christopher loamy coarse sand, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1sg35
Elevation: 6,250 to 6,610 feet
Mean annual precipitation: 23 to 33 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 40 to 90 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Christopher, loamy coarse sand, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Christopher, Loamy Coarse Sand

Setting

Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash derived from granodiorite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 8 inches: loamy coarse sand
Bw1 - 8 to 26 inches: loamy coarse sand
Bw2 - 26 to 42 inches: loamy coarse sand
Bw3 - 42 to 61 inches: loamy coarse sand

Properties and qualities

Slope: 0 to 9 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)

Hydric soil rating: No

Minor Components

Gefo, gravelly loamy coarse sand

Percent of map unit: 10 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Jabu

Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Oneidas

Percent of map unit: 3 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Loamy, Fragipan, Outwash (F022AF003CA)
Hydric soil rating: No

Marla

Percent of map unit: 2 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: Yes

7442—Christopher loamy coarse sand, 9 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1sg36
Elevation: 6,230 to 6,540 feet
Mean annual precipitation: 23 to 31 inches
Mean annual air temperature: 41 to 46 degrees F

Frost-free period: 40 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Christopher, loamy coarse sand, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Christopher, Loamy Coarse Sand

Setting

Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash derived from granodiorite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 8 inches: loamy coarse sand
Bw1 - 8 to 26 inches: loamy coarse sand
Bw2 - 26 to 42 inches: loamy coarse sand
Bw3 - 42 to 61 inches: loamy coarse sand

Properties and qualities

Slope: 9 to 30 percent
Percent of area covered with surface fragments: 0.0 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Minor Components

Gefo, gravelly loamy coarse sand

Percent of map unit: 10 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Jabu

Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Oneidas

Percent of map unit: 3 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Loamy, Fragipan, Outwash (F022AF003CA)
Hydric soil rating: No

Marla

Percent of map unit: 2 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: Yes

7451—Gefo gravelly loamy coarse sand, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1sg3j
Elevation: 6,220 to 6,450 feet
Mean annual precipitation: 21 to 43 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 40 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Gefo, gravelly loamy coarse sand, and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gefo, Gravelly Loamy Coarse Sand

Setting

Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash derived from granodiorite

Typical profile

A - 0 to 15 inches: gravelly loamy coarse sand
C - 15 to 75 inches: gravelly coarse sand

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6s
Hydrologic Soil Group: A
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Minor Components

Christopher, loamy coarse sand

Percent of map unit: 10 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Jabu

Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Oneidas

Percent of map unit: 3 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear

Ecological site: Frigid, Loamy, Fragipan, Outwash (F022AF003CA)
Hydric soil rating: No

Marla

Percent of map unit: 2 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: Yes

7461—Jabu coarse sandy loam, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: 1sg41
Elevation: 6,230 to 6,810 feet
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 40 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Jabu and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jabu

Setting

Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash derived from granodiorite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 7 inches: coarse sandy loam
Bt1 - 7 to 21 inches: coarse sandy loam
Bt2 - 21 to 46 inches: gravelly coarse sandy loam
Bx - 46 to 67 inches: coarse sandy loam
C - 67 to 73 inches: stratified fine sandy loam to silty clay
Cd - 73 to 101 inches: coarse sandy loam

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: 39 to 79 inches to fragipan; 59 to 79 inches to densic material

Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 39 to 79 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Minor Components

Christopher, loamy coarse sand
Percent of map unit: 10 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Oneidas
Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Loamy, Fragipan, Outwash (F022AF003CA)
Hydric soil rating: No

Gefo, gravelly loamy coarse sand
Percent of map unit: 3 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Marla
Percent of map unit: 2 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: Yes

7462—Jabu coarse sandy loam, 9 to 30 percent slopes

Map Unit Setting

National map unit symbol: 1sg42
Elevation: 6,230 to 7,410 feet
Mean annual precipitation: 23 to 41 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 40 to 90 days
Farmland classification: Not prime farmland

Map Unit Composition

Jabu and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Jabu

Setting

Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Outwash derived from granodiorite

Typical profile

Oi - 0 to 1 inches: slightly decomposed plant material
A - 1 to 7 inches: coarse sandy loam
Bt1 - 7 to 21 inches: coarse sandy loam
Bt2 - 21 to 46 inches: gravelly coarse sandy loam
Bx - 46 to 67 inches: coarse sandy loam
C - 67 to 73 inches: stratified fine sandy loam to silty clay
Cd - 73 to 101 inches: coarse sandy loam

Properties and qualities

Slope: 9 to 30 percent
Depth to restrictive feature: 39 to 79 inches to fragipan; 59 to 79 inches to densic material
Natural drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 39 to 79 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 5.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e

Hydrologic Soil Group: A
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Minor Components

Christopher, loamy coarse sand
Percent of map unit: 10 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Oneidas
Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Loamy, Fragipan, Outwash (F022AF003CA)
Hydric soil rating: No

Gefo, gravelly loamy coarse sand
Percent of map unit: 3 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Marla
Percent of map unit: 2 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: Yes

7541—Ubaj sandy loam, 0 to 9 percent slopes

Map Unit Setting
National map unit symbol: 1sg45
Elevation: 6,230 to 6,530 feet

Mean annual precipitation: 23 to 39 inches
Mean annual air temperature: 41 to 46 degrees F
Frost-free period: 40 to 90 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Ubaj and similar soils: 80 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Ubaj

Setting

Landform: Lake terraces, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium and/or colluvium derived from granodiorite over lacustrine deposits

Typical profile

Oi - 0 to 0 inches: slightly decomposed plant material
A - 0 to 7 inches: sandy loam
BA - 7 to 17 inches: sandy loam
Bt1 - 17 to 28 inches: sandy clay loam
2Bt2 - 28 to 42 inches: clay loam
2Bt3 - 42 to 49 inches: clay
2Cg - 49 to 120 inches: clay

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Moderately well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low (0.01 to 0.14 in/hr)
Depth to water table: About 48 to 72 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 8.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: No

Minor Components

Jabu

Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear

Across-slope shape: Linear
Ecological site: Frigid, Loamy, Fragipan, Outwash (F022AF003CA)
Hydric soil rating: No

Christopher, loamy coarse sand
Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Oneidas
Percent of map unit: 5 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Loamy, Fragipan, Outwash (F022AF003CA)
Hydric soil rating: No

Gefo, gravelly loamy coarse sand
Percent of map unit: 3 percent
Landform: Hillslopes on outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope, tread
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Or Loamy Outwash (F022AF002CA)
Hydric soil rating: No

Marla
Percent of map unit: 2 percent
Landform: Valley flats, outwash terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Tread, talf
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: Frigid, Sandy, Moist, Outwash Fan (F022AX100CA)
Hydric soil rating: Yes

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Appendix G

COMPACT DISC OF AQUATIC RESOURCE EXCEL SPREADSHEET, GIS METADATA, AND FINAL AQUATIC RESOURCES DELINEATION REPORT

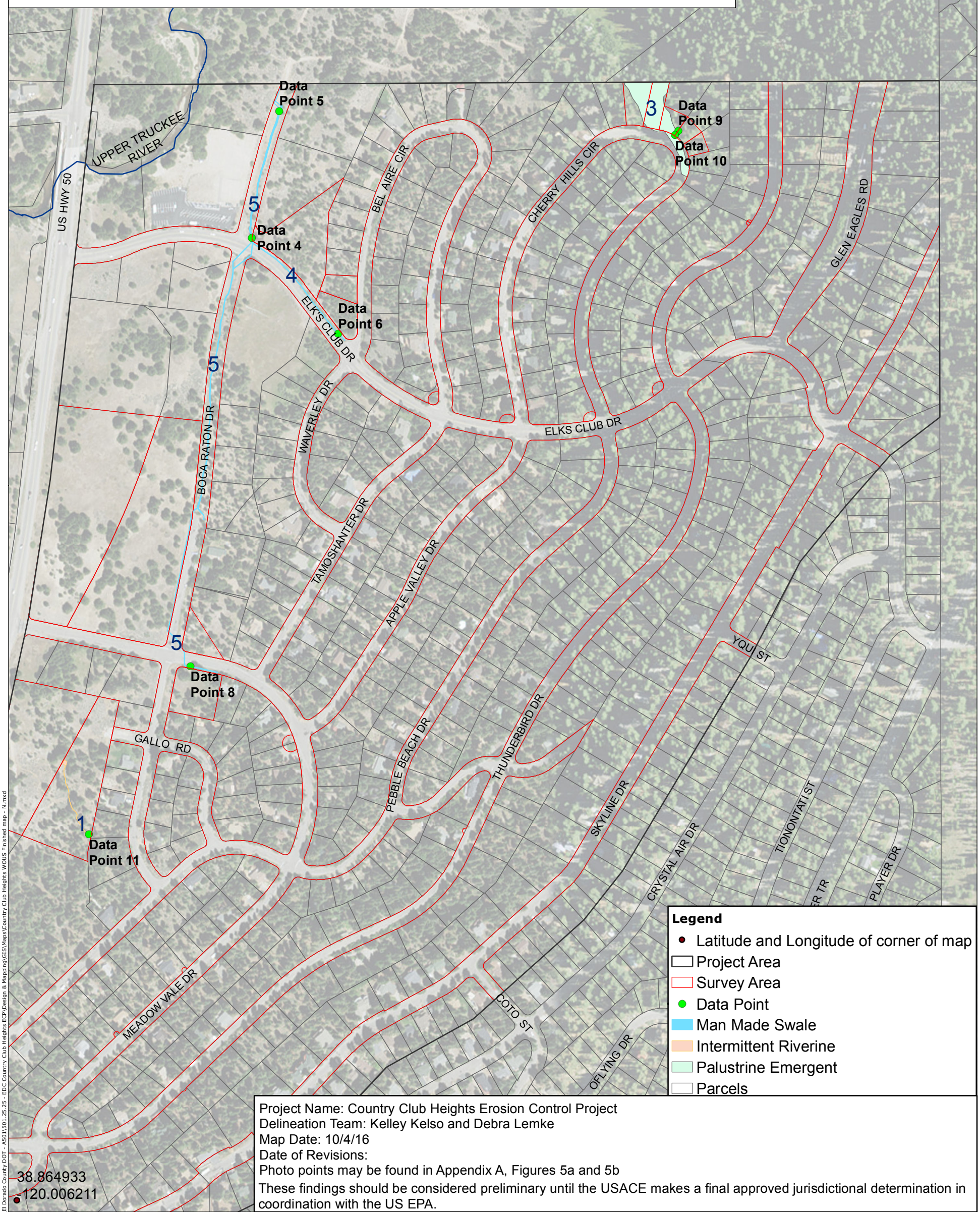
Appendix H

AQUATIC RESOURCE DELINEATION MAPS

Feature Number	Feature Type	OHWM width (inches)	Area (Acres)
1 - Unnamed drainage	Intermittent Riverine	26	0.007
2 - Wetland 1 Hwy 50	PEM - Nonpersistent	NA	0.014
3 - Wetland 2 Cherry Hills Circle	PEM - Persistent	NA	0.573
4 - MMS Elks Club Drive	MMS	105	0.099
5 - MMS Boca Raton Drive	MMS	24, 56, 169	0.719
6 - MMS Southern Pines Drive	MMS	31	0.223

MMS = Man Made Swale

PEM = Palustrine Emergent Wetland



Project Name: Country Club Heights Erosion Control Project
Delineation Team: Kelley Kelso and Debra Lemke
Map Date: 10/4/16
Date of Revisions:
Photo points may be found in Appendix A, Figures 5a and 5b
These findings should be considered preliminary until the USACE makes a final approved jurisdictional determination in coordination with the US EPA.

County Country Club Heights Erosion Control Project - North

Waters of the United States Delineation

1 in. = 350 ft.

0 350 700 ft.

N

Credits: ESRI World Imagery; other data sources

Date: 10/4/2016
Author: kkelso

Appendix H

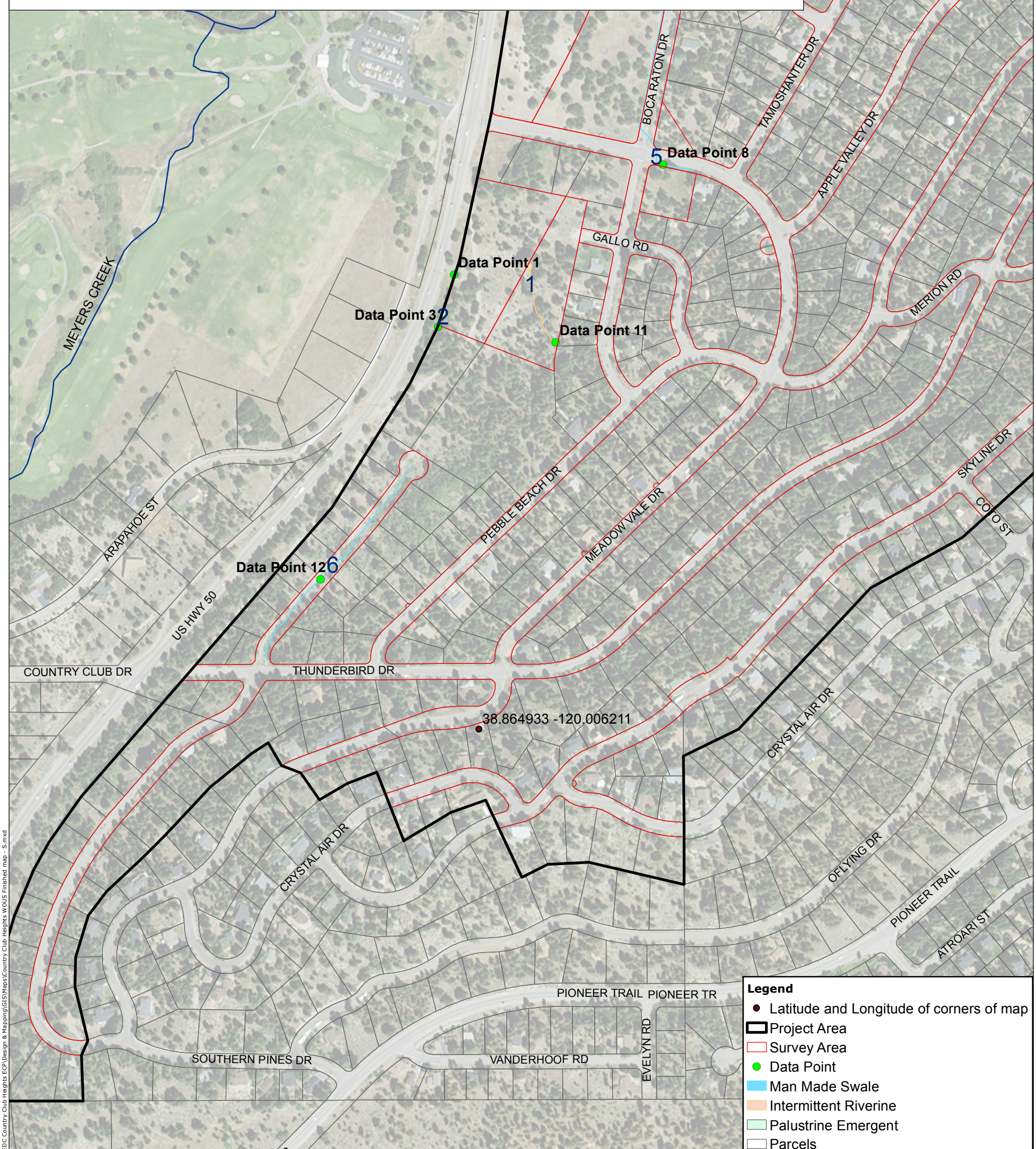
NCE

Document Path: P:\Active Projects\El Dorado County DOT - A501\501.25.25 - EDC Country Club Heights ECP\Design & Mapping\GIS\Maps\Country Club Heights WOUS Finished map - N.mxd

Feature Number	Feature Type	OHWM width (inches)	Area (Acres)
1 - Unnamed drainage	Intermittent Riverine	26	0.007
2 - Wetland 1 Hwy 50	PEM - Nonpersistent	NA	0.014
3 - Wetland 2 Cherry Hills Circle	PEM - Persistent	NA	0.573
4 - MMS Elks Club Drive	MMS	105	0.099
5 - MMS Boca Raton Drive	MMS	24, 56, 169	0.719
6 - MMS Southern Pines Drive	MMS	31	0.223

MMS = Man Made Swale

PEM = Palustrine Emergent Wetland



Project Name: Country Club Heights Erosion Control Project
Delineation Team: Kelley Kelso and Debra Lemke
Map Date: 10/4/16
Date of Revisions:
Photo points may be found in Appendix A, Figures 5a and 5b
These findings should be considered preliminary until the USACE makes a final approved jurisdictional determination in coordination with the US EPA.

County Country Club Heights Erosion Control Project - South

Waters of the United States Delineation

1 in. = 350 ft.

0 350 700 ft.

N

Credits: ESRI World Imagery; other data sources

Date: 10/4/2016
Author: kkelso

Appendix H

NCE

Document Path: P:\Active Projects\El Dorado County DOT - A501\501.25.25 - EDC Country Club Heights ECP\Design & Mapping\GIS\Maps\Country Club Heights WOUS Finished map - S.mxd