

**SACRAMENTO MUNICIPAL UTILITY DISTRICT  
UPPER AMERICAN RIVER PROJECT  
(FERC NO. 2101)**

**VEGETATION MAPPING  
TECHNICAL REPORT**

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- UARP General Vegetation Map – Northeastern Area
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- UARP General Vegetation Map – Southwestern Area
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## LIST OF APPLICABLE STUDY PLANS

### Description

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- Vegetation Mapping Study Plan



## **4.8 Vegetation Mapping Study Plan**

### **4.8.1 Pertinent Issue Questions**

The vegetation mapping study element addresses Terrestrial Resource Issue Question:

25. "What is the distribution of vegetation types in the Project area?"

### **4.8.2 Background**

Mapping the distribution of vegetation types within the UARP provides a baseline of information for a variety of studies required as part of the license application. An initial mapping effort was conducted in 2000 by KEA Environmental, Inc. (KEA 2000), and is summarized in the Initial Information Package (IIP) (SMUD 2001). The 2000 mapping was conducted using 1996 aerial photographs obtained from the Eldorado National Forest of the UARP Project Boundary. All areas mapped were evaluated on the ground and data was gathered on potential habitat for special status plants, a description of the vegetation types (including a list of dominant plant species with cover and abundance values) and presence of weedy species (KEA 2000). This effort produced Geographic Information Systems (GIS) vegetation maps at a scale of 1:24000 that show the vegetation types, special status plants, and noxious weeds within the FERC Project Boundary. Riparian areas along the stream courses were not mapped, but areas around the reservoirs and Project facilities were mapped. SMUD also has recent aerial photography that will allow additional mapping. Additional information regarding vegetative alliances, special status plants and invasive-noxious weeds found may be found in the IIP. The 2000 inventory conducted by KEA, Inc. provides a full description of plant types found in the UARP in the inventory. That report is available from SMUD for review.

### **4.8.3 Study Objectives**

The objective of the vegetation mapping study is to identify the vegetation types within the study area that were not mapped in the 2000 vegetation mapping exercise. The purpose of the vegetation type mapping is to map the area at a 1:24000 scale for the purposes of typing the study area; actual scales used in developing the map may be less, depending on source map (e.g., aerial photo) scales, which may be as large as 1:12,000 scale. Detailed studies of special habitat types, specifically for riparian, wetland, and special aquatic types, are not part of this study effort. Separate study plans have been developed that cover the aforementioned types. Because these types are likely to be small in area, a mapping scale appropriate to the type will be used and is defined in those specific studies.

Mapping for special-status species habitat will be developed in concert with initial surveys performed for species needing additional vegetation mapping (e.g., willow flycatcher), as determined by agency biologists and botanists. A significant amount of the Eldorado National Forest has already been mapped for USFS-managed species (e.g., spotted owl, northern goshawk), and this proposed mapping effort is not intended to duplicate that work.

### **4.8.4 Study Area and Sampling Locations**

The study area is intended to cover vegetation that may be affected by Project operation and maintenance activities (i.e., primarily within the FERC Project boundary including bypass reaches and tributaries streams within the Project boundary) and to generate habitat information needed to support various wildlife studies. These dual purposes allow the study area to be defined based on an elevation demarcation as follows:

Below approximately 3,000 feet elevation: The study (mapping) area will be the area within approximately 500 feet of the FERC Project boundary surrounding all above-ground Project facilities/features and bypass reaches. The lack of developed recreational areas and the steep topography in the areas generally below 3,000 feet support this designation. The portion of the South Fork American River below White Rock powerhouse (e.g., Chili Bar Reservoir and powerhouse) will not be mapped in this effort. Above approximately 3,000 feet elevation: The study (mapping) area will be the area within approximately 0.5-mile of the FERC Project boundary surrounding all above-ground Project facilities/features and bypass reaches. Additional study areas will be included as deemed appropriate (e.g., the developed and dispersed recreation areas being identified by the recreation TWG, other areas as

determined by the fire and fuels management plan, and project roads that would be identified through the project sources of sediment study in coordination with the recreation and aquatic TWGs).

#### 4.8.5 Information Needed From Other Studies

Information is available from the existing vegetation mapping that was conducted in 2000 and the Botanical Resources Inventory Upper American River Project studies conducted by KEA Environmental, Inc. also conducted in 2000. Mapping efforts for wildlife habitat assessment and for aquatic communities will also be incorporated into the overall vegetation mapping effort. Information from this study will support the studies for special status plants and animals, as well as for locating invasive weeds and riparian areas. Information from the recreation surveys will be incorporated as appropriate to determine additional areas to be surveyed. Information from initial biological surveys will dictate the need for additional vegetation mapping studies as determined necessary by agency and staff biologists and botanists.

#### 4.8.6 Study Methods and Schedule

The 2000 vegetation mapping effort will be reviewed to identify any areas within the study area not mapped in 2000. Then, any recent aerial photography of the area or additional mapping done by the Eldorado National Forest (ENF), as well as information on special status plant populations from the California Natural Diversity Data Base (CNDDB) will be reviewed. Existing aerial photography, where available, will be used for the vegetation mapping in 2002. Portions of the Study Area not covered by existing photography will be evaluated to determine if new aerial photos are required to complete the mapping effort; as necessary, this supplemental photography will be taken in spring 2002.

Vegetation types will be mapped at a 1:24000 scale consistent with the 2000 mapping effort. A separate study plan will address riparian and wetland areas using a more detailed scale as discussed in these respective study plans. GIS mapping from the aerial photographs will be done using a minimum 1.0-acre polygon, with special elements (e.g., riparian areas, seeps, wet meadows) less than 1.0-acre in size identified by a separate symbol. Vegetation designations will be based on the descriptions of terrestrial plant types used in *CalVeg GeoBook* (USDA 2000) classification scheme, which provides vegetation mapping for the northern Sierra Nevada mountains and foothills. Additional descriptive modifiers will be added for wetland and riparian types as necessary. Areas of small size that are not well-represented on the map will be described in the narration and in the specific study plans designed to address riparian and wetland types. The CalVeg GeoBook scheme provides vegetation mapping for the northern Sierra Nevada mountains and foothills. Vegetation types will be ground-truthed where the Licensee has legal access (e.g., ownership/easement rights, public lands) and within reasonable safety limits. This will involve going to the various vegetation types within the study area and reviewing how these types show up on the aerial photographs. The photos and on-the-ground site visits will be correlated to insure accuracy of the mapping effort and description of vegetation types.

Mapping relative to the Mule Deer Study will focus on delineation of important habitat use areas for deer (e.g., migration corridors, fawning areas, holding areas) within the study area defined above; this information will be gained largely through existing California Department of Fish and Game deer habitat data. It will not be the intent of this effort to map these important deer habitat elements outside the project study area. Mapping beyond the study area will be done on a case-by-case basis as determined necessary for other wildlife studies as determined necessary by agency and staff biologists and botanists.

Terminology and data type will be consistent with that found in the California Wildlife Habitat Relations (WHR) program. If this information is determined to be necessary, the study plan will be amended by the Terrestrial TWG. Since the information generated from this study may be used in determining general and not specific wildlife habitat suitability, detailed analyses of the study area (e.g., tree size, vegetation layering, snag and downed log assessments) will not be made. General observations will be made about canopy cover and general successional characteristics.

The results of this study will be presented to the Terrestrial Resources Technical Working Group (TWG) in late 2002. Should the data indicate that additional investigation is warranted, this study plan will be amended, in

consultation with the Terrestrial Resources TWG, to include data gathering and analysis in the specific problem areas in 2003.

#### 4.8.7 Analysis

The vegetation mapping will delineate the distribution and extent of major vegetation types within the study area. The results will support analyses for other resource studies including the Riparian, Wetland, Special Status Plants, Invasive/Noxious Weeds, and the various Aquatic Resources and Wildlife Resources studies. A "cross-walk" will be developed to facilitate comparisons between the vegetation types specified in the CalVeg Geo Book (USDA 2000) (with modifiers for wetland and riparian types), which will be included in the Riparian and Wetland study plan reports) and the designations of the California Wildlife Habitat Relationships System (CWHR).

#### 4.8.8 Study Output

Study results will be presented to the Terrestrial Resources TWG and the Plenary Group at the end of 2002. However, the ultimate study output will be a written report that includes the issues addressed, objectives, study area, methods, results (i.e., narrative descriptions of vegetation mapping units and GIS-maps prepared at a minimum scale of 1:24000 that delineate each plant community in the study area), analysis, discussion, and conclusions. The report will be prepared in a format that will allow the information to be inserted directly into the Licensee-prepared Draft Environmental Assessment that will be submitted to FERC with the Licensee's application for a new license.

#### 4.8.9 Preliminary Estimated Study Cost

***[A preliminary estimated study cost will be prepared after the Terrestrial Resources TWG approves the plan and prior to presentation of the plan to the Plenary Group for consideration.]***

#### 4.8.10 TWG Endorsement

The Terrestrial TWG approved this plan, as amended, on March 22, 2002. The participants at the meeting who said they could "live with" this study plan were USFS, CDFG, CNPS, and SMUD. None of the participants at the meeting said they could not "live with" this study plan.

On May 1, 2002 the following participants gave Plenary Group approval to the plan: USFS, BLM, USFWS, Taxpayers of El Dorado County, Friends of El Dorado County, Camp Lotus, El Dorado County Water Agency, El Dorado County, Placer County Water Agency, California Department of Fish and Game, California State Water Resources Control Board, Pacific Gas and Electric and Friends of the River. None of the participants at the meeting said they could not "live with" this study plan.

#### 4.8.11 Literature Cited

KEA Environmental, Inc. 2000. Botanical inventory for the Upper American River Project. Prepared for SMUD, Sacramento, California

SMUD (Sacramento Municipal Utility District). 2001. Initial Information Package for Relicensing of the Upper American River Project (FERC Project No. 2101). Sacramento, CA.

USDA (U.S. Department of Agriculture, Forest Service). 2000. Remote sensing lab CalVeg Geobook: Existing vegetation, Version 1. Pacific Southwest Experiment Station, Sacramento, CA. CD-ROM volume 2.



## VEGETATION MAPPING TECHNICAL REPORT

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### SUMMARY

SMUD mapped a total of 59,868 acres of non-riparian vegetation in and around UARP facilities. Of this, 43,992 acres were forested, 7,957 acres were shrubland, and 7,919 acres are other alliances. Forested habitats were most common and most often represented by the Mixed Conifer-Pine, Douglas-Fir-Pine, or Mixed Conifer-Fir vegetation alliances. However, shrub-dominated vegetation alliances were common in high-elevation habitats near Loon Lake, Rubicon, and Buck Island reservoirs and low-elevation chaparral habitats traversed by UARP transmission lines. In addition, shrubs were often dominant as a result of transmission line clearing in habitats otherwise dominated by mid-elevation conifers. These areas were typically represented by the Montane Mixed Chaparral or Lower Mixed Montane Chaparral vegetation alliances.

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### 1.0 INTRODUCTION

This technical report is one in a series of reports prepared by Devine Tarbell & Associates, Inc. (DTA) for the Sacramento Municipal Utility District (SMUD) as an appendix to SMUD's application to the Federal Energy Regulatory Commission (FERC) for a new license for the Upper American River Project (UARP or Project). The report addresses vegetation mapping around UARP reservoirs, transmission lines, and UARP Reaches. This report includes the following sections:

- **BACKGROUND** – Summarizes the applicable study plan approved by the UARP Relicensing Plenary Group; a brief description of the issue questions addressed, in part, by the study plan; the objectives of the study plan; the study area, and agency information requests. In addition, requests by resource agencies for additions to this technical report are described in this section.
- **METHODS** – A description of the methods used in the study, including a listing of study sites.
- **RESULTS** – A description of the most important data results. Raw data, where copious, and detailed model results are provided by request in a separate compact disc (CD) for additional data analysis and review by interested parties.
- **LITERATURE CITED** – A listing of all literature cited in the report.

This technical report does not include a detailed description of the UARP Alternative Licensing Process (ALP) or the UARP, which can be found in the following sections of SMUD's application for a new license: The UARP Relicensing Process, Exhibit A (Project Description), Exhibit B (Project Operations), and Exhibit C (Construction).

Also, this technical report does not include a discussion regarding the effects of the UARP on reservoir fisheries and related environmental resources, nor does the report include a discussion of appropriate protection, mitigation, and enhancement measures. An impacts discussion regarding the UARP is included in the applicant-prepared preliminary draft environmental

assessment (PDEA) document, which is part of SMUD’s application for a new license. Development of resource measures will occur in settlement discussions, which will commence in 2004, and will be reported on in the PDEA.

## 2.0 BACKGROUND

On May 1, 2002, the UARP Relicensing Plenary Group approved the Vegetation Mapping Study Plan that was developed by and approved by the UARP Terrestrial Technical Working Group (TWG) on March 22, 2002. The study plan was designed to address, in part, the following issues questions developed by the UARP Relicensing Plenary Group:

Issue Question 25                      What is the distribution of vegetation types in the UARP area?

### 2.1 Vegetation Mapping Study Plan

The principle objective of this study was to identify the vegetation types within the study area that were not mapped during SMUD’s 2000 vegetation mapping.

The study area was intended to cover terrestrial vegetation that may be affected by UARP operation and maintenance activities (i.e., primarily within the FERC Project Boundary, including UARP Reaches but excluding the Reach Downstream of Chili Bar). Below approximately 3,000 feet in elevation, the study area included the area within approximately 500 feet of the FERC Project Boundary and/or UARP Reaches. Above approximately 3,000 feet in elevation, the study area was expanded to include the area within approximately 0.5-mile of the FERC Project Boundary and/or UARP Reaches.

Note that, while the Vegetation Mapping Study Plan study area includes UARP Reaches, riparian vegetation is excluded from this technical report because such vegetation is typically not identifiable at the mapping scales specified by the TWG. The results of riparian mapping efforts, including for the Reach Downstream of Chili Bar, are reported in the *Riparian Vegetation and Wetlands Technical Report*.

### 2.2 Water Year Types

As described in the *Water Temperature Technical Report*, the UARP Relicensing Water Balance Model Subcommittee established five water year types to be applied to all preliminary analysis with the understanding that the UARP Relicensing Plenary Group, with cause, may modify the current water year types in the future. For reference purposes, the water year types that would have applied to the period when the Vegetation Mapping Study fieldwork was performed are described in Table 2.2-1 below.

| Table 2.2-1. Water year types applied to individual months of years 2001-2003. |     |     |     |     |     |      |      |     |     |     |     |     |
|--|-----|-----|-----|-----|-----|------|------|-----|-----|-----|-----|-----|
| Year   | Jan | Feb | Mar | Apr | May | June | July | Aug | Sep | Oct | Nov | Dec |
| 2003   | BN  | BN  | BN  | D   | BN  | BN   | BN   | BN  | BN  | BN  | BN  | BN  |

AN=Above normal water year, D=Dry water year, BN=Below normal water year.



### 2.3 Agency Requested Information

In a letter dated December 17, 2003 to the Licensee, the agencies identified, by study, information they believed they needed to begin settlement discussions, with the understanding that additional information might be requested. While the Vegetation Mapping Study was not specifically addressed, the agencies general comment regarding terrestrial studies is pertinent:

- All studies will need GIS shape files showing habitat/vegetation types and spatial relationships with meta-data.

In a letter dated May 13, 2004, the agencies stated in regards to the *Vegetation Mapping Technical Report* (February 2004) the following:

- Vegetation mapping to support assessment of effects to terrestrial resources will be needed for Project-related activities, including recreation.

On June 22, 2004, the UARP Terrestrial Working Group met to discuss the adequacy of UARP terrestrial resources technical reports. The Technical Working Group concluded that for the *Vegetation Mapping Technical Report*:

- The Issue Questions and Objectives stated in the study plan are adequately addressed by the information provided in the technical report.
- The methods employed were adequate to address Issue Questions and Objectives.

### 3.0 METHODS

Vegetation mapping presented in this report is based on aerial photographs of the study area taken on August 30 2002 and June 30 2003. Digital versions of these photos were evaluated using AutoCAD software, and preliminary vegetation polygons were delineated based on topography, appearance, and the results of an earlier, limited mapping effort (KEA 2000). A subset of these polygons were chosen for ground-truthing efforts, based on their apparent vegetation type and accessibility. One hundred twenty nine ground-truthing points were evaluated during July 2003, using the California Native Plant Society's Vegetation Rapid Assessment (VRA) protocol (CNPS 2001).

Ground-truthing data were viewed in conjunction with observations made during other terrestrial studies (e.g., the special-status plant and noxious weed studies, which traversed the entire transmission line corridor) as well as existing mapping data (KEA 2000), and used to delineate vegetation polygons on 1:6000 scale orthophoto mapsheets. A minimum polygon size of one acre was used during mapping. Vegetation classification followed the CalVeg system described by Matyas and Parker (1980) and the United States Forest Service (USFS 2000). Potential vegetation alliance included all those known from the North Sierran and Central Valley Ecological provinces (USFS 2003a, USFS 2003b).

Vegetation polygons were digitized to form a GIS layer using ArcGIS software, and this layer combined with existing topographic and Project GIS coverage to produce 1:24000 scale vegetation type maps for the entire study area. The resulting maps are provided in Appendix A of this technical report. These maps divide the study area into four sections: 1) the Northeast, including Rubicon, Gerle Creek, and Loon Lake reservoirs; 2) the Southeast, including Union Valley, Ice House, Junction, and Camino reservoirs; 3) the Southwest, including Brush Creek and Slab Creek reservoirs, and 4) the West, including the UARP transmission line corridor from White Rock Powerhouse to Folsom Junction.

#### **4.0 RESULTS**

Twenty-nine vegetation alliances were observed in the study area, including 16 forested and nine shrubland alliances. A total of 59,868.4 acres were mapped, including 43,992.3 forested, 7,957.0 shrubland, and 7919.1 acres of other alliances. Table 4.0.1 provides summary statistics for each vegetation alliance and corresponding California Wildlife Habitat Relationships system habitat types, as described by the CDFG (CDFG 1998). Vegetation alliances, their characteristic species, and their distribution within the study area are described below. In addition, detailed descriptions of vegetation directly surrounding UARP facilities and reservoirs were prepared in 2000 (KEA 2000), provided in Appendix C to this technical report.

| <b>Table 4.0-1. Summary of CalVeg vegetation alliances within the vegetation mapping study area.</b> |   |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
|--|---|--------------------|------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|---------------------------|-----------------------|
| <b>Alliance (and code)</b>   | <b>CWHR habitat type</b>                    | <b>Total Acres</b> | <b>% of Study Area</b> | <b>Total in Northeast Area</b> | <b>% of Northeast Area</b> | <b>Total in Southeast Area</b> | <b>% of Southeast Area</b> | <b>Total in Southwest Area</b> | <b>% of Southwest Area</b> | <b>Total in West Area</b> | <b>% of West Area</b> |
| <b>Shrub-dominated Alliances</b>   |   |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
| Chamise (CA)   | Chamise-Redshank Chaparral, Mixed Chaparral | 26.2               | 0.0%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 26.2                      | 0.9%                  |
| Gabbro Chaparral (CB) <sup>1</sup>   | Mixed Chaparral                             | 221.2              | 0.4%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 221.2                     | 7.7%                  |
| Gabbro Chapparal – disturbed (CF)  | Mixed Chaparral                             | 26.3               | 0.0%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 26.3                      | 0.9%                  |
| Greenleaf Manzanita (CG)   | Mixed Chaparral                             | 97.7               | 0.2%                   | 0                              | 0.0%                       | 8.9                            | 0.0%                       | 88.8                           | 1.0%                       | 0                         | 0.0%                  |
| Huckleberry Oak (CH)   | Montane Chaparral                           | 4850.3             | 8.0%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Upper Montane Mixed Shrub (CM)   | Montane Chaparral                           | 507.8              | 0.8%                   | 221.6                          | 1.2%                       | 286.2                          | 0.9%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Lower Montane Mixed Chaparral (CQ)   | Mixed Chaparral                             | 541.0              | 0.9%                   | 0                              | 0.0%                       | 111.8                          | 0.4%                       | 391.8                          | 4.5%                       | 37.4                      | 1.3%                  |
| Whiteleaf Manzanita Chaparral (CW)   | Montane Chaparral                           | 138.4              | 0.2%                   | 0                              | 0.0%                       | 3.1                            | 0.0%                       | 131.4                          | 1.5%                       | 3.9                       | 0.1%                  |
| Upper Montane Mixed Chaparral (CX)   | Montane Chaparral                           | 1,548.1            | 2.6%                   | 751.5                          | 4.2%                       | 796.6                          | 2.6%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| <b>Tree-dominated Alliances</b>  |   |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
| Non-Productive Mixed Hardwoods (NX)  | Montane Hardwood                            | 745.9              | 1.2                    | 0                              | 0                          | 0                              | 0                          | 737.4                          | 8.5                        | 8.5                       | 0.3                   |
| Canyon Live Oak (QC)   | Montane Hardwood                            | 3,107.9            | 5.1%                   | 0                              | 0.0%                       | 808.7                          | 2.6%                       | 2,266.5                        | 26.2%                      | 32.7                      | 1.1%                  |
| Blue Oak (QD)  | Blue Oak                                    | 565.9              | 0.9%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 565.9                     | 19.6%                 |

| <b>Table 4.0-1. Summary of CalVeg vegetation alliances within the vegetation mapping study area.</b> |   |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
|--|---|--------------------|------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|---------------------------|-----------------------|
| <b>Alliance (and code)</b>   | <b>CWHR habitat type</b>                        | <b>Total Acres</b> | <b>% of Study Area</b> | <b>Total in Northeast Area</b> | <b>% of Northeast Area</b> | <b>Total in Southeast Area</b> | <b>% of Southeast Area</b> | <b>Total in Southwest Area</b> | <b>% of Southwest Area</b> | <b>Total in West Area</b> | <b>% of West Area</b> |
|  | Woodland, Blue Oak-Foothill Pine                |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
| Black Oak (QK)   | Montane Hardwood                                | 48.0               | 0.1%                   | 2.7                            | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 45.3                      | 1.6%                  |
| Willow (QO)  | Montane Riparian                                | 14.0               | 0.0%                   | 0.3                            | 0.0%                       | 0                              | 0.0%                       | 9.9                            | 0.1%                       | 3.8                       | 0.1%                  |
| Aspen (QQ)   | Aspen   | 3.5                | 0.0%                   | 1.3                            | 0.0%                       | 2.2                            | 0.0%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Interior Live Oak (QW)   | Montane Hardwood                                | 476.7              | 0.8%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 57.6                           | 0.7%                       | 419.1                     | 14.5%                 |
| Willow-Alder (QY)  | Montane Riparian                                | 56.7               | 0.1%                   | 21.3                           | 0.1%                       | 35.4                           | 0.1%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Lodgepole Pine (LP)  | Lodgepole Pine                                  | 273.1              | 0.5%                   | 226.7                          | 1.2%                       | 46.4                           | 0.2%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Mixed Conifer – Fir (MF)   | Sierran Mixed Conifer, White Fir                | 20,545.3           | 34.1%                  | 9591.0                         | 52.5%                      | 10,954.3                       | 35.9%                      | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Mixed Conifer – Pine (MP)  | Sierran Mixed Conifer, Montane Hardwood-Conifer | 6,771.1            | 11.2%                  | 4.0                            | 0.0%                       | 4,930.4                        | 16.1%                      | 1,836.7                        | 21.2%                      | 0                         | 0.0%                  |
| Gray Pine (PD)   | Blue Oak-Foothill Pine                          | 170.0              | 0.3%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 170.0                     | 5.9%                  |
| Ponderosa Pine (PP)  | Ponderosa Pine                                  | 8,774.1            | 14.5%                  | 317.5                          | 1.7%                       | 8,248.2                        | 27.0%                      | 205.7                          | 2.4%                       | 2.7                       | 0.1%                  |
| Mountain Alder (TA)  | Montane Riparian                                | 27.8               | 0.0%                   | 3.5                            | 0.0%                       | 24.3                           | 0.1%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Douglas Fir – Pine (DP)  | Douglas-Fir, Montane Hardwood-Conifer           | 2,412.3            | 4.0%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 2,217.4                        | 25.7%                      | 194.9                     | 6.8%                  |
| <b>Other Alliances</b>   |   |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
| Agricultural   | Deciduous                                       | 235.2              | 0.4%                   | 0                              | 0.0%                       | 0                              | 0%                         | 158.7                          | 1.8%                       | 76.5                      | 2.7%                  |

| <b>Table 4.0-1. Summary of CalVeg vegetation alliances within the vegetation mapping study area.</b> |   |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
|--|---|--------------------|------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|--------------------------------|----------------------------|---------------------------|-----------------------|
| <b>Alliance (and code)</b>   | <b>CWHR habitat type</b>  | <b>Total Acres</b> | <b>% of Study Area</b> | <b>Total in Northeast Area</b> | <b>% of Northeast Area</b> | <b>Total in Southeast Area</b> | <b>% of Southeast Area</b> | <b>Total in Southwest Area</b> | <b>% of Southwest Area</b> | <b>Total in West Area</b> | <b>% of West Area</b> |
| (AG)   | Orchard, Irrigated Grain Crops, Irrigated Hayfield, Irrigated Row and Field Crops |                    |                        |                                |                            |                                |                            |                                |                            |                           |                       |
| Barren (BA)  | Barren  | 895.3              | 1.5%                   | 401.2                          | 2.2%                       | 453.9                          | 1.5%                       | 25.1                           | 0.3%                       | 15.1                      | 0.5%                  |
| Annual Grass/Forb (HG)   | Annual Grass  | 410.9              | 0.7%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 6.1                            | 0.1%                       | 404.8                     | 14.0%                 |
| Grass- Sedge - Rush (HJ)   | Fresh Emergent Wetland, Wet Meadow  | 324.7              | 0.5%                   | 91.5                           | 0.5%                       | 230.4                          | 0.7%                       | 1.5                            | 0.0%                       | 1.3                       | 0.0%                  |
| Perennial Grass (HM)   | Perennial Grass   | 67.5               | 0.1                    | 0                              | 0.0%                       | 67.5                           | 0.2%                       | 0                              | 0.0%                       | 0                         | 0.0%                  |
| Tule-Cattail (HT)  | Fresh Emergent Wetland  | 7.3                | 0.0%                   | 1.1                            | 0.0%                       | 2.4                            | 0.0%                       | 0                              | 0.0%                       | 3.8                       | 0.1%                  |
| Ornamental Grass (IG)  | None  | 80.2               | 0.1%                   | 0                              | 0.0%                       | 0                              | 0.0%                       | 0                              | 0.0%                       | 80.2                      | 2.8%                  |
| Developed (UB)   | Urban   | 749.5              | 1.2%                   | 5.5                            | 0.0%                       | 76.6                           | 0.3%                       | 145.7                          | 1.7%                       | 521.7                     | 18.1%                 |
| Water (WA)   | Lacustrine, Riverine  | 5,168.2            | 8.6%                   | 1,695.6                        | 9.3%                       | 3,215.5                        | 10.5%                      | 244.8                          | 2.8%                       | 12.7                      | 0.4%                  |
| Unmapped (XX)  | N/A   | 443.6              | 0.7%                   | 71.4                           | 0.4%                       | 242.3                          | 0.8%                       | 119.5                          | 1.4%                       | 10.4                      | 0.4%                  |
| <b>Totals</b>  |   | <b>60,312.0</b>    | <b>100%</b>            | <b>18,258.0</b>                | <b>100%</b>                | <b>30,525.0</b>                | <b>100%</b>                | <b>8,644.6</b>                 | <b>100%</b>                | <b>2,884.4</b>            | <b>100%</b>           |

<sup>1</sup>Gabbro chaparral is not a CalVeg alliance, but is addressed separately because of its importance in the UARP are



## 4.1 Shrub-Dominated Alliances

### 4.1.1 Chamise Alliance (CA)

The Chamise Alliance (CA) is used to map chaparral areas dominated by chamise (*Adenostoma fasciculatum*). Other chaparral shrubs are also found in CA habitats, including whiteleaf manzanita (*Arctostaphylos viscida*) and hoary coffeeberry (*Rhamnus tomentella*), but with limited cover. Gray pine (*Pinus sabiniana*) was the only tree noted during ground-truthing surveys. CA polygons represented a total of 26.2 acres, or less than one percent of the entire study area. All CA habitats occur in the western section of the study area, generally on west-facing slopes within the transmission line corridor.

### 4.1.2 Gabbro Chaparral (CE)

The Gabbro Chaparral classification (CE) is used to map gabbro chaparral, an edaphically defined vegetation type found in the vicinity of Pine Hill, in the western section of the study area (Wilson 1986). Although is not currently included in the CalVeg system, it is treated separately here because it supports a number of special-status plant taxa, each described in the *Special-Status Plants and Invasive/Noxious Weeds Technical Report*. Areas mapped as CE include vegetation meeting criteria for the CW, CA, CQ, and HG alliances, with dominant species typical of each. This classification was based on observed vegetation patterns rather than geological survey data, which should be consulted prior to decision making in these areas. CE polygons represent a total of 221.2 acres, or less than one percent of the entire study area. All CE habitats occur in the western section of the study area.

### 4.1.3 Gabbro Chaparral Alliance (Disturbed) (CF)

The Disturbed Gabbro Chaparral classification (CF) is used to map a subset of lands within the Pine Hill area gabbro soil formation that appear to have been subject to land clearing and/or development activities. Although heavily disturbed, they potentially support gabbro-adapted special-status plants, some of which appear to be disturbance-adapted (e.g., Layne's butterweed [*Senecio layneae*]). CF polygons represent a total of 26.3 acres, or less than one percent of the entire study area. All CF habitats occur in the western section of the study area.

### 4.1.4 Greenleaf Manzanita Alliance (CG)

The Greenleaf Manzanita Alliance (CG) is used to map shrub habitats in which greenleaf manzanita (*Arctostaphylos patula*) dominates, often to the near-exclusion of other shrubs. Other species observed in these areas include deerbrush (*Ceanothus integerrimus*), mountain whitethorn (*Ceanothus cordulatus*), and white fir (*Abies concolor*), each with limited cover. Not previously mapped in the North Sierran ecological province (USFS 2003a), CG polygons represent a total of 97.7 acres, or less than one percent of the entire study area. Most CG habitats occur in the southwest section of the study area, within the transmission line corridor.

#### 4.1.5 Huckleberry Oak Alliance (CH)

The Huckleberry Oak Alliance (CH) is used to map shrub habitats dominated by huckleberry oak (*Quercus vaccinifolia*). Other species common in the CH alliance include pinemat manzanita (*Arctostaphylos nevadensis*), mountain whitethorn, lodgepole pine (*Pinus contorta var murryana*) and stunted Jeffery pine (*Pinus jeffreyi*).

CH polygons represent a total of 4850.3 acres, or 8.0 percent of the entire study area. All CH habitats occur in the northeast section of the study area, occurring on shallow, granitic soils around Loon Lake, Rubicon, and Buck Island reservoirs. Some of these areas could likely be mapped as CM habitats because of their varied shrub composition, but they were designated CH in deference to earlier mapping efforts (KEA 2000) and the overall dominance of huckleberry oak. At somewhat lower elevations (e.g., along the Loon Lake Reach of Gerle Creek), other species become more common and huckleberry oak correspondingly less dominant. These areas are mapped as the CM alliance.

#### 4.1.6 Lower Montane Mixed Chaparral Alliance (CQ)

The Lower Montane Mixed Chaparral Alliance (CQ) is used to map lower elevation chaparral habitats with no clear pattern of dominance by any one species. Whiteleaf manzanita, hoary coffeeberry, wedgeleaf ceanothus (*Ceanothus cuneatus*), toyon (*Heteromeles arbutifolia*), and western poison oak (*Toxicodendron diversilobum*) are each well-represented. Sparse trees are occasional in this otherwise shrub-dominated alliance, most often gray pine, interior live oak (*Quercus wislizeni*), or black oak (*Quercus kelloggii*). The presence of greenleaf manzanita often signals a transition to the structurally and ecologically similar Upper Montane Mixed Chaparral Alliance (CX).

In the study area, the CQ alliance commonly occurs as a result of transmission line clearing in habitats otherwise dominated by mid-elevation conifers (e.g. the Douglas Fir-Pine alliance [DP] or the Mixed Conifer-Pine alliance [MP]). CQ polygons represent a total of 541.0 acres, or less than one percent of the entire study area. CQ habitats occur in the southeast and southwest sections of the study area, especially within the transmission line corridor as it runs west of Camino reservoir.

#### 4.1.7 Upper Montane Mixed Chaparral Alliance (CX)

The Upper Montane Mixed Chaparral Alliance (CX) is generally used to map upper elevation chaparral habitats with no clear pattern of dominance by any one species, although in the study area, mountain whitethorn is consistently the most common within CX habitats. Other common shrubs include greenleaf manzanita and deerbrush. Sparse trees are occasional in this otherwise shrub-dominated alliance, including white fir, black oak, and red fir (*Abies magnifica*). The presence of whiteleaf manzanita in CX habitats signals a transition to the structurally and ecologically similar Lower Montane Mixed Chaparral alliance (CQ).



In the study area, the CX alliance commonly occurs as a result of transmission line clearing in habitats otherwise dominated by mid to high-elevation conifers (e.g., the Mixed Conifer-Fir Alliance [MF]). CX polygons represent a total of 1548.1 acres, or 2.6 percent of the entire study area. CX habitats occur in the northeast and southeast sections of the study area, within the transmission line corridor as it runs northeast of Camino reservoir.

#### 4.1.8 Upper Montane Mixed Shrub Alliance (CM)

The Upper Montane Mixed Shrub Alliance (CM) is used to map upper elevation habitats structurally similar to the Huckleberry Oak (CH) alliance, but with a more diverse species composition. Greenleaf manzanita, mountain whitethorn, and bitter cherry (*Prunus emarginata*) co-occur with huckleberry oak in the CM alliance, often with sparse tree cover of Jeffery pine, white fir, or other conifers.

CM polygons represent a total of 507.8 acres, or less than one percent of the entire study area. CM habitats occur in the northeast and southeast sections of the study area, largely mapped on south-facing slopes at slightly lower elevations than the CH alliance.

#### 4.1.9 Whiteleaf Manzanita Chaparral (CW)

The Whiteleaf Manzanita Alliance (CW) is used to map stands dominated by whiteleaf manzanita. A lower elevation analogue to the greenleaf manzanita alliance, CW habitats were also observed to support mahala mat (*Ceanothus prostratus*), and, in lower elevations, the subshrub creeping sage (*Salvia sonomensis*). In addition, significant areas of bare soil and unvegetated slash also occur in areas mapped as CW.

CW polygons represent a total of 138.4 acres, or less than one percent of the entire study area. In the study area, the CW alliance commonly occurs as a result of transmission line clearing in habitats otherwise dominated by low to mid elevation conifers and hardwoods. CW habitats mostly occur in the southwest section of the study area, including on Poho Ridge under the transmission lines, where adjacent lands often support the Mixed Conifer-Pine alliance (MP). It is also found in the transmission line corridor below Slab Creek reservoir, and in the Pine Hill area, where it is mapped as Gabbro Chaparral (CE) due to its occurrence on gabbro soils.

#### 4.1.10 Mountain Alder Alliance (TA)

The Mountain Alder Alliance (TA) is used to map habitats dominated by mountain alder (*Alnus incana*). Restricted to riparian and wetland areas, TA occurs in thin bands along stream edges, and as shrub thickets in grass-sedge-rush alliance (HJ) meadows. Because riparian areas are outside the scope of the vegetation mapping study, TA polygons included here only include the latter habitats. Detailed mapping of TA and other riparian habitats is included in the *Riparian and Wetlands Technical Report*.

TA polygons mapped during the vegetation mapping study represent a total of 27.8 acres, or less than one percent of the entire study area. They are concentrated in the southeast and northeast sections of the study area.

#### 4.1.11 Willow-Alder Alliance (QY)

The Willow-Alder Alliance (QY) is used to map habitats in which either white alder (*Alnus rhombifolia*) or mountain alder share dominance with willow (*Salix* spp.). Restricted to riparian and wetland areas, QY occurs in bands along stream edges, and as shrub thickets in grass-sedge-rush alliance (HJ) meadows. Because riparian areas are outside the scope of the vegetation mapping study, QY polygons included here only include the latter habitats. Detailed mapping of QY and other riparian habitats is included in the *Riparian and Wetlands Technical Report*.

QY polygons represent a total of 56.7 acres, or less than one percent of the entire study area. They are concentrated in the southeast and northeast sections of the study area.

#### 4.1.12 Willow Alliance (QO)

The Willow Alliance (QO) is used to map habitats in which willow dominates to the exclusion of other trees and shrubs. Restricted to riparian and wetland areas, QO occurs in bands along stream edges, and as shrub thickets in grass-sedge-rush alliance (HJ) meadows. Because riparian areas are outside the scope of the vegetation mapping study, QO polygons included here only include the latter habitats. Detailed mapping of QO and other riparian habitats is included in the *Riparian and Wetlands Technical Report*.

QO polygons represent a total of 14.0 acres, or less than one percent of the entire study area. They are mostly mapped in the southwest and western sections of the study area.

### **4.2 Tree-dominated Alliances**

#### 4.2.1 Black Oak Alliance (QK)

The Black Oak Alliance (QK) is used to map mixed hardwood/conifer forests with a strong or dominant component of black oak. Conifers and other hardwoods are common in the QK alliance, including ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), and canyon live oak. The shrub understory is generally well-developed, with western poison oak, deerbrush, and California buckeye (*Aesculus californica*) each well-represented. QK polygons represent a total of 48.0 acres, or less than one percent of the entire study area. The QK alliance is mapped mostly in the western section of the study area, where it occurs as small polygons intermixed with larger, conifer-dominated alliances, often in drainages.

#### 4.2.2 Blue Oak Alliance (QD)

The Blue Oak Alliance (QD) is used to map open grasslands and woodlands supporting blue oak (*Quercus douglasii*) as the dominant tree. Gray pine and interior live oak often occur as well,

and total tree cover is generally low. Shrubs are common in the QD alliance but with very low cover; the most common species are western poison oak and California buckeye, each with higher cover in partially shaded drainages.

The understory of the QD alliance is its most prominent feature, composed of annual, generally exotic, grasses interspersed with native and exotic forbs. In the study area, wild oats (*Avena fatua* and *A. barbata*), ripgut grass (*Bromus diandrus*), red brome (*Bromus madritensis* ssp. *rubens*), hedgehog dogtail grass (*Cynosurus echinatus*) goatgrass (*Aegilops triuncialis*), and medusahead (*Taeniatherum caput-medusae*) are each common components of the QD understory. The latter two of these are typically concentrated near roads, development, or other anthropogenic disturbance. Forbs such as hedge parsley (*Torilis arvensis*), blue dicks (*Dichelostemma capitatum*), and pretty face (*Triteleia ixioides*) can also be locally common, most often in areas well removed from development.

QD polygons represent a total of 565.9 acres, or less than one percent of the entire study area. The QD alliance is restricted to the western section of the study area, often occurring next to Annual Grass-Forb (HG) polygons with similar understory species composition, but no tree layer.

#### 4.2.3 Canyon Live Oak Alliance (QC)

The Canyon Live Oak Alliance (QC) is used to map hardwood stands with canyon live oak (*Quercus chrysolepis*) as the dominant tree. It can occur in pure stands, or in combination with conifers (often Douglas-fir or ponderosa pine) or other hardwoods (generally black oak). The shrub layer is typically well developed in QC habitats, often including toyon, western poison oak, California buckeye, and Sierra coffeeberry (*Rhamnus rubra*).

QC polygons represent a total of 3,107.9 acres, or 5.2 percent of the entire study area. The QC alliance is mostly mapped in the southwest section of the study area, particularly on the steep south facing slopes of Silver Creek upstream of Camino reservoir. Many of these stands could also be considered the non-productive mixed hardwoods alliance (NX), but were designated QC because of the general dominance of canyon live oak, and in deference to earlier mapping efforts (KEA 2000).

#### 4.2.4 Douglas Fir- Pine Alliance (DP)

The Douglas-Fir – Pine Alliance (DP) is used to map coniferous forest stands dominated by Douglas-fir and ponderosa pine. These habitats often also support black oak or canyon live oak, but few other conifers are present; although species such as white fir, sugar pine (*Pinus lambertiana*) or incense cedar (*Calocedrus decurrens*) occur, they are never dominant. The shrub layer in DP habitats includes shrubs such as deerbrush, whiteleaf manzanita, and tan oak (*Lithocarpus densiflorus*). DP polygons represent a total of 2412.3 acres, or 4.0 percent of the entire study area. The DP alliance is mostly mapped in the southwest section of the study area, where large blocks of DP habitat are mapped in the vicinity of Brush Creek and Slab Creek reservoirs.

#### 4.2.5 Gray Pine Alliance (PD)

The Gray Pine Alliance (PD) is used to map sparsely to moderately forested areas in which gray pine is the dominant conifer. It occurs on rocky soils similar elevations to the blue oak (QD) and interior live oak (QW) alliances, and these species often co-occur in gray pine habitats. The shrub layer is typically well-developed, and commonly includes deerbrush, whiteleaf manzanita, and hoary coffeeberry.

PD polygons represent a total of 170.0 acres, or less than one percent of the entire study area. The PD alliance is only mapped in the western, low elevation section of the study area, where it supports a botanically important serpentine outcrop community described in the *Special-Status Plants and Invasive/Noxious Weeds Technical Report*.

#### 4.2.6 Interior Live Oak Alliance (QW)

The Interior Live Oak Alliance (QW) is used to map hardwood forests and grasslands dominated by interior live oak. These often take the form of open, sparsely treed grasslands similar to blue oak (QD) habitats in species composition, although at a somewhat higher elevation. It can also be found as full-canopy forests in drainages or north-facing slopes in otherwise gray pine (PD) or blue oak (QD) alliances. In both cases, commonly associated shrubs include western poison oak and California buckeye. QW polygons represent a total of 476.7 acres, or less than one percent of the entire study area. The QW alliance is largely restricted to the western, low-elevation section of the study area.

#### 4.2.7 Lodgepole Pine Alliance (LP)

The Lodgepole Pine Alliance (LP) is used to map coniferous forests dominated by lodgepole pine. In the study area, it typically occurs in mesic or wetland habitats adjacent to reservoirs or streams, or at the margins or within meadows otherwise typical of the grass-sedge-rush (HJ) alliance. Associated conifers, when they occur, typically include those of the Mixed Conifer-Fir (MF) alliance. LP polygons represent a total of 273.1 acres, or less than one percent of the entire study area. The LP alliance is mapped in the northeast and southeast sections of the study area, typically as small polygons adjacent to riparian or wetland habitats.

#### 4.2.8 Mixed Conifer - Fir Alliance (MF)

The Mixed Conifer – Fir Alliance (MF) is used to map mixed coniferous forests in which white fir and Jeffery pine are each prominent. In addition, MF habitats are generally of high enough elevations to support lodgepole pine where appropriate (e.g., at stream edges). Red fir, sugar pine, and incense cedar can each be found in the MF alliance; Douglas-fir and/or ponderosa pine typically signal a transition to the Mixed Conifer-Pine (MP) alliance. The understory in MF habitats is usually a function of canopy closure: open areas support greenleaf manzanita, mountain whitethorn, and bitter cherry, but under closed canopies sparse Sierra gooseberry (*Ribes roezlii*) and prince's pine (*Chimaphila umbellata*) can be the only shrubs.

MF polygons represent a total of 20,545.3 acres, or 34.1 percent of the entire study area. The MF alliance is mapped across large areas of the northeast and southeast sections of the study area, but is replaced by the MP alliance near the western limit of Union Valley reservoir.

#### 4.2.9 Mixed Conifer - Pine Alliance (MP)

The Mixed Conifer – Pine (MP) is used to map mixed coniferous forests in which Jeffery pine is absent, and white fir shares dominance with lower-elevations species such as ponderosa pine and Douglas-fir. Two or more species always share dominance in the MP alliance. In effect the lower-elevation counterpart to the Mixed Conifer – Fir (MF) alliance, the MP alliance shares with it the common overstory components sugar pine and incense cedar. The shrub layer, too, shares many of the same species, including Sierra gooseberry and greenleaf manzanita.

MP polygons represent a total of 6,771.1 acres, or 11.2 percent of the entire study area. The MP alliance is concentrated in the southeast and southwest sections of the study area, replacing the MF alliance near the western limit of Union Valley reservoir. Around Camino reservoir, some stands mapped as MP could also be categorized as the Douglas-fir – Pine (DP) because of the strong presence of Douglas-fir. Conversely, borderline MP habitats near Slab Creek reservoir were generally typed as DP because a single species (Douglas-fir) is often dominant there.

#### 4.2.10 Non-Productive Mixed Hardwoods Alliance (NX)

The Non-Productive Mixed Hardwoods Alliance (NX) is used to map mixed hardwood stands in which no species is clearly dominant, and overall site potential is poor. Black oak, canyon live oak, interior live oak, toyon, and coyote brush (*Baccaris pilularis*) are each represented in NX habitats. NX polygons represent a total of 745.9 acres, or 1.2 percent of the entire study area. NX is mostly found in the southwest section of the study area.

#### 4.2.11 Ponderosa Pine Alliance (PP)

The Ponderosa Pine Alliance (PP) is used to map forested or plantation lands dominated by ponderosa pine, with few or no other trees. PP polygons represent a total of 8,774.1 acres, or 14.6 percent of the entire study area. It mostly occurs as recently established plantations in the southeast, northeast and southwest sections part of the study area.

#### 4.2.12 Quaking Aspen Alliance (QQ)

The Quaking Aspen Alliance (QQ) is used to map forested habitats with a significant component of quaking aspen (*Populus tremuloides*), an uncommon component of riparian-influenced habitats in the northeastern, higher elevation section of the study area. Conifers typical of the Mixed Conifer – Fir (MF) and Lodgepole Pine (LP) alliances are common in the QQ alliance. Although these patches are often unmappably small, some QQ polygons of mapping size were observed to the south of Ice House Reservoir during ground truthing efforts. QQ polygons represent a total of 3.5 acres, or less than one percent of the entire study area.

### 4.3 Other Alliances

#### 4.3.1 Agricultural (AG)

The Agricultural classification (AG) is used to map actively in food and/or fiber production, including orchards, row crops, and actively grazed pastures. Less actively used lands that could also be considered agricultural are typically classed as Blue Oak (QD) or Annual Grass-Forb (HG). Agricultural polygons are occasional in the western section of the study area, within the transmission line corridor. AG polygons represent a total of 235.2 acres, or less than one percent of the entire study area; they are concentrated in the southwest and western sections.

#### 4.3.2 Barren (BA)

The Barren classification (BA) is used to map lands supporting little or no vegetation, including drawdown zones around reservoirs and some highly disturbed landings. Outside of these areas, the largest polygons of BA habitat are found in the vicinity of Loon Lake; while very poorly vegetated, these areas support species typical of those found in adjacent Huckleberry Oak (CH) habitats. In addition, vegetation clearing within the transmission line corridor has resulted in numerous, largely non-vegetated slash piles in the western section of the study area; when large enough to be mapped, these are also treated as BA. BA polygons represent a total of 875.2 acres, or less than one percent of the entire study area.

#### 4.3.3 Annual Grass - Forb (HG)

The Annual Grass – Forb Alliance (HG) is used to map grassland habitats dominated by non-native annuals. In the study area, wild oats, ripgut grass, red brome, hedgehog dogtail grass, goatgrass, and medusahead are each common components of the HG alliance. The latter two of these are typically concentrated near roads, development, or other anthropogenic disturbance. Forbs such as hedge parsley, blue dicks, and pretty face can also be locally common in the HG alliance, most often in areas well removed from development. Conversely, heavily disturbed areas mapped as HG are often dominated by yellow starthistle (*Centaurea solstitialis*). Scattered trees (usually blue oak or interior live oak) are often found in HG polygons; when their cover exceeds approximately 10% these areas are generally classed as Blue Oak (QD) alliance. HG polygons represent a total of 410.9 acres, or less than one percent of the entire study area. These habitats are concentrated in the western, low-elevation section of the study area.

#### 4.3.4 Grass-Sedge-Rush Alliance (HJ)

The Grass-Sedge-Rush Alliance (HJ) includes all seasonally or permanently wet meadows, areas generally dominated by sedges (*Carex* spp., often *C. vesicaria* or *C. aquatilis*) or rushes (*Juncus* spp., often *J. xiphioides*, *J. balticus* or *J. chlorocephalus*). A diverse range of grasses and forbs also occur, including corn lily (*Veratrum californicum* var. *californicum*), sparse-flowered bog orchid (*Platanthera sparsiflora*), sticky cinquefoil (*Potentilla glandulosa*), and Bigelow's sneezeweed (*Helenium bigelovii*). Shrubs or small trees are also a common component of HJ habitats, with arroyo willow, shining willow, and mountain alder each well-represented,

especially in transitions to their respective alliances. In high elevation meadows, the HJ alliance occurs as the understory in lodgepole pine (LP) polygons. A more comprehensive list of species and descriptions of HJ habitats is included in the *Riparian Vegetation and Wetlands Technical Report* (February 2004).

HJ polygons represent a total of 324.7 acres, or less than one percent of the entire study area. They are concentrated in the southeast section of the study area, where extensive HJ meadows are found in the Robbs Valley area, the shoreline of Union Valley reservoir, and along the Loon Lake reach of Gerle Creek. At lower elevations, HJ habitats are most often very small patches associated with perennial streams.

#### 4.3.5 Perennial Grass (HM)

The Perennial Grass Alliance (HM) is used to map dry grassland-forb dominated areas, often upslope of reservoir wetlands in the grass-sedge-rush (HJ) alliance. Species composition is generally not consistent among HM polygons, but California goldenrod (*Solidago californica*), western yarrow (*Achillea millefolium*), and Lupine (*Lupinus* sp.) were all observed. HM represents a total of 67.5 acres, or less than one percent of the entire study area.

#### 4.3.6 Ornamental Grass (IG)

The Ornamental Grass Alliance (IG) is used to map large areas of ornamental, usually irrigated, grasses. Large lawns and (more commonly) golf courses in the far western parts of the study area are mapped as IG. It represents a total of 80.2 acres, or less than one percent of the entire study area.

#### 4.3.7 Tule-Cattail Alliance (HT)

The Tule – Cattail Alliance (HT) is used to map emergent wetlands dominated by Tule (*Scirpus acutus*) or cattail (*Typha* spp.). HT represents a total of 7.3 acres, or less than one percent of the entire study area. It is only found in the northeast, southeast, and western sections of the study area.

#### 4.3.8 Urban/Developed (UB)

The Urban/Developed classification (UB) includes all developed areas, including residential housing, non-agricultural commercial areas, major project facilities, and fundamentally disturbed lands surrounding each. Some disturbed lands similar to the blue oak (QD) or annual grass-forb (HG) alliances are included in the UB alliance when they are directly associated and adjacent to residential units. Although they meet the definition of UB, roads were generally not mapped during this effort, excepting larger paved roads in the lower transmission line corridor. UB represents a total of 749.5 acres, or 1.2 percent of the entire study area. It is mapped most extensively in the western section of the study area.

#### 4.3.9 Water (WA)

The Water classification (WA) is used to map permanent open water areas, including reservoirs, ponds, and open-water wetlands. Because riparian corridors were specifically excluded from the study area, water within them was not mapped. WA represents a total of 5,168.6 acres, or 8.6 percent of the entire study area, and is mapped most extensively at the three UARP storage reservoirs in the northeast and southeast sections of the study area.

#### 4.3.10 Unmapped (XX)

The Unmapped classification (XX) is used in areas for which orthophoto coverage was not available due to small gaps in aerial photography. XX represents a total of 443.6 acres, or less than one percent of the entire study area. They are mostly found in the southeast and southwest sections.

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# **APPENDIX A**

## **VEGETATION MAPS**

- UARP General Vegetation Map - Northeastern Area
- UARP General Vegetation Map - Southeastern Area
- UARP General Vegetation Map - Southwestern Area
- UARP General Vegetation Map - Western Area

