Placer County Water Agency
Middle Fork American River Project
(FERC No. 2079)

FINAL

TERR 1 - VEGETATION COMMUNITIES AND WILDLIFE HABITAT TECHNICAL STUDY REPORT - 2007

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June 2008

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1.0 INTRODUCTION

This report describes surveys conducted by the Placer County Water Agency (PCWA) in accordance with the TERR 1 - Vegetation Communities and Wildlife Habitat Technical Study Plan (TERR 1 - TSP) for the Middle Fork American River Project (MFP or Project), which was included in Supporting Document (SD) H of the Pre-Application Document (PAD) (PCWA 2007). Specifically, this report provides a detailed description of the methods and results of vegetation community and wildlife habitat studies completed in 2007. A draft report was distributed to the Terrestrial Technical Working Group (TWG) on January 31, 2008 for a 60 day comment period. The comment period ended on March 31, 2008. No comments were received.

2.0 STUDY OBJECTIVES

The objectives of the vegetation community and wildlife habitat studies described in the TERR 1 - TSP are:

- Document vegetation communities and wildlife habitats adjacent to existing Project facilities and features, recreation facilities, and dispersed concentrated use areas.
- Document vegetation communities and wildlife habitats adjacent to potential Project betterments, including: new facilities, roads, and trails; staging and disposal sites; and new inundation areas.

Figure 1 shows the TERR 1 - TSP study objectives and the study elements associated with each objective. It also shows where information developed is documented.

3.0 STUDY IMPLEMENTATION

Study elements described in the TERR 1 - TSP were initiated in 2006 and will be completed in 2008. In 2006, existing data on vegetation communities and wildlife habitats in the study area was compiled, and in 2007 field surveys were conducted in the study area. Study elements that have been completed and outstanding study elements are discussed further below.

3.1 STUDY ELEMENTS COMPLETED

3.1.1 Vegetation Communities

Develop Preliminary Vegetation Community Maps from Available CalVeg Data

Preliminary vegetation community maps were developed in 2006 based on US Department of Agriculture - Forest Service (USDA-FS) CalVeg data (USDA-FS 2000). These preliminary maps are available in the SD-F of the PAD for the MFP (PCWA 2007).

Verify Calveg Data Using Aerial Photographs and Project Video

Pre-field verification of the preliminary vegetation community maps was conducted in August 2007, and included a review of aerial photographs of the study area (AirPhoto USA 2005) and the Project video. Areas where CalVeg data did not appear to correspond to the aerial photographs or the video were documented on hard-copy maps for follow-up during ground-truth surveys.

Conduct Ground-Truth Surveys

The preliminary vegetation community maps were ground-truthed during field surveys conducted in August through November 2007. Results of the ground-truth surveys are provided in Section 6.1 of this report.

Develop Final Vegetation Community Maps

Final vegetation community maps were developed in October 2007 and are included as Maps 1a through 1i and Maps 2a through 2d of this report. A list of vegetation communities present in the vicinity of the MFP based on these finalized maps is provided in Table 1. Descriptions of these vegetation communities are provided in Appendix A. Photographs of representative vegetation communities are provided in Appendix B. Data sheets from the surveys are provided in Appendix C.

3.1.2 Wildlife Habitats

Develop Calveg-CWHR Crosswalk Table for the MFP

A final CalVeg-CWHR crosswalk table for the MFP was developed in October 2007 based on final vegetation community maps. It is included as Table 2 of this report.

Develop Preliminary Vegetation Density Maps from Aerial Photographs and Project Video

Preliminary vegetation density maps of the study area were developed from existing vegetation density information (USDA-FS 2000) in August 2007. Pre-field verification of these maps was completed using aerial photography of the study area (AirPhoto USA 2005) and the Project video.

Conduct Vegetation Density Ground-Truth Surveys and Collect Data on Tree Size Classes

Preliminary vegetation density maps were ground-truthed and data on tree size classes were collected during field surveys conducted August through November 2007. Results from these surveys are included in Section 6.2. Data sheets from the surveys are provided in Appendix C. Summary data results are included as Appendices D and E.

Develop Final Vegetation Density and Tree Size Class Maps

Final vegetation density maps and tree size class maps were developed in November 2007 and are included as Maps 3a through 3i and Maps 4a through 4c of this report.

3.1.3 Variances from the TERR 1 - TSP

The 2007 studies were implemented in accordance with the TSP with two exceptions. First, the timing of the distribution of the 2007 draft technical study report (TSR) was delayed as described below. Second, the detailed description of the riparian community at the mouth of Five Lakes Creek and at upper Hell Hole Reservoir potentially inundated by the Hell Hole Reservoir Seasonal Storage Increase Betterment could not be completed in 2007 because the existing topographic resolution was insufficient to accurately identify the new inundation area. A detailed photogrammetry survey of the upper reservoir area was completed in late 2007 which will provide detailed topography with sufficient resolution to accurately identify the new inundation area after post-processing of the data is completed. A schedule for completion of this work is provided below.

Report Schedule Variance

The TERR 1 - TSR was scheduled to be submitted to the Terrestrial Technical Working Group (TWG) in November 2007. The report was not distributed until January 2008 because additional time was necessary to complete data analysis and prepare final vegetation community maps. Because of this variance, the following schedule will be implemented to finalize this report.

Date	Activity
January 2008	Distribute draft TERR 1 - TSR to the Terrestrial TWG
February 2008 through March 2008	Terrestrial TWG review and provide comments on draft TERR 1 - TSR
April and May 2008	Resolve comments and prepare final TERR 1 - TSR
June 2008	Distribute final TERR 1 - TSR to the Terrestrial TWG and Plenary
September and October 2008	Incorporate riparian data collected as part of AQ 10 - Riparian Resources TSP into draft supplemental TERR 1 - TSR
October 2008	Distribute draft supplemental TERR 1 - TSR to the Terrestrial TWG
November 2008 through January 2009	Terrestrial TWG to review and provide comments on draft supplemental TERR 1 - TSR
February and March 2009	Resolve comments and prepare final TERR 1 - TSR
March 2009	Distribute final TERR 1 - TSR to the Terrestrial TWG and Plenary

3.2 OUTSTANDING STUDY ELEMENTS

Detailed descriptions of riparian vegetation communities at the mouth of Five Lakes Creek and at upper Hell Hole Reservoir potentially affected by the Hell Hole Reservoir Seasonal Storage Increase Betterment will be completed in 2008 following review of photogrammetry elevation layers and implementation of riparian surveys. The riparian vegetation community data will be collected in 2008 as part of the AQ 10 - Riparian Resources TSP. This information will be incorporated into the TERR 1 vegetation community maps and described in a supplemental technical report provided to the stakeholder in late 2008. Refer to the table above for the schedule of these activities.

Additionally, if additional Project facilities, features, recreation facilities, or concentrated use areas are identified, they will be surveyed consistent with the TERR 1 - Vegetation Communities and Wildlife Habitats.

3.2.1 Proposed modifications to the TERR 1 - TSP

There are no proposed modifications to the TERR 1 - TSP.

4.0 EXTENT OF STUDY AREA

The study area for the documentation of vegetation communities includes:

- ¼ mile around existing Project facilities and features, recreation facilities, and dispersed concentrated use areas.
- ¼ mile around potential Project betterments, including new facilities, roads, trails, staging and disposal sites; as well as new inundation areas.

5.0 STUDY APPROACH

This section describes the study approach used to document vegetation communities and wildlife habitats in the study area.

5.1 VEGETATION COMMUNITIES

The study approach for documenting vegetation communities in the vicinity of the MFP included development of preliminary vegetation community maps from available CalVeg data, verification of preliminary maps based on a review of aerial photography and a Project video, conducting ground-truth surveys, and development of final vegetation maps. The approach for implementation of each of these steps is described below.

5.1.1 Develop Vegetation Community Maps from Available CalVeg Data

The best available existing information on vegetation communities in the study area was obtained and used to develop preliminary maps of vegetation communities. This included the Classification and Assessment with LANDSAT of Visible Ecological Groupings (CalVeg) data for the Eldorado and Tahoe National Forests (ENF and TNF)

(USDA-FS 2000). The CalVeg system is used to classify existing vegetation present on federally managed forestlands based on LANDSAT color infrared satellite imagery. Data are verified using soil-vegetation maps and professional guidance from various sources statewide.

The term "alliance" is used in the CalVeg system, and is defined as a uniform group of plant associations sharing one or more dominant or diagnostic overstory species. This term corresponds closely to what plant ecologists call a community type and foresters call a forest type or stand. The term "community" is used in this document, and is considered synonymous to the term "alliance" as defined by CalVeg.

Preliminary information on riparian communities in the study area was based on field surveys (helicopter and ground) conducted in August, September, and October 2005 as part of PCWA's 2005 Physical Habitat Characterization Study (PCWA 2005). Riparian community classifications described in the 2005 Physical Habitat Characterization Study Reports were cross-referenced with the CalVeg classification system based on species present. A GIS layer with point and line data from these reports was overlayed on the CalVeg vegetation community maps to show riparian vegetation communities associated with the stream reaches associated with the MFP.

5.1.2 Verify CalVeg Data Using Aerial Photographs and Project Video

Pre-field verification of the preliminary vegetation community maps included a review of aerial photographs of the study area (AirPhoto USA 2005). All photographs were full-color orthophotographs taken September 13 and 15, 2005 at a sensor height of 12,000 feet above ground level and at a photo scale of 1:2000 with 35% overlap. This information was subsequently scanned at 2000 DPI creating 18 inch pixel resolution.

In addition, a Project video of stream reaches and reservoirs associated with the MFP was reviewed. PCWA developed a high resolution, digital video of study streams and Project facilities in 2005. The video was taken from a helicopter during September and October of 2005 and includes both low altitude views of the stream corridor and overviews of the surrounding watersheds in the following areas:

- Middle Fork American River from Folsom Reservoir to Ralston Afterbay (taken at two flows).
- Middle Fork American River from Ralston Afterbay to 5.5 miles upstream of French Meadows Reservoir.
- Rubicon River from confluence with Middle Fork American River to 5.8 miles upstream of Hell Hole Reservoir.
- Long Canyon Creek, North Fork Long Canyon Creek, South Fork Long Canyon Creek, and Duncan Creek.
- Primary Project facilities.

CalVeg data, as shown on the preliminary maps, were compared to the aerial photographs and Project video. Areas where CalVeg data did not appear to correspond to the aerial photographs or the video were documented on hard-copy maps for follow-up examination during ground-truth surveys.

5.1.3 Conduct Ground-Truth Surveys

Ground-truth surveys for vegetation communities were conducted in the following areas:

- A selection of 20% of vegetation community polygons within ¼ mile of Project facilities and features, Project recreation facilities, and dispersed concentrated use areas.
- Within ¼ mile of all Project betterments, including new facilities, roads, and trails; staging and disposal sites; and new inundation areas.
- Areas identified for follow-up examination during pre-field verification of the preliminary maps, as described above.

Ground-truth surveys were conducted by a team of two biologists on foot, by vehicle, and by helicopter. The following data were collected at each site surveyed: date and surveyor names; GPS coordinates and location or facility name; CalVeg-designated vegetation community and field-assessed vegetation community (if different); approximate size of area surveyed; dominant overstory species composition; general characterization of subdominant or understory species; and wildlife species observed on the site. For tree-dominated communities, estimates of forest structure characteristics (e.g., diameter at breast height (dbh) and percent canopy cover) were also noted. Refer to Section 5.2.2 for details on collection of forest structure data. Ground-truth surveys were not conducted in inaccessible areas.

Vegetation community type was verified by comparing dominant overstory species observed at each site with the dominant overstory species that characterize the vegetation community as described in the *Field Key to CalVeg-North Sierran Zone 3* (USDA-FS 2007a) and *Vegetation Descriptions North Sierran Ecological Province-CalVeg Zone 3* (USDA-FS 2005a). For sites in which the CalVeg-designated vegetation community on the preliminary maps did not appear to be correct, the new field-assessed vegetation community was noted, and hard-copy vegetation community maps of the study area were marked to indicate the extent of the new vegetation community.

Portions of the study area that had been affected by wildfire after development of the original CalVeg designations were also noted on the datasheets and on hard-copy vegetation community maps. Vegetation communities that were altered by fire were reclassified to reflect their current status.

5.1.4 Develop Final Vegetation Community Maps

Final maps of vegetation communities were developed based on the results of pre-field review the existing CalVeg data using aerial photographs and video of the study area and ground-truth surveys.

Hard-copy corrections to vegetation community maps completed during the review of aerial photographs and the Project video and the ground-truth surveys were digitized and incorporated into GIS layers. Additionally, GIS layers showing the extent and severity of wildfire in the study area from 2000 to present were overlaid onto the vegetation community maps. This includes:

- Data on the fire history of the region through 2004, collected by USDA-FS as a cooperative effort of USDA-FS, the Department of Forestry and Fire Protection (CalFire), the Bureau of Land Management (BLM), and the National Park Service (NPS) (USDA-FS 2005b);
- Burned Area Reflectance Classification (BARC) data showing the extent and severity of the Ralston Fire (USDA-FS 2007b); and
- Field notes taken during ground-truth surveys in the study area.

Moderate-to-severely burned areas are shown on the final vegetation community maps as a semi-transparent layer.

5.2 WILDLIFE HABITATS

As shown in Figure 1, the overall study approach for documentation of wildlife habitats includes development of a CalVeg-CWHR crosswalk table and development of forest structure maps, including vegetation density and tree size class maps. The approach for implementation of these study elements is described below.

5.2.1 Develop MFP CalVeg-CWHR Crosswalk Table

USDA-FS and CDFG developed a CalVeg-CWHR Crosswalk for California (USDA-FS 2004a) as a way to determine what wildlife habitats are likely to be present based on existing CalVeg vegetation communities. A list of CalVeg vegetation communities was compiled for the study area based on final vegetation communities maps. Each CalVeg community was then translated into a CWHR wildlife habitat using the CalVeg-CWHR Crosswalk for California. This was documented in a Project-specific CalVeg-CWHR crosswalk table.

5.2.2 Develop Forest Structure Maps

Forest structure data, including vegetation density and tree size class, were collected during 2007 field surveys and maps were developed to provide additional information on wildlife habitats in the study area. These data and maps will be analyzed as part of the TERR 4 - Special-Status Wildlife technical studies to be implemented in 2008. The

approach for the collection of vegetation density and tree size class data and development of maps is described below.

Vegetation Density

The following steps were implemented to document vegetation density: 1) develop preliminary vegetation density maps from existing vegetation density data and from a review of aerial photographs and Project video; 2) conduct vegetation density ground-truth surveys; and 3) develop final vegetation density maps. Each of these steps is described below.

Develop Preliminary Vegetation Density Maps

Existing GIS layers showing vegetation density for the ENF and TNF were obtained from USDA-FS (USDA-FS 2000) and overlaid onto maps of the study area. Vegetation density information for federal forestlands are derived from the same LANDSAT color infrared satellite imagery used to develop the CalVeg vegetation community GIS layers, as described in Section 5.1.1 of this report. Conifer and hardwood tree cover is mapped from the LANDSAT imagery as a function of canopy closure. These canopy closure data are then grouped into categories consistent with CWHR vegetation density classifications (CDFG 2002). CWHR vegetation density categories include sparse (10 to 24 percent canopy cover), open (25 to 39 percent canopy cover), moderate (40 to 59 percent canopy cover), and dense (60 to 80 percent canopy cover).

These existing vegetation density maps were compared against aerial photographs (AirPhoto USA 2005) and the Project video, as well as wildfire data for the study area (USDA-FS 2005b and 2007b). Details on the aerial photographs, Project video, and wildfire data are provided in Section 5.1.2 and 5.1.4 of this report. Based on the review of aerial photographs, two additional vegetation density categories were added for the MFP. These are barren (0 to 10 percent canopy cover) for the documentation of barren or rocky areas with less than 10 percent canopy cover, and extremely dense (greater than 80 percent canopy cover) for the documentation of densely forested areas. Polygons that were incorrectly classified or that needed to be modified based on current conditions were corrected on hard-copy vegetation density maps. These corrections were then digitized and incorporated into preliminary vegetation density maps of the study area.

Conduct Ground-Truth Surveys

Preliminary vegetation density maps were verified by conducting ground-truth surveys in the study area. Vegetation density was verified by estimating percent canopy cover in tree-dominated vegetation communities in representative locations in the study area. Inaccessible areas were not ground-truthed.

Canopy cover estimates in tree-dominated communities within ¼ mile of Project facilities and recreation facilities were obtained as part of vegetation community ground-

truth surveys described in Section 5.1.3. At selected survey locations, percent canopy cover within an approximately 30-meter radius from a reference point was estimated using a spherical densiometer. Four canopy cover estimates were taken from the point, one in each cardinal direction (north, east, south, and west) (Figure 2). The spherical densiometer was modified to isolate only 17 densiometer points (out of 37) to avoid overlap of readings that can result from the curved surface of densiometer (Platts et. al, 1987). These data were recorded on vegetation community data sheet as described in Section 5.1.3.

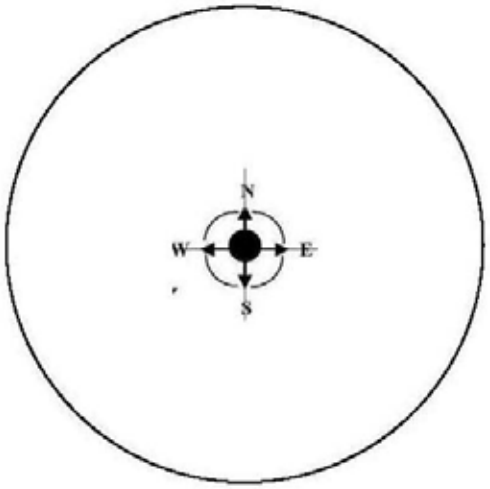

Figure 2.

In addition, more detailed vegetation density data were collected within ¼ mile of proposed Project betterments. In tree-dominated stands near Project betterments, additional sampling sites in representative habitat were surveyed. At each survey location, a center point was selected and recorded using a GPS unit. Percent canopy cover was estimated at five areas (or positions) at the survey location using a spherical densiometer. This included a center point and four points (north, east, south, and west) located approximately 30 meters from the center point. Four canopy cover estimates were taken at each of the five points, one in each compass direction (or orientation) (north, east, south, and west) (Figure 3). These data were recorded on vegetation community data sheet as described in Section 5.1.3.

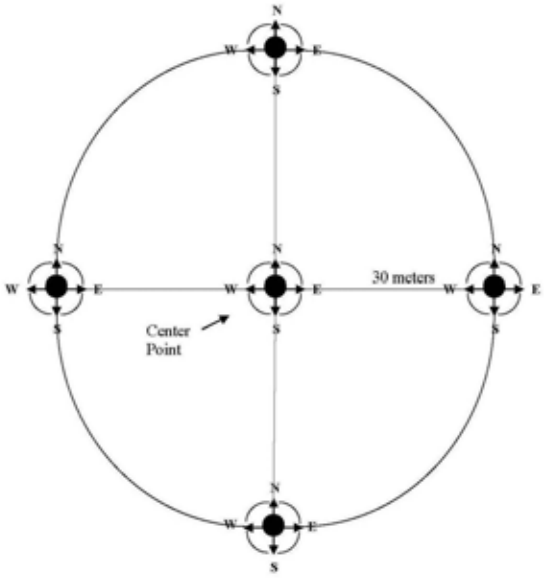

Figure 3.

Other information recorded on the data sheet included date and surveyor names; GPS coordinates and location or facility name; dominant overstory species composition; general characterization of subdominant or understory species; and wildlife species observed on the site.

Vegetation density data collected in the field were entered into a spreadsheet for analysis. This included determination of a final percent canopy cover estimate for each sampling plot, calculated as the average of the four estimates taken from one point at Project facilities and recreation facilities; or calculated as overall average of the five canopy cover estimates obtained within each plot at the proposed

Project betterments. The average was calculated by taking the total number of shaded densiometer points at each position, divided by the total possible number of densiometer points, multiplied by 100.

Develop Final Vegetation Density Maps

Final vegetation density maps were developed that incorporated changes made based on the review of aerial photographs, Project video, and wildfire data described previously. In addition, vegetation density (i.e., canopy cover) averages calculated from ground-truth surveys were compared to the vegetation density polygons on the preliminary vegetation density maps. These polygons were reclassified if the calculated vegetation density average from field measurements did not fall within the appropriate interval for the vegetation density category designated on the preliminary maps.

Tree Size Class

Tree size class data were collected to provide information on habitat for forest-dwelling special-status species (including northern goshawk, California spotted owl, American marten, and Pacific fisher) potentially occurring in areas where Project betterments are proposed. Tree size class is one characteristic of forest structure that USDA-FS uses to assess habitat suitability for these wildlife species. Other factors used for determining habitat suitability for these species include species range and distribution, vegetation community, and vegetation density. Tree size class data and other habitat characteristics will be reviewed in 2008 in consultation with the TERR TWG as part of the TERR 4 - Special-Status Wildlife technical studies to identify location associated with the Proposed Project betterments where northern goshawk surveys should be conducted.

The steps implemented for data collection and development of tree size class maps associated with the proposed Project betterments are described below.

Conduct Tree Size Class Field Surveys

Tree size class data were collected at selected sampling sites in accessible areas in representative tree-dominated stands within ¼ mile of the Hell Hole Reservoir Seasonal Storage Increase Betterment and the French Meadows Capacity Upgrade Betterment. Data were not collected within ¼ mile of the proposed Ralston Powerhouse Capacity Upgrade Betterment because the terrain around the powerhouse is not accessible by foot or by vehicle. The powerhouse is set within a steep, narrow river canyon, and the vegetation communities are situated at the top of granite walls that are too steep to scale. In addition, the upgrade activities associated with this betterment will take place primarily within the interior of the Ralston Powerhouse and in staging areas located within the current fenced footprint of the facility.

Based on habitat descriptions provided in the Sierra National Forest Plan Amendment (USDA-FS 2004b), sampling sites were selected within conifer-dominated vegetation communities that occur in the vicinity of proposed Project betterments. These

communities, include mixed conifer-pine (MP) and Douglas-fir-pine (DP), represent potential habitat for the forest-dwelling special-status species of interest including northern goshawk, California spotted owl, American marten, and Pacific fisher. In addition, the USDA-FS (2004b) also identified that hardwood forests represent potential habitat for California spotted owl. Therefore, black oak communities (QK) occurring around the perimeter of Hell Hole Reservoir were included in tree size class surveys. Canyon live oak (QC) vegetation communities were not sampled, because the canyon live oak individuals around Hell Hole Reservoir are shrub-like, multi-trunked trees that do not attain a size class appropriate for California spotted owl (i.e., greater than 24 inches dbh). Appendix B provides photographs of representative canyon live oak trees in the vicinity of Hell Hole Reservoir.

Tree size classes at each sampling site were characterized by estimating the percent of trees within designated size class categories as described in the *California Native Plant Society (CNPS)-Sierra Nevada Foothills Vegetation Rapid Assessment Protocol* (CNPS 2006). This protocol designates six categories based on tree dbh as follows: T1 (< 1 inch), T2 (1-6 inches), T3 (6-11 inches), T4 (11-24 inches), T5 (24-48 inches), and T6 (> 48 inches).

The center point of each representative sampling plot was recorded using a GPS unit. Each plot was approximately 900 sq meters (30 meters by 30 meters). Hardwood and coniferous trees in each plot were measured at approximately 4 feet from the ground (i.e., breast height) using a dbh measuring tape. These data were recorded on a data sheet. Other data collected include date and surveyor names; GPS coordinates and location or facility name; dominant overstory species composition; general characterization of subdominant or understory species; and wildlife species observed on the site. Tree size class data collected in the field were entered into a spreadsheet for analysis.

During the analysis, the tree size class data collected in the field were grouped into the two categories to identify potential habitat for the special-status species of interest based on the following USDA-FS forest management recommendations (USDA-FS 2004b):

- Trees in the dominant and co-dominant crown should average at least 24 inches dbh for northern goshawk, California spotted owl, and American marten;
- Forest should be comprised of medium-to-large trees (11 to 24 inches dbh) for Pacific fisher.

Develop final tree size class maps

Final tree size class maps for the study area (i.e., ¼ mile around potential Project betterments) were developed based on the results of field data collected in stands of mixed conifer-pine (MP), Douglas-fir-pine (DP) and black oak (QK). The tree size class in each of these stands was expressed as the total percentage of trees in two size class categories: 11 to 24 inches dbh, and 24 inches dbh or greater.

6.0 STUDY RESULTS

The following presents results of the TERR 1 vegetation community and wildlife habitat studies completed in 2007.

6.1 VEGETATION COMMUNITIES

Preliminary vegetation community maps based on the existing CalVeg data for the study area were completed in 2006 and were included in the SD F of the PAD for the MFP (PCWA 2007). Preliminary vegetation community maps were ground-truthed during field surveys conducted August through November 2007. Based on the results of ground-truth surveys, vegetation data were generally accurate with the following exceptions:

- Developed or cleared areas surrounding Project facilities that were originally classified as barren (BA) by CalVeg were reclassified as urban or developed (UB). Barren habitats include exposed bedrock and cliffs that are devoid of vegetation but still represent potential habitat for wildlife. Barren habitats do not include disturbed or developed areas such as cleared and graveled parking or staging areas, which do not represent potential habitat.
- Several areas classified as barren (BA) by CalVeg now support a variety of non-native grasses and were thus reclassified as annual grass-forb vegetation communities (HG).
- Several polygons within ¼ mile of the Middle Fork Interbay originally classified as Douglas-fir-pine (DP) forests by CalVeg were reclassified as pure stands of Pacific Douglas-fir (DF).
- Several polygons within ¼ mile of the Middle Fork Interbay originally classified as canyon live oak (QC) by CalVeg were reclassified as Douglas-fir-pine (DP).
- Black oak vegetation communities (QK) were overrepresented on the northwestern shore of Hell Hole Reservoir. Several polygons of QK were reclassified as canyon live oak (QC), upper montane mixed chaparral (CX), or mixed conifer-pine (MP).
- Several polygons on the southeastern shore of Hell Hole Reservoir identified as mixed conifer-fir (MF) by CalVeg were reclassified as mixed conifer-pine (MP) or as Douglas-fir-pine (DP).
- Several polygons on the southeastern shore of Hell Hole Reservoir identified as mixed conifer-pine (MP) were reclassified as canyon live oak (QC).

In addition, the effects of two recent wildfires had the potential to change several CalVeg communities designations in the study area. These wildfires include:

- The Ralston Fire, which occurred in September 2006 in the vicinity of Mosquito Ridge Road east of Foresthill. The fire burned approximately 8,423 acres of land.

The Ralston Fire affected several vegetation communities within the study area on the north side of Ralston Afterbay, including canyon live oak (QC), gray pine (PD), ponderosa pine (PP), and lower montane mixed chaparral communities (CX). However, due to the low intensity of the fire, many of the dominant trees in these communities remained intact, and therefore the vegetation communities designated for these areas remained the same.

- The Star Fire, a catastrophic wildfire which occurred in August and September 2001, and burned approximately 17,500 acres in the ENF, TNF, and adjacent private lands. The fire started in the vicinity of Duncan Canyon in the ENF and spread north to the TNF.

  The Star Fire affected vegetation communities within the study area in the vicinity of Duncan Creek Diversion and the southern end of French Meadows Reservoir, including mixed conifer-pine (MP) and mixed conifer-fir (MF) communities. Most of the dominant trees in these communities were entirely removed in the fire, and native shrubs are now dominant. Therefore, the conifer communities severely affected by the Star Fire have been reclassified as upper montane mixed chaparral (CX).

Table 1 provides a finalized list of vegetation communities present in the study area based on the results of ground-truth surveys. Descriptions of these vegetation communities are provided in Appendix A. Photographs of representative vegetation communities are provided in Appendix B. Data sheets are included in Appendix C.

Maps 1a-1i provide the final vegetation community maps developed for Project facilities and features, recreation facilities, and dispersed concentrated use area. Maps 2a-2d provide the final vegetation community maps developed for proposed Project betterments, including new facilities, roads, trails, staging and disposal sites, and new inundation areas.

6.2 WILDLIFE HABITATS

6.2.1 Develop MFP CalVeg-CWHR Crosswalk Table

Table 2 provides the MFP CalVeg-CWHR Crosswalk Table identifying wildlife habitats occurring in the study area, based on final vegetation community maps.

6.2.2 Develop Forest Structure Maps

Vegetation Density

Ground-truth surveys for verifying the preliminary vegetation density maps were conducted August through November 2007. Data sheets from the field surveys are included in Appendix C. Summary results are included as Appendix D. Maps 3a-3i provide the final vegetation density maps developed for the study area.

Tree Size Class

Field surveys for collection of tree size data associated with potential Project betterments were conducted August through November 2007. Data sheets from the field surveys are included in Appendix C. Summary results are included as Appendix E. Map 4 provides the final tree size class maps developed for potential Project betterments.

7.0 LITERATURE CITED

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TABLES

TERR 1 Table 1. Vegetation Communities Present in the TERR-1 Study Area.

CalVeg Vegetation Community	CalVeg Code
Herb-Dominated Communities	
Annual Grasses/Forbs	HG
Wet Meadow	HJ
Shrub-Dominated Communities	
Huckleberry Oak	CH
Lower Montane Mixed Chaparral	CQ
Mountain (Thinleaf) Alder	TA
Upper Montane Mixed Chaparral	CX
Tree-Dominated Communities	
Black Oak	QK
Blue Oak	QD
Canyon Live Oak	QC
Cottonwood–Alder	QJ
Douglas-Fir–Pine	DP
Gray Pine	PD
Interior Live Oak	QW
Interior Mixed Hardwoods	NX
Mixed Conifer–Fir	MF
Mixed Conifer–Pine	MP
Mixed Riparian Hardwoods	NR
Montane Mixed Hardwoods	TX
Pacific Douglas-Fir	DF
Ponderosa Pine	PP
White Alder	QE
White Fir	WF
Willow	QO
Willow–Alder	QY
Non-vegetated Areas	
Barren	BA
Developed/Urban	UB

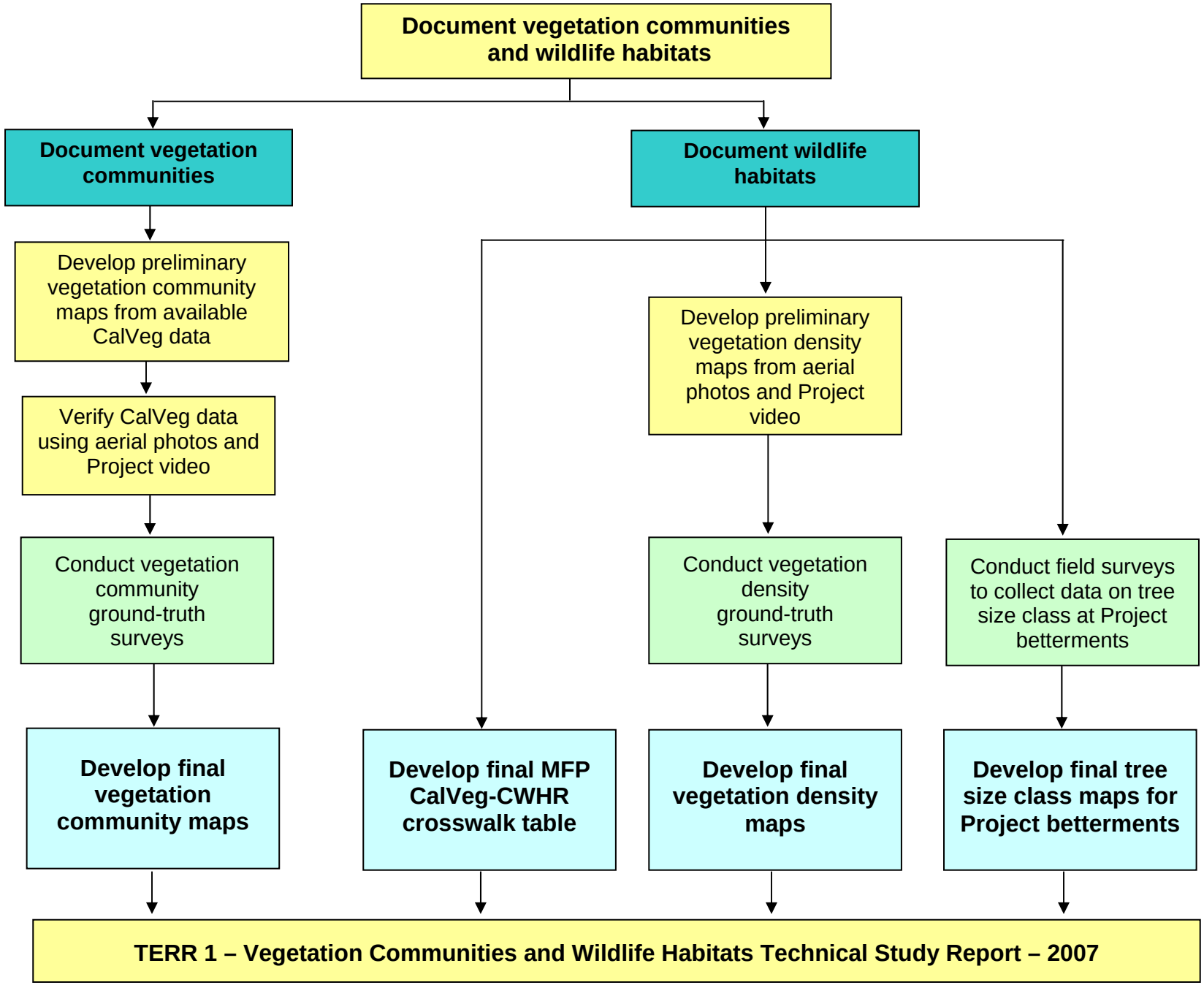
TERR 1 Table 2. CalVeg–CWHR Crosswalk for the TERR-1 Study Area.

CalVeg Vegetation Community[1]	CalVeg Code	CWHR Wildlife Habitat[2]
Herb-Dominated Communities		
Annual Grasses/Forbs	HG	Annual Grass
Wet Meadow	HJ	Wet Meadow
Shrub-Dominated Communities		
Huckleberry Oak	CH	Montane Chaparral
Lower Montane Mixed Chaparral	CQ	Montane Chaparral
Mountain (Thinleaf) Alder	TA	Montane Riparian
Upper Montane Mixed Chaparral	CX	Montane Chaparral
Tree-Dominated Communities		
Black Oak	QK	Montane Hardwood
Blue Oak	QD	Blue Oak Woodland
Canyon Live Oak	QC	Montane Hardwood
Cottonwood–Alder	QJ	Montane Riparian
Douglas-Fir–Pine	DP	Douglas-Fir
Gray Pine	PD	Blue Oak–Foothill Pine
Interior Live Oak	QW	Montane Hardwood
Interior Mixed Hardwoods	NX	Montane Hardwood
Mixed Conifer–Fir	MF	Sierran Mixed Conifer
Mixed Conifer–Pine	MP	Sierran Mixed Conifer
Mixed Riparian Hardwoods	NR	Montane Riparian
Montane Mixed Hardwoods	TX	Montane Hardwood
Pacific Douglas-Fir	DF	Douglas-Fir
Ponderosa Pine	PP	Ponderosa Pine
White Alder	QE	Montane Riparian
White Fir	WF	White Fir
Willow	QO	Montane Riparian
Willow–Alder	QY	Montane Riparian
Non-vegetated areas		
Barren	BA	Barren
Developed/Urban	UB	Urban

[1]Source: http://www.fs.fed.us/r5/rsl/projects/classification/system.shtml
[2]Source: http://www.dfg.ca.gov/whdab/html/wildlife_habitats.html

FIGURES

Figure 1. TERR 1 – Vegetation Communities and Wildlife Habitats Study Objectives and Related Study Elements and Reports.



MAPS

APPENDIX A

Descriptions of Vegetation Communities in the TERR 1 Study Area

Provided below is a brief description of CalVeg vegetation communities and non-vegetated areas identified in the study area. Vegetation community and non-vegetated area descriptions and nomenclature are based on *Vegetation Descriptions. North Sierran Ecological Province - CALVEG Zone 3* (USDA-FS 2005a).

Herb-Dominated Communities

Annual Grasses and Forbs (HG)

Annual grass and forb communities are dominated by introduced annual grasses in the genera *Bromus, Vulpia, Avena*, and *Lolium*. HG may occur as a pure patch or as an understory layer in other communities. Native species that may occur include bluegrass(*Poa annua*), purple needlegrass (*Nassella pulchra*), Idaho fescue (*Festuca idahoensis*), and California poppy (*Eschscholzia californica*).

Wet Meadow (Grass–Sedge–Rush) (HJ)

The wet meadow community occurs in level or gently sloping areas that have moist soils and permanent water sources such as streams, meadows, and lakes. HJ may also occasionally occur as an understory community. Dominant species include sedges and rushes (*Juncus* spp.), as well as water-tolerant grass and forb species.

Shrub-Dominated Communities

Huckleberry Oak (CH)

The huckleberry oak (*Quercus vaccinifolia*) community occurs in the Sierra Nevada on very shallow, stony, or gravelly soils between approximately 3,850 and 9,000 feet in elevation. Stands may be mixed with manzanita (*Arctostaphylos* spp.), bush chinquapin (*Chrysolepis sempervirens*), mountain whitethorn (*Ceanothus cordulatus*), and bitter cherry (*Prunus emarginata*). Conifer species may include Jeffrey pine (*Pinus jeffreyi*), red fir (*Abies magnifica*), western white pine (*Pinus monticola*), lodgepole pine (*Pinus contorta* var. *murrayana*), and western juniper (*Juniperus occidentalis*).

Lower Montane Mixed Chaparral (CQ)

This low-elevation mixed shrub community occurs scattered in foothill areas between 750 to 6,350 feet in elevation. CQ includes a mixture of whiteleaf manzanita (*Arctostaphylos viscida*), common manzanita (*Arctostaphylos manzanita*), wedgeleaf ceanothus *(Ceanothus cuneatus)*, lemmon ceanothus (*Ceanothus lemmonii*), chaparral whitethorn (*Ceanothus leucodermis*), chamise (*Adenostoma fasciculatum)*, Fremont silktassel (*Garrya fremontii*), birchleaf mountain mahogany (*Cercocarpus betuloides*), poison oak (*Toxicodendron diversilobum*), various shrub oaks (*Quercus* spp.), hoary coffeeberry (*Rhamnus tomentella*), and other lower elevation shrub species.

Mountain (Thinleaf) Alder (TF)

Mountain or thinleaf alder (*Alnus tenuifolia*) is a high-elevation small tree or tall shrub species, generally occurring in pure stands between 4,100 and 9,020 feet in elevation. TF occurs in large perennial grass and forb meadows where streams and coarse,

shallow, or gravelly soils exist. These saturated or seasonally flooded sites are sometimes adjacent to white fir (*Abies concolor*), mixed conifer–fir, and red fir sites. Minor inclusions of tree or shrub willows (*Salix* spp.) or mountain maple (*Acer glabrum*) may occur in this type, but the density of mountain alder stands limits the growth of other species, aside from some aquatic grasses and forbs.

Upper Montane Mixed Chaparral (CX)

The upper montane mixed chaparral community is a mixed-species shrub type that occurs commonly between 2,200 and 8,900 feet in elevation. Chaparral species such as greenleaf manzanita (*Arctostaphylos patula*), mountain whitethorn, snowbrush (*Ceanothus velutinus*), and deerbrush (*Ceanothus integerrimus*) are indicators of this community. Whiteleaf manzanita may be present on the west slope foothills at lower elevations of this type, representing a transition between the lower montane mixed chaparral community and CX.

Tree-Dominated Communities

Black Oak (QK)

The black oak (*Quercus kelloggii*) community is one of the most common and wide-ranging hardwood communities in the Middle Fork American River Watershed. QK is found typically on moist soils up to approximately 7,000 feet in elevation on both west and east slopes of the Sierra Nevada. QK may occurs in pure stands or in mixed stands as an understory component within several different conifer communities including Douglas-fir–pine, ponderosa pine, mixed conifer–pine, white fir, eastside pine, and mixed conifer–fir. Black oak often grows in mixed stands with canyon live oak (*Quercus chrysolepis*) creating a mixed hardwoods community. Bigleaf maple (*Acer macrophyllum*), dogwood (*Cornus* spp.), white alder (*Alnus rhombifolia*), and California bay (*Umbellularia californica*) are common associates in shaded areas and along riparian corridors.

Blue Oak (QD)

The blue oak (Quercus douglasii) community occurs on gentle slopes up to approximately 3,300 feet in elevation. It may occur in pure or mixed stands, and it is often found in close association with other vegetation communities including gray pine, ponderosa pine, and Douglas-fir–pine communities. Other species found in this community include wedgeleaf ceanothus, whiteleaf manzanita, and poison oak.

Canyon Live Oak (QC)

Canyon live oak occurs in pure or mixed stands in proximity to the Douglas–fir–pine, mixed conifer–pine, ponderosa pine, and black oak communities. QC is generally found on relatively dry soils or in steep canyons between approximately 600 and 6,500 feet in elevation in the northern Sierra Nevada. A mixture of shrubs such as wedgeleaf ceanothus, deerbrush, and whiteleaf manzanita often occur in the understory of this community.

Cottonwood–Alder (QJ)

Cottonwood–alder communities are characterized by a mixture of Fremont cottonwood (*Populus fremontii*) and white alder. QJ occurs rarely in the northern Sierra Nevada. QJ is generally found from 1,800 to 2,400 feet in elevation, on moist soils or in riparian areas adjacent to ponderosa pine, Douglas-fir–pine and blue oak (*Quercus douglasii*) communities.

Douglas-Fir–Pine (DP)

The Douglas-fir–pine community occurs below 5,900 feet in elevation, and is characterized by Douglas-fir (*Pseudotsuga menziesii*) and ponderosa pine (*Pinus ponderosa*). The shrub community most commonly associated with the Douglas-fir–pine is lower montane mixed chaparral, including species such as wedgeleaf ceanothus, whiteleaf manzanita, and poison oak.

Gray Pine (PD)

This community, dominated by gray pine (*Pinus sabiniana*), occurs primarily in the foothills of the Sierra Nevada, on steep, dry rocky canyons with south aspects, below about 4,200 feet in elevation. These sites are typically diverse in structure, with a mixture of hardwoods such as canyon live oak, interior live oak (*Quercus wislizenii*) and blue oak, and low-elevation chaparral shrubs such as wedgeleaf ceanothus and whiteleaf manzanita, and common manzanita. Patches of annual grasses are often found adjacent to gray pine stands.

Interior Live Oak (QW)

Interior live oak communities are generally found in association with gray pine, ponderosa pine, or Douglas-fir–pine communities between approximately 700 and 3,000 feet in elevation. Other trees found in this community may include black cottonwood (*Populus balsamifer ssp. trichocarpa*) and white alder.

Interior Mixed Hardwoods (NX)

The interior mixed hardwoods community occurs below about 3,000 feet in elevation in scattered areas along the western edge in the northern Sierra Nevada. Stands are composed of several species of hardwoods with no clearly dominant species. The stands include any combinations of interior live oak, canyon live oak, valley oak (*Quercus lobata*), or blue oak, in addition to shrubs commonly found in the lower montane mixed chaparral such as wedgeleaf ceanothus, poison oak, and whiteleaf manzanita. Trees in the montane mixed hardwoods community may be present in the mixture, but do not form the majority elements in the mixture. Overstory conifers mainly include Douglas-fir, ponderosa pine, knobcone pine (*Pinus attenuata*), and gray pine.

Mixed Conifer–Fir (MF)

The mixed conifer–fir community is the high elevation counterpart of the mixed conifer–pine community. MF occurs from approximately 3,700 to 8,800 feet in elevation. Three major species define this mixed conifer type: white fir, Jeffrey pine, and lodgepole pine.

At lower elevations, mixed conifer pine associates such as Douglas-fir and ponderosa pine may occur. As elevation increases, red fir becomes more prominent. Other associates at all elevations include sugar pine (*Pinus lambertiana*) and incense cedar (*Calocedrus decurrens*). The upper montane mixed chaparral and occasionally the huckleberry oak communities are often found adjacent to MF.

Mixed Conifer–Pine (MP)

The mixed conifer–pine community occupies moist soils across a range of sites between approximately 1,900 and 7,800 feet in elevation. MP is defined by the presence of several conifer species, including ponderosa pine, incense cedar, Douglas-fir, white fir, and sugar pine, with Jeffrey pine occurring very rarely. Any one of these species may become locally dominant over small areas. Riparian habitats within this community are characterized by the presence of white alder, maple, and willow. Understory shrubs in this community include deerbrush and whiteleaf manzanita at lower elevations, and greenleaf manzanita at higher elevations.

Mixed Riparian Hardwoods (NR)

The mixed riparian hardwoods community occurs along rivers and streams and includes a mixture of riparian hardwood species with no clearly dominant species. The mixture includes combinations of quaking aspen (*Populus tremuloides*), willow, and black cottonwood.

Montane Mixed Hardwoods (TX)

Montane mixed hardwoods communities are generally found in the northern Sierra Nevada from 500 to 5,400 feet in elevation. It generally occurs on sites favorable to mid-montane conifers such as ponderosa pine and usually above the interior mixed hardwoods sites on the western edge. Species may include any combination of non-dominant black oak, pacific madrone (*Arbutus menziesii*), and/or tree chinquapin (*Chrysolepis chrysophylla*). Other species such as canyon or interior live oak may be included, but are not the main species. The principal overstory conifer associates are Douglas-fir, ponderosa pine, incense cedar, and sugar pine.

Pacific Douglas-Fir (DF)

Pacific Douglas-fir (*Pseudotsuga menziesii*) maintains dense stands on north-facing, shaded or moist sites at the same general range of the Douglas-fir–pine , approximately 660 to 4,600 feet in elevation. On the western side of northern Sierra Nevada, species include canyon live oak, black oak, tanoak (*Lithocarpus densiflorus*), and, more rarely, tree chinquapin.

Ponderosa Pine (PP)

The ponderosa pine community is defined by pure stands of ponderosa pine. It is commonly found between approximately 900 and 5,800 feet in elevation on moist western slopes in the northern Sierra Nevada. Within the Middle Fork American River Watershed, PP is associated most commonly with the canyon live oak and black oaks on south-, east- and west-facing slopes and with Douglas-fir–pine and mixed conifer–

pine communities on north-facing aspects. Shrubs of lower montane areas such as whiteleaf manzanita, wedgeleaf ceanothus, and poison oak also may be commonly found within the ponderosa pine communities.

White Alder (QE)

White alder communities occur in pure or mixed stands along rivers and streams, generally below about 6,200 feet in elevation. QE may include other tree species such as Pacific yew (*Taxus brevifolia*), California hazelnut (*Corylus cornuta* var. *californica*).

White Fir (WF)

Pure stands of white fir are found primarily on the west side of the northern Sierra Nevada from approximately 3,900 to 8,500 feet in elevation. WF occurs typically in cool, moist, shady environments on north aspects, in riparian areas and around large lakes. WF represents an intermediate zone between the mixed conifer–pine and mixed conifer–firs on south and west aspects, and between the mixed conifer–pine and red firs on north and east aspects. Montane mixed chaparral and huckleberry oaks are commonly associated shrub types, and mountain alder, black oak, willow species, and black cottonwood are commonly associated hardwoods.

Willow (QO)

The willow community is wide-ranging, extending from approximately 2,100 to 8,600 feet in elevation. Species of tree and shrub willows dominate the hardwood mixture, and may include Scouler's willow (*Salix scouleriana*), shining willow (*Salix lucida*), Gooding's black willow (*Salix gooddingii*), and narrow-leaved willow (*Salix exigua*). QC may occur in pure stands along streams and moist canyon bottoms, or it may be mixed with conifers such as those in the mixed conifer–pine, mixed conifer–fir, and lodgepole pines. Willow–aspen, white alder, and black cottonwood communities may also be associated with the willow community.

Willow–Alder (QY)

This community is generally found between 3,180 and 6,950 feet in elevation. Willow species, which in this Project vicinity may include Scouler's willow, shining willow, Gooding's black willow, and narrow-leaved willow, occur together with white alder, along streams or seepage areas. Neither taxon is clearly dominant in the riparian mixture. Common associates include species of gooseberry and currant (*Ribes* spp.), blackberry (*Rubus* spp.), wild rose (*Rosa* spp.), and poison oak.

Non-vegetated areas

Barren (BA)

A barren landscape is defined generally as an area devoid of vegetative cover. BA includes exposed bedrock and cliffs, but it does not include disturbed or developed areas that currently are degraded but could support vegetation under normal circumstances.

Developed/Urban (UB)

A developed landscape includes any lands dominated by urban and other buildings or structures and may also include roads, parking lots, city parks, etc.

APPENDIX B

Photographs of Representative Vegetation Communities in the TERR 1 Study Area

HERB-DOMINATED COMMUNITIES

Annual Grasses / Forbs (HG) community located along the road from FR 69 to Middle Fork Interbay.

SHRUB-DOMINATED COMMUNITIES

Upper Montane Mixed Chaparral (CX) communities located along FR 96 from Duncan Creek Diversion to French Meadows Reservoir. The burned trees are remnants of a Mixed Conifer–Pine (MP) community which was burned in the 2001 Star Fire.

An **Upper Montane Mixed Chaparral (CX)** community located on the northern side of Hell Hole Reservoir in the vicinity of the proposed French Meadows – Hell Hole Tunnel Surge Shaft Tank Construction Staging Area.

TREE-DOMINATED COMMUNITIES

Both photographs on this page show **Black Oak (QK)** communities located along FR 14NO9A, on the northern side of Hell Hole Reservoir.

Canyon Live Oak (QC) on the steep, inaccessible slopes near Middle Fork – Interbay Dam.

A **Canyon Live Oak (QC)** community on the south side of Hell Hole Reservoir near Hell Hole Dam.

A view of a **Canyon Live Oak (QC)** community on steep granite slopes near the Hell Hole–Middle Fork Tunnel Gate House (visible to the left). Mixed Conifer–Pine (MP) communities are visible near the top of the ridge.

A **Douglas-Fir–Pine (DP)** community located on the south side of Hell Hole Reservoir

A **Gray Pine (PD**) community along the ridgeline above from Ralston Picnic Area. This area was affected by the 2006 Ralston Fire.

A **Mixed Conifer–Fir (MF)** community located on the south side of French Meadows Reservoir near the French Meadows – Hell Hole Tunnel Intake Trash Rack.

A **Mixed Conifer–Pine (MP**) community located on the north side of Duncan Creek Diversion. Trees burned trees in the 2001 Star Fire can be seen in the foreground.

A **Mixed Conifer–Pine (MP)** community near North Fork Long Canyon Diversion.

A **Mixed Conifer–Pine (MP)** community near South Fork Long Canyon Diversion.

A view of a **Pacific Douglas-Fir (DF)** community, looking west from the Upper and Lower Switchyards at Middle Fork Interbay.

A view of the steep canyon slopes leading to the Ralston Afterbay. The vegetation communities, which vary with slope and aspect, include **Pacific Douglas-Fir (DF)** and **Canyon Live Oak (QC)**.

A **White Fir (WF)** community in located at the eastern end of French Meadows reservoir.

APPENDIX C

TERR 1 Data Sheets

PCWA MIDDLE FORK AMERICAN RIVER PROJECT (FERC NO. 2079)

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 6, 2007
Surveyers:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment: Ralston Powerhouse Turbine Upgrade
GPS Location:	10 S 696989 / 4319348
2000 CalVeg Designation:	Barren (BA)
Field-Assessed CalVeg Designation:	Developed (UB)

General Site Summary

General site description/notes:
Facility is on a developed site. Set at base of the river canyon, very steep slopes up either side.
North-facing slopes across from PH are canyon live oak (QC). South-facing slopes are burned up to penstock, which acted as firebreak. Also QC.
This is accurately reflected in current CalVeg data.
Density/tree size data not collected at this site – slopes are not accessible.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Canyon live oak	S-facing = 25% N-facing = 50%
Black oak	S = 0% N = 5%
Doug-fir	S = 0% N = 5%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	Estimated from aerial photos only				
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Wildlife species observed on site:

PCWA MIDDLE FORK AMERICAN RIVER PROJECT (FERC NO. 2079)

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 6, 2007
Surveyers:	Sara Gillespie (RBI), Steve Tucker (Entrix)
Location Name:	Proposed Betterment: Small Hydro Upgrades & Additions at Ralston Afterbay
GPS Location:	Accuracy = 32 ft; PCWA 1 0695099 / 4319653; PCWA 2 0695030 / 4319876
2000 CalVeg Designation:	Barren (BA)
Field-Assessed CalVeg Designation:	Developed (UB)

General Site Summary

General site description/notes:
Betterment site is a small gravel/paved lot next to Ralston Dam, surrounded by disturbed ground w/ annual grasses.
Area w/in and immediately around betterments is fairly disturbed – area around powerhouse is burned.
Facility is at the base of steep river canyon – vegetated/forested areas are inaccessible. No density data were collected. Tree size in QC community
on south side of canyon across from dam, north-facing) estimated by sight only. Photos 372-382 and 804
Surrounding vegetation: Appears to be Pacific Douglas-fir (DF) and Canyon Live Oak (QC) – this is consistent with current CalVeg mapping. No
change to mapping necessary.
Substrate Notes: Gravel – modified as part of project facility

Community Composition and Structure

Dominant Species	% Cover (Approx)

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		5	~27	40	~27	0	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	Densities estimated from aerial photos only				
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:

Wildlife species observed on site: Violet-green swallow, cliff swallow , American robin, Anna's hummingbird

Date:	August 6, 2007
Surveyers:	Sara Gillespie (RBI) Joan McHale (RBI), Steve Tucker (Entrix)
Location Name:	Ralston Afterbay Picnic Area
GPS Location:	PCWA 10S 0696385 / 4319832
2000 CalVeg Designation:	Canyon Live Oak (QC)
Field-Assessed CalVeg Designation:	Canyon Live Oak (QC)

General Site Summary

General site description/notes:
Picnic area is set in a canyon that runs perpendicularl to the MFAR canyon. Affect of Ralston fire visible along both sides of road (FR 96) on the drive here.
Photos of eastern (west-facing) slope of canyon near picnic area (photos 377-379 and 800-801). Photos of western (east-facing) slope (802 and 803).
Thin band of riparian veg within 25 feet of water – Rubus, grape, alder, Salix spp.
Remainder appears to be Canyon Live Oak (QC) as indicated on the maps. Transitions to gray pine at the tops of the ridges. Largest trees within this
Community, however, are several very large Doug-fir.
Tree size in this area was estimated by sight. Too steep to access on foot. Density estimated by aerial photos only.
Substrate Notes: Some serpentine

Community Composition and Structure

Dominant Species	% Cover (Approx)
Canyon Live Oak	Major/Dominant
Gray pine and Douglas-fir (concentrated on ridges)	Minor, increasing toward ridges
Madrone, bay-laurel	Minor

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		West slope: 10	45	40	5	0	0
		East slope: 10	20	50	20	0	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	Estimated from aerials				
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Manzanita, bay, black oak, toyon
Wildlife species observed on site:
Acorn woodpecker, fence lizards

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 7, 2007
Surveyers:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Small Hydro Upgrades & Additions – Middle Fork Interbay Small Hydro Additions
GPS Location:	10 S 707524 / 4322439 (approx)
2000 CalVeg Designation:	Canyon Live Oak (QC)
Field-Assessed CalVeg Designation:	Developed (UB)

General Site Summary

General site description/notes:
Areas marked for betterment on map are completely graveled/paved.
Entire project area is at bottom of river canyon, very steep granite slopes. Could not access tree stands. Density estimated from aerial photos only.
No tree size estimates taken.
South-facing slopes of canyon mostly granite, more dense canopy of canyon live oak (QC) toward the ridgeline.S-facing slope. Accurate as mapped.
North-facing slopes of canyon are mapped accurately,, with the exception of the area shown as mixed Doug-fir–pine (DP). This has no has no pine
intermixed – modify to Pacific Doug-fir (DF).
Photo 383
Substrate Notes: Granite and serpentinite bedrock

Community Composition and Structure

Dominant Species	% Cover (Approx)
Canyon live oak	S-facing = 40%; N-facing = 60%
Douglas-fir	S-facing = 2%; N-facing = 20%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		Not taken					

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	Estimated from aerial photographs				
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Wildlife species observed on site:
black phoebe, western wood peewee, canyon wren
Gray fox seen crossing project road on the way in.

Date:	August 7, 2007
Surveyers:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Along road from FR69 to Middle Fork Interbay
GPS Location:	10S 0706615 / 4322847
2000 CalVeg Designation:	Barren (BA)
Field-Assessed CalVeg Designation:	Annual Grassland (HG)

General Site Summary

General site description/notes:
Photo 390
Mapping accurate, but barren area now filled in w/annual grasses; grass area continues uphill side of road, about 100 feet, then becomes Canyon Live
Oak (QC). Hillsides very steep – tree stand not accessible on foot.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Lolium (Italian ryegrass)	50%
yellow asteraceae	20%
Calystegia spp.	5%
Other annuals (B. Tectorum, others)	25%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		N/A					

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	N/A				
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Wildlife species observed on site:

PCWA MIDDLE FORK AMERICAN RIVER PROJECT (FERC NO. 2079)

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 7, 2007
Surveyers:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	MF Powerhouse / Upper & Lower Switchyards
GPS Location:	10 S 708064 / 4322239 (approx)
2000 CalVeg Designation:	**S-facing slopes**: Canyon Live Oak (QC) **N-facing slopes**: QC and Doug-fir–Pine (DP)
Field-Assessed CalVeg Designation:	**S-facing slopes**: Canyon Live Oak (QC) **N-facing slopes**: see below

General Site Summary

General site description/notes:
Pictures 388, 389
Facility is in steep granite canyon. Not possible to access forested stands to take structure data. South-facing slopes are correct as mapped in CalVeg.
Modifications to N-facing side – see notes on veg comm. map
Section A = Douglas-fir only
Section B = OK as is
Section C = Mixed DF-Pine, bring polygon down to shoreline
See notes on powerlines – could not access either powerline in this area, need keys/permission for gates.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Could not access forested stands for more detailed information on species	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		Not accessible					

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	Estimated from aerial photos only.				
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Could not access forested stands for more detailed information on species
Wildlife species observed on site: No species observed

Date:	August 13, 2007
Surveyers:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Duncan Creek Reservoir
GPS Location:	PCWA 5 – 0706616 / 4322869
2000 CalVeg Designation:	Mixed Conifer-Pine
Field-Assessed CalVeg Designation:	Mixed Conifer-Pine

General Site Summary

General site description/notes:
Much of the area has been burned (shown accurately in aerials)
Mixed age forested area (not burned) alongside the diversion; lots of downed wood.
Pine is not dominant – no Jeffrey or Ponderosa; really fir dominated; but no Jeffrey or Lodgepole, so remains as is.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Incense cedar	Dominant (no Jeffrey or Sugar pine)
Red fir	Dominant
White fir	Dominant
Sugar Pine & Doug-fir	Less dominant

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		< 5%	< 5%	< 5%	~ 45%	~45%	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	12	14	9	14	**49**
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:

Symphoricarpos spp., Campanulaceae (twinberry, vine form), bracken fern

Wildlife species observed on site:

Stellar's jay, red breasted nuthatch

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: November 6, 2007
Surveyers: S Gillespie, A Hendrickson
Location Name: Duncan Creek Diversion (surrounding characteristic forest stand – extant)
GPS Location: (Waypoint 126) 10S 0718221 / 4335072 (+/- 25 ft)
2000 CalVeg Designation: Mixed Conifer – Pine (MP)
Field-Assessed CalVeg Designation: Mixed Conifer – Pine (MP) and Upper Montane Mixed Chaparral (CX)

General Site Summary

General site description/notes: Photos 665 to 667
We selected remaining unburned forest to sample in the Duncan Creek area – most of the mixed conifer – pine forest in this area has been severely burned.
Aerial photos showing extent and severity of burn are accurate. Extant forested areas are concentrated on the eastern side of the diversion.
Lots of white fir, but Jeffrey and lodgepole pine are absent. (These pine species are necessary to designate an area as mixed conifer–fir (MF))
CalVeg designation of this area as mixed conifer–pine appears correct.
Most of the southern portion of the diversion going south toward French Meadows is severely burned. Severely burned communities should be
re-classified as upper montane chaparral. Shrub species growing in the burned areas include deerbrush, snowbrush, and manzanita spp.
Substrate Notes: Thick organic layer in forested areas. Open dirt, some rocks and pebbles.

Community Composition and Structure

Dominant Species	% Cover (Approx)
Sugar Pine	20%
White and red fir	35%
Incense cedar	20%
Douglas-fir	10%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		10%	5%	30%	30%	20%	5%

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	15	13	8	9	**45**
	North	13	17	5	11	**46**
	East	11	15	11	12	**49**
	South	13	15	15	9	**52**
	West	11	9	12	4	**36**

Characterize subdominant/understory species:

Very sparse herbaceous layer in the extant forests – probably shaded out. Snowbrush is the dominant understory shrub.

Wildlife species observed on site: None at this time. This survey was conducted in the afternoon, bird species quiet. FS is also conducting logging in the area.

Date:	August 13, 2007
Surveyers:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment – Duncan Creek (component of Hell Hole Seasonal Storage Increase)
GPS Location:	
2000 CalVeg Designation:	Barren (BA)
Field-Assessed CalVeg Designation:	Developed (UB)

General Site Summary

General site description/notes:
Actual betterment site shown on maps is largely developed/disturbed.
Rock disturbed slopes cutting down to diversion.
Construction ongoing at other end of diversion.
Remainder of Duncan Creek area is accurate as mapped – see other data sheets for Duncan Creek
Breeding American dipper and spotted sandpiper on downed logs in reservoir.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Salix spp., Alnus spp., along the water	25%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Wildlife species observed on site:
American dipper (1 adult, 1 juv), spotted sandpiper (1 adult, 1 juvevnile)

Date:	August 13, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Burned N-facing hillside along FR86 leading to French Meadows
GPS Location:	PCWA 7 717753 / 4332455
2000 CalVeg Designation:	Mixed Conifer–Pine (MP)
Field-Assessed CalVeg Designation:	Upper Montane Mixed Chaparral (CX)

General Site Summary

General site description/notes:
Photos 404, 405, 406
CalVeg identified this site as MP prior to the Star Fire of 2001. Most of the trees on the hillside along FR 86 leading to French Meadows were burned
in the fire. The area now supports succcessional community of shrubs including manzanita spp. and deerbrush and other Ceanothus spp.
This area should be reclassified as upper montane mixed chaparral (CX). Sapling pines visible.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
N/A	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Ceanothus spp., manzanita spp., mountain whitethorn; ~ 90% shrub cover on hillside; sprouting ponderosa pine and incense cedar.
Wildlife species observed on site:
Chipping sparrow, dark-eyed junco, American robin, lesser goldfinch.
Cooper's hawk and osprey seen soaring over the reservoir.

Date:	August 13, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	South side of French Meadows along road – representative forest habitat
GPS Location:	PCWA 6 721973 / 4331876
2000 CalVeg Designation:	Mixed Conifer–Pine (MP)
Field-Assessed CalVeg Designation:	Mixed Conifer–Pine (MP)

General Site Summary

General site description/notes:
Photos 401, 402, 403
We confirmed veg type in a representative stand along the south side of French Meadows Reservoir. Vegetation is consistent with mixed conifer–pine
(MP). Species include Doug-fir, white fir, sugar pine, and incense cedar. Estimations of density and tree size were taken. See more detailed information
for this area on other data sheets.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Incense cedar	
Doug-fir	
White fir	
Sugar pine	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		5%	10%	5%	65%	15%	———
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	16	15	13	14		
	North						
	East						
	South						
	West						

Characterize subdominant/understory species:
Photos 400 - 403
Symphoricarpos, ribes spp., dogwood ~ 50% groundcover, < 1 foot high
Lots of organic matter
Wildlife species observed on site:
dusky flycatcher, American robin

Date: November 6, 2007
Surveyers: S Gillespie, A Hendrickson
Location Name: French Meadows Campgrounds (forested stands near Lewis Campground)
GPS Location: (Waypoint 121) 10S 0723006 / 4334552 (+/- 29 ft)
2000 CalVeg Designation: Mixed Conifer – Fir (MF)
Field-Assessed CalVeg Designation: Mixed Conifer – Fir (MF)

General Site Summary

General site description/notes: Photos 642 – 645
We selected a forested stand representative of eastern end of French Meadows reservoir. Forest is similar to areas in the vicinity of Duncan Creek, but with
the addition of Jeffrey pine, which is diagnostic for Mixed Conifer–Fir (MF) according to USFS descriptions. Other tree species include red and white fir and
incense cedar. USFS is currently logging in this vicinity.
Forest is dense with sapling trees -- few large, old-growth trees.
Substrate Notes: Lots of organic matter in forested areas.

Community Composition and Structure

Dominant Species	% Cover (Approx)
Red and white fir	20%
Incense cedar	20%
Jeffrey pine	10%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		35	4	10	20	6	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	16	14	15	14	**59**
	North	16	14	15	15	**60**
	East	16	14	15	15	**60**
	South	16	17	17	17	**67**
	West	15	13	8	15	**51**

Characterize subdominant/understory species:

Little to no herbaceous or shrub layer with the exception of sapling incense cedar and some sapling pines/firs. Understory species include wintergreen, mountain whitethorn, gooseberry.

Wildlife species observed on site: golden-crowned kinglet, red-breasted nuthatch, American crow, warbler spp., northern flicker, Steller's jay, mountain blue bird (Sialia spp.)

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: November 6, 2007
Surveyers: S Gillespie, A Hendrickson
Location Name: Betterment: French Meadows Reservoir, at French Meadows-Hell Hole Tunnel Intake Trash Rack
GPS Location: (Waypoint 124) 10S 0721763 / 4331793 (+/- 26 ft)
2000 CalVeg Designation: Mixed Conifer – Fir (MF)
Field-Assessed CalVeg Designation: Mixed Conifer – Fir (MF) and Developed (UB)

General Site Summary

General site description/notes:
Photos 655-657: Photos of the area of proposed betterment. Photos 658-660: Photos of sampling site near betterment.
The actual site of the betterment (trash rack and construction site) is developed, a graveled-in area just off the reservoir. Map was modified to show that
the betterment site is developed. We sampled a mixed conifer-fir stand several hundred feet away from the betterment, on the south (upslope) side of French
Meadows road. Much of this area appears to have been logged in recent years.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Red and white fir	
Incense cedar	
Sugar pine	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		23	22	23	22	10	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	15	11	17	15	**58**
	North	7	11	17	17	**52**
	East	9	13	17	10	**49**
	South	14	14	13	17	**58**
	West	16	12	15	17	**60**

Characterize subdominant/understory species:

Understory species include mountain whitethorn, deerbrush, annual herbs/bracken fern (dead)

Wildlife species observed on site: northern flicker, mountain chickadee

Date: November 6, 2007
Surveyers: A Hendrickson, S Gillespie
Location Name: French Meadows Campgrounds (forested stands near McGuire Picnic Area/Poppy Campground)
GPS Location: (Waypoint 122) 10S 0722096 / 4333630 (+/- 29 ft)
2000 CalVeg Designation: Mixed Conifer – Fir (MF)
Field-Assessed CalVeg Designation: Mixed Conifer – Fir (MF)

General Site Summary

General site description/notes:
Forest similar to previous plot sampled near Lewis Campground. However, this area has been logged. Slightly moister microsite, lodgepole pine has
replaced Jeffrey pine.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Red and white fir	
Incense cedar	
Lodgepole pine	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		15	25	25	25	10	0
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	14	9	10	17	**50**	
	North	15	14	12	13	**54**	
	East	15	14	10	12	**51**	
	South	14	12	14	14	**54**	
	West	12	15	16	16	**59**	

Characterize subdominant/understory species:

Sparse herbaceous/shrub layer, dominant shrub species present is mountain whitethorn

Wildlife species observed on site: mountain chickadee, Steller's jay

Date: November 6, 2007
Surveyers: S Gillespie, A Hendrickson
Location Name: French Meadows Reservoir, eastern end off of FR 96
GPS Location: (Waypoint 123) 10S 0724405 / 4335136 (+/- 20 ft)
2000 CalVeg Designation: White Fir (WF)
Field-Assessed CalVeg Designation: White Fir (WF)

General Site Summary

General site description/notes: Photos 649 – 651
We chose this site because it is one of the few polygons in the study area that CalVeg has labeled as White Fir (WF). This area has been selectively logged
(fairly recent). Lots of cut branches/woody debris strewn around. They appear to have removed many trees in the 11-24" DBH category, very few trees of
this size, although a few larger trees (> 24 DBH) are still standing.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Red and white fir	
Incense cedar	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		25	20	25	10	20	0
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	10	16	14	16	**56**	
	North	7	12	16	12	**56**	
	East	8	15	16	12	**51**	
	South	12	16	14	7	**49**	
	West	6	15	16	11	**48**	

Characterize subdominant/understory species:

Wildlife species observed on site: northern flicker, mountain chickadee

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: Novmeber 6, 2007
Surveyers: S Gillespie, A Hendrickson
Location Name: French Meadows
GPS Location: (Waypoint 124) 10S 0723845 / 4333432
2000 CalVeg Designation: Mixed Conifer – Pine (MP)
Field-Assessed CalVeg Designation: Mixed Conifer – Fir (MF)

General Site Summary

General site description/notes:
We selected a forested stand representative of southern end of French Meadows reservoir. Forest is similar to areas in the vicinity of Duncan Creek, but with
the addition of Jeffrey pine, which is diagnostic for Mixed Conifer–Fir (MF) according to USFS descriptions. Other tree species include red and white fir and
incense cedar.
Forest is dense with sapling tree; few large, old-growth trees.
Substrate Notes: Lots of organic matter in forested areas. Large amount of downed, woody debris

Community Composition and Structure

Dominant Species	% Cover (Approx)
Red and White Fir	
Sugar Pine	
Incense cedar	
Jeffrey Pine	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		10	40	40	5	5	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	5	8	14	12	**39**
	North	1	12	9	2	**24**
	East	14	15	14	6	**49**
	South	13	12	5	14	**44**
	West	0	4	10	4	**18**

Characterize subdominant/understory species: Sparse herbaceous layer, primarily grasses and forbs.

Wildlife species observed on site: No wildlife species observed. Surveys conducted during afternoon- period of low activity.

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 15, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment: Tunnel Surge Shaft and Tank Project
GPS Location:	PCWA 8 IOS 0724065 / 4328959
2000 CalVeg Designation:	Black Oak (QK)
Field-Assessed CalVeg Designation:	Black Oak (QK), Canyon Live Oak (QC), and Upper Montane Mixed Chaparral (CX)

General Site Summary

General site description/notes:
We followed FR 14NO9A, a rough jeep trail with leads to the following proposed betterment facilities: Tunnel Surge Shaft and Tank and associated
construction and work areas. The trail becomes difficult to follow. Trail will be improved as part of betterment.
We surveyed the approximate area where the construction will take place. While black oak communities are present along the jeep trail, the proposed
betterments site is on a granite outcrop surrounded by shrub species such as stunted canyon live oak, greenleaf and whiteleaf manzanita, and wedgeleaf
ceanothus.
Detailed veg data for these communities is supplied on other data sheets.
Substrate Notes: Large granite outcrops / boulders

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Community Composition and Structure

Dominant Species	% Cover (Approx)

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Wildlife species observed on site:
Red-breasted nuthatch, Steller's jay, Cassin's vireo, western wood peewee, yellow-rumped warbler, red-breasted sapsucker, black-throated gray warbler, pygmy
nuthatch, lazuli bunting, hairy woodpecker, western fence lizard, ground squirrel
Osprey nest in tall snag, ½ mile straight up from this point: N10 S 0723006 / 4327174

Date:	August 14, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment FR 14NO9A
GPS Location:	PCWA 9 1O S 0723777 / 4328682
2000 CalVeg Designation:	Black oak (QK)
Field-Assessed CalVeg Designation:	Black Oak (QK)

General Site Summary

General site description/notes: We sampled black oak community along the jeep trail that will be improved as part of the proposed betterments and
upgrades at Hell Hole.
Photos: 455, 456
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Q. Kelloggi	50%
C. decurrens	40%
P. Jeffrey	10% (interspersed)

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		10%	7%	15%	~ 40%	~20%	-----
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	15	14	7	14	**50**	
	North						
	East						
	South						
	West						

Characterize subdominant/understory species:

Understory species include Ceanothus, Ribes, mountain misery, about 50% ground cover in total.

Wildlife species observed on site:

Brown creeper, acorn woodpecker

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 14, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment: Hell Hole PH Upgrades
GPS Location:	See map
2000 CalVeg Designation:	Barren (BA)
Field-Assessed CalVeg Designation:	Barren (BA) and Developed (UB)

General Site Summary

General site description/notes:
Photos: 413–415
Area around PH where betterment will be implemented is developed, graveled. There is a small strip of riparian veg (refer to Katie's report) w/white alder,
willow species, *Mimulus cardinalis*, and interspersed Jeffrey pine right along the Rubicon.
There is a small stand of trees north of PH; not sure if this will be disturbed by construction characterized by fir, white alder, ponderosa pines.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Jeffrey pine	
Doug fir	Total cover = 30%
White alder	
Incense cedar	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:	
Understory	Mimulus cardinalis
	Brikelia
	Yerba santa - Eriodictryon

Wildlife species observed on site:
Osprey (soaring above dam), Cassin's finch, American robin, American dipper (juvenile), ground squirrel

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 14, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment Hell Hole Reservoir Season Storage Increase – Hell Hole Dam
GPS Location:	See map
2000 CalVeg Designation:	Barren (BA)
Field-Assessed CalVeg Designation:	Developed (UB)

General Site Summary

General site description/notes:
Several proposed construction sites for betterments are directly on the dam. Dam and faces are developed, rather than barren.
Substrate Notes: granite

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Community Composition and Structure

Dominant Species	% Cover (Approx)

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Wildlife species observed on site:
Rock wren, osprey

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 14, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment – Seasonal Storage Increase, South Side of Hell Hole Dam
GPS Location:	
2000 CalVeg Designation:	Mixed Conifer-Pine (MP)
Field-Assessed CalVeg Designation:	Canyon Live Oak (QC)

General Site Summary

General site description/notes:
Photos 426 & 427 – from habitat, looking N across reservoir
Photos 423, 424 – looking to N side of dam
Photo 425 – closeup of S side of dam
We assessed veg type in a patch of vegetation immediately next to the south side of HH dam. This area was designated as MP by CalVeg data.
This is incorrect, this is canyon live oak (QC). Conifer-dominated communities begin approx 1 mile to the east along the reservoir.
Changes noted on maps.
Substrate Notes: Large granite bedrock and boulders, very steep.

Community Composition and Structure

Dominant Species	% Cover (Approx)
Canyon live oak	Major/Dominant – 60% total g.c.
Whiteleaf Manzanita	Major/Dominant
Western juniper	Minor constituent – 5–10%
Doug-fir	Minor constituent – 5–10%
Jeffrey pine	Minor constituent – 5–10%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Shrub layer between rocks – ferns, Carex spp. galium
Wildlife species observed on site:
Western fence lizard

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 14, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	Proposed Betterment: Facilities and Construction Areas associate with the French Meadows – Hell Hole Pump Storage Project
GPS Location:	Approx 10 S 724300 / 4328760
2000 CalVeg Designation:	Canyon Live Oak (QC) and Upper Montane Mixed Chaparral (CX)
Field-Assessed CalVeg Designation:	Barren (BA) and Developed (UB)

General Site Summary

General site description/notes:
We surveyed the following facilities and construction areas associated with the proposed French Meadows –Hell Hole Pump Storage betterments:
Pump Storage Powerhouse Penstock and Construction Staging Areas, Pump Storage Penstock and Construction Staging Areas, Pump Storage Powerhouse
and Construction Work Area, French Meadows Powerhouse Parapet Wall.
The Tunnel Surge Shaft and Tank and associated construction work areas and road improvements were covered separately (refer to appropriate datasheets).
CalVeg had identified these facilities as QC and CX. However, the facilities themselves are on previously developed/graveled-in land. Therefore
maps were revised to show these areas as barren (BA) (for areas composed of granite substrate) and/or developed (UB). The veg community
immediately adjacent to these facilities is QC.
No forest structure data taken at this location (not applicable)
Substrate Notes: The facilities are on a steep slope, lots of granite substrate/large granite boulders.

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Community Composition and Structure

Dominant Species	% Cover (Approx)

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:
Wildlife species observed on site:
BASW, ground squirrel, western fence lizard

Date:	November 7, 2007
Surveyors:	Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name:	Hell Hole Sampling Site 1 (near proposed Tunnel Surge Shaft or Pipeline Road-betterment)
GPS Location:	(Waypoint 130) 10S 0724019 / 4329032 (+/- 23 feet)
2000 CalVeg Designation:	Black Oak (QK)
Field-Assessed CalVeg Designation:	Black Oak (QK)

General Site Summary

General site description/notes:
We sampled a black oak stand near where the betterment uphill of the French Meadows is proposed (along FR 14NO9A). The vegetation along this road
changes from black oak to upper montane chaparral to mixed conifer-pine dependent on slope and soil conditions (rockier areas have chaparral, more shrubs
and fewer to no trees). We hiked out approximately 1 mile on 14NO9A.
Photos 699 and 700: Parking area at head of 14NO9A. Photos 701 – 704: photos of sample area 1. Photos 705-706: photos of granite shelf and shrub
Vegetation near sample area 1. 707-709: shows the area where we stopped and turned around (10S 0724588 / 4329338). This area was chaparral with the
following species: Greenleaf Manzanita, huckleberry oak, canyon live oak (shrubby). Approximately 5% tree cover in this area, including stunted
ponderosa pine and incense cedar. 710-711 – photos of upper montane chapparal near parking area/ jeep trail head (also photos 699 and 700).
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Black oak	Major constituent
Incense cedar	Major constituent
Ponderosa pine	Minor constituent
Doug-fir	Minor constituent

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		20%	15%	30%	30%	5%	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	9	15	12	5	**41**
	North	10	11	11	7	**39**
	East	11	8	15	17	**51**
	South	17	16	15	13	**61**
	West	11	12	8	12	**43**

Characterize subdominant/understory species:

Understory vegetation is sparse, some small scrubby oaks (canyon live oak) and mountain misery. Large rocks and boulders strewn around.

Wildlife species observed on site: western bluebird, American robin, ruby-crowned kinglet, dark-eyed junco, downy woodpecker, red-tailed hawk,

hairy woodpecker, northern flicker, mountain quail, Steller's jay

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	November 7, 2007
Surveyors:	Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name:	Hell Hole – Sampling Area 2
GPS Location:	(Waypoint 132) 10S 0723401 / 4327621 (+/- 18 ft)
2000 CalVeg Designation:	Mixed Conifer– Pine (MP)
Field-Assessed CalVeg Designation:	Black Oak (QK)

General Site Summary

General site description/notes:
This site was located on the north side of FR 2. The community on the north (upslope) side of the road in this area is black oak. Mixed conifer-pine (MP)
occupies the southern (downslope) side of FR 2.
We did not estimate canopy cover at this site, since the oaks have lost their leaves and the estimate would not be accurate.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Black oak	Major constituent
Incense cedar	Major constituent
Ponderosa pine	Minor constituent

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		10	10	33	40	7	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center					
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:

Understory include shrub species such as Ceanothus and Manzanita spp., and some shrub canyon live oak

Wildlife species observed on site: red-breasted nuthatch, golden-crowned kinglet, western bluebird, mountain chickadee, and downy woodpecker

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: November 7, 2007
Surveyers: Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name: Hell Hole 3, along reservoir
GPS Location: (Waypoint 133) 10S 0726767 / 4328983
2000 CalVeg Designation: Mixed Conifer – Fir (MF) and Mixed Conifer – Pine (MP)
Field-Assessed CalVeg Designation: Mixed Conifer – Pine (MP)

General Site Summary

General site description/notes: One of five representative sampling sites on the south side of HH reservoir. Sites were accessed via boat.
North side of the reservoir east of the French Meadows PH was inaccessible, water levels are low and the granite walls of reservoir too
steep to climb.
2000 CalVeg data identified both MP and MF in area. Based on tree composition, including absence of firs, lodgepole pine & Jeffrey pine,
MP was designated as the CalVeg community.
Photos 2414-2417.
Substrate Notes: Heavy leaf and needle litter with large amount of downed, woody debris. Large boulders throughout site

Community Composition and Structure

Dominant Species	% Cover (Approx)
Incense Cedar – major	
Douglas-fir – major	
Ponderosa Pine – minor	
Black Oak – minor	
Canyon Live Oak – minor	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		1	3	5	45	45	1
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	13	13	14	17	**57**	
	North	16	15	14	16	**61**	
	East	14	15	14	15	**58**	
	South	15	15	14	15	**59**	
	West	13	16	16	15	**60**	

Characterize subdominant/understory species: No subdominant or understory species.

Wildlife species observed on site: 2 adult bald eagles seen flying over the reservoir while putting the boat in at the boat ramp.

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: November 7, 2007
Surveyors: Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name: Hell Hole 6, along reservoir
GPS Location: (Waypoint 136) 10S 0725324 / 4327955
2000 CalVeg Designation: Mixed Conifer – Fir (MF)
Field-Assessed CalVeg Designation: Mixed Conifer – Pine (MP)

General Site Summary

General site description/notes:
This site is dominated by Doug-fir with sugar pine, white fir, and incense cedar. Proportions of trees present seem best described by MP.
Photos 2437 through 2440 and 2443
There is an osprey nest to the east of this site on a tall snag, visible from the reservoir at the top of a ridge. Waypoint 137, 0725348 / 4327987 (plus
about 300 m to the SE of this waypoint)
Substrate Notes: Heavy accumulation of leaf and needle litter with large amounts of downed, woody debris, including limbs and small trees.

Community Composition and Structure

Dominant Species	% Cover (Approx)
Douglas-fir – major	
Incense cedar – minor	
White pine – minor	
White fir – minor	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		5	20	20	33	20	2

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	17	16	13	15	**61**
	North	15	15	15	16	**61**
	East	15	14	15	15	**59**
	South	16	17	15	13	**61**
	West	16	17	17	17	**67**

Characterize subdominant/understory species: Understory species include seedling and sapling Douglas-fir and Ponderosa pine. No shrubs in understory.

Wildlife species observed on site: No wildlife observed at site. See notes on osprey nest on front.

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: November 7, 2007
Surveyors: Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name: Hell Hole 4, along reservoir
GPS Location: (Waypoint 134) 10S 0726401 / 4328812
2000 CalVeg Designation: Mixed Conifer – Fir (MF)
Field-Assessed CalVeg Designation: Mixed Conifer – Pine (MP)

General Site Summary

General site description/notes:
This area was designated as mixed conifer-fir by CalVeg. Designation changed to MP based on the fact that dominant tree species were ponderosa
pine, Douglas-fir, and incense cedar. Several red firs present.
Photos 2423-2425
Substrate Notes: Lots of organic matter under canopy including heavy accumulation of needle litter.

Community Composition and Structure

Dominant Species	% Cover (Approx)
Ponderosa Pine – major	
Incense Cedar – major	
Douglas-fir – major	
Red fir – minor	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		5	5	15	37	38	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	16	17	15	16	**64**
	North	0	0	0	0	**0**
	East	15	14	15	14	**58**
	South	15	16	17	17	**65**
	West	12	16	17	12	**57**

Characterize subdominant/understory species:

Open areas support manzanita / *Ceanothus* sp. Lots of organic matter under canopy, no understory layer. Granite rock at south end of plot and cliff at north end of plot.

Wildlife species observed on site: northern flicker

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: November 7, 2007
Surveyors: Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name: Hell Hole 5, along reservoir
GPS Location: (Waypoint 135) 0725678 / 4328340
2000 CalVeg Designation: Mixed Conifer – Pine (MP)
Field-Assessed CalVeg Designation: Mixed Conifer – Pine (MP)

General Site Summary

General site description/notes:
Photos 2426 to 2428
Tree species at this site included Doug-fir, incense cedar, ponderosa pine and black oak. CalVeg designation of MP was not changed.
This site is next to a rock promontory which juts out into the lake.
Substrate Notes: Heavy accumulation of leaf and needle litter.

Community Composition and Structure

Dominant Species	% Cover (Approx)
Douglas-fir – major	
Incense cedar – major	
Ponderosa pine – minor	
Black oak – minor	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		15	10	33	33	15	0
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	12	16	12	13	**53**	
	North	13	15	13	11	**52**	
	East	13	13	14	16	**56**	
	South	15	14	16	17	**62**	
	West	12	15	17	16	**60**	

Characterize subdominant/understory species: Understory species include seedling and sapling Douglas-fir and Ponderosa pine. No shrubs in understory.

Wildlife species observed on site: western bluebird, white-headed woodpecker, red-breasted nuthatch, Stellar's jay, squirrels, bear and coyote tracks at water's edge

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	November 6, 2007
Surveyers:	S Gillespie, A Hendrickson
Location Name:	Hell Hole Reservoir, sampling site 7 (nearest HH Dam)
GPS Location:	(Waypoint 136) 10S 0724739 / 4327116 (+/- 33 ft)
2000 CalVeg Designation:	Mixed Conifer – Pine (MP)
Field-Assessed CalVeg Designation:	Douglas-fir–Pine (DP)

General Site Summary

General site description/notes: Photos 2446 – 2448
This was a relatively small stand of conifers about ½ mile from HH dam on the south side of the reservoir located in a transition area from the QC-dominated
southern end of the reservoir to the conifer-dominated upper end of the reservoir. 2000 CalVeg calls this stand MP. However, the site is strongly dominated
by large Douglas-fir,with several other tree species including incense cedar, ponderosa pine, and white fir as more minor consituents.
DP seemed to best describe community composition at this site. Douglas-fir was more dominant at this location than at the other sites surveyed along
the reservoir today (HH 3 through HH 6).
Substrate Notes: Ground completely covered with thick layer of organic matter: needles, downed branches, etc.

Community Composition and Structure

Dominant Species	% Cover (Approx)
Douglas-fir	Major
Incense Cedar	Major
Black Oak	Minor
Ponderosa Pine	Minor
White Fir	Minor

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		15	30	20	30	5	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	14	13	15	15	**57**
	North	3	4	6	12	**25**
	East	12	15	15	6	**48**
	South	17	17	17	15	**66**
	West	13	17	6	5	**41**

Characterize subdominant/understory species:

Herbaceous layer is very sparse, some bracken fern and several small shrub oaks (shrub canyon live oak).

Wildlife species observed on site: western bluebird, golden-crowned kinglet, American crow

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	November 7, 2007
Surveyors:	Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name:	Hell Hole sampling site 8, near intersection of FR 2 and French Meadows PH Road
GPS Location:	(Waypoing 139) 10S 0723355 / 4327135 (+/- 33 ft)
2000 CalVeg Designation:	Mixed Conifer-Pine (MP)
Field-Assessed CalVeg Designation:	Mixed Conifer-Pine (MP)

General Site Summary

General site description/notes: We sampled tree size structure in a densely forested area near the intersection of FR 2 and the road leading to French
Meadows PH. The area sampled was on the downslope (southern) side of the road. The upslope (northern) side of the road is much more open.
Very large trees in this stand, especially the incense cedar. This area may have been planted by FS or PCWA as part of the campground, which is nearby.
Photos 2449-2451 (on RBI camera)
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
Incense cedar	Major
Ponderosa Pine	Major
White fir	Minor
Black oak	Minor

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		10	10	30	10	30	10

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	Density estimated from aerial photos				
	North					
	East					
	South					
	West					

Characterize subdominant/understory species:

Understory layer is absent. Very little light comes through the canopy, very thick organic layer (needles, etc.)

Wildlife species observed on site: No species observed

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	August 15, 2007
Surveyors:	Sara Gillespie, RBI; Steve Tucker, ENTRIX
Location Name:	South Fork Long Canyon Betterment-crest gates (Hell Hole Reservoir Seasonal Storage Increase)
GPS Location:	See map
2000 CalVeg Designation:	Barren (BA)
Field-Assessed CalVeg Designation:	Developed (UB)

General Site Summary

General site description/notes:
Photos: 457, 458, 459 – Areas around SFLC diversion
Construction area is developed/granite/gravel
Surrounding vegetation is MP, as mapped by CalVeg. Veg data on this sheet for surrounding forest.
Substrate Notes:

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Community Composition and Structure

Dominant Species	% Cover (Approx)
Douglas-fir	60%
Ponderosa pine	10%
Incense cedar	20%
Sugar pine	10%
Black oak	10%

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		15%	10%	15%	40%	20%	———
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	11	9	13	11		
	North						
	East						
	South						
	West						

Characterize subdominant/understory species:

Symphoricarpus, ribes – 30% groundcover, < 1 foot high.

Wildlife species observed on site:

Osprey, red-breasted nuthatch, Steller's jay

Date:	November 6, 2007
Surveyors:	Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name:	South Fork Long Canyon, sampling site 2
GPS Location:	(Waypoint 129) 10S 0718786 / 4325488 (+/- 18 ft)
2000 CalVeg Designation:	Mixed Conifer-Pine (MP)
Field-Assessed CalVeg Designation:	Mixed Conifer-Pine (MP)

General Site Summary

General site description/notes:
Photos 696-698
Very similar to first sampling site. Nice mixed conifer-pine stand. Goshawks seen previously in this area. It was near dusk when we sampled this site.
One very large tree in the stand (<48" dbh)
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
White fir	Minor
Doug-fir	Major
Incense cedar	Major
Sugar and ponderosa pine	Major
Black oak	Minor

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		10	20	30	30	18	2
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	17	9	14	16	**56**	
	North	15	13	11	12	**51**	
	East	16	14	12	15	**57**	
	South	15	17	13	12	**57**	
	West	15	14	16	15	**60**	

Characterize subdominant/understory species:

No understory species

Wildlife species observed on site: No wildlife observed

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date:	November 6, 2007
Surveyors:	Sara Gillespie, RBI; Ann Hendrickson, RBI
Location Name:	South Fork Long Canyon, sampling site 1
GPS Location:	(Waypoint 128) 10S 0718884 / 4325456 (+/- 14 ft)
2000 CalVeg Designation:	Mixed Conifer-Pine (MP)
Field-Assessed CalVeg Designation:	Mixed Conifer-Pine (MP)

General Site Summary

General site description/notes:
Photos 693-695
Nice mixed conifer-pine stand. Goshawks seen previously in this area. It was near dusk when we sampled this site, visibility limited.
Trees fairly large, quite a few in the 24 to 48” dbh range. More very large trees visible on the horizon, outside the area sampled.
Substrate Notes:

Community Composition and Structure

Dominant Species	% Cover (Approx)
White fir	Minor
Doug-fir	Major
Incense cedar	Major
Sugar and ponderosa pine	Major
Black oak	Minor

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		10	10	30	30	20	0

	Canopy Cover (Use densiometer)	North	East	South	West	Total
	Center	13	15	16	13	**57**
	North	16	16	15	10	**57**
	East	16	16	13	13	**58**
	South	10	12	12	5	**39**
	West	13	13	15	11	**52**

Characterize subdominant/understory species:

No understory species. Some sapling pines and incense cedar.

Wildlife species observed on site: No species observed

VEGETATION COMMUNITY GROUND-TRUTHING SURVEY DATA SHEET

Date: November 6, 2007
Surveyers: Sara Gillespie, RBI; Ann Hendrickson, RBI, Steve Tucker, Entrix
Location Name: North Fork Long Canyon 1
GPS Location: (Waypoint 127) 10S 0717960 / 4325533
2000 CalVeg Designation: Mixed Conifer – Pine (MP)
Field-Assessed CalVeg Designation: Mixed Conifer – Pine (MP)

General Site Summary

General site description/notes:
Very similar to SF Long Canyon Creek forest stands. No proposed betterment at this location.
Species include white fir, Doug-fir, incense cedar, sugar and ponderosa pines; several black oaks
CalVeg mapping is correct at this location.
Photos 460, 461, and 462 and 690-692
Substrate Notes: Lots of organic matter in forested areas. Large amount of downed, woody debris

Community Composition and Structure

Dominant Species	% Cover (Approx)
Sugar and ponderosa pines	
Doug-fir	
White fir	
Incense cedar	
Black oak	

Tree-dominated communities	Tree DBH	T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")
		5	20	10	40	25	0
	Canopy Cover (Use densiometer)	**North**	**East**	**South**	**West**	**Total**	
	Center	16	16	15	14	**61**	
	North	14	15	14	13	**56**	
	East	12	13	10	11	**46**	
	South	15	15	13	14	**57**	
	West	14	16	17	10	**57**	

Characterize subdominant/understory species: Sparse herbaceous layer, primarily grasses and forbs. No shrubs. Scattered fir and pine seedlings

Deerbrush (C.interregimus) in openings and along road leading to the diversion.

Wildlife species observed on site: No wildlife species observed. Surveys conducted during afternoon- period of low activity

APPENDIX D

Vegetation Density Data

Appendix D. Vegetation Density Data.

Project Area	GPS location		Position	Percent Canopy Cover[1]				
				Orientation				Total %
				North	East	South	West	Canopy Cover[2]
Hell Hole Reservoir	724019	4329032	Center	9	15	12	5	60
			North	10	11	11	7	57
			East	11	8	15	17	75
			South	17	16	15	13	90
			West	11	12	8	12	63
			Average					**69**
Hell Hole Reservoir	726767	4328983	Center	13	13	14	17	84
			North	16	15	14	16	90
			East	14	15	14	15	85
			South	15	15	14	15	87
			West	13	16	16	15	88
			Average					**87**
Hell Hole Reservoir	726401	4328812	Center	16	17	15	16	94
			North	0	0	0	0	0
			East	15	14	15	14	85
			South	15	16	17	17	96
			West	12	16	17	12	84
			Average					**80**
Hell Hole Reservoir	725678	4328340	Center	12	16	12	13	78
			North	13	15	13	14	81
			East	13	13	14	16	82
			South	15	14	16	17	91
			West	12	15	17	16	88
			Average					**81**
Hell Hole Reservoir	725324	4327955	Center	17	16	13	15	90
			North	15	15	15	16	90
			East	15	14	15	15	87
			South	16	17	15	13	90
			West	16	17	17	17	99
			Average					**83**

[1] Numbers represent the number of points on the densiometer, out of a total of 17 possible, that were shaded by overhead canopy cover.

[2] Numbers represent average canopy cover calculated as the total number of densiometer points at each position, divided by the total possible densiometer points, multiplied by 100.

Appendix D. Vegetation Density Data.

Project Area	GPS location		Position	Percent Canopy Cover				
				Orientation				Total %
				North	East	South	West	Canopy Cover
Hell Hole Reservoir	724739	4327116	Center	14	13	15	15	84
			North	3	4	6	12	37
			East	12	15	15	6	71
			South	17	17	17	15	97
			West	13	17	6	5	60
			Average					**81**
South Fork Long Canyon Creek Diversion	718786	4325488	Center	17	9	14	16	82
			North	15	13	11	12	75
			East	16	14	12	15	84
			South	15	17	13	12	84
			West	15	14	16	15	88
			Average					**83**
South Fork Long Canyon Creek Diversion	718884	4325456	Center	13	15	16	13	84
			North	16	16	15	10	84
			East	16	16	13	13	85
			South	10	12	12	5	57
			West	13	13	15	11	76
			Average					**77**
Duncan Creek Diversion	718221	4335072	Center	15	13	8	9	66
			North	13	17	5	11	68
			East	11	15	11	12	72
			South	13	15	15	9	76
			West	11	9	12	4	53
			Average					**67**
Duncan Creek Diversion	706616	4322869	Center	12	14	9	14	**72**
French Meadows Reservoir	723006	4334552	Center	16	14	15	14	87
			North	16	16	13	17	91
			East	16	14	15	15	88
			South	16	17	17	17	99
			West	15	13	8	15	75
			Average					**88**

Appendix D. Vegetation Density Data.

Project Area	GPS location		Position	Percent Canopy Cover				
				Orientation				Total %
				North	East	South	West	Canopy Cover
French Meadows Reservoir	722096	4333630	Center	14	9	10	17	74
			North	15	14	12	13	79
			East	15	14	10	12	75
			South	14	12	14	14	79
			West	12	15	16	16	87
			Average					**79**
French Meadows Reservoir	724405	4335136	Center	10	16	14	16	82
			North	7	12	16	12	69
			East	8	15	16	12	75
			South	12	16	14	7	72
			West	6	15	16	11	71
			Average					**74**
French Meadows Reservoir	723845	4333432	Center	5	8	14	12	57
			North	1	12	9	2	35
			East	14	15	14	6	72
			South	13	12	5	14	65
			West	0	4	10	4	26
			Average					**51**
French Meadows Reservoir	721763	4331793	Center	15	11	17	15	85
			North	7	11	17	17	76
			East	9	13	17	10	72
			South	14	14	13	17	85
			West	16	12	15	17	88
			Average					**81**
French Meadows Reservoir	721973	4331876	Center	16	15	13	14	**85**

APPENDIX E

Tree Size Class Data

Appendix E. Tree Size Class Data.

			Tree Size Class (percent in each DBH Category[1])						
Site	GPS location		T1 (<1")	T2 (1-6")	T3 (6-11")	T4 (11-24")	T5 (24-48")	T6 (>48")	Total %
HHI	724019	4329032	20	15	30	30	5	0	**100**
HH2	723401	4327621	10	10	33	40	7	0	**100**
HH3	726767	4328983	1	3	5	45	45	1	**100**
HH4	726401	4328812	5	5	15	37	38	0	**100**
HH5	725678	4328340	15	10	30	30	15	0	**100**
HH6	725324	4327955	5	20	20	33	20	2	**100**
HH7	724739	4327116	15	30	20	30	5	0	**100**
HH8	723355	4327135	10	10	30	10	30	10	**100**
SFLC2	718786	4325488	10	20	30	30	8	2	**100**
SLFC1	718884	4325456	10	10	30	30	20	0	**100**
FM5	721763	4331793	23	22	23	22	10	0	**100**

[1]Tree size class categories as designated in the *California Native Plant Society-Sierra Nevada Foothills Vegetation Rapid Assessment Protocol* (CNPS 2006)