

## **5.6 Riparian Vegetation Study Plan**

### **5.6.1 Pertinent Issue Questions**

The riparian vegetation study plan addresses Terrestrial Resource Issue Questions:

29. What is the distribution of riparian areas/zones surrounding project reservoirs and along stream reaches where flows are altered by project operations and in other areas influenced by project facilities or operations?
- 40: What is the current condition of the riparian habitat along each affected stream reach? Is there information on historical conditions that would be of use in evaluating potential improvement to the riparian habitat? How has the condition changed?

### **5.6.2 Background**

Riparian vegetation refers to plants species that are associated with the banks of a river or lake and require a dependable supply of ground or surface water for their growth and development. Mountain alder, white alder, willows, cottonwoods, and valley oak are typical woody riparian species that may be found in the Project area. It is known that flow regime alteration can result in changes in riparian vegetation communities, which are dependent on several variables, including the magnitude and timing of flow alteration. This study is designed to determine how Project operations may affect riparian communities through a phased-approach of mapping, analysis and ground characterization.

Mapping of dominant vegetation types within much of the UARP Project Boundary was previously conducted in 2000 (KEA 2000). Specifically, riparian vegetation areas around the reservoirs and project facilities were mapped; riparian areas along affected stream reaches have yet to be mapped. SMUD (Licensee) also has recent aerial photography and videography that will facilitate additional mapping efforts. Information from the geomorphological studies will also be used to determine the location and sustainability of riparian communities. Further mapping will be conducted as part of the 2002 vegetation mapping study.

Some information is available on existing conditions for riparian areas based on the 2000 botanical resources inventory (KEA 2000). Historical information for the project was included in the Initial Information Package (IIP) prepared by the Licensee in July 2001. The UARP was constructed over a period of years beginning in the late 1950s. Consequently, flow regimes in the UARP below project reservoirs have been altered for nearly 50 years. It is not known if information relative to the distribution and extent of plant communities present at these sites prior to project development is available, or if there are usable quantitative data available on the plant species that occupied these plant communities. To the extent that they are available, historic photos of the UARP will be reviewed in an attempt to obtain information on historical conditions within the project relative to existing conditions. This information will be used to determine if there have been any significant changes to riparian communities resulting from project operations.

### **5.6.3 Study Objectives**

This study has the following objectives: 1) determine the distribution and frequency of riparian plant communities in sufficient detail to understand if the Project does or could affect riparian vegetation, and, if so, identify feasible opportunities to enhance riparian vegetation; 2) obtain information on the current condition of the riparian habitat along each affected stream reach and determine its role in maintaining channel stability; and 3) obtain information on historic conditions to compare these conditions with current conditions.

### **5.6.4 Study Area and Sampling Locations**

The study area will include: 1) the area identified within the FERC Project boundary; and 2) affected flow reaches of streams regulated by Project facilities (Table 1). This includes the area within 300 feet of the normal high water line along Project-affected reaches. At locations where riparian plant communities extend outside the above width, the

study area will be extended as needed to describe the full extent of these communities. Additional study areas will be included as deemed appropriate (e.g., the developed and dispersed recreation areas being identified by the Recreation TWG, other areas as determined by the Fire and Fuels Management Plan, and Project roads that would be identified through the Project Sources of Sediment Study in coordination with the Recreation and Aquatic TWGs).

Sampling locations (in Phase 3) will be established using the Greenline Riparian-Wetland Monitoring methodology (USDI 1993). The purpose of the greenline monitoring method is to provide riparian vegetation information suitable for use in evaluating the distribution and conditions of the riparian areas. The greenline is defined as: “*that specific area where a more or less continuous cover of vegetation is encountered when moving away from the center of an observable channel.*” The greenline is established as a permanent transect and is usually located at the water’s edge. The greenline is established as a permanent transect so it can be monitored over time, if desired.

<b>Reach</b>	<b>Length (mi)</b>	<b>Upstream Reservoir Capacity (ac-ft)</b>	<b>Comments</b>
Rubicon Dam	5.7	1,435	Rubicon River downstream of Rubicon Reservoir. Reach extends to confluence with Little Rubicon River.
Rockbound Dam Reach	0.3	N/A	Little Rubicon River between Rockbound Lake and Buck Island Reservoir. Rockbound Lake has no releasable storage capacity.
Buck Island Dam	3.0	1,070	Little Rubicon River downstream of Buck Island Reservoir. Reach extends to confluence with Rubicon River.
Loon Lake Dam	8.5	76,200	Gerle Creek downstream of Loon Lake. Not typically subject to spill flows, due to headwater location of reservoir.
Gerle Creek Dam	1.2	1,260	Gerle Creek downstream of Gerle Reservoir. Reach extends to confluence with South Fork Rubicon River.
Robbs Peak Dam	1.1	30	South Fork Rubicon River downstream of Robbs Peak Reservoir. Reach extends to confluence with Gerle Creek. Robbs Peak Reservoir is a headwater forebay that receives most of its flow from Gerle Creek.
Ice House Dam	11.5	45,960	South Fork Silver Creek downstream of Ice House Reservoir
Junction Dam	8.3	280,540	Silver Creek downstream of Junction Reservoir
Camino Dam	6.2	825	Silver Creek downstream of Camino Reservoir
Brush Creek Dam	2.2	1,530	Brush Creek downstream of Brush Creek Reservoir. Bypass reach is over 9% gradient.
Slab Creek Dam	8.0	16,600	S.F. American River downstream of Slab Creek Reservoir
Chili Bar	20.0		Chili Bar Dam to Flosom Reservoir normal high water line

All Project-affected reaches will be included in Phase 1 described below.

#### 5.6.5 Information Needed From Other Studies

The following sources of information will be used to initially establish the location and distribution of the riparian plant communities within the Study Area: 1) 2000 and 2002 Vegetation Mapping Study; 2) aerial videography of portions of the UARP Project area; and 3) other aerial photography. The presence of riparian plant communities may be limited in portions of the study area because of the geomorphological characteristics. Therefore, it will be important to obtain information from the geomorphological studies, which will be the first step in determining if further evaluation is needed to determine if there are any Project effects on riparian communities. Information from the wetland and various aquatic resources studies will also be used to identify riparian areas.

Information will be obtained relative to historic conditions. Potential sources of this information could include historical photos, archived files, newspaper records, published scientific records, and records from the Forest Service and Licensee.

A literature search of studies conducted for other similar hydropower projects will also be reviewed. Information from similar studies will be used to provide support for the analysis of potential effects from the project. The El

Dorado Irrigation District (EID) has completed studies for FERC Project No. 184 (Resource Insights 2001). This project has some similarities to the UARP and may provide useful information and analysis for evaluating the UARP project conditions.

#### 5.6.6 Study Methods And Schedule

The existing riparian vegetation types within the UARP study area will be mapped. An initial vegetation map has been prepared for portions of the UARP (KEA 2000). Those areas that were not mapped in 2000 (e.g., affected reaches) will be mapped in 2002. The Licensee also has recent aerial videography that will be used for mapping vegetation types that are difficult or unsafe to access from the ground. Information from the geomorphological studies will also be used to analyze whether the riparian communities are limited by geomorphological characteristics or by project operations.

Information on the distribution and frequency of riparian plant communities will be gathered to provide sufficient detail to determine if project operations affect riparian vegetation. To the extent that information is available, historical photos and/or data available on communities within the study area will be used to evaluate if there have been significant changes to the riparian communities within the UARP.

Study methods will include:

Phase I - Aerial Photography: Obtain aerial photographs of the Study Area at a resolution of one pixel equaling one foot in the summer/fall of 2002 prior to leaf drop and georeference them on to orthophotos. Map riparian vegetation communities at a scale of 1:2400 using a combination of *A List of California Terrestrial Natural Communities Recognized by the Natural Diversity Data Base*, 1997, California Department of Fish and Game, Natural Heritage Division, the CalVeg (USDA 2000) classification system, and further descriptive modifiers that identify the dominant plant species within the mapping unit. Areas not well represented on the maps will be described in the narration.

The existing vegetation maps, videography, aerial photographs, and new vegetation maps generated from the vegetation mapping study for 2002 will also be used to map the distribution of riparian areas. Mapping done using aerial photographs of the study area will be ground-truthed in areas that are safely accessible.

Phase II: - Using the vegetation maps and information gathered from the stream geomorphological studies, analyze riparian community densities in conjunction with geomorphological characteristics and Project flow regimes. This evaluation will be useful in determining potential limitations (e.g., recruitment and/or encroachment) of riparian habitat growth. The purpose of this phase of the study is to identify those areas that may potentially be affected by the project and thus concentrate the studies on these areas. Stream reaches that are not likely to be affected by the Project because the limitation for riparian development is related directly to the geomorphology of the site will not be studied, other than they will be mapped and included in the description for the Project study area. The Terrestrial and Aquatics TWGs will be consulted to identify potential affected areas.

Phase III – Ground Sampling: Conduct stratified sampling of representative riparian areas identified in Phase I. Additional sample sites may be included based on the need as identified by other studies (e.g., dispersed recreation areas and modified stream channels). The purpose of this sampling is to characterize the riparian plant communities and select components (e.g. root density, bank stability, and recruitment) in enough detail to determine if the Project affects them. Develop appropriate strata after Phase I mapping is complete. Sampling would begin in summer and fall 2002 assuming timely approval and initiation of this study plan. Since sampling protocols for riparian vegetation are not standardized, testing and refining may be needed in 2003.

Strata – Strata will include a combination of Phase I communities, stream channel type (i.e., Rosgen II classification and other relevant data), or other factors derived from information gained in Phase I and other related studies.

Sampling Method – Within each strata, establish and measure greenline type vegetation plots. A plot is 100 meters in length along both sides of the stream. The plot begins at the greenline along the stream edge

or estimated bankfull height (based on a visual approximation of where the bankfull height), whichever occurs first, and extends to the outer edge of the floodprone area (approximately 2 times maximum bankfull depth). Greenline plots as described here conceptually follows Greenline Riparian-Wetland Monitoring (USDI 1993). The Greenline method is best applied to depositional streams. For non-depositional stream reaches that are identified for further study (based on Phase 2), a modified version of the Greenline method will be implemented that will provide information on species composition, canopy cover, and class size distribution using a sample plot size appropriate to the size of the riparian area.

Target Vegetation – Sample vegetation community types following A Riparian Community Type Classification of the West Slope of the Central Sierra Nevada of California (USDA 1999). Within each sample plot: 1) identify and describe each riparian plant community, including graminoid and herbaceous plants, shrubs and trees; 2) measure canopy cover; 3) characterize willows, cottonwoods and other riparian plants (e.g., species, diameter class, community structure, vigor, age and estimates of rooting depth); and 4) identify areas that have potential for enhancement.

Sample Location and Frequency – Sample all strata in the riparian vegetation identified during Phase I in the Study Area. Sample up to 10 percent of the riparian vegetation by area using a variable plot frequency based on the importance and/or extent of the strata. The total number of plots and distribution of plots within all strata should be determined following Phase I.

If available, information relative to historic conditions for riparian areas will be obtained. Potential sources of this information could include historical photos, archived files, newspaper records, published scientific records, and records from the Forest Service and Licensee. This information will be used to quantify historical conditions for the riparian areas.

A literature search of studies conducted for other, similar, hydropower projects will also be reviewed. Information from similar studies will be used to provide support for the analysis of potential effects (or non-effects) from the project. The El Dorado Irrigation District has completed studies for FERC Project No. 184 (Resource Insights 2001). This project has some similarities to the UARP and may provide useful information and analysis for evaluating the UARP project conditions.

#### 5.6.7 Analysis

Species composition and factors contributing to the establishment (e.g., geomorphology) and disturbance of riparian vegetation communities in the Study Area will be analyzed. Existing riparian communities will be compared to nearby reference streams. Historical records will be examined and compared to existing conditions.

A similar analysis was made for the EID FERC Project No. 184. Field research was conducted at diversions or dams and at potentially sensitive downstream stream reaches. The assessment of potential effects was evaluated using past research in the Sierra Nevada based on criteria established for identifying effects of altered stream hydrology (Harris et al. 1987). The Harris et al. study (and others) has demonstrated that riparian vegetation expression and potential impacts of hydrologic changes are influenced by stream gradient, floodplain geomorphology, and substrate as well as by instream flows. The Rosgen system was used to identify potentially sensitive reaches using topographic maps and aerial photographs. Additional field data was collected on geomorphology and vegetation. All of this information was used to evaluate potential effects. A similar analysis will be used in this study plan to evaluate the species composition and establishment of riparian areas within the UARP study area.

#### 5.6.8 Study Output

Study results will be presented to the Terrestrial and Aquatic Resources TWGs and UARP Plenary Group toward the end of 2002. However, the ultimate study output will be a written report that includes the issues addressed, objectives, study area, methods, analysis, results, discussion, and conclusions. The reports will be prepared in a format that allows the information to be inserted directly into the Licensee-prepared Draft Environmental Assessment that will be submitted to FERC with the Licensee's application for a new license. The report will

describe the existing riparian vegetation in the study area and compare it with vegetation commonly present on similar type streams with unimpaired flow regimes. Comparisons can be drawn from literature and reference reaches. The report will also describe opportunities to protect, restore or enhance riparian vegetation based on environmental and engineering feasibility.

5.6.9 Preliminary Estimated Study Cost

*A preliminary cost estimate was not included in the version of this study plan approved by the Plenary Group.*

5.6.10 TWG Endorsement

*The Terrestrial TWG approved this plan on March 22, 2002. The participants at the meeting who said they could “live with” this study plan were USFS, CDFG, CNPS, and SMUD. None of the participants at the meeting said they could not “live with” this study plan. The Plenary Group approved this study plan on May 3, 2002. The participants at the meeting who said they could “live with” this study plan were Taxpayers of El Dorado County, Friends of El Dorado County, USFS, Camp Lotus American River Recreation Association, PG&E, SMUD, SWRCB, County of El County, El Dorado Citizens for Water, NPS, CalSPA, PCWA, FOR, City of Sacramento, CDFG, California Outdoors and USBLM. None of the participants at the meeting said they could not “live with” this study plan.*

5.6.11 Literature Cited

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