# Study 6.1 RIPARIAN HABITAT UPSTREAM OF ENGLEBRIGHT RESERVOIR<sup>1</sup>

February 2012

# 1.0 **Project Nexus and Issue**

Yuba County Water Agency's (YCWA or Licensee) continued operation and maintenance (O&M) of the Yuba River Development Project (Project) may have the potential to affect riparian habitat.

# 2.0 <u>Resource Management Goals of Agencies with</u> Jurisdiction Over the Resource to be Studied

YCWA believes that three agencies have jurisdiction over special-status plants: 1) the United States Department of Agriculture Forest Service (Forest Service); 2) United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS); and 3) California Department of Fish and Game (CDFG). Each of these agencies and its jurisdiction and management direction, as understood by YCWA at this time, is discussed below.

### Forest Service

The Forest Service's management goals for special-status plants on National Forest System (NFS) land are identified in the National Forest Management Act (NFMA, Public Law 94-588 1976) and the Tahoe National Forest (TNF) Land and Resource Management Plan (TNF LRMP) (USDA Forest Service 1990), as amended by the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001) and the Supplemental Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004a and b).

- <u>Plant Community Diversity/Special Habitats/Connectivity</u>: Manage riparian plant communities to maintain and improve the species composition and structural diversity. Manage riparian plant communities to maintain and/or improve spatial and temporal connectivity for native riparian plant species within and between watersheds to provide physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.
- <u>Streamflow Patterns/Sediment Regimes/Stream and Shoreline Riparian Vegetation</u>: Manage stream flows to maintain and /or improve in-stream flows so they are sufficient to sustain desired conditions of riparian plant communities. Manage streambanks and shorelines to minimize erosion and sustain desired riparian habitats.

<sup>&</sup>lt;sup>1</sup> YCWA's included a Riparian Habitat Upstream of Englebright Reservoir Study in its August 2011 Revised Study Plan. FERC's September 30, 2011 Study Determination and December 8, 2011 Study Modification required modifications to the study. YCWA filed a modified Study with FERC on February 14, 2012, and the modified Study was approved by FERC on May 14, 2012 without modification. This Study includes the modifications.

### <u>NMFS</u>

NMFS's statutory authorities and responsibilities are described by NMFS in Section 2.0 of Enclosure A in NMFS's March 7, 2011 letter to FERC providing NMFS's comments on YCWA's Pre-Application Document, or PAD (YCWA 2010). NMFS's jurisdiction and responsibilities are not repeated here.

### <u>CDFG</u>

The CDFG is the relevant state fish and wildlife agency for consultation and Federal Power Act (FPA) Section 10(j) (16 U.S.C. § 803(j)) purposes. In the state of California, fish and wildlife resources are held in trust for the people of the state by and through the CDFG (Cal. Fish and Game Code § 711.7). "Species of Special Concern" do not have formal legal status, but are intended to focus attention on species at conservation risk.

# 3.0 <u>Study Goals and Objectives</u>

The goal of this study is to assess the condition of riparian habitats within river reaches upstream of the United States Army Corps of Engineer's (USACE) Englebright Reservoir potentially affected by continued Project O&M.

The objective of this study is to gather the data and information necessary to meet the study goals.

# 4.0 <u>Existing Information and Need for Additional</u> <u>Information</u>

YCWA's PAD (YCWA 2010) contained information about the riparian vegetation mapped in the area of the Project, including CalVeg maps and National Wetland Inventory (NWI) maps on a 1:24,000 scale, shown with United States Geological Survey (USGS) topographic features and Project facilities. Section 7.6 of the PAD includes a table of NWI palustrine and riverine wetland types and acres within the Project Area<sup>2</sup> and the Federal Energy Regulatory Commission (FERC) Project Boundary.<sup>3</sup>

Based on NWI maps (USFWS 1987), there are approximately 40,417 feet and 125 acres of riverine wetlands within the Project Area, with approximately 8,044 feet and 54 acres within the FERC Project Boundary. Remaining NWI classified wetland habitats in the Project Area include approximately 63,926 feet and 13 acres of palustrine wetlands and approximately 4,635 acres of reservoir open water.

<sup>&</sup>lt;sup>2</sup> For the purposes of this document, the Project Area is defined as the area within the Federal Energy Regulatory Commission (FERC) existing Project Boundary and the land immediately surrounding the FERC Project Boundary (i.e., within about 0.25 mile of the FERC Project Boundary) and includes Project-affected reaches between Project facilities and downstream to the next major water controlling feature or structure.

<sup>&</sup>lt;sup>3</sup> The FERC Project Boundary is the area that YCWA uses for normal Project operations and maintenance, and is shown on Exhibits J, K, and G of the current license.

NWI riparian wetlands have been classified using aerial imagery but no ground-mapping data is known to exist to support this inventory. In addition, no known site-specific assessments of riparian habitats or habitat condition within the FERC Project Boundary are known to exist. To achieve the study goals, additional information is needed.

#### 5.0 **Study Methods and Analysis**

#### 5.1 **Study Area**

The study area includes: 1) the Middle Yuba River from Our House Diversion Dam Impoundment to the confluence with the North Yuba River, 2) Oregon Creek from the Log Cabin Diversion Dam Impoundment to the confluence with the Middle Yuba River, 3) the North Yuba River from New Bullards Bar Dam Reservoir to the confluence with the Middle Yuba River, and 4) and the portion of the Yuba River from the confluence of the North and Middle Yuba rivers to just upstream of the USACE Englebright Reservoir.

If YCWA proposes an addition to the Project, the study area will be expanded if necessary to include areas potentially affected by the addition.

#### 5.2 **General Concepts and Procedures**

The following general concepts and practices apply to the study:

- Personal safety is the most important consideration of each fieldwork team.
- Licensee will make a good faith effort to obtain permission to access private property where needed well in advance of entering the property.
- Field crews may make minor variances to the FERC-approved study in the field to accommodate actual field conditions and unforeseen problems. When minor variances are made, Licensee's field crew will follow the protocols in the FERC-approved study.
- When Licensee becomes aware of major variances to the FERC-approved study, Licensee will issue an e-mail to the Relicensing Contact List describing the variance and reason for the variance. Licensee will contact by phone the Forest Service (if the variance is on National Forest System land), U.S. Fish and Wildlife Service, State Water Resources Control Board, and CDFG to provide an opportunity for input regarding how to address the variance. Licensee will issue an e-mail to the Relicensing Contact List advising them of the resolution of the variance. Licensee will summarize in the final study report all variances and resolutions.
- Licensee's performance of the study does not presume that Licensee is responsible in whole or in part for measures that may arise from the study.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (3 meter data collection accuracy under ideal conditions), or similar units. GPS

data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and Licensee's relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets. Upon request, GIS maps will be provided to agencies in a form, such as ESRI Shapefiles, GeoDatabases, or Coverage with appropriate metadata, that is useful for interactive data analysis and interpretation. Metadata will be Federal Geographic Data Committee compliant.<sup>4</sup>

- Licensee's field crews will record incidental observations of aquatic and wildlife species observed during the performance of this study. All incidental observations will be reported in the appropriate Licensee report (e.g., incidental observations of special-status fish recorded during fieldwork for the Special-Status Turtles Western Pond Turtle Study will be reported in Licensee's Stream Fish Populations Study report). The purpose of this effort is not to conduct a focus study (no effort in addition to the specific field tasks identified for the specific study) or to make all field crews experts in identifying all species, but only to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g., Quat-128 [didecyl dimethyl ammonium chloride], scrub brush, etc.) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus (*Batrachochytrium dendrobatidis*), and invasive invertebrates (e.g., zebra mussels, *Dreissena polymorpha*). This is of primary importance when: 1) moving between tributaries and mainstem reaches; 2) moving between basins (e.g., Middle Yuba River, Yuba River and North Yuba River); and 3) moving between isolated wetlands or ponds and river or stream environments.

# 5.3 Methods

The study includes five steps: 1) site selection; 2) gather data and prepare for field effort; 3) conduct field surveys; 4) prepare data and quality assure/quality control (QA/QC) data; and 5) prepare report. Each step is described below.

### 5.3.1 Step 1 – Site Selection

### 5.3.1.1 Riparian Vegetation Sites

A total of eight<sup>5</sup> Riparian Vegetation Sites will be co-located, to the extent possible, with Study 1.1, Morphology Upstream of Englebright Reservoir Study sites (Table 5.3.1). Each site will be approximately 20 times bankfull width. At seven of the eight sites, three riparian vegetation transects will be located. To the extent possible, these transects will be co-located with transects located for Study 1.1, Channel Morphology Upstream of Englebright Reservoir Study. At the

 $<sup>\</sup>frac{4}{2}$  The Forest Service and CDFG each requested that a copy of the GIS maps be provided to them when the maps are available.

<sup>&</sup>lt;sup>5</sup> YCWA's Study 6.1 in its Revised Study Plan included six Riparian Vegetation Sites. FERC's September 30, 2011 Study Determination directed that "...modification of section 5.3.1 of study 6.1 (filed September 9, 2011) to include the Middle Yuba River below Our House dam and the Yuba River above Colgate powerhouse..." (Appendix A, p 25). YCWA has modified the Study as directed by FERC.

site on the Middle Yuba River upstream of Our House Diversion Dam, one transect will be located to provide enough information to characterize the area; a full assessment will not be performed at this site.<sup>6</sup> Therefore, a total of 22 vegetation transects will be selected.

Six of the eight Riparian Vegetation Sites and 18 of the 22 transects were selected in consultation with Relicensing Participants on September 20-23, 2011 and on November 18, 2011, and in a webinar meeting on December 1, 2011. The selected sites and transects are shown on Attachment 6-1A to this Study. The remaining sites and transects to be selected are the single Riparian Vegetation Site and associated three transects in the North Yuba River and the single Riparian Vegetation Site and one associated transect on the Middle Yuba River upstream of Our House Diversion Dam. YCWA will consult with Relicensing Participants regarding the location of these sites and transects.

Stream	Potential Location	Character	Riparian Vegetation Sites	LWM Sites
	Above Our-House Dam, within influence of base level control effected by Our House Diversion <sup>1</sup>	Low gradient (1.7% map gradient), depositional.	Yes (Limited Study Location)	
	Below Our House Dam	Steeper (>1% gradient), confined, more transport- dominated bedrock control channel	Yes	Yes
	Upstream of Oregon Creek ~ 2 miles	Confined, transport-dominated bedrock control and low gradient bedrock pool		Yes
Middle Yuba River	Above Oregon Creek	Steeper (>1% gradient), confined, more transport- dominated than below Oregon Creek, though some lateral cobble/gravel bar development.	Yes	Yes
	Below Oregon Creek in the vicinity of Freemans Crossing	Moderately and unconfined channel, ~1% gradient, alluvial and depositional.	Yes	Yes
	Near Confluence with Yellowjacket Creek (RM 1.4)	Low gradient, moderately unconfined, bedrock controlled.		Yes
	Above Confluence with North Yuba River	Confined, bedrock and bolder controlled		Yes
Oregon Creek	Below Log Cabin Diversion Dam	Confined ~1.8% map gradient.		Yes
	Vicinity of Celestial Valley	Confined 1.6% gradient, planar bedform, gravel- sized material in channel and on margins.	Yes	Yes
	Between the Middle Yuba junction and Allegheny Road Bridge (RM 1.92)	Low gradient, depositional, moderately unconfined.		Yes
North Yuba River	Above Confluence with Middle Yuba River <sup>7</sup>	Reach has very little accessibility due to vertical cliffs, and dominance of bedrock and boulders within channel. Large, immobile substrate, lateral and vertical controls by bedrock limit responsiveness to changes in inputs of sediment and to changes in hydrology.	Yes	Yes

 Table 5.3-1. Location and character of 8 Riparian Vegetation Sites and 12 LWM Sites.

<sup>&</sup>lt;sup>6</sup> The Forest Service requested and YCWA agreed to characterize riparian vegetation and habitat at a single site with a single transect upstream of Our House Diversion Dam. It was agreed that a level of effort at the site would be significantly less than the level of effort at the other seven Riparian Vegetation Sites.

<sup>&</sup>lt;sup>7</sup> Site location was changed from the North Yuba River below New Bullards Bar Dam to the North Yuba River upstream of the confluence with the Middle Yuba River during site selection with relicensing participants on February 9, 2012. The area upstream of the confluence has smaller substrate that is more likely to respond to changes in flows and is therefore a more representative response reach for study.

Stream	Potential Location	Character	Riparian Vegetation Sites	LWM Sites
Yuba River	Above New Colgate Powerhouse	Confined; map gradient of less than 1% but habitat mapping data shows numerous high gradient riffles of up to 11% gradient separated by long, deep mid- channel pools and short low-gradient riffles with substrate dominated by boulders and bedrock.	Yes	Yes
Yuba River (cont)	Below New Colgate Powerhouse	Confined, less than 1%, cobble and boulder- dominated bed with very deep pools immediately below the Powerhouse, but increasing alluvial deposition moving downstream.	Yes	Yes

Table 5.3-1. (continued)

Site will be located to evaluate the effects of base-level control of the Project on bedload deposition; the level of analysis is limited to physical extent of bedload deposition and a "snapshot" of the riparian vegetation just upstream of the influence that will include some limited measurements.

### 5.3.1.2 Large Woody Material Sites

A total of 12<sup>8</sup> Large Woody Material (LWM, also sometimes referred to as Large Woody Debris, or LWD) Sites will be surveyed (Table 5.3-1). Seven of these sites will be collocated with riparian vegetation survey sites, with the remaining three sites located on the Middle Yuba River downstream of Our House Diversion Dam and Oregon Creek downstream of Log Cabin Diversion Dam. The length of each of these sites will be 20 times the bankfull width, or as near as possible to that length as access permits due to safety considerations.

All of the sites have been selected. Seven of the 12 sites are co-located with the Riparian Vegetation Sites, and were selected in consultation with Relicensing Participants in the field on September 20-23, 2011, and in a webinar meeting on December 1, 2011; one site is not collocated with a Riparian Vegetation site was also chosen during these field visits. Four LWM Sites were chosen during November 2 and 8, 2011 meetings. The LWM Sites on the Middle Yuba River and Oregon Creek are shown in Figure 5.3-1; all the LWM Sites are shown on Attachment 6-1A to this Study.

<sup>&</sup>lt;sup>8</sup> YCWA's Study 6.1 in its Revised Study Plan included two LWM Sites. FERC's September 30, 2011 Study Determination directed that "... YCWA modify the LWD survey methodology of Study 1.1 to incorporate seven LWD survey study sites, with locations identical to those currently proposed for geomorphic surveys upstream of Englebright dam. In addition to these seven study sites, we recommend that after consultation with NMFS, CDFG and the Forest Service, YCWA should identify additional study sites to adequately survey LWD in the potential response reaches of Oregon Creek and the Middle Yuba River." (Appendix A, p 23). In FERC's December 8, 2011 Study Plan Modification, FERC provided additional detail regarding the number and location of LWM Sites stating "...we recommend that YCWA modify Section 5.3.3.3.1 of study 6.1 (Quantifying Large Woody Material) to include nine LWD study areas on the Middle Yuba River and Oregon Creek, as shown in figure 1 [of FERC's letter]." (Appendix A, p 10). YCWA has modified the Study as directed by FERC in its December 8 2011 letter, but included the sites in a new section (Section 5.3.1.2) rather than in Section 5.3.3.3.1.



Figure 5.3-1. LWM Sites areas on the Middle Yuba River and Oregon Creek. (SOURCE: Figure 1 in FERC's December 8, 2011 Study Modification.)

### 5.3.2 Step 2 – Collect and Review Existing Data and Information

Existing data, including GIS data, historical information, reports, maps, and aerial photography relevant to riparian vegetation will be collected and reviewed where available for river reaches. These sources are expected to provide documentation on geology, topography, soils, riparian vegetation coverage and type, invasive species, and land-use (i.e., mining, timber management, recreation, road development, fires, grazing, and water diversions). Information regarding riparian vegetation and physical processes on western slope Sierra Nevada streams or other pertinent riparian literature from other geographic regions will also be reviewed. Pertinent information will be used for comparison and interpretive purposes when evaluating the streams and rivers in the study area.

## 5.3.3 Step 3 – Condition Assessment<sup>9</sup>

YCWA will assess the condition of existing riparian vegetation by collecting a variety of quantifiable, reproducible measurements of vegetation with channel and stage discharge relationships at typical flows. The compilation of data collected for this study will inform species distribution within each lateral area of the stream channel, and its relationship to average high, low, bankfull and floodprone flows. Channel and vegetation cross-sections will map where bankfull and floodprone stages occur in relation to the presence of riparian vegetation. Stream discharge calculations from Study 3.10, Instream Flow Upstream of Englebright Reservoir using the Physical Habitat Simulation Model (PHABSIM) at co-located transects. Flow frequency analysis for the period of record will use daily average flow values to establish frequency of inundation of various surfaces in the riparian zone under existing and unimpaired by project hydrologic scenarios. Where vegetation and PHABSIM transects are not co-located, the same methods (i.e., PHABSIM stage/Q relation and frequency of inundation) will be used for the riparian-only transect(s).

YCWA will examine the relationship between the presence of dominant woody species and their placement in the channel, as well as their general age class and vigor. Vegetation transects will capture species dominance, abundance, richness, ground and canopy cover, as well as lateral and horizontal complexity. A general description of the study site will be developed, identifying specific influences contributing to the character of each riparian zone, including, but not limited to, channel formation, upland influences (i.e., cattle grazing or landslides), excessive erosion or deposition, and the presence of noxious weeds or special-status plants. The compilation of data collected during the study will provide the necessary information for understanding the potential of each system to support riparian communities.

All pertinent references, aerial photographs, hydrology, and field data will be used to describe existing conditions of riparian vegetation and any clear changes to the vegetation or channel that may have occurred over time. Although each methodology will be described in detail in the subsections that follow, an overview of the methods is included here with generalized rational:

- Vegetation transects with nested plots
  - > species abundance, richness, and distribution
  - > age-class structure of riparian vegetation

<sup>&</sup>lt;sup>9</sup> YCWA's Study 6.1 in its Revised Study Plan described how the Study would relate flows to riparian vegetation. FERC's September 30, 2011 Study Determination directed that "... YCWA should modify section 5.3.3.4, after consultation with NMFS, Cal Fish and Game, Forest Service, FWS, and Foothills, to provide a detailed description of study methods." (Appendix A, p. 24). In its December 8, 2011 Study Modification, FERC directed YCWA to replace the existing Section 5.3.3, Step 3, Condition Assessment, with a new section in FERC's letter stating "To resolve our study dispute with NMFS, we recommend that the introductory language of section 5.3.3 of study 6.1 be replaced with the following section...[Text not repeated here due to the length of the text].' (Appendix A, pp 12 and 14). The section has been replaced as directed by FERC.

- $\blacktriangleright$  plant species wetland status and trend<sup>10</sup>
- germination and recruitment
- Historical aerial photograph analysis
  - ➤ examine what changes have taken place over time
  - when changes took place
  - examine possible causes for changes
- Large woody material mapping
  - Iocations and physical characteristics of large woody material
  - ➢ function in the channel
- General riparian condition
  - changes in channel and bank substrate (including any excessive erosion or deposition)
  - land use activities
  - > unusual stress or mortality on riparian plant community
  - riparian vegetative and hydrologic connectivity (or lack of)
  - $\blacktriangleright$  measure the status and trend of wetland indicator plants<sup>11</sup>
  - flow frequency analyses under existing and unimpaired by YRDP hydrologic scenarios of discharges necessary to inundate riparian communities

## 5.3.3.1 Riparian Vegetation Site and Transects with Nested Plots

Surveyors will collect quantitative data along Riparian Vegetation Site transects. Vegetation transects will extend from the water's edge at low flow, to hill slope (including bars if present); at the Oregon Creek study site, where the channel is unconfined, the vegetation transect will end at calculated floodprone width. For the purpose of the study, riparian vegetation is defined as wetland indicator species as identified by the *National List of Plant Species that Occur in Wetlands: California (Region 0)* (Reed 1988) or a similar reference.<sup>12</sup> All vascular plant species located within the vegetation transects will be sampled, with cover estimates made for each.

Information collected along each transect will include two types of plots: 1) herbaceous vegetation (1 meter square plots), and 2) woody vegetation (trees and shrubs) (5 by 2 meter plots). Plots will be nested, with herbaceous and other cover plots occurring within the woody vegetation plots. More than one herbaceous and other cover plot may be located within a woody

<sup>&</sup>lt;sup>10</sup> YCWA's Study 6.1 in its Revised Study Plan did not explicitly include recording the wetland status and trend of each plant species located within the nested plots. In personal communication on February 3, 2012 (USFS 2012), the Forest Service requested that YCWA "...would add plant species wetland status and trend." The text has been modified as recommended by the Forest Service.

<sup>&</sup>lt;sup>11</sup> YCWA's Study 6.1 in its Revised Study Plan did not explicitly state that the status and trend of wetland indicator plants would be measured. In personal communication on February 3, 2012 (USFS 2012), the Forest Service requested that YCWA "...will measure the status and trend of wetland indicator plants." The text has been modified as recommended by the Forest Service.

<sup>&</sup>lt;sup>12</sup> YCWA's Study 6.1 in its Revised Study Plan defines riparian vegetation as wetland indicator species. In personal communication on February 3, 2012 (USFS 2012), the Forest Service commented that "...*Riparian vegetation and wetland indicator species are two separate concepts. It would be best if all vascular plant species are noted and cover estimates made for each. That way, the trend in wetland indicator species can be estimated.*" The text has been modified for clarification, as recommended by the Forest Service.

plot. Both the woody and herbaceous cover plots will be located perpendicular to transects located on the downstream side.

At a minimum, each transect will have at least two nested plots: one woody plot on each side of the stream at the start of vegetation, and within each woody plot, two herbaceous plots located side by side. Additional fluvial features (i.e., floodplains and terraces) that are at least 2 meters wide and are intersected by a vegetative transect will have a minimum of one nested plot. The following information will be collected in the plots:

- Herbaceous vegetation
  - $\blacktriangleright$  All vascular plant<sup>13</sup> species cover in percent
  - ➢ Total canopy cover
  - Layer canopy cover (generally stratified by herbaceous and other, shrub, and tree layers)
  - List all species present in each plot and provide an indication of whether they are native and/or special-status Approximate age class by size (i.e., seedling, recruit or adult)
  - > Other cover data (i.e., large woody material or boulders)
- Woody vegetation
  - Canopy coverage class in percent
  - Stem count per individual or species class
  - > Tree diameter in diameter at breast-height
  - > Dominant species relative decadence in percent
  - Dominant species coverage in percent
  - List all tree and shrub species present and provide an indication of whether they are native and/or special-status<sup>14</sup>
  - > Other cover data (i.e., large woody material or boulders)

### 5.3.3.2 Historical Aerial Photograph Analysis

Field data and observations will be used in tandem with historical aerial photography analysis to determine if any major shifts in riparian stand structure, composition, or surface area have occurred. The photographs will also be used to identify observable changes in land use, channel morphology (i.e., excessive erosion or deposition), upland influences (i.e., landslide), or other features pertinent to the analysis.

<sup>&</sup>lt;sup>13</sup> YCWA's Study 6.1 in its Revised Study Plan indicated that dominant plant species occurring in herbaceous vegetation plots would be recorded. In personal communication on February 3, 2012 (USFS 2012), the Forest Service expressed concern that "...only dominant plant species will be sampled." The text has been modified for clarification, as recommended by the Forest Service.

<sup>&</sup>lt;sup>14</sup> For all special-status species observations, YCWA will complete the appropriate CNDDB form and transmit the form to the CNDDB. YCWA will provide a copy of the CNDDB form to the Forest Service if the observation occurs on NFS land.

### 5.3.3.3 Information to be Reviewed to Determine if a Focused Study Will be Needed in the Second Study Year to Examine Project Effects on Riparian Vegetation Seed Germination<sup>15</sup>

YCWA will assess the condition of existing woody riparian germination by collecting vegetation plot data along transects. All vegetative data collected in the plots will be included in the seed germination evaluation, with specific focus on the following factors:

- No seed germination or recruitment present
- Mono-typic age stands with no obvious or recent link to a peak flow event
- Decumbent or distressed vegetation
- Lack of woody species present in areas with substrate capable of supporting woody vegetation
- Stage/discharge and flow frequency analyses under existing and unimpaired by Project conditions
- Literature search as it pertains to riparian vegetation and any potential key indicator species in the Sierra Nevada
- Any additional pertinent items

YCWA will provide germination and recruitment data to Relicensing Participants 1 month prior to the issuance of the Initial Study Report for consultation regarding the need for additional riparian seed germination studies.<sup>16</sup> If, based on the results of the information, YCWA and Relicensing Participants collaboratively agree that seed germination or recruitment, including the need for modeling the relationship between flows and germination, should be studied in the second year, YCWA and Relicensing Participants will collaborate regrading the study and YCWA will propose the study in its Initial Study Report.

# 5.3.3.4 LWM Data Collection

LWM plays an important role in streams by shaping channel morphology, storing sediment and organic matter, and providing habitat for wildlife. Two efforts will be made to quantify LWM potentially affected by Project operations: 1) LWM will be quantified at specified locations; and 2) a generalized LWM budget will estimate the amount of LWM moving through the Project-affected reaches.

<sup>&</sup>lt;sup>15</sup> YCWA's Study 6.1 in its Revised Study Plan did not assess seed germination. FERC's September 30, 2011 Study Determination directed that YCWA modify "...study 6.1 to require a determination of need for modeling the relationship between flows and riparian species germination after the first year of study to be included in the initial study report." (Appendix A, pp 24 and 25). In its December 8, 2011 Study Modification, FERC directed YCWA to add a new section stating "We also recommend that the following section be added to the study 6.1 between 5.3.3.2 and 5.3.3.3....[Text not repeated here due to the length of the text].' (Appendix A, pp 13 and 14). YCWA has added the new section as directed by FERC.

<sup>&</sup>lt;sup>16</sup> YCWA's Study 6.1 in its Revised Study Plan did not indicate that consultation with relicensing participants would be performed to determine the need for second year riparian seed germination studies. In an email dated February 7, 2012 (NMFS 2012), NMFS expressed concern "...that the evaluation of this need would be done collectively: stakeholders/agencies, FERC, and YCWA...this is not entirely clear or expressly stated." The text has been modified for clarification, as recommended by NMFS.

### 5.3.3.4.1 Quantifying LWM

YCWA will quantify LWM at the LWM Sites described in Step 1. LWM occurring within each site will be counted as follows: all LWM greater than 3 ft in length within the active channel within four diameter classes (4-12 inches, 12-24 inches, 24-36 inches, and greater than 36 inches) and four length classes (3-25 ft, 25-50 ft, 50-75 ft, and greater than 75 ft). More detailed measurements will be taken for key pieces located within riparian habitat study sites.

Key pieces of LWM are defined as pieces either longer than 1/2 times the bankfull width, or of sufficient size and/or are deposited in a manner that alters channel morphology and aquatic habitat (e.g., trapping sediment or altering flow patterns). Key piece characteristics to be recorded will include:

- piece location, either mapped onto aerial photos or documented with GPS
- piece length
- piece diameter
- piece orientation
- position relative to the channel
- whether the piece has a rootwad
- tree species or type (e.g., conifer or hardwood)
- whether the piece is associated with a jam or not
- the number of large pieces in the jam
- recruitment mechanism
- function in the channel

### 5.3.3.4.2 Large Woody Material Budget<sup>17</sup>

In addition to field-collected quantities of LWM (Section 5.3.3.3.1), estimates of the annual volume of LWM trapped in reservoirs, where available, will be included with estimates of LWM passing over Our House, Log Cabin, and Englebright dams (based on recorded flows and flows estimated for the movement of LWM over each dam). YCWA will describe the LWM budget as the quantity of LWM observed in study sites, estimated annual volume of wood trapped in Project facilities (no longer available to downstream reaches), and estimated annual volume of wood passing over Project facilities. Existing conditions and Project-related influences on LWM budget will be discussed.

<sup>&</sup>lt;sup>17</sup> YCWA's Study 6.1 in its Revised Study Plan inadvertently omitted YCWA's intention to gather and summarize quantitative and anecdotal information regarding the quantity and fate of LWM removed from New Bullards Bar Reservoir, Our House Diversion Dam, Log Cabin Diversion Dam, and Englebright Reservoir. FERC's September 30, 2011 Study Determination directed that "... YCWA quantify LWD removal from project reservoirs as originally proposed and that study 6.1 be modified accordingly. Additionally, we recommend that YCWA consult with NMFS, Forest Service, Cal Fish and Game and FWS on the methodology for the quantification of LWD removal at project reservoirs should existing records prove insufficient to fulfill that objective." (Appendix A, pp 21 and 22). In FERC's December 8, 2011 Study Plan Modification, FERC added "To resolve our study dispute with NMFS, we also recommend that study 6.1 be modified to include a LWD budget as outlined in section 5.3.3.3.2 (Large Woody Material Budget) of YCWA's revised study filed on September 8, 2011." (Appendix A, p 10). YCWA has modified the Study as directed by FERC in its December 8, 2011 letter, but included the information in a new section (Section 5.3.3.4.2) rather than in Section 5.3.3.2.

Quantitative and anecdotal information will be gathered and summarized. This information will be compiled from YCWA records regarding quantity and fate of LWM removed by YCWA from New Bullards Bar Reservoir, from Our House Diversion Dam, and from Log Cabin Diversion Dam. YCWA consult with agencies on the methodology for the quantification of LWM removal at Project reservoirs should existing records prove insufficient to fulfill that objective.

#### 5.3.3.5 **General Riparian Site Information**

The purpose of collecting generalized information within each study site is to provide a venue for describing all relevant influences to the riparian system that may not otherwise be included in data collection efforts. Any pertinent information regarding study site condition will be collected and used in conjunction with other collected data for site assessment.

General riparian site information to be collected includes:

- Channel and bank substrate along transects
- Evidence of channel encroachment or bank instability (including any excessive erosion or • deposition)
- Evidence of recreational and other land use activities •
- Evidence of unusual stress or mortality on riparian plant community •
- Evidence of riparian vegetative connectivity (or lack of) •
- Hydrologic connectivity (or lack of) •
- Biotic structure, including vertical and horizontal complexity •

In addition, YCWA will collect:

- Herbarium specimen for all bryophyte species encountered in the plots (or otherwise observed at the site) and submit the specimen to the Forest Service.
- Establish photo points at each site.
- Add the presence of riparian vegetation to cross-sectional profiles to indicate where the vegetation occurs relative to bankfull and flood prone widths.
- Provide rooting depth (as indicated by available literature search no site-specific measurements) of the dominant riparian species present in a tech memo.
- Historical photograph analysis of riparian study sites. •

Channel cross sections and vegetation transect information will provide a basis for examining the relationship between flow, inundation duration and frequency, and riparian vegetation. Seedling and recruitment information will be captured by vegetation plot and general site description and will reflect if germination or regeneration is occurring under current operating conditions. To the extent possible, calculated unimpaired and regulated flow information will be examined against existing riparian vegetation, or shifts in riparian vegetation or health, as observed in historical aerial photograph analysis or field observations. Field data and observations will also

Page 13 of 60

be used in tandem with historical aerial photograph analysis to determine if any major shifts in riparian stand structure, composition, or surface area have occurred.

## 5.3.4 Step 4 – Prepare Data and Quality Assure/Quality Control Data

Following field surveys, YCWA will develop GIS maps depicting existing riparian habitat and other related information collected during the study. Field data will then be subject to QA/QC procedures, including spot-checks of transcription and comparison of GIS maps with field notes to verify locations of wetland and riparian sites found. YCWA will also produce a map for each study site that shows the extent of riparian vegetation as depicted on historic aerial photos compared to riparian vegetation extent depicted on recent aerial photos.

## 5.3.5 Step 5 – Prepare Report

YCWA will prepare a report that includes the following sections: 1) Study Goals and Objectives; 2) Methods; 3) Results; 4) Discussion; and 5) Description of Variances from the FERC-approved study proposal, if any. The report will include field data to support riparian condition assessment and riparian habitat maps.

# 6.0 <u>Study-Specific Consultation</u>

The study includes three study-specific consultations:

- All of the 12 LWM Sites and seven of the eight Riparian Vegetation Sites and 21 of the 22 Riparian Vegetation transects have been selected. The remain site and transect to be selected is the single Riparian Vegetation Site and one associated transect on the Middle Yuba River upstream of Our House Diversion Dam.<sup>18</sup>
- YCWA will consult with NMFS, Forest Service, CDFG and USFWS on the methodology for the quantification of LWM removal at Project reservoirs should existing records prove insufficient to fulfill the objective of gathering quantitative and anecdotal information regarding quantity and fate of woody material removed from New Bullards Bar Reservoir, from Our House Diversion Dam, and from Log Cabin Diversion Dam. (Step 3)
- YCWA will provide germination and recruitment data to Relicensing Participants 1 month prior to the issuance of the Initial Study Report for consultation regarding the need for additional riparian seed germination studies. If, based on the results of the information, YCWA and Relicensing Participants collaboratively agree that seed germination or recruitment, including the need for modeling the relationship between flows and germination,

<sup>&</sup>lt;sup>18</sup> YCWA performed the final site and transect selection with relicensing participants on February 9, 2012. Consultation for the remaining site upstream of Our House Diversion Dam is not required, as the site will be located by the fluvial geomorphology field crew to evaluate the effects of base-level control of the Project on bedload deposition with the level of analysis is limited to physical extent of bedload deposition and a "snapshot" of the riparian vegetation just upstream of the influence that will include some limited measurements.

should be studied in the second year, YCWA and Relicesning Participants will collaborate regrading the study and YCWA will propose the study in its Initial Study Report.

# 7.0 <u>Schedule</u>

FERC's December 8, 2011 required that YCWA provide a modified study to FERC for approval no later than March 8, 2012. YCWA intends, at its own risk and assuming Relicensing Participants cooperation, to complete Site Selection (Step 1) in January 2012. The schedule provided below assumes FERC will approve the modified Study no later than mid March 2012.

Complete Site Selection (Step 1)	January –March 2012
Collect and Review Existing Data and Information (Step 2)	April - May 2012
Condition Assessment (Step 3)	June - July 2012
Prepare and QA/QC Data (Step 4)	July 2012
Study Report Preparation (Step 5)	August - September 2012

# 8.0 <u>Consistency of Methodology with Generally Accepted</u> <u>Scientific Practices</u>

This study provides an assessment of existing riparian vegetation and is consistent with the goals, objectives, and methods outlined for most recent FERC hydroelectric relicensing efforts in California. The proposed methodologies use standard assessment methods developed and used by federal land management agency personnel.

# 9.0 <u>Level of Effort and Cost</u>

YCWA estimates the cost to complete this study in 2011 dollars is between \$261,000 and \$355,000.<sup>19</sup>

# 10.0 <u>Attachments</u>

This study plan includes four attachments:

- Attachment 6-1A Location of Riparian Vegetation Sites and Transects and LWM Sites Selected in Consultation with Relicensing Participants as of the Time the Modified Study Plan is Filed with FERC
- Attachment 6-1B Documentation of Transmittal of Draft Study Plan to Forest Service, United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), CDFG, SWRCB and Foothills Water Network (FWN)

<sup>&</sup>lt;sup>19</sup> YCWA's Riparian Habitat Upstream of Englebright Reservoir Study in its August 2011 Revised Study Plan had an estimate cost range of between \$210,000 and \$285,000. With the modifications required by FERC in its September 30, 2011 Study Determination, the estimated cost range is between \$261,000 and \$355,000.

Attachment 6-1C Written Comments from Forest Service and NMFS

Attachment 6-1D YCWA' Reply to Written Comments

# 11.0 <u>References Cited</u>

- Bovee, K. 1997. Data collection procedures for the Physical Habitat Simulation System. U.S. Geological Survey, Biological Resources Division, Fort Collins, Colorado.
- Buffington, J.M. and D.R. Montgomery. 1999. A procedure for classifying textural facies in gravel-bed rivers. Water Resources Research. Vol35, No. 6, pp 1903-1914.
- National Marine Fisheries Service (NMFS). 2011. Figure developed and provided for study dispute resolution. National Oceanic and Atmospheric Administration (NOAA).

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- Reed Jr., P. B. 1988. National List of Plant Species that Occur in Wetlands. California (Region 0). U.S. Fish and Wildlife Service, Washington, DC, USA. Biol. Rep. 88 (24).
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- \_\_\_\_\_.2004b. Sierra Nevada Forest Plan Amendment Final Supplemental Environmental Impact Statement and Record of Decision. Available from: <a href="http://www.fs.fed.us/r5/snfpa/>">http://www.fs.fed.us/r5/snfpa/></a>. United States Department of Agriculture--Forest Service, Pacific Southwest Region.
- \_\_\_\_\_.2001. Sierra Nevada Forest Plan Amendment.
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- United States Fish and Wildlife Service (USFWS). 1987. National Wetland Inventory (NWI) maps. US Department of the Interior, USFWS, Region 1. Portland, OR.
- Yuba County Water Agency (YCWA). 2010. Yuba River Development Project Pre-Application Document. Yuba County Water Agency, Marysville, CA. <u>http://www.ycwa-relicensing.com</u>.

# **ATTACHMENT 6-1A**

Location of Riparian Vegetation Sites and Transects and LWM Sites Selected in Consultation with Relicensing Participants as of the Time the Modified Study Plan is Filed with FERC

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# **ATTACHMENT 6-1B**

Transmittal of Draft Study Plan to Forest Service, USFWS, NMFS, SWRCB, CDFG and FWN

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Lynch, Jim
Sunday, January 08, 2012 7:30 AM
'tquinn01@fs.fed.us'; 'Daniel_Welsh@fws.gov'; 'ksmith@dfg.ca.gov'; 'Smith, Dennis -FS'; Teater, Dan -FS; alison_willy@fws.gov (Alison_Willy@fws.gov); Rick Wantuck; Larry Thompson; John Wooster; JParks@waterboards.ca.gov; MaryLisa Lynch; Sharon Stohrer (SSTOHRER@dfg.ca.gov): 'Julie Leimbach'
caikens@vcwa.com; 'Geoff Rabone'; 'Alan Mitchnick'; Kenneth Hogan
Yuba Relicensing: Transmittal of Draft Study 6.1, Riparian Habitat Upstream of Englebright Reservoir for 30-Day Review Period
Attachment 6-1A - Location of Study Sites Selected to Date.pdf; Study 06-01 - Riparian Habitat Above Englebright - Modified per FERC 093011 and 120811 Determinations - DRAFT - 010811.doc

#### - YUBA RIVER DEVELOPMENT PROJECT RELICENSING -

#### Transmittal of Riparian Habitat Upstream of Englebright Reservoir Study (Study 6.1) Plan for 30-Day Review Period - Written Comments due to YCWA by Close of Business on February 7, 2012 -

On September 30, 2011, FERC's Director of Energy Projects issued a Study Determination related to Yuba County Water Agency's (YCWA) relicensing of its Yuba River Development Project, FERC Project 2246. The Determination required, among other things, that YCWA develop and file with FERC by December 29, 2011 (30 days from the date of the Determination) a modified plan for Study 6.1, Riparian Habitat Upstream of Englebright Reservoir Study (Study). The Determination also required YCWA to consult with the Forest Service, USFWS, NMFS, CDFG and FWN regarding at least parts of the Study, providing them 30 days to review the draft Study plan, and include evidence of consultation in YCWA's final plan filed with FERC.

On December 8, 2011, FERC issued two letters, each which pertained to the Study at least in part. One of the letters provided details on how the Study should be modified, including specific wording to include in the modified Study. The second letter revised the schedule for filing of the final Study with FERC from December 29, 2011 to March 8, 2012 (70 days from the date of the December 8 letter).

Attached to this e-mail for your review are two files: 1) a draft Study 6.1, Riparian Habitat Upstream of Englebright Reservoir Study, excluding Attachment 6-1A, in Microsoft Word™ format; and 2) Attachment 6-1A (maps) to the draft Study in \*.PDF format. We would appreciate your written comments on the draft Study plan no later than close of business on February 7, 2012, 30 days from the date of this e-mail.

We will address your written comments in the Study plan that we file with FERC, and attach your written comments to the Study plan we file. We may call you if we have any questions regarding your comments to be sure we understand them or to reconcile differences.

Note that some other studies for which FERC's Determination required YCWA to consult with agencies are in development and we will transmit our draft of those studies to you when they are available.

Let us know if there is anything we can do to facilitate your review.

If you have any questions about this e-mail, please contact Jim Lynch.

Curt Aikens General Manager Yuba County Water Agency 530-741-6278 x115

This e-mail sent on behalf of the above party by:

JAMES LYNCH

HDR Engineering, Inc.

Senior Vice President, Hydropower Services

2379 Gateway Oaks, Suite 200 | Sacramento, CA 95833 916.564.4214 | d: 916.679.8740 |c: 916.802.6247 james.lynch@hdrinc.com | hdrinc.com

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# **ATTACHMENT 6-1C**

Written Comments from Forest Service and NMFS<sup>20</sup>

<sup>&</sup>lt;sup>20</sup> YCWA did not receive written comments from USFWS, SWRCB, CDFG or FWN within the deadline for providing written comments on the draft modified study.

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#### Pitts, Sheila

From:	Bailey, Gaea
Sent:	Monday, February 13, 2012 3:54 PM
To:	Pitts, Sheila
Subject:	FW: Yuba Relicensing: Transmittal of Draft Study 6.1, Riparian Habitat Upstream of
2.6 (20 <b>0</b> ,2) (200	Englebright Reservoir for 30-Day Review Period
Attachments:	Study 06-01 - Riparian Habitat Above Englebright - Modified per FERC 093011 and 120811
	Determinations - DRAFT - 010811 DW comments 1_9_2012.docx

FYI - Forest Service comments attached.

From: VanZuuk, Kathy -FS [mailto:kvanzuuk@fs.fed.us]
Sent: Friday, February 03, 2012 7:32 AM
To: Bailey, Gaea
Subject: Yuba Relicensing: Transmittal of Draft Study 6.1, Riparian Habitat Upstream of Englebright Reservoir for 30-Day Review Period

Hi Gaea, I received these comments on the study plan and would like to discuss them with you. When would that work for you? Kathy

### Study 6.1 **RIPARIAN HABITAT** UPSTREAM OF ENGLEBRIGHT RESERVOIR<sup>1</sup>

January 2011

#### 1.0 **Project Nexus and Issue**

Yuba County Water Agency's (YCWA or Licensee) continued operation and maintenance (O&M) of the Yuba River Development Project (Project) may have the potential to affect riparian habitat.

#### 2.0 **Resource Management Goals of Agencies with** Jurisdiction Over the Resource to be Studied

YCWA believes that three agencies have jurisdiction over special-status plants: 1) the United States Department of Agriculture Forest Service (Forest Service); 2) United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS); and 3) California Department of Fish and Game (CDFG). Each of these agencies and its jurisdiction and management direction, as understood by YCWA at this time, is discussed below.

Forest Service

The Forest Service's management goals for special-status plants on National Forest System (NFS) land are identified in the National Forest Management Act (NFMA, Public Law 94-588 1976) and the Tahoe National Forest (TNF) Land and Resource Management Plan (TNF LRMP) (USDA Forest Service 1990), as amended by the Sierra Nevada Forest Plan Amendment (USDA Forest Service 2001) and the Supplemental Sierra Nevada Forest Plan Amendment (USDA Forest Service 2004a and b).

- Plant Community Diversity/Special Habitats/Connectivity: Manage riparian plant communities to maintain and improve the species composition and structural diversity. Manage riparian plant communities to maintain and/or improve spatial and temporal connectivity for native riparian plant species within and between watersheds to provide physically, chemically and biologically unobstructed movement for their survival, migration and reproduction.
- Streamflow Patterns/Sediment Regimes/Stream and Shoreline Riparian Vegetation: Manage ٠ stream flows to maintain and /or improve in-stream flows so they are sufficient to sustain desired conditions of riparian plant communities. Manage streambanks and shorelines to minimize erosion and sustain desired riparian habitats.

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<sup>&</sup>lt;sup>1</sup> YCWA's included a Riparian Habitat Upstream of Englebright Reservoir Study in its August 2011 Revised Study Plan. FERC's September 30, 2011 Study Determination and December 8, 2011 Study Modification required modifications to the study. Those modifications have been made in this study plan.

FERC-Modified Study Riparian Habitat Above Englebright ©2011, Yuba County Water Agency

#### NMFS

NMFS's statutory authorities and responsibilities are described by NMFS in Section 2.0 of Enclosure A in NMFS's March 7, 2011 letter to FERC providing NMFS's comments on YCWA's Pre-Application Document, or PAD (YCWA 2010). NMFS's jurisdiction and responsibilities are not repeated here.

#### CDFG

The CDFG is the relevant state fish and wildlife agency for consultation and Federal Power Act (FPA) Section 10(j) (16 U.S.C. § 803(j)) purposes. In the state of California, fish and wildlife resources are held in trust for the people of the state by and through the CDFG (Cal. Fish and Game Code § 711.7). "Species of Special Concern" do not have formal legal status, but are intended to focus attention on species at conservation risk.

#### 3.0 Study Goals and Objectives

The goal of this study is to assess the condition of riparian habitats within river reaches upstream of the United States Army Corps of Engineer's (USACE) Englebright Reservoir potentially affected by continued Project O&M.

The objective of this study is to gather the data and information necessary to meet the study goals.

#### 4.0 Existing Information and Need for Additional Information

YCWA's PAD (YCWA 2010) contained information about the riparian vegetation mapped in the area of the Project, including CalVeg maps and National Wetland Inventory (NWI) maps on a 1:24,000 scale, shown with United States Geological Survey (USGS) topographic features and Project facilities. Section 7.6 of the PAD includes a table of NWI palustrine and riverine wetland types and acres within the Project Area<sup>2</sup> and the Federal Energy Regulatory Commission (FERC) Project Boundary.<sup>3</sup>

Based on NWI maps (USFWS 1987), there are approximately 40,417 feet and 125 acres of riverine wetlands within the Project Area, with approximately 8,044 feet and 54 acres within the FERC Project Boundary. Remaining NWI classified wetland habitats in the Project Area include approximately 63,926 feet and 13 acres of palustrine wetlands and approximately 4,635 acres of reservoir open water.

Riparian Habitat Above Englebright Page 2 of 18 FERC-Modified Study ©2011, Yuba County Water Agency January 2011

<sup>&</sup>lt;sup>2</sup> For the purposes of this document, the Project Area is defined as the area within the Federal Energy Regulatory Commission (FERC) existing Project Boundary and the land immediately surrounding the FERC Project Boundary (i.e., within about 0.25 mile of the FERC Project Boundary) and includes Project-affected reaches between Project facilities and downstream to the next major water controlling feature or structure.

<sup>&</sup>lt;sup>3</sup> The FERC Project Boundary is the area that YCWA uses for normal Project operations and maintenance, and is shown on Exhibits J, K, and G of the current license.

NWI riparian wetlands have been classified using aerial imagery but no ground-mapping data is known to exist to support this inventory. In addition, no known site-specific assessments of riparian habitats or habitat condition within the FERC Project Boundary are known to exist. To achieve the study goals, additional information is needed.

#### 5.0 Study Methods and Analysis

#### 5.1 Study Area

The study area includes: 1) the Middle Yuba River from Our House Diversion Dam Impoundment to the confluence with the North Yuba River, 2) Oregon Creek from the Log Cabin Diversion Dam Impoundment to the confluence with the Middle Yuba River, 3) the North Yuba River from New Bullards Bar Dam Reservoir to the confluence with the Middle Yuba River, and 4) and the portion of the Yuba River from the confluence of the North and Middle Yuba rivers to just upstream of the USACE Englebright Reservoir.

If YCWA proposes an addition to the Project, the study area will be expanded if necessary to include areas potentially affected by the addition.

#### 5.2 General Concepts and Procedures

The following general concepts and practices apply to the study:

- · Personal safety is the most important consideration of each fieldwork team.
- Licensee will make a good faith effort to obtain permission to access private property where needed well in advance of entering the property.
- Field crews may make minor variances to the FERC-approved study in the field to
  accommodate actual field conditions and unforeseen problems. When minor variances are
  made, Licensee's field crew will follow the protocols in the FERC-approved study.
- When Licensee becomes aware of major variances to the FERC-approved study, Licensee will issue an e-mail to the Relicensing Contact List describing the variance and reason for the variance. Licensee will contact by phone the Forest Service (if the variance is on National Forest System land), U.S. Fish and Wildlife Service, State Water Resources Control Board, and CDFG to provide an opportunity for input regarding how to address the variance. Licensee will issue an e-mail to the Relicensing Contact List advising them of the resolution of the variance. Licensee will summarize in the final study report all variances and resolutions.
- Licensee's performance of the study does not presume that Licensee is responsible in whole
  or in part for measures that may arise from the study.
- Global Positioning System (GPS) data will be collected using either a Map Grade Trimble GPS (sub-meter data collection accuracy under ideal conditions), a Recreation Grade Garmin GPS unit (3 meter data collection accuracy under ideal conditions), or similar units. GPS

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FERC-Modified Study 1 ©2011, Yuba County Water Agency

Riparian Habitat Above Englebright Page 3 of 18

data will be post-processed and exported from the GPS unit into Geographic Information System (GIS) compatible file format in an appropriate coordinate system using desktop software. The resulting GIS file will then be reviewed by both field staff and Licensee's relicensing GIS analyst. Metadata will be developed for deliverable GIS data sets. Upon request, GIS maps will be provided to agencies in a form, such as ESRI Shapefiles, GeoDatabases, or Coverage with appropriate metadata, that is useful for interactive data analysis and interpretation. Metadata will be Federal Geographic Data Committee compliant.<sup>4</sup>

- Licensee's field crews will record incidental observations of aquatic and wildlife species observed during the performance of this study. All incidental observations will be reported in the appropriate Licensee report (e.g., incidental observations of special-status fish recorded during fieldwork for the Special-Status Turtles Western Pond Turtle Study will be reported in Licensee's Stream Fish Populations Study report). The purpose of this effort is not to conduct a focus study (no effort in addition to the specific field tasks identified for the specific study) or to make all field crews experts in identifying all species, but only to opportunistically gather data during the performance of the study.
- Field crews will be trained on and provided with materials (e.g., Quat-128 [didecyl dimethyl ammonium chloride], scrub brush, etc.) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus (*Batrachochytrium dendrobatidis*), and invasive invertebrates (e.g., zebra mussels, *Dreissena polymorpha*). This is of primary importance when: 1) moving between tributaries and mainstem reaches; 2) moving between basins (e.g., Middle Yuba River, Yuba River and North Yuba River); and 3) moving between isolated wetlands or ponds and river or stream environments.

#### 5.3 Methods

The study includes five steps: 1) site selection; 2) gather data and prepare for field effort; 3) conduct field surveys; 4) prepare data and quality assure/quality control (QA/QC) data; and 5) prepare report. Each step is described below.

#### 5.3.1 Step 1 – Site Selection

#### 5.3.1.1 Riparian Vegetation Sites

A total of eight<sup>5</sup> Riparian Vegetation Sites will be co-located, to the extent possible, with Study 1.1, Morphology Upstream of Englebright Reservoir Study sites (Table 5.3.1). Each site will be approximately 20 times bankfull width. At seven of the eight sites, three riparian vegetation transects will be located. To the extent possible, these transects will be co-located with transects located for Study 1.1, Channel Morphology Upstream of Englebright Reservoir Study. At the

 Riparian Habitat Above Englebright
 FERC-Modified Study

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January 2011

<sup>&</sup>lt;sup>4</sup> The Forest Service and CDFG each requested that a copy of the GIS maps be provided to them when the maps are available. <sup>5</sup> YCWA's Study 6.1 in its Revised Study Plan included six Riparian Vegetation Sites. FERC's September 30, 2011 Study Determination directed that "...modification of section 5.3.1 of study 6.1 (filed September 9, 2011) to include the Middle Yuba River below Our House dam and the Yuba River above Colgate powerhouse..." (Appendix A, p 25). YCWA has modified the Study as directed by FERC.

Yuba County Water Agency Yuba River Development Project FERC Project No. 2246

site on the Middle Yuba River upstream of Our House Diversion Dam, one transect will be located to provide enough information to characterize the area; a full assessment will not be performed at this site.6 Therefore, a total of 22 vegetation transects will be selected.

Six of the eight Riparian Vegetation Sites and 18 of the 22 transects were selected in consultation with Relicensing Participants on September 20-23, 2011 and on November 18, 2011, and in a webinar meeting on December 1, 2011. The selected sites and transects are shown on Attachment 6-1A to this Study. The remaining sites and transects to be selected are the single Riparian Vegetation Site and associated three transects in the North Yuba River and the single Riparian Vegetation Site and one associated transect on the Middle Yuba River upstream of Our House Diversion Dam. YCWA will consult with Relicensing Participants regarding the location of these sites and transects. [Forest Service, USFWS, NMFS, CDFG, SWRCB and FWN -YCWA intends to propose that the remaining two Riparian Vegetation Sites and four associated transects be selected in January 2012. This section in the modified Study that will be filed with FERC will be amended to reflect the most current status of this effort when the final is filed. YCWA]

Stream	Potential Location	Character	Riparian Vegetation Sites	LWM Sites
	Above Our-House Dam, within influence of base level control effected by Our House Diversion <sup>1</sup>	Low gradient (1.7% map gradient), depositional.	Yes (Limited Study Location)	24
	Below Our House Dam	Steeper (>1% gradient), confined, more transport- dominated bedrock control channel	Yes	Yes
	Upstream of Oregon Creek - 2 miles	Confined, transport-dominated bedrock control and low gradient bedrock pool		Yes
Middle Yuba River	Above Oregon Creek	Steeper (>1% gradient), confined, more transport- dominated than below Oregon Creek, though some lateral cobble/gravel bar development.	Yes	Yes
	Below Oregon Creek in the vicinity of Freemans Crossing	Moderately and unconfined channel, -1% gradient, alluvial and depositional.	Yes	Yes
	Near Confluence with Yellowjacket Creek (RM 1.4)	Low gradient, moderately unconfined, bedrock controlled.		Yes
	Above Confluence with North Yuba River	Confined, bedrock and bolder controlled	-	Yes
Oregon Creek	Below Log Cabin Diversion Dam	Confined ~1.8% map gradient.	-	Yes
	Vicinity of Celestial Valley	Confined 1.6% gradient, planar bedform, gravel- sized material in channel and on margins.	Yes	Yes
	Between the Middle Yuba junction and Allegheny Road Bridge (RM 1.92)	Low gradient, depositional, moderately unconfined.		Yes
North Yuba River	Below New Bullards Bar Dam.	Reach has very little accessibility due to vertical cliffs, and dominance of bedrock and boulders within channel. Large, immobile substrate, lateral and vertical controls by bedrock limit responsiveness to changes in inputs of sediment and to changes in hydrology.	Yes	Yes

Table 5.3-1. Location and character of 8 Riparian Vegetation Sites and 12 LWM Sites.

<sup>6</sup> The Forest Service requested and YCWA agreed to characterize riparian vegetation and habitat at a single site with a single transect upstream of Our House Diversion Dam. It was agreed that a level of effort at the site would be significantly less than the level of effort at the other seven Riparian Vegetation Sites.

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FERC-Modified Study Riparian Habitat Above Englebright ©2011, Yuba County Water Agency

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#### Table 5.3-1. (continued)

Stream	Potential Location	Character	Riparian Vegetation Sites	LWM Sites
Yuba River	Above New Colgate Powerhouse	Confined; map gradient of less than 1% but habitat mapping data shows numerous high gradient riffles of up to 11% gradient separated by long, deep mid- channel pools and short low-gradient riffles with substrate dominated by boulders and bedrock.	Yes	Yes
Yuba River (cont)	Below New Colgate Powerhouse	Confined, less than 1%, cobble and boulder- dominated bed with very deep pools immediately below the Powerhouse, but increasing alluvial deposition moving downstream.	Yes	Yes

Site will be located to evaluate the effects of base-level control of the Project on bedload deposition; the level of analysis is limited to physical extent of bedload deposition and a "snapshot" of the riparian vegetation just upstream of the influence that will include some limited measurements.

#### 5.3.1.2 Large Woody Material Sites

A total of  $12^7$  Large Woody Material (LWM, also sometimes referred to as Large Woody Debris, or LWD) Sites will be surveyed (Table 5.3-1). Seven of these sites will be collocated with riparian vegetation survey sites, with the remaining three sites located on the Middle Yuba River downstream of Our House Diversion Dam and Oregon Creek downstream of Log Cabin Diversion Dam. The length of each of these sites will be 20 times the bankfull width, or as near as possible to that length as access permits due to safety considerations.

All of the sites have been selected. Seven of the 12 sites are co-located with the Riparian Vegetation Sites, and were selected in consultation with Relicensing Participants in the field on September 20-23, 2011, and in a webinar meeting on December 1, 2011; one site is not collocated with a Riparian Vegetation site was also chosen during these field visits. Four LWM Sites were chosen during November 2 and 8, 2011 meetings. The LWM Sites on the Middle Yuba River and Oregon Creek are shown in Figure 5.3-1; all the LWM Sites are shown on Attachment 6-1A to this Study.

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<sup>&</sup>lt;sup>7</sup> YCWA's Study 6.1 in its Revised Study Plan included two LWM Sites. FERC's September 30, 2011 Study Determination directed that "...YCWA modify the LWD survey methodology of Study 1.1 to incorporate seven LWD survey study sites, with locations identical to those currently proposed for geomorphic surveys upstream of Englebright dam. In addition to these seven study sites, vere commend that after consultation with NMFS, CDFG and the Forest Service, YCWA should identify additional study sites to adequately survey LWD in the potential response reaches of Oregon Creek and the Middle Yuba River." (Appendix A, p 23). In FERC's December 8, 2011 Study Plan Modification, FERC provided additional detail regarding the number and location of LWM Sites stating "...ver encommend that TCWA modify Section 5.3.3.1 of study 6.1 (Quantifying Large Woody Material) to include nine LWD study areas on the Middle Yuba River and Oregon Creek, as shown in figure 1 (of FERC's letter)." (Appendix A, p 10). YCWA has modified the Study a directed by FERC in its December 8 2011 Study 1.1 return in Section 5.3.3.1.

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Figure 5.3-1. LWM Sites areas on the Middle Yuba River and Oregon Creek. (SOURCE: Figure 1 in FERC's December 8, 2011 Study Modification.)

#### 5.3.2 Step 2 – Collect and Review Existing Data and Information

Existing data, including GIS data, historical information, reports, maps, and aerial photography relevant to riparian vegetation will be collected and reviewed where available for river reaches. These sources are expected to provide documentation on geology, topography, soils, riparian vegetation coverage and type, invasive species, and land-use (i.e., mining, timber management, recreation, road development, fires, grazing, and water diversions). Information regarding riparian vegetation and physical processes on western slope Sierra Nevada streams or other pertinent riparian literature from other geographic regions will also be reviewed. Pertinent information will be used for comparison and interpretive purposes when evaluating the streams and rivers in the study area.

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#### 5.3.3 Step 3 - Condition Assessment<sup>8</sup>

YCWA will assess the condition of existing riparian vegetation by collecting a variety of quantifiable, reproducible measurements of vegetation with channel and stage discharge relationships at typical flows. The compilation of data collected for this study will inform species distribution within each lateral area of the stream channel, and its relationship to average high, low, bankfull and floodprone flows. Channel and vegetation cross-sections will map where bankfull and floodprone stages occur in relation to the presence of riparian vegetation. Stream discharges necessary to inundate riparian communities will be estimated using calibrated stagedischarge calculations from Study 3.10, Instream Flow Upstream of Englebright Reservoir using the Physical Habitat Simulation Model (PHABSIM) at co-located transects. Flow frequency analysis for the period of record will use daily average flow values to establish frequency of inundation of various surfaces in the riparian zone under existing and unimpaired by project hydrologic scenarios. Where vegetation and PHABSIM transects are not co-located, the same methods (i.e., PHABSIM stage/Q relation and frequency of inundation) will be used for the riparian-only transect(s).

YCWA will examine the relationship between the presence of dominant woody species and their placement in the channel, as well as their general age class and vigor. Vegetation transects will capture species dominance, abundance, richness, ground and canopy cover, as well as lateral and horizontal complexity. A general description of the study site will be developed, identifying specific influences contributing to the character of each riparian zone, including, but not limited to, channel formation, upland influences (i.e., cattle grazing or landslides), excessive erosion or deposition, and the presence of noxious weeds or special-status plants. The compilation of data collected during the study will provide the necessary information for understanding the potential of each system to support riparian communities.

All pertinent references, aerial photographs, hydrology, and field data will be used to describe existing conditions of riparian vegetation and any clear changes to the vegetation or channel that may have occurred over time. Although each methodology will be described in detail in the subsections that follow, an overview of the methods is included here with generalized rational:

- Vegetation transects with nested plots .
  - species abundance, richness, and distribution
  - age-class structure of riparian vegetation
  - germination and recruitment

 Historical aerial photograph analysis examine what changes have taken place over time

<sup>4</sup> YCWA's Study 6.1 in its Revised Study Plan described how the Study would relate flows to riparian vegetation. FERC's September 30, 2011 Study Determination directed that "... YCWA should modify section 5.3.3.4, after consultation with NMFS, Cal Fish and Game, Forest Service, FWS, and Foothills, to provide a detailed description of study methods." (Appendix A, p. 24). In its December 8, 2011 Study Modification, FERC directed YCWA to replace the existing Section 5.3.3, step 3, Condition Assessment, with a new section in FERC's letter stating. "To resolve our study dispute with NMFS, we recommend that the introductory language of section 5.3.3 of study 6.1 be replaced with the following section... [Text not repeated here due to the length of the text]." (Appendix A, pp 12 and 14). The section has been replaced as directed by FERC.

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**Comment [dw1]:** I would add plnt species wetland status and trend. The proportion of wetland indicator plant species on the transects will help a lot in determining if the hydrology of the sites is being maintimed.

Comment [dw2]: I wonder if the study will actually measure germination? Seems like the study is measuring recruitment, not germination.

intained.

- when changes took place examine possible causes for changes
- · Large woody material mapping
  - locations and physical characteristics of large woody material
  - function in the channel
- · General riparian condition
  - changes in channel and bank substrate (including any excessive erosion or deposition)
  - land use activities
  - unusual stress or mortality on riparian plant community >
  - riparian vegetative and hydrologic connectivity (or lack of)
  - flow frequency analyses under existing and unimpaired by YRDP hydrologic scenarios of > discharges necessary to inundate riparian communities

#### 5.3.3.1 **Riparian Vegetation Site and Transects with Nested Plots**

Surveyors will collect quantitative data along Riparian Vegetation Site transects. Vegetation transects will extend from the water's edge at low flow, to hill slope (including bars if present); at the Oregon Creek study site, where the channel is unconfined, the vegetation transect will end at calculated floodprone width. For the purpose of the study, riparian vegetation is defined as wetland indicator species as identified by the National List of Plant Species that Occur in Wetlands: California (Region 0) (Reed 1988).

Information collected along each transect will include two types of plots: 1) herbaceous vegetation (1 meter square plots), and 2) woody vegetation (trees and shrubs) (5 by 2 meter plots). Plots will be nested, with herbaceous and other cover plots occurring within the woody vegetation plots. More than one herbaceous and other cover plot may be located within a woody plot. Both the woody and herbaceous cover plots will be located perpendicular to transects located on the downstream side.

At a minimum, each transect will have at least two nested plots: one woody plot on each side of the stream at the start of vegetation, and within each woody plot, two herbaceous plots located side by side. Additional fluvial features (i.e., floodplains and terraces) that are at least 2 meters wide and are intersected by a vegetative transect will have a minimum of one nested plot. The following information will be collected in the plots:

- Herbaceous vegetation
  - Dominant species cover in percent
  - > Total canopy cover
  - Layer canopy cover (generally stratified by herbaceous and other, shrub, and tree layers) > List all species present in each plot and provide an indication of whether they are native and/or special-status Approximate age class by size (i.e., seedling, recruit or adult)
  - >
  - Other cover data (i.e., large woody material or boulders)

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Comment [dw3]: I would add here that the study will measure the status and trend of wetland indicator plants

Comment [dw4]: This is not clear to me. Does this mean that only wetland indicator species will be sampled. Riparian vegetation and wetland indicator species are two separate concepts. It would be best if all vascular plant species are noted and cover estimates made for each. That way, the trend in

wetland indicator species can be estimated.

**Comment [dw5]:** Not clear to me. Does this mean that only dominant plant species will be sampled? Or will all vascular plant species be

sampled?

- Woody vegetation
  - > Canopy coverage class in percent
  - Stem count per individual or species class
  - > Tree diameter in diameter at breast-height
  - > Dominant species relative decadence in percent
  - Dominant species coverage in percent
  - > List all tree and shrub species present and provide an indication of whether they are native and/or special-status9
  - > Other cover data (i.e., large woody material or boulders)

#### 5.3.3.2 **Historical Aerial Photograph Analysis**

Field data and observations will be used in tandem with historical aerial photography analysis to determine if any major shifts in riparian stand structure, composition, or surface area have occurred. The photographs will also be used to identify observable changes in land use, channel morphology (i.e., excessive erosion or deposition), upland influences (i.e., landslide), or other features pertinent to the analysis.

#### 5.3.3.3 Information to be Reviewed to Determine if a Focused Study Will be Needed in the Second Study Year to Examine Project Effects on Riparian Vegetation Seed Germination $^{10}\,$

YCWA will assess the condition of existing woody riparian germination by collecting vegetation plot data along transects. All vegetative data collected in the plots will be included in the seed germination evaluation, with specific focus on the following factors:

- · No seed germination or recruitment present
- · Mono-typic age stands with no obvious or recent link to a peak flow event
- Decumbent or distressed vegetation
- Lack of woody species present in areas with substrate capable of supporting woody vegetation
- Stage/discharge and flow frequency analyses under existing and unimpaired by Project conditions
- Literature search as it pertains to riparian vegetation and any potential key indicator species in the Sierra Nevada
- Any additional pertinent items

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<sup>&</sup>lt;sup>9</sup> For all special-status species observations, YCWA will complete the appropriate CNDDB form and transmit the form to the CNDDB. YCWA will provide a copy of the CNDDB form to the Forest Service if the observation occurs on NFS land.
<sup>10</sup> YCWA's Study 6.1 in its Revised Study Plan did not assess seed germination. FERC's September 30, 2011 Study Determination directed that YCWA modify "...study 6.1 to require a determination of ened for modeling the relationship between flows and riparian species germination after the first year of study to be included in the initial study report." (Appendix A, pp 24 and 25). In its December 8, 2011 Study Modification, FERC directed YCWA to add a new section stating with the directed to the directed of the directed of 152.22 (The study of the form) of the study of the form of the directed of the form of We also recommend that the following section be added to the study 6.1 between 5.3.3.2 and 5.3.3.3:...[Text not repe here due to the length of the text].' (Appendix A, pp 13 and 14). YCWA has added the new section as directed by FERC.

If seed germination or recruitment is identified as a concern during first year studies, the need for modeling the relationship between flows and germination will be examined.

#### 5.3.3.4 LWM Data Collection

LWM plays an important role in streams by shaping channel morphology, storing sediment and organic matter, and providing habitat for wildlife. Two efforts will be made to quantify LWM potentially affected by Project operations: 1) LWM will be quantified at specified locations; and 2) a generalized LWM budget will estimate the amount of LWM moving through the Project-affected reaches.

#### 5.3.3.4.1 Quantifying LWM

YCWA will quantify LWM at the LWM Sites described in Step 1. LWM occurring within each site will be counted as follows: all LWM greater than 3 ft in length within the active channel within four diameter classes (4-12 inches, 12-24 inches, 24-36 inches, and greater than 36 inches) and four length classes (3-25 ft, 25-50 ft, 50-75 ft, and greater than 75 ft). More detailed measurements will be taken for key pieces located within riparian habitat study sites.

Key pieces of LWM are defined as pieces either longer than 1/2 times the bankfull width, or of sufficient size and/or are deposited in a manner that alters channel morphology and aquatic habitat (e.g., trapping sediment or altering flow patterns). Key piece characteristics to be recorded will include:

- piece location, either mapped onto aerial photos or documented with GPS
- piece length
- piece diameter
- piece orientation
- position relative to the channel
- · whether the piece has a rootwad
- tree species or type (e.g., conifer or hardwood)
- · whether the piece is associated with a jam or not
- the number of large pieces in the jam
- · recruitment mechanism
- function in the channel

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#### 5.3.3.4.2 Large Woody Material Budget<sup>11</sup>

In addition to field-collected quantities of LWM (Section 5.3.3.3.1), estimates of the annual volume of LWM trapped in reservoirs, where available, will be included with estimates of LWM passing over Our House, Log Cabin, and Englebright dams (based on recorded flows and flows estimated for the movement of LWM over each dam). YCWA will describe the LWM budget as the quantity of LWM observed in study sites, estimated annual volume of wood trapped in Project facilities (no longer available to downstream reaches), and estimated annual volume of wood passing over Project facilities. Existing conditions and Project-related influences on LWM budget will be discussed.

Quantitative and anecdotal information will be gathered and summarized. This information will be compiled from YCWA records regarding quantity and fate of LWM removed by YCWA from New Bullards Bar Reservoir, from Our House Diversion Dam, and from Log Cabin Diversion Dam. YCWA consult with agencies on the methodology for the quantification of LWM removal at Project reservoirs should existing records prove insufficient to fulfill that objective.

#### 5.3.3.5 General Riparian Site Information

The purpose of collecting generalized information within each study site is to provide a venue for describing all relevant influences to the riparian system that may not otherwise be included in data collection efforts. Any pertinent information regarding study site condition will be collected and used in conjunction with other collected data for site assessment.

General riparian site information to be collected includes:

- · Channel and bank substrate along transects
- Evidence of channel encroachment or bank instability (including any excessive erosion or deposition)
- Evidence of recreational and other land use activities
- Evidence of unusual stress or mortality on riparian plant community
- Evidence of riparian vegetative connectivity (or lack of)
- Hydrologic connectivity (or lack of)
- · Biotic structure, including vertical and horizontal complexity

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<sup>&</sup>lt;sup>11</sup> YCWA's Study 6.1 in its Revised Study Plan inadvertently omitted YCWA's intention to gather and summarize quantitative and anecdotal information regarding the quantity and fate of LWM removed from New Bullards Bar Reservoir, Fur House Diversion Dam, Log Cabin Diversion Dam, and Englebright Reservoir. FRC's September 30, 2011 Study Determination directed that "... *YCWA quantify LWD removal from project reservoirs as originally proposed and that study 6.1 be modified accordingly. Additionally, we recommend that YCWA consult with NMFS, Forest Service, Cal Fish and Game and FWS on the methodology for the quantification of LWD removal at project reservoirs should existing records prove insufficient to fulfill that objective." (Appendix A, pp 21 and 22). In FERC's December 8, 2011 Study Plan Modification, FERC added "To resolve our study dispute with NMFS, we also recommend that study 6.1 be modified to include a LWD budget as outlined in section 5.3.3.3.2 (Large Woody Material Budget) of YCWA's revised study filed on September 8, 2011." (Appendix A, p 10). YCWA has modified the Study as directed by FERC in its December 8, 2011 letter, but included the information in a new section (Section 5.3.3.4.2) rather than in Section 5.3.3.2.* 

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In addition, YCWA will collect:

- Herbarium specimen for all bryophyte species encountered in the plots (or otherwise observed at the site) and submit the specimen to the Forest Service.
- · Establish photo points at each site.
- Add the presence of riparian vegetation to cross-sectional profiles to indicate where the vegetation occurs relative to bankfull and flood prone widths.
- Provide rooting depth (as indicated by available literature search no site-specific measurements) of the dominant riparian species present in a tech memo.
- · Historical photograph analysis of riparian study sites.

Channel cross sections and vegetation transect information will provide a basis for examining the relationship between flow, inundation duration and frequency, and riparian vegetation. Seedling and recruitment information will be captured by vegetation plot and general site description and will reflect if germination or regeneration is occurring under current operating conditions. To the extent possible, calculated unimpaired and regulated flow information will be examined against existing riparian vegetation, or shifts in riparian vegetation or health, as observed in historical aerial photograph analysis or field observations. Field data and observations will also be used in tandem with historical aerial photograph analysis to determine if any major shifts in riparian stand structure, composition, or surface area have occurred.

#### 5.3.4 Step 4 – Prepare Data and Quality Assure/Quality Control Data

Following field surveys, YCWA will develop GIS maps depicting existing riparian habitat and other related information collected during the study. Field data will then be subject to QA/QC procedures, including spot-checks of transcription and comparison of GIS maps with field notes to verify locations of wetland and riparian sites found. YCWA will also produce a map for each study site that shows the extent of riparian vegetation as depicted on historic aerial photos compared to riparian vegetation extent depicted on recent aerial photos.

#### 5.3.5 Step 5 - Prepare Report

YCWA will prepare a report that includes the following sections: 1) Study Goals and Objectives; 2) Methods; 3) Results; 4) Discussion; and 5) Description of Variances from the FERC-approved study proposal, if any. The report will include field data to support riparian condition assessment and riparian habitat maps.

#### 6.0 Study-Specific Consultation

The study includes two study-specific consultations:

 All of the 12 LWM Sites and six of the eight Riparian Vegetation Sites and 18 of the 22 Riparian Vegetation transects have been selected. The remaining sites and transects to be selected are the single Riparian Vegetation Site and associated three transects in the North

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Yuba River and the single Riparian Vegetation Site and one associated transect on the Middle Yuba River upstream of Our House Diversion Dam. YCWA will consult with Relicensing Participants regarding the location of these sites and transects. (Step 1)

 YCWA consult with NMFS, Forest Service, CDFG and USFWS on the methodology for the quantification of LWM removal at Project reservoirs should existing records prove insufficient to fulfill the objective of gathering quantitative and anecdotal information regarding quantity and fate of woody material removed from New Bullards Bar Reservoir, from Our House Diversion Dam, and from Log Cabin Diversion Dam. (Step 3.)

#### 7.0 <u>Schedule</u>

FERC's December 8, 2011 required that YCWA provide a modified study to FERC for approval no later than March 8, 2012. YCWA intends, at its own risk and assuming Relicensing Participants cooperation, to complete Site Selection (Step 1) in January 2012. The schedule provided below assumes FERC will approve the modified Study no later than mid March 2012. [Forest Service, USFWS, NMFS, CDFG, SWRCB and FWN – YCWA intends to propose that the remaining two Riparian Vegetation Sites and four associated transects be selected in January 2012. This section in the modified Study that will be filed with FERC will be amended to reflect the most current status of this effort when the final is filed. YCWA]

Complete Site Selection (Step 1)	January 2012
Collect and Review Existing Data and Information (Step 2)	April - May 2012
Condition Assessment (Step 3)	
Prepare and QA/QC Data (Step 4)	July 2012
Study Report Preparation (Step 5)	August - September 2013

#### 8.0 <u>Consistency of Methodology with Generally Accepted</u> <u>Scientific Practices</u>

This study provides an assessment of existing riparian vegetation and is consistent with the goals, objectives, and methods outlined for most recent FERC hydroelectric relicensing efforts in California. The proposed methodologies use standard assessment methods developed and used by federal land management agency personnel.

#### 9.0 Level of Effort and Cost

YCWA estimates the cost to complete this study in 2011 dollars is between \$261,000 and \$355,000.^{12}

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<sup>&</sup>lt;sup>12</sup> YCWA's Riparian Habitat Upstream of Englebright Reservoir Study in its August 2011 Revised Study Plan had an estimate cost range of between \$210,000 and \$285,000. With the modifications required by FERC in its September 30, 2011 Study Determination, the estimated cost range is between \$261,000 and \$355,000.

#### 10.0 Attachments

This study plan includes four attachments:

- Attachment 6-1A Location of Riparian Vegetation Sites and Transects and LWM Sites Selected in Consultation with Relicensing Participants as of the Time the Modified Study Plan is Filed with FERC
- Attachment 6-1B Documentation of Transmittal of Draft Study Plan to Forest Service, United States Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), CDFG, SWRCB and Foothills Water Network (FWN)
- Attachment 6-1C Written Comments from Forest Service, USFWS, NMFS, CDFG, SWRCB and FWN
- Attachment 6-1D YCWA' Reply to Written Comments

[Forest Service, USFWS, NMFS, CDFG, SWRCB and FWN – Attachments 6-1B, 6-1C and 6-1D are not included in this draft, but will be included in the modified Study filed with FERC. YCWA]

#### 11.0 References Cited

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- Buffington, J.M. and D.R. Montgomery. 1999. A procedure for classifying textural facies in gravel-bed rivers. Water Resources Research. Vol35, No. 6, pp 1903-1914.
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- United States Fish and Wildlife Service (USFWS). 1987. National Wetland Inventory (NWI) maps. US Department of the Interior, USFWS, Region 1. Portland, OR.
- Yuba County Water Agency (YCWA). 2010. Yuba River Development Project Pre-Application Document. Yuba County Water Agency, Marysville, CA. <u>http://www.ycwarelicensing.com.</u>

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> Yuba County Water Agency Yuba River Development Project FERC Project No. 2246

# ATTACHMENT 6-1A

Location of Riparian Vegetation Sites and Transects and LWM Sites Selected in Consultation with Relicensing Participants as of the Time the Modified Study Plan is Filed with FERC

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Lynch, Jim	
From:	John Wooster [john.wooster@noaa.gov]
Sent:	Tuesday, February 07, 2012 4:47 PM
To:	Lynch, Jim; Alan Mitchnick
Cc:	Kenneth Hogan; Larry Thompson
Subject:	Comments: Yuba Relicensing: Transmittal of Draft Study 6.1, Riparian Habitat Upstream of Englebright Reservoir for 30-Day Review Period

#### Hi Alan and Jim:

In reviewing the latest draft of YCWA's Study Plan 6.1 Riparian Habitat Upstream of Englebright Reservoir, a question arose pertaining to determining the need for a second year study for modeling seed germination related to flows. You may recall that FERC put forth in the original determination that a need for this modeling would be determined following first year study results, and then as a group we came up with some data/information to be used for determining the potential need. I have assumed all along that the evaluation of this need would be done collectively: stakeholders/agencies, FERC, and YCWA. However, as I read the revised 6.1 Study Plan, this is not entirely clear or expressly stated.

Below I paste the only text from the Study Plan 6.1 pertaining to this decision (pg 11), without any mentioning of who will be doing the examining / identifying if there is a concern / or determining if there is a need: "If seed germination or recruitment is identified as a concern during first year studies, the need for modeling the relationship between flows and germination will be examined."

Also, note there is not any mention under the study-specific consultation section 6.0 of coordinating with RPs pertaining to the assessment of needing this second year modeling study or not.

As such, I think the Study Plan should be modified to explicitly include the RPs in evaluating the first year study results and determining the potential need to do the second year modeling study.

Alan/Ken, maybe you could weigh in on whether I have missed the intent of the FERC determination and/or our subsequent discussions?

Thanks!

-John

On Sun, Jan 8, 2012 at 7:29 AM, Lynch, Jim < Jim.Lynch@hdrinc.com > wrote:

#### - YUBA RIVER DEVELOPMENT PROJECT RELICENSING -

#### Transmittal of Riparian Habitat Upstream of Englebright Reservoir Study (Study 6.1) Plan for 30-Day Review Period

#### - Written Comments due to YCWA by Close of Business on February 7, 2012 -

On September 30, 2011, FERC's Director of Energy Projects issued a Study Determination related to Yuba County Water Agency's (YCWA) relicensing of its Yuba River Development Project, FERC Project 2246. The Determination required,

1

among other things, that YCWA develop and file with FERC by December 29, 2011 (90 days from the date of the Determination) a modified plan for Study 6.1, Riparian Habitat Upstream of Englebright Reservoir Study (Study). The Determination also required YCWA to consult with the Forest Service, USFWS, NMFS, CDFG and FWN regarding at least parts of the Study, providing them 30 days to review the draft Study plan, and include evidence of consultation in YCWA's final plan filed with FERC.

On December 8, 2011, FERC issued two letters, each which pertained to the Study at least in part. One of the letters provided details on how the Study should be modified, including specific wording to include in the modified Study. The second letter revised the schedule for filing of the final Study with FERC from December 29, 2011 to March 8, 2012 (70 days from the date of the December 8 letter).

Attached to this e-mail for your review are two files: 1) a draft Study 6.1, Riparian Habitat Upstream of Englebright Reservoir Study, excluding Attachment 6-1A, in Microsoft Word™ format; and 2) Attachment 6-1A (maps) to the draft Study in \*.PDF format. We would appreciate your written comments on the draft Study plan no later than close of business on February 7, 2012, 30 days from the date of this e-mail.

We will address your written comments in the Study plan that we file with FERC, and attach your written comments to the Study plan we file. We may call you if we have any questions regarding your comments to be sure we understand them or to reconcile differences.

Note that some other studies for which FERC's Determination required YCWA to consult with agencies are in development and we will transmit our draft of those studies to you when they are available.

Let us know if there is anything we can do to facilitate your review.

If you have any questions about this e-mail, please contact Jim Lynch.

Curt Aikens

General Manager

Yuba County Water Agency

530-741-6278 x115

This e-mail sent on behalf of the above party by:

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# **ATTACHMENT 6-1D**

YCWA's Reply to Written Comments

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Flood Control • Water Supply • Fishery Enhancement • Recreation • Hydro Electric Generation



February 13, 2012

**Electronically Transmitted** 

John Wooster United States Department of Commerce National Marine Fisheries Service 650 Capitol Mall, Suite 5-100 Sacramento, CA 95814

Subject:Yuba River Development Project<br/>FERC Project No. 2246-058<br/>Reply to Comments on YCWA's<br/>Revised Study 6.1, Riparian Habitat Upstream Of Englebright Reservoir

Dear Mr. Wooster:

On September 30, 2011, the Federal Energy Regulatory Commission's (FERC) Director of the Office of Energy Projects (Director) issued a Study Plan Determination (Determination) related to Yuba County Water Agency's (YCWA) relicensing of its Yuba River Development Project, FERC Project 2246.

The Determination required, in part, that YCWA modify its proposed Study 6.1, Riparian Habitat Upstream Of Englebright Reservoir (Study) and file the modified Study with FERC within 90 days of the date of FERC's letter (i.e., by December 29, 2011), allowing at least 30 days for comment by agencies. The Determination required YCWA include in its filing copies of agency's comments, a discussion of how comments were addressed, and reason for not adopting any agency recommendations.

In its December 8, 2011 Study Plan Modification, FERC directed YCWA to make additional modifications to the Study, and in another letter dated December 8, 2011, FERC amended the deadline to March 8, 2012 for YCWA to file its modified Study.

YCWA modified the Study as directed by the Determination and, on January 8, 2012, provided the draft modified Study for 30-day review and comment to the United States Department of Agriculture, Forest Service (Forest Service); United States Department of Interior, Fish and Wildlife Service (USFWS); United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS); California Department of Fish and Game (CDFG); State Water Resources Control Board (SWRCB); and Foothill Water Network (FWN).

1220 F Street • Marysville, CA 95901-4226 • 530.741.6278 • Fax: 530.741.6541 www.ycwa.com Mr. Wooster February 13, 2012 Page 2 of 3

The Forest Service and NMFS each provided comments in e-mails dated February 3 and February 7, 2012, respectively. USFWS, CDFG, SWRCB and FWN did not provide written comments.

Provided below is YCWA's reply to NMFS's single comment regarding the draft modified Study. For ease of reference, YCWA has duplicated the comment and then provided its reply indicating whether YCWA has adopted the comment, adopted the comment with modification, or did not adopt the comment.

YCWA files this letters with FERC as part of the revised Study.

#### COMMENT AND REPLY

**<u>NMFS-1</u>**: "In reviewing the latest draft of YCWA's Study Plan 6.1 Riparian Habitat Upstream of Englebright Reservoir, a question arose pertaining to determining the need for a second year study for modeling seed germination related to flows. You may recall that FERC put forth in the original determination that a need for this modeling would be determined following first year study results, and then as a group we came up with some data/information to be used for determining the potential need. I have assumed all along that the evaluation of this need would be done collectively: stakeholders/agencies, FERC, and YCWA. However, as I read the revised 6.1 Study Plan, this is not entirely clear or expressly stated.

Below I paste the only text from the Study Plan 6.1 pertaining to this decision (pg 11), without any mentioning of who will be doing the examining / identifying if there is a concern / or determining if there is a need: "If seed germination or recruitment is identified as a concern during first year studies, the need for modeling the relationship between flows and germination will be examined."

Also, note there is not any mention under the study-specific consultation section 6.0 of coordinating with RPs pertaining to the assessment of needing this second year modeling study or not.

As such, I think the Study Plan should be modified to explicitly include the RPs in evaluating the first year study results and determining the potential need to do the second year modeling study." (Only comment in February 7, 2012 e-mail from John Wooster, NMFS, to Jim Lynch, HDR)

<u>YCWA's Reply</u>: ADOPTED. YCWA added wording to the study to include consultation with Relicensing Participants regarding the need for second year riparian seed germination study. The addition was made in Section 5.3.3.3 (Information to be Reviewed to Determine if a Focused Study Will be Needed in the Second Study Year to Examine Project Effects on Riparian Vegetation Seed Germination) and in Section 6.0 (Study-Specific Consultation). YCWA will provide germination and recruitment data to Relicensing Participants 1 month prior to the issuance of the Initial Study Report, and consult with Relicensing Participants. If, based on the information, YCWA and Relicensing Participants collaboratively agree seed germination or recruitment is identified is a concern, the need for modeling the relationship between flows and

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germination will be examined. The results of the collaboration, including a proposal for a second year study if collaboratively agreed to, will be included in the Initial Study Report.

If you have any questions regarding this matter, please contact me

Sincerely, YUBA COUNTY WATER AGENCY

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Curt Aikens General Manager

cc:

Alan Mitchnick – FERC DC Ken Hogan – FERC DC

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**Electronically Transmitted** 

February 13, 2012

Tom Quinn Forest Supervisor United States Department of Agriculture, Forest Service Tahoe National Forest 631 Coyote Street Nevada City, CA 95959-2250

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YCWA modified the Study as directed by the Determination and, on January 8, 2012 provided the draft modified Study for 30-day review and comment to the United States Department of Agriculture, Forest Service (Forest Service); United States Department of Interior, Fish and Wildlife Service (USFWS); United States Department of Commerce, National Oceanic and

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Atmospheric Administration, National Marine Fisheries Service (NMFS); California Department of Fish and Game (CDFG); State Water Resources Control Board (SWRCB); and Foothill Water Network (FWN).

The Forest Service and NMFS each provided comments in e-mails dated February 3 and February 7, 2012, respectively. USFWS, CDFG, SWRCB and FWN did not provide written comments.

Provided below is YCWA's reply to the Forest Service's five comments regarding the draft modified Study. The comments were included to the Forest Service's February 3 e-mail as Track Changes to the draft modified Study. For ease of reference, YCWA has duplicated the comment and then provided its reply indicating whether YCWA has adopted the comment, adopted the comment with modification, or did not adopt the comment.

YCWA files this letters with FERC as part of the revised Study.

#### COMMENTS AND REPLIES

<u>USFS-1:</u> Following the bullet "Vegetation transects with nested plots:" "*I would add plnt species wetland status and trend. The proportion of wetland indicator plant species on the transects will help a lot in determining if the hydrology of the sites is being maintained.*" (Page 8 of 18)

<u>YCWA's Reply</u>: ADOPTED. YCWA has modified the study plan to include the wetland status and trend of plant species identified within vegetation transect plots (page 8).

**USFS-2:** Following the bullet "Vegetation transects with nested plots:" "*I wonder if the study will actually measure germination? Seems like the study is measuring recruitment, not germination.*" (Page 8 of 18)

<u>YCWA's Reply</u>: NOT ADOPTED. YCWA agrees that the measurement of seed germination is not being proposed in the first year study methods. However, the vegetation transect plots provide germination presence/absence information, as both germinating seedlings and recruits occurring within vegetation plots will be recorded. Second year studies directly studying germination will be proposed if problems with germination (e.g., lack of germination and/or recruits) are evident. See Section 5.3.3.3 for details on focused seed germination study in the second year. YCWA corresponded via e-mail with Kathy Van Zuuk, the botanist from the Tahoe National Forest, regarding the reasoning for YCWA not adopting the Forest Service's proposal, and YCWA believes agreement was reached.

**USFS-3:** Following the bullet "riparian vegetative and hydrologic connectivity (or lack of):" "*I would add here that the study will measure the status and trend of wetland indicator plants*" (Page 9 of 18)

<u>YCWA's Reply</u>: ADOPTED. YCWA has modified the study plan at page 9 to measure the status and trend of wetland indicator plant species identified within vegetation transect plots.

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**USFS-4:** Following the first paragraph in Section 5.3.3.1: "*This is not clear to me. Does this mean that only wetland indicator species will be sampled. Riparian vegetation and wetland indicator species are two separate concepts. It would be best if all vascular plant species are noted and cover estimates made for each. That way, the trend in wetland indicator species can be estimated.*" (Page 9 of 18)

<u>YCWA's Reply</u>: ADOPTED. YCWA agrees that riparian and wetland vegetation are separate concepts, but also recognizes the value of using wetland indicator species as identified by the *National List of Plant Species that Occur in Wetlands: California (Region 0)* (Reed 1988) to identify areas that support hydrophytic plants. YCWA has added wording to the study plan on page 9 to clarify that additional references may be utilized to identify riparian species and that all vascular plant species located within the vegetation plots will be sampled, with cover estimates made for each.

**USFS-5:** Following the bullet "Dominant species cover in percent:" "Not clear to me. Does this mean that only dominant plant species will be sampled? Or will all vascular plant species be sampled?" (Page 9 of 18)

<u>YCWA's Reply</u>: ADOPTED. YCWA has changed the study plan wording at page 9 to indicate that all vascular plant species located within the vegetation plots will be sampled, with cover estimates made for each.

If you have any questions regarding this matter, please contact me

Sincerely, YUBA COUNTY WATER AGENCY

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Curt Aikens General Manager

cc:

Alan Mitchnick – FERC DC Ken Hogan – FERC DC

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