Study 7.10

INSTREAM FLOW DOWNSTREAM OF ENGLEBRIGHT DAM

November 2010

1.0 Project Nexus

Yuba County Water Agency's (Licensee or YCWA) continued operation and maintenance (O&M) of the existing Yuba River Development Project (Project) has a potential to affect Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) habitat in the Yuba River downstream of the United States Army Corps of Engineers' (USACE) Englebright Dam.[1]

Regarding *O. mykiss*, the physical appearance of adults and the presence of seasonal runs and year-round residents indicate that both sea-run (steelhead) and resident rainbow trout exist in the Yuba River downstream of USACE's Englebright Dam. Thus, it is recognized that both anadromous and resident lifehistory strategies of *O. mykiss* have been and continue to be present in the river, resulting in the use of the term "steelhead/rainbow trout" when referring to *O. mykiss* in this study proposal.

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

[Relicensing Participants - This section is a placeholder in the Pre-Application Document (PAD). Section 5.11(d)(2) of 18 CFR states that an applicant for a new license must in its proposed study *"Address any known resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied."* During 2010 study proposal development meetings, agencies advised License that they would provide a brief written description of their jurisdiction over the resource to be addressed in this study. If provided before Licensee files its Proposed Study Plan and Licensee agrees with the description, Licensee will insert the brief description here stating the description was provided by that agency. If not, prior to issuing the Proposed Study Plan, Licensee will describe to the best of its knowledge and understanding the management goals of agencies that have jurisdiction over the resource addressed in this study. Licensee]

3.0 Existing Information and Need for Additional Information

The Yuba River downstream of Englebright Dam is one of the more thoroughly studied rivers in the Central Valley of California. A considerable amount of information associated with flow-habitat relationships for steelhead/rainbow trout and Chinook salmon is available from

[1] Englebright Dam was constructed by the California Debris Commission in 1941, is owned, operated and maintained by the United States Army Corps of Engineers; and is not included as a Project facility in FERC licenses for the Yuba-River Development Project.

previously conducted studies dating back to the late 1980s. Current information from ongoing data collection, monitoring, and evaluation activities, particularly from the Yuba Accord M&E Program (M&E Program) addressing salmonid populations and physical habitat conditions in the lower Yuba River downstream of the Englebright Dam is presently or will soon be available for the conduct of this study. The information currently available includes, but is not limited to:

- Topographic and geologic maps, including a digital elevation model (DEM) of the Yuba River downstream of USACE's Englebright Dam (M&E Program 2010)2
- Hydrologic modeling and statistics for the Yuba River (YCWA 2007)
- Operations procedures for Project facilities (YCWA 2009)
- PHABSIM habitat modeling of the Yuba River conducted by Beak Consultants for the California Department of Fish and Game, or CDFG (Beak 1989)
- Two-dimensional hydrodynamic habitat modeling (River2D) of the Yuba River conducted by the U.S. Fish and Wildlife Service, or USFWS (Gard 2007; 2008)
- Two-dimensional hydrodynamic modeling (SRH-2D) of the Yuba River by the University of California at Davis for the River Management Team (M&E Program 2010)
- Low-altitude aerial video of the Yuba River (YCWA 2009)
- Spatial and temporal abundance and distribution of steelhead/rainbow trout and Chinook salmon adult spawning (Beak 1989; M&E Program 2010)
- Spatial and temporal abundance and distribution of steelhead/rainbow trout and Chinook salmon juvenile rearing (Beak 1989; Kozlowski 2004)
- Fall-run Chinook salmon redd observations (n=154) in the Yuba River by Beak Consultants used to develop site-specific spawning habitat suitability criteria (HSC) (Beak 1989)
- Spring-run Chinook salmon (n=168), fall-run Chinook salmon (n=870) and steelhead/rainbow trout redd (n=184) observations in the Yuba River by the USFWS used to develop site-specific spawning HSC (Gard 2007; 2008)
- Spring-run and fall-run Chinook salmon and steelhead/rainbow trout redd observations in the Yuba River by the RMT (M&E Program 2010)
- Chinook salmon fry (n=180) and juvenile (n=500) rearing observations in the Yuba River by Beak Consultants used to develop site-specific HSC (Beak 1989)
- Spring-run and fall-run Chinook salmon fry (n=178) and juvenile (n=39) and steelhead/rainbow trout fry (n=195) and juvenile (n=74) rearing observations in the Yuba River by the USFWS used to develop site-specific HSC (Gard 2008)

Information from ongoing data collection, monitoring, and evaluation activities, particularly from the Yuba Accord M&E Program (M&E Program) addressing salmonid populations and physical habitat conditions in the Yuba River downstream of Englebright Dam that will be available for the conduct of this study includes, but is not limited to:

[2] M&E Program documents and work products are located at the River Management Team web site, www.yubaaccordrmt.com.

- Hydrologic water balance/operations model of the Yuba River (Relicensing Study Proposal 2.2)
- Water temperature simulation model of the Yuba River (Relicensing Study Proposal 2.6)
- Substrate and cover classification maps of the Yuba River downstream of USACE's Englebright Dam to characterize microhabitat and mesohabitat conditions (M&E Program).
- Mesohabitat classification map of the Yuba River (M&E Program)
- Chinook salmon and steelhead/rainbow trout redd observations in the Yuba River by the RMT to develop site-specific spawning HSC (M&E Program)
- Chinook salmon and steelhead/rainbow trout redd observations in the Yuba River by YCWA to develop site-specific spawning HSC (YCWA)
- Spring/fall-run Chinook salmon and steelhead/rainbow trout fry and juvenile rearing observations in the Yuba River by the RMT used to develop site-specific HSC (M&E Program)
- Spatial and temporal distributions of steelhead/rainbow trout, spring-run and fall-run Chinook salmon in the Yuba River by the RMT (M&E Program)

At this juncture two habitat modeling studies exist for Chinook salmon and steelhead/rainbow trout for the Yuba River downstream of Englebright Dam; plus additional detailed hydraulic model, habitat and usage data exist to compile a third habitat modeling analysis.

4.0 Study Goals and Objectives

The goal of the study is to evaluate steelhead and Chinook salmon habitat as a function of flow in the Yuba River downstream of the Englebright Dam.

The objectives of the study include: 1) estimate the habitat index versus flow relationships (Weighted Usable Area, or WUA) using hydraulic and habitat models for Chinook salmon and steelhead/rainbow trout in the Yuba River downstream of Englebright Dam; 2) use WUA-flow relationships and the hydrologic record to develop habitat duration of fish habitat over time under the existing operational scenario (i.e. Yuba Accord flow schedules) and other comparative scenarios; and 3) provide a quantitative basis and create a technical rationale for evaluating alternative flow scenarios.

5.0 Study Methods and Analysis

5.1 Study Area

For the purpose of this study, the study area includes the Yuba River from Englebright Dam to USACE's Daguerre Point Dam.

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), USFWS, SWRCB 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.
- 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 (i.e., no effort in addition 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) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, and invasive invertebrates (e.g. zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: 1) 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 Study Methods

[Relicensing Participants – Licensee believes that sufficient information generally exists to develop flow-habitat relationships for the Yuba River downstream of Englebright Dam without the undertaking of a complete new hydraulic and habitat model development study effort. Licensee proposes to work with Relicensing Participants to evaluate existing information and past study work, identify the strongest elements of the existing work, and develop flow-habitat relationships for Chinook salmon and steelhead/rainbow trout based on the existing information in the Yuba River downstream of Englebright Dam. Additional data gathering may be useful, and will be identified. Licensee is committed to developing a habitat/flow relationship for Chinook salmon and steelhead/rainbow trout in the Yuba River downstream of Englebright Dam to the extent necessary to support Relicensing, and intends to discuss methods and analysis with Relicensing Participants and include in Licensee's Proposed Study Plan a detailed study proposal for an Instream Flow Downstream of Englebright Dam. Licensee]

6.0 Study Proposal Consultation

[Relicensing Participants – To be completed. Licensee]

7.0 Schedule

[Relicensing Participants – To be completed. However, Licensee expects the study to begin in October 2011 following FERC's Study Determination and be completed by October 2012, when Licensee files with FERC its Initial Study Report. Licensee]

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

[Relicensing Participants – To be completed. Licensee]

9.0 Level of Effort and Cost

[Relicensing Participants – YCWA will include a cost range estimate for this study in its Proposed Study Plan. Licensee]

10.0 References Cited

[Relicensing Participants – To be completed. Licensee]

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