Study 7.12

PROJECT EFFECTS ON FISH FACILITIES ASSOCIATED WITH DAGUERRE POINT DAM[1]

May 2012

1.0 Project Nexus

Yuba County Water Agency's (Licensee or YCWA) continued operation and maintenance of the existing Yuba River Development Project (Project) has a potential to affect the functioning of two existing fish ladders associated with the United States Army Corps of Engineer's (USACE) Daguerre Point Dam,[2] which is located at River Mile 11.2[3] on the Yuba River, and a fish screen at the existing Hallwood-Cordua Diversion, which is located upstream of Daguerre Point Dam. In this study, the fish ladder and fish screen are collectively referred to as the "fish facilities."

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

YCWA believes that five agencies, at least in part, have jurisdiction over the fish facilities that cold be affected by the Project: 1) USACE; 2) United States Department of Interior, Fish and Wildlife Service (USFWS); 3) United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS); 3) California Department of Fish and Game (CDFG); and 4) State Water Resources Control Board, Division of Water Rights (SWRCB). Each of these agencies and their jurisdiction and management direction, as understood by YCWA at this time, is discussed below.

USACE

USACE has ultimate authority over Daguerre Point Dam and its associated fish ladders.

[1] Yuba County Water Agency's (Licensee or YCWA) YCWA's August 2011 Revised Study Plan did not include a study to investigate the effects of the Project on the existing Daguerre Point Dam's or Hallwood-Cordua's fish facilities. In its September 30, 2011 Study Determination, FERC stated: "*… we recommend that YCWA provide an analysis, utilizing existing and available information, on the potential for the Yuba River Project to affect fish passage conditions at Deguerre* [sic] *Point dam, and on the Hallwood-Cordua diversion screens (study criteria 4). Specifically, the analysis should consider how operation of the Narrows II powerhouse, including flow timing, magnitude, duration, and rate of change, may affect the fish facilities at Daguerre Point dam. The study should be developed after consultation with, NMFS, Cal Fish and Game, the Water Board, and FWS, and the U.S. Army Corps of Engineers and filed for Commission approval. The specific parameters sought in Request Element #8 would be appropriate to investigate to the extent that they are influenced by operations at the Narrows II powerhouse. As such, we recommend, that YCWA include this investigation in its analysis, if it identifies any potential project effects on fish facilities at DeGuerre Point dam.*" (Appendix A, p 42.) March 8, 2012, YCWA submitted a modified Study plan. On May 14, 2012, FERC approved the modified Study with additional modifications. This Study incorporates FERC's additional modifications.

[2] Daguerre Point Dam was constructed in 1906 by the California Debris Commission, and is owned, operated and maintained by USACE. The dam is discussed in more detail in Section 4.2 of this Study plan.

[3] River miles (RM) were calculated using the National Hydrography Dataset (NHD) GIS data. River miles start at the confluence of the Yuba River with the Feather River (RM 0.0) and move upstream in the Yuba River.

USFWS
USFWS' jurisdiction and goals and objectives are described by USFWS on pages 1 through 3 of USFWS' March 7, 2011 letter to FERC that provided USFWS' comments on YCWA's Pre-Application Document (PAD) (YCWA 2010). USFWS' jurisdiction, goals and objectives are not repeated here.

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

CDFG
CDFG's jurisdiction is described by CDFG on page 1 of CDFG's March 2, 2011 letter to FERC providing CDFG's comments on YCWA's PAD. CDFG's goal, as described on page 2 of CDFG's letter is to preserve, protect, and as needed, to restore habitat necessary to support native fish, wildlife and plant species.

SWRCB
SWRCB has authority under the federal Clean Water Act (33 U.S.C. §11251-1357) to restore and maintain the chemical, physical and biological integrity of the Nation's waters. Throughout the relicensing process the SWRCB maintains independent regulatory authority to condition the operation of the Project to protect water quality and the beneficial uses of stream reaches consistent with Section 401 of the federal Clean Water Act, the Regional Water Quality Control Board Basin Plans, State Water Board regulations, CEQA, and any other applicable state law.

3.0 Study Goals and Objectives

The goal of this study is to analyze if operation of the Project's Narrows 2 Powerhouse, including flow timing, magnitude, duration, and rate of change, affects the fish facilities and, if so, how.

4.0 Existing Information and Need for Additional Information

4.1 Project Operations

Water storage and management by the Project on the Yuba River first occurs at New Bullards Bar Reservoir, located 2.3 miles upstream of the North Yuba River's confluence with the Middle Yuba River, and also occurs downstream at USACE's Englebright Reservoir,[4] which is located at river mile (RM) 23.9 on the Yuba River - 41.9 miles downstream of New Bullards Bar Reservoir and 12.7 miles upstream of Daguerre Point Dam. Our House Dam diverts water from the Middle Yuba (with a maximum capacity of 860 feet [ft]) into the Lohman Ridge Diversion

[4] Englebright Dam was constructed by the California Debris Commission in 1941, is owned, operated and maintained by the USACE; and is not included as a Project facility in FERC licenses for the Yuba River Development Project.

Tunnel, which has its outlet on Oregon Creek, just above the Log Cabin Diversion Dam. Log Cabin Diversion Dam diverts some of the combined flows of Lohman Ridge Tunnel and Oregon Creek (with a maximum capacity of 1,100 cubic feet per second [cfs]) into New Bullards Bar Reservoir via the Camptonville Diversion Tunnel. Englebright Dam is the upstream terminus for accessible habitat of anadromous salmonids in the Yuba River basin. Water may spill over Englebright Dam, which has no outlets; be released from Pacific Gas and Electric Company's (PG&E) 12 megawatt (MW) Narrows 1 Powerhouse, which has a maximum release capacity of 730 cfs; be released from the Project's 50 MW Narrows 2 Powerhouse, which has a maximum capacity of 3,400 cfs; or be released from the Project's Narrows 2 Powerhouse Bypass, which has a capacity of 3,000 cfs and is used to provide flow during emergencies and outages. Currently, YCWA and PG&E coordinate the operations of Narrows 1 and 2 powerhouses for hydropower efficiency and to maintain relatively constant flows in the lower Yuba River (LYRA 2007). The Narrows 1 Powerhouse typically is used for low-flow reservoir releases (< 730 cfs), or to supplement the Narrows 2 Powerhouse capacity during high flow reservoir releases.

Annual maintenance requires the Narrows 2 Powerhouse to be shut down for a 2- to 3-week period, which may be extended if major maintenance is performed. Maintenance is typically scheduled for the beginning of September or during the winter months.

4.2 Daguerre Point Dam and Associated Fish Ladders

The California Debris Commission began construction of the original Daguerre Point Dam in 1904 as part of the later Yuba River Debris Control Project (USACE 2001). The dam is located in a cut above and to the north of the original Yuba River channel. The bedrock under Daguerre Point Dam is a portion of the Daguerre Point Terrace, a feature that facilitated the construction of a low dam at a relatively low cost (USACE 2011). Over the next few years, the cut through Daguerre Point was completed and a concrete inlet wall, or spillway, was constructed. Cobble training walls extending about 12,000 ft on each side of the river below the cut were built. The entrance gates to the settling basin were constructed, most of its enclosing levees were built, and the outlet works were practically completed when this part of the dam was found no longer necessary and was abandoned under authority of the River and Harbor Act of June 25, 1910. The land acquired for the settling basin, together with the intake and outlet works, was then sold.

While dam construction was completed in May 1906, the river was not diverted over the dam until 1910 (USACE 2007). The dam rapidly filled to capacity with sediment and debris that moved downstream during flooding in 1911 (Hunerlach et al. 2004). The result is that the dam has held back millions of cubic yards of mining debris which would otherwise have passed into the navigable channels of the Feather and Sacramento Rivers (USACE 1981). Since the cessation of upstream hydraulic mining operations, Daguerre Point Dam has retained the debris stored behind the dam and prevented it from being washed into the Feather and Sacramento Rivers to the detriment of associated navigation and flood control facilities. The dam is not intended for, nor does it provide for, the control of floods (USACE 2001).

The current configuration of Daguerre Point Dam is a reinforced, overflow concrete ogee ("s-shaped") spillway with concrete apron and concrete abutments. The ogee spillway section is 575 ft wide and 25 ft tall (NMFS 2007). There is no reservoir associated with the dam.

Fish ladders were added to Daguerre Point Dam in 1911 to permit salmon and steelhead access upriver to the seasonal spawning areas. However, the ladders were quickly destroyed by floods, and have been redesigned and rebuilt numerous times.[5] Currently, the dam has two associated fish ladders that were constructed by USACE and CDFG, each ladder with a control gate. The ladders are composed of step-wise concrete bays on either side of the dam. The ladders are designed for salmonid fish passage and are monitored with infrared VAKI Riverwatcher scanners during critical salmonid migration periods. USACE's Daguerre Point Dam Operations and Maintenance Manual requires that the ladders be physically closed when water elevations reach 130 ft, or when flows are slightly less than 10,000 cfs (SWRCB 2003), and be kept closed until the water recedes to an elevation of 127 ft (CALFED and YCWA 2005). However, USACE is collaborating with resource agencies to improve salmonid fish passage and current operational practices keep the ladders open at water elevations higher than 130 ft and reopen the ladders before the water elevation recedes to 127 ft.

Management of the existing fish ladders is a coordinated effort amongst several parties. CDFG has removed large woody material that may clog the ladders. USACE clears sediment at the tops of and exits from the fish ladders. In addition, the Cordua Irrigation District works with USACE, NMFS, CDFG and USFWS to determine timing and placement of flashboards installed along the Daguerre Point Dam spillway during important migration periods. The increased water elevations that result with flashboard placement have been shown to dramatically improve fish recognition of ladders and passage rates overall. The flashboards are removed following adult salmonid passage periods.

Figures 4.2-1 and 2 show the existing Daguerre Point Dam fish ladders.

[5] Fish ladders were reconstructed by the State of California after flood washouts in 1942, 1949, 1952, 1954 and 1964 (USACE 2005).

Figure 4.2-1. North fish ladder at Daguerre Point Dam (photo by D. Simodynes, October 9, 2009).

Figure 4.2-2. South fish ladder at Daguerre Point Dam.

4.3 Hallwood-Cordua Fish Screen

The Hallwood-Cordua Diversion, a gravity flow diversion facility located on the north bank of the lower Yuba River just above Daguerre Point Dam, has a diversion capacity of 625 cfs (SWRCB 2001).

The diversion was originally screened in 1972, and the original screen was modified in 1977 (CALFED and YCWA 2005). The original screen was located in the North Canal about 0.25-mile downstream from the river diversion, and utilized V-shaped perforated plate screen construction. A bypass system diverted fish captured by the screen into a collection tank, and the collected fish were returned to the Yuba River either through a pipeline or by truck (SWRCB 2001). The original screen was operated by CDFG for intermittent periods during the Chinook salmon juvenile emigration period of April through June (SWRI et al. 2000).

The design and operation of the original screen, as modified, resulted in the loss of significant numbers of fish (SWRCB 2001). During some years, the fish screen was not operated at all, which resulted in occasions when reportedly up to a million juvenile salmonids were entrained in the diversion (CALFED and YCWA 2005). When operational, the screen was reported to be effective in preventing the entrainment and impingement of juvenile salmonids, but salmonid losses reportedly did occur as a result of predation in the intake channel between Daguerre Point Dam and the screen. In addition, predation resulted from the removal of the screen by CDFG during the emigration period of juvenile steelhead (YCWA et al. 2000).

In 2001, the modified original fish screen was replaced with the existing fish screen that more closely conforms to CDFG and NMFS fish screening criteria. This screen is at the same location as the original screen, but has more appropriate-sized openings and sweeping and approach velocities to facilitate direct return of screened fish back to the river below Daguerre Point Dam. Additionally, the existing fish screen is operated for the entire diversion season (NMFS 2002). Rehabilitation efforts included the installation of the proper-sized screening material and continuous operation of the screen throughout the irrigation season along with the direct return of screened fish back to the river below the dam (NMFS 2007).

Figure 4.3-1 shows the existing Hallwood-Cordua Diversion fish screen.

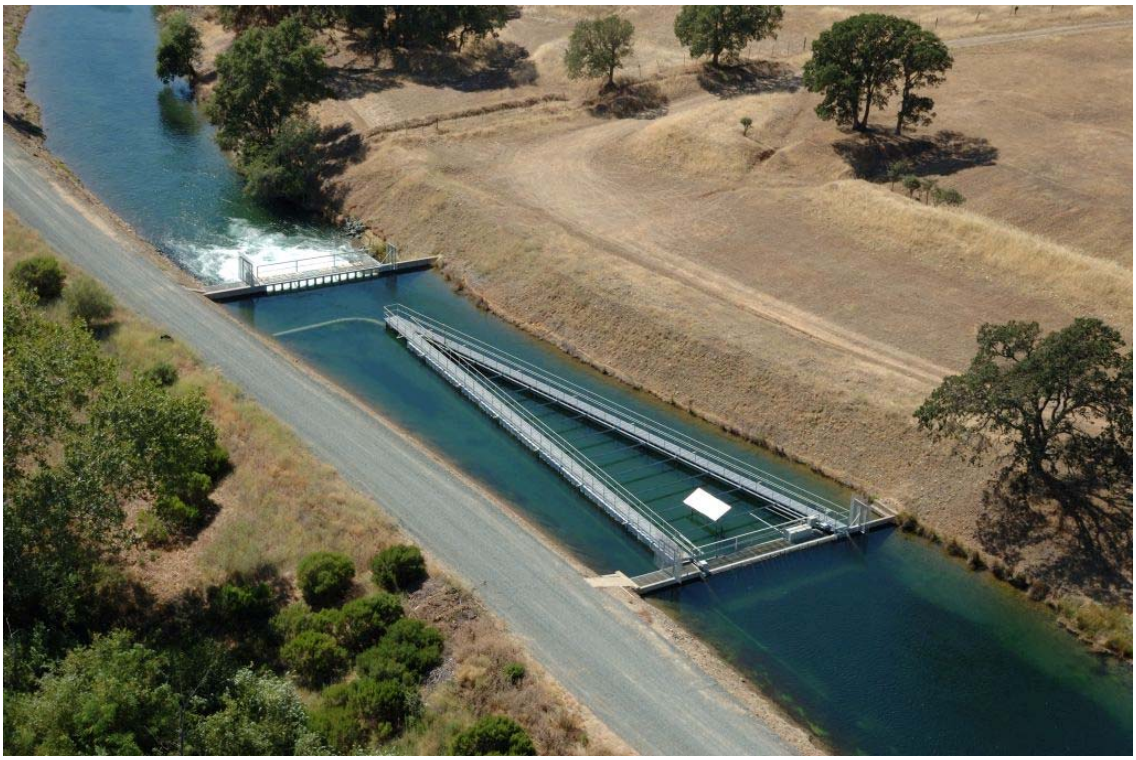

Figure 4.3-1. Hallwood-Cordua Diversion fish screen.

4.4 Browns Valley Irrigation District Pumpline Diversion Facility[6]

Browns Valley Irrigation District (BVID) maintains a screened diversion upstream of all other proximal Daguerre Point Dam diversion facilities. The facility resides on a small channel that runs parallel to the main channel and rejoins after approximately 4,000 ft. The facility is composed of a fish screen, a diversion lagoon, and a pumping station. The diversion lagoon is approximately 250 ft long by 70 ft wide. The facility is rated for diverting up to 65 cfs and BVID is under contract with YCWA to have up to 9,500 acre-feet of water during the months of April to August. The fish screen was installed in and became operational in April 1999.

A gabion and steel structure supports the actual fish screens. The structure is anchored by 12 concrete-filled steel posts drilled into bedrock with steel members welded to those posts. The structure's abutments are rock-filled gabions, with three rows at the base of the abutment tapering up to one row at the top. The abutments are keyed into the gravel banks adjacent to the structure. The surface of the gabion abutments facing the diversion channel is coated with gunite.

[6] FERC's May 14, 2012 Determination stated "*Study 7.12 should be modified to include an evaluation of how the project's operation may affect all downstream fish facilities/screens associated with the DaGuerre Point dam complex; including the South Yuba/Brophy and the Browns Valley diversions' fish screens.*" (p. 13). The Study has been modified to include an assessment of the Browns Valley diversion fish screen.

The screen is composed of fish screen frames and panels, six vertical approach-velocity control flow baffles, and a screen cleaning system (sweeper arm). The fish screen frames consist of a 1/8–inch (in)-thick stainless steel plate that occupies approximately the top section of the frame and a profile bar screen panel made of stainless steel wedge wire that measures about 81 in by 51 in and occupies approximately the bottom section of the frame. The fish screen panels have slotted openings approximately 1.75 millimeters wide. The openings in each screen panel comprise approximately 43 percent of each screen's surface. The fish screen frames slide into guide rails on the diversion-channel side of the fish screen structure and are held in place by gravity. There are 10 fish screen frames on the diversion-channel side of the fish screen structure.

Figure 4.4-1. BVID Pumpline Diversion Facility.

4.5 South Yuba-Brophy Irrigation Diversion[7]

The South Yuba-Brophy Irrigation Diversion is located proximally above Daguerre Point Dam opposite the Hallwood-Cordua Diversion. The diversion headworks consist of an intake channel and bypass channel, a porous rock gabion fish screen, a diversion pond (approximately 1 acre in

[7] FERC's May 14, 2012 Determination stated "*Study 7.12 should be modified to include an evaluation of how the project's operation may affect all downstream fish facilities/screens associated with the DaGuerre Point dam complex; including the South Yuba/Brophy and the Browns Valley diversions' fish screens.*" (p. 13). The Study has been modified to include an assessment of the South Yuba-Brophy diversion fish screen.

size) behind rock gabion wall, and an irrigation canal. The rock gabion is approximately 300 ft long and is 30 ft wide at its base narrowing to 10 ft wide at the top.

Water flows into the small side channel where it can be diverted through the gabion or flow through the channel back into the mainstem. Water entering the diversion pool percolates through the porous cobble-sized rock held together by mesh. Water can be released into the main irrigation canal through 5 ft diameter pipes, which is regulated by a gate at the head of each pipe. The pipe extends approximately 600 ft underground to the main irrigation canal.

Figure 4.5-1. View of the South Yuba-Brophy Irrigation Diversion.

5.0 Study Methods and Analysis

5.1 Study Area

The study area is the Yuba River in the vicinity of the fish facilities.

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, NMFS, 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. 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.[8]
- 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 focused study (i.e., 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) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, Didymosphenia geminate algae, and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: 1) between tributaries and mainstem reaches; 2) between basins (e.g., Middle Yuba River, Yuba River, and North Yuba River); and 3) between isolated wetlands or ponds and river or stream environments.

[8] The Forest Service and CDFG each requested that a copy of the GIS maps be provided to them when the maps are available.

5.3 Methods[9]

The assessment of Project effects on the fish facilities will be completed in a phased approach. Phase 1 will be composed of a desktop analysis supported by existing information and Phase 2, if warranted after completion of Phase 1, will be a field assessment. Phase 2 will be implemented if any Project effects on the fish facilities are found in Phase 1.

5.3.1 Phase 1 – Desktop Assessment

Phase 1 will be composed of a desktop assessment to review existing data relevant to Project operations and the potential impact to the fish facilities. Phase 1 of the study will be completed in five steps, each of which is described below.

Note that the purpose of Phase 1 is to determine if the Project has an adverse effect on the efficiency or operating periods of the fish facilities as designed. The purpose of Phase 1 is not to perform an assessment of the efficiency of the fish facilities (e.g., Can the design be improved? Are the fish facilities operating properly?), but only to assess the effects of project operations on the functioning of the existing facilities.

5.3.1.1 Step 1 – Collection and Review of Existing Data

Existing and available operations data will be collected for Englebright Dam, Narrows 1 Powerhouse, Narrows 2 Powerhouse, Daguerre Point Dam fish ladders, and the Hallwood-Cordua Diversion fish screen, South Yuba-Brophy Diversion and Browns Valley Diversion as well as hydrologic data from tributary streams not affected by the project which may contribute to actual flows arriving at the Daguerre Point Dam and nearby facilities. Fisheries data identifying run timing and anadromous salmonid fish presence within the study area will be collected. Existing stage/discharge data will be summarized from data gathered by the River Management Team (RMT). Any other data assessing the performance of the fish facilities will also be sought. Data will be primarily collected from the YCWA's own files and records, but any additional information required will be requested from NMFS, CDFG, USACE, BVID, South Yuba Water District, Brophy Irrigation District, Hallwood Irrigation District, and Cordua Irrigation District.

[9] In its September 30, 2011 Study Determination, FERC stated: "*Specifically, the analysis should consider how operation of the Narrows II powerhouse, including flow timing, magnitude, duration, and rate of change, may affect the fish facilities at Daguerre Point dam.* (Appendix A, p 42). FERC's Determination continued to say "*…we are recommending that YCWA develop a study plan for an analysis of potential project effects on the fish facilities at DaGuerre Point dam. The specific parameters sought in Request Element #8 would be appropriate to investigate to the extent that they are influenced by operations at the Narrows 2 powerhouse. As such, we recommend, that YCWA include this investigation in its analysis, <u>if it identifies any potential project effects on fish facilities at DaGuerre Point dam</u>.* (Appendix A, p 44) (highlight added). The Element #8 parameters are summarized by FERC as "*Specifically, NMFS seeks information on: Temperature profiles through the reservoirs and identification of thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations; Bathymetry profiles through the reservoirs and identification of thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations; and Hydraulic profiles to describe velocity patterns in pools below the dam and upstream near diversion intakes, forebay, fish ladders, and areas near diversion points*." (Appendix A, pp 43 & 44). The methods described in this study comply with FERC's direction.

5.3.1.2 Step 2 – Analysis of Collected Data

The goal of Step 1 will be to provide sufficient data to complete a five-part analysis of hydro operations and anadromous salmonid fish populations from Englebright Reservoir to Daguerre Point Dam that will include:

- Description of the operational relationship, minimum flow requirements, and diversion rates at Englebright Reservoir, Narrows 1 and 2 powerhouses, Hallwood-Cordua Diversion, and Daguerre Point Dam
- Characterization of historic operations at Narrows 2 Powerhouse
- Description of Daguerre Point Dam fish ladder operations and overview of design and design criteria
- Description of Hallwood-Cordua Diversion fish screen operations and overview of design and design criteria
- Characterization and discussion of critical anadromous salmonid life history periods and associated exposure to the fish ladders and fish screen
- Assess the range and extent to which project operation may affect the efficiency of downstream passage routes (e.g., spillway crest and fish ladders) at Daguerre Point Dam
- Establish a stage/discharge relationship from the existing RMT data to describe how operations may influence the efficiency of the downstream fish facilities

The analyses will characterize and describe the operations and of the Narrows 2 Powerhouse relative to other surrounding non-Project activity. The potential effect of the Narrows 2 Powerhouse will be investigated as related to fall-run Chinook salmon, spring-run Chinook salmon, and steelhead, as data is readily available. The analyses will be presented in tables, figures, and described within an analysis of results.

5.3.1.3 Step 3 - Data Quality Assurance/Quality Control

All data generated from analyses during this effort, including both input data and output data, will undergo a quality assurance/quality control procedure, and will be organized in Excel and/or HEC-DSS formats, where applicable.

5.3.1.4 Step 4 – Determine if Phase 2 Is Warranted

YCWA will review the results of the Phase 1 analysis with Relicensing Participants and determine if Phase 2 is warranted (i.e., if phase 1 indicates that the Project has an adverse effect of the efficiency or operating periods on the fish facilities as designed). If YCWA and Relicensing Participants collaboratively agree that Phase 2 is not warranted, YCWA will move to step 5 of phase 1. If YCWA and Relicensing Participants collaboratively agree that phase 2 is warranted, YCWA will move to Phase 2.

5.3.1.5 Step 5 – Prepare Report and Determine If Phase 2 Is Warranted

YCWA will prepare a report summarizing Phase 1 that includes the following sections: 1) Study Goals and Objectives; 2) Methods and Analysis; 3) Results; 4) Discussion; and 5) Description of Variances from the FERC-approved study proposal, if any. The report will summarize the existing and available data in tables, figures, and text in order to characterize historic and expected conditions at the fish facilities based on historic operations.

5.3.1 Phase 2 – Field Assessment

Phase 2 will investigate potential effects identified within the Phase 1 desktop assessment of how the Project may have an adverse effect on the fish facilities as designed. Since the potential effects are unknown at this time, Phase 2 the scope of Phase 2 investigations may include one or more of the following activities,[10] or activities not listed here:

- Temperature profiles through the Daguerre Point Dam impoundment and upstream and downstream of the dam and/or downstream of the Hallwood-Cordua fish screen to identify thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations
- Bathymetry profiles through the Daguerre Point Dam impoundment to identify thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations
- Hydraulic profiles Daguerre Point Dam impoundment and upstream and downstream of the dam and/or downstream of the Hallwood-Cordua fish screen to describe velocity patterns

It is currently expected that, if needed, water temperature profiles would be collected by taking vertical measurements with a Hydrolab (or equivalent hardware), bathymetry measurements would be collected in a pre-established gridded pattern using a boat mounted acoustic depth sounder, and hydraulic profiles would be collected along pre-established transects using an Acoustic Doppler Current Profiler. These are all standard methodologies. However, YCWA will consult with Relicensing Participants to determine the appropriate methods and locations, based on Phase 1 results.

At the conclusion of Phase 2, if performed, YCWA will prepare summarizing Phase 1 and Phase 2 that includes the following sections: 1) Study Goals and Objectives; 2) Methods and Analysis; 3) Results; 4) Discussion; and 5) Description of Variances from the FERC-approved study proposal, if any.

6.0 Study-Specific Consultation

The study includes the following study-specific consultation:

[10] See footnote 6.

- YCWA will consult with NMFS, CDFG, USACE, Hallwood Irrigation District and Cordua Irrigation District to obtain specific information, including design criteria, for the fish facilities (Phase 1, Step 1).
- YCWA will review the results of the Phase 1 analysis with Relicensing Participants and determine if Phase 2 is warranted (i.e., if phase 1 indicates that the Project has an adverse effect of the efficiency of the fish facilities as designed). If YCWA and Relicensing Participants collaboratively agree that Phase 2 is not warranted, YCWA will move to step 5 of Phase 1. If YCWA and Relicensing Participants collaboratively agree that phase 2 is warranted, YCWA will move to Phase 2. (Phase 1, Step 4.)
- YCWA will consult with Relicensing Participants to determine the appropriate methods and locations for Phase 2, based on Phase 1 results (Phase 2).

7.0 Schedule

FERC's December 8, 2011 letter required that YCWA provide a modified study to FERC for approval no later than March 8, 2012. The schedule provided below assumes FERC will approve the modified study no later than mid-March 2012.

Phase 1

Step 1 – Collection and Review of Existing Data..... June – July 2012
Step 2 – Analysis of Collected Data ..... July – August 2012
Step 3 – Data Quality Assurance/Quality Control..... July – August 2012
Step 4 – Determine If Phase 2 Is Warranted.....August 2012
Step 5 – Prepare Phase 1 Report (Assuming Phase 2 Not Warranted).... August – September 2012

Phase 2 (If Warranted)

Identification of Phase 2 Methods ..... August - September 2012
Data Collection ..... September - November 2012
Prepare Phase 1 and 2 Report ..... December 2012 - January 2013

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

The methods presented in this study plan are consistent with other generally accepted scientific study methods concerning anadromous salmonid population assessments, including those conducted by the Resource Agencies in California.

9.0 Level of Effort and Cost

YCWA estimates the cost to complete Phase 1 of this study in 2011 dollars is between $55,000 and $65,000. The scope of Phase 2 is not determined, but could range between $125,000 and $175,000 additional 2011 dollars, if implemented in its entirety. The total for both phases would range from $170,000 to $230,000.

10.0 Attachments

This study plan includes three attachments:

Attachment 7-12A Documentation of Transmittal of Draft Study Plan to USACE, NMFS, USFWS, SWRCB and CDFG for 30-Day Review and Comment

Attachment 7-12B Written Comments from USFWS and CDFG

Attachment 7-12C YCWA's Reply to Written Comments

11.0 References Cited

CALFED and YCWA. 2005. Draft Implementation Plan for Lower Yuba River Anadromous Fish Habitat Restoration. Multi-Agency Plan to Direct Near-Term Implementation of Prioritized Restoration and Enhancement Actions and Studies to Achieve Long-Term Ecosystem and Watershed Management Goals. Prepared by Lower Yuba River Fisheries Technical Working Group. October 2005.

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Lower Yuba River Accord (LYRA). 2007. Environmental Impact Report/Environmental Impact Statement for the Lower Yuba River Accord. Available online: http://www.yubaaccordrmt.com/Yuba%20Accord%20Documents/Forms/AllItems.aspx?RootFolder=%2fYuba%20Accord%20Documents%2fDraft%20EIR%2dEIS%20for%20the%20Proposed%20Lower%20Yuba%20River%20Accord&FolderCTID=&View=%7bB86CA5B0%2d7D95%2d45E5%2dA951%2d795AB3A3A8AF%7d

State Water Resources Control Board (SWRCB). 2001. Decision Regarding Protection of Fishery Resources and Other Issues Relating to Diversion and Use of Water from the Lower Yuba River.

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ATTACHMENT 7-12A

Transmittal of Draft Study Plan to USACE, USFWS, NMFS, SWRCB and CDFG

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Lynch, Jim

From: Lynch, Jim
Sent: Friday, January 20, 2012 5:00 PM
To: 'Daniel_Welsh@fws.gov'; 'ksmith@dfg.ca.gov'; '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)'; 'Doug.Grothe@usace.army.mil'
Cc: 'caikens@ycwa.com'; 'Geoff Rabone'; 'Alan Mitchnick'; 'Kenneth Hogan'
Subject: RE: Yuba Relicensing: Transmittal of Draft Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam, for 30-Day Review Period
Attachments: Study 07-12 - Effects on Dagrerre point Dam Fish Facilities - DRAFT - New Study per FERC 093011 Determination.doc

Doug – Sorry for missing you on the initial e-mail earlier today. See below and feel free to call me if you have any questions.

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

From: Lynch, Jim
Sent: Friday, January 20, 2012 9:24 AM
To: 'Daniel_Welsh@fws.gov'; 'ksmith@dfg.ca.gov'; '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)'
Cc: 'caikens@ycwa.com'; 'Geoff Rabone'; 'Alan Mitchnick'; 'Kenneth Hogan'
Subject: Yuba Relicensing: Transmittal of Draft Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam, for 30-Day Review Period

- YUBA RIVER DEVELOPMENT PROJECT RELICENSING -

Transmittal of Project Effects on Fish Facilities Associated with Daguerre Point Dam Study (Study 7.12) Plan for 30-Day Review Period
- Written Comments due to YCWA by Close of Business on February 20, 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 (90 days from the date of the Determination) a new study to assess Project effects on the fish ladders at Daguerre Point Dam and the Hallwood-Cordua Diversion fish screen. The Determination also required YCWA to consult with the USFWS, NMFS, CDFG and SWRCB regarding 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 a letter that 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 is a draft Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam, in Microsoft Word™ format. We would appreciate your written comments on the draft Study plan no later than close of business on February 20, 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:

2

ATTACHMENT 7-12B

Written Comments from USFWS and CDFG[11]

[11] YCWA did not receive written comments from USACE, NMFS, or SWRCB within the deadline for providing written comments on the draft modified study.

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In Reply Refer To:

FEB 16 2012

Ms. Kimberly Bose, Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, DC 20426

Subject: U.S. Fish and Wildlife Service Comments on Study Plan Determination Modifications for Study 1.2 Channel Morphology Downstream of Englebright Dam, Study 6.2 Riparian Habitat Downstream of Englebright Dam, and Study 7.12 Project Effects on Fish Facilities Associated with Daguerre Point Dam for the Yuba River Hydroelectric Project, Federal Energy Regulatory Commission Project 2246-058; Yuba, Sierra, and Nevada Counties, California

Dear Ms. Bose:

On September 30, 2011, the Director of Energy Projects for the Federal Energy Regulatory Commission (Commission or FERC) issued a Study Plan Determination for the Yuba County Water Agency's (YCWA or Applicant) application for new licensing of its Yuba River Hydroelectric Project, FERC Project 2246-058 (Project). The Determination required, 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 1.2 Channel Morphology Downstream of Englebright Dam, Study 6.2 Riparian Habitat Downstream of Englebright Dam, and a new Study based on NMFS-1, Element #3 and #8, Evaluation of Project Effects on DaGuerre Point Dam's Fish Facilities. The Determination also required YCWA to consult with the U.S. Fish and Wildlife Service (Service or USFWS), the National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), and the California State Water Resources Control Board (SWRCB) regarding at least parts of the aforementioned studies, providing them 30 days to review the draft Study plan modifications, and incorporate or address any resource agency comments into the final plan filed with FERC. By letter filed October 28, 2011, YCWA requested a change in the deadline for filing some of the modified and new study plans, including Studies 1.2, 6.2 and a newly designated 7.12 that was based on NMFS-1(and which was referenced as Study 6.12 in YCWA's request). On December 8, 2011, FERC issued a letter that revised the schedule for filing of the final Study plans with FERC from December 29, 2011 to March 8, 2012 (70 days from the date of the December 8th letter).

As noted above, the Commission's Study Plan Determination required YCWA to allow at least thirty days for agency comment on the proposed modifications to the study plans. The following constitute the Service's comments on the proposed modifications to the above Study Plans. The Service submits these comments and recommendations under the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. § 1531 *et seq.*), the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. § 661 *et seq.*), and the Federal Power Act (FPA) (16 U.S.C. § 791a, *et seq.*).

The information requested will inform the Service and the Commission in determining: (1) the effects of the Project on juvenile rearing of Chinook salmon (*Oncorhynchus tshawytscha*) and steelhead (*O. mykiss*) in the lower river, because Project operations directly affect the amount and quality of rearing habitat available to Chinook salmon and steelhead; and (2) the extent that Project operations impede or otherwise influence upstream and downstream passage of Chinook salmon and steelhead adults and juveniles through the fish facilities at Daguerre Point Dam. The utility of implementing studies 1.2, 6.2, and 7.12 as they are currently described is unclear due to their generally broad goals and objectives and their lack of specificity. The Applicant needs to adequately describe the nexus between Project operations and effects (direct, indirect, and cumulative) on the resource to be studied (18 CFR § 5.11(d)(4)). The Project effects (direct, indirect, and/or cumulative) on in-channel habitat, riparian habitat, and fish passage should be described in further detail in each of the respective studies (18 CFR § 5.11(d)(4)).

Comments on Study Plan Determination Modifications

Study 1.2 – Channel Morphology Below Englebright

General Comment No. 1:

This is a very thorough study that proposes to primarily analyze sediment transport dynamics (i.e., erosion and deposition) over multiple scales. However, the title of Study 1.2: "Channel Morphology Downstream of Englebright Dam," is misleading, as Study 1.2 appears to be primarily focused on sediment transport dynamics as related to the contemporary Project-induced flow regime. Specifically, the study goals and objectives (Section 3.0) only mention "sediment dynamics" (i.e., substrate mobility; particle size distribution for salmonid spawning; spawning gravel distribution) and "spill flow effects on channel morphology in the Yuba River downstream of Englebright Dam" as the primary objectives. Furthermore, under the Study Methods section 5.3, floodplain (through 2D Hydrodynamic modeling), riparian, and large woody material (LWM) are all mentioned as components of the ongoing information collection effort to be utilized in Study 1.2. These processes are fundamental to any "channel morphology study" of a river system (Montgomery and Buffington 1998, Church 2002, Poole 2002, Montgomery and Piegay 2003, Kondolf et al. 2006), especially as they relate to aquatic habitat and fisheries (Schlosser 1991, Maddock 1999, Fausch et al. 2002, Thorp et al. 2006) and should be stated as such up front. However, no mention of any of these analyses is presented within the opening sections and they are not mentioned as specific objectives. Such geomorphological processes are fundamental to the currently stated goal of Study 1.2, which is to "quantify or characterize river form and process in the Yuba River downstream of the Englebright Dam, and

to assess potential impacts to the river form and process due to continued operation of the Project."

If Study 1.2 is to address all the elements of channel morphology, the Service suggests that these processes should be either included as part of the study objectives, or a new objective should be added specifically explaining that a synthesis of Study 1.2 with other studies (e.g., Study 6.2 - Riparian Habitat, Large Woody Material, Substrate and Cover Mapping) will be developed. For clarity purposes, the Service suggests describing these additional elements in more detail in Section 3.0.

General Comment No. 2:

The Applicant needs to adequately describe the nexus between Project operations and effects (direct, indirect, and cumulative) on the resource to be studied (18 CFR § 5.11(d)(4)). The Applicant also needs to further explain the Project effects (direct, indirect, and/or cumulative) on channel morphology downstream of Englebright Dam (CFR 18 § 5.11(d)(4)). The Applicant states that the continued operation and maintenance of the Project has the "potential" to affect channel morphology and fluvial processes but does not elaborate or explain how these processes are important to the various resources (i.e., T&E species, aquatic species, riparian plants, wildlife resources, migratory birds, etc.).

Study 6.2 – Riparian Habitat Below Englebright

General Comments:

We already suspect or know anecdotally and from a few cursory surveys that very few cottonwoods (mostly old) occur on the lower Yuba River, and that most of the willows are the shrubby, quick-colonizing species rather than the tree-like species. This study includes the necessary step of documenting the above existing conditions. More critical, however, the study should examine the effects of YCWA actions on cottonwood recruitment in the lower Yuba River. The effects of flow regime on cottonwood recruitment have been effectively studied in the Sacramento River (e.g., Roberts et al. 2002) and some of the same mechanisms may be at work in the lower Yuba River. However, non-flow related characteristics of the lower Yuba River (e.g., lack of fines, lack of sufficient parental stock, etc.) also may be limiting. It is not clear how the second objective of evaluating "trends in riparian health and factors contributing to riparian conditions in the Study Area" will be meaningfully accomplished with this study, as doing so would require parsing the effects of flow, substrate, parental stock, and other factors. The study objectives and methods should be refocused to conduct this sort of limiting factors analysis so Project effects can be identified.

Specific Comments:

Section 5.2 (General Concepts and Procedures).

Regarding the Global Positioning System (GPS) data collection methods (6th bullet): Will the selected 3 meter level of accuracy meet metadata requirements for use in ESRI Shapefiles and

GeoDatabases? Will map grade, survey grade, or recreation grade GPS units be needed? These vary in data quality and need to be selected beforehand. This comment also applies to Section 5.3.1.3.1 (Vegetation Mapping).
Regarding minimizing the chance of spreading non-native invasive species (8th bullet): It would be useful to develop and implement a Hazard Analysis Critical Control Point (HACCP) Plan which would indicate that zebra mussels are not a concern relative to this proposed study but that New Zealand mudsnails are a concern.

Section 5.3.1.1 (Step 1—Site Selection): The "wetted edge of the river" would be variable depending on water year and existing flow. An explicit methodology for addressing in-channel gravel bars, floodplain and emergent vegetation should be developed, and potential limitations of this protocol should be acknowledged.

Section 5.3.1.3.3 (Digital Elevation Model Topographic Map and Hydrodynamic Model): It is unclear what is meant by determining "vegetation types by heights." The usefulness of the existing LiDAR data set (now a few years old) for the lower Yuba River in classifying riparian vegetation types is still unclear. A recent symposium focusing on this data indicated difficulty in identifying species. Accuracy is much better for taller, isolated trees and is worse for smaller shrubby species. Cottonwood, Sycamore, Willow, and Other classes can be distinguished with "fair accuracy." New LiDAR technology is supposed to be much better.

Study 7.12 – Project Effects on Fish Facilities Associated with Daguerre Point Dam

General Comments:

As the Service indicated in its comments on the Preliminary Application Document (dated March 7, 2011), "the raised water elevation created by Daguerre Point Dam allows YCWA to divert water into the Browns Valley, Hallwood-Cordua, and South Yuba-Brophy diversions." Therefore, it is unclear why Project effects on the operation of the Hallwood-Cordua diversion fish screen are being addressed in this study and not the effects on South Yuba-Brophy and Browns Valley diversion fish screens. All three diversions rely on the presence of Daguerre Point Dam and screen efficiency may be affected by Project operations. Additionally, the Applicant should include an assessment on how the Project directly affects juvenile Chinook salmon and steelhead as outmigrants pass over Daguerre Point Dam. Juvenile mortality from predation as outmigrants pass over Daguerre Point Dam and improving efficiency of fish screening devices and fish bypasses were identified as limiting factors by the Service in the Final Restoration Plan for the Anadromous Fish Restoration Program (AFRP) (USFWS 1995, 2001), a comprehensive plan that has been filed with the Commission pursuant to §10(a)(2) of the Federal Power Act, 16 U.S.C. section 803(a)(2)(A). Consequently, all the existing information on the Project effects that are associated with Daguerre Point Dam that are described in both the AFRP Working Paper (USFWS 1995) and the Final Restoration Plan (USFWS 2001) should be included in Section 4.0 of the study plan and evaluated accordingly.

It is not clear how the various steps of Phase 1 of the proposed study will achieve its stated goal of determining if the Project adversely impacts "the efficiency of the fish facilities as designed." The potential impacts of the Project are described as "unknown," yet several are identified for consideration under Phase 2 which is proposed to occur only if "YCWA and Relicensing Participants collaboratively agree" that it should. Furthermore, the Applicant should elaborate and develop specific study objectives in Section 3.0. This should include a site specific assessment on each of the affected facilities as a separate objective (i.e., Daguerre Point Dam fish ladder, Daguerre Point Dam, Hallwood-Cordua Diversion fish screen, South Yuba-Brophy diversions, etc.).

The ideas identified for consideration under Phase 2 (e.g., examination of bathymetric and hydraulic profiles) actually can be investigated under Phase 1 using existing data (e.g., Deas 1999; USFWS 2010a,b,c; and mapping and modeling data available from the Yuba Accord River Management Team). Phase 1 of this study should be revised with this as its focus.

Specific Comments:

Section 5.3.1 (Phase 1 – Desktop Assessment): The term/concept "efficiency of the fish facilities" should be explained more fully. It is not clear how the activities described in this and subsequent steps will achieve the stated purpose of Phase 1. Presumably, the study is trying to identify what the potential adverse effects of the Yuba River Hydroelectric Project are on adult upstream fish passage, juvenile fish entrainment, or fish screen efficiency. Stating some hypotheses would greatly benefit this section and help direct the study.

Section 5.3.1.2 (Step 2 – Analysis of Collected Data): Simply describing and characterizing operations will not achieve the stated goal of this study. The real focus of this study should be to assess the effects of overall Project operation on the flow, stage, head difference, depth-velocity patterns, and temperature at Daguerre Point Dam.

Section 5.3.1 (Phase 2 – Field Assessment): Despite stating that the potential effects of the Project are "unknown," we do have some idea about what the potential effects might be. For example, Project operations may affect adult passage timing through the fish ladders by affecting attraction flows or the number and timing of juveniles entrained or bypassed in the Hallwood-Cordua diversion facility.

Conclusion

With some revision, the three proposed studies comprising the Study Plan Determination modifications have the potential to provide valuable results that will inform the development of Project license conditions. The Service has worked closely with other resource agencies and the Applicant, in order to design studies that would measure Project-level effects in a scientifically defensible manner and at a reasonable cost. The Service has worked with the Applicant in seeking solutions to Study Plan deficiencies and we appreciate the collaborative discussions in which all participants have engaged.

Ms. Kimberly Bose, Secretary 6

If you have any questions regarding this response, please contact Deborah Giglio of my staff at (916) 414-6600.

Sincerely,

Daniel Welsh
Assistant Field Supervisor

Enclosures

cc:
FERC #2246 Service List, Yuba River Hydroelectric Project

References

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USFWS. 2010b. Flow-habitat relationships for juvenile fall/spring-run Chinook salmon and steelhead/rainbow trout rearing in the Yuba River. Sacramento Fish and Wildlife Office, Planning and Instream Flow Branch. October 8, 2010.

USFWS. 2010c. Relationships between flow fluctuations and redd dewatering and juvenile stranding for Chinook salmon and steelhead/rainbow trout in the Yuba River. Sacramento Fish and Wildlife Office, Planning and Instream Flow Branch. September 15, 2010.

BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

CERTIFICATE OF SERVICE

I hereby certify that U.S. Fish and Wildlife Service Comments on Study Plan Determination Modifications for Study 1.2 Channel Morphology Downstream of Englebright Dam, Study 6.2 Riparian Habitat Downstream of Englebright Dam, and Study 7.12 Project Effects on Fish Facilities Associated with Daguerre Point Dam for the Yuba River Hydroelectric Project, Federal Energy Regulatory Commission Project No. P-2246-058, Yuba, Sierra, and Nevada Counties, California has this day been electronically filed with the Federal Energy Regulatory Commission and electronically served on Parties indicating a willingness to receive electronic service and served, via deposit in U.S. mail, first-class postage paid, upon each other person designated on the service list for Project #2246-058 compiled by the Commission Secretary.

Dated at Sacramento, California, this 16th February, 2012.

Name:
Heeja Seto
U.S. Fish and Wildlife Service
2800 Cottage Way, Rm. W-2605
Sacramento, CA 95825
(916) 414-6600

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Pitts, Sheila

From: Sharon Stohrer [SSTOHRER@dfg.ca.gov]
Sent: Monday, February 13, 2012 8:20 AM
To: Lynch, Jim; caikens@ycwa.com
Cc: MaryLisa Lynch; Sean Hoobler; Alan Mitchnick; Kenneth Hogan; alison_willy@fws.gov (Alison_Willy@fws.gov); Daniel_Welsh@fws.gov; Elizabeth_Campbell@fws.gov; Pitts, Sheila; Rick Wantuck; JParks@waterboards.ca.gov; 'Geoff Rabone'
Subject: Re: Yuba Relicensing: Transmittal of Draft Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam, for 30-Day ReviewPeriod
Attachments: Study 07-12 - Effects on Dagrerrepoint Dam Fish Facilities - DRAFT - Ne.doc

Importance: High

Curt & Jim,
Please note that the February 20th due date shown below is a recognized Holiday. Resource Agencies ask that the due date for comments be extended beyond that holiday to cob on February 21st, as standard courtesy allows in most FERC matters. Agency staff would appreciate the issuance of an e-mail to notify all of this corrected due date.

Thank you for the opportunity for 30-day review on this important YRDP study plan.
Sharon

****
Sharon J. Stohrer
Staff Environmental Scientist
Department of Fish and Game
1701 Nimbus Road
Rancho Cordova, CA 95670
(916) 358-2384

>>> On 1/20/2012 at 9:24 AM, "Lynch, Jim" <Jim.Lynch@hdrinc.com> wrote:

- YUBA RIVER DEVELOPMENT PROJECT RELICENSING -

Transmittal of Project Effects on Fish Facilities Associated with Daguerre Point Dam Study (Study 7.12) Plan for 30-Day Review Period
- Written Comments due to YCWA by Close of Business on February 20, 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 (90 days from the date of the Determination) a new study to assess Project effects on the fish ladders at Daguerre Point Dam and the Hallwood-Cordua Diversion fish screen. The Determination also required YCWA to consult with the USFWS, NMFS, CDFG and SWRCB regarding 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 a letter that 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 is a draft Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam, in Microsoft Word™ format. We would appreciate your written comments on the draft Study plan no later than close of business on February 20, 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:

2

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

Study 7.12

PROJECT EFFECTS ON FISH FACILITIES ASSOCIATED WITH DAGUERRE POINT DAM[1]

January 2012 + DFG edits (February 20, 2012)

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 the functioning of two existing fish ladders associated with the United States Army Corps of Engineer's (USACE) Daguerre Point Dam,[2] which is located at River Mile 11.2[3] on the Yuba River, the South Yuba/Brophy Diversion Pumps, and a fish screen at the existing Hallwood-Cordua Diversion, which is located upstream of Daguerre Point Dam. In this study, the fish ladder and fish screen are collectively referred to as the "fish facilities."

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

YCWA believes that five agencies, at least in part, have jurisdiction over the fish facilities that cold be affected by the Project: 1) USACE; 2) United States Department of Interior, Fish and Wildlife Service (USFWS); 3) United States Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS); 3) California Department of Fish and Game (CDFG); and 4) State Water Resources Control Board, Division of Water Rights (SWRCB). Each of these agencies and their jurisdiction and management direction, as understood by YCWA at this time, is discussed below.

USACE

USACE has ultimate authority over Daguerre Point Dam and its associated fish ladders.

---

[1] Yuba County Water Agency's (Licensee or YCWA) YCWA's August 2011 Revised Study Plan did not include a study to investigate the effects of the Project on the existing Daguerre Point Dam's or Hallwood-Cordua's fish facilities. In its September 30, 2011 Study Determination, FERC stated: *"... we recommend that YCWA provide an analysis, utilizing existing and available information, on the potential for the Yuba River Project to affect fish passage conditions at Deguerre* [sic] *Point dam, and on the Hallwood-Cordua diversion screens (study criteria 4). Specifically, the analysis should consider how operation of the Narrows II powerhouse, including flow timing, magnitude, duration, and rate of change, may affect the fish facilities at Daguerre Point dam. The study should be developed after consultation with, NMFS, Cal Fish and Game, the Water Board, and FWS, and the U.S. Army Corps of Engineers and filed for Commission approval. The specific parameters sought in Request Element #8 would be appropriate to investigate to the extent that they are influenced by operations at the Narrows II powerhouse. As such, we recommend, that YCWA include this investigation in its analysis, if it identifies any potential project effects on fish facilities at DeGuerre Point dam."* (Appendix A, p 42.) This study complies with FERC's direction.

[2] Daguerre Point Dam was constructed in 1901 by the California Debris Commission, and is owned, operated and maintained by USACE. The dam is discussed in more detail in Section 4.2 of this Study plan.

[3] River miles (RM) were calculated using the National Hydrography Dataset (NHD) GIS data. River miles start at the confluence of the Yuba River with the Feather River (RM 0.0) and move upstream in the Yuba River.

Yuba County Water Agency
Yuba River Development Project
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USFWS
USFWS's jurisdiction and goals and objectives are described by USFWS on pages 1 through 3 of USFWS's March 7, 2011 letter to FERC that provided USFWS's comments on YCWA's Pre-Application Document. Or PAD (YCWA 2010). USFWS's jurisdiction, goals and objectives are not repeated here.

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 PAD. NMFS's jurisdiction and responsibilities are not repeated here.

CDFG
CDFG's jurisdiction is described by CDFG on page 1 of CDFG's March 2, 2011 letter to FERC providing CDFG's comments on YCWA's PAD. CDFG's goal, as described on page 2 of CDFG's letter is to preserve, protect, and as needed, to restore habitat necessary to support native fish, wildlife and plant species within the FERC boundaries of the YRDP and downstream of the project as resources are affected by ongoing facility operations.

SWRCB
SWRCB has authority under the federal Clean Water Act (33 U.S.C. §11251-1357) to restore and maintain the chemical, physical and biological integrity of the Nation's waters. Throughout the relicensing process the SWRCB maintains independent regulatory authority to condition the operation of the Project to protect water quality and the beneficial uses of stream reaches consistent with Section 401 of the federal Clean Water Act, the Regional Water Quality Control Board Basin Plans, State Water Board regulations, CEQA, and any other applicable state law.

3.0 Study Goals and Objectives

The goal of this study is to analyze if operation of the Project's Narrows 2 Powerhouse, including flow timing, magnitude, duration, and rate of change, affects the fish facilities and, if so, how,

4.0 Existing Information and Need for Additional Information

4.1 Project Operations

Water storage and management by the Project on the Yuba River first occurs at New Bullards Bar Reservoir, located 2.3 miles upstream of the North Yuba River's confluence with the Middle Yuba River, and also occurs downstream at USACE's Englebright Reservoir,[4] which is located

[4] 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.

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at RM 23.9 on the Yuba River - 41.9 miles downstream of New Bullards Bar Reservoir and 12.7 miles upstream of Daguerre Point Dam. Englebright Dam is the upstream terminus for accessible habitat of anadromous salmonids in the Yuba River basin. Water may spill over Englebright Dam, which has no outlets; be released from Pacific Gas and Electric Company's (PG&E) 12 megawatt (MW) Narrows 1 Powerhouse, which has a maximum release capacity of 730 cubic feet per second (cfs); be released from the Project's 50 MW Narrows 2 Powerhouse, which has a maximum capacity of 3,400 cfs; or be released from the Project's Narrows 2 Powerhouse Bypass, which has a capacity of 3,000 cfs and is used to provide flow during emergencies and outages. Currently, YCWA and PG&E coordinate the operations of Narrows 1 and 2 powerhouses for hydropower efficiency and to maintain relatively constant flows in the lower Yuba River (LYRA 2007). The Narrows 1 Powerhouse typically is used for low-flow reservoir releases (< 730 cfs), or to supplement the Narrows 2 Powerhouse capacity during high flow reservoir releases.

Annual maintenance requires the Narrows II Powerhouse to be shut down for a 2- to 3 week period, or longer if major maintenance is performed. Maintenance is typically scheduled for the beginning of September or during the winter months.

4.2 Daguerre Point Dam and Associated Fish Ladders

The California Debris Commission began construction of the original Daguerre Point Dam in 1904 as part of the later Yuba River Debris Control Project (USACE 2001). The dam is located in a cut above and to the north of the original Yuba River channel. The bedrock under Daguerre Point Dam is a portion of the Daguerre Point Terrace, a feature that facilitated the construction of a low dam at a relatively low cost (USACE 2011). Over the next few years, the cut through Daguerre Point was completed and a concrete inlet wall, or spillway, was constructed. Cobble training walls extending about 12,000 feet on each side of the river below the cut were built. The entrance gates to the settling basin were constructed, most of its inclosing levees were built, and the outlet works were practically completed when this part of the dam was found no longer necessary and was abandoned under authority of the River and Harbor Act of June 25, 1910. The land acquired for the settling basin, together with the intake and outlet works, was then sold (USACE 1981).

While dam construction was completed in May 1906, the river was not diverted over the dam until 1910 (USACE 2007). The dam rapidly filled to capacity with sediment and debris that moved downstream during flooding in 1911 (Hunerlach et al. 2004). The result is that the dam has held back millions of cubic yards of mining debris which would otherwise have passed into the navigable channels of the Feather and Sacramento Rivers (USACE 1981). Since the cessation of hydraulic mining operations, Daguerre Point Dam has retained the debris stored behind the dam and prevented it from being washed into the Feather and Sacramento Rivers to the detriment of associated navigation and flood control facilities. The dam is not intended for, nor does it provide for, the control of floods (USACE 2001).

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The current configuration of Daguerre Point Dam is a reinforced, overflow concrete ogee ("s-shaped") spillway with concrete apron and concrete abutments. The ogee spillway section is 575 feet wide and 25 feet tall (NMFS 2007). There is no reservoir associated with the dam.
Fish ladders were added to Daguerre Point Dam in 1911 to permit salmon and steelhead access upriver to the seasonal spawning areas. However, the ladders were quickly destroyed by floods, and have been redesigned and rebuilt numerous times. Currently, the dam has two associated fish ladders that were constructed by USACE and CDFG, each ladder with a control gate. The ladders are composed of step-wise concrete bays on either side of the dam. The ladders are designed for salmonids fish passage and are monitored with an infrared VAKI Riverwatcher scanner during critical salmonid migration periods. USACE's Daguerre Point Dam Operations and Maintenance Manual requires that the ladders be physically closed when water elevations reach~~ed~~ 130 feet, or when flows are slightly less than 10,000 cfs (SWRCB 2003), and be kept closed until the water recedes to an elevation of 127 feet (CALFED and YCWA 2005). However, USACE is collaborating with resource agencies to improve salmonid fish passage and current~~ly~~ operation practices keep~~s~~ the ladders open at water elevations higher than 130 feet, and direct the reopening~~s~~ of ~~the~~ ladders before the water elevation recedes to 127 feet.

Management of the existing fish ladders is a coordinated effort amongst several parties. CDFG has removed large woody material that may clog the ladders. USACE clears sediment at the tops of and exits from the fish ladders. In addition, the Cordua Irrigation District works with USACE, NMFS, CDFG and USFWS to determine timing and placement of flashboards installed along the Daguerre Point Dam spillway during important migration periods. The increased water elevations that result with flashboard placement~~s~~ have been~~were~~ shown to dramatically improve fish recognition of ladders and passage rates overall. The flashboards are removed following adult salmonid passage periods.

Figures 4.2-1 and 2 show the existing Daguerre Point Dam fish ladders.

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Figure 4.2-1. North fish ladder at Daguerre Point Dam (photo by D. Simodynes, October 9, 2009).

Figure 4.2-2. South fish ladder at Daguerre Point Dam.

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4.3 South Yuba/Brophy Water Districts Diversion Pumps

The South Yuba Water District and Brophy Water District share a common point of diversion located on the south bank of the lower Yuba River, just upstream of Daguerre Point Dam. The point of diversion includes a rock gabion wall constructed within the channel to separate mainstem flow from a small impoundment or diversion pool, where four diversion pumps are sited. The combined diversion capacity of the four South Yuba/Brophy pumps is 680 cfs.. The rock gabion wall was intended to serve as a gabion fish screen to protect against entrainment of downstream migrant fish equal to or greater than one-inch in length. However, design of this gabion structure has been shown to be less than effective in preventing the entrainment of juvenile steelhead, Chinook, and other resident fish species found in the vicinity of the diversion (i.e., Sacramento pikeminnow, sunfish, and basses) (Demko and Crammer 1993) (USFWS 1989).

4.4 Hallwood-Cordua Fish Screen

The Hallwood-Cordua Diversion, a gravity flow diversion facility located on the north bank of the lower Yuba River just above Daguerre Point Dam, has a diversion capacity of 625 cfs (SWRCB 2001).

The diversion was originally screened in 1972, and the original screen was modified in 1977 (CALFED and YCWA 2005). The original screen was located in the North Canal about 0.25 mile downstream from the river diversion, and utilized a V-shaped perforated plate screen constructed. A bypass system diverted fish captured by the screen into a collection tank, and the collected fish were returned to the Yuba River either through a pipeline or by truck (SWRCB 2001). The original screen was operated by CDFG for intermittent periods during the Chinook salmon juvenile emigration period of April through June (SWRI et al. 2000).

The design and operation of the original screen, as modified, resulted in the loss of significant numbers of fish (SWRCB 2001). During some years, the fish screen was not operated at all, which resulted in occasions when reportedly up to a million juvenile salmonids were entrained in the diversion (CALFED and YCWA 2005). When operational, the screen was reported to be effective in preventing the entrainment and impingement of juvenile salmonids, but salmonid losses reportedly did occur as a result of predation in the intake channel between Daguerre Point Dam and the screen. In addition, predation resulted from the removal of the screen by CDFG during the emigration period of juvenile steelhead (YCWA et al. 2000).

In 2001, the original fish screen was replaced with the existing fish screen that more closely conforms to CDFG and NMFS fish screening criteria. This screen is at the same location as the original screen, but has appropriate openings and sweeping and approach velocities to facilitate direct return of screened fish back to the river below Daguerre Point Dam. Additionally, the existing fish screen is operated for the entire diversion season (NMFS 2002). Although the existing fish screen does not meet all of CDFG's and NMFS's criteria, the rehabilitation efforts

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included the installation of the proper-sized screening material and have allowed continuous operation of the screen throughout the irrigation season along with the direct return of screened fish back to the river below the dam (NMFS 2007).

Figure 4.~~3~~4-1 shows the existing Hallwood-Cordua Diversion fish screen.

Figure 4.~~3~~4-1. Hallwood-Cordua Diversion fish screen.

5.0 Study Methods and Analysis

5.1 Study Area

The study area is the Yuba River in the vicinity of the fish facilities.

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.

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- 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, NMFS, 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. 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 (FGDC) compliant.[5]
- 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 focused study (i.e., 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) for decontaminating their boots, waders, and other equipment between study sites. Major concerns are amphibian chytrid fungus, Didymosphenia geminate algae, and invasive invertebrates (e.g., zebra mussel, *Dreissena polymorpha*). This is of primary importance when moving: 1) between tributaries and mainstem reaches; 2) between basins (e.g., Middle Yuba River, Yuba River, and North Yuba River); and 3) between isolated wetlands or ponds and river or stream environments.

[5] The Forest Service and CDFG each requested that a copy of the GIS maps be provided to them when the maps are available.

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5.3 Methods[6]

The assessment of Project effects on the fish facilities will be completed in a phased approach. Phase 1 will be composed of a desktop analysis supported by existing information and Phase 2, if warranted after completion of Phase 1, will be a field assessment. Phase 2 will be implemented if any Project effects on the fish facilities are found in Phase 1.

5.3.1 Phase 1 – Desktop Assessment

Phase 1 will be composed of a desktop assessment to review existing data relevant to Project operations and the potential impact to the fish facilities. Phase 1 of the study will be completed in five steps, each of which is described below.

Note that the purpose of Phase 1 is to determine if the Project has an adverse effect of the efficiency of the fish facilities as designed; the purpose of Phase 1 is not to perform an assessment of the efficiency of the fish facilities (e.g., Can the design be improved? Are the fish facilities operating properly?)

5.3.1.1 Step 1 – Collection and Review of Existing Data

Existing and available operations data will be collected for Englebright Dam, Narrows 1 Powerhouse, Narrows 2 Powerhouse, Daguerre Point Dam fish ladders, the South Yuba/Brophy Diversion pumps, and the Hallwood-Cordua Diversion fish screen. Fisheries data identifying run timing and anadromous salmonid fish presence within the study area will be collected. Any other data assessing the performance of the fish facilities will also be sought. Data will be primarily collected from the YCWA's own files and records, but any additional information required will be requested from NMFS, CDFG, USACE, Hallwood Irrigation District and Cordua Irrigation District.

5.3.1.2 Step 2 – Analysis of Collected Data

[6] In its September 30, 2011 Study Determination, FERC stated: *"Specifically, the analysis should consider how operation of the Narrows II powerhouse, including flow timing, magnitude, duration, and rate of change, may affect the fish facilities at Daguerre Point dam.* (Appendix A, p 42). FERC's Determination continued to say *"...we are recommending that YCWA develop a study plan for an analysis of potential project effects on the fish facilities at DaGuerre Point dam. The specific parameters sought in Request Element #8 would be appropriate to investigate to the extent that they are influenced by operations at the Narrows 2 powerhouse. As such, we recommend, that YCWA include this investigation in its analysis, if it identifies any potential project effects on fish facilities at DaGuerre Point dam.* (Appendix A, p 44) (highlight added). The Element #8 parameters are summarized by FERC as "*Specifically, NMFS seeks information on: Temperature profiles through the reservoirs and identification of thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations; Bathymetry profiles through the reservoirs and identification of thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations; and Hydraulic profiles to describe velocity patterns in pools below the dam and upstream near diversion intakes, forebay, fish ladders, and areas near diversion points.*" (Appendix A, pp 43 & 44). The methods describe din this study comply with FERC's direction.

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The goal of Step 1 will be to provide sufficient data to complete a five-part analysis of hydro operations and anadromous salmonid fish populations from Englebright Reservoir to Daguerre Point Dam that will include:

- Description of the operational relationship, minimum flow requirements, and diversion rates at Englebright Reservoir, Narrows 1 and 2 powerhouses, Hallwood-Cordua Diversion, South Yuba/Brophy Diversion, and Daguerre Point Dam
- Characterization of historic operations at Narrows 2 Powerhouse
- Description of Daguerre Point Dam fish ladder operations and overview of design and design criteria
- Description of Hallwood-Cordua Diversion and South Yuba/Brophy Diversion fish screen operations and overview of design and design criteria
- Characterization and discussion of critical anadromous salmonid life history periods and associated exposure to the fish ladders and fish screen

The analyses will characterize and describe the operations and of the Narrows 2 Powerhouse relative to other surrounding non-Project activity. The potential effect of the Narrows 2 Powerhouse will be investigated as related to fall-run Chinook salmon, spring-run Chinook salmon, and steelhead, as data is readily available. The analyses will be presented in tables, figures, and described within an analysis of results.

5.3.1.3 Step 3 - Data Quality Assurance/Quality Control

All data generated from analyses during this effort, including both input data and output data, will undergo a quality assurance/quality control (QA/QC) procedure, and will be organized in Excel and/or HEC-DSS formats, where applicable.

5.3.1.4 Step 4 – Determine if Phase 2 Is Warranted

YCWA will review the results of the Phase 1 analysis with Relicensing Participants and determine if Phase 2 is warranted (i.e., if phase 1 indicates that the Project has an adverse effect of the efficiency of the fish facilities as designed). If YCWA and Relicensing Participants collaboratively agree that Phase 2 is not warranted, YCWA will move to step 5 of phase 1. If YCWA and Relicensing Participants collaboratively agree that phase 2 is warranted, YCWA will move to Phase 2.

5.3.1.5 Step 5 – Prepare Report and Determine If Phase 2 Is Warranted

YCWA will prepare a report summarizing Phase 1 that includes the following sections: 1) Study Goals and Objectives; 2) Methods and Analysis; 3) Results; 4) Discussion; and 5) Description of Variances from the FERC-approved study proposal, if any. The report will summarize the existing and available data in tables, figures, and text in order to characterize historic and expected conditions at the fish facilities based on historic operations.

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5.3.1 Phase 2 – Field Assessment

Phase 2 will investigate potential effects identified within the Phase 1 desktop assessment of how the Project may have an adverse effect on the fish facilities as designed. Since the potential effects are unknown at this time, Phase 2 the scope of Phase 2 investigations may include one or more of the following activities,[7] or activities not listed here:

- Temperature profiles through the Daguerre Point Dam impoundment and upstream and downstream of the dam and/or downstream of the Hallwood-Cordura and Brophy fish screens to identify thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations
- Bathymetry profiles through the Daguerre Point Dam impoundment to identify thermal refugia and other temperature stratification that may affect adult and juvenile salmonid migrations
- Hydraulic profiles Daguerre Point Dam impoundment and upstream and downstream of the dam and/or downstream of the Hallwood-Cordua and Brophy fish screens to describe velocity patterns
- Assessment of entrainment impacts on fish communities in the vicinity of Brophy Diversion Pumps.

It is currently expected that, if needed, water temperature profiles would be collected by taking vertical measurements with a Hydrolab (or equivalent hardware), bathymetry measurements would be collected in a pre-established gridded pattern using a boat mounted acoustic depth sounder, and hydraulic profiles would be collected along pre-established transects using an Acoustic Doppler Current Profiler. These are all standard methodologies. However, YCWA will consult with Relicensing Participants to determine the appropriate methods and locations, based on Phase 1 results.

At the conclusion of Phase 2, if performed, YCWA will prepare summarizing Phase 1 and Phase 2 that includes the following sections: 1) Study Goals and Objectives; 2) Methods and Analysis; 3) Results; 4) Discussion; and 5) Description of Variances from the FERC-approved study proposal, if any.

6.0 Study-Specific Consultation

The study includes the following study-specific consultation:

- YCWA will consult with NMFS, CDFG, USACE, Hallwood Irrigation District, ~~and~~ Cordua Irrigation District, South Yuba Water District, and Brophy Water District to obtain specific information, including design criteria, for the fish facilities (Phase 1, Step 1).

[7] See footnote 6.

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- YCWA will review the results of the Phase 1 analysis with Relicensing Participants and determine if Phase 2 is warranted (i.e., if phase 1 indicates that the Project has an adverse effect of the efficiency of the fish facilities as designed). If YCWA and Relicensing Participants collaboratively agree that Phase 2 is not warranted, YCWA will move to step 5 of Phase 1. If YCWA and Relicensing Participants collaboratively agree that phase 2 is warranted, YCWA will move to Phase 2. (Phase 1, Step 4.)

- YCWA will consult with Relicensing Participants to determine the appropriate methods and locations for Phase 2, based on Phase 1 results (Phase 2).

7.0 Schedule

FERC's December 8, 2011 letter required that YCWA provide a modified study to FERC for approval no later than March 8, 2012. The schedule provided below assumes FERC will approve the modified study no later than mid March 2012.

Phase 1
Step 1 – Collection and Review of Existing Data..... March – May 2012
Step 2 – Analysis of Collected Data ..... June – July 2012
Step 3 – Data Quality Assurance/Quality Control .....June – July 2012
Step 4 – Determine If Phase 2 Is Warranted.....July 2012
Step 5 – Prepare Phase 1 Report (Assuming Phase 2 Not Warranted).... August – September 2012

Phase 2 ~~(If Warranted)~~
Identification of Phase 2 Methods ..... July - August 2012
Data Collection ..... August - October 2012
Prepare Phase 1 and 2 Report .....November - December 2012

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

The methods presented in this study plan are consistent with other generally accepted scientific study methods concerning anadromous salmonid population assessments, including those conducted by the Resource Agencies in California.

9.0 Level of Effort and Cost

YCWA estimates the cost to complete Phase 1 of this study in 2011 dollars is between $45,000 and $55,000. The scope of Phase 2 is not determined, but could range between $125,000 and $175,000 additional 2011 dollars, if implemented in its entirety. The total for both phases would range from $170,000 to $230,000.

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10.0 Attachments

This study plan includes three attachments:

Attachment 3-12A Documentation of Transmittal of Draft Study Plan to USACE, NMFS, USFWS, SWRCB and CDFG for 30-Day Review and Comment

Attachment 3-12B Written Comments from USACE, NMFS, USFWS, SWRCB and CDFG

Attachment 3-12C YCWA's Reply to Written Comments

[USACE, USFWS, NMFS, CDFG and SWRCB – Attachments 7-12A, 7-12B and 7-12C are not included in this draft, but will be included in the new Study filed with FERC. YCWA]

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ATTACHMENT 3-12C

YCWA's Reply to Written Comments

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

March 8, 2012

Electronically Transmitted

Daniel Welsh
Assistant Field Supervisor
United States Department of the Interior
Fish and Wildlife Service
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Subject: Yuba River Development Project
FERC Project No. 2246-058
Reply to Comments on YCWA's
Revised Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam

Dear Mr. Welsh:

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 develop a new study plan to analyze potential Project effects on fish passage conditions at the Daguerre Point Dam and the Hallwood-Cordua fish screen, and file the new study plan 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 a letter dated December 8, 2011, FERC amended the deadline to March 8, 2012 for YCWA to file its new study.

YCWA developed a new study plan (named Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam) as directed by the Determination and, on January 20, 2012 provided the draft Study for 30-day review and comment to the United States Army Corps of Engineers (USACE); 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); and State Water Resources Control Board (SWRCB).

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YCWA received written comments from CDFG in an e-mail dated February 21, 2012. USFWS did not provide written comments to YCWA, but filed a letter with FERC dated February 16, 2012. That letter included comments on the Study. USACE, NMFS and SWRCB did not provide written comments.

Provided below is YCWA's reply to the USFWS's written comments on the new study plan. 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

USFWS-1: *"As the Service indicated in its comments on the Preliminary Application Document (dated March 7, 2011), "the raised water elevation created by Daguerre Point Dam allows YCWA to divert water into the Browns Valley, Hallwood-Cordua, and South Yuba-Brophy diversions." Therefore, it is unclear why Project effects on the operation of the Hallwood-Cordua diversion fish screen are being addressed in this study and not the effects on South Yuba-Brophy and Browns Valley diversion fish screens. All three diversions rely on the presence of Daguerre Point Dam and screen efficiency may be affected by Project operations."* (p. 4 of USFWS's February 16, 2012 letter)

YCWA's Reply: NOT ADOPTED. As directed by FERC, YCWA developed a study to address potential Project effects on fish passage at Daguerre Point Dam and at the Hallwood-Cordua fish screen. FERC did not direct YCWA to assess potential Project effects at the South Yuba-Brophy and Browns Valley fish screens. YCWA's study is consistent with FERC's Determination.

USFWS-2: *"Additionally, the Applicant should include an assessment on how the Project directly affects juvenile Chinook salmon and steelhead as outmigrants pass over Daguerre Point Dam. Juvenile mortality from predation as outmigrants pass over Daguerre Point Dam ant} improving efficiency of fish screening devices and fish bypasses were identified' as limiting factors by the Service in the Final Restoration Plan for the Anadromous Fish Restoration Program (AFRP) (USFWS 1995, 2001), a comprehensive plan that has been filed with the Commission pursuant to §1O(a)(2) of the Federal Power Act, 16 U.S.C. Section 803(a)(2)(A). Consequently, all the existing information on the Project effects that are associated with Daguerre Point Dam that are described in both the AFRP Working Paper (USFWS 1995) and the Final Restoration Plan (USFWS 2001) should be included in Section 4.0 of the study plan and evaluated accordingly.* (p. 4 of USFWS's February 16, 2012 letter)

YCWA's Reply: NOT ADOPTED. FERC specifically identified that flow timing, magnitude, duration, and rate of change may affect the efficiency of fish screens or fish passage at Daguerre Dam. As a result, FERC identified those areas should be assessed. YCWA will address how operations benefit or reduce the effectiveness of the fish facilities in light of species presence and timing, but direct species assessments were not within the identified scope and may

be confounded by other factors. Further, FERC did not direct YCWA to assess all of the AFRP identified issues, but again directed YCWA to assess fish passage at Daguerre Point Dam and the Hallwood-Cordua fish screen relative to Project operations. YCWA's study is consistent with FERC's Determination.

USFWS-3: *"It is not clear how the various steps of Phase 1 of the proposed study will achieve its stated goal of determining if the Project adversely impacts "the efficiency of the fish facilities as designed." The potential impacts of the Project are described as "unknown," yet several are identified for consideration under Phase 2 which is proposed to occur only if "YCWA and Relicensing Participants collaboratively agree" that it should."* (p. 5 of USFWS's February 16, 2012 letter)

YCWA's Reply: NOT ADOPTED. For example and to help clarify the commenter's confusion, YCWA identified that CDFG supported the design of the Hallwood-Cordua screen. This design was established within an effective operational range, like all fish screens. If flow as a result of operations approaches or moves out of that reasonable design range, then the effectiveness of the screen may be diminished. YCWA will investigate and characterize operations relative to the general design and functionality of the fish screen and describe if operations may temporarily reduce the effectiveness of the screen. A similar approach will be taken for passage at Daguerre Dam to determine if certain flows may hinder passage.

For Phase 2, YCWA did suggest more detailed investigative approaches, but these methodological options do not suggest specific issues. The example approaches are to give the reader an understanding of common 'global' research applications that may be employed to obtain more detail, which could be applied at any diversion.

USFWS-4: *"Furthermore, the Applicant should elaborate and develop specific study objectives in Section 3.0. This should include a site specific assessment on each of the affected facilities as a separate objective (i.e., Daguerre Point Dam fish ladder, Daguerre Point Dam, Hallwood-Cordua Diversion fish screen, South Yuba-Brophy diversions, etc.)."* (p. 5 of USFWS's February 16, 2012 letter)

YCWA's Reply: ACCEPTED WITH MODIFICATION. YCWA's study plan does address specific objectives relative to the fish facilities at Daguerre Point Dam, fish ladder, and Hallwood-Cordua fish screen. These specific facilities will be characterized and assessed to determine if Project operations are individually affecting the performance of these facilities. In essence, the current study proposal addresses the request above specifically to what the FERC-specified scope required.

USFWS-5: *"The ideas identified for consideration under Phase 2 (e.g., examination of bathymetric and hydraulic profiles) actually can be investigated under Phase 1 using existing data (e.g., Deas 1999; USFWS 2010a, b, c; and mapping and modeling data available from the Yuba Accord River Management Team). Phase 1 of this study should be revised with this as its focus."* (p. 5 of USFWS's February 16, 2012 letter)

YCWA's Reply: ADOPTED WITH MODIFICATION. The phased approach was suggested because it allows for the necessary amount of data to be collected and assessed to address whether Project operations adversely affect fish facilities. YCWA is confident that Phase 1 will provide sufficient data to determine if an in-depth analysis is required or identify a specific issue to investigate further. YCWA will review pertinent existing information as necessary to accurately meet Phase 1 objectives. This review may include the identified resources suggested by the commenter. However, restructuring the existing proposal to move into a detailed bathymetric and hydraulic assessment is not currently warranted and is premature. This approach may be considered if warranted after conducting the Phase 1 assessment.

USFWS-6: *"Section 5.3.1 (Phase 1-Desktop Assessment): The term/concept "efficiency of the fish facilities" should be explained more fully. It is not clear how the activities described in this and subsequent steps will achieve the stated purpose of Phase 1. Presumably, the study is trying to identify what the potential adverse effects of the Yuba River Hydroelectric Project are on adult upstream fish passage, juvenile fish entrainment, or fish screen efficiency. Stating some hypotheses would greatly benefit this section and help direct the study."* (p. 5 of USFWS's February 16, 2012 letter)

YCWA's Reply: NOT ADOPTED. YCWA clearly states that the purpose of the study is to determine, based on current screen design, whether Project operations adversely impact the function of the fish screen. From this purpose statement, the commenter can identify the hypothesis being tested is whether operations impact the operation of the fish screens. Every fish screen is designed to operate within an established capacity or range. YCWA will characterize and generally describe the screen. Next, YCWA will discuss whether current operations periodically exceed the optimal operational range of the screen, thus reducing its effectiveness. If the screen is limited by operations, then the timing of that less-efficient period can be overlaid with salmonid periodicity to determine if fish may also be exposed and possibly affected.

USFWS-7: *"Section 5.3.1.2 (Step 2 -Analysis of Collected Data): Simply describing and characterizing operations will not achieve the stated goal of this study. The real focus of this study should be to assess the effects of overall Project operation on the flow, stage, head difference, depth-velocity patterns, and temperature at Daguerre Point Dam."* (p. 5 of USFWS's February 16, 2012 letter)

YCWA's Reply: NOT ADOPTED. FERC specified that YCWA assess how flow timing, magnitude, duration, and rate of change effect fish facilities. The commenter identified study suggestions (i.e. temperature, head differential, etc.) are more focused study areas that could be considered in a potential Phase 2 study, if Phase 1 identifies a specific related issue that requires further detailed assessment. However, to start with the more detailed approach is premature and not warranted as a first-step to the study.

USFWS-8: *"Section 5.3.1 (Phase 2 -Field Assessment): Despite stating that the potential effects of the Project are "unknown," we do have some idea about what the potential effects might be. For example, Project operations may affect adult passage timing through the fish ladders by affecting attraction flows or the number and timing of juveniles entrained or*

bypassed in the Hallwood-Cordua diversion facility." (p. 5 of USFWS's February 16, 2012 letter)

YCWA's Reply: NOT ADOPTED. The commenter has assumed that any identified issue at the fish facilities is associated with Narrows 2 Powerhouse Project releases. However, there are a number of factors that are confounding, which include the operation of the non-Project Narrows 1 Powerhouse and the management of the Daguerre Dam and ladders by the Corps and CDFG. While the commenter may attempt to attribute all potential existing issues to Project operations, it is not as clean-cut as the reader is assuming - making the statement presumptive. YCWA reaffirms that without fully characterizing operations and existing conditions, the potential effects of Narrows 2 Powerhouse on Daguerre fish facilities is currently unclear and unknown.

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

Sincerely,
YUBA COUNTY WATER AGENCY

Curt Aikens

Curt Aikens
General Manager

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

March 8, 2012

Electronically Transmitted

Kent Smith
Regional Manager
State of California – The Natural Resources Agency, Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

Subject: Yuba River Development Project
FERC Project No. 2246-058
Reply to Comments on YCWA's
Modified Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam

Dear Mr. Smith:

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 develop a new study plan to analyze potential Project effects on fish passage conditions at the Daguerre Point Dam and the Hallwood-Cordua fish screen, and file the new study plan 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 a letter dated December 8, 2011, FERC amended the deadline to March 8, 2012 for YCWA to file its new study.

YCWA developed a new study plan (named Study 7.12, Project Effects on Fish Facilities Associated with Daguerre Point Dam) as directed by the Determination and, on January 20, 2012 provided the draft Study for 30-day review and comment to the United States Army Corps of Engineers (USACE); 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); and State Water Resources Control Board (SWRCB).

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YCWA received written comments from CDFG in an e-mail dated February 21, 2012. USFWS did not provide written comments to YCWA, but filed a letter with FERC dated February 16, 2012. That letter included comments on the Study. USACE, NMFS and SWRCB did not provide written comments.

Provided below is YCWA's reply to the CDFG's redline revisions to the new study plan. For ease of reference, YCWA has duplicated generally characterized the revision 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

CDFG-1: Commenter adds, "*...the South Yuba/Brophy Diversion Pumps...*" in project nexus to expand scope of study. (p. 1 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADOPTED. As directed by FERC, YCWA developed a study to address potential Project effects on fish passage at Daguerre Point Dam and at the Hallwood-Cordua fish screen. FERC did not direct YCWA to assess potential Project effects at the South Yuba-Brophy and Browns Valley fish screens. YCWA's study is consistent with FERC's Determination.

CDFG-2: Commenter adds (see underlined text in quote) within Resource Management Goals of Agencies, "*CDFG's goal, as described on page 2 of CDFG's letter is to preserve, protect, and as needed, to restore habitat necessary to support native fish, wildlife and plant species within the FERC boundaries of the YRDP and downstream of the project as resources are affected by ongoing facility operations.*" (p. 2 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: ADOPTED WITH MODIFICATION. The intent of the management goals is to identify jurisdiction and goals, not to make judgment statements regarding ongoing resource studies assessing if the YRDP affects the lower Yuba River. The study will be revised to include all of the statement up to, "*...downstream of the project.*"

CDFG-3: Commenter made minor mechanical revisions to Section 4.2 Daguerre Point Dam and Associated Fish ladders of study. (p. 4 of redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: ADOPTED WITH MODIFICATION. The majority of the mechanical revisions were adopted except where language revisions did not improve the document.

CDFG-4: Commenter added section titled "*South Yuba/Brophy Water Districts Diversion Pumps*". Paragraph states "*The South Yuba Water District and Brophy Water District share a common point of diversion located on the south bank of the lower Yuba River, just*

upstream of Daguerre Point Dam. The point of diversion includes a rock gabion wall constructed within the channel to separate mainstem flow from a small impoundment or diversion pool, where four diversion pumps are sited. The combined diversion capacity of the four South Yuba/Brophy pumps is 680 cfs. The rock gabion wall was intended to serve as a gabion fish screen to protect against entrainment of downstream migrant fish equal to or greater than one-inch in length. However, design of this gabion structure has been shown to be less than effective in preventing the entrainment of juvenile steelhead, Chinook, and other resident fish species found in the vicinity of the diversion (i.e., Sacramento pikeminnow, sunfish, and basses) (Demko and Crammer 1993) (USFWS 1989)." (p. 6 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADOPTED. See reply to comments CDFG-1.

CDFG-5: Commenter added, "*the South Yuba/Brophy Diversion pumps*" to section 5.3.1.1 Step 1 – Collection and Review of Existing Data. (p. 9 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADOPTED. There is not a Project nexus with the South Yuba/Brophy Diversion Pumps. There are numerous confounding factors that eliminate any nexus that include the rock gabion wall used to reduce entrainment, independent diversion operation, and existing ownership by the South Yuba/Brophy Water Districts.

As directed by FERC, YCWA developed a study to address potential Project effects on fish passage at Daguerre Point Dam and at the Hallwood-Cordua fish screen. FERC did not direct YCWA to assess potential Project effects at the South Yuba-Brophy and Browns Valley fish screens. YCWA's study is consistent with FERC's Determination.

CDFG-6: Commenter added, "*the South Yuba/Brophy Diversion pumps*" to section 5.3.1.2 Step 2 – Analysis of Collected Data. (p. 10 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADOPTED. See reply to comments CDFG-1 and -5.

CDFG-7: Commenter added, "*Brophy*" fish screens to Section 5.3.1 Phase 2 – Field Assessment. The commenter also added a bullet point, "*Assessment of entrainment impacts on fish communities in the vicinity of Brophy Diversion Pumps*" to section. (p. 11 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADOPTED. See reply to comments CDFG-1 and -5.

CDFG-8: Commenter added, "*South Yuba Water District, and Brophy Water District*" to section 6.0 Study-Specific Consultation. Commenter also made minor mechanical edits. (p. 11 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADOPTED. See reply to comments CDFG-1 and -5.

CDFG-8: Commenter, in section 7.0 Schedule, crossed out "*If Warranted*" under Phase 2 heading. (p. 12 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADPOPTED. Commenter infers that the phased approach be eliminated and that Phase 2 be included regardless of outcome from Phase 1. However, the phased approach allows for critical review to determine if additional data is needed after Phase 1. If the data is determined to be required, the Phase 2 will be required. This approach is both responsible to the environmental resource and financial responsibility of YCWA. Without any further justification, there does not appear to be a valid reason to exclude the phased approach.

CDFG-10: Commenter added two references to section 11.0 References Cited:

Demko, D.B. and S.P. Crammer. 1993. Evaluation of Juvenile Chinook Entrainment at the South Yuba-Brophy Diversion Headworks. (Prepared for South Yuba-Brophy and Yuba County Water Agency by S.P. Cramer & Associates, Inc.)

United States Fish and Wildlife Service (USFWS). 1989. Letter to Paul R. Minasian, dated February 22, 1989.

(pgs. 13 and 14 redlined YCWA study plan dated February 20, 2012)

YCWA's Reply: NOT ADOPTED. Added references address South Yuba-Brophy addition, which is not supported, per comment responses CDFG-1 and -5.

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

Sincerely,
YUBA COUNTY WATER AGENCY

Curt Aikens

Curt Aikens
General Manager