



Foothills Water Network

Via Electronic Submittal

Hon. Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, DC 20426

January 27, 2012

RE: COMMENTS ON INITIAL STUDY REPORT FOR THE YUBA RIVER DEVELOPMENT PROJECT (P-2246)

Dear Secretary Bose:

The Foothills Water Network (Network) has reviewed the December 3, 2012 Revised Initial Study Report of licensee Yuba County Water Agency (YCWA) for the relicensing of the Yuba River Development Project (P- 2246). The Network represents a broad group of non-governmental organizations and water resource stakeholders in the Yuba, Bear, and American Watersheds. The overall goal of the Foothills Water Network is to provide a forum that increases the effectiveness of non-profit conservation organizations to achieve river and watershed restoration and protection benefits for the Yuba, Bear, and American Rivers. This includes negotiations at the county, state, and federal levels, with an immediate focus on the FERC relicensing processes.

Network members have participated with YCWA and the resources agencies in collaborative discussions on study modifications. The Network respectfully submits the following comments in response to the Revised Initial Study Report.

1. GENERAL

The Network has organized its comments according to whether it is proposing a modification to a study, proposing a new study, noting deficiencies or variances in the manner in which the study was implemented or providing feedback to the Licensee. Generally, the Network's comments are intended to ensure that the study plan process produces sufficient information to ensure that the Commission and other relicensing participants can make informed recommendations, provide adequate terms and conditions and meaningfully evaluate the project pursuant to the National Environmental Policy Act (NEPA).

The Network is providing comments on the following studies:

GEOLOGY AND SOILS

Study 1.1 Channel Morphology Upstream of Englebright Reservoir

Study 1.2 Channel Morphology Downstream of Englebright Reservoir

WATER RESOURCES

Study 2.1 Hydrologic Alteration
Study 2.2 Water Balance/Operations Model
Study 2.3 Water Quality
Study 2.4 Bioaccumulation
Study 2.5 Water Temperature Monitoring
Study 2.6 Water Temperature Model

AQUATIC RESOURCES

Study 3.1 Aquatic Macroinvertebrates Upstream of Englebright Reservoir
Study 3.2 Aquatic Macroinvertebrates Downstream of Englebright Reservoir
Study 3.3 Special-Status Aquatic Mollusks
Study 3.4 Special-Status Amphibians—Foothill Yellow-Legged Frog Surveys
Study 3.5 Special-Status Amphibians—Foothill Yellow-Legged Frog Modeling

Study 3.8 Stream Fish Populations Upstream of Englebright Reservoir
Study 3.9 Non-ESAListed Fish Populations Downstream of Englebright Dam
Study 3.10 Instream Flow Upstream of Englebright
Study 3.11 Entrainment
Study 3.12 New Colgate Powerhouse Ramping

RIPARIAN, WETLANDS AND LITTORAL HABITATS

Study 6.1 Riparian Habitat Upstream of Englebright Reservoir
Study 6.2 Riparian Habitat Downstream of Englebright Dam

THREATENED, ENDANGERED AND FULLY PROTECTED SPECIES

Study 7.2 Potential Narrows 2 Powerhouse Extension
Study 7.3 ESA-Listed Amphibians—California Red-Legged Frog
Study 7.8 ESA/CESA-Listed Salmonids Downstream of Englebright Dam
Study 7.9 Green Sturgeon Downstream of Englebright Dam
Study 7.10 Instream Flow Downstream of Englebright Dam
Study 7.11 Fish Behavior and Hydraulics Near Narrows 2 Powerhouse
Study 7.12 Evaluation of Project Effects on Fish Facilities Associated with Daguerre Point Dam

RECREATION RESOURCES

Study 8.1 Recreational Use and Visitor Surveys
Study 8.2 Recreational Flow

The Network reserves the right to comment on the final study results of the following studies, which are not complete at the time of the deadline for Comments on the Initial Study Report. The expected date of completion follows each study.

- Study 7.12 Evaluation of Project Effects on Fish Facilities Associated with Daguerre Point Dam - January 31, 2013
- Study 7.10 Instream Flow Downstream of Englebright Dam - January 31, 2013
- Study 6.1 Riparian Habitat Upstream of Englebright Reservoir February 28, 2013
- Study 7.8 ESA/CESA-Listed Salmonids Downstream of Englebright Dam - February 28, 2013
- Study 7.9 Green Sturgeon Downstream of Englebright Dam - February 28, 2013
- Study 2.6 Water Temperature Model - March 31, 2013
- Study 7.11 Fish Behavior and Hydraulics Near Narrows 2 Powerhouse - March 31, 2013
- Study 8.1 Recreation Use and Visitor Surveys - March 31, 2013
- Study 12.1 Historic Properties - March 31, 2013
- Study 1.1 Channel Morphology Upstream of Englebright Reservoir - April 15, 2013
- Study 3.10 Instream Flow Upstream of Englebright Reservoir - April 15, 2013
- Study 6.2 Riparian Habitat Downstream of Englebright Dam - August 31, 2013
- Study 2.3 Water Quality - September 30, 2013
- Study 3.5 Special-Status Amphibians – Foothill Yellow-Legged Frog Habitat Modeling - September 30, 2013
- Study 3.8 Stream Fish Populations Upstream of Englebright Reservoir - September 30, 2013
- Study 7.2 Narrows 2 Powerhouse Intake Extension - September 30, 2013
- Study 8.2 Recreational Flow - September 30, 2013
- Study 3.11 Entrainment - October 31, 2013

The Network has two general comments at this time. First, the Network has previously presented arguments supporting the proposition that the Commission may regulate Licensee’s use of Englebright Reservoir for power operations at the project. The Network considers this issue unresolved. In alignment with the Network’s argument, the Network advocated for the approval of studies that would generate information adequate to evaluate an alternative whereby the new license is conditioned on fish passage provisions that mitigate the impacts of YCWA’s operations and use of Englebright Dam. Such studies were not included in the final study plan. However, the Network believes that the necessary information is being gathered through the Yuba Salmon Forum and therefore will not request additional studies related to this subject at this time.

Second, the Network recognizes a reasonable and foreseeable change in baseline conditions. As the agencies have filed Modified Terms and Conditions for the Yuba-Bear and Drum-Spaulding Relicensings, it is reasonable to expect changed instream flows entering into the Yuba River Development Project. The YRDP assessment of baseline should take into account new minimum instream flows and new spring snowmelt recession flows to be released from Nevada Irrigation District’s Milton Reservoir on the Middle Yuba River. Among other effects, this could change the number of whitewater boating days in the baseline.

2. REQUESTED MODIFICATIONS AND ADDITIONS TO STUDY PLAN

Study 3.11 Entrainment

The Network supports the US Fish and Wildlife Service comments regarding the need for second year data collection to study fish entrainment at the Narrows 2 powerhouse. The Network sees evidence that previous requests for this study component were not supported by the Commission and YCWA out of some misinterpretation or misrepresentation of that request as research. The question of entrainment at the Narrows 2 facility is fundamental to understanding project effects and developing sound project mitigations.

Study 3.12 New Colgate Powerhouse Ramping

Substantial portions of this study are not complete. There are no results for fish stranding. Down ramp travel time calculations are not reported. Final calibration of hydraulic models is awaiting completion of the PHABSIM study in the reach downstream of Colgate. All of this is expected to be reported in the final technical memo. The Network supports comments on this study by the California Department of Fish and Wildlife (CDFW).

Study 6.1 Riparian Habitat Upstream of Englebright Reservoir

This study is partially complete. The Network agrees with the Licensee's Interim Study Report list of five remaining tasks including: 1) quantify large woody material (LWM) material at the LWM assessment sites; 2) develop a LWM budget; 3) develop stage/discharge and flow frequency analyses for with-Project and without-Project conditions; 4) complete analysis; and 5) issue a final technical memorandum.

Technical Memo 6-1 (November 2012) reports two study consultation steps yet to occur: 1) need for additional data gathering related to seed germination and recruitment and 2) LWM removal from project reservoirs.

Study 6.1 Section 6.0 Study-Specific Consultation states:

If, based on the results of the information, YCWA and Relicensing Participants collaboratively agree that seed germination or recruitment, including the need for modeling the relationship between flows and germination, should be studied in the second year, YCWA and Relicensing Participants will collaborate regarding the study and YCWA will propose the study in its Initial Study Report.

At a relicensing meeting on January 8, 2013, relicensing participants discussed the need for additional data gathering related to seed germination and recruitment. At this meeting, the Network, CDFW, and the National Marine Fisheries Service requested that the Licensee develop a model for riparian hardwood germination. YCWA declined the request.

The Network requests modification of Study 6.1 to require the Licensee to develop a model and analyze potential viability of germination for riparian hardwood species. The model should draw on a spreadsheet that parameterizes viable germination using seed dispersal period, maximum root follow rate and threshold conditions for subsequent flow change events. Model results

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should include tabular and graphic demonstrations of potential viable germination for all years of with-project and without-project hydrology. The Licensee should present the results in a way that demonstrates (and quantifies where feasible) frequency of potential viable germination by channel elevation (stage) and with representative cross-sections. The Licensee should consult with relicensing Participants on final model parameters. Target species will include Fremont cottonwood, Goodings willow, red willow, and white alder. This model should use surrogates and assumptions when specific data is limited for some species.

The analysis below shows good cause why the proposed study modification should be approved consistent with the requirement contained in 18 C.F.R. § 5.15(d) related to modifications to approved study plans.

The proposal is necessary to achieve the goal and objective of the study. As contained in Study Plan 6.1, the goal of this study is to assess the condition of riparian habitats within river reaches upstream of the United States Army Corps of Engineers (USACE) Englebright Reservoir potentially affected by continued Project O&M. The objective of this study is to gather the data and information necessary to meet the study goals. In order to meet the goal to assess the condition of riparian habitats, it is necessary to determine the project effects on riparian hardwood recruitment.

Technical Memo 6.1 (December 2012) and the recent relicensing participants meeting on Study 6.1 (January 2013) have revealed that data being collected and prepared is insufficient to provide a sound basis for FERC recommended license terms and conditions. The Licensee's study implementation deviates from the approved study plan in that the results and methodology will not produce the objective of assessing the condition of riparian habitat upstream of Englebright Reservoir. The study as implemented by the Licensee so far has led to insufficient data acquisition to provide information necessary for the Commission to accurately characterize project impacts, develop reasonable alternatives for NEPA analysis, and ultimately adopt license conditions to address such impacts.

The Project's flow management may be altering hydrologic conditions to a degree that successful germination and establishment (recruitment) has altered either frequency or channel location. The lack of seedlings and recruits of some expected species in some project reaches are evidence of these project effects on riparian condition.

The requested study modification is necessary to confirm the mechanism and habitat consequences of any such impaired condition. New license conditions could consist of flow measures that mitigate the impact by providing slower rates of recession at certain times or habitat enhancements to offset known change in riparian habitat due to the project. Therefore, the proposed study modification will remedy the study deficiencies identified above and lead to more informed decision making.

The Interim Study Report notes that YCWA will review the project's hydrology as it may affect riparian conditions, but it is unclear what objectives and methodology the Licensee will apply to this final part of the study. Given the evidence of project impacts on flow and seed germination, the assessment of riparian condition requires more analysis of the impacts of flows on seed

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germination. The Network proposed study modification will meet the study's goal, remedy the study deficiencies and lead to more informed decision making.

The proposed model and analysis conforms to established scientific methods, as presented in the Network's similar request for Study 6.2 (see below). The additional work of the licensee to support this request requires no field work or special expenses. The estimated cost of time and analysis to complete the proposal is \$10,000.

Study 6.2 Riparian Habitat Downstream of Englebright Dam

This study is partially complete. YCWA states in the Interim Study Report that the remaining tasks are to assess project affects on riparian habitat and issue a final technical memorandum. The Interim Study Report fails to note a specified consultation to occur with relicensing participants about the need for Phase Two studies. Technical Memo 6-2 (December 2012) also omits any reference to the consultation for Phase Two studies.

Study Plan 6.2 section 5.3.1.4 states: "At the conclusion of Phase 1, YCWA will prepare a report summarizing Phase 1, provide the report to the licensing participants, and meet with the relicensing participants to discuss the need for additional data collection. If relicensing participants collaboratively agree that additional data are needed, YCWA and Relicensing Participants will collaboratively develop the methods for Phase 2 ... and YCWA will provide the methods to FERC for consideration. "

Since releasing any study results or issuing Technical Memo 6-2 in December, YCWA has held one consultation meeting on this study on January 8, 2013. At this meeting relicensing participants were occupied with reviewing Phase 1 results and the discovery of certain study deficiencies (see last Network comment section of this document). In order to meet the study goal and objectives, the Network, CDFW and National Marine Fisheries Service requested a model of riparian hardwood germination as collection of Phase 2 information. YCWA denied the request.

The Network proposes a collaborative approach to development of Phase 2 study elements as described in Study Plan 6.2. However, in the event that YCWA continues to disagree with the need for additional information, the Network requests a study modification to achieve the objectives of the study. In summary, the Network proposes the following necessary study modifications: 1) develop a model for determining project-related viability of germination for riparian hardwood species and 2) analyze the characteristics of major cottonwood stands, including age, vertical structure and flood-prone location.

The analysis below shows good cause why this request should be approved consistent with the requirement contained in 18 C.F.R. § 5.15(d) related to modifications to approved study plans.

The goal of Study Plan 6.2 is to characterize riparian habitat as potentially affected by the Project. Specific objectives of the study plan include determining riparian vegetation composition, age class structure, and evaluating regeneration and germination. The inclusion of Large Woody Material (LWM) surveys in Study 6.2 makes sense because one aspect of a healthy

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riparian community is the local production of LWM. Large specimens of hardwood species such as cottonwood are particularly important for the production of LWM and other functional roles of riparian vegetation. Technical Memo 6.2 reveals that only 15 key pieces of LWM were found in the entirety of surveyed sites even though a substantial portion of measured individual cottonwoods are large enough in diameter (>24”) and height to be key pieces of wood when they fall over. This result underscores the importance of carefully evaluating any project effects on the recruitment of riparian hardwoods. If determined, such project effects could be mitigated through a flow measure or enhancement actions. This study modification is designed to provide critical information for such an evaluation of project effects, and the resulting information is needed to design mitigations or enhancements for the new license.

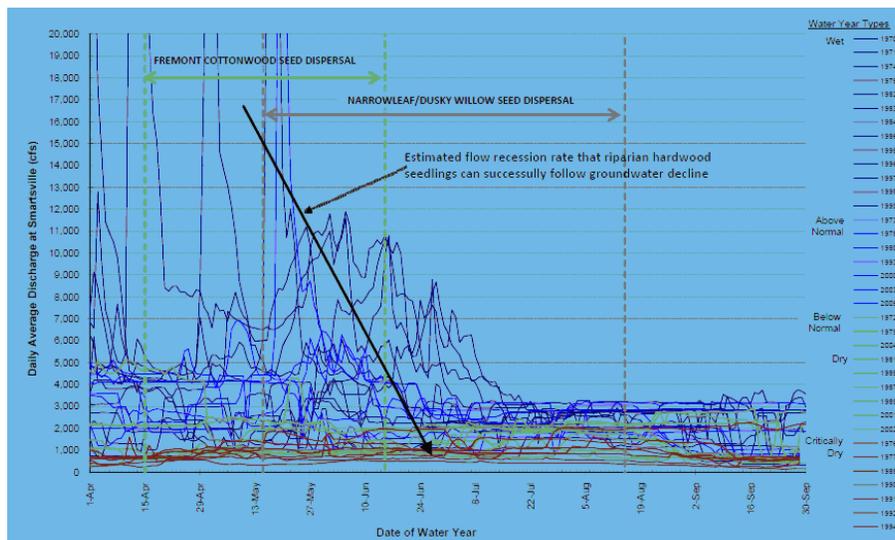
Recruitment model

To meet the objectives of Study 6.2, YCWA should develop a model and conduct certain analyses for determining potential viability of germination for riparian hardwood species. The model should draw on a spreadsheet that will parameterize viable germination using seed dispersal period, maximum root follow rate and threshold conditions for subsequent flow change events. Input values for these parameters are available from literature already reviewed as part of the study. Relicensing participants should have an opportunity to consult on final model parameters. Model results will include tabular and graphic demonstrations of potential viable germination for all years of with-project and without-project hydrology. The Licensee should present the results in such a way that will demonstrate (and quantify where feasible) frequency of potential viable germination by channel elevation (stage) and with representative cross-sections. Target species will include Fremont’s cottonwood, Goodings willow, white alder and sycamore. This model should use surrogates and assumptions when specific data is limited for some species.

The requested model and analysis follows established methods in this scientific field. General methods for this study component can be found in Mahoney and Rood (1998) and Stillwater Sciences (2006). The Network believes that similar models have been established by multiple investigators of other river systems in the region. The additional work of the licensee to support this request requires no field work or special expenses. The estimated cost of time and analysis to complete the proposal would be \$10,000, and substantially less if performed in addition to the essentially equivalent study modification request for Study 6-1.

Figure 1 containing lower Yuba River hydrographs during project years is presented for conceptual purposes, and illustrates several parameters of a recruitment box model including seed dispersal period and maximum root follow rate for riparian hardwoods (from CBEC and SYRCL, 2010).

Figure 1



Analysis of cottonwood stand characteristics

Technical Memo 6.2 reveals that YCWA has ceased to attempt to complete the Inventory and Aging of Existing Cottonwood Stands (Study Plan section 3.3.1.3.2). As rationale, the Licensee cites a relationship between cottonwood age and diameter at breast height (dbh) that does not yield a narrow confidence interval when assigning age to trees by dbh. The Licensee can still meet the study objective, albeit through a modified approach. The Licensee should use pooled cottonwood core data to assign relative age to cottonwood stands. Specifically, based on the pooled data from 91 tree cores, the 95% confidence interval for aging trees by dbf is +/- 3.9 years. This is precise enough to assign relative age to cottonwood stands “to determine approximately when each stand was established and if recruitment continues” to replace the stands, as directed in the Study Plan 6-2. Much of the work to complete this study component is complete. Most of the study modification can be accomplished through desktop analysis of the riparian mapping data. Additional fieldwork is required for measuring dbh at selected stands. The Licensee should consult relicensing participants on determination of stand selection method.

In addition, the Licensee should perform pertinent characterizations of cottonwood stands through analysis of the riparian mapping as generally stated in the study plan for the condition assessment. Technical Memo 6.2 reveals that the Licensee has underutilized the riparian mapping data for analytical methods that support study objectives. For example, YCWA examined the distribution of cottonwoods only among reaches and four flow boundaries (in-channel, bankfull, floodway, and valley floor). Reliance on such a limited and coarse analysis may lead to misleading results and inadequate information for evaluating and managing project effects. Technical Memo 6-2 states that “cottonwoods have relatively even distribution laterally across the valley floor”, and cites as evidence the proportion of cottonwood polygons in the four flow boundaries. However, a more refined analysis of cottonwood location relative to channel elevation or flows presents different results. Figures below were generated from the same mapping data used by YCWA. Figure 2 shows the distribution of cottonwoods by elevation above the low water channel. Cottonwood polygons have been converted to area to better represent the relative coverage of canopy. Figure 3 shows the frequency distribution for all five Foothills Water Network

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reaches combined and the marked variation among the five reaches. The Licensee should conduct additional analyses of this type and the analysis should include cottonwood height and relationship to flood frequency. To meet study plan objectives, the Licensee should combine these results with results from the recruitment model to evaluate if current conditions represent predicted patterns of successful recruitment and stand replacement.

Figure 2

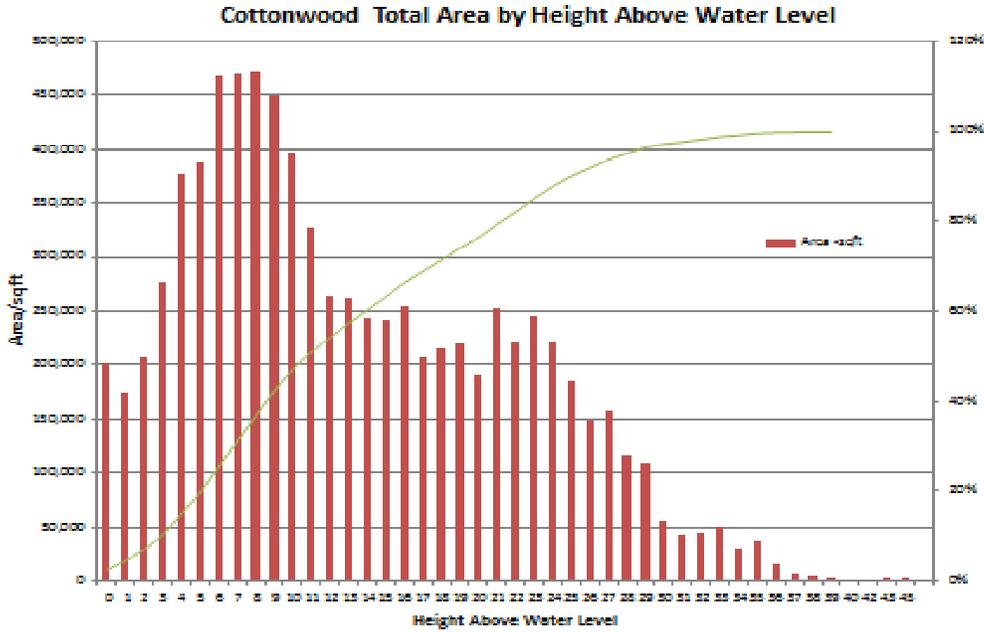
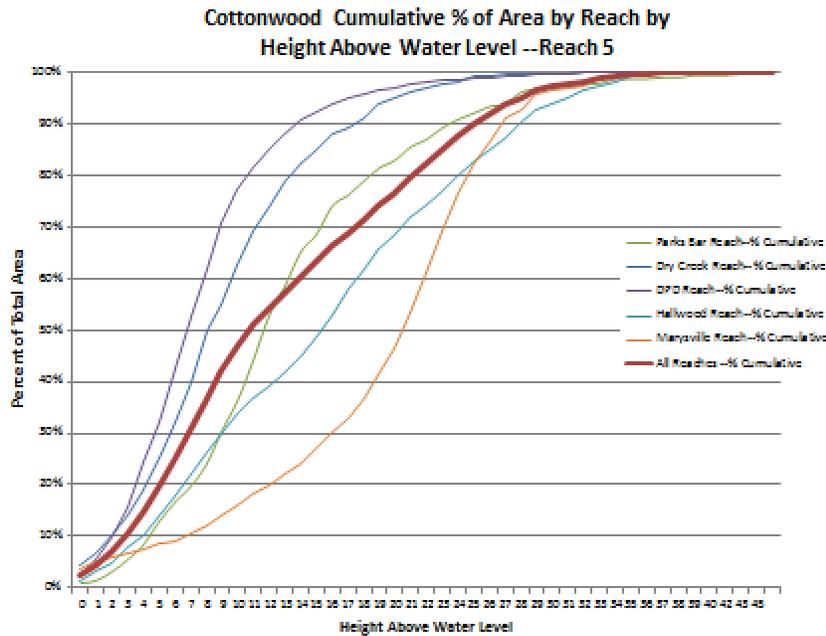


Figure 3



CBEC and SYRCL. 2010. Rehabilitation Concepts for the Parks Bar Reach of the Lower Yuba River. Prepared for the US Fish and Wildlife Service. www.yubariver.org/restoratoin

Mahoney, J.M. and S.B. Rood. 1998. Streamflow requirements for cottonwood seedling recruitment - an integrative model. *Wetlands* 18(4):634-645.

Stillwater Sciences. 2006. Restoring recruitment processes for riparian cottonwoods and willows: a field-calibrated predictive model for the lower San Joaquin Basin. Prepared for CALFED BayDelta Ecosystem Restoration Program, Sacramento, California. Prepared by Stillwater Sciences and Dr. John Stella, in conjunction with Dr. John Battles and Dr. Joe McBride, Department of Environmental Science, Policy, and Management, University of California, Berkeley.

Study 7.2 Narrows 2 Powerhouse Extension

The study is not complete. The Licensee still must meet with relicensing participants to determine whether or not water temperature targets other than those established by the Yuba Accord River Management Team should be used to determine the need for and appropriate configuration of a Narrows 2 Powerhouse Intake modification.

The Network recommends that this study be modified to require the Licensee to develop alternative conceptual designs for the Narrows 2 Powerhouse Intake whether or not water temperature targets are agreed to by the relicensing participants. There is good cause for the Commission to approve this modification, as noted below.

The requested change is necessary because under the current study design, it is possible that no information will be produced regarding the efficacy of modifying the Narrows 2 Powerhouse

Intake. Pursuant to the existing study design, this analysis is required only if the Licensee determines that the existing intake is unable to meet certain water temperature targets that were developed in an outside process unrelated to this current relicensing or is unable to meet certain water temperature targets that must be agreed to by the Licensee and relicensing participants. Essentially, the study design places the resource agencies (and other relicensing participants) in an untenable situation. To receive information that could inform future licensing conditions, specifically that related to the feasibility of modifying the Narrows 2 intake, they must develop and agree to temperature criteria before having the benefit of all the information that will be provided pursuant to relicensing, and way before such criteria would need to be developed to be included as proposed protection, mitigation and enhancement measures. Assuming water temperature criteria can be developed in the near future, it is still unclear how temperature will be managed in the future given the multiple processes proceeding in the watershed, including this relicensing and the State Water Resources Control Board's update to its Sacramento/San Joaquin Bay Delta Water Quality Control Plan. Therefore, it is unreasonable to condition analysis on a set of water management criteria that may or may not be realistic in the long-term. Information regarding modifying the existing intake should be obtained now.

Specifically, the Network recommends that the Licensee evaluate an alternative design that places the location of the intake at the lowest practicable elevation. The Commission should approve this modification because the information being collected pursuant to the existing study design is insufficient to provide a sound basis for FERC recommended license terms and conditions.

Study 7.3 ESA-Listed Amphibians—California Red-Legged Frog

The Network supports comments by the US Fish and Wildlife Service (Service) requesting that each of the 91 sites identified by the aquatic habitat site assessments are surveyed in accordance with Service's California red-legged frog survey guidance. In addition, the Network believes that the Service has demonstrated good cause for why there is a need to survey some additional locations that were inadvertently rejected as California red-legged frog habitat. Specifically, the Service explains that bullfrogs are good indicators of potential California red-legged frog habitat and therefore recommends that stream and river reaches where bullfrogs were detected should be surveyed for California red-legged frogs from 0.25 mile upstream of each bullfrog detection, or population, to 0.25 mile downstream of that bullfrog detection or population. In addition, surveys for vocalizing bullfrogs, in riverine areas outside of the areas surveyed under Studies 3-4 and 3-6 should be conducted in late spring and summer. The Network agrees that the Service's suggested modifications for more survey of suitable habitat for California red-legged frogs and for additional surveys to establish baseline conditions for a Bullfrog Management Plan will allow a more thorough assessment of the amount of habitat available to support breeding California red-legged frogs and the level of pressure that bullfrogs may be putting on California red-legged frog populations. Therefore, the Commission should approve this modification as it will meet the study's goal, remedy the existing study deficiencies and lead to more informed decision making.

3. REQUEST FOR NEW STUDIES

a. Mercury Transport and Speciation

Mercury contamination is a critical issue of environmental health in the Yuba and Sacramento River watershed. Consumption of mercury-laden fish leads to developmental delays in fetuses, infants, and children, and can lead to neurological symptoms and other health problems in adult humans as well as ecological problems in wildlife (Weiner et al. 2003). The transport of mercury and methylmercury through Sierra Nevada reservoirs (via spillways and controlled releases) is a significant contributor to Bay-Delta methylmercury levels. Over a 20-year period (1984-2003) it is estimated that 98% of total mercury loads to the Delta came from upstream tributaries (Wood et al. 2010). Some of the highest known levels of mercury in fish tissues among Sierra-Nevada watersheds have been found in reaches above and below YCWA project facilities (Alpers et al. 2005).

Englebright Reservoir has extremely elevated fish tissue concentrations of mercury (May et al. 2000), which are the basis of a fish consumption advisory issued by the California Office of Environmental Health Hazard Assessment. Operations of Colgate Powerhouse influence the wetting and drying of sediments in Englebright Reservoir which, based on research in the nearby Camp Far West Reservoir, likely increases rates of mercury methylation (Alpers et al. 2008). YCWA's Narrows 2 facility, the principal outlet of Englebright reservoir, conveys mercury downstream as confirmed by sampling of the current YCWA's Water Quality Study 2.3.

Elemental mercury adheres to fine sediment and can remain biologically benign in deposits or even in suspended transport. When mercury is disturbed by anthropogenic processes, however, broken down to finer particles and oxygenated, the mercury becomes more susceptible to methylation. Studies on the South Yuba River demonstrate that mechanics of dredging sediments increase the methylation and transport of mercury downstream, and rate of uptake to the biotic environment. Mercury gets "flowered" as it goes through a dredge (Fleck et al 2011) and the oxygenation occurring in this environment makes it more reactive and more likely to methylate (Marvin-DiPasquale et al. 2011). The mechanism by which dredges change the structure of mercury is similar to the mechanism of powerhouse turbines, and may be responsible for greater concentrations of methyl mercury found below dams (Alpers et al. 2008).

Data being collected is insufficient to provide a sound basis for FERC recommended license terms and conditions. The Initial Study Report reveals that Study 2.3 (Water Quality) and Study 2.4 (Bioaccumulation) will not support any evaluation of potential project effects on mercury transport, speciation, and bioaccumulation. Mercury speciation refers to the different chemical and structural forms of mercury that determine processes such as methylation and bio-uptake. New information and current studies by YCWA support the need for a new study focused on assessing potential effects of the project on mercury transport, speciation and bioaccumulation.

Technical Memorandum 2.3 reports the results of mercury analysis from water samples obtained from the tailraces for Colgate powerhouse and Narrows 2 powerhouse in March 2012.

Unsurprisingly, the sample results show a strong positive relationship between total suspended

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sediment and total mercury. One of the four samples (sampling was repeated at each powerhouse three days following because initial samples exceeded hold time limits) was collected when there was no measureable suspended sediment. All three of the other samples had total mercury concentrations exceeding the maximum total mercury concentrations measured at all ambient sites in the watershed during spring of 2012. During conditions of moderate suspended sediment (29.75 ng/L) at Narrows 2 on March 19, total mercury in the sample (19.4 ng/L) was 16 times the average ambient concentration of total mercury and 5 times the maximum ambient concentration.

The proposed study has a clear project nexus and relationship to potential mitigations.

When reservoirs are turbid, hydropower facilities may increase the yield of methylated mercury to downstream reaches by converting elemental or particulated mercury into an oxygenated form subject to increased rates of methylation. This increase in the yield of methylated mercury would be associated with an increase in mercury through the trophic levels of organisms in the lower Yuba River, Sacramento River and the Delta. If such an increase in the yield of methylated mercury to the lower Yuba River were occurring, then several potential project modifications or mitigations may be considered. For example, bypasses could be utilized during highly turbid periods or the licensee could implement projects to reduce methylated mercury formation in other parts of the watershed such as the shallow zones of Englebright Reservoir.

A similar request for a study was included in comments by FWN, CDFW and the State Water Resources Control Board on YCWA's proposed study plan in July 2011. Subsequent collaborative discussions led to an agreement to include in the Water Quality study a one-time sampling of the tailraces of the Colgate and Narrows 2 powerhouses for analysis mercury and methylmercury. The resulting samples confirmed that Narrows 2 powerhouse transports mercury in significantly higher concentrations than ambient for the watershed. However, the resulting effort was ineffective for the goals and objectives as stated below. Moreover, new information and regulations regarding mercury have emerged to emphasize the need and demonstrate the methodological approach for this study.

The objective of this proposed study is to collect information to determine project effects on the transport and speciation of mercury. The goal is to provide a basis for developing project mitigations or enhancements, if warranted based on study results.

Goals and objectives of this study are not being met with an existing study methodology.

YCWA's bioaccumulation study contributed data on mercury toxicity in fish tissues, but does not evaluate the effects of the project on transport or chemical changes in mercury that influence biological uptake. Resulting data, while useful for establishing science-based fish advisories, is not useful in understanding project effects on bioaccumulation of mercury. YCWA's Water Quality study collected data on total mercury and methylmercury during low flow conditions, but because most mercury is transported in association with high concentrations of suspended sediment (Fleck et al. 2011), the study results are not useful in understanding project effects on the availability of this toxin.

New information has emerged since the study plan determinations. Recent studies on the South Yuba River (Fleck et al 2011, Marvin-DiPasquale et al. 2011) have demonstrated that

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mechanics similar to turbines increase the methylation and transport of mercury downstream, and the rate of entrance to the biotic environment. Also, new methods for measuring “reactive mercury” and “dissolved mercury” have become standardized (Huffman et al. 2012, Brooks Rand Labs 2012) and these parameters provide a direct means of evaluating the potential effect of project powerhouses on the chemical structure of mercury.

New regulations have taken effect pertaining to mercury in the lower Yuba River. The North Yuba, Middle Yuba, South Yuba, Englebright Reservoir, and the lower Yuba River are all listed as an impaired water body under the Clean Water Act section 303(d) because of mercury contamination. Some of these water bodies, including the lower Yuba River, were added to the official list of polluted water bodies and dates for establishing Total Maximum Daily Load limits, approved by the U.S. Environmental Protection Agency, following initial study plan development.

The analysis above shows good cause for approval of the new study and is consistent with the requirement contained in 18 C.F.R. § 5.15(e) related to proposals for new information gathering or studies.

Study Methods:

1. Sample the unmixed tailrace water below Narrows 2 powerhouse at three times of high suspended sediment transport through the powerhouse.
2. Take paired samples simultaneously if possible and within 20 minutes, of water bypassing the powerhouse by spilling over dam.
3. To ensure variability of conditions, sampling events will occur less than 3 hours apart, and all three sampling occasions will span a minimum of 3 days.
4. Adequately high suspended sediment for sampling will be assumed to occur when flow at the Smartsville gage is in excess of 5000 cfs and has increased 100% in the preceding 36 hrs. In addition, turbidity in the tailrace must be greater than 100 NTU.
5. Samples will be tested in-situ for temperature and pH, and sent to a laboratory for testing of the following parameters:
 - a. Total mercury (EPA method 1631)
 - b. Dissolved mercury (EPA 1631)
 - c. Reactive mercury (Brooks Rand Labs, Huffman et al. 2012)
 - d. Total dissolved solids (EPA 2540)
 - e. Total suspended solids (EPA 2520)
6. Special sampling handling and transport procedures will be followed per laboratory recommendations to ensure data accuracy (see Brooks Rand field sampling directions).

Estimated Cost: Based on laboratory rate sheets, including a Brooks Rand Lab sheet on reactive mercury, number of samples, necessary equipment, and travel, the estimated direct costs for the study total \$3500. Costs for 3 field days for two staff, and 3 office days for one staff are estimated at \$4000 for a total estimated cost of \$7500.

Citations for Mercury Transport and Speciation Study Request

Alpers, Charles N., et. al.: Geochemical Data for Mercury, Methylmercury, and Other Constituents in Sediments from Englebright Lake, California, 2002

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b. Bullfrog Study

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The Network supports the request by the US Fish and Wildlife Service for a new study of bullfrog distribution and habitat in project effected waters. Bullfrog are an invasive species with significant consequences to native biota, and new information on the presence of bullfrog points to the need for a study that can support consideration of how project operations can variously exacerbate or mitigate the problem.

4. STUDY DEFICIENCIES, VARIANCES AND FEEDBACK

Study 1.1 Channel Morphology Upstream of Englebright Reservoir

This study is incomplete. The study element in which tracers will be placed in the river has not been completed yet because appropriate flows have not been present yet. If the Licensee is not able to complete the study according to the prescribed methodology in Study Plan 1-1, then the Licensee should consult with relicensing participants to agree on an alternative methodology.

In addition, the Network notes that the hand drawn maps are hard to discern. The Network recommends that Licensee revise the maps to ensure they can be easily interpreted and therefore useful to inform decision-making.

Study 1.2 Channel Morphology Downstream of Englebright Reservoir

The Network has not been able to complete review of Technical Memorandum 1-2, but recognizes that the primary method used by YCWA to characterize physical habitat is alternative to existing standards or precedent from investigation of other rivers. The Network is concerned that interpretations of these data, without data from more standardized methods, may lead to incomplete or bias conclusions and thereby restrict the full range of necessary considerations for developing license terms and conditions.

Study 2.1 Hydrologic Alteration

The Network supports comments by the National Marine Fisheries Service on the deficiencies of this study and the need for more information to meet study goals and objectives. Specifically, more information, such as that from seasonal flood flow analysis, is needed to develop sound license conditions.

Study 2.2 Water Balance/Operations Model

This study is incomplete. At this time, relicensing participants are continuing to work with the Licensee regarding modifications to the model. The Network anticipates that an agreement will be reached and that the Licensee will make the agreed upon changes to the model and believes that the Water Balance / Operations Model will prove useful for informing decision-making in this relicensing.

The Network recommends that the Licensee provide the raw data inputs to relicensing participants so that they can have the data in hand when reviewing the technical memo report. The Network requests a meeting of relicensing participants to learn more about the assumptions for inputs going into the model. In particular, the Network is concerned about the inputs and assumptions in Dry and Extreme Critically Dry Year types.

The Network supports the CDFW comments on this study report.

Study 2.3 Water Quality

This study is partially complete. YCWA states in the Interim Study Report that the only tasks remaining are to: 1) process water quality data collected in the fall of 2012; 2) consult with relicensing participants regarding the need for focused second year studies; and 3) issue a final technical memorandum. A meeting has been scheduled for the consultation on January 30th. The Network reserves the right to comment on the completeness of the study following consultation and issuance of a final technical memorandum. Potential necessary modifications include sampling as proposed under the new study of mercury transport and speciation in the event that the new study proposal is not approved.

Technical Memorandum 2.3 Section 4.8 claims that the 27.7 µg/L of nickel recorded in the spring 2012 sampling at Englebright Reservoir's upper-reservoir location was "essentially equivalent" to the California Toxic Rule criteria of 18.8 µg/L. Such misleading language should be avoided when the recorded value exceeds the CTR criteria, in this case by 47% .

Study 2.5 Water Temperature Monitoring

This study is incomplete. The Network requests that the Licensee present the margin temperature results in a different format that is more useful to interpretation and decision-making. The Network requests the Licensee provide a few representative DSS plots that show the thalweg and margin temperatures. The table that is currently included in the Technical Memo could be easily distorted depending on the time the temperatures were gathered. The Network requests a meeting of relicensing participants to come to an agreement on the format in which the results will be displayed. We also request that the map fully identify the locations for the margin temperature measurements.

The results for water temperature at Narrows 2 and Colgate data points appear to be outliers. The Licensee should analyze these data points and explain why the temperatures at the powerhouses are presenting as outliers.

Study 2.6 Water Temperature Models

Relicensing participants participating in the development and refinement of the temperature model agreed that the water temperature model needs to be refined. The modeling team is working on the Middle Yuba River part of the model. The modeling team could change the timing of surveys to capture a range of water temperature values.

The model reflects the Lower Yuba River reaches downstream of Englebright Reservoir well.

Study 3.1 Aquatic Macroinvertebrates Upstream of Englebright Reservoir

This study deviated from the study methodology in three ways.

1. The methodology includes SWAMP protocol. Without consultation with the agencies, the Licensee switched to another protocol. Though there may have been good reason for

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the switch and protocol, it is a deviation from the study methodology without consultation and agreement from relicensing participants.

2. Licensee delayed the completion date of the study.
3. Without consultation, the Licensee dropped two of the study sites due to lack of riffle habitat.

The Network requests the Licensee present the rationale for the change in protocol and the proposed protocol to relicensing participants. We also request that the Licensee explain to relicensing participants the rationale for excluding two of the proposed study sites. The study sites should be studied or alternatives for study found if needed to meet the study objectives.

Study 3.4 Special-Status Amphibians—Foothill Yellow-Legged Frog Surveys

This study is incomplete. The technical memo has incomplete results on timing and distribution below New Bullards Bar Reservoir. The Network supports the comments by the Forest Service and US Fish and Wildlife Service on this study.

Study 3.5 Special-Status Amphibians—Foothill Yellow-Legged Frog Modeling

The Network supports the Forest Service and US Fish and Wildlife Service's comments on this study. The 2-D Foothill Yellow-Legged Frog data results should include an analysis of a range of flows.

Study 3.8 Reservoir Fish Populations

The Network supports the Forest Service and US Fish and Wildlife Service recommendations that the Licensee add parasites and fish health to the field data sheet to meet the study objectives for assessing fish health. Forest Service personnel detected anchor worm parasites on many fish while in the field. The study results should take into account fish health as observed by the field crew.

Study 3.8 Stream Fish Populations Upstream of Englebright Reservoir

The Network supports the Forest Service and US Fish and Wildlife Service recommendations that the Licensee add parasites and fish health to the field data sheet to meet the study objectives for assessing fish health. The Fish Population Study is deficient on a number of counts:

1. The Licensee did not record parasites present on the fish. While in the field with the field crew, a Forest Service representative documented anchor worms on many fish. The identification of parasites should be put on the field data form. To say the fish are in good condition ignores the observance in the field of these parasites and ignores the question of whether the project has impact on the presence of the parasites.
2. The field crew only rarely reached depletion of fish when electro-shocking in the Fish Population Study. Therefore, the study results are really not reaching the objective of telling us how many fish are representative of the area and what condition they are in.

3. The Licensee interpreted Chinook stranding as natural and not caused by the project. The project probably caused it. If we cannot agree on the cause of death, then the interpretation should be broadened or left out of the technical memo.
4. In studying Yellow Jacket Creek site, the field crew ran out of time and failed to reach depletion. They returned the next day to snorkel the reach. However, despite the recommendation from the Forest Service representative, they did not leave the blocknets up in the river overnight. The report did not mention that the field crew had removed the blocknets between the study days. During the intervening time without blocknets, fish certainly could have left or entered the reach they were studying. Therefore, the results could be biased and subject to a large margin of error. Furthermore, the field crew was supposed to have four people but they only had three, which contributed to their inability to complete the study according to the methodology. This fish population study at this site should be redone.

The study technical memo contradicts itself multiple times. In some parts, it states that there is a study variance in that there is no study site on the North Yuba River. In other parts of the memo, it reports results from the site on the North Yuba River. Results for the North Yuba also appear in the tables of the studies. The Licensee should resolve this contradiction in the technical memo. If there is a variance, the Licensee should explain the rationale to all relicensing participants. If there is no variance, then the Licensee should just revise the memo and resend it to relicensing participants.

Study 3.9 Non-ESAListed Fish Populations Downstream of Englebright Dam

The Network supports the comments by California Department of Fish and Wildlife on this study.

Study 3.11 Entrainment

This study is incomplete and there are variances from the study plan. In the technical memo, the Licensee claims they did not vary from the study methodology. However, representatives from the Forest Service and Department of Fish and Wildlife have brought to our attention that the field crew did pull the antennae array and trash rack out of the river at various times. Presumably, the field crew did this to release the woody debris that had built up against it and let it downstream. However, this presents a number of issues with the study methodology. First, it presents the question: how can the study results claim that the antennae array was 100% efficient when it was not in the river 100% of the time. Second, we cannot know if there were fish hiding under the debris or in the vicinity that went downstream into the turbines when the field crew pulled the trash rack and antennae array out of the river.

The Network requests the Licensee to inform us on its methodology as well as the dates, the frequency, timing, and duration of the removal of the trash rack and the antennae array. We request that the Licensee pair the list of out of service times with the entrainment data. We also request that the Licensee provide the raw data for milling fish detected in the Entrainment Study. The study results should take into account this variance from the methodology.

In the future, the Licensee should let the relicensing participants know 1-2 days in advance before the field crew pulls out the trash rack and the antennae array and give time for agencies to inspect and be present for the action. The field crew should be able to anticipate the need to remove the array because head flow diminishes in the presence of a build-up of debris.

The Licensee should continue the Entrainment Study until summer 2013. The study says the Licensee will pull out the antennae array as soon as the Licensee stops diverting. We request that the Licensee continue with the study and not pull the antennae array after it stops diverting until the consultation between the Licensee and agencies results in the decision to pull the antennae array. The rationale for continuing the study is that due to the variance, the Licensee did not get the expected number of days of study for the Entrainment Study.

Furthermore, we request a relicensing meeting to discuss whether additional fish tagging would be needed because of the intermittent removal of the antennae array and trash rack.

Additionally, study Table 3.1-1 has calculation errors that should be corrected. This is important because the miscalculations can drastically change the results for such a small sample size of fish that were pit-tagged.

Study 6.2 Riparian Habitat Downstream of Englebright Dam

This study has deficiencies and Technical Memo 6.2 requires corrections and additions:

- In the Executive Summary, the list of woody species present, “in order of most to least number of individuals” mistakenly lists cottonwood before willow. The order should correspond with Table 3.2-3 in Technical Memo 6-2.
- It is unclear from Technical Memo 6.2, and discussions with YCWA, if LWM pieces were mapped in relation to 5000 cfs or bankfull extent. If necessary, the Licensee should revisit the field to identify the location and frequency of large woody debris with GPS and relate that to a map as required in the study plan.
- Data on key pieces of LWM should be presented with all the attributes described in Study Plan 6-2, including dimensions, type of tree, and presence of root wad.
- More explanation is warranted on the relationship between riparian trees and LWM. Key pieces of LWM are rare even though cottonwoods and sycamore of the lower Yuba grow to that size. The average height of cottonwood polygons (WSI) is > 25'. Of the 88 cottonwoods measured for coring, 30% would be key pieces if they fell over. The obvious conclusion is that more cottonwood stands in the floodplain would lead to more key LWM, and more structural diversity in the channel.
- Riparian mapping data by WSI requires reporting of riparian types in either # of polygons or area, not individuals. P29 Table 3.2-4 incorrectly describes polygons as trees in the last column. Table 3.2-5 incorrectly describes trees per reach (instead of site). The data in Table 3.2-7 contains erroneous data under the column “diameter at breast height (in)”. The Technical Memo does not clarify whether the analysis of estimated age versus dbh was conducted on all cottonwood cores, or only the “high confidence” cores for which dbh was measured. An unacknowledged variance occurred in that dbh was not measured in the field for some of the cottonwoods that were cored. No explanation is given.

- Figure 3.2-1: Box plot is wrong charting application here and does not identify whether or not the data includes the cores of low confidence in estimating age. Use simple scatter column instead. Order reaches sequentially.
- Analysis of riparian mapping data from WSI is far too limited to meet the study objectives considering the sophistication of the data. The Final Study Report should utilize simple queries, graphs and map outputs to adequately characterize: 1) differences in composition and cover among reaches (there is a strong trend of more vegetative cover and more diversity downstream; 2) structural characteristics or height among species, reaches and location (vertically) in the channel (for example, overall data shows very large differences in height between willow and cottonwood); and 3) vertical (stage-discharge) distribution of vegetation by stand type or height. Full analysis would involve expansion of attributes for floodway (5000 – 21100cfs) to include area and height for each vegetation type, and area of no vegetation.
- Aerial photo analysis -- Tables that attempt to describe hydrologic differences between periods contain meaningless data except for date and magnitude of peak flood. Note that peak floods occurred 6 yrs before 1970 photo, 1 yr before 1987 photo and 13 yrs before 2010 photo and duration for regrowth can explain some of the patterns in the time series.
- Discussion of historical riparian vegetation does not describe how dredging activity destroyed riparian vegetation as it worked in the river channel up through the 1960s.

Study 7.8 ESA/CESA-Listed Salmonids Downstream of Englebright Dam

The Network supports the Forest Service and US Fish and Wildlife Service recommendations that the Licensee add parasites and fish health to the field data sheet to meet the study objectives for assessing fish health. Forest Service personnel detected anchor worm parasites on many fish while in the field. The study results should take into account fish health as observed by the field crew.

Study 7.9 Green Sturgeon Downstream of Englebright Dam

The study is incomplete. The Network requests the opportunity to participate in the collaborative meeting to share information that has been compiled in Phase 1 of the study.

Study 7.10 Instream Flow Downstream of Englebright Dam

This study is not complete. The Network reserves the right to comment on this study when it is finalized.

Study 7.11 Fish Behavior and Hydraulics Near Narrows 2 Powerhouse

This study is not complete. The Network wishes to participate in necessary forthcoming consultation for the completion of this study, and supports comments on the Technical Memo by the National Marine Fisheries Service.

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

The study is incomplete. The Network requests the opportunity to participate in the collaborative meeting to review information from Phase 1 analysis and determine any need for Phase 2 of the study.

Study 8.1 Recreational Use and Visitor Surveys

The Network supports the Forest Service comments on Recreational Use and Visitor Surveys including but not limited to the assertion that the Project should include identified roads and trails.

Study 8.2 Recreational Flow

The Network requests that the Licensee provide more detailed information regarding the analysis and results of the Recreational Flow Study and provide clarification where noted below.

First, the Network recommends that the Licensee give a more detailed account of the results from the whitewater focus group. This focus group took place on April 26th, 2012 in Grass Valley, and was separate from the focus group that took place on July 18th, 2012 in which the group discussed the boating take-out for the North Fork Yuba study reach. Section 3.1.1.1.9 of the Initial Study Report gives a brief summary of the information gathered during the April 26th whitewater focus group. However it is difficult to discern the meaningfulness of the responses. For instance, Table 3.1-40 highlights that when members of the focus group were asked about the availability of flow information, the group said that the information was, "... not reliable or predictable," and that, "flows vary within 24 hours, and are a central issue for boatability of the reach." The responses from the focus group should be explained in more detail. For example, in regards to the quotes above, the study should explain in more detail why flow variability is a central issue.

The Network also recommends that the Technical Memo provide better context regarding the recreational quality of the Our House Dam to Highway 49 reach. The Technical Memo states that participants stated that this run is "slightly better than Chamberlain Falls run on the North Fork of the American River." To put this in perspective, the reader must know that the Chamberlain Falls run is considered to be one of the best Class IV runs in the State. It was clearly stated during the focus group that the Our House Dam to Highway 49 reach was as good as any Class IV run in California, and this should be captured in the study results.

The Network recommends the Licensee include the survey results of an opportunistic boating study on April 27th, 2012 be in the Technical Memo. The Network understood from relicensing participants meetings that the Licensee would include the survey results from the opportunistic boating study in the Technical Memo. Upon review, it is clear that these results have not been included. We request that they be added to the study.

On April 27th 2012, a group of boaters ran the Our House Dam to Highway 49 reach. This group included rafts and kayaks. The survey results will help meet the study goals and objectives.

Finally, the Network recommends that the Licensee revise the survey results in section 3.1.1.1.2 because they are erroneous. The study states that, “nearly all boaters responded that the flow level they boated was “marginal” to “totally unacceptable” with some exceptions.” These survey results from an opportunistic boating study are inconsistent with other survey responses and comments made during the focus group. Table 3.1-18 shows that boaters would overwhelmingly return to paddle the Our House Dam to Highway 49 reach at optimal flow levels.

Contradictorily, these are the same flow levels that boaters rated as completely unacceptable in the previous section of the Technical Memo. One of the challenges in doing an opportunistic rather than a controlled flow study is that the consultants conducting the study do not necessarily administer the surveys. It is possible that participants may misunderstand survey questions and respond inappropriately. This may be the case in this instance. We recommend that the Licensee’s consultant contact the survey respondents to verify and clarify their survey responses.

The Network will work with other relicensing participants to continue to consult on the remaining recreational flow study elements in relation to the Entrainment study.

Thank you for considering these comments. If you have comments or questions, please contact Julie Leimbach, Coordinator of the Foothills Water Network julie@foothillswaternetwork.org 530-622-8497.

Respectfully,

Foothills Water Network Yuba-Bear Working Group



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