ATTACHMENT 2
TO SSWD'S OCTOBER 13, 2016 LETTER

SSWD'S REPLY TO
REQUESTS FOR NEW STUDIES

South Sutter Water District (SSWD) received 12 requests for 10 new studies included in the seven comment letters from agencies, tribes and non-governmental organizations (Table 1). SSWD adopted some elements of four of the requested new studies, and did not adopt eight of the requested new studies (Table 2).

Table 1. Number of requested new studies.

Requested New Study	NMFS	CDFW	SWRCB	OHP	FWN	USFWS	UAIC	Total
Effects of the Camp Far West Project and Related Facilities on Fluvial Processes and Channel Morphology for Anadromous Fish	1							1
Effects of the Camp Far West Project and Related Facilities on Coldwater Delivery Feasibility for Anadromous Fish	1							1
Vegetation Mapping Study Plan		1						1
Sturgeon Study Plan		1				1		2
Benthic Marcroinvertebrate Study Plan		1				1		2
Algal Growth Study			1					1
Evaluation of Migration and Use of the Lower Bear River by Juvenile Chinook Salmon and Other Anadromous Fish Using Two Rotary Screw Traps					1			1
California Red-legged Frog Study						1		1
Juvenile Chinook salmon survival Study						1		1
Large Woody Material and Sediment Transport Study						1		1
Subtotal by Commenter	*2*	*3*	*1*	*0*	*1*	*5*	*0*	--
Total Requested New Studies	**12**							

Table 2. Elements of requested new studies that SSWD adopted.

Requested New Study	Adopted Elements
Effects of the Camp Far West Project and Related Facilities on Fluvial Processes and Channel Morphology for Anadromous Fish	LWM count in Bear River downstream of non-Project diversion dam, course sediment evaluation and gravel permeability in Bear River downstream of non-Project diversion dam
Effects of the Camp Far West Project and Related Facilities on Coldwater Delivery Feasibility for Anadromous Fish	None
Vegetation Mapping Study Plan	None
Sturgeon Study Plan	eDNA, snorkel surveys and beach seining in the Bear River downstream of the non-Project diversion dam

Table 2. (continued)

Requested New Study	Adopted Elements
Benthic Marcroinvertebrate Study Plan	None
Algal Growth Study	None
Evaluation of Migration and Use of the Lower Bear River by Juvenile Chinook Salmon and Other Anadromous Fish Using Two Rotary Screw Traps	None
California Red-legged Frog Study	Additional survey time to monitor for American bullfrog and two additional site visits
Juvenile Chinook salmon survival Study	None
Large Woody Material and Sediment Transport Study	Sediment accumulation in Camp Far West Reservoir

SSWD's reply to each requested new study is provided below by study. In general, for each request, SSWD indicated which Relicensing Participants requested the new study, and SSWD has stated whether SSWD adopted the request without modification, adopted the request with modification, or did not adopt the request. For requests adopted with modifications or not adopted, SSWD has explained the reason why it modified or did not adopt the request, in the context of the Federal Energy Regulatory Commission's (FERC) study plan criteria.

1.0 Requested New Study - Effects of the Camp Far West Project and Related Facilities on Fluvial Processes and Channel Morphology for Anadromous Fish

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) requested a new study named *Effects of the Camp Far West Project and Related Facilities on Fluvial Processes and Channel Morphology for Anadromous Fish* (NMFS, Enclosure A, pp. 2 through 10). In general, the study would evaluate the effects of the Project on fluvial processes and channel morphology, including the amount and size of coarse substrate material that life stages of anadromous and resident fishes use and rely upon in freshwaters. The study would quantify the magnitude of the Project's impacts on sediment and large woody material (LWM) supply and the resultant effects on anadromous fish. The study area would include the Bear River from Camp Far West Dam downstream to the junction with the Feather River. NMFS' new study request includes three requested "elements," which are discussed below. NMFS did not estimate the level of effort or cost to complete the study, or describe why SSWD's proposed studies were not adequate to inform requirements in the new license.

In general, the overall purpose of NMFS' new study (i.e., asses Project effects) is inconsistent with the purpose of relicensing studies, which is to supplement existing, relevant and reasonably available information. Interested parties may use these to perform their own assessment of Project effects and propose requirements in the new license. In particular, SSWD will assess Project effects in its Draft License Application (DLA) and Final License Application (FLA), and FERC will use these data in its National Environmental Policy Act (NEPA) document.

New Study Elements	SSWD's Reply
Request Element #1 – Quantify the frequency and volume of LWM inundated and trapped on annual basis by Camp Far West Reservoir.	**NOT ADOPTED.** NMFS does not adequately address the Project nexus study criterion. NMFS appears to rely on two arguments. The first argument is that the dam, when constructed, removed a large volume of wood that was trapped in reservoir and, therefore, is no longer available to downstream reaches. The second NMFS argument is that the dam traps LWM from upstream so that the LWM is not available to downstream reaches. NMFS' first argument is not relevant. FERC's baseline is existing condition. Affects of Project construction are not addressed in relicensing. NMFS' second argument assumes that Camp Far West Dam captures significant amounts of upstream LWM that would otherwise pass downstream. This is not the case. As stated at page 3.2.1-22 of the PAD, SSWD very rarely collects LWM from Camp Far West Reservoir. Given the above, this element of NMFS' requested new study would not inform requirements in the new license.
Request Element #2 – Quantify Coarse Sediment Storage and Available Spawning Habitat in the Lower Bear River.	**ADOPTED WITH MODIFICATION.** Spawning gravel is being quantified in the Bear River from the non-Project diversion dam downstream to the Highway 70 bridge as part Study 3.1, *Salmonid Redd Surveys* (see Section 4.3.1) Study 3.3, *Instream Flow*, has been modified to include methods to quantify the volume of coarse bed material as set out in Curtis et al. 2005[1], and separate sediment into the storage element stability classes set out in Kelsey et al. (1987[2]) in the two study sites. SSWD has collected LiDAR on the entire reach and these data, along with data collected for studies 3.1 and 3.3 will be used to provide an estimate of total sediment volume. Study 3.1 (Section 4.3.2) has been modified to include an assessment of gravel permeability.
Request Element #3 – Quantify LWM presence in the Lower Bear River.	**ADOPTED WITH MODIFICATION.** Notwithstanding SSWD's reply to NMFS Requested Element #1 above, information regarding LWM in the Bear River downstream of the non-Project diversion dam was included in the PAD. SSWD quantified LWM as part of the habitat mapping performed by SSWD in 2015. In certain locations, LWM was quantified as follows: any downed wood within bankfull width of channel greater than or equate to one-half bankfull width. Size classes within which LWM was binned was maximum diameters of 4 in. to 12 in., 12 in. to 24 in., 24 in. to 36 in., or greater than 36 in. Length classes were less than 3 ft, 3 ft to 10 ft, 10 ft to 25 ft, 25 ft to 75 ft, and greater than 75 ft. A general summary of LWM was provided in the PAD in section 3.2.1.8.3. However, LWM quantification was not continuous. SSWD will complete habitat mapping to provide continuous habitat and LWM quantification in the Bear River from the non-Project diversion dam to the Feather River confluence as described in Study 3.3, *Instream Flow*. SSWD will also add pieces smaller than bankfull not previously counted; minimum size criteria of length exceeding 3 ft, minimum diameter of 4 in. at the large end, and must be at least partially within bankfull (after Ruediger and Ward 1996[3]). Key pieces will be located as follows: a base map will be loaded onto a mobile device (e.g., tablet or laptop) and be utilized along with data collection software that can collect features (e.g., polygons, lines, areas, points) from an external GPS source. Data will be collected with a differential GPS antennae capable of 1 meter or better accuracy. Data for LWM key pieces located within the Study 3.3, *Instream Flow*, sites will be collected as requested in NMFS Element #3. It was noted during the habitat mapping that the introduced species of *Arundo donax* (common name giant cane) was very effective at sorting gravel, scouring pools and forming riffles, and habitat diversity. It should not be ignored and a LWM study alone would not acknowledge the importance of this roughness element. Location, length, width and height of cane-stem accumulations, along with effects on channel (i.e., backwater effect, flow diversion, pool forcing, gravel sorting, and cover) will also be added to habitat mapping report. The complete habitat mapping report including methods, photographs and discussion of LWM and other information will be included in the DLA and FLA.

[1] Curtis, J.A., L.E. Flint, C.N. Alpers, and S.M. Yarnell. 2005. Conceptual model of sediment processes in the upper Yuba river watershed, Sierra Nevada, CA. USGS Staff Published Research. Paper 482.

[2] Kelsey, H.M., R. Lamberson, and M.A. Madej. 1987. Stochastic model for the long-term transport of stored sediment in a river channel. Water Resources Research, Vol. 23, No. 9, pp 1738-1750.

[3] Ruediger, R. and J. Ward. 1996. Abundance and function of large woody debris in central Sierra Nevada streams. FHR Currents, No. 20.

2.0 Requested New Study - Effects of Camp Far West Project and Related Facilities on Coldwater Delivery Feasibility for Anadromous Fish

NMFS requested a new study named *Effects of Camp Far West Project and Related Facilities on Coldwater Delivery Feasibility for Anadromous Fish* (NMFS, Appendix B, pp. 20 through 26). The purpose of the study would be to evaluate the effects of the Camp Far West Hydroelectric Project and associated facilities on water temperature and to evaluate whether the Project can reliably deliver cold water to benefit salmonids in the Bear River downstream of the non-Project diversion dam. This study would use the existing Water Balance/Operations Model and SSWD's proposed Temperature Model (Study 2.2). NMFS' new study request includes three requested "elements," which are discussed below. NMFS did not estimate the level of effort or cost to complete the study, or describe why SSWD's proposed studies were not adequate to inform requirements in the new license.

As above, NMFS' new study is inconsistent with the purpose of relicensing studies, which is to supplement existing, relevant and reasonably available information – not assess Project effects. Interested parties will use existing information and information form relicensing studies to perform their own assessment of Project effects and propose requirements in the new license, and SSWD will assess Project effects in its DLA and FLA, and FERC will assess Project effects in its NEPA document.

New Study Elements	SSWD's Reply
Request Element #1 - Develop Operational Scenarios to prioritize cold water delivery to the lower Bear River	**ADOPTED.** Development of a temperature model is included in Study 2.2, *Water Temperature Modeling.* As a part of this study, the temperature model will include the option to set user-defined downstream release targets from Camp Far West using CE-QUAL-W2's built-in ability to automate port selection from a multiple outlet structure. This option will be turned off for the Base Case scenario.
Request Element #2 – Develop conceptual engineering options for modifications to infrastructure needed to deliver cold water	**NOT ADOPTED.** This element is not a request for a new study, but is a request for a PM&E – modifications of existing Project facilities. The request is premature because, at this time, no one has demonstrated that the Project has an adverse affect on downstream anadromous fish due to Project affects on water temperature, or that modification of the Camp Far West intake is needed. This is a request for a feasibility level study, which is not necessary or appropriate at this time in the relicensing.
Request Element #3 – Simulate infrastructure and operational changes of water temperature in the lower Bear River	**NOT ADOPTED.** Refer to SSWD's reply to Study Request Element #2 above.

3.0 Requested New Study - Vegetation Mapping

The California Department of Fish and Wildlife (Cal Fish and Wildlife) requested a new study named *Vegetation Mapping Study Plan* (Cal Fish and Wildlife, pp. 25 through 28). Cal Fish and Wildlife did not include a detailed study proposal in its comment letter, but provided a general outline. The purpose of Cal Fish and Wildlife's requested study would be to determine the fish, wildlife and plant species habitats that occur within the FERC Project Boundary and adjacent affected areas. Cal Fish and Wildlife's requested study includes three "elements" which are discussed below. Cal Fish and Wildlife provided an estimated cost to complete the study, and did

not describe why SSWD's proposed studies were not adequate to inform requirements in the new license.

New Study Elements	SSWD's Reply
Request Element #1 – Use the VegCAMP vegetation classification system to map the described areas within and outside of the FERC Project Boundary.	**NOT ADOPTED.** The requested study by Cal Fish and Wildlife offers insufficient explanation of how the study is more appropriate than other methods (Criterion 4) or relevant to inform resources goals and objectives (Criterion 5). Cal Fish and Wildlife states that this study plan is "*…needed to assess the most current and accurate vegetation typing information…to determine which fish, wildlife and plant habitats occur*…" (p. 26). However, Cal Fish and Wildlife has provided no evidence that the vegetation types presented in the PAD (based on the Forest Service CalVeg System) are insufficient for the needs of informing requirements in the new license. There is also no explanation of how this study would provide useful, additional information. In addition, Cal Fish and Wildlife states that it has already produced a VegCAMP map of the area. SSWD has requested that Cal Fish and Wildlife provides its map and the results of its ground truthing. This information will be incorporated into the DLA and FLA. Additionally, since the 2007 State Legislative mandating of an official vegetation mapping structure for California, multiple major relicensings, including the Yuba River Development Project (FERC No. 2246), the Drum-Spaulding Project (FERC No. 2310), the Yuba-Bear Hydroelectric Project (FERC No. 2266), the Don Pedro Project (FERC No. 2299), and the Merced River Hydroelectric Project (FERC No. 2179), have used the CalVeg system in order to identify habitat types. SSWD is not aware of any comments that the CalVeg system limited the ability of the agencies and licensees to identify potential requirements in the new license based on these data.
Request Element #2 – Perform an unspecified amount of ground-truthing of the vegetation types within the same area.	**NOT ADOPTED.** Refer to SSWD's reply to Study Request Element #1 above.
Request Element #3 – Map and describe any riparian vegetation along the shoreline of Camp Far West Reservoir, within any stream, creek or other drainage inlets to the reservoir, the Bear River upstream of the reservoir and the Bear River downstream of the Camp Far West Dam, extending 100 feet from the FERC Project Boundary.	**NOT ADOPTED.** Per the Cal Fish and Wildlife letter, p. 8, a major focus of the requested study is the identification by VegCAMP of "*…riparian tree alliances along the southern shoreline of Camp Far West Reservoir and in the Bear River arm of the reservoir*...[and] *along the Bear River downstream of the Camp Far West Dam…*" which were not identified by CalVeg. In 2013, SSWD conducted a biological assessment (BA) for the entirety of Camp Far West Reservoir that included surveys of riparian habitat as a natural community of special concern. Per the BA, "*…riparian is mostly absent along the Bear River [arm of the reservoir] due to the lack of soil and highly scoured bedrock*," conditions which are unlikely to have changed in the intervening three years (SSWD 2013). Additionally, no riparian communities or vegetation was identified on the southern shoreline (or elsewhere) on Camp Far West Reservoir. Again, these conditions are unlikely to have changed in the 3 years since that survey. These existing data are sufficient to address Cal Fish and Wildlife's concern about the possible riparian vegetation that was supposedly missed by the CalVeg mapping of the Project.

4.0 Requested New Study - Sturgeon

Cal Fish and Wildlife and the United States Department of the Interior, Fish and Wildlife Service (USFWS) each requested a new study named *Sturgeon* (CDFW, pp. 29 through 31 and USFWS, Enclosure C). Neither agency provided a detailed study proposal. The goals of the study would be to "*1) document the occurrence, temporal and spatial distribution, and movement of green and white sturgeon in the lower Bear River; 2) identify changes in the availability of habitat for holding and spawning adult sturgeon under different flow conditions; and 3) determine whether Project operations and maintenance activities adversely affect sturgeon in the lower Bear River*" (p. 29). Cal Fish and Wildlife and USFWS indicated that five different 'elements' are necessary in order to meet the goals of the study and each are discussed below. Finally, Cal Fish and Wildlife requested collaboratively developing the study plan which is not a requirement of the TLP process. Neither Cal Fish and Wildlife or USFWS estimated the level of effort or cost to complete the study.

As above, part of Cal Fish and Wildlife's and USFWS' new study is inconsistent with the purpose of relicensing studies, which is to supplement existing, relevant and reasonably available information – not assess Project effects. Interested parties will use existing information and information form relicensing studies to perform their own assessment of Project effects and propose requirements in the new license, and SSWD will assess Project effects in its DLA and FLA, and FERC will assess Project effects in its NEPA document.

SSWD understands that there is limited information regarding sturgeon in the Bear River downstream of the non-Project diversion dam. SSWD has adopted portions of this study request, as described below, as well as other requested study modifications related to Study 3.2, *Stream Fish*, and Study 3.3, *Instream Flow* (See Attachment 1 to this letter). Specifically, SSWD has modified Study 3.2 to include eDNA sampling, additional snorkeling surveys and add beach seining during each of its snorkeling events. Each of these items is meant to provide additional opportunity to document the presence of sturgeon and other fishes throughout the Bear River downstream of the non-Project diversion dam during different times of year. These studies will meet goals 1 and 2 in Cal Fish and Wildlife's and USFWS' requested new study. Based on the results of these studies and other studies, and existing information regarding sturgeon (i.e. life history, habitat requirements and distribution), SSWD will discuss the potential Project affects on sturgeon in the DLA and FLA (Goal 3).

New Study Elements	**SSWD's Reply**
Request Element #1 – Collecting and analyzing eDNA	**ADOPTED WITH MODIFICATION.** Study 3.2 has been modified to include two eDNA sampling events, one in the fall after the first winter freshet and one in the spring before low flow conditions. Sampling will be conducted according to Bergman et al 2016 including a single sample every 500 meters from the Camp Far West Diversion Dam to the confluence of the Feather River or the obvious start of back water effects. While SSWD sees the value in collecting eDNA samples it does not believe it is necessary to collaboratively develop the sampling logistics with CDFW. The methodology for collecting eDNA samples is well documented and the timing will be consistent with other study schedules requested by CDFW in order to increase the chances of observing anadromous fish during various life stages (i.e. fall and spring).
Request Element #2 – Conduct snorkel surveys	**ADOPTED WITH MODIFICATION.** SSWD has already proposed snorkel surveys as part of Study 3.2, *Stream Fish*. The specific locations, timing and methods are detailed in the Study Plan.
Request Element #3 – Conduct deep water surveys to document the occurrence of sturgeon in the Bear River downstream of the non-Project diversion dam	**NOT ADOPTED.** Cal Fish and Wildlife and USFWS provided no specific direction on how or when deep water snorkeling would occur. Conducting deep water surveys to document the occurrence of sturgeon is redundant to the eDNA sampling now proposed by SSWD (see SSWD's response to Request Element #1). eDNA samples collected when adult sturgeon are likely to be in the Bear River will provide a greater opportunity for detection compared to snorkeling at selected sites for an unspecified amount of time.
Request Element #4 – Collect larval and juvenile sturgeon during early spring through summer utilizing rotary screw traps, artificial substrates, and larval nets deployed at multiple locations	**NOT ADOPTED.** Cal Fish and Wildlife and USFWS provided no specific direction on how or when these methods would be used. Collecting juvenile sturgeon using rotary screw traps and artificial substrates is also redundant with the eDNA sampling SSWD proposes for the same reasons provide in response to Request Element #1. In addition, shallow water snorkeling and beach seining in the spring (described in Study 3.2) are also meant to capture and identify juvenile fish in the Bear River at the selected sample locations. Rotary screw traps are also very expensive to install and maintain without guaranteeing to provide the necessary data to meet the study goals or help address future license conditions.

Request Element #5 – Conduct surveys to identify potential spawning habitat	**NOT ADOPTED.** Cal Fish and Wildlife and USFWS provided no specific direction on how or when these methods would be used. SSWD has noted that sturgeon have the potential to occur in the Bear River downstream of the non-Project diversion dam but essentially no information exists to support that sturgeon currently reside in the Bear River. Furthermore, the Bear River is not considered critical habitat for green sturgeon, under the ESA. CDFW and other agencies stated recent information exists regarding the presence of sturgeon in the Bear River. SSWD has requested this information and will incorporate it into the DLA and FLA if it is provided in time.

5.0 Requested New Study - Benthic Macroinvertebrates

Cal Fish and Wildlife and the USFWS each requested a new study named *Benthic Macroinvertebrate* (CDFW, pp. 31 through 34 and USFWS, Enclosure F). Neither agency provided a detailed study proposal. The goals of the proposed study would be to "*1) assess the BMI community structure to evaluate overall stream health in the lower Bear River; and 2) determine whether Project operations and maintenance adversely affects BMI community structure in the Lower Bear River.*" Neither Cal Fish and Wildlife or USFWS estimated the level of effort or cost to complete the study.

As above, part of Cal Fish and Wildlife's and USFWS' new study is inconsistent with the purpose of relicensing studies, which is to supplement existing, relevant and reasonably available information – not assess Project effects.

New Study Elements	SSWD's Reply
Request Element #1 – Collect BMI using the reach-wide benthos method described in the SWRCB's Surface Water Ambient Monitoring Program (SWAMP[4])	**NOT ADOPTED.** SSWD understands there is limited information available on BMI communities in the Bear River but it is less clear why an understanding of the BMI communities is necessary for informing new license conditions. One goal of the proposed study is to assess the BMI community to evaluate overall stream health. SSWD has proposed multiple studies that will assess "stream health" and the Bear River water quality, water temperature, salmonid redd, stream fish and instream flow. The result of these studies and existing information will be used to assess potential Project affects in the Bear River in the DLA and FLA. It is also unclear how collecting BMI data in the Bear River downstream of Camp Far West Dam will meet the second goal of the study - to determine if the Project adversely affects BMI communities. The results of any BMI survey will be a single data point for BMI population in the Bear River. At best, some general assumptions could be made to categorize if the BMI communities were "good," and Cal Fish and Wildlife and USFWS do not provide any information on how these data would be used to inform future license conditions or why the proposed studies will not provide enough information to assess "stream health." SSWD will perform studies related to anadromous and special-status fishes in the Bear River downstream of the non-Project diversion dam. It is anticipated that analysis provided in the DLA and FLA including potential PM&E measures will mainly be focused on these species and that PM&E measures intended to benefit special status fishes will also benefit other organisms in the Bear River, including BMI.

6.0 Requested New Study - Algae Growth

The California State Water Resources Control Board (SWRCB) requested a new study named *Algae Growth* (SWRCB, pp. 4 through 6). SWRCB did not include a detailed study proposal in its comment letter, but did provide a general outline. The purpose of SWRCB's requested study would be to generically "*…provide information on whether continued Project operations and*

[4] Ode, P.R.. 2007. Standard operating procedures for collecting macroinvertebrate samples and associated physical and chemical data for ambient bioassessments in California. California State Water Resources Control Board Surface Water Ambient Monitoring Program (SWAMP) Bioassessment SOP 001.

management and associated recreational use have an adverse effect on water resources…" (p. 4 of Attachment A to SWRCB's letter). The geographic scope of the requested study is the Camp Far West Reservoir and the Bear River below Camp Far West Dam and the non-Project diversion dam. SWRCB did not provide an estimated cost to complete this study. The SWRCB's requested study includes three "elements" which are discussed below.

As above, the SWRCB's new study is inconsistent with the purpose of relicensing studies, which is to supplement existing, relevant and reasonably available information – not assess Project effects.

New Study Elements	SSWD's Reply
Request Element #1 – On a monthly basis from June - October, visually assess Camp Far West Reservoir for algae growth in proportion to surface area.	**NOT ADOPTED**. The SWRCB has provided no evidence that algae growth in Camp Far West Reservoir is a nuisance or adversely affects beneficial uses designated in the Basin Plan. In addition, SSWD is unaware of any reports that algae growth in Camp Far West Reservoir is a nuisance or adversely affects beneficial uses designated in the Basin Plan. Further, the Project does not contribute any nutrients to the reservoir that would exacerbate algae growth. Given this, the SWRCB's requested study is a research study clearly outside the scope of relicensing, and would not inform requirements in the new license.
Request Element #2 - If algae bloom is located on Camp Far West Reservoir, determine the dominant species and toxicity levels throughout bloom event.	**NOT ADOPTED.** See SSWD's reply to Request Element #1.
Request Element #3 - Determine percent algal cover in stream reaches in the Bear River below both dams, using current Surface Water Ambient Monitoring Program protocols.	**NOT ADOPTED**. The SWRCB has provided no evidence that algae growth in the Bear River downstream of Camp Far West Dam is a nuisance or adversely affects beneficial uses designated in the Basin Plan. In addition, SSWD is unaware of any reports that algae growth in the Bear River downstream of Camp Far West Dam is a nuisance or adversely affects beneficial uses designated in the Basin Plan. Further, the Project does not contribute any nutrients to the Bear River downstream of Camp Far West Dam that would exacerbate algae growth. Given this, the SWRCB's requested study is a research study clearly outside the scope of relicensing, and would not inform requirements in the new license. SWRCB indicated that high water temperature is one factor that contributes to the potential for algae blooms. Water temperature above 25°C is optimal for algae blooms (Center for Earth and Environmental Science 2016), and that information can be taken into account during the assessment of potential Project affects on water temperature in the Bear River downstream of Camp Far West Dam.

7.0 Requested New Study - Evaluation of Migration and Use of the Lower Bear River by Juvenile Chinook Salmon and Other Anadromous Fish Using Two Rotary Screw Traps, and Requested New Study - Juvenile Chinook Salmon Survival

The Foothill Water Network (FWN) requested a new study named *Evaluation of Migration and Use of the Lower Bear River by Juvenile Chinook Salmon and Other Anadromous Fish Using Two Rotary Screw Traps* (FWN, Attachment 1), and USFWS requested a new study named *Juvenile Chinook Salmon Survival Study* (USFWS, Enclosure D). FWN's study request is fairly detailed and provides an estimated cost of $400,000 to $700,000. The goals of the study would be to better understand how juvenile Chinook salmon and other anadromous fish (i.e., steelhead and sturgeon) may be affected by the Camp Far West Hydroelectric Project. In addition to

juvenile fish that are natal to the Bear River, FWN is concerned about the use of the Bear River downstream of the non-Project diversion dam by non-natal fish from the Feather River and Dry Creek, which may use the Bear River to rear under certain conditions. The goals and objectives of USFWS' requested study are similar to the FWN requested study.

As above, the FWN's and USFWS' new study is inconsistent with the purpose of relicensing studies, which is to supplement existing, relevant and reasonably available information – not assess Project effects.

New Study Elements	SSWD's Reply
Request Element #1 – Install two rotary screw traps in the Bear River downstream of the non-Project diversion dam.	**NOT ADOPTED**. SSWD understands that there is limited information regarding anadromous fish in the Bear River downstream of the non-Project diversion dam. To better understand how anadromous fish use the Bear River, SSWD has adopted portions of various study request as well as other requested study modifications related to Study 3.2, Stream Fish, and Study 3.3, Instream Flow (See Attachment 3 to this letter). Specifically, SSWD has agreed to conduct eDNA sampling, perform additional snorkeling surveys and add beach seining during each of its snorkeling events. Each of these items will provide additional opportunity to document the presence of anadromous fish throughout the Bear River downstream of the non-Project diversion dam during different times of year. The addition of rotary screw traps (RST) as described by FWN would be another method to detect juvenile anadromous fish, but it is unclear why it would be needed in addition to SSWD's proposed studies. FWN admits placement in the Bear River for RSTs may be difficult given the flow and channel characteristics present. Given the large financial and labor commitment associated with operating RSTs, it seems like the methods proposed by SSWD will provide similar results for much less cost. In addition, it is unclear how the FWN-proposed RST locations will help to assess Project affects on juvenile salmonids, particularly the non-natal fish FWN is also concerned about. Pleasant Grove Road Bridge is almost 2 miles upstream of the Dry Creek confluence, so any fish captured in that trap will most likely be from further upstream in the Bear River. The second, currently unspecified, trap location would be downstream of Dry Creek, so any fish captured in that trap could be from either Dry Creek or the Bear River. Finally, there is no definitive way to determine if fish captured in either trap are from the Bear River, Feather River or Dry Creek without expensive genetic studies, which FWN has not proposed.
Request Element #2 – Fish marking for survival estimates.	**NOT ADOPTED.** USFWS references a PSMFC (2016[5]) document to base methods from, but it is unclear how these marked fish would be used. One way to use marked fish is to do mark/recapture surveys to determine RST catch efficiency. If SSWD were to install RST, it would consider this as part of the standard methodology. If USFWS is hoping that fish caught at the upstream RST would be marked and recaptured at the downstream trap, this seems unlikely given general trap efficiency and the other potential reasons a fish may not be captured at both traps (i.e., predation, injury, and prolonged rearing upstream).

8.0 Request for New Study - California Red-legged Frog

USFWS requested a new study with a detailed study plan entitled *California Red-legged Frog* (CRLF) (USFWS, Enclosure 1). The new study request includes two "elements," which are discussed below. USFWS did not estimate the cost to complete this study, but described the methodology as "very inexpensive." The plan includes 12 references in the Reference Section, although only three of these are cited in the text.

[5] Pacific States Marin Fisheries Commission (PSMFC). 2016. American River rotary screw trap protocol. Unpublished document prepared for U.S. Fish and Wildlife Service's Comprehensive Assessment and Monitoring Program, Sacramento, CA. 49 pages.

New Study Elements	SSWD's Reply
Request Element #1 – Perform night surveys for California red-legged frog (CRLF) (*Rana draytonii*) at all lentic aquatic sites within one-mile of the Project that are potentially suitable habitat for CRLF on lands owned by SSWD, including six unspecified locations around Camp Far West Reservoir, and at any other site in the study area where the land-owner grants permission to SSWD for surveys.	**NOT ADOPTED.** The geographic scope of the study request is the FERC Project boundary and areas extending 1 mile from the Project. SSWD has not included CRLF surveys within its proposed CRLF study for reasons described below in the context of FERC's criteria for new studies. The need for additional information (Criterion 4) is unclear on the basis of two contradictory statements in USFWS' request. On page 2 (Study Goals and Objectives), USFWS states the goal of the study request is to "*identify and quantify the location of any CRLF within the Project boundary and any* ***accessible*** *lands* (emphasis added) *that would be affected by bullfrog dispersal from the Project*." However, on page 1 (Introduction) USFWS states: "*This proposed study is intended to gather essential and fundamental information of California red-legged frogs within the FERC Boundary and in areas within one-mile of the Project that could be affected by bullfrog dispersal into occupied California red-legged habitat*." If this information from all sites is "essential and fundamental," it is not credible to limit the need for information to "accessible sites" (i.e., where landowner permission is granted). This suggests that CRLF surveys may have no bearing on license requirements, given that failure to survey any site within 1-mile of the Project would require USFWS to assume CRLF presence at those sites, the same result as exists if no surveys were performed. With regards to Criterion 5, Project nexus and development of license requirements, USFWS has not adequately explained the nexus between hydroelectric Project operations and effects on CRLF. Under Project Nexus, the new study request states that "*the Project contributes to direct, indirect, and cumulative effects on native frogs within the Project boundary because warm-water fishes are well established in Camp Far West Reservoir*." However, the presence of warm-water fishes is not otherwise addressed in USFWS' study request. Hydroelectric operations do not include SSWD's irrigation water diversion for which the reservoir was constructed. Generation is associated with water releases that would otherwise be spilled. SSWD's water diversion dam is a non-Project facility and the Project is not a water diversion. Camp Far West Reservoir has a long history of fish stocking by Cal Fish and Wildlife (formerly Cal Fish and Game) and the reservoir is immediately downstream of a well-established warm-water fishery in the Bear River. As noted in the PAD, the Bear River between Lake Combie and Camp Far West Reservoir is "*a renowned area for bass fishing*." The study plan implies that the reservoir would be suitable habitat for CRLF in the absence of warm-water fishes, despite other unsuitable features such as a lack of riparian and emergent vegetation, and long fetch. More generally, large reservoirs rarely provide suitable habitat for CRLF, because of deep water, steep shorelines, and wave action associated with a long fetch. USFWS does not indicate a general or specific license requirement that might result from the study request. The only potentially suitable breeding habitat for CRLF within the Project boundary is associated with two sewage lagoons in the Project recreation areas. All other potential habitat is situated on private property where SSWD has no authority. Possibly, the study is intended as a justification for a license requirement that SSWD attempt to remove American bullfrogs (*Lithobates catesbeianus*) from the Project. However, bullfrogs are capable of long-distance overland dispersal and are, therefore, as likely to disperse into CRLF habitat from perennial streams, stock ponds, and other agricultural impoundments outside the Project vicinity as from the Project. Equally, CRLF are as likely to disperse in both directions. With regards to Criterion 7 (consideration of level of effort and cost), the request does not include any estimate of cost, although USFWS' letter described the methodology as "very inexpensive." However, licensee's preliminary analysis indicates that the study cost could easily exceed $100,000 if all suitable sites on private property are accessible for the six night surveys and three separate day surveys (see Request Element #2). As indicated above, SSWD is concerned that CRLF surveys would not serve a useful purpose unless landowner permission is granted for all potential habitat within 1-mile of the Project, which is unlikely. Furthermore, SSWD questions the value of CRLF surveys for relicensing, because surveys that do not document the presence of CRLF at a site are only considered valid for 2 years (USFWS 2005[6]). This suggests that regardless of survey results, an effects determination would have a limited "shelf-life" much shorter than the relicensing process and the resulting FERC license term. Finally, in regards to Criterion 6 (study methods), the methods described in the study are not fully consistent with methods specified by USFWS (2005) guidance, which require the use of

[6] United States Fish and Wildlife Service (USFWS). 2005. Revised guidance on site assessments and field surveys for California red-legged frog. August 2005.

binoculars during eye shine surveys, surveys from the water where necessary, and accurate identification of all frogs encountered. The study plan states that "*frogs with a noticeable lip mark, dorsal-lateral fold, or small tympanum should be recorded as California red-legged frogs*." However, this methodology for identification of observed frogs is not consistent with USFWS (2005), which stipulates that observed frogs should be regarded as "unidentified" unless they possess one or more of certain "positive diagnostic marks" (i.e., features that are typically present and not shared by other co-occurring species). As such, this methodology could result in false positives for the presence of CRLF. USFWS (2005) lists three positive diagnostic marks for CRLF: 1) a bright red dorsum; 2) prominent dorsolateral fold; and 3) a well-defined lip stripe. A small tympanum is a feature shared by other frogs, including juvenile and adult female American bullfrogs, and is therefore not a positive diagnostic mark for CRLF.

The request element also states that "*any frogs that chirp when they jump into the water shall be recorded as bullfrogs. The number of frogs that hop without chirping and the number that hop without vocalizing shall be recorded*." The distinction between "chirping" and "vocalizing" is not explained. USFWS (2005) accurately states that bullfrogs often "squawk" when diving into the water and concludes that "a squawk from a fleeing frog will be sufficient to positively identify the frog as a bullfrog." However, the lack of this vocalization is not evidence to distinguish CRLF from American bullfrog and is not considered diagnostic for differentiating adult bullfrogs from juvenile bullfrogs (although juveniles may vocalize in this way more frequently). Therefore, recording the number of frogs that do not vocalize has no practical value.

Request Element #2 – Perform a total of three daytime surveys for American bullfrog at each specified location within the Project boundary, Bear River upstream of the non-Project diversion dam, and all other accessible lentic habitat sites within one-mile of the Project.

ADOPTED WITH MODIFICATION. SSWD has proposed a CRLF Study, which includes noting the presence of American bullfrog during performance of the study. In addition, SSWD has made a general commitment stated under "General Concepts" in each study plan, to document observations of American bullfrog during field work. However, SSWD has revised its study to increase field time at sites suitable for bullfrog and adding up to two additional site visits, for visual detection of bullfrog tadpoles and visual and auditory detection of post-metamorphic life stages, generally following the methods described by USFWS under "*daytime surveys for bullfrog*," except that SSWD's study will specifically include observations of bullfrog tadpoles and egg masses and will not include recording the number of bullfrogs that do not vocalize. As indicated above, SSWD does not see a distinction between "*frogs that hop without chirping and...that hop without vocalizing*" and does not see a practical value in recording the number of bullfrogs that do not vocalize.

With regards to Criterion 5, Project nexus and development of license requirements, USFWS has not adequately explained the nexus between hydroelectric Project operations and Project effects that justify the study request, specifically in regards to the geographic scope of the request or indicated how the information would be used to develop license requirements. USFWS states that bullfrog surveys will be performed at six unspecified locations around Camp Far West Reservoir, one at each of two sewage lagoons associated with Project recreation facilities, two at "*the after-bay/diversion pool*," and at "*any accessible stock ponds*" within 1-mile of the Project. SSWD does not propose bullfrog surveys outside of the Project boundary, where Project operations have no foreseeable relation to bullfrog breeding. Further, the number of sites specified by USFWS at Camp Far West Reservoir is arbitrary and unrelated to presence of suitable habitat for bullfrog life stages. Instead, SSWD proposes that the number and location of sites at the reservoir should reflect habitat conditions, and therefore could be more or less than six sites. Reference to "*afterbay/diversion pool*" is also unclear. Water that passes through the Project powerhouse is discharged into the Bear River. Habitat at this location is unlikely to support bullfrog breeding because of flowing water. SSWD's irrigation diversion is not a Project facility and the pool created by the non-Project diversion dam is outside of the Project boundary and completely unrelated to hydroelectric O&M. Therefore, a license requirement for bullfrogs in the diversion pool would not be justified.

9.0 Request for New Study - Large Woody Material and Sediment Transport Study

USFWS requested a new study named *Large Woody Material and Sediment Transport*, for which USFWS included a detailed study proposal in its comment letter (USFWS, Enclosure E). In general, the purpose of USFWS' study would be to evaluate the effects of the Project on changes to geomorphic processes. The study seeks to quantify the magnitude of the Project's impacts on sediment and LWM supply and the resultant effects on anadromous fish. The study area includes the Bear River from Camp Far West Dam downstream to the junction with the

Feather River. Five elements were included in the study plan, each of which is discussed below. USFWS did not estimate a cost estimate to complete the study.

New Study Elements	SSWD's Reply
Request Element #1 – Quantify the amount of riparian habitat lost during construction of the original Camp Far West Dam and Diversion Dam. The Service recommends the Licensee utilize the methods described in the NMFS August 25, 2016 comment letter on the PAD. Measure or estimate the LWM trapped in the Camp Far West Reservoir. Assess potential impacts of other land-use activities.	**NOT ADOPTED.** Refer to SSWD's reply to NMFS' Request Element #1 in Section 1.0 above.
Request Element #2 – Quantify fine and coarse sediment volumes trapped in Camp Far West Reservoir.	**ADOPTED.** Bathymetry was done on the Camp Far West Reservoir in 2008 to develop a new capacity curve. The current volume of storage will be compared to the as-built volume (i.e., using the original capacity curve). An estimate of total volume loss, assumed to be lost due to coarse and fine sediment additions, will be calculated and converted to sediment tons/year as follows: Assume 62 lbs/ft^3 (0.837 tons/ yd^3, Dendy and Champion 1978[7]), which converts the volume to the tons, then annualized for the estimate of tons added between construction and 2008. Assume 15 percent of sediment stored is bedload (i.e., coarse material) and the remaining 85% is fine. This information will be included in SSWD's DLA and FLA.
Request Element #3 – Survey the volume of mobile, coarse sediment and fine sediment stored in the active channel in the Lower Bear River.	**ADOPTED WITH MODIFICATION.** Refer to SSWD's reply to NMFS' Request Element #2 in Section 1 above.
Request Element #4 – Conduct habitat mapping and characterization along the remaining length of the lower Bear River and quantify the frequency and volume of LWM. The Service recommends using the parameters indicated in NMFS August 25, 2016 comment letter on the PAD.	**ADOPTED WITH MODIFICATION.** Refer to SSWD's reply to NMFS' Request Element #3 in Section 1.0 above.
Request Element #5 – Licensee will summarize and distribute results from this study no later than 3 months from the end of data collection and will discuss result from the survey at a Relicensing Project meeting within one month of issuance of study report.	**NOT ADOPTED.** SSWD will make the information from all of its relicensing studies available in SSWD's DLA and FLA.

[7] Dendy, F. E., and W. A. Champion (1978), Sediment deposition in U.S. reservoirs: Summary of data reported through 1975, Misc. Publ. 1362, 68 pp., U.S. Dep. of Agric., Washington, D. C.