



November 21, 2014

Filed via Electronic Submittal (E-File)

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

Subject: La Grange Hydroelectric Project, FERC Project No. 14581
Submittal of Updated Fish Passage Assessment Study Plan and Meeting Notes from
October 6 Study Plan Meeting

Dear Secretary Bose:

On September 5, 2014, Turlock Irrigation District (“TID”) and Modesto Irrigation District (“MID”) (collectively, the “Districts”), co-owners of the La Grange Diversion Dam on the Tuolumne River, filed their Proposed Study Plan (“PSP”) in accordance with Federal Energy Regulatory Commission (“FERC”) regulations governing the Integrated Licensing Process (“ILP”) as provided in 18 CFR § 5.11. On October 6, 2014, the Districts held a study plan meeting at MID’s offices in Modesto, California. The purpose of the meeting was to discuss the Districts’ PSP document and Licensing Participants’ (LPs) study requests. The Districts’ Meeting Notes from the study plan meeting are included with this filing.

Based on discussions with LPs at the study plan meeting, the Districts have significantly expanded their original Fall-Run Chinook Salmon Migration Barrier Study Plan. As described in the attached updated study plan, the Districts propose to collaborate with LPs to undertake certain fish passage and upper river habitat suitability studies, in addition to the original Migration Barrier study, within the two-year ILP study period (2015/2016). This updated study plan, which is intended to replace the previously submitted Fall-Run Chinook Salmon Migration Barrier Study Plan, is now entitled the Fish Passage Assessment Study Plan, and includes:

- a concept-level fish passage alternatives assessment, to be conducted in parallel with the fish barrier assessment originally proposed in the PSP,
- an Upper Tuolumne River habitat suitability assessment, and
- a habitat and fish stranding assessment below La Grange Diversion Dam.

By this letter, the Districts are issuing the updated Fish Passage Assessment Study Plan as an addendum to the Districts’ PSP replacing in its entirety the original Fall-Run Chinook Salmon Migration Barrier Study Plan. The Districts request LPs review and comment by the December 4,

Ms Kimberly D Bose

Page 2

November 21, 2014

P-14581 Updated Fish Passage Assessment Study Plan / October 6, 2014 Study Plan Meeting Notes

2014 deadline for PSP comments. The Districts note that, with the exception of the attached updated study plan, the other components of the PSP remain unchanged. The Districts welcome comments on the proposed Recreation Safety Assessment and Cultural Resources draft study plans as submitted with the PSP. Both the PSP document and updated Fish Passage Assessment Study Plan are available on the La Grange Project's licensing website at <http://www.lagrange-licensing.com>.

If you have any questions about this filing, please contact the undersigned at the addresses or telephone numbers listed below.

Sincerely,



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Attachments: La Grange Hydroelectric Project October 6, 2014 Study Plan Meeting Notes
La Grange Hydroelectric Updated Project Fish Passage Assessment Study Plan

La Grange Hydroelectric Project Licensing (FERC No. 14581)
Proposed Study Plan Meeting
Modesto Irrigation District
1231 11th Street, Modesto, California

Monday, October 6, 2014
10:00 AM to 4:00 PM

On October 6, 2014, Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts), licensing participants (LPs), and Federal Energy Regulatory Commission (FERC) staff held the Proposed Study Plan (PSP) Meeting for the licensing of the La Grange Hydroelectric Project (Project). The purpose of the PSP Meeting is to discuss studies requested by LPs, studies proposed by the Districts, and studies not adopted in the PSP by the Districts. This document summarizes discussion during the meeting. It is not intended to represent a transcript of the meeting. Attachment A provides a list of meeting attendees and Attachment B provides the agenda and PowerPoint slides presented during the meeting.

Jenna Borovansky (representing HDR, consultant to the Districts) welcomed meeting attendees to the PSP Meeting. Individuals around the meeting room introduced themselves and Ms. Borovansky reviewed the safety protocols for the room.

Ms. Borovansky began the slide presentation. She summarized the status of the Project within the Integrated Licensing Process (ILP) schedule, the meeting agenda, and the location of the La Grange Diversion Dam (LGDD) and Project facilities. Ms. Borovansky then reviewed the seven ILP study criteria and the purpose of the meeting. She stated that the Districts received a total of 16 study requests. One study request was related to recreation resources. The other 15 study requests were related to water and aquatic resources, and several of these were very similar in the information being sought. LPs had significant interest in upstream and downstream passage studies, not solely at LGDD, but at both LGDD and Don Pedro Dam (DPD). DPD, the Districts' project located upstream of LGDD, is being relicensed in a separate proceeding. The DPD Final License Application was filed with FERC in April 2014. The Districts' did not adopt the LPs' requests for upstream and downstream passage studies, but instead proposed a Fall-Run Chinook Salmon Migration Barrier Study (Chinook Barrier Study).

John Devine of HDR (representing the Districts) indicated that the Districts received requests from the National Marine Fisheries Service (NMFS), the U. S. Fish and Wildlife Service (USFWS), and the Conservation Groups (CG) to study upstream and downstream passage of anadromous fish at both LGDD and DPD. He stated that the CG study request included detailed steps to be completed in its assessment. The NMFS and USFWS study requests were similar to the CG study request, but did not include as much detail as the CG request.

Mr. Devine then reviewed the rationale behind the Districts' proposal to complete the Fall-Run Chinook Salmon Migration Barrier Study. He explained that while LGDD does not have a fishway and would therefore appear to be a barrier to anadromous fish passage, to the Districts' knowledge, there is no data that actually demonstrates that migrating anadromous fish become stranded at LGDD or the tailrace, nor was any such data provided in any of the LPs' study

requests. Mr. Devine said the Districts therefore do not know if, or to what extent, the LGDD is an actual barrier to fish migration. The purpose of migration is to locate suitable spawning habitat. Previous studies have shown there is considerable spawning and rearing habitat below LGDD which would have to be bypassed by migrating fish before they reach LGDD. Mr. Devine also explained that available data indicates that pre-spawn mortality levels are very low. Although the LGDD may appear to be a barrier to upstream migration, the Districts do not have any data on the number or species of fish that reach the LGDD. It is also unknown if fish that migrate to the LGDD or powerhouse simply head back downstream to suitable spawning habitat.

Mr. Devine said that the Districts propose to gather basic information over a two-year period on the number of fish that reach the LGDD, the species of those fish, and if those fish become stranded at the dam (indicated by pre-spawn mortality). He noted that NMFS' own anadromous fish passage guidance states that the size of the fish run is one of the primary pieces of biological information needed before a fish passage facility can be planned. Mr. Devine said that the Districts believe that no sensible fish passage design can even begin to proceed without basic fish migration information. He noted that the Districts proposed a two-year study to ensure the data represents more than just a single year data point. Mr. Devine reiterated that it is important to first identify what fish make it to the powerhouse or dam and become stranded and do not head back downstream. The otolith study being undertaken by the Districts with the support of CDFW indicates that in most years, a majority of the migrating anadromous fish on the Tuolumne River are strays that would not exhibit fidelity to previous spawning areas. Without knowing the size of the run or the species, the Districts would not know where to start with planning fish passage design parameters. Mr. Devine stated that the fish passage studies proposed by the licensing participants were very costly, and that the study proposed by the Districts was a necessary first step in a well-planned fish passage feasibility study.

John Buckley (representing the Central Sierra Environmental Resource Center) stated that the first bullet of the slide being presented ["Whether the LGDD constitutes an actual barrier to upstream anadromous fish migration is unknown at this time."] was self-evident, and that the question to be answered is not if the dam is an actual barrier, but if there are any fish actually trying to get past the dam. Mr. Devine replied that it is not disputed that the dam is a barrier in the river, but it is unknown what species reach the dam, in what numbers, and at what time, and that information was necessary to complete a basic design for fish passage facilities.

Larry Thompson (representing NMFS) stated that in some other fish passage projects, even when the species was nearly absent or was totally absent, the fish passage evaluation had gone forward. He stated that in the future, NMFS may contemplate a propagation program, in conjunction with the fish passage facility, so that if there are very few Central Valley steelhead today, NMFS may bolster that population in some way in the future. Mr. Thompson said that in the San Joaquin River Restoration Program, spring-run Chinook salmon were reintroduced below Friant Dam. A propagation facility was built below the base of the dam. Fish were brought in from other sources because the species was believed to be extirpated in the river, and the propagation program went forward. Mr. Thompson said he believed that Mr. Devine had acknowledged that it is fact that the dam acts an anadromous fish barrier, and that this is not unknown at this time. He added that NMFS' proposed fish passage study would produce data to inform the fish passage plan. Regarding the numbers of fish to pass and what species those fish

are, Mr. Thompson stated that NMFS uses minimum population viability criteria that could serve as the low number of fish to plan for and that historical escapement data could serve as the high number of fish to plan for. Mr. Thompson added that the fish passage plan could be flexible over time, and start with an experimental pilot project. NMFS was open to multiple options, and that trap and haul was just one option.

Mr. Devine stated that it is not a fact that LGDD serves as a barrier to fish migration. He said there are two parts to whether a barrier exists. The first part is if there is a physical barrier in the river. The second is, if a physical barrier exists, does the barrier actually prevent fish migration, meaning does the barrier prevent spawning or inhibit the life cycle of a fish. He said that if a fish passage facility were to be built, and there weren't any fish to pass, or there were relatively few fish arriving at the fish passage facility, then the fish passage facility would amount to a very significant financial investment with very little purpose. Mr. Devine said it is the opinion of the Districts that a fish passage facility should be a measure to mitigate for fish being unable to spawn. He said that the Districts believe there is a very small pre-spawn mortality in the Tuolumne River. The Don Pedro Relicensing Salmonid Population Information Integration and Synthesis Study (W&AR-05) studied the suitable spawning habitat on the Tuolumne River. He noted that the study, which was completed using a workshop consultation process, estimated pre-spawn mortality in the Lower Tuolumne River to be 1% to 2%. The purpose for passing fish upstream would be to increase juvenile production of the population. Of those that may reach the LGDD or the powerhouse, it was unknown how many fish simply move back downstream to spawn.

Cecil Russell (representing the Modesto Chamber of Commerce) said that he was unsure if collecting additional information on salmon spawning would help to increase the ability of fish to spawn. Mr. Russell stated he did not understand the reasoning behind the need to pass fish at LGDD. He said that the LGDD would have been a barrier to fish migration since it was built, and that whatever the effects the dam, they have been occurring for a long period of time. Mr. Russell added that the dam was not all of a sudden preventing spawning, and that there were times in the past when many fish returned to the river.

Mr. Thompson estimated that the LGDD cuts off 100 miles of upstream habitat, including the mainstem and tributaries. He said that Mr. Russell was correct that the dam had been in place for over 100 years, and that the baseline being looked at for the Project considered all those years of restricting upward and downward fish migration. Mr. Thompson said the LGDD certainly resulted in lost production. For a number of years, NMFS had seen a long-term decline in returning fish. It is common sense that a lot of habitat has been lost. Below LGDD, the water is very valuable for multiple uses. Water is diverted, resulting in a streamflow much less than the streamflow prior to LGDD construction. Flow, temperature, large wood debris, and gravel conditions have all changed and those changes have affected salmon populations. It is logical that if fish migrated upstream of the dam into the cold water, where the river is forested and the gravel provides better spawning habitat, better fish production would occur and those fish would then migrate downstream. Mr. Thompson said that NMFS would like to improve the conditions of the lower Tuolumne River as well.

Mr. Russell asked if it was true that bass are the biggest reason for declining fish population. Mr. Devine replied that the Districts completed a predation study for the Don Pedro relicensing that indicates predation has a substantial impact to young salmon, and that the Districts hoped to complete another predation study of the lower Tuolumne River (LTR) in 2015.

Peter Drekmeier (representing the Tuolumne River Trust) said that it is known that salmon spawn in the La Grange tailrace. Mr. Devine asked what information Mr. Drekmeier's statement was based on. Gretchen Murphy (representing the California Department of Fish and Wildlife) replied that she had observed fish spawning in the A1 riffle. Mr. Devine replied that the A1 riffle, as defined by the Districts, is located just around the corner from the tailrace. Ms. Murphy replied that CDFW considers the end of the tailrace as part of riffle A1.

Mr. Drekmeier said that it is known that the primary limiting factor to salmon spawning and rearing is a lack of habitat left in the LTR. He said that based on other things people had said during the meeting, opening up the upper Tuolumne River to anadromous fish would be beneficial. Referring to Mr. Drekmeier's statement about habitat in the LTR, Mr. Devine stated that information beyond unsupported generalities was necessary. He noted that results from studies completed for the Don Pedro relicensing showed that there is significant spawning habitat in the LTR. The studies estimate that over 40,000 fall-run Chinook salmon can be supported by existing habitat. Those numbers had been developed through workshop consultation and had been available to the public for over a year. Mr. Devine added that the studies also show there is enough existing habitat to support 800,000 spawning *O.mykiss* and that the statement that there is no spawning habitat below LGDD is simply untrue.

Mr. Devine said that regarding temperature, depending on the time of the year, the water above Don Pedro Reservoir does not meet EPA (2003) criteria for over-summering salmonids. That assessment is in the Don Pedro Final License Application (FLA). Mr. Devine said that at this stage in the discussions there must be data to support the generalizations being made in the meeting. He reiterated that the Districts are concerned that many studies had been requested, yet no data had been offered that fish actually reach the LGDD and are prevented from spawning.

Mr. Thompson replied that it was circular reasoning to say that the Districts will not do a study because there is not any data on whether LGDD is a barrier. He said the studies being requested by NMFS intend to get that information. He said NMFS agrees there is no data. NMFS took a lot of time to prepare its study requests, and that providing data in the study requests is not required by the regulations. Mr. Thompson said that it is common sense that the LGDD is a barrier to upstream fish passage migration and that there does not need to be specific evidence to show that is the case. Instead, data is needed to show how the LGDD project effects on migration can be ameliorated.

Mr. Devine said that based on Mr. Thompson's comments, theoretically, the Districts could go forward and build a fish passage facility at great cost, and no fish would show up. He said the Districts needed the basic information of what fish show up and when they show up. To state that the Districts are not proposing to do anything is not correct. The Districts' study plan states that basic information is needed first. Instead of first asking the Districts to spend millions of dollars on upstream and downstream fish passage studies, it makes sense to first get the basic

information on how many fish are arriving at LGDD and not returning to available spawning habitat downstream.

Mr. Buckley said that the wording in the Districts' meeting materials and proposed study plans matters. He said that based on the Districts' wording, it appeared that the Districts were jumping to conclusions on what the outcome of their proposed study will be. While the slide being presented asks if the dam is an actual barrier, the real question is if the dam stops a significant number of fish from spawning upstream. If only a small percentage of fish reach the dam, and they return downstream to spawn, that does not mean that the fish would not have spawned upstream if given the chance. If only a small percentage of fish reach the dam, it would be prejudgment to assume that if fish spawn successfully downstream, they would not have chosen to instead spawn upstream.

Jim Hastreiter (representing the Federal Energy Regulatory Commission) said that ultimately, the FERC National Environmental Policy Act (NEPA) document would evaluate two general alternatives for fish passage. The first alternative would not include fish passage and the second alternative would include fish passage. FERC will have to do that evaluation. Therefore, at some point FERC will need at least a feasibility study of fish passage. Mr. Hastreiter said he was unsure what the best timing for such a feasibility study would be, but that timing for such a study was what was being discussed at this meeting. Mr. Hastreiter said that FERC would need information on the cost of fish passage. A feasibility study typically has two components. The first component is engineering, and is based on such factors as the size of the dam, characteristics of the reservoir, and Project operations. The second component would look at the feasibility of fish passage, which is governed by fish behavior. Mr. Hastreiter noted that fish behavior was what was being discussed presently in this meeting. He said that FERC will need both types of information to complete its NEPA analysis.

Referring to Mr. Hastreiter's comments, Mr. Devine said that he did not disagree with Mr. Hastreiter, but that he wished to also offer an alternate view. He said that a fish passage facility is essentially a protection, mitigation, and enhancement (PM&E) measure. A PM&E measure is undertaken to mitigate an impact. First, an impact must be defined. Mr. Devine questioned what impact would be mitigated by fish passage. Mr. Devine said that he agreed with Mr. Hastreiter that a sequence is necessary. He said that NMFS' study request suggests a sequence in which the Districts first complete a two-year multi-million dollar study to assess both fish passage and the carrying capacity of the upper river. This is one way to look at the sequence. However, Mr. Devine questioned whether this sequence met the ILP study criteria for project nexus, and why the Districts should have to spend a million plus dollars to understand the carrying capacity of a stretch of river that is not affected by the Project. Mr. Devine said that a logical start to the sequence would be to determine how many fish are trying to pass the dam. If there are very few fish arriving at the dam, Mr. Devine asked what impact would be mitigated by fish passage. NMFS suggested that impacts to future fish should be mitigated. The Districts suggest that the monitoring proposed in the Fall-Run Chinook Salmon Migration Barrier Study Plan could be extended beyond two years if that time is not adequate to get sufficient data. Mr. Devine added that at this time, there is no reliable schedule or funding to restore spring-run Chinook salmon to the Tuolumne River. In addition, there are very low numbers of steelhead on

the river. The Districts' proposed study would look at how many fish are migrating to the dam. The Districts contend this is a logical sequence.

Mr. Hastreiter said that he did not think the Districts' study plan laid out a complete sequence including when the fish passage study would be completed. He requested that the Districts lay out the sequence they have in mind.

Chris Shutes (representing the California Sportfishing Protection Alliance, or CSPA, which is a member of the CG) said that it seemed that the sequence laid out by the Districts was basically laid out to not have any other steps. He said that it appeared that no entity was suggesting that fall-run Chinook salmon be passed above the dam. The CG was not proposing this. Mr. Shutes said that the steelhead population numbers were a type of chicken and egg situation because most historical habitat for steelhead had been lost. Habitat loss is a project effect. This issue is not about habitat effects upstream. No further study is needed to show that the dam prevents access. Mr. Shutes said that the construction of LGDD has made the upriver habitat unavailable, and now the Districts are arguing that because there are so few, it's not necessary to move them to more suitable habitat upstream. He added that his understanding of recovering endangered species is that the interest is in recovering those species with very few individuals. Whether or not there is suitable habitat below the dam, for resident and anadromous steelhead, it does not seem to be working well. Mr. Shutes said that he thought the threshold set up by the Districts would land at a preordained answer. Although there is plenty of habitat downstream, for whatever reason the habitat is not being used successfully.

Mr. Russell said that if the fish population numbers being referred to are less than the population over 100 years ago, perhaps the reason for the smaller population was the introduction of predator fish. He asked if predation would be part of this study. Mr. Shutes replied that predation would not be a part of this study plan because predation data already exists. Mr. Shutes added that the goal of moving fish upstream was to get the fish to safe habitat.

Mr. Russell questioned whether a greater fish population meant only that more fish would be eaten by predators. Mr. Shutes replied that the more fish there are, the more likely it is that the fish will make it past those predators. Mr. Shutes said he was skeptical of the predation argument and that a separate study of juvenile rearing was necessary. Mr. Drekmeier added that the Districts are currently planning to undertake a predation study on that topic.

Mr. Shutes stated that spring-run Chinook fish exist phenotypically. These fish spawn earlier than fall-run Chinook salmon. The juveniles migrate downstream when the predators are less likely to be active. For example, there are very few striped bass in the stream at that time. The outmigration success for those juveniles would be greater than the success of fall-run Chinook juveniles.

Larry Byrd (representing himself) asked if the Districts had completed their most recent proposed predation study. Mr. Devine replied that the Districts were hopeful to complete the study in 2015.

Dr. Luke Miller (representing himself) said that there would be no water in the river, and thus no spawning habitat, if there were not dams because this had been a very dry year. Dr. Miller asked the meeting attendees to raise their hands if they lived in the Districts' service areas or would be helping to pay for the proposed fish passage studies, even though it was unknown how many fish were in the river. He stated that the river is much different now than it was when LGDD was constructed.

Mr. Shutes said that the Districts had spent over \$50 million dollars on the Don Pedro Hydroelectric Project relicensing. In contrast, he thought a million dollar study on fish passage was not inappropriate. Art Godwin (representing TID) clarified that the \$50 million dollar figure was an estimate that also included the costs of future PM&E measures associated with Don Pedro, as well as the cost of the relicensing process.

Alison Willy (representing USFWS) said that discussion of costs was inappropriate at this point in the meeting, and asked if this topic could be tabled until later in the agenda. Ms. Willy said that regarding the biology surrounding the fish passage study requests, steelhead and spring-run Chinook salmon were both upper watershed species. Most of the time, the conditions downstream were not appropriate to sustain these fish. These fish were upriver species that are prevented by the dam from going upstream.

Stacy Henderson (representing Thomas H. Terpstra Attorney at Law) stated that she was attending the meeting on behalf of her clients who are small and local family farmers. Their goal was to ensure that studies are only conducted when necessary. Ms. Henderson said that the Districts should not be forced to pay for studies that were inappropriate at this time. It was reasonable to complete the Districts' study first, and then review the results of that study to determine what else may need to be done. The idea that because \$50 million had been spent so far, it was reasonable to spend an additional \$1 million on studies was troubling.

Ms. Willy said it was helpful that many studies had already been done for the Tuolumne River. There were certainly cost savings since many studies had already been completed. Ms. Willy said that FERC would make the decision on whether a study cost was too expensive and was reasonable. Ms. Willy said that the job of the attendees was to determine what questions needed to be answered, and then provide that to FERC.

Mr. Thompson said that he agreed with much of what was being said. He reiterated that under the regulations and NEPA, FERC needed to evaluate fish passage. Although money had been spent on the Don Pedro relicensing, a fish passage study had not been completed and the information that FERC needed for the NEPA analysis did not exist. Mr. Thompson said that bad decisions cost money as well as good decisions and that NMFS, along with everyone else, wanted to make informed decisions. NMFS had not made any decisions on whether fish should be passed over the dam or not. He said that NMFS had guidance and ideas they wanted to explore, but no decisions had been made.

Mr. Hastreiter said that there were three ways that fish passage could be incorporated into the license for LGDD. The first way was if the Districts proposed fish passage, and FERC accepted that as a license condition. The second way was if FERC required fish passage in the license.

The third way was if NMFS required fish passage under its Federal Power Act Section 18 prescriptions. Mr. Hastreiter said that ultimately, NMFS had the final say on whether fish passage would be required.

Mr. Devine said that the Districts were not unwilling to study fish passage, but contend that a sequence of studies was appropriate. Mr. Devine clarified that contrary to Mr. Shutes' earlier statement, NMFS was proposing that passage of fall-run Chinook salmon be part of the study. Mr. Devine said that NMFS' fall-run Chinook salmon management goals below the project could be met under existing conditions. Regarding spring-run Chinook salmon, there was no timetable for spring-run Chinook salmon to be in the watershed. NMFS may reserve its prescription authority for use in the future when a formal and funded effort for reintroduction of spring-run Chinook salmon was a reality. The same could be said for steelhead. Mr. Devine said that if no fish were actually arriving at the dam, then no fish would be passed. Just building fish passage would not make fish arrive at the dam. Other efforts in the watershed, and outside the watershed, were necessary to improve these fish populations. Spending the money now on something that may not occur for 20 or 30 years did not seem appropriate.

Mr. Devine stated that FERC had seven study plan criteria. Costs and level of effort were among the required criteria. Regarding Criteria 3 [If the requester is not a resource agency, explain any relevant public interest considerations in regards to the proposed study], Dr. Miller asked in whose public interest were these study requests. Mr. Hastreiter replied that the public was interested in fish and that all were welcome to express their concerns to FERC.

Mr. Devine reviewed the Fall-Run Chinook Salmon Migration Barrier Study and study methods presentation slides.

Mr. Buckley reiterated that the wording used in the Districts' proposals was important. The wording in the presentation prejudged the effects and significance. The important question to answer was whether there was a barrier for fish moving upstream. Making a judgment based on fish spawning successfully downstream after hitting the dam was inappropriate. Mr. Devine replied that the Districts were not trying to prejudge the study outcome. There are a number of stray fish that come into the Tuolumne River. The Districts' fall-run Chinook salmon otolith testing study for the Don Pedro project, a draft study report for which was currently under review by CDFW, found that on average 57% of fish in the Tuolumne River were strays. Chinook in the Tuolumne River may not have fidelity to prior spawning areas and may just be moving through the watershed. If the fish turn around at the dam and do not have pre-spawn mortality, then the fish are contributing to juvenile production. The reason for fish passage would be to increase juvenile production. The Districts' proposed study was trying to get at whether passing fish upstream would increase juvenile production.

Mr. Devine clarified that the otolith testing had been completed for fall-run Chinook salmon only and that spring-run Chinook salmon otolith had not been available from CDFW.

Mr. Devine clarified that a "stray" is a fish that is not native to the Tuolumne River. The Districts' study was finding that the majority of fall-run Chinook in the Tuolumne River were

coming from the Merced River Fish Hatchery, the Mokelumne River Fish Hatchery, and/or the Coleman National Fish Hatchery.

Mr. Byrd asked how the two-year study proposed by the Districts would be conducted. Andrea Fuller (representing FISHBIO) responded that the study would use a similar approach to weir data collection already occurring on the river. A weir would be established on two channels in the study reach and would count how many fish passed upstream and downstream of the weir. The weir would count fish 24 hours a day and would collect precise information to the minute, as well as pictures.

Mr. Byrd said that the salmon biologists needed to know what is actually going on in the Tuolumne River. Mr. Byrd said he owns land bordering approximately seven miles of the river and is on the river everyday. Mr. Byrd said that carp and suckers are important predators in the river. Carp and suckers follow migrating fish as they travel above Basso Bridge. This reach has the main spawning beds and the carp and suckers eat the salmon eggs before they hatch. Mr. Byrd invited meeting attendees to come with him to see this take place. Mr. Byrd also said that the fish that reached the spawning reach were in poor condition when they arrived and were in no condition to continue upstream.

Mr. Devine resumed presentation of the Fall-Run Chinook Salmon Migration Barrier Study Plan.

Ms. Fuller confirmed that the weir would have video monitoring.

Mr. Thompson said that for a different project, NMFS contracted with Montgomery Watson Harza (MWH) to perform conceptual engineering for fish passage on the Yuba River. For conceptual engineering, run size information was not needed. NMFS worked on collecting the run information while the conceptual engineering was being completed. Mr. Thompson said he was worried that the study proposed by the Districts would result in a decision one way or the other regarding fish passage, because the Districts may not get a run while the study is being conducted, and that the decision would not consider future propagation by NMFS. Mr. Thompson cited a project in Washington where a fish passage facility was completed to pass sockeye. In the beginning, only a few sockeye were passed. Now, hundreds of thousands of fish were being passed. The ultimate size of the run was unknown when the facility was completed, but they were able to use adaptive management to make it work. Mr. Thompson said he did not disagree that the information identified by the Districts regarding run size was important, only that he disagreed that this information could not be collected concurrently with the feasibility study. John Wooster (representing NMFS) added that NMFS proposed that the study sequence also start with a study of upstream habitat.

Mr. Genzoli (representing himself) stated that the Districts' approach to the study sequence seemed logical.

Mr. Devine stated that there was currently no funded restoration program on the Tuolumne River for spring-run Chinook salmon. He questioned why the Districts should study these fish when they do not exist. Mr. Devine then asked why the Districts could not wait on fish passage until there was a funded plan or an existing run that consists of more than a few strays. He added that

in the example cited by Mr. Thompson, sockeye were already present in the river. In contrast, there is no evidence of spring-run Chinook salmon in the Tuolumne River reaching the LGDD. Why would the Districts build a potential \$50 million dollar fishway to pass only 5 or 10 fish? Mr. Thompson responded that the population sizes now were not the sizes that should be used to design fish passage.

Mr. Buckley said that the question at hand was not whether fish passage facilities should be built. The question instead was what information was needed by FERC to make a decision. Mr. Buckley said it appeared that the Districts were entrenched in their thinking that a conceptual analysis of fish passage was inappropriate. For individuals who have already made up their minds, no study results would make a difference. A study now could provide basic information and costs.

Mr. Devine said that well done fish passage studies would cost many millions of dollars and the Districts were being asked to spend many millions of dollars to study something where the study requestors put forward no evidence of a need. The Districts are suggesting that there should be more certainty about the probability that fish passage would be useful.

Steve Edmondson (representing NMFS) said that there was extensive information that rim dams impact fish populations. Part of the rationale for NMFS requesting an upstream habitat study was to establish the need for fish passage. Regarding fish passage on the Yuba River, NMFS wanted to find out the potential production. NMFS wanted to first establish the need for fish passage, and then study feasibility. The studies on the Yuba River cost \$150,000, not millions of dollars. Mr. Shutes added that it was a generalization to say that the studies would cost millions of dollars. If a fish passage facility was then deemed appropriate, no one was suggesting that the Districts shoulder the entire cost.

Bill Ketscher (representing himself) said that the big question to be answered was whether suitable habitat existed on the lower Tuolumne River. If there was not suitable habitat, then the focus should turn to the availability of suitable habitat upstream. The fact that there were tremendous fish runs before the Don Pedro Dam was built shows there was enough habitat to support significant fish runs. There are many factors that affect habitat. The requests to study upstream habitat are asking the Districts to spend a lot of money when there may be adequate spawning habitat already existing downstream.

Mr. Devine asked for clarification on NMFS' proposed study sequence. He asked if NMFS' study requests were the entirety of the sequence, or if there would be additional steps in the sequence. Mr. Wooster replied that there were no additional steps. He added that NMFS' upper habitat study request and fish passage study request would provide enough information about whether fish passage should be built.

Mr. Devine said that considering whether to spend millions of dollars on a fish passage facility would require more than a reconnaissance-level study. He noted that NMFS' own construction cost estimates resulting from the study requested by NMFS would have a range of minus 50% to plus 100%. Mr. Devine added that the MWH study cited by Mr. Thompson did not include many of the components that would be needed for the La Grange Project. Mr. Thompson

responded that the study he cited included such components as an instream fish collector and a screened intake and said he disagreed that the scope of that report was not applicable to the La Grange Project. Mr. Thompson said he would provide the report. He also said the report was available on e-Library under Project 2246.

Mr. Devine asked for clarification on whether NMFS would make a decision about fish passage after the two years of study which only involved a reconnaissance-level study. Mr. Thompson replied that NMFS would consider FERC's NEPA evaluation. He added that the studies requested by NMFS would provide information to inform both FERC's NEPA analysis and NMFS' own decision-making process.

Mr. Buckley said it was frustrating to hear cost numbers being cited as gospel. There may be a range of options at different costs that would achieve the same goal. Some options may cost \$50 to \$60 million, while other options may cost just a fraction of that. He asked if the goal of the meeting was to judge the need for a feasibility study or if the goal was to determine the need for estimating the number of fish reaching the dam. Mr. Buckley said that just because fish spawn below the dam does not mean there would not be significant improvement if the fish could get upstream. What needed to be determined at the meeting was whether the question of fish passage could be answered with just the number of fish or whether a feasibility study was needed.

Mr. Shutes said that he believed the appropriate level of study was an evaluation of upstream fish habitat as well as a reconnaissance-level feasibility study. He said the results of the study would dictate which options to follow. Fish passage prescription by NMFS was one option. Mr. Shutes said he believed that if NMFS prescribed fish passage, that it would take many years for many fish to get upstream. By that time, there could be more strays in the Tuolumne River. At that point, it would be very speculative what the next steps would be. Regarding funding for fish passage, Mr. Shutes said that interested parties may look for funding to help with the costs. CSPA may not have funds to donate, but they could help look for funding. If the Districts take a collaborative approach, there would be many considerations to look at.

Mr. Shutes said the first thing to be done now was to conduct the studies requested by NMFS and the CG and that it was important not to presume the outcomes. If the Districts did not do the studies now, the licensing process may be delayed or the necessary information to help understand whether fish passage would be beneficial might not be available. One million dollars was a lot of money, but in the scheme of things and in the context of this licensing process, it was not an excessive amount. Mr. Shutes added that existing information must of course be considered, and that would help save both time and money.

Alison Willy (representing USFWS) said she personally supported NMFS' two-prong approach. Ms. Willy said that, speaking on behalf of the USFWS, there were historically both *O.mykiss* and Chinook upstream of Don Pedro. The USFWS was interested in both upstream and downstream barriers to migration. There were ways to study fish moving downstream that would be inexpensive add-ons to the studies already proposed.

Mr. Devine resumed the slide presentation and began a discussion of the requests for the study of available habitat upstream of Don Pedro Reservoir. There were three requests for upstream habitat studies to determine habitat suitability for anadromous fish. Mr. Devine indicated that considerable information on the suitability of upstream habitat already exists. Much of this information was collected by the Districts or CCSF and was summarized in the Don Pedro FLA.

Mr. Devine said that the Districts believed NMFS was also already conducting an upstream habitat study. He said the Districts had asked to participate in a field visit but were told that the maximum number of people had already been invited to go. Mr. Devine asked NMFS to confirm that it had received funding for upriver studies. Mr. Wooster confirmed this. Mr. Devine asked if NMFS would provide the Districts the scope and schedule for the study. Mr. Wooster replied that the scope of the study did not include fish passage feasibility studies. The funded study is to focus on evaluating habitat suitability using remote sensing and LiDAR technologies. The study data would complement data to be collected through NMFS' study requests. Mr. Wooster said that the majority of money appropriated to the study would be spent flying LiDAR and collecting hyperspectral data. Mr. Wooster said that NMFS would be very willing to share the data with the Districts. Regarding schedule, Mr. Wooster said that the LiDAR and hyperspectral image data was collected over the summer. Data analysis should take about five months and that data would be available next spring. Mr. Devine asked if a trip report was developed from the recent field visit. Mr. Wooster said the trip report would be provided in the final report scheduled to be completed in the fall of 2015.

Mr. Devine said that NMFS' upstream habitat study seemed to address many of the questions asked by the CG in their study requests. Mr. Devine asked if it would make sense for NMFS to complete the first level of habitat assessment before moving on to the next stage of study. Mr. Wooster replied that that would not make sense because NMFS did not have the funding to complete several components of the study, including field data collection. Mr. Wooster added that the LiDAR data collected by NMFS would be useful complementary data.

Mr. Devine asked if the NMFS study had a study plan. Mr. Wooster replied that there was not a study plan in the sense of how a study plan was defined in the FERC licensing process. However, there was a plan document. Mr. Wooster said he would provide a copy of the study plan to the Districts.

Mr. Godwin asked if work for the NMFS study was being performed by a contractor or was being performed by NMFS staff. Mr. Wooster replied that the work was being directed by the NMFS Science Center and that a vendor was used to complete the remote sensing work.

Mr. Devine asked how much money was authorized for the study. Mr. Wooster questioned the relevancy of this question, and then replied he was unsure of the exact amount, but that the authorization was on the order of about \$100,000. He said 75% to 80% of the money was going towards remote sensing.

Referring to the float trip completed by NMFS over the summer, Mr. Devine asked about the purpose and outcome of the trip. Mr. Wooster said the trip had several purposes. On the trip, members of the Science Center collected information on substrate grain sizes at discrete

locations. Also on the trip, members of the study team tried out depth collection methods and field tested an echo sounder. Mr. Wooster said the trip was essentially a reconnaissance visit. He said that a trip report would include the data collected on grain sizes, the trial and error results from testing the depth finders, and the results of whether the hyperspectral data was accurate. Mr. Wooster said there was not yet a trip report with this information but that this information would be included in the final report due out next fall. Mr. Wooster added that during the float trip, NMFS also deployed several water temperature loggers. Mr. Wooster said the number of loggers deployed was about one quarter or one third of the number of water temperature loggers requested in NMFS' study request. Mr. Wooster said that NMFS would be more than willing to work with the Districts on incorporating NMFS' water temperature loggers into the study plan. Mr. Wooster said he would provide the locations of the NMFS temperature loggers.

Mr. Devine resumed the slide presentation. He said the Districts did not believe that the upstream study requests met ILP Criteria 5 or ILP Criteria 7. Many components of the study requests asked for data about CCSF's Hetch Hetchy operations. Mr. Devine said the Districts disagreed that there was a project nexus to Hetch Hetchy operations.

Mr. Wooster said that only a very small portion of NMFS' upstream habitat study request related to CCSF operations. Mr. Wooster asked if NMFS removed the component in the study plan relating to CCSF, would the Districts' response to the study request be different.

Mr. Devine asked if the water temperature modeling component of NMFS' study request was referring to the model created under the Don Pedro relicensing. He said the model looked at unimpaired flows and temperatures and the results are contained in an appendix to the Don Pedro FLA. Mr. Wooster replied that the model in the FLA may cover some of NMFS' model request. Mr. Wooster said NMFS would look into it and get back to Mr. Devine.

Mr. Thompson, referring to the project nexus of habitat upstream of Don Pedro Reservoir to the La Grange Project, said that upstream habitat would be relevant to the license if fish passage were required. If fish passage were required under NMFS' Section 18 prescription authority, it would be important to be informed by the condition of the upstream habitat, including habitat immediately below CCSF facilities. Mr. Devine responded that it was apparent that information about upstream habitat was of interest to NMFS in their consideration of fish passage. Mr. Devine added that if NMFS required fish passage under Section 18 prescription authority, the quality of upstream habitat would be a fundamental question related to NMFS' management of the resource. Mr. Devine said the Districts do not think they are responsible for collecting information for NMFS to use in its fishery management decisions.

Mr. Thompson explained that Section 18 was a part of the Federal Power Act. He said that fish passage would first be evaluated in FERC's NEPA analysis. If NMFS were to add a preliminary prescription, the prescription would be evaluated in the first draft of the NEPA analysis. Mr. Thompson said that NMFS would consider what was in the NEPA analysis, and then would decide either to file a final prescription or to withdraw the prescription. Mr. Thompson said that Mr. Devine's statement that upstream habitat information should be NMFS' responsibility to collect was incorrect because upstream habitat would pertain to the license. Mr. Devine

responded that the Districts believed it was NMFS' responsibility to get the upstream information NMFS' needs to support its prescription. He said the study request constituted fundamental biological research, and that the La Grange Project had no effect on the suitability of habitat upstream of Don Pedro Reservoir.

Mr. Wooster said he disagreed with Mr. Devine. He said the LGDD blocks marine-derived nutrients from getting upstream. Mr. Devine responded that Wheaton Dam was built in the 1870s. At that time, it was reported that Wheaton Dam had blocked upstream access for anadromous fish. Mr. Thompson replied that Yoshiyama et al. (1996) did not agree with Mr. Devine's assertion. Mr. Thompson said that this paper provided historical accounts of the rivers throughout the Central Valley and stated that Wheaton Dam *may* have totally blocked fish passage. Mr. Thompson added that Wheaton Dam no longer existed and was not of interest here. LGDD was the jurisdictional dam.

Mr. Devine said that NMFS stated in its study plan that information was needed about upstream habitat to determine where fish potentially trucked from LGDD should be placed. The Districts contend this is a fishery resource management issue and has no connection to the La Grange hydro project. Mr. Wooster replied that if the fish could swim upstream now, it could be observed where the fish congregate. But because the fish are blocked, where to place the fish must be evaluated. Mr. Thompson added that NMFS was spending money to find out where fish could be placed. Mr. Devine said he believed the number of options where fish could be placed was limited to possibly only two or three locations. Mr. Thompson said that CCSF facilities may also be an option, but that was unknown.

Referring back to Mr. Wooster's question that if the NMFS study request was modified to take out the element relating to CCSF, would that impact the Districts' acceptance of the study request, Mr. Devine said that other elements of the study plan were problematic. The large wood debris (LWD) element, which related to flow, as well as the element relating to the sediment budget, were only relevant to CCSF systems and the unimpaired watershed. Mr. Devine said he did not see how these were effects of the LGDD and he questioned the nexus to LGDD. Mr. Shutes said that the Districts were not affecting the habitat, but they were affecting access to the habitat.

Mr. Devine asked why a PHABSIM analysis for the upriver habitat was unnecessary. Mr. Shutes said it appeared that NMFS thought the information was good enough without it. In response, Mr. Devine asked how fry rearing could be studied without PHABSIM. He said that an IFIM had been necessary to study such issues downstream on the LTR. Ms. Willy replied that PHAMSIM was unnecessary because the upstream river reach was different from the downstream reach. For example, the upstream reach was shallower. The data could be collected with LIDAR. She also said that on a certain level, the upstream data collection would be less expensive than the downstream data collection because researchers would not have to get into the river. Mr. Devine said that study of fry rearing in the upper reach would be particularly tricky due to the steepness of the upper reach and the peaking flows coming from CCSF.

Mr. Wooster asked, in regards to CCSF's upstream habitat data and river ecosystem program, if any CCSF meeting attendee would give a summary of data that has been collected between Don

Pedro Reservoir and Early Intake Dam. Bill Sears (representing the San Francisco Public Utilities Commission) replied that the work performed by McBain & Trush was a high-level look at hydrology. CCSF had temperature data at select locations, likely including some of the same locations where NMFS was currently collecting data. Mr. Wooster asked if CCSF had temperature data downstream of the South Fork. Mr. Sears replied that CCSF had some temperature data for this reach and that HDR could provide the data. Ms. Borovansky said that the information had been provided previously, via cd, during the Don Pedro relicensing and that HDR would confirm available data and provide it to NMFS.

Mr. Devine asked if NMFS had reviewed the CG's upstream study request cost estimate. Mr. Devine said the CG's cost estimate was in the range of one million dollars. Mr. Wooster said he had not and that NMFS' study request was in the range of \$200,000 to \$300,000.

Mr. Devine said the Districts thought the upstream habitat study as proposed by the CG's study plan could cost up to \$2 million. Mr. Devine asked how the cost estimate was calculated. Mr. Shutes said the estimate was based on a similar level of effort at another project, but that it was difficult to make an estimate without knowing all the existing data. Mr. Shutes said that collecting data since the Rim Fire and getting recent temperature data with different water years would be appropriate. He said that the goal was not to spend money, but to produce useable and useful information.

Mr. Shutes said one of the elements of the CG's study plan involved asking CCSF to identify the feasibility of adjusting city operations. He said he would like the city to consider this request as an opportunity.

Mr. Devine said the discussion's emphasis on CCSF operations showed that the Districts did not affect those flows and that the study requests did not meet the project nexus criteria. Mr. Shutes responded that he agreed that changes to CCSF's operations would only come voluntarily from CCSF. He said he did not agree that understanding baseline information was not part of the project nexus.

Meeting broke for lunch at 12:40 pm and resumed at 2:00 pm.

Ms. Borovansky resumed the slide presentation. She reviewed the Districts' proposed Recreation Access and Safety Assessment, including the study plan goals and objectives.

Mr. Hastreiter asked a question on behalf of FERC Recreation Planner Adam Beeko, who was not in attendance. Mr. Hastreiter asked why the proposed study only evaluated up to 300 feet in elevation, which was four feet above the spillway. Mr. Devine confirmed that the LGDD spillway crest was 296.4 feet. Mr. Hastreiter asked if the study area would extend to Don Pedro Dam. Mr. Devine confirmed that was true.

Ms. Borovansky resumed the slide presentation. She reviewed the study methods.

On behalf of Adam Beeko, Mr. Hastreiter asked why the Districts were not proposing to evaluate potential enhancements if sites were identified that would be safe. He asked when the Districts

were proposing to evaluate those enhancements. Ms. Borovansky responded that if uses were identified as feasible and safe, the Districts would identify enhancements. She said that was the next logical step. Mr. Hastreiter said that Mr. Beeko was wondering why that was not included in the study plan.

Lee Delano (representing himself) asked if aesthetics were included in the Recreation Access and Safety Assessment. He said there was a scenic view available at Picnic Hill, which is located approximately 500 feet downstream of LGDD on the MID side of the river (river right). Mr. Shutes asked about the level of detail the Districts would use when identifying recreation opportunities. Ms. Borovansky responded that the proposed methodology would evaluate a number of activities and the risks associated with those activities. Ms. Borovansky confirmed the methodology would evaluate activities that occur on the shore.

Mr. Drekmeier asked if the study would evaluate a put-in facility downstream of LGDD. Ms. Borovansky replied that the study would first look at what activities were feasible and safe to occur.

Mr. Drekmeier asked how it was determined that the study area would extend to 200 feet downstream of the tailrace. He asked if that was a standard distance to use. Ms. Borovansky replied that that distance basically marked the extent of the project nexus. Mr. Devine added that the 200 feet would include the intersection of the tailrace and the main channel.

Mr. Drekmeier asked if bird watching would be included as a recreation resource in the study plan. Mr. Shutes said that he would like to see specific activities to be studied called out in the study plan. Ms. Borovansky replied that could be provided. Ms. Borovansky confirmed that the Canadian Dam Association risk assessment form referenced in the slide presentation was included in the study plan as an attachment. Mr. Shutes said that he would like to know which activities included in the CDA sheet did not apply to the Project. Ms. Borovansky requested that Mr. Shutes and others submit to the Districts which activities they believed were applicable to the Project. She said the Districts would present a revised list in the Revised Study Plan.

Mr. Bob Hackamack (representing himself) asked how high above the maximum pool the survey would go. He said that based on that height, rock climbing could be considered a recreation activity. Mr. Devine said that a Project Boundary had not yet been selected. The Project Boundary would include all the Project works needed for Project operation, and was dependent on the results on the studies.

Ms. Borovansky resumed the slide presentation. She completed the slides about the Recreation Feasibility and Safety Assessment and began the slides about the Cultural Resources Study.

Mr. Hackamack asked if the study would include the ditch that leads from the old Wheaton Dam. He said the ditch is located above the dam. Mr. Godwin said Mr. Hackamack was referring to the old mining ditch. Ms. Borovansky said the study would focus only on resources that may be potentially impacted by continued operations. Mr. Hackamack said he believed that was a mistake and that studying the ditch could be very interesting.

Ms. Willy asked how it would be known if recreation activity had the potential to impact cultural resources if cultural resources were not being surveyed in the entire recreation study area. Ms. Borovansky and Mr. Devine clarified that if recreation facilities were proposed in an area that had not been surveyed for cultural resources, then cultural resources would then be surveyed. Mr. Hastreiter said that any cultural resources study needed for a proposed recreation area would be completed prior to license issuance.

Various meeting attendees discussed when there would be opportunities to submit comments prior to license issuance. Mr. Hastreiter noted that State Historic Preservation Officer (SHPO) approval would be necessary before FERC could order a license. Mr. Devine noted that consultation related to cultural resources was usually kept to a smaller list of people because of the potential for vandalism to identified cultural resources. Mr. Hastreiter said that Frank Winchell, FERC's cultural resources specialist assigned to the Project, may have questions regarding the extent of the Area of Potential Effects, and whether it should be extended to include the entire pool. Mr. Hastreiter said he would ask Mr. Winchell to call Ms. Borovansky if he had additional comments.

Ms. Borovansky resumed the slide presentation. She reviewed the Cultural Resources Study methods and schedule.

Mr. Hackamack said that although the recreation study area did not extend below 200 feet downstream of the tailrace, he wanted to note the existence of safety hazards in the lower Tuolumne River. He said that water hyacinth was also an issue in the river, and may impact the movement of salmon.

Ms. Borovansky resumed the slide presentation. She reviewed study requests from NMFS (Effects of the Project and Related Activities on Fish Stranding and Salmonid Habitat in the Vicinity of the La Grange Project), USFWS (Draft Redd Dewatering Study), and SWRCB (Tailrace Habitat Assessment). Ms. Borovansky said it was not clear why existing information was not adequate to meet the needs of these study requests.

Mr. Wooster said that NMFS requested analysis on the potential for fish stranding, or entrainment. He said there were five flow conduits below LGDD. Mr. Wooster said that data from a USGS gage located downstream of the dam had no bearing on this request because it was unable to differentiate flows from the five conduits or provide rate of stage change immediately downstream of the dam. Mr. Wooster said that analysis of that gage data provided in the La Grange Pre-Application Document (La Grange PAD) was not the data that NMFS was requesting.

Mr. Devine responded that a similar request arose during the Don Pedro relicensing. He said that the data requested by Mr. Wooster was unavailable because it was simply not collected. Mr. Devine said there was no systematic collection of data of when the gates were open or closed. Mr. Devine said it may be possible to create some data by going back into operator records.

Mr. Hastreiter asked for which conduits the Districts had long-term data. Mr. Devine replied that the Districts had powerhouse flow data, and may also have data from the sluice gates in the TID canal. He said that records had been kept on flows through the powerhouse since 2007, but this would need to be confirmed with the Districts.

Mr. Hastreiter asked how long the Districts had been releasing 25 cfs at the MID gate. Mr. Devine replied that he did not know. Over the long-term, releases may not have been all the time. Recently, to the best of his knowledge, the gates had been releasing about 25 cfs around the clock. This estimate was based on the flows from the powerhouse and readings from the USGS gage. However, no long-term records were kept on the MID gate as far as he was aware.

Mr. Hastreiter asked if the mass balancing that NMFS suggested the Districts complete was possible. Mr. Devine said that the math would amount to guessing, as the Districts had explained during the Don Pedro relicensing.

Mr. Wooster asked if the Districts had provided information on flows from the sluice gates on the TID canal. He said the Districts had said that records had been kept only since the gates became automated. He added that NMFS had no information on the frequency that the gates were opened and closed.

Mr. Hastreiter noted that during the site visit the question came up of why the powerhouse was not generating. Mr. Devine replied that during the June 1 to September 30 period, required FERC flows range from 50 to 250 cfs. In the driest water years, required FERC flows are 50 cfs, although the Districts usually provide a bit more for a buffer, and during high air temperature periods, voluntarily provide up to 100 cfs. The small unit is reported by TID to sometimes exhibit stability problems at very low flows, circa 50 to 75 cfs. Mr. Wooster noted that during the FERC site visit, flows were at 90 cfs at the USGS gage. Mr. Devine noted that this would mean that the unit flow would have been about 65 cfs because about 25 cfs would be coming from the MID spillway. Mr. Wooster added that during the site visit, Mr. Devine had stated that the units would normally cycle back on in the afternoon. Mr. Devine replied that this was not exactly correct. The point being made was that if the flows were to increase later due to the Districts providing extra flow to the LTR due to high temperatures, then the small unit would probably come back in service. Mr. Hastreiter confirmed that was what Mr. Devine said during the site visit.

Mr. Thompson asked what was preventing the Districts from beginning to gather the flow data from the five outlets. Mr. Devine replied that the Districts did not understand that to be what NMFS had requested in its study request. Mr. Wooster said that the USGS gage data could not help determine upstream stage changes, therefore this additional data was necessary.

Mr. Hastreiter asked if NMFS' request was related to the transect information NMFS had also requested. Mr. Wooster clarified that NMFS had asked for elevation information about the bar between the main channel and tailrace. He confirmed that NMFS was not asking for topographic information, and not a hydraulic model.

Mr. Devine asked if fish movement data collected by the Chinook Barrier Study would meet NMFS' needs. Mr. Wooster replied that the information would be an added benefit, but would not be a replacement.

Mr. Hastreiter asked how NMFS would use the elevation data. Mr. Wooster replied that NMFS would use the elevation data for enhancement measures. He confirmed that the elevation data for the bar was needed not for stranding purposes, but for potential PM&E measures. Mr. Hastreiter asked if the elevation data was currently available. Mr. Devine replied that the data was not currently available. Mr. Devine said that the Districts would provide the topographic data and flow data.

Mr. Hastreiter asked if NMFS would describe the information they would like to use to determine if stranding was an issue. Mr. Thompson replied that the information was described in the study plan. Mr. Devine reiterated that the records needed to create a long-term flow duration curve were incomplete. Mr. Wooster asked if the operation rules provided in the La Grange PAD could be used to back calculate data. Mr. Devine replied that the rules were too informal for that purpose and were meant only to provide a sense of normal operation sequence. The Districts could apply the rules to the existing data, but Mr. Devine was doubtful it would get at what NMFS was requesting. Mr. Wooster responded that the rules may help show when fish have egress into the pool below the LGDD. He remarked that he had not seen any time series data for when the dam spills, or spill duration data. He asked if that data was available. Mr. Devine said the Districts could use existing information to back into those numbers. He said the Districts would provide that data as far back as was available. Mr. Wooster asked how far the generation records go back and Mr. Devine replied he was unsure.

Mr. Thompson said that regarding fish passage, NMFS would need to know the flows coming from the project at different times of the year. The information was needed not just for stranding and redds dewatering, but would be useful for fish passage siting and conceptual analysis. Mr. Devine asked if the fish counting weir data would suffice. Mr. Thompson replied that that information would be helpful, but that flow data was also needed.

Regarding the bar elevation data, Mr. Hastreiter asked if NMFS wanted a specific number of profiles. Mr. Wooster said that NMFS requested profiles spaced 10-foot across the bar. He added that the weir data was best for understanding fish movement, and was not as helpful for siting a fishway. Mr. Devine said that a lack of information on where the fish might congregate and a lack of information on their behavior around the project facilities could lead to poor fishway design.

Regarding NMFS' data request, Mr. Devine said the Districts may need more specific information from NMFS. Mr. Wooster said he welcomed further discussion.

Ms. Willy said that the USFWS study request expanded upon NMFS' study area by about a quarter of mile downstream. Mr. Devine asked if the river stage study completed for Don Pedro provided the information requested by USFWS. Ms. Willy replied that the existing information was not sufficient because stage change data was not available for the specific area cited by USFWS.

Mr. Hastreiter asked what the channel looks like where the tailrace enters the main channel, in regards to the potential for stranding. Mr. Devine replied that the range of stage change was very small, about one inch, and that was why the Districts believed stranding was not a particular issue. Mr. Willy said that the USFWS was interested to look at the margins, and to know if there was a change in the margins downstream of the confluence with the tailrace that could dewater redds. Mr. Hastreiter asked if that would require an extra transect. Ms. Willy replied that USFWS had requested surveys on the margins. She said this information would be collected via ground observations. Mr. Devine confirmed that this data collection would not require a ground survey with transects. Mr. Hastreiter asked if it would be easier to do a transect. He said something measurable was needed.

Mr. Hastreiter asked who wrote the USFWS study plan and if CDFW was already conducting this work. Ms. Murphy replied that CDFW reviewed the area noted by USFWS once a week. Mr. Hastreiter suggested that CDFW may be able to add to its observation checklist to include the data USFWS as requesting. Ms. Willy confirmed that the USFWS was only concerned when there was a change in flow that could dewater a redd. Unfortunately, this would not necessarily coincide with CDFW's weekly visit. Ms. Murphy said that this work would not be difficult to accomplish, and would only require some coordination.

Mr. Devine said that between October 16 and May 31, in every water year, the flow was at least 150 cfs. The flow was kept quite constant throughout that period. The USGS records show that only very infrequently was there a change in stage. The Districts' stage change analysis demonstrated the lack of an impact.

Mr. Wooster said that another trigger for redd dewatering, in addition to a change in flow, was if the TID canal intake had to close and all the water moved to MID's canal. Steve Boyd (representing TID) said that situation had never occurred. Mr. Wooster asked what caused the 2009 dewatering. Mr. Devine said it was his understanding that the plant was taken offline for maintenance at a poor time, and that mistake in operations had been corrected. Mr. Hastreiter confirmed that the 2009 dewatering was an operator issue and was not a part of normal operations. Mr. Devine said this incident is fully documented in the record.

Ms. Murphy asked if the main channel was surveyed as part of the redd mapping study conducted for Don Pedro. Mr. Devine said he did not know but would check. He also said that the Districts could incorporate that into the weir count. He said the Districts would know if there was an operational change, and could then evaluate if there was any redd dewatering. Ms. Willy said she would like to review the actual specifics of how these observations would take place. Mr. Devine said the Districts could coordinate with USFWS as well as CDFW. Mr. Hastreiter asked if the State Water Resources Control Board (SWRCB) was on board with this idea. Peter Barnes (representing SWRCB) said the SWRCB was concerned only with the tailrace and how operations of the powerhouse could affect flows in that area. Mr. Barnes added that SWRCB could set a minimum instream flow for the tailrace, if necessary.

Ms. Willy said that she like NMFS' study request because it would collect information that would be useful for future decision making. Mr. Thompson said that NMFS would respond in

writing to any portions of the Districts' plan that were objectionable. Mr. Hastreiter said that the Districts could perform any study they wanted, regardless of whether it was approved by FERC.

Ms. Borovansky resumed the slide presentation. She presented the reasons why the Districts did not accept NMFS' request for a study of *O.mykiss* genetics. She said the Districts rejected this study request because the information already exists and the information would not inform the license.

Mr. Thompson read a passage from page 4-3 of the PSP that stated there was no self-sustaining population of steelhead in the Tuolumne River. Mr. Thompson said there was no study prerequisite that there be a certain population size in a river prior to a study. In addition, Zimmerman et al., which was cited in the PSP, had a broad study scope and was meant only to determine if steelhead existed, and not to determine abundance. FERC had stated for the record that steelhead occur in the river. Mr. Thompson added that that the NMFS study request was not a research request and would provide important information for stock selection that may be necessary in the event of fish passage. In the Operating Criteria and Plan (OCAP), NMFS assessed the stock of the American River to determine if it was appropriate to pass at Folsom Dam. NMFS has proposed a similar study for the Tuolumne River.

Mr. Devine questioned how it would be determined where steelhead captured in the Tuolumne River originated from. Mr. Thompson said it would be necessary to take a tissue sample. The samples would help build a database, which would eventually show which offspring returned and which fish were strays. An alternative way to study origination would be to tag young fish and see which fish return. This data would be used for both fish passage and to measure the success of habitat improvements. NMFS could offer significant resources for this effort in the form of the NMFS Science Center. The Science Center has already built the expensive genetic testing procedures and algorithm. It would be very expensive for the Districts to build this work from scratch. Mr. Thompson added that working with the Science Center would be more cost efficient.

Mr. Thompson said that he did not agree with the Districts' characterization that Garza and Pierce's findings stated that most *O.mykiss* in the LTR are not native to the LTR. If steelhead in the LTR were found to be of hatchery origin, NMFS may decide not to pass those fish, but first the situation must be much better understood than it is currently.

Mr. Bryd asked if there was a visual difference between a rainbow trout and a steelhead. Mr. Thompson said you cannot tell the difference between the two by looking at the fish. The only way to tell is to kill the fish and examine the otolith.

Mr. Thompson said that salmon migrating upstream that pass the fish weir located near the mouth of the river could have tissue clipped for analysis. The same could be done for carcasses found in the river. In response to Mr. Bryd's question if that process would be expensive, Mr. Thompson replied that it was becoming more inexpensive as the technology improved.

Mr. Devine asked if a tissue sample could indicate if an *O.mykiss* was a steelhead. Mr. Thompson replied that the tissue would not tell if the fish was a steelhead. However, the

tissue could be used to build a family tree where fish from different generations could be linked to one another. Mr. Thompson added that it could not be ruled out that in the future that tissue could be used to determine if a fish was a steelhead.

Mr. Devine asked if NMFS wanted the Districts to collect tissue samples and send them to NMFS. Mr. Thompson replied that NMFS did not want this. He said the NMFS Science Center would first need to be contacted. Mr. Devine asked how long it would take to develop a database for the LTR. Mr. Thompson replied that a database had already been started, and the algorithm the database used had already been developed. In response to a question from Ms. Willy, Mr. Thompson affirmed that NMFS was interested in collecting both upstream and downstream genetics.

Mr. Godwin asked if anyone was currently collecting tissue clips. Ms. Murphy replied that tissue samples were collected from carcasses, depending on the condition of the carcass. Mr. Thompson said NMFS could partner with anglers to take fin clips and fish measurements. Mr. Godwin asked if that would be legal. Mr. Thompson replied he was unsure, but that a similar program had been developed on another river. He said that NMFS was open to the idea.

Ms. Borovansky resumed the slide presentation. She reviewed NMFS' request for a study on the loss of marine-derived nutrients.

Mr. Thompson said that this study was related to fish passage. He said the LGDD had blocked all fish passage, thus resulting in lost marine-derived nutrients. He said it was known from other projects that if fish were introduced above dams into their historical habitat, it was first beneficial to fertilize the river with fish carcasses or other fertilizer. Mr. Thompson added that he believed a study on this topic was currently underway on the Russian River. The potential license condition stemming from these study results would be to fertilize upstream if there was fish passage. Mr. Devine asked if it would first be appropriate to determine if there had been an impact from the loss of marine-derived nutrients.

Ms. Willy said that marine-derived nutrients are beneficial not just to instream species but to the whole ecosystem as well. Steve Edmondson (representing NMFS) said the state of Oregon had a program for years in which fish carcasses were placed above the dam to replace lost nutrients.

Mr. Thompson asked if there was a question about how this data would inform license conditions. Mr. Hastreiter replied that he did not know and that this would be discussed internally at FERC.

Mr. Thompson said this study would be mostly a desktop study and that he could not recall the estimated budget. Ms. Willy said that this topic was well-covered in the academic literature. Mr. Edmondson said he knew of paper where the effects of marine-derived nutrients were evident in tree rings. He said he would send the paper.

Ms. Borovansky resumed the presentation. She reviewed the USFWS's juvenile salmonid floodplain rearing study request.

Ms. Borovansky reviewed the components of the Districts' LTR Floodplain Hydraulic Study being completed for Don Pedro and asked if it met USFWS's needs. Ms. Willy said she would review the study to see if it was adequate. Mr. Devine offered for the Districts to have a conference call with the USFWS to discuss the study. Ms. Willy replied that that would be helpful and suggested a good time for a call would not be until early November.

Ms. Borovansky resumed the presentation. She reviewed the USFWS's juvenile chinook survival study request.

Ms. Borovansky said that information from the Don Pedro relicensing appeared to address the data requested by this study. Ms. Willy asked when the Don Pedro Chinook Salmon model was last updated. Mr. Devine and Ms. Borovansky replied that the model had last been updated in March 2014, and that this version was available in the Don Pedro FLA.

Mr. Devine asked if the rotary screw trap data collected for Don Pedro met the USFWS's request. Ms. Willy said that information was helpful, but that the USFWS was trying to determine how juvenile salmon moved through inundated floodplain. Mr. Devine replied that this would be measured in the Districts' Mark and Recapture Predation Study, if there were floodplain flows when the study was conducted. Ms. Willy asked if it was possible to conduct the study during a period of inundation flows. Mr. Devine answered that the study was opportunistic and would occur with whatever flows occurred. He added that predation would be estimated at a range of flows.

Ms. Borovansky resumed the presentation. She reviewed the USFWS's request for a study on Chinook salmon egg viability.

Ms. Borovansky said the Districts believed this study request was similar to a request made during the Don Pedro relicensing, and that the requested information already existed in the Tuolumne River Chinook Salmon Population Model. Ms. Willy said she would discuss whether the existing model was adequate with the USFWS Lodi office. Mr. Devine offered to have a conference call with USFWS to discuss what information currently existed. Ms. Willy agreed.

Mr. Thompson said that on page 4-8 of the PSP, the Districts stated that the USFWS and other agencies did not provide comments on the Tuolumne River Chinook Salmon Population Model, and as such, the Districts considered conclusions based on the model to be accepted by the USFWS as valid. Mr. Thompson said that NMFS did not consider not providing study comments to be an acceptance of study results.

Ms. Borovansky reviewed action items from the meeting [action items are listed below]. Mr. Hastreiter asked if there was an action item regarding transects for NMFS. Mr. Devine replied that the Districts would look into this and would get with Mr. Thompson about any questions.

Mr. Shutes asked about the schedule moving forward. Mr. Devine replied that the Districts would provide a schedule that may include another meeting or conference call.

Mr. Devine reviewed the next steps in the ILP process. Mr. Shutes said he believed another discussion would be helpful if the Districts were willing to propose substantive changes to the plan.

Meeting adjourned at 4:30 pm.

Action Items

1. Mr. Thompson said he would provide the MWH fish passage report. He also said the report was available on e-Library under Project 2246.
2. Mr. Wooster said he would provide a copy of the NMFS upstream habitat study plan and the scope of the study.
3. Mr. Wooster said he would provide the locations of the temperature loggers for the NMFS upstream study plan.
4. Mr. Wooster said NMFS would look into the unimpaired flow and temperature information provided in the Don Pedro FLA and get back to the Districts on the issue if upper river temperature modeling met NMFS' information request.
5. Mr. Shutes and others will provide to the Districts recreation activities which they believe are applicable to the Project area.
6. Ms. Borovansky said HDR would confirm the availability of temperature data for the reach below South Fork and provide this information to NMFS if the data is available.
7. Ms. Borovansky said the Districts would present a revised list of recreation activities relevant to La Grange in the Revised Study Plan.
8. Mr. Hastreiter said he would ask Mr. Winchell to call Ms. Borovansky if Mr. Winchell had additional comments on the cultural resources draft study plan.
9. Mr. Devine said that the Districts would provide data that are available for the various LGDD conduits.
10. Mr. Devine said the Districts would consider how to accommodate the USFWS interest in surveys following stage change occurrences below and near the end of the tailrace.
11. Mr. Devine said he would confirm if the area immediately downstream of LGDD had been surveyed for redds as part of the Don Pedro Salmonid Redd Mapping Study. (The area was inspected as part of that study; the substrates (large cobble; boulders; rock outcrops) do not provide suitable habitat).
12. Mr. Edmondson said he would send the paper he referenced about marine-derived nutrients.
13. Ms. Willy said she would review the Don Pedro Lower Tuolumne River Floodplain Hydraulic Assessment Study Plan and follow up with the Districts as necessary.
14. Ms. Willy said she would discuss with the USFWS Lodi office the Tuolumne River Chinook Salmon Population Model and follow up with the Districts as necessary.
15. The Districts will review NMFS' transect request and would follow up with Mr. Thompson as necessary.

ATTACHMENT A

Meeting Attendees

**La Grange Hydroelectric Project
Study Plan Meeting
Monday, October 6, 2014
10:00 a.m. – 4:00 p.m.**

Attendees

No.	Name	Organization
1	Theresa Simsiman	American Whitewater
2	Gretchen Murphey	CDFW
3	Ray Dias	Grower
4	Chris Shutes	CSPA
5	Jim Hastreiter	FERC
6	Bill Sears	SFPUC
7	Les Johnson	Farmer
8	Bob Hackamack	Self
9	Peter Barnes	SWRCB
10	Alison Willy	USFWS
11	Brian Genzoli	Grower
12	Keith D Boggs	Stanislaus County
13		
14	John Buckley	CSERC
15	Deanna Probst	Stanislaus Business Alliance
16	Phillip Stino	Farmer
17	Leonard Van Elderen	Yosemite Farm Credit
18	Allen Peterson	Farmer
19	Stacy Henderson	THT, APC
20	Luke Miller	Farmer
21	Andrea Fuller	FISHBIO
22	Marco Moreno	LCR
23	Peter Drekmeier	TRT
24	Michelle Reimers	TID
25	Bill Ketscher	Farmer
26		
27	Larry Thompson	NOAA-NMFS
28	Jim Alves	City of Modesto
29	Cecil Russell	Modesto Chamber
30	John Holland	Modesto Bee
31	Calvin Curtin	TID
32	Matt Moses	SFPUC
33	Ellen Levin	SFPUC
34	Adrienne Carr	BAWSCA
35	John Wooster	NMFS
36	Tom Holley	NMFS
37	Steve Edmondson	NMFS

38	Richard Gemperle	GEP Inc
39		
40	Dave Absher	Absher Land & Livestock
41	Joy Warren	MID
42	Larry Byrd	MID
43	Bill Paris	O'Laughlin & Paris
44	Steve Boyd	TID
45	Jesse Deason	HDR
46	Art Godwin	TID
47	Bill Johnston	MID
48	Jenna Borovansky	HDR
49	John Devine	HDR
50	Roger Varney	MID
51	Anna Brathwaite	MID
52		
53	Melissa Williams	MID
54	Samantha Wookey	MID
55	Herb Smart	TID

Please direct any corrections in the translations of the names from the handwritten sign-in sheets to the attention of Rose Staples at rose.staples@hdrinc.com. Thank you.

ATTACHMENT B

Meeting Agenda Meeting PowerPoint Presentation

La Grange Hydroelectric Project Study Plan Meeting

Monday, October 6, 10:00 am – 4:00 pm
MID Offices, 1231 11th Street, Modesto, CA

(Times are approximate and subject to change)

TIME	TOPIC
9:30 am to 10:00 am	SIGN-IN
10:00 am to 10:15 am	Introductions, review agenda and purpose of the meeting
10:15 am to 12:00 pm	<p>Discussion of water and aquatic resources study requests</p> <ul style="list-style-type: none"> • Upstream and downstream fish passage studies requested by licensing participants <ul style="list-style-type: none"> ○ Discussion of availability of existing information (ILP Study Plan Criteria 4) ○ Discussion of basis for project nexus (Criteria 5) ○ Confirmation of target species (Criteria 6) ○ Estimate of run size (Criteria 6) ○ Discussion of basis for study cost estimate and schedule (Criteria 7) • Discussion of the Districts’ Fall-Run Chinook Salmon Migration Barrier Draft Study Plan • Upstream habitat studies requested by licensing participants <ul style="list-style-type: none"> ○ Discussion of availability of existing information (Criteria 4) ○ Discussion of basis for project nexus (Criteria 5) ○ Discussion of basis for study cost estimate and schedule (Criteria 7) • Discussion of the Districts’ response to upstream habitat study requests
12:00 pm to 1:15 pm	LUNCH BREAK (Lunch is on your own)
1:15 pm to 2:00 pm	<ul style="list-style-type: none"> • Discussion of the Recreational Access and Facilities Feasibility study request <ul style="list-style-type: none"> ○ Discussion of availability of existing information (ILP Study Plan Criteria 4) ○ Discussion of basis for project nexus (Criteria 5) • Discussion of the Districts’ Recreation Access and Safety Assessment Draft Study Plan
2:00 pm to 2:15 pm	Discussion of the Districts’ Cultural Resources Draft Study Plan
2:15 pm to 3:45 pm	<p>Discussion of remaining study requests</p> <ul style="list-style-type: none"> • Effects of the Project and Related Activities on Fish Stranding and Salmonid Habitat in the Vicinity of the La Grange Project, Draft Redd Dewatering Study, and Tailrace Habitat Assessment • Effects of Project and Related Activities on the Genetic Makeup of Steelhead/Rainbow Trout <i>Oncorhynchus mykiss</i> in the Tuolumne River • Effects of Project and Related Activities on the Losses of Marine-Derived Nutrients in the Tuolumne River • Draft Juvenile Salmonid Floodplain Rearing Study • Draft Juvenile Chinook Salmon Survival Study • Draft Genetics of Chinook Salmon in the Upper Tuolumne River
3:45 pm to 4:00 pm	Closing summary and action items
4:00 pm	ADJOURNMENT



MID and TID welcome you to the La Grange Hydroelectric Project Proposed Study Plan Meeting

<http://www.lagrange-licensing.com>



The Integrated Licensing Process

Where We Are

Pre-Application Document	February 24, 2014
FERC's Scoping Document 1	May 23, 2014
PAD/SD1 Comments and Study Requests Due	July 22, 2014
Proposed Study Plan Document	September 5, 2014
FERC's Scoping Document 2	September 5, 2014
Proposed Study Plan Meeting	October 6, 2014
Proposed Study Plan Comments Due	December 4, 2014
Revised Study Plan Document	January 3, 2015
Revised Study Plan Comments Due	January 18, 2015
FERC's Study Plan Determination	February 22, 2015



Today's Agenda

9:30 am to 10:00 am	Sign-In
10:00 am to 10:15 am	Introductions, review agenda, purpose of the meeting
10:15 am to 12:00 pm	<ul style="list-style-type: none">- Discussion of water and aquatic resources study requests<ul style="list-style-type: none">- Upstream and downstream fish passage studies requested by LPs- Discussion of the Districts' Fall-Run Chinook Salmon Migration Barrier Draft Study Plan- Upstream habitat studies requested by LPs- Discussion of the Districts' response to upstream habitat study requests
12:00 pm to 1:15 pm	Lunch (Lunch is on your own)
1:15 pm to 2:00 pm	<ul style="list-style-type: none">- Discussion of the Recreational Access and Facilities Feasibility study request- Discussion of the Districts' Recreation Access and Safety Assessment Draft Study Plan

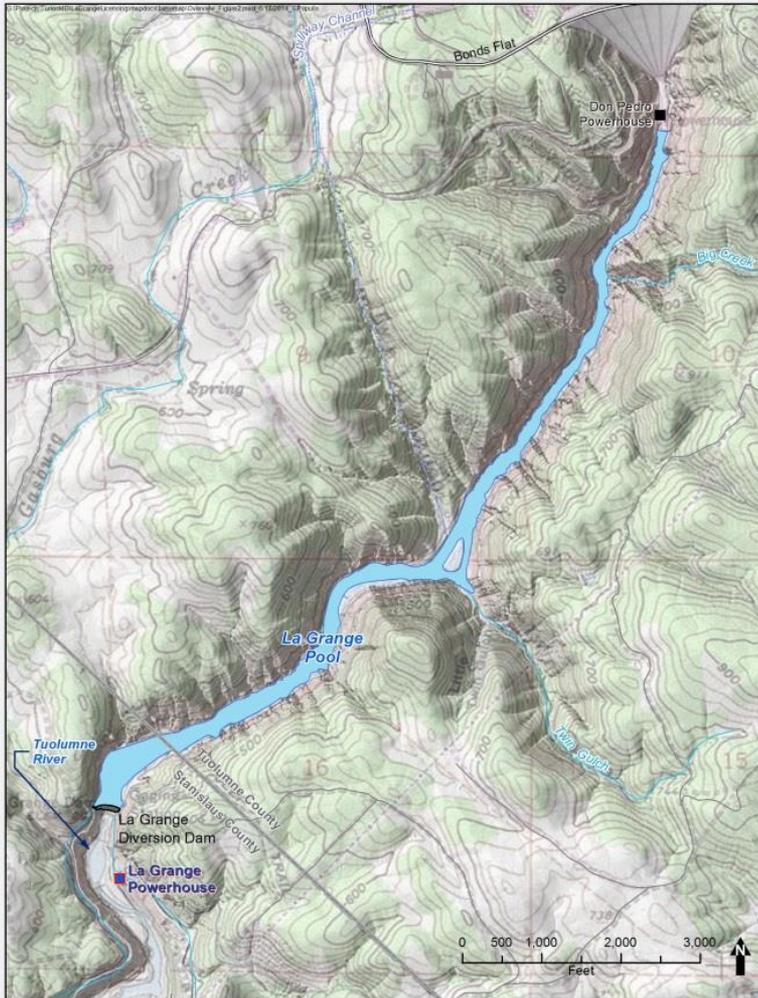


Today's Agenda

2:00 pm to 2:15 pm	Discussion of the Districts' Cultural Resources Draft Study Plan
2:15 pm to 3:45 pm	<ul style="list-style-type: none">- Discussion of remaining study requests<ul style="list-style-type: none">- Effects of the Project and Related activities on Fish Stranding and Salmonid Habitat in the Vicinity of the La Grange Project, Draft Redd Dewatering Study, and Tailrace Habitat Assessment- Effects of the Project and Related Activities on the Genetic Makeup of Steelhead/Rainbow Trout <i>Oncorhynchus mykiss</i> in the Tuolumne River.- Effects of Project and Related Activities on the Losses of Marine-Derived Nutrients in the Tuolumne River- Draft Juvenile Salmonid Floodplain Rearing Study- Draft Juvenile Chinook Salmon Survival Study- Draft Genetics of Chinook Salmon in the Upper Tuolumne River
3:45 pm to 4:00 pm	Closing summary and action items
4:00 pm	Adjournment

Location

- La Grange Diversion Dam (LGDD) is located in Stanislaus County
- La Grange impoundment is located in Stanislaus and Tuolumne counties



Map of La Grange Hydroelectric Project



Project Facilities



- Two-unit powerhouse on south side of river
- TID diversion tunnel and forebay
- La Grange Diversion Dam (131 ft high)
- Spillway
- Penstock intakes and penstocks
- Tailrace
- Substation

La Grange Hydroelectric Project Facilities



La Grange Diversion Dam





ILP Study Criteria

18 CFR Section 5.9(b)(1) – (7)

1. Describe the goals and objectives of each study proposal and the information to be obtained;
2. If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied;
3. If the requester is not a resource agency, explain any relevant public interest considerations in regards to the proposed study;
4. Describe existing information concerning the subject of the study proposal, and the need for additional information;
5. Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements;
6. Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed season(s) and duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge; and
7. Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.



La Grange Hydroelectric Project FERC No. 14581



**Study Plan Meeting
October 6, 2014**

Study Requests Received



Fish Passage Feasibility Study at Project Facilities (USFWS)

Effects of the Project and Related Activities on Fish Passage for Anadromous Fishes (NMFS)

Fish Passage Engineering Assessment (CG)



La Grange Hydroelectric Project FERC No. 14581



Fall-Run Chinook Salmon Migration Barrier Study

**Study Plan Meeting
October 6, 2014**



Fall-Run Chinook Salmon Migration Barrier Study

Project Nexus

- Whether the LGDD constitutes an actual barrier to upstream anadromous fish migration is unknown at this time.
- If only a small percentage of the migrating fall-run Chinook population actually reaches the LGDD, and if those fish that do reach the LGDD typically move back downstream to spawn, then the existence of the LGDD is not a barrier to spawning.
- Therefore, the Districts propose to conduct a two-year study to investigate whether and to what extent the Project is a barrier to the upstream migration of fall-run Chinook salmon and whether it adversely affects spawning.



Fall-Run Chinook Salmon Migration Barrier Study

Study Goals and Objectives

- The study will document the fall-run Chinook salmon that may migrate upstream to the Project and become stranded.
- **Objectives**
 - Determine the number of fall-run Chinook salmon migrating upstream to the Project during the 2015/2016 and 2016/2017 migration seasons.
 - Compare the number of fall-run Chinook salmon migrating upstream to the Project to total escapement during the 2015/2016 and 2016/2017 migration seasons.
 - Document carcass condition (egg retention) to evaluate pre-spawn mortality rates of fall-run Chinook salmon migrating upstream to the Project, which do not move back downstream to spawn.



Fall-Run Chinook Salmon Migration Barrier Study

Study Area

The study area consists of the Tuolumne River channel opposite the Project powerhouse and in the tailrace just downstream of the powerhouse.



Fall-Run Chinook Salmon Migration Barrier Study

Study Methods

- Operate a fish counting weir to determine the number of fall-run Chinook salmon migrating upstream to the Project.
- Compare the number of fall-run Chinook salmon migrating upstream to the Project (i.e., above the counting weir) and not returning to downstream habitat to total fall-run Chinook escapement.
- Document carcass condition (egg retention) to evaluate pre-spawn mortality rates of fall-run Chinook salmon migrating upstream to the Project (i.e., those that do not return to downstream habitats below Project facilities to spawn).



Fall-Run Chinook Salmon Migration Barrier Study



Fish Counting Weir Approximate Location





Fall-Run Chinook Salmon Migration Barrier Study

Study Schedule

Planning and Permitting	October 2014 – August 2015
Field Work	September 2015 – April/May 2016
	September 2016 – April/May 2017
Data Entry, QA/QC, and Analysis	September 2015 – June 2017
Initial Study Report Issuance	February 2016
Updated Study Report Preparation	February 2017 – July 2017



**Quantifying Existing Upper Tuolumne River
Habitats for Anadromous Fish as They Pertain to
Fish Passage Blockage at La Grange diversion
dam (NMFS)**

**Upper Tuolumne River Habitat Assessment
(USFWS)**

**Upper Tuolumne River Anadromous Fish Habitat
Assessment (CG)**



ILP Criteria 4: Availability of Existing Information

- CCSF Upper Tuolumne River Ecosystem Program
- NMFS ongoing study
- BLM and NPS Tuolumne River Wild and Scenic River Draft Comprehensive Management Plan and EIS
- CCSF Water System Improvement Program (WSIP)
- Historical, unimpaired, and current temperature data
- Historical, unimpaired, and current flow data
- Clavey River feasibility study



ILP Criteria 5: Project Nexus

ILP Criteria 7: Basis for Study Cost Estimate and Schedule



Recreational Access and Facilities Feasibility Study (CG)



La Grange Hydroelectric Project FERC No. 14581



Recreation Access and Safety Assessment

**Study Plan Meeting
October 6, 2014**



Recreation Access and Safety Assessment

Project Nexus

FERC regulations require that the license application include a description of existing recreation facilities to be maintained during the term of the license, new measures or facilities proposed by the applicant, and measures to ensure the safety of the public in its use of Project lands and waters.



Recreation Access and Safety Assessment

Study Goals and Objectives

The goals of this study are:

- 1) to identify and characterize public use and potential recreation opportunities in the study area, and
- 2) to assess the public safety risk of identified recreation opportunities in the study area.



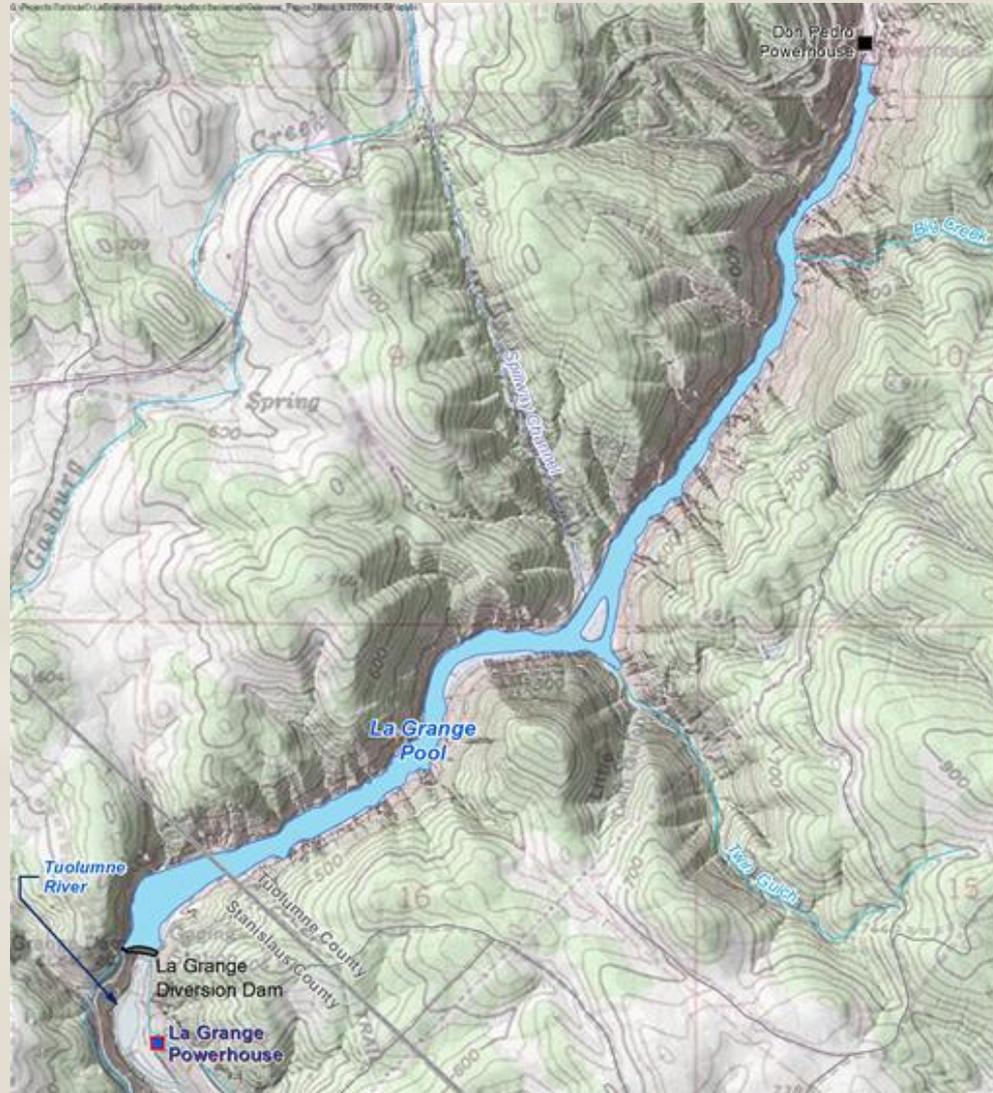
Recreation Access and Safety Assessment

Study Area

- The study area includes the Tuolumne River from RM 51.8 (which is approximately 200 feet downstream of where the tailrace meets the bypass reach) upstream to Don Pedro Dam, located at RM 54.8.
- Above the LGDD, the study area will extend to elevation 300 feet.



Recreation Access and Safety Assessment Study Area





Recreation Access and Safety Assessment

Study Methods

- Step 1 – Identify and Describe Existing Public Access and Potential Recreation Opportunities in the Study Area

- Step 2 – Assess Risk to Public Safety
 1. Establish Boundaries of Site Components (Areas)
 2. Identify Potential Recreation Activities within Each Component
 3. Identify Hazards within Each Component
 4. Identify Existing Risk Treatments (Measures) and Their Effectiveness
 5. Assign Incident Likelihood Ratings (ILR)
 6. Assign Incident Consequence Ratings
 7. Determine Risk Rating and Assign Risk Level

- Step 3 – Prepare Report



Recreation Access and Safety Assessment

Study Schedule

Step 1 (Identify and describe existing public access and potential recreation opportunities)	March 2015 – April 2015
Step 2 (Assess risk to public safety)	May 2015 – July 2015
Step 3 (Prepare report)	August 2015 – October 2015
Initial Study Report Issuance	February 2016



Recreation Access and Safety Assessment Portions of Study Request Not Adopted

- Requests for study of manmade hazards and downstream recreation opportunities are not related to the Project and were not adopted
- Requests for studies of PM&E measures are premature at this stage of the licensing process
- Requests for regional recreation needs and recreation potential - this information is already available in such sources as the California Outdoor Recreation Plan (2008) and the Don Pedro Project Recreation Facility Condition and Public Accessibility Assessment, and Recreation Use Assessment Study Report (2013).



La Grange Hydroelectric Project FERC No. 14581



Cultural Resources Study

**Study Plan Meeting
October 6, 2014**



Cultural Resources Study

Project Nexus

The Districts' continued operation and maintenance (O&M) of the La Grange Hydroelectric Project may affect historic properties that are listed on or eligible for listing on the National Register of Historic Places (NRHP).



Cultural Resources Study

Study Goals and Objectives

- The primary study goal is to assist FERC in meeting its compliance requirements under Section 106 of the NHPA, as amended, by determining if licensing of the La Grange Hydroelectric Project will have an adverse effect on historic properties.
- The objective of this study is to identify cultural resources within the area of potential effects (APE), formulate a plan to evaluate their eligibility to the NRHP, if needed, and identify La Grange Hydroelectric Project-related effects on those resources.



Cultural Resources Study

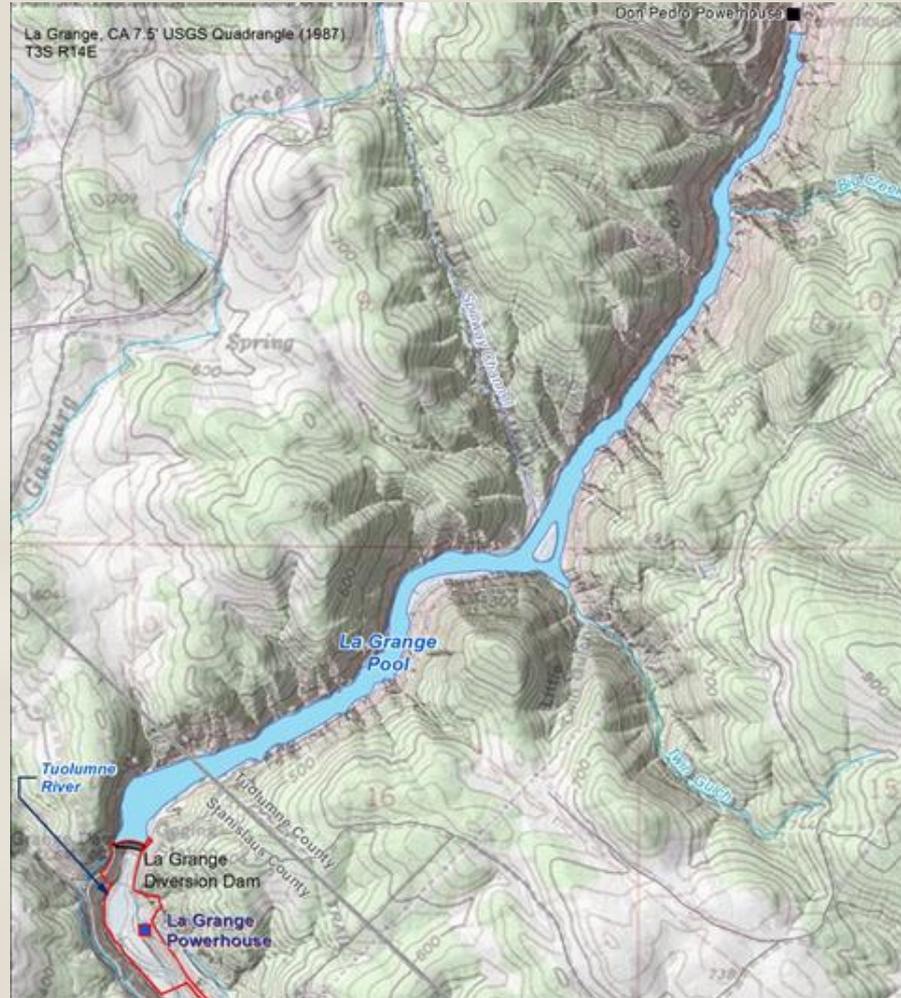
Area of Potential Effects

The APE has been initially defined as the lands incorporating the La Grange Hydroelectric Project facilities, and La Grange Hydroelectric Project access roads.



Cultural Resources Study

Area of Potential Effects





Cultural Resources Study

Study Methods

- Step 1 – Obtain SHPO Approval of APE
- Step 2 – Archival Research
- Step 3 – Field Survey
- Step 4 – Tribal Field Visit
- Step 5 – National Register of Historic Places Evaluation
- Step 6 – Identify and Assess Potential Effects on National Register-Eligible Properties
- Step 7 – Reporting



Cultural Resources Study

Study Schedule

Obtain SHPO approval of APE	January 2015
Archival Research/Field Work	February – April 2015
Tribal Field Visit	April 2015
NRHP Evaluation/Identify and Assess Effects	April – May 2015
Report Preparation	June – September 2015
Report Submittal to Tribes	October 2015
Report Submittal to SHPO	December 2015
Initial Study Report Issuance	February 2016



La Grange Hydroelectric Project FERC No. 14581



**Study Plan Meeting
October 6, 2014**

**Remaining Study Requests
Not Adopted**



Effects of the Project and Related Activities on Fish Stranding and Salmonid Habitat in the Vicinity of the La Grange Project (NMFS)

Draft Redd Dewatering Study (USFWS)

Tailrace Habitat Assessment (SWRCB)



**Effects of the Project and Related Activities on the
Genetic Makeup of Steelhead/Rainbow Trout
Oncorhynchus mykiss in the Tuolumne River
(NMFS)**



Effects of the Project and Related Activities on the Losses of Marine-Derived Nutrients in the Tuolumne River (NMFS)



Draft Juvenile Salmonid Floodplain Rearing (USFWS)



Juvenile Chinook Salmon Survival (USFWS)



Genetics of Chinook Salmon in the Upper Tuolumne River (USFWS)



Chinook Salmon Egg Viability (USFWS)



Questions and Comments

<http://www.lagrange-licensing.com>



EXTRA SLIDES



Scoping Document 2 Schedule

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
The applicants	Issue Public Notice for NOI/PAD	11/15/13	5.3(d)(2)
The applicants	File NOI/PAD with FERC	2/24/14	5.5, 5.6
FERC	Issue Notice of Commencement of Proceeding; Issue Scoping Document 1	5/23/14	5.8
FERC	La Grange Project Environmental Site Review and Scoping Meetings	6/22/14	5.8(b)(viii)
All stakeholders	PAD/SD1 Comments and Study Requests Due	7/22/14	5.9
FERC	Issue Scoping Document 2	9/5/14	5.1
The applicants	File Proposed Study Plan (PSP)	9/5/14	5.11(a)
All stakeholders	Proposed Study Plan Meeting	10/5/14	5.11(e)
All stakeholders	Proposed Study Plan Comments Due	12/4/14	5.12
The applicants	File Revised Study Plan	1/3/15	5.13(a)
All stakeholders	Revised Study Plan Comments Due	1/18/15	5.13(b)
FERC	Director's Study Plan Determination	2/2/15	5.13(c)



Scoping Document 2 Schedule

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
FS, FWS, Ecology	Any Study Disputes Due	2/22/15	5.14(a)
Dispute Panel	Third Dispute Panel Member Selected	3/9/15	5.14(d)
Dispute Panel	Dispute Resolution Panel Convenes	3/14/15	5.14(d)(3)
The applicants	Applicant Comments on Study Disputes Due	3/19/15	5.14(j)
Dispute Panel	Dispute Resolution Panel Technical Conference	3/24/15	5.14(j)
Dispute Panel	Dispute Resolution Panel Findings Issued	4/13/15	5.14(k)
FERC	Director's Study Dispute Determination	5/3/15	5.14(l)
The applicants	First Study Season	2015	5.15(a)
The applicants	Initial Study Report	2/2/16	5.15(c)(1)
All stakeholders	Initial Study Report Meeting	2/17/16	5.15(c)(2)
The applicants	Initial Study Report Meeting Summary	3/3/2016	5.15(c)(3)



Scoping Document 2 Schedule

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
All stakeholders	Any Disputes/Requests to Amend Study Plan Due	4/2/2016	5.15(c)(4)
All stakeholders	Responses to Disputes/Amendment Requests Due	5/2/16	5.15(c)(5)
FERC	Director's Determination on Disputes/Amendments	6/1/16	5.15(c)(6)
The applicants	Second Study Season	2016	5.15(a)
The applicants	Updated Study Report due	2/1/17	5.15(f)
All stakeholders	Updated Study Report Meeting	2/16/17	5.15(f)
The applicants	Updated Study Report Meeting Summary	3/3/17	5.15(f)
All stakeholders	Any Disputes/Requests to Amend Study Plan Due	4/2/17	5.15(f)
All stakeholders	Responses to Disputes/Amendment Requests Due	5/2/17	5.15(f)
FERC	Director's Determination on Disputes/Amendments	6/1/17	5.15(f)
The applicants	File Preliminary Licensing Proposal	1/18/16	5.16(a)
All stakeholders	Preliminary Licensing Proposal Comments Due	4/17/16	5.16(e)
The applicants	File Final License Application	6/16/16	5.17
The applicants	Issue Public Notice of License Application Filing	6/30/16	5.17(d)(2)



Entities providing study requests and/or comments on SD1 and PAD

Licensing Participant	Date of Comment Letter
Bay Area Water Supply and Conservation Agency	July 21, 2014
Conservation Groups	July 22, 2014
NOAA – National Marine Fisheries Service	July 22, 2014
State Water Resources Control Board	July 22, 2014
U.S. Fish and Wildlife Service	July 22, 2014



Licensing participant study requests filed with FERC

CGs	<ul style="list-style-type: none"> • Fish Passage • Upper Tuolumne Habitat Suitability • Recreation Access and Facilities Feasibility
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USFWS	<ul style="list-style-type: none"> • Draft Juvenile Salmonid Floodplain Rearing Study • Draft Chinook Salmon Egg Viability Study • Draft Juvenile Chinook Salmon Survival Study • Draft Genetics of Chinook Salmon in the Upper Tuolumne River • Draft Redd Dewatering Study
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SWRCB	<ul style="list-style-type: none"> • Fish Passage Feasibility Study • Upper Tuolumne River Habitat Assessment • Tailrace Habitat Assessment
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NMFS	<ul style="list-style-type: none"> • Effects of the La Grange Project and Related Activities on Fish Passage for Anadromous Fishes • Effects of the Project and Related Activities on Fish Stranding and Salmonid Habitat in the Vicinity of the La Grange Project • Quantifying Existing Upper Tuolumne River Habitats for Anadromous Fish as They Pertain to Fish Passage Blockage at La Grange Dam • Effects of Project and Related Activities on the Genetic Makeup of Steelhead/Rainbow Trout <i>Oncorhynchus mykiss</i> in the Tuolumne River • Effects of Project and Related Activities on the Losses of Marine-Derived Nutrients in the Tuolumne River
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UPDATED STUDY PLAN

**LA GRANGE HYDROELECTRIC PROJECT
FISH PASSAGE ASSESSMENT STUDY PLAN**

DRAFT FOR LICENSING PARTICIPANTS' REVIEW AND COMMENT

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DRAFT STUDY PLAN

TURLOCK IRRIGATION DISTRICT AND MODESTO IRRIGATION DISTRICT

LA GRANGE HYDROELECTRIC PROJECT FERC NO. 14581

Fish Passage Assessment

November 2014

1.0 Project Description

The Turlock Irrigation District (TID) and Modesto Irrigation District (MID) (collectively, the Districts) own the La Grange Diversion Dam (LGDD) located on the Tuolumne River in Stanislaus County, California (Figures 1.0 and 2.0). LGDD is 131 feet high and is located at river mile (RM) 52.2 at the exit of a narrow canyon, the walls of which contain the pool formed by the diversion dam. Under normal river flows, the pool formed by the diversion dam extends for approximately one mile upstream. When not in spill mode, the water level above the diversion dam is between elevation 294 feet and 296 feet approximately 90 percent of the time. Within this 2-foot range, the pool storage is estimated to be less than 100 acre-feet of water.

The drainage area of the Tuolumne River upstream of LGDD is approximately 1,550 square miles. Tuolumne River flows upstream of LGDD are regulated by four upstream reservoirs: Hetch Hetchy, Lake Eleanor, Cherry Lake, and Don Pedro. The Don Pedro Project is owned jointly by the Districts, and the other three dams are owned by the City and County of San Francisco (CCSF). Inflow to the La Grange pool is the sum of releases from the Don Pedro Project (FERC No. 2299), located 2.3 miles upstream, and very minor contributions from two small intermittent streams downstream of Don Pedro Dam.

LGDD was constructed from 1891 to 1893 to replace Wheaton Dam, which was built by other parties in the early 1870s. The LGDD raised the level of the Tuolumne River to permit the diversion and delivery of water by gravity to irrigation systems owned by TID and MID. The Districts' irrigation systems currently provide water to over 200,000 acres of prime Central Valley farmland and drinking water to the City of Modesto. Built in 1924, the La Grange hydroelectric plant is located approximately 0.2 miles downstream of LGDD on the south (left) bank of the Tuolumne River and is owned and operated by TID. The powerhouse has a capacity of slightly less than five megawatts (MW). The La Grange Hydroelectric Project (La Grange Project or Project) operates in a run-of-river mode. The LGDD provides no flood control benefits, and there are no recreation facilities associated with the La Grange Project or the La Grange pool.

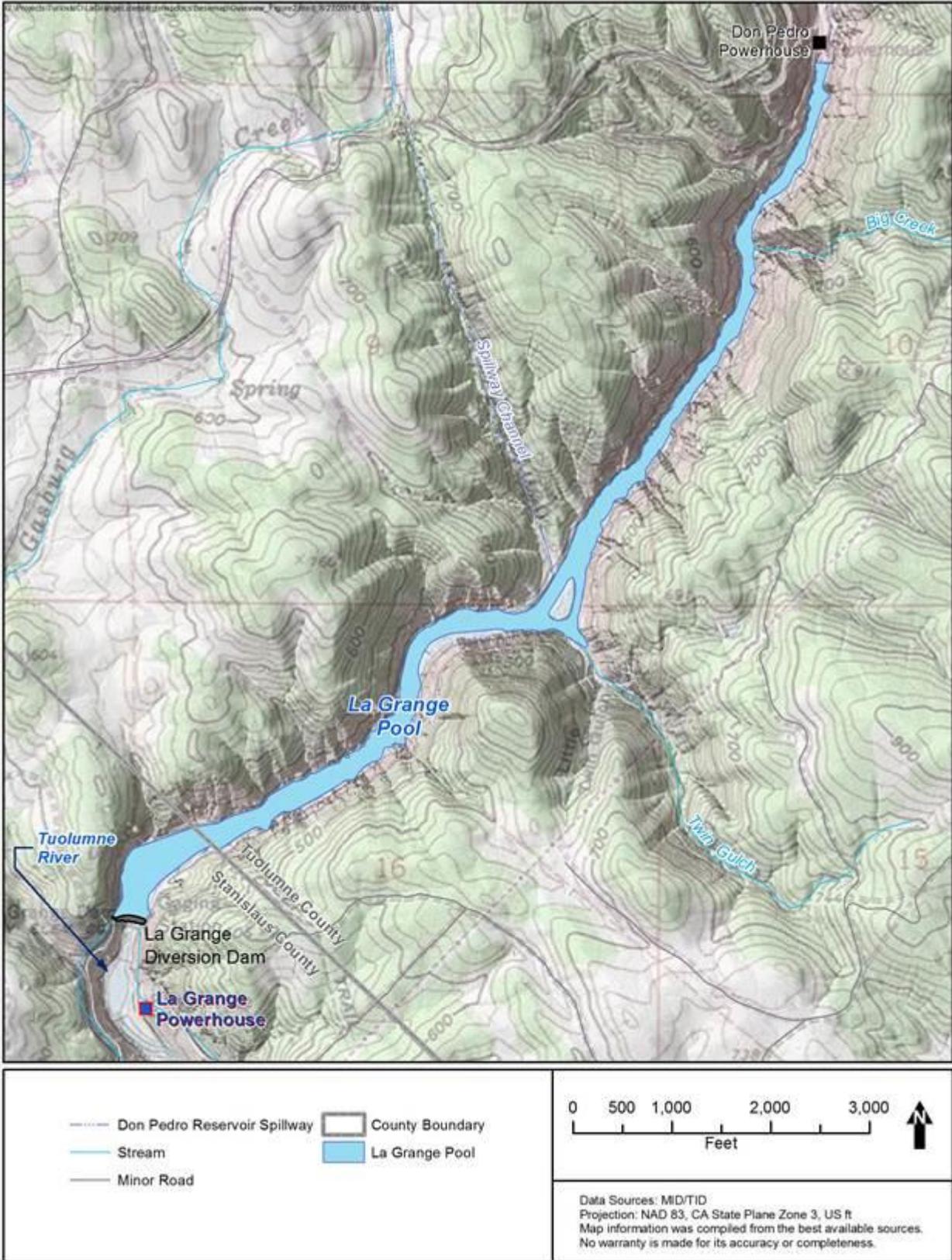


Figure 1.0. La Grange Hydroelectric Project location map.

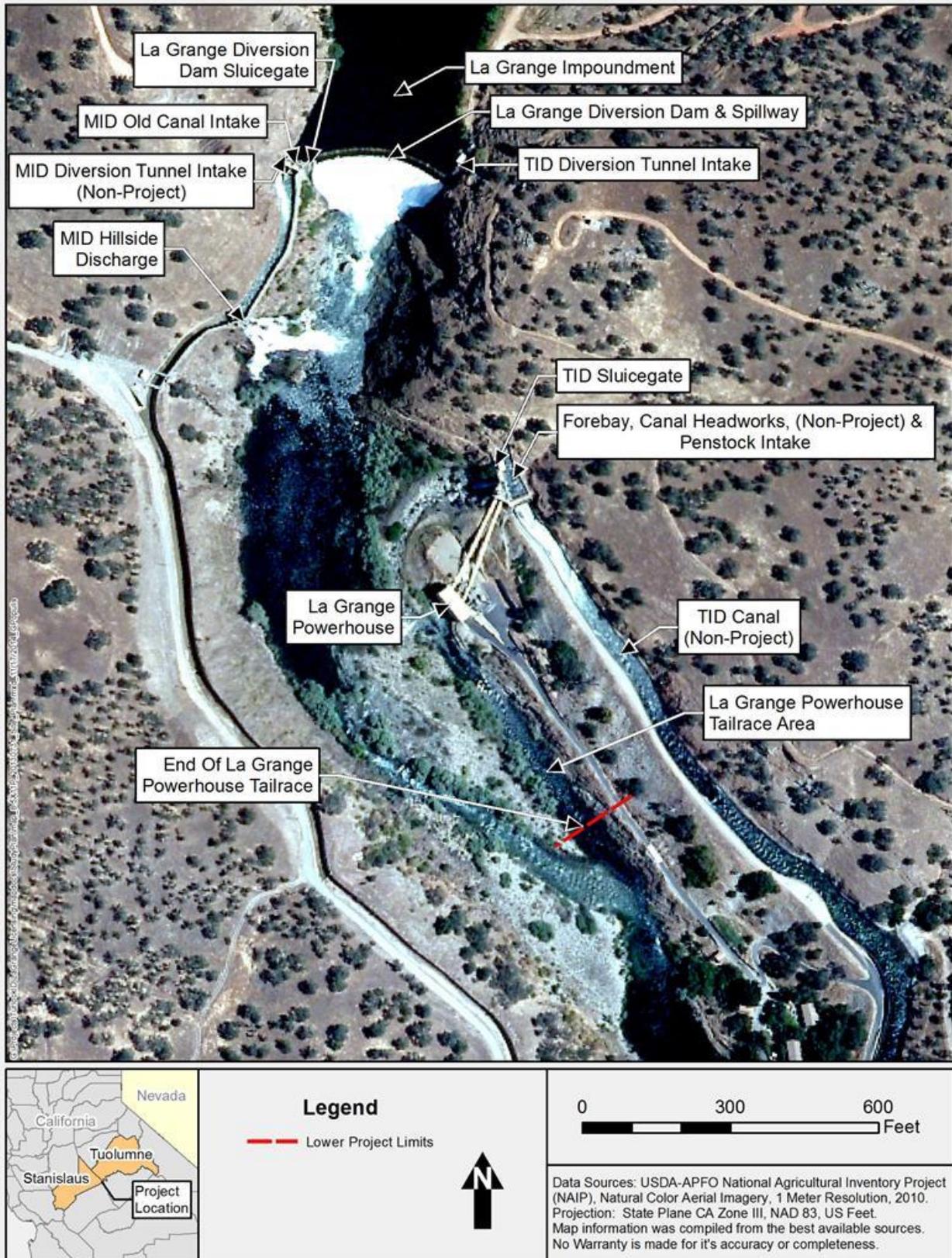


Figure 2.0. La Grange Hydroelectric Project site plan.

2.0 Study Requests, Project Nexus, and Information Needed

The Fish Passage Assessment contains three related elements that together comprise the entire study plan: (1) Fish Passage Facilities Assessment; (2) Upstream Habitat Assessment; (3) Downstream Habitat Assessment and Fish Stranding Observations. A discussion of the need for information and the potential Project nexus is provided below for each study element. As explained below, the Districts continue to assert that certain elements of the Licensing Participants' (LPs) study requests, and this updated study plan, do not meet FERC's study plan criteria. While the Districts reserve their rights relative to any FERC order in this regard, the Districts do agree to execute the studies described below and herein in collaboration with Licensing Participants.

2.1 Fish Passage Facilities Assessment

Resource agencies and Conservation Groups (CGs) requested that the Districts undertake extensive studies of anadromous fish passage facilities at the LGDD as part of the licensing process for the La Grange Project. Specifically, these entities requested that the Districts undertake investigations of upstream and downstream fish passage facilities at both LGDD and the Districts' Don Pedro Dam located upstream of LGDD. Although the Districts do not believe that studies of fish passage facilities meet FERC's study criteria specified in its regulations governing the Integrated Licensing Process (ILP) (see 18 C.F.R. Part 5, Section § 5.9), the Districts are willing to collaborate with licensing participants and FERC staff to perform certain investigations of upstream and downstream anadromous fish passage facilities at the Districts' La Grange and Don Pedro developments as described herein. The Districts are willing to conduct an initial two-year, phased evaluation to (1) develop in cooperation with LPs' initial biological design criteria for fish passage facilities, (2) gather hydrologic data and engineering information in cooperation with licensing participants to inform conceptual upstream and downstream passage facility layouts, (3) identify and discuss the pros and cons of potential fish passage alternatives, and (4) for select passage alternatives, develop preliminary functional design information, facility sizing, site plans, layouts, and initial cost estimates. In addition, any significant additional information needs required to develop reliable facility functional designs, construction cost estimates, and annual operation and maintenance (O&M) costs would be identified and defined.

The Districts continue to point out that the La Grange Project is not a FERC-licensed facility, and it remains uncertain whether FERC will issue a license for it, or if issued, the Districts would accept the license. The resource agencies and CGs have contended in their study requests for the La Grange Project that performing a study of installing fish passage facilities at just the La Grange Project would be of little value. Hence, the resource agencies and CGs are requesting fish passage studies within the La Grange proceeding that encompass both La Grange and Don Pedro facilities. The Districts contend that they cannot be compelled at this point in the Don Pedro relicensing process to study fish passage at Don Pedro, by proxy or otherwise, since Don Pedro is not a barrier to upstream adult migration. Any study of fish passage under the La Grange proceeding must only involve the La Grange facilities in order to meet FERC's seven study criteria. It has not been shown, and no evidence has been offered by any party, that fish passage at La Grange is necessary to support viable salmon and/or steelhead populations on the

Tuolumne River. The potential availability of suitable salmon or steelhead habitat above LGDD or Don Pedro Reservoir would be a sufficient justification for fish passage studies at La Grange *only* if there were not adequate habitat downstream of the La Grange Project. Substantial information has been provided in the Don Pedro Final License Application indicating that there is abundant salmon and steelhead habitat below LGDD, and no party has provided any evidence to the contrary.

Therefore, the Districts continue to assert that an assessment of fish passage facilities at LGDD constitutes a study of a mitigation measure, the need for which has not been adequately demonstrated by the resource agencies or CGs. It has been FERC's policy that costly studies of mitigation measures are not appropriate until a need for the measure has been demonstrated; that is, a project effect has been determined. Just as it is inappropriate to require a licensee to provide mitigation for entrainment mortality unless there is evidence that a fishery population is being adversely affected (*see, e.g., City of New Martinsville v. FERC*, 102 F. 3d 567 (D.C. Cir. 1996), *Tower Kleber Limited Partnership*, 91 FERC ¶ 61,172 (2000)), it is inappropriate to require applicants to undertake costly studies of mitigation measures until some evidence of a need for the mitigation measure has been demonstrated.

While the LGDD may appear to be a barrier to anadromous fish migration, there is no evidence presented in the resource agencies' or CGs' study requests showing that significant numbers of anadromous fish are being prevented from migrating upstream or, more to the point, that *any* upstream migrants are being prohibited from successfully spawning or rearing in the Tuolumne River. Indeed, there is no evidence presented in any study request that indicates anadromous fish are even reaching the LGDD or even the La Grange powerhouse, and that if a few actually reach these locations, they are not moving back downstream to spawn successfully.

Even the National Marine Fisheries Service' (NMFS) study request only goes as far as stating that the La Grange powerhouse and LGDD are "potential" barriers to adult salmon. The salmon population found in the Tuolumne River is a fall-run Chinook (*Oncorhynchus tshawytscha*) population. There is no evidence of an anadromous spring-run Chinook or steelhead (*Oncorhynchus mykiss*) population in the Tuolumne River. NMFS only identifies the potential that populations of these two anadromous species *might* at some future time occur in the Tuolumne River; however, there currently are no approved plans or approved funding for reintroduction of spring-run Chinook in the Tuolumne River basin, and, as noted, there is no evidence of a steelhead run in the Tuolumne River. Moreover, studies undertaken as part of the Don Pedro Hydroelectric Project relicensing demonstrate that there is sufficient spawning and rearing habitat in the lower Tuolumne River downstream of LGDD to meet the resource agencies' fall-run Chinook population goals, and the lower river supports a growing *O.mykiss* population. Proposing to provide upstream and downstream fish passage for spring-run Chinook and steelhead on the Tuolumne River, at a cost of many millions of dollars, is not warranted based on an uncertain and highly speculative projection that populations of these fish may at some future time exist in the Tuolumne River. Indeed, providing such upstream and downstream passage facilities at LGDD or Don Pedro based on the mere hope that such fish might someday be present and might someday make use of such facilities is the very type of "Field of Dreams" justification ("If you build it, they will come.") that the courts have found to be legally inadequate. *See Bangor Hydro-Electric Co. v. FERC*, 78 F.3d 659, 664 (D.C. Cir. 1996).

In their Proposed Study Plan document filed with FERC and LPs on September 4, 2014, and in the Proposed Study Plan Meeting held on October 6, 2014, the Districts indicated their view that a step-wise approach to the question of the need for fish passage at LGDD was warranted, with the first step consisting of exploring whether, and to what extent, LGDD constituted an actual barrier to successful fish migration. For this assessment, the Districts defined a two-year study to determine the number and timing of anadromous fish approaching and holding (i.e., not returning back downstream to spawning habitat) at LGDD.

In their request for studies, resource agencies and CGs have proposed a two-year study plan that they assert is necessary to evaluate anadromous fish passage at both LGDD and the Don Pedro Project. The Districts acknowledge that conducting the Districts' proposed study as a prerequisite to beginning an evaluation of upstream and downstream passage facilities would further extend the study period; therefore, in the spirit of cooperation, the Districts are willing to undertake the two-year study of fish passage facilities in parallel with its two-year study of the need for fish passage instead of conducting these studies sequentially, i.e., conducting the study of fish passage facilities after completing the study of the need for fish passage contingent upon a need being established. To this end, the Districts have combined their original fish barrier study with the LPs' requests for studies of fish passage facilities. The study plan contained in this document is consistent with this in-parallel performance of the work. The Districts agree to undertake this "in-parallel" study approach, as described further below, as a voluntary action on their part in an attempt to foster a collaborative investigation of issues related to fish passage on the Tuolumne River. The fact that the Districts are agreeing to undertake this "in-parallel" study approach at this time should not be construed in any way as a waiver of the Districts' position that anadromous fish passage studies are premature unless and until a need for such facilities has been demonstrated by substantial evidence, and the Districts specifically reserve their right to advance this position at any time.

2.2 Upstream Habitat Assessment

NMFS's Recovery Plan identifies the upper Tuolumne River above Don Pedro Reservoir as a candidate area for reintroduction of Central Valley steelhead and spring-run Chinook salmon (NMFS 2014). However, little information exists to reliably assess the current quantity and quality of suitable habitat for the adult, egg, fry, and juvenile life stages of these salmonid species in the upper Tuolumne River watershed. NMFS has requested information on upstream fish migration barriers and water temperatures in the upper basin to inform its decision making in the context of potential Federal Power Act (FPA) 10(j) recommendations, section 18 fishway prescriptions, and Endangered Species Act (ESA) consultation. For the reasons discussed below, the Districts do not believe that this request satisfies the study criteria requirements mandated by FERC's ILP process. Nevertheless, as with the fish passage facilities assessment, the Districts are willing to voluntarily conduct a two-year, phased assessment of physical barriers and temperature conditions in the upper Tuolumne River, as described in subsequent sections of this plan, and in cooperation with licensing participants.

Because the La Grange Project does not affect in any way habitat in the upper Tuolumne River, the request to study habitat in upstream reaches does not satisfy the ILP's project nexus criterion. NMFS' study request states that "...this study will primarily focus on an evaluation of historic

habitat, to inform a potential reintroduction that will likely target the historic salmonid habitat above Don Pedro Reservoir as called for in NMFS Recovery Plan (NMFS 2014)." NMFS' Recovery Plan is based on the idea that prior to the construction of Wheaton Dam ca. 1878 and La Grange Dam in 1893, habitat in the upper Tuolumne River was suitable for spring-run Chinook and steelhead. To the extent that NMFS's requested study is an assessment of "historic habitat", the study request is considered an assessment of pre-Project conditions, and as a result, is inconsistent with FERC's definition of baseline. In any event, it is apparent that any study conducted under current conditions is a study of today's habitat conditions, which are markedly different from historical conditions (e.g., due to upstream water resource development and climate change to name two significant changes occurring over the last 130 years). NMFS' Recovery Plan did not have the benefit of prior field study or research to determine whether suitable habitat still exists above Don Pedro Reservoir; therefore, NMFS's current study request constitutes baseline research to identify whether, and the extent to which, suitable habitats may exist to support its Recovery Plan.

NMFS requires information to support judgments made as part of its Recovery Plan development and to inform its decision-making regarding the suitability of upstream habitats. In its December 22, 2011, Study Plan Determination for the Don Pedro Hydroelectric Project, FERC stated with respect to essentially the identical study request that *"the suitability of upstream habitat for anadromous salmonids, as it relates to recovery planning under NMFS guidelines, pertains to management decisions and actions which most appropriately fall under NMFS jurisdiction. For these reasons, we conclude that a study of upriver populations and habitat is not warranted."* The Districts continue to agree with FERC staff's December 2011 determination that it is the responsibility of the fisheries management agencies, not the license applicant, to conduct the research needed to understand the conditions in river reaches for which the agencies are proposing significant fish introduction programs, especially when the proposed project does not affect that habitat in any respect.

Nonetheless, to more fully support licensing participants in their development of information to supplement the proposed fish passage studies described above, to provide further useful information, to document important river conditions between Early Intake and the upstream end of the Don Pedro Reservoir, and to foster collaboration among all parties, the Districts will cooperate with licensing participants by conducting certain studies of this reach, as described further in this study plan.

2.3 Downstream Habitat Assessment and Fish Stranding Observations

Licensing Participants requested information related to the operation of the La Grange Project and associated "five flow conduits" (i.e., La Grange powerhouse, LGDD spillway, TID sluiceway, MID hillside discharge, and LGDD sluiceway) because these "flow conduits" are asserted to have the potential to influence fish behavior and movement in the vicinity of the La Grange Project, as upstream migrating fish may be attracted to different sources of flow. LPs believe that the discharge patterns resulting from flows passed at the La Grange Project have the potential to attract, and then possibly strand, fish in multiple locations. The Districts have been asked to document flows, characterize physical habitat, and observe fish behavior in the immediate vicinity of the La Grange Project.

The Districts agree that Project operations have the potential to affect anadromous fish behavior, to the extent that anadromous fish may be present in the immediate area of Project facilities, thereby establishing a reasonable project nexus. Although the Districts have previously presented information on flow variability downstream of the La Grange Project (see Don Pedro Project Update Study Report, January 2014), NMFS' study request identifies the need for information on discharges associated with two conduits, i.e., the MID hillside discharge and the LGDD sluiceway that were not individually evaluated as part of the previous study under the Don Pedro relicensing proceeding. As such, the Districts agree to conduct a two-year evaluation of flows, associated habitat attributes, and observations of salmonids in the immediate area of the Project under certain flow conditions, as described further below.

3.0 Resource Agency Management Goals

The Districts contend that four agencies have resource management goals related to Chinook salmon and steelhead and/or their habitat: (1) U.S. Department of Interior, Fish and Wildlife Service (USFWS); (2) NMFS; (3) California Department of Fish and Wildlife (CDFW); and (4) State Water Resources Control Board (SWRCB).

A goal of the USFWS (2001) Anadromous Fish Restoration Program, as stated in Section 3406(b)(1) of the Central Valley Project Improvement Act, is to double the long-term production of anadromous fish in California's Central Valley rivers and streams. Objectives in meeting this long-term goal include: (1) improve habitat for all life stages of anadromous fish through provision of flows of suitable quality, quantity, and timing, and improved physical habitat; (2) improve survival rates by reducing or eliminating entrainment of juveniles at diversions; (3) improve the opportunity for adult fish to reach spawning habitats in a timely manner; (4) collect fish population, health, and habitat data to facilitate evaluation of restoration actions; (5) integrate habitat restoration efforts with harvest and hatchery management; and (6) involve partners in the implementation and evaluation of restoration actions.

NMFS has developed Resource Management Goals and Objectives for species listed under the Magnuson-Stevens Fishery Conservation and Management Act (16 U.S.C. §1801 et seq.) and the Endangered Species Act (ESA) (16 U.S.C. §1531 et seq.), as well as anadromous species that are not currently listed but may require listing in the future. NMFS' (2009) Public Draft Recovery Plan for Sacramento River Winter-run Chinook salmon, Central Valley Spring-run Chinook salmon, and Central Valley steelhead (Draft Recovery Plan) outlines the framework for the recovery of ESA-listed species and populations in California's Central Valley. For Central Valley steelhead, the relevant recovery actions identified by NMFS for the Tuolumne River are to: (1) conduct habitat evaluations, and (2) manage cold water pools behind La Grange and Don Pedro dams to provide suitable water temperatures for all downstream life stages of *O.mykiss*. For Chinook salmon, the relevant goals are to enhance the Essential Fish Habitat downstream of LGDD and achieve a viable population of Central Valley fall/late fall-run Chinook salmon in the Tuolumne River. NMFS' spring-run Chinook salmon conceptual recovery scenario for the Southern Sierra Nevada Diversity Group includes reintroduction of spring-run Chinook salmon to candidate areas of the Tuolumne River above Don Pedro Dam.

CDFW's mission is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend, for their ecological values and for their use and enjoyment by the public. CDFW's resource management goals, as summarized in restoration planning documents such as Restoring Central Valley Streams: A Plan for Action (Reynolds et al. 1993), are to restore and protect California's aquatic ecosystems that support fish and wildlife, and to protect threatened and endangered species under California Fish and Wildlife Code (Sections 6920–6924).

SWRCB has responsibility under the federal Clean Water Act (33 U.S.C. §11251–1357) to preserve and maintain the chemical, physical, and biological integrity of the State's waters and to protect water quality and the beneficial uses of stream reaches consistent with Section 401 of the federal Clean Water Act, the Regional Water Quality Control Board Basin Plans, State Water Board regulations, the California Environmental Quality Act, and any other applicable state law.

4.0 Summary of Study Objectives

The proposed La Grange Project Fish Passage Assessment has the following objectives to be achieved using a phased approach over the course of two consecutive study years (study phases are described in Methods [Section 6] and Schedule [Section 7]).

1. Fish Passage Facilities Assessment:

- a. Concept-level fish passage alternatives: Identify and develop concept-level alternatives for upstream and downstream passage of Chinook salmon and steelhead at the La Grange and Don Pedro dams. Specific objectives are listed below:
 1. Obtain available information to establish existing baseline conditions relevant to impoundment operations and siting passage facilities.
 2. Obtain and evaluate available hydrologic data and biological information for the Tuolumne River to identify potential types and locations of facilities, run size, fish periodicity, and the anticipated range of flows that correspond to fish migration.
 3. Formulate and develop preliminary sizing and functional design for select, alternative potential upstream and downstream fish passage facilities.
 4. Develop Class-V opinions of probable construction cost and annual O&M costs for select fish passage concept(s).
- b. La Grange Project fish barrier assessment: Evaluate the potential impact of the LGDD and the La Grange powerhouse as barriers to upstream migration of adult fall-run Chinook salmon and, if they occur, steelhead, including documentation of the proportion of the fall-run Chinook salmon population that may migrate upstream to these facilities and an evaluation of potential impacts to the reproductive success of these fish. Specific objectives are listed below:
 1. Determine the number of fall-run Chinook salmon and steelhead migrating upstream to the LGDD and the La Grange powerhouse during the 2015/2016 and 2016/2017 migration seasons.

2. Compare the number of fall-run Chinook salmon and steelhead migrating upstream to the LGDD and the La Grange powerhouse to total escapement during the 2015/2016 and 2016/2017 migration seasons.
 3. Document carcass condition (egg retention) to evaluate pre-spawn mortality rates of fall-run Chinook salmon and steelhead migrating upstream to the LGDD and the La Grange powerhouse, which do not move back downstream to spawn.
 4. Implement formal documentation of incidental fish observations in the vicinity of the LGDD, La Grange powerhouse tailrace, and TID sluiceway channel.
2. Upstream Reach Assessment: Conduct an assessment of certain habitat characteristics of the Tuolumne River upstream of the Don Pedro Project Boundary.
- a. Barriers to upstream anadromous salmonid migration:
 1. Compile results from any relevant prior studies and conduct field surveys to identify barriers (both complete and partial) to upstream anadromous salmonid migration in the mainstem Tuolumne River upstream of the Don Pedro Project Boundary and tributaries, including the North, Middle, and South forks of the Tuolumne River, Cherry Creek, and the Clavey River.
 2. Characterize and document the physical structure of each barrier under base flow and spawning migration flow conditions.
 - b. Water temperature monitoring and modeling:
 1. Use existing data to characterize the thermal regimes of the upper Tuolumne River and tributaries from the Don Pedro Project Boundary to CCSF's Early Intake, including the North, Middle, and South forks of the Tuolumne River, Cherry Creek, and the Clavey River. Identify locations where temperatures appear to be suitable for salmonids.
 2. Depending on the availability of information, logistical feasibility, and safety, install data loggers to obtain additional information in locations for which existing data are inadequate.
 3. Develop and test a computer model to simulate existing thermal conditions in the Tuolumne River between Early Intake and the Don Pedro Reservoir.
 - c. Upstream Habitat Suitability Assessment:
 1. Summarize data from the upper Tuolumne River habitat suitability evaluation being conducted by NMFS; data will be used, if applicable, to complement the barrier assessment and temperature studies identified above.
 2. Identify additional information needs following completion of barrier assessment, temperature assessment, and review of available data from the NMFS study.

3. Habitat Assessment and Fish Stranding below La Grange Dam and Powerhouse:
 - a. Develop hydrologic data for flow conduits at the La Grange Project:
 1. Continue existing monitoring of discharges associated with the La Grange powerhouse, LGDD spillway, and the TID sluiceway.
 2. Conduct two years of monitoring of the MID hillside discharge and LGDD sluiceway.
 3. Based on existing information, to the extent available, characterize the magnitude and rate of flow and stage changes when project conduits are shut down.
 - b. Collect topographic, depth, and habitat data in the vicinity of the La Grange Project Facilities:
 1. Survey longitudinal profiles and transects along the channel thalweg in the La Grange powerhouse tailrace channel, TID sluiceway channel, and the mainstem river channel upstream of where it joins the tailrace channel.
 2. Measure water depths at a flow of approximately 25 cfs in the mainstem river channel upstream of where it joins the tailrace channel and at approximately 75 to 100 cfs in the La Grange powerhouse tailrace channel and the TID sluiceway channel.
 3. Map substrate and habitat in the reaches where longitudinal profiles are surveyed, delineating pools, runs, high- and low-gradient riffles, step-pools, and chutes.
 4. Map patches of spawning-sized gravels in the tailrace and mainstem upstream of the tailrace that are greater than 2 m².
 5. Conduct pebble counts in riffles, runs, and pool tailouts to document substrate particle size distribution in these habitats.
 - c. Assess fish presence and potential for stranding: Conduct periodic direct visual observations in the TID sluiceway channel downstream to the confluence of the La Grange powerhouse tailrace and the main channel of the Tuolumne River to assess the presence and potential stranding of salmonids.

5.0 Need for Additional Information

5.1 Fish Passage Facilities Assessment

Historically, both fall- and spring-run Chinook salmon occurred in the Tuolumne River basin. Currently, however, only a fall-run Chinook salmon population is present in the Tuolumne River. Central Valley spring-run Chinook salmon, currently listed as threatened, were proposed as endangered by NMFS on March 9, 1998. NMFS (1998) concluded that the Central Valley spring-run Chinook salmon ESU was in danger of extinction and native spring-run Chinook salmon are extirpated from the San Joaquin River Basin.

As a result, the fish barrier component of this study will focus on the potential stranding of fall-run Chinook and any steelhead that may be present. Adult fall-run Chinook salmon migration in

the Tuolumne River extends upstream to the vicinity of the LGDD and occurs from September through December, with peak migration activity occurring in October and November (TID/MID 2013b). Spawning occurs in late October to early January, soon after fish enter the river. Spawning occurs in the gravel-bedded reach (upstream of RM 24) where suitable spawning substrates exist. Egg incubation and fry emergence occur from October through early February. Juvenile fall-run Chinook have a relatively short freshwater rearing period before they emigrate to the ocean.

Since the completion of Don Pedro Dam in 1971, spawner estimates have ranged from 40,300 in 1985 to 77 in 1991 (TID/MID 2010, Report 2009-2). From 1971 to 2013, the date of the peak weekly live spawner count has ranged from October 31 (1996) to November 27 (1972), with a median date of November 12 (TID/MID 2010, Report 2009-2). Since fall 2009, escapement monitoring has been conducted at a counting weir established at RM 24.5, near the downstream end of the gravel-bedded reach (TID/MID 2010, Report 2009-8). Since 1971, CDFW has conducted annual salmon spawning surveys. In addition to CDFW's work, the Districts have studied fall-run Chinook salmon on the lower Tuolumne River through annual seine surveys conducted since 1986, annual snorkel surveys since 1982, fish weir counts since 2009, and more recently as part of the Don Pedro Hydroelectric Project relicensing process.

O.mykiss exhibits two life history forms: a resident form commonly known as rainbow trout, and an anadromous form commonly known as steelhead. Central Valley steelhead begin to enter fresh water in August and peak spawning occurs from December through April. After spawning, adults may survive and return to the ocean. Steelhead progeny rear for one to three years in fresh water before they emigrate to the ocean where most of their growth occurs. Spawning by resident rainbow trout in the Central Valley coincides with steelhead and interbreeding is possible. Although low numbers of anadromous *O.mykiss* have been documented in the Tuolumne River (Zimmerman et al. 2009), there is no empirical scientific evidence of a self-sustaining "run" or population of steelhead currently in the Tuolumne River. As a result, while *O.mykiss* are not specifically being investigated as part of this study, weir counts will extend through at least April, flows permitting, and any apparent anadromous *O.mykiss* encountered at the weir during the study will be recorded.

NMFS has also requested information to aid in evaluating what would constitute safe, effective, and timely upstream and downstream anadromous fish passage at both the La Grange Project and the Don Pedro Project. NMFS and the CGs contend that suitable habitat for anadromous salmonids may exist upstream of Don Pedro Reservoir and that fish passage evaluations of just the La Grange Project facilities would probably not adequately inform the development of alternatives for safe and effective fish passage to adequate amounts of upstream habitat (i.e., fish would need to be passed upstream of the Don Pedro Project to make a fish passage program feasible). Currently there is inadequate information upon which to base consideration of fish passage.

As noted in Section 2.1 of this study plan, the Districts do not believe that fish passage studies are warranted at this point in the La Grange Project licensing. Nevertheless, the Districts agree to undertake an initial two-year, phased (phases described in the Methods section of this plan) evaluation to (1) identify the biological design criteria for potential fish passage, (2) gather

information that would inform the siting and sizing of conceptual upstream and downstream fish passage facilities (3) identify and evaluate potential fish passage alternatives, (4) for select fish passage alternatives, develop preliminary functional layouts and cost estimates, and (5) identify any additional information needs.

5.2 Upstream Habitat Assessment

NMFS's Recovery Plan identifies the upper Tuolumne River basin above Don Pedro Reservoir as a candidate area for reintroduction of Central Valley steelhead and spring-run Chinook salmon (NMFS 2014). Currently, there is insufficient information available to assess the quantity and quality of suitable habitat for these salmonid species in the upper Tuolumne River and tributaries below Early Intake. Resource agencies and CGs have requested information on the potential presence of upstream fish migration barriers and water temperatures in the upper basin to inform decision-making in the context of FPA sections 10(a) and 10(j) recommendations, section 18 fishway prescriptions, and any required ESA consultation.

As discussed in detail in Section 2.2 of this study plan, the Districts do not believe that these study requests satisfy the study criteria requirements mandated under FERC's ILP regulations, and as such, cannot be FERC-ordered studies within the context of either the La Grange licensing or the Don Pedro relicensing. Nevertheless, the Districts agree to voluntarily conduct a two-year, phased investigation of migration barriers, temperature conditions, and general habitat conditions in the upper Tuolumne River and appropriate tributaries below CCSF's Early Intake.

5.3 Habitat Assessment and Fish Stranding below La Grange Dam and Powerhouse

The operation of the La Grange Project and the five flow conduits used to pass flow to the lower Tuolumne River have the potential to influence fish behavior and movement in the immediate vicinity of the La Grange Project. Resource agencies and CGs believe that the La Grange Project's discharge pattern has the potential to strand fish in multiple locations, and NMFS has requested flow estimates, characterizations of physical habitat, and fish behavior observations in the immediate vicinity of the La Grange Project.

The Districts agree that flows passed at the La Grange Project might affect fish behavior in the immediate vicinity of the Project facilities. Flow data are available for three of the Project conduits, i.e., the La Grange powerhouse, the LGDD spillway, and the TID sluiceway, which have been presented as part of the Don Pedro relicensing proceeding (see Don Pedro Project Updated Study Report, January 2014). However, systematic flow records for the MID hillside discharge and the LGDD sluiceway do not exist. The Districts will continue to record flow data as they currently do and will also collect two years of operational and flow records at the two conduits where data are currently unavailable (i.e., MID hillside discharge and the LGDD sluiceway). There is also limited information available on physical habitat conditions and fish behavior in the immediate vicinity of the La Grange Project facilities, and as such, the Districts will conduct an evaluation of certain habitat attributes and observations of fish in the immediate area of the Project under the flow conditions specified further below.

6.0 Study Area and Methods

6.1 Study Area

6.1.1 Fish Passage Facilities Assessment

The concept-level assessment of upstream and downstream fish passage alternatives will encompass the Tuolumne River from immediately below the LGDD to the upstream limit of the Don Pedro Project Boundary. The study area for the fish barrier assessment will consist of the Tuolumne River channel opposite the La Grange powerhouse tailrace and the La Grange tailrace just downstream of the powerhouse. For incidental fish observations, the study area will include the immediate vicinity of the LGDD, the La Grange powerhouse tailrace channel, and the TID sluiceway channel.

6.1.2 Upstream Habitat Assessment

Field surveys to identify barriers to the upstream migration of anadromous salmonids will be conducted along the mainstem Tuolumne River upstream of the Don Pedro Project Boundary, the North, Middle, and South forks of the Tuolumne River, Cherry Creek, and the Clavey River. Provisional temperature monitoring locations (locations to be refined following review of existing information) may be located in portions of the following rivers/reaches: the mainstem Tuolumne River between Early Intake and Don Pedro Reservoir, the Clavey River, Cherry Creek, and the North, Middle, and South forks of the Tuolumne River. Potential habitat characteristics above the Don Pedro Project Boundary and additional habitat information needs will be assessed based on the results of the barrier assessment, temperature evaluation, and NMFS's habitat suitability analysis, which is expected to be available in fall 2015.

6.1.3 Habitat Assessment and Fish Stranding below LGDD and La Grange Powerhouse

Flow records will continue to be collected for the La Grange powerhouse, LGDD spillway, and TID sluiceway. Flows from the MID hillside discharge and the LGDD sluiceway will be estimated based on gate position and reservoir water levels. Topographic surveys, depth assessments, and fish habitat mapping/substrate evaluation will be conducted in the La Grange tailrace channel, the TID sluiceway channel, and the mainstem Tuolumne River from where it joins the tailrace channel upstream to the LGDD plunge pool. The total length of stream channel to be assessed is approximately 0.5 miles. Direct visual observations of salmonids will be conducted in the TID sluiceway channel. Greater detail regarding specific study locations is presented in the Methods section below.

6.2 Study Methods

6.2.1 Fish Passage Facilities Assessment

6.2.1.1 Concept-Level Fish Passage Alternatives

The evaluation of concept-level upstream and downstream fish passage alternatives will occur in two phases. Phase 1 (conducted in 2015) will involve collaborative information gathering and evaluation of facility siting, sizing, general biological and engineering design parameters, and operational considerations. Phase 2 (conducted in 2016) will involve the development of preliminary functional layouts and site plans, estimation of preliminary capital and O&M costs, and identification of any additional significant information needs for select passage alternatives.

Task 1: Evaluation of General Biological and Engineering Design Parameters and Alternatives Identification (2015)

In 2015, an evaluation of upstream and downstream fish passage facilities general design criteria and considerations will be conducted by the Districts in collaboration with LPs. The collaborative process will consist of three workshops held in 2015. Workshops will be conducted following FERC's issuance of its Study Plan Determination (February 2015) and are preliminarily suggested to occur in April, July, and October of 2015. Workshop dates will be finalized in consultation with licensing participants. Existing information will be gathered and summarized to characterize (1) relevant physical characteristics of existing project(s) facilities; (2) relevant project operations and potential limitations associated with those operations; (3) descriptions of local topography and geology, as necessary; (4) the physical environment in the areas of potential facilities locations; (5) Chinook and steelhead life-histories and periodicities¹; (6) basin hydrology as it pertains to fish periodicities and developing passage facilities; (7) potential land ownership issues; (8) an account of applicable NMFS and CDFW fish passage facility biological and engineering design criteria and any potential limitations resulting from adherence to those criteria; and (9) other information affecting siting, sizing, general design, and operation of potential fish passage facilities.

Following the synthesis of the information described above, identification and initial sizing of potential upstream and downstream fish passage facilities will be conducted. Based on this, the Districts and LPs will mutually select potential passage alternatives for which preliminary siting and functional layouts will be developed. Initial sizing, siting, and layouts should be able to be ready for LP review prior to the issuance of the Initial Study Report (ISR) required by the ILP regulations. Factors to be considered when identifying potential passage alternatives will include, but not necessarily be limited to, (1) distance (travel time) to and from the La Grange Project; (2) ease of accessibility for vehicles and/or boats; (3) the availability and cost of providing electrical service; (4) the extent to which construction, maintenance, and operation of the facility could interfere with river or reservoir recreation, (5) potential water quantity and quality concerns; (6) potential predation issues; (7) any relevant siting and/or land ownership

¹ Because there are no spring-run Chinook or steelhead runs in the Tuolumne River, periodicities will be based on existing information from other nearby basins or historical records.

limitations and the need for possible easements; and (8) to what extent conditions are compatible with implementation of available fish passage technologies.

Task 2: Preliminary Functional Layouts and Cost Estimates (2016)

In 2016, the Districts will develop functional site layouts, general design parameters, and associated Class-V opinions of probable construction and O&M costs for select fish passage alternatives developed in collaboration with LPs in 2015. Considerations addressed during the development of preliminary functional layouts for upstream passage alternatives will include, but not necessarily be limited to, (1) major facility siting and sizing components; (2) water supply infrastructure; (3) fish collection, acclimation, and holding facilities; (4) fish transport infrastructure and vehicles (if needed); (5) debris management; (6) fish attraction flows; (7) instrumentation and control equipment; (8) an explanation of how the proposed design complies with NMFS and CDFW fish passage criteria; and (9) identification of any additional information needs.

Considerations addressed during the development of preliminary functional layouts for downstream passage alternatives will include, but not necessarily be limited to, (1) major siting and sizing components; (2) fish sampling, acclimation, and holding facilities; (3) fish transport infrastructure and vehicles (if needed); (4) fish capture and debris management technologies; (5) provision of fish attraction flows; (6) guidance nets/curtains; (7) anchorage and flotation provisions (if needed); (8) dewatering facilities; (9) instrumentation and control equipment; (10) an explanation of how the proposed design complies with NMFS and CDFW fish passage criteria; and (11) identification of any additional information needs.

Task 3: Documentation and Reporting

A report will be produced to summarize all biological and engineering considerations, the identification of potential fish passage alternatives, the development of functional layouts, siting, and sizing information, and Class-V opinions of probable construction and annual O&M costs for selected fish passage alternatives.

6.2.1.2 La Grange Project Fish Barrier Assessment

The proposed study will evaluate the potential for the LGDD and the La Grange powerhouse to be a barrier to the upstream migration and successful spawning of anadromous fish (i.e., fall-run Chinook and, if they occur, steelhead) during the 2015/2016 and 2016/2017 migration seasons by:

- Operating a fish counting weir to determine the number of anadromous fish migrating upstream to the LGDD and the La Grange powerhouse,
- Comparing to total escapement the number of anadromous fish migrating upstream to the LGDD and the La Grange powerhouse (i.e., above the counting weir) and not returning to downstream spawning habitat,

- Documenting carcass condition (egg retention) to evaluate pre-spawn mortality rates of anadromous fish migrating upstream to the LGDD and the La Grange powerhouse (i.e., those that do not return to downstream spawning habitat), and
- Document fish observations in the immediate vicinity of the LGDD, La Grange powerhouse, and in the TID sluiceway channel.

The study consists of three tasks beginning with planning and permitting, followed by two years of field data collection, and then data analysis and reporting. Each of these tasks is described in the following sections.

Task 1: Planning and Permitting

Permits will be required to operate the fish counting weir in the vicinity of the La Grange Project, including a Section 4d take authorization for Central Valley steelhead from NMFS, a Streambed Alteration Agreement and Scientific Collector Permit amendments from CDFW, and a Section 404 permit (which could involve a requirement for a CWA Section 401 permit) from the U.S. Army Corps of Engineers. Existing permits may be amended to include operation of the proposed new counting weir near the La Grange Project facilities. In some cases new permits may need to be obtained. Permits are expected to take six months to obtain, and some permit applications must be submitted prior to FERC's Study Plan Determination. For instance, Section 4d take authorizations are issued on a calendar-year basis, with applications due each fall for the coming year. Due to this timeline, a 4d take authorization was requested in October 2014 to allow counting weir monitoring to begin in fall 2015.

Equipment will be obtained or fabricated in preparation for field data collection, with the primary components consisting of a weir and a fish counting device (i.e., video system or Vaki Riverwatcher).

Task 2: Field Data Collection

To collect Year-1 data, a fish counting weir consisting of two segments will be installed in the Tuolumne River in late August/early September of 2015 and be operated through at least April 2016, flows permitting. The same monthly schedule will be followed in the 2016/2017 season to collect Year-2 data. One weir segment will be placed downstream of the large pool below LGDD in the Tuolumne River main channel, and the second segment will be placed just below the La Grange powerhouse in the tailrace channel. The counting weirs will be operated to determine the number of migrating fish that move upstream of the weirs. The total number of migrating fish exhibiting upstream migration behavior will be defined as the net difference between upstream and downstream fish counts at the weir. Sampling will end approximately 5-10 days following the spring pulse flow. In addition to monitoring Chinook salmon, any *O.mykiss* encountered at the counting weir during the sampling period will be recorded. Monitoring methods will be similar to those employed at the weir operated since 2009 at RM 24.5 (Becker et al. 2014). Continued monitoring at the downstream site (RM 24.5) will be used to determine total escapement to the Tuolumne River for comparison to the number of fish approaching the LGDD or the La Grange powerhouse and not moving back downstream to estimate the extent to which the La Grange facilities are actually a barrier to upstream migration

and spawning. Hourly water temperature and instantaneous dissolved oxygen data will be collected at the weir.

Salmon encountering barriers to migration may experience pre-spawn mortality. During carcass surveys conducted to estimate salmon escapement, CDFW examines female salmon carcasses for egg retention to estimate pre-spawn mortality of Chinook salmon. Assessments have been conducted in several Central Valley streams in some years, but it is more common for the data not to be collected due to a lack of available funding and staff. To the Districts' knowledge, salmon egg retention (i.e., pre-spawn mortality) has never been documented on the Tuolumne River. To evaluate the potential effect of the LGDD and the La Grange powerhouse on reproductive success of upstream migrants, the Districts propose to conduct weekly surveys above the counting weir during 2015/2016 and 2016/2017 to assess the presence/absence of live Chinook salmon, spawning activity or carcasses, and to evaluate egg retention in female carcasses. The Districts will promptly notify CDFW of any carcasses observed. Similar to egg retention evaluations conducted by CDFW on the Stanislaus and upper Sacramento rivers, fresh female carcasses will be classified as spent if few eggs are remaining, as partially spent if a substantial amount of the eggs remain (i.e., 50% or more), and unspent if the ovaries appear nearly full of eggs (Guignard 2005, Snider et al. 2002).

Observations of fish above the counting weir and in the TID sluiceway channel will be conducted twice daily (times will vary as a function of existing workload) by project operators in the immediate vicinities of the LGDD, La Grange powerhouse, and within the TID sluiceway channel. Observations will be recorded on standardized datasheets, which will include the following information:

- Date and time of observation;
- Approximate discharge and conduit status at time of observation;
- Powerhouse output at time of observation;
- Number of fish observed and their approximate size;
- Identification of species, if possible;
- Locations of fish (to be indicated on a previously-generated base map);
- Description of general fish behaviors, such as moving upstream or downstream, spawning, holding in one specific location, or leaping/jumping;
- Notation of any observations of fish swimming into the La Grange powerhouse tailrace;
- Notation of any observations of fish swimming into the TID sluiceway channel; and
- Notation of any redds that become dewatered, and the duration of any dewatering, due to a change in powerhouse operations.

Task 3: Data Management, Analysis, and Report Preparation

Weir monitoring data will be downloaded or entered into a database frequently during the field data collection periods, error checked, and summarized. Data will include images of passing fish and corresponding information such as date, time, and direction of passage, species, and estimated fish size; instream conditions (i.e., water temperature and turbidity); and weir performance. Raw data will be summarized to determine daily upstream and downstream weir counts and the total number of fish exhibiting persistent upstream migration behavior (upstream

counts minus downstream counts). The total number of fish exhibiting persistent upstream migration behavior will be divided by total escapement determined at the lower weir (at RM 24.5). Any spawning activity, live Chinook salmon or *O.mykiss*, or carcasses observed upstream of the weir will be reported. Egg retention rates will be reported for any female Chinook salmon carcasses observed. Datasheets on incidental observations of fish in the vicinity of the LGDD, La Grange powerhouse, or TID sluiceway channel will be input into an electronic database, summarized, and included as part of reporting. Preliminary results for the majority of the fall-run Chinook migration period during the first year of monitoring (i.e., September 2015/December 2016) may be able to be provided in the Initial Study Report in February 2016. Based on the results of the 2015/2016 study season, modifications to the study may be made prior to implementation of the 2016/2017 study season. Comprehensive reporting of the results from the two-year study will be submitted in September 2017.

6.2.2 Upstream Habitat Assessment

6.2.2.1 Barriers to Upstream Anadromous Salmonid Migration in the Upper Tuolumne River Basin

Task 1: Review Existing Survey Results

The first step in the migration barrier assessment of the upper Tuolumne River basin (i.e., upstream of the Don Pedro Project Boundary) will consist of a compilation and review of results from any relevant prior studies. An attempt will be made to locate, access, and compile readily available and relevant existing data. This information review and synthesis will occur in 2015.

Task 2: Conduct Field Surveys (2015 and 2016)

After reviewing existing information, a field survey will be conducted to identify barriers in the mainstem and North, Middle, and South forks of the upper Tuolumne River, as well as Cherry Creek, and the Clavey River. Field crews will identify complete and partial barriers to upstream salmonid migration using definitions agreed upon with LPs.

In 2015, the following information will be recorded during base flow conditions at each barrier identified either through the use of existing information or during the field surveys: (1) global positioning system (GPS) coordinate points; (2) measured height of each barrier; (3) measured length and estimated maximum and average depth of any plunge pools at the base of barriers; (4) measured average water velocity (with a hand-held current meter) at the apex of the barrier, if measurements can be made safely, or estimated velocity if measurements cannot be made; (5) slope of the barrier; (6) measured (or estimated if measurement is unsafe) maximum and average depth of the fish exit point on the upstream side of the barrier; (7) an assessment of adjacent channel features that might be inundated at higher flows; and (8) a photograph of the barrier from one or more (as determined by field crews) designated photo-points.

In 2016, the same information (i.e., the eight items identified in the preceding paragraph) will be recorded at each barrier during flows typical of the spring-run Chinook and steelhead migration seasons. Because there are no spring-run Chinook or steelhead populations in the Tuolumne

River, periodicities will be based on existing information from other nearby basins or historical records. Identification of migration flow periods will account for the travel time that would be needed for spring-run Chinook or steelhead to complete their upstream migration to the upper basin.

Task 3: Reporting

Preliminary results of the migration barrier assessment activities (i.e., conducted in 2015) may be able to be provided in the Initial Study Report in February 2016. Based on the results of the 2015 study season, modifications to the study may be made prior to implementation of the 2016 study season. An updated technical report summarizing the results of activities described in Tasks 1 and 2 will be submitted in the February 2017 Updated Study Report. The report will include maps showing the locations of all barriers and photo documentation of conditions at the barriers under base flow and migration flow conditions.

6.2.2.2 Water Temperature Monitoring and Modeling

Task 1: Identify, Synthesize, and Interpret Existing Water Temperature and Flow Data

In 2015, existing information, to the extent it is available, will be used to characterize the thermal regimes of the upper Tuolumne River below CCSF's Early Intake and in the following tributaries upstream to the location of the first barrier to anadromous fish migration: the North, Middle, and South forks of the Tuolumne River, Cherry Creek, and the Clavey River. Based on these data, a collaborative effort will be undertaken with LPs to identify locations and seasons where temperatures appear to be suitable for anadromous salmonids.

Task 2: Install Data Loggers

In 2015, a workshop will be held with LPs to identify locations where useful temperature and river stage monitoring stations could be established. Potential locations for deploying temperature and stage data loggers will be selected, as needed, to provide a general characterization of accessible areas that appear to have thermal regimes suitable for supporting multiple life-stages of Chinook and steelhead under a range of hydrologic conditions, based on data collected under Task 1.

The following provisional data-logger deployment numbers and locations are suggested (these may change depending upon further review of existing information and coordination with LPs): (1) four to five monitoring stations in the mainstem Tuolumne River, depending on the number of data-loggers installed by NMFS in 2014; (2) two stations in the Clavey River; (3) two stations in Cherry Creek; and (4) up to two stations in each of the South, Middle, and North forks of the Tuolumne River. Data logger locations would be spaced at intervals sufficient to generally characterize the thermal regime at each location. Water temperatures would likely be measured at 30-minute intervals from the time of data logger deployment in summer 2015 to the time loggers are retrieved in October 2016. Data would be downloaded at intervals, depending on conditions in the field. Depending upon the availability of existing flow data, stage data may be

supplemented by flow measurements sufficient to develop approximate stage-discharge rating curves.

Task 3: Water Temperature Modeling

In 2016, existing flow, temperature, meteorological, and channel geometry data—augmented as necessary by results from data loggers deployed as part of Task 2 and any flow/stage data collected by the Districts—will be used to develop a water temperature model to simulate the thermal regimes in the Tuolumne River and reaches of tributaries below Early Intake, including the South, Middle, and North forks of the Tuolumne River, Cherry Creek, and the Clavey River that are accessible to anadromous salmonids.

Preliminarily, the RMA-2 and RMA-11 suite of models appear to be suitable for simulating conditions in the study area. The RMA models can model both flow and temperature in extremely steep reaches and report sub-daily water temperature. Use of the RMA-2 (v8.0 or later) for hydrodynamics and RMA-11 (v8.0 or later) for water temperature would represent the river reaches in a one-dimensional, depth- and laterally-averaged, finite element scheme. RMA - 2 calculates velocity, water surface elevation, and depth at defined nodes of each grid element in the geometric network representing the river. Following model development, model calibration will be completed, along with sensitivity analyses. The model will then be used to simulate existing conditions under 2015-2016 flow conditions.

Task 4: Reporting

Raw temperature data from data loggers will be provided annually in spreadsheet format to licensing participants. Preliminary results of temperature monitoring activities (i.e., conducted in 2015) will be provided in the Initial Study Report in February 2016. The Updated Study Report (February 2017) will include: (1) the synthesis of existing temperature data, (2) a summary of temperature measurements made with data-loggers (e.g., average, maximum, and 7DADM temperatures), and (3) a description of temperature model development, calibration, sensitivity analyses, and simulation of existing conditions.

6.2.2.3 Habitat Assessment

Task 1: Collaborative Review of Results from NMFS LiDAR/Hyperspectral Remote Sensing Study

Data from the upper Tuolumne River LiDAR and hyperspectral remote sensing-based habitat evaluation being conducted by NMFS may be used, to the extent applicable, to complement the barrier and temperature assessments described above. According to NMFS personnel, initial data are expected to be available in spring 2015 and a full report in fall 2015. Therefore, review of and incorporation of relevant information from the NMFS study into this component of the Districts' study will occur in fall of 2015 in collaboration with NMFS and other LPs.

Task 2: Identification of Additional Information Needs

Based on the completed barrier assessment, NMFS's habitat assessment, and preliminary temperature information, the Districts will work with LPs to identify additional information needed to assess upstream habitat conditions.

6.2.3 Habitat and Fish Stranding Assessment Downstream of La Grange Dam and Powerhouse

6.2.3.1 Develop Hydrology Datasets Specific to Flow Conduits at the La Grange Project

Task 1: Flow Records for Project Conduits

The Districts will continue to estimate flows as they currently do for the La Grange powerhouse, LGDD spillway, and TID sluiceway. Beginning in March 2015, flows at the MID hillside discharge and the LGDD sluiceway will be estimated by recording gate opening and reservoir water levels, or another appropriate and suitable method of estimating flow.

The flow data from each of the five potential flow points will be summarized as follows:

- A daily time-series of approximate flows at each of the five flow points during the two-year monitoring period (when/if discharges are occurring).
- A record, by year and month, of the number of days the La Grange powerhouse is offline for at least some part of the day.
- A record, by year and month, of the number of days the La Grange tailrace channel does not receive any flow for at least some part of the day (i.e., no discharge through the powerhouse or TID sluiceway channel).
- A record, by year and month, of the number of days when the mainstem channel opposite the powerhouse does not receive any discharge for at least some part of the day (i.e., no discharge through the MID hillside discharge, the LGDD spillway, or the LGDD sluiceway).

Task 2: Reporting

Existing data for the La Grange powerhouse, the LGDD spillway, and the TID sluiceway will be summarized, and additional flow data collected at the MID hillside discharge and the LGDD sluiceway will be provided to LPs, in spreadsheet format, for 2015 and 2016.

6.2.3.2 Collect Topographic, Depth, and Habitat Data in the Vicinity of the La Grange Project

Task 1: Topographic Surveys

In 2015, topographic surveys will be conducted during low-flow periods in the La Grange tailrace channel, the TID sluiceway channel (to the point upstream of where the sluiceway channel meets the nearly vertical hill slope), and the mainstem Tuolumne River from where it joins the tailrace channel upstream to the LGDD plunge pool. Longitudinal profiles along the channel thalweg will be collected. Measurement points will be located at 10-foot intervals along

each longitudinal profile. In addition, topographic points will be documented to characterize the large cobble and bedrock island that separates the La Grange tailrace channel from the mainstem channel. At each data point along the longitudinal profile, data will be tied to a common horizontal and vertical datum. Data will be collected on foot and by boat as necessary.

Task 2: Evaluation of Water Depths

During the longitudinal profile data collection (described above), field crews will measure the maximum water depth in the channels. In addition, a visual estimate of average depth will be made. Water depth measurement and observation will be conducted at typical low flows, i.e. 25 cfs in the Tuolumne River main channel and about 75 to 100 cfs in the La Grange Project tailrace channel and TID sluiceway channel. Data will be collected on foot and by boat as necessary.

Task 3: Salmonid Habitat Mapping and Substrate Assessment

Habitat unit maps will be generated for the sections of channel identified in Task 1. Maps will be delineated into polygons corresponding to the following macrohabitat types: pools, step-pools, runs, high-and low-gradient riffles, and chutes. All patches of spawning gravel that are greater than 2 m² in area will be delineated on the habitat maps. The total length of stream channel that will be mapped (for all sections identified in Task 1) will be about 0.5 miles. All habitat mapping will be conducted by the same field crew members to reduce observer bias.

During habitat surveys, pebble counts will be conducted in riffles, runs, and pool tailouts, and from these counts D50 and D84 statistics will be developed for the relevant habitat units. All substrate counts will be conducted by the same field crew member(s) to reduce observer bias.

Task 4: Reporting

A brief technical memorandum describing the methods employed in the field, along with schematics documenting longitudinal profiles, a tabular summary of depth measurements, habitat maps, and a table of D50 and D84 values will be provided in the Initial Study Report in February 2016.

6.2.3.3 Fish Presence and Potential Stranding in the TID Sluiceway Channel and La Grange Tailrace

Task 1: Observation methods

Daytime, direct visual observation of fish presence will be made from August 2015 through April 2016 and August 2016 through April 2017 any time that a flow change occurs in the TID sluiceway channel. In addition, if during these periods the La Grange powerhouse trips offline, biologists will be notified to report to the site for observation of the sluiceway and tailrace channels. Observations will occur during any flow transition from the time of maximum flow in the sluiceway channel through the subsequent closing of any of the sluice gates and until

complete cessation of the sluiceway flow release. Fish observations will be integrated into the Districts' existing protocol as described below.

- Station or unit trips, or powerhouse is shut down.
- TID sluiceway(s) open immediately; auxiliary flow valve at sluiceways also is opened (either remotely or locally).
- Remote system operations center tries to restart the powerhouse or unit (Note: about 80 percent of the time, the powerhouse can be restarted very quickly by the remote operator).
- If unable to restart, a local operator is dispatched to the site to help diagnose the problem and restart the turbine-generator(s) locally, and remote system operator sends an email to a TID biologist or an on-call backup biologist, who arrives at site as soon as practicable.
- Upon station or unit restart, auxiliary flow valve remains open until the biologist arrives on site to inspect the TID sluiceway channel and tailrace for fish.
- If fish are observed, data are recorded to document the fish location, estimated length, and species; photo(s) will be taken to document occurrences of fish; any fall-run Chinook observed will be relocated to tailrace; if *O.mykiss* are observed, a NMFS-approved protocol will be initiated.
- Once the sluiceway channel is cleared of any fish present, the auxiliary flow valve of the sluiceways is shut down.

Task 2: Reporting

The timing and duration of direct visual observations, details of all salmonid observations, and the photographic record of physical conditions during changes in flow and any incidences of trapped or stranded salmonids will be provided in the Initial Study Report in February 2016 and in the Updated Study Report in February 2017.

7.0 Schedule

The Districts anticipate the following schedules for completion of the study components. The schedules assume that FERC will issue its Study Plan Determination in early February 2015, and that the study elements will not be subject to dispute resolution.

7.1 Fish Passage Facilities Assessment

7.1.1 Concept-Level Fish Passage Alternatives

- Collaboration on biological and engineering considerationsApril – December 2015
- Fish passage consultation workshops.....April, July, and October 2015
- Functional design drawings and cost estimates March 2016 – November 2016
- Initial study report February 2016
- Updated study report February 2017

7.1.2 La Grange Project Fish Barrier Assessment

- Planning and permitting October 2014 – July 2015
- Fieldwork September 2015 – April/May 2016; September 2016 – April/May 2017
- Incidental fish observations at Project Facilities September 2015 – May 2017
- Data entry, QA/QC, and analysis September 2015 – August 2017
- Initial study report February 2016
- Updated study report February 2017
- Final study report September 2017

7.2 Upstream Habitat Assessment

7.2.1 Barriers to Upstream Migration

- Compile and review existing data March – May 2015
- Conduct field surveys August 2015 – June 2016
- Initial study report February 2016
- Updated study report February 2017

7.2.2 Water Temperature Monitoring and Modeling

- Synthesize and interpret existing water temperature data March – May 2015
- Licensing participant workshop June 2015
- Install temperature data loggers June – September 2015
- Temperature data collection June 2015 – October 2016
- Initial study report February 2016
- Water temperature modeling March 2016 – November 2016
- Updated study report February 2017

7.2.3 Upstream Habitat Characterization

- Review of results from NMFS Upstream Habitat Study² September/October 2015
- Incorporation of results from NMFS study with barrier study and interim temperature data and identification of additional information needs February 2016

7.3 Downstream Habitat Assessment

7.3.1 Flow and habitat measurements

- Initiate flow recording at project conduits April 2015 – December 2016
- Collect topographic, depth, and habitat data August – November 2015
- Data entry, QA/QC, and analysis September 2015 – June 2017
- Initial study report February 2016
- Updated study report February 2017

² NMFS has stated that data will be available in spring 2015, and a final report is currently scheduled for fall 2015.

7.3.2 Fish Stranding Observations

- Fish observations in TID sluiceway and tailrace channels.. August 2015 – April/May 2016
- Data entry, QA/QC, and summarizingSeptember 2015 – December 2016
- Initial study report February 2016
- Updated study report February 2017

8.0 Consistency of Methodology with Generally Accepted Scientific Practices

8.1 Concept-Level Fish Passage Alternatives and La Grange Project Fish Barrier Assessment

The preliminary functional layouts, siting and sizing of facilities, and Class-V opinions of probable construction cost for upstream and downstream passage measures will be developed according to NMFS criteria (NMFS 2008), industry standards, and general approaches used in the Pacific Northwest, where a wide range of fish passage technologies have been designed and deployed. Direct fish counts conducted at weirs or other fixed points constitute a well established and commonly used technique often employed during FERC licensing proceedings to determine the abundance of migrating adult salmon. A counting weir has been operated annually since 2009 at RM 24.5 to estimate fall-run Chinook salmon escapement to the Tuolumne River.

8.2 Upstream Habitat Assessment

The methods proposed for identifying and analyzing fish barriers in the upper Tuolumne River and tributaries are consistent with what is done in salmonid-bearing streams in the western United States, as evidenced by their similarity to the approach proposed by NMFS in its study request. The temperature modeling methods proposed in this study plan are consistent with those applied widely in the United States, including (i.e., using the same model as) the SWRCB’s Sacramento River Temperature Modeling Project and the Klamath River Total Maximum Daily Load (TMDL) from Link River Dam to Keno Dam.

8.3 Downstream Habitat Assessment and Fish Stranding Observations

Measurements of physical conditions along transects are commonly made in a wide variety of fish habitat studies and can be considered routine. Habitat unit typing will be based on standard definitions of what constitutes a particular habitat (consistent with EHM, Hankin and Reeves, Frissell, etc.). Pebble counts will be performed according to commonly applied standards (e.g., Wolman), with substrate sizes as typically defined for California streams. Characterizations of substrate composition (i.e., D50 and D84 statistics) represent an approach applied universally throughout North America and were recommended by NMFS in its study request. Direct observations of fish will be conducted according to specifications provided by NMFS in its study request, and field biologists will rigorously document all observations.

9.0 Level of Effort and Cost

Placeholder for costs.

10.0 References

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http://docs.streamnetlibrary.org/StreamNet_References/CAsn90626.pdf
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