

**Conservation Groups’
Fish Passage Engineering Assessment
Study Request**

1.0. Background

The requested study will inform the Commission and licensing participants regarding the feasibility of fish passage at the La Grange and Don Pedro Dams.

The Tuolumne River is known to have been historically inhabited by Central Valley steelhead (“DPS”), Central Valley fall-run Chinook salmon, and Central Valley spring-run Chinook salmon (“ESU”).¹ Clavey Falls, at the confluence of the Clavey River, may have obstructed salmon migration at certain flows, but spring-run salmon and steelhead undoubtedly ascended the mainstem past Clavey Falls for a considerable distance. Spring-run salmon and steelhead were most likely blocked from further upstream migration by Preston Falls, four miles upstream of the present Early Intake Dam, about 50 miles upstream of the present Don Pedro Dam. Today, the City and County of San Francisco’s Early Intake Dam is the upstream limit of native fish distribution, including Sacramento suckers, riffle sculpins, and California roach, on the mainstem Tuolumne River.² Steelhead likely ascended Cherry Creek and the Clavey River but not the South and Middle Forks of the Tuolumne, where there are formidable waterfalls within a short distance of the South Fork’s confluence with the mainstem.³

One of the major causes of the decline in anadromous fish populations in the Tuolumne River⁴ is blocked access to historically-occupied upper Tuolumne River habitat by the La Grange Dam. La Grange Dam, constructed in 1893, completely blocked upstream migration of

¹ Lindley, S. T., R. S. Schick, A. Agrawal, M. Goslin, T. E. Pearson, E. Mora, J. Anderson, B. May, S. Greene, C. Hanson, A. Low, D. McEwan, R. B. MacFarlane, C. Swanson, and J. G. Williams, “Historical Population Structure of Central Valley Steelhead and its Alteration by Dams.” *San Francisco Estuary and Watershed Science* 4(1)(3):1-19 (Feb. 2006); available at: <http://repositories.cdlib.org/jmie/sfews/vol4/iss1/art3>. See also Yoshiyama, R. M., E. R. Gerstung, F. W. Fisher, and P. B. Moyle, “Historical and present distribution of Chinook salmon in the Central Valley drainage of California” (2006), pp. 71-176 in California Department of Fish and Game, “Contributions to the Biology of Central Valley Salmonids,” *Fish Bulletin* 179, p. 100.

² *Id.*

³ Pers. Comm. Michael Martin, PhD., fisheries biologist and local landowner (July, 2014).

⁴ Central Valley spring-run Chinook and Central Valley steelhead are listed as threatened under the federal Endangered Species Act, and Central Valley fall-run Chinook are designated as species of special concern. National Marine Fisheries Service, “Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter-Run Chinook Salmon and Central Valley Spring-Run Chinook Salmon and Distinct Population Segment of Central Valley Steelhead” (2009) (Draft Recovery Plan), p. 4; see also National Marine Fisheries Service, Species of Concern: Fall-run Chinook Salmon (2010), available at http://www.nmfs.noaa.gov/pr/pdfs/species/chinooksalmon_highlights.pdf. The Final Recovery Plan is scheduled for release on July 22, 2014.

anadromous fish.⁵ La Grange Dam remains the terminal barrier to upstream migration of anadromous fish in the Tuolumne River today.

Turlock Irrigation District (“TID”) operates the La Grange Project powerhouse. Modesto and Turlock Irrigation Districts (collectively, “Districts”) operate La Grange Dam for water and power supply purposes and to make fish flow releases required under the Don Pedro License. Whether the Districts use La Grange facilities to re-regulate releases from Don Pedro Powerhouse is a disputed issue currently pending before the D.C. Circuit Court of Appeals.⁶ Don Pedro Dam is approximately 2.3 miles upstream of La Grange Dam. There is no dispute that the Districts coordinate operation of the La Grange and Don Pedro Projects for water supply and power purposes.

There is little riverine habitat between La Grange Dam and Don Pedro Dam. La Grange Diversion Pool is not significantly fluctuated in its stage height, and its backwater extends effectively to Don Pedro Dam.⁷ There would likely be little benefit to providing fish passage at La Grange Dam alone, since fish that passed La Grange Dam would be immediately blocked by Don Pedro Dam, with no significant increase in spawning or rearing habitat for anadromous salmonids. This study request therefore focuses on providing upstream and downstream fish passage between the Tuolumne River downstream of La Grange Dam and the nearest substantial riverine habitat upstream of La Grange Dam: the Tuolumne River upstream of Don Pedro Reservoir.

Due to the presence of the 580-foot Don Pedro Dam approximately 2.3 miles upstream of La Grange Dam, a non-volitional (collection and transport) fish passage alternative likely will be needed to restore upstream fish passage past the La Grange and Don Pedro Projects. This study request assumes that collection and transport is the only feasible option to achieve fish passage between the Tuolumne River downstream of La Grange Dam and the Tuolumne River upstream of Don Pedro Reservoir.

The National Marine Fisheries Service’s (“NMFS”) Public Draft Recovery Plan identifies the Upper Tuolumne River above Don Pedro Reservoir as a candidate area for reintroduction of spring-run Chinook salmon and steelhead to further recovery of these threatened species.⁸ The plan includes recommendations for evaluating and implementing a recovery plan on the Tuolumne River watershed for these protected species and their habitats.⁹ Information produced during this study may also be used to inform NMFS’ exercise of authority under Federal Power Act (“FPA”) sections 10(j), 18, and consultation under Endangered Species Act (“ESA”) section 7 for the licensing/relicensing of the La Grange and Don Pedro projects.

⁵ Yoshiyama, p. 101.

⁶ Turlock Irrigation Dist., et al. v. FERC, Nos. 13-1250 and 13-1253 (D.C. Cir. filed Sept. 13, 2014).

⁷ See *Turlock and Modesto Irrigation Dists.*, 144 FERC ¶ 61,051 (July 19, 2013), ¶ 73.

⁸ Draft Recovery Plan, p. 116.

⁹ See *id.*

2.0. Engineering Evaluation of Upstream and Downstream Movement of Chinook salmon and steelhead past La Grange Dam, La Grange Reservoir, Don Pedro Dam, and Don Pedro Reservoir: Study Elements

The overarching purpose of this study is to evaluate a suite of options for physically moving spring-run Chinook salmon and steelhead between the lower Tuolumne River and the Tuolumne River upstream of Don Pedro Reservoir. It is meant to be a reconnaissance-level evaluation that compares and analyzes the relative merits of alternative locations for facilities, specifications and design, operational and other physical requirements, construction methods and impacts, and that evaluates the costs of various alternatives.

2.1. Establish a Tuolumne River Fish Passage Technical Working Group

Applicants shall invite interested relicensing stakeholders to participate in a Fish Passage Technical Working Group (“TWG”) to develop specifications for study elements required by this study and a parallel study to evaluate suitable habitat for re-introduction of anadromous salmonids into the upper Tuolumne River and accessible tributaries. The TWG will also review study implementation and results. We believe that the TWG will need to function for about two years. We believe the study overall will take two years to complete.

2.2. Evaluate potential locations, facilities and costs for downstream adult capture and acclimation facilities

This step will evaluate potential locations, necessary elements and features, and costs of adult capture and acclimation facilities in the lower Tuolumne River. It will consist of six tasks. Licensee, in consultation with the Technical Working Group, shall:

1. Identify suitable river reach for adult capture facilities.
2. Develop criteria for site selection of adult capture facilities.
3. Identify potential sites for adult capture facilities. Consider needs associated with capture facilities in site evaluation.
4. Present alternative designs for fish capture facilities. Assume:
 - a. Need to capture fish or attract fish into acclimation facilities.
 - b. Need to segregate and possibly to mark fish.
 - c. Need for connectivity from river to capture facilities.
 - d. Need for acclimation facilities.
 - e. Need for infrastructure to move fish from acclimation facilities to transportation.
 - f. Need for reliable road access, with preference for minimal transport time and roughness.

- g. Need to provide water to acclimation facilities.
 - h. Need for on-site facilities for personnel.
 - i. Need for potable water and power.
5. Estimate costs. Cost estimates shall include a range of -50% to +100%. Costs shall be broken down by alternative elements and stated both in actual construction costs and as net present value over thirty years.
 6. Prepare report. Compile results of the tasks described above into a single report. The report should be reviewed by a qualified technical editor and senior engineer to ensure that the report meets applicable standards of professional quality and formatting and is free of technical and grammatical errors. The contractor shall submit a final report and all supporting information and technical data.

2.3. Evaluate potential locations, facilities and costs for upstream adult acclimation and release facilities

This step will evaluate potential locations, necessary elements and features, and costs of adult acclimation and release facilities in the upper Tuolumne River. It will consist of six tasks. Licensee, in consultation with the TWG, shall:

1. Identify suitable river reach for adult release facilities. This will take into account biological needs such as migration opportunities and thermal conditions. It will consider the relative biological merits of single- or multiple-release locations.
2. Develop criteria for site selection of adult acclimation and release facilities.
3. Identify potential sites for adult release facilities. Consider needs associated with release facilities in site evaluation.
4. Present alternative designs for fish release facilities. Assume:
 - a. Need for acclimation facilities.
 - b. Need to move fish from acclimation facilities to river.
 - c. Value of connectivity for volitional departure from acclimation facilities to river.
 - d. Need for infrastructure to move fish from transportation to acclimation facilities.
 - e. Need for reliable road access, with preference for minimal transport time and roughness.
 - f. Need to provide water to acclimation facilities.
 - g. Need for on-site facilities for personnel.
 - h. Need for potable water and power.

5. Estimate costs. Cost estimates shall include a range of -50% to +100%. Costs shall be broken down by alternative elements and stated both in actual construction costs and as net present value over thirty years.
6. Prepare report. Compile results of the tasks described above into a single report. The report should be reviewed by a qualified technical editor and senior engineer to ensure that the report meets applicable standards of professional quality and formatting and is free of technical and grammatical errors. The contractor shall submit a final report and all supporting information and technical data.

2.4. Evaluate potential locations, facilities and costs for downstream juvenile capture, acclimation and transport facilities

This step will evaluate potential locations, necessary elements and features, and costs of downstream juvenile capture, acclimation and transport facilities, both in the upper Tuolumne River and in Don Pedro Reservoir. It shall consider both in-river capture facilities and an in-reservoir floating surface collector. It will consist of seven tasks. Licensee, in consultation with the TWG, shall:

1. Develop criteria for site selection of juvenile capture facilities.
2. Identify potential sites for in-river juvenile capture facilities. This will consider both biological advantages of locating facilities close to the head of Don Pedro Reservoir as possible. It will also consider ability to withstand flooding and effectiveness at high flow. It will also consider needs associated with juvenile capture facilities in site evaluation.
3. Present alternative designs for in-river juvenile capture facilities. Assume:
 - a. Need to define flow range of effective use.
 - b. Need to define capture efficiency.
 - c. Need to segregate and mark fish.
 - d. Need to release non-target species back to river.
 - e. Need to avoid conflicts with recreational river uses and users, particularly whitewater boaters.
 - f. Need for acclimation facilities.
 - g. Need to move fish from river to acclimation facilities.
 - h. Need for infrastructure to move fish from acclimation facilities to transportation.
 - i. Need for reliable road access, with preference for minimal transport time and roughness.
 - j. Need to provide water to acclimation facilities.
 - k. Need for on-site facilities for personnel.
 - l. Need for potable water and power.

4. Identify possible locations for in-reservoir juvenile capture facilities. Consider needs associated with juvenile capture facilities in site evaluation.
5. Present alternative designs for in-reservoir juvenile capture facilities. Assume:
 - a. Need to operate at differing reservoir stage elevations.
 - b. Need to define attraction velocity.
 - c. Need to define capture efficiency.
 - d. Need to segregate and mark fish.
 - e. Need to release non-target species back to reservoir.
 - f. Need to avoid conflicts with recreational and other reservoir uses and users.
 - g. Need for acclimation facilities.
 - h. Need to move fish from reservoir to acclimation facilities.
 - i. Need for infrastructure to move fish from acclimation facilities to transportation.
 - j. Need for reliable road access, with preference for minimal transport time and roughness.
 - k. Need to provide water to acclimation facilities.
 - l. Need for on-site facilities for personnel.
 - m. Need for potable water and power.
6. Estimate costs. Cost estimates shall include a range of -50% to +100%. Costs shall be broken down by in-river and in-reservoir collection alternatives. Costs shall also be broken down by alternative elements and stated both in actual construction costs and as net present value over thirty years.
7. Prepare report. Compile results of the tasks described above into a single report. The report should be reviewed by a qualified technical editor and senior engineer to ensure that the report meets applicable standards of professional quality and formatting and is free of technical and grammatical errors. The contractor shall submit a final report and all supporting information and technical data.

2.5. Evaluate potential locations, facilities and costs for downstream juvenile acclimation and release facilities

This step will evaluate potential locations, necessary elements and features, and costs of juvenile acclimation and release facilities in the lower Tuolumne River. It will consist of six tasks. Licensee, in consultation with the TWG, shall:

1. Identify suitable river reaches for juvenile release facilities. This will take into account biological needs such as migration opportunities and thermal conditions. It will consider the relative biological merits of single or multiple release locations.

2. Develop criteria for site selection of juvenile release facilities.
3. Identify potential sites for juvenile release facilities. Consider needs associated with release facilities in site evaluation.
4. Present alternative designs for fish release facilities. Assume:
 - a. Need for acclimation facilities.
 - b. Need to move fish from acclimation facilities to river.
 - c. Value of connectivity for volitional departure from acclimation facilities to river.
 - d. Need for infrastructure to move fish from transportation to acclimation facilities.
 - e. Need for reliable road access, with preference for minimal transport time and roughness.
 - f. Need to provide water to acclimation facilities.
 - g. Need for on-site facilities for personnel.
 - h. Need for potable water and power.
5. Estimate costs. Cost estimates shall include a range of -50% to +100%. Costs shall be broken down by alternative elements and stated both in actual construction costs and as net present value over thirty years.
6. Prepare report. Compile results of the tasks described above into a single report. The report should be reviewed by a qualified technical editor and senior engineer to ensure that the report meets applicable standards of professional quality and formatting and is free of technical and grammatical errors. The contractor shall submit a final report and all supporting information and technical data.

3.0. Consistency with Integrated Licensing Process Study Criteria

1. *Describe the goals and objectives of each study proposal and the information to be obtained.*

The overarching purpose of this study is to evaluate a suite of options for physically moving spring-run Chinook salmon and steelhead between the lower Tuolumne River and the Tuolumne River upstream of Don Pedro Reservoir. It is meant to be a reconnaissance-level evaluation that compares and analyzes the relative merits of alternative locations for facilities, specifications and design, operational and other physical requirements, construction methods and impacts, and that evaluates the costs of various alternatives. The study will evaluate opportunities for the physical reintroduction of spring-run Chinook salmon and steelhead to these areas historically used by these species. Such reintroduction may be required by NMFS under authority of FPA section 18 or by agreement between applicants and other stakeholders.

2. *If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied.*

Proponents are neither a resource agency nor an Indian tribe.

NMFS' Public Draft Recovery Plan identifies the Upper Tuolumne River above Don Pedro Reservoir as a candidate area for reintroduction of spring-run Chinook salmon and steelhead to further recovery of these threatened species. Information produced during this study will also help to inform NMFS' exercise of authority under FPA sections 10(j) and 18 and ESA section 7 for the licensing/relicensing of the La Grange and Don Pedro projects.

The State Water Resources Control Board is responsible for protecting the beneficial uses of the state's waters. Beneficial uses that may be affected by this study request include spawning and migration of anadromous fish.

3. *If the requester is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.*

NMFS has estimated that 90% of the historic habitat for spring-run Chinook salmon and steelhead has been rendered inaccessible by dams in California's Sacramento – San Joaquin watershed. Spring-run Chinook are no longer extant in the San Joaquin watershed, although a program is currently underway to restore them to the San Joaquin River mainstem. NMFS, in its Draft Recovery Plan, has identified the upper Tuolumne River as a candidate area for reintroduction of spring-run Chinook salmon and steelhead to further recovery of these species.

At the Scoping Meeting for this project, NMFS stated its resource goals for anadromous fish include "providing access to suitable habitats" and "to expand or establish additional viable populations in areas where anadromous fish are now blocked or reduced."¹⁰

4. *Describe existing information concerning the subject of the study proposal and the need for additional information.*

Evaluations of capture and transport opportunities in the Yuba Salmon Forum has developed extensive information and analysis (including costs) of representative capture and transport in the Yuba River watershed. Evaluation of opportunities in the upper Sacramento River watershed (pursuant to requirements made by NMFS and the Bureau of Reclamation in the Biological Opinion for the Operations and Criteria Plan for the Central Valley Project and State Water Project) is planned but less complete. To our knowledge, there has been no comparable analysis of engineering options for capture and transport operations in the Tuolumne River watershed. The Commission denied a study request by NMFS to gather such information incident to the relicensing of the Don Pedro Project.

¹⁰ eLibrary no. 20140618-4015 (June 18, 2014), pp. 33-34.

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.*

La Grange Dam is the terminal barrier to upstream migration of anadromous fish in the Tuolumne River today. As stated above, the closest available riverine habitat in the Tuolumne River upstream of La Grange Dam is the Tuolumne River upstream of Don Pedro Reservoir.

The Commission declined to require that the La Grange and Don Pedro Projects be licensed in a single proceeding, stating: “[t]he La Grange Project requires licensing under FPA section 23(b)(1); there is no need for us to determine whether the La Grange Project might also require licensing as part of a complete unit of development with the Don Pedro Project.”¹¹ In defending this decision in court, the Commission argued: “[g]iven the Conservation Groups’ ability to raise their environmental concerns in both the Don Pedro and La Grange proceedings, they cannot establish any significant prejudice from the Commission’s failure to decide this issue.”¹² It further argued that the Conservation Groups’ legal challenge is based on the completely illogical premise that the licensing proceedings – which will analyze fish passage issues and develop any necessary license terms – will actually worsen any existing fish passage issues.”¹³

If the La Grange Project were licensed as part of a complete unit of development with the Don Pedro Project, fish passage past both dams and reservoirs would be subject to the Section 18 authority of NMFS and thus squarely on the table for study in relicensing. Consistent with the Commission’s assurance that separate proceedings makes no practical difference to fish passage or to the interests of Conservation Groups and the public interest they represent, OEP Staff must find that study of capture and transport options between the lower Tuolumne River downstream of the La Grange Dam fish barrier and the habitat upstream of Don Pedro Reservoir is appropriate for the licensing of the La Grange Project.

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 the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.*

Many of the methods recommended were recently employed in the Yuba Salmon Forum, a voluntary collaborative process that has evaluated stream reaches in the upper Yuba River watershed for their potential to support reintroduced spring-run Chinook salmon and steelhead. The Yuba Salmon Forum included technical and other representatives from water purveyors,

¹¹ *Turlock & Modesto Irrigation Dists.*, 144 FERC ¶ 61,051 (July 19, 2013), ¶ 116.

¹² Brief of Respondent at 46, *Turlock Irrigation Dist., et al. v. FERC*, Nos. 13-1250 and 13-1253 (D.C. Cir. July 17, 2014).

¹³ *Id.* at 45.

hydroelectric project operators, resource agencies, and non-governmental organizations. The engineering analysis requested is intended to conform to standard engineering and construction analysis. It is possible that additional important elements may be gleaned from review of Yuba Salmon Forum documents.

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.*

Conservation Groups have limited proposed study elements to evaluation of engineering options for capture and transport of anadromous fish, since volitional options are almost certainly infeasible due to the height of Don Pedro Dam and the length of Don Pedro Reservoir. We are not aware of the details of proposed alternative studies, though we expect that the elements included our study request will in many respects be similar to those proposed by NMFS.

The Yuba Salmon Forum engineering analyses were done for representative actions in order to evaluate alternative geographic options for reintroduction. We believe that the number of variables that will need to be considered for the Tuolumne River evaluation will be smaller than the Yuba analyses, because suitable geographic destinations in the upper Tuolumne watershed seem to be more limited.

In consideration that this study will evaluate engineering opportunities for fish passage past the Don Pedro Project as well as past the La Grange Project, we believe that the Commission's consideration of level of effort should be seen in the context of the benefits to applicants of both projects. *See* discussion above relating to Study Criterion #5.

We base our cost estimates on our sense of the costs for engineering studies in the Yuba Salmon Forum, and on the relatively few engineering variables presented by capture and transport options in the Tuolumne River. We estimate the total cost for this study to be \$300,000.

4.0. References

Brief of Respondent, Turlock Irrigation Dist., et al. v. FERC, Nos. 13-1250 and 13-1253 (D.C. Cir. July 17, 2014).

Lindley, S. T., R. S. Schick, A. Agrawal, M. Goslin, T. E. Pearson, E. Mora, J. Anderson, B. May, S. Greene, C. Hanson, A. Low, D. McEwan, R. B. MacFarlane, C. Swanson, and J. G. Williams, *Historical Population Structure of Central Valley Steelhead and its Alteration by Dams*. *San Francisco Estuary and Watershed Science* 4(1)(3):1-19 (Feb. 2006). Available at: <http://repositories.cdlib.org/jmie/sfews/vol4/iss1/art3>.

National Marine Fisheries Service (NMFS), *Public Draft Recovery Plan for Sacramento River Winter-run Chinook Salmon, Central Valley Spring-run Chinook Salmon, and Central Valley Steelhead*' (Oct. 7, 2009). NMFS, Southwest Region, Sacramento, California. Available at

http://www.westcoast.fisheries.noaa.gov/publications/recovery_planning/salmon_steelhead/domains/california_central_valley/public_draft_recovery_plan_october_2009.pdf.

Turlock & Modesto Irrigation Dists., 144 FERC ¶ 61,051 (July 19, 2013).

Yoshiyama, R. M., E. R. Gerstung, F. W. Fisher, and P. B. Moyle, “Historical and present distribution of Chinook salmon in the Central Valley drainage of California” (2001), pp. 71-176 in R. L. Brown, “Contributions to the Biology of Central Valley Salmonids,” Fish Bulletin 179. California Department of Fish and Game, Sacramento.