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UNITED STATES OF AMERICA 123 FERC ¶ 62,012
FEDERAL ENERGY REGULATORY COMMISSION

MODESTO IRRIGATION DISTRICT PROJECT NO. 2299 – 057
TURLOCK IRRIGATION DISTRICT

ORDER ON TEN-YEAR SUMMARY REPORT UNDER ARTICLE 58
(Issued April 3, 2008)

INTRODUCTION

The Modesto Irrigation District and the Turlock Irrigation District (Districts) for the Don Pedro Project filed on March 25, 2005, the Ten-Year Summary Report (Summary Report) pursuant to Article 58 of the license, as amended.[1] The Districts supplemented the Summary Report with annual reports filed on March 31, 2006, and March 30, 2007. The project is located on the Tuolumne River, in Stanislaus and Tuolumne Counties, California.

BACKGROUND

The Don Pedro Project was licensed March 10, 1964. It consists of a 1,750-foot-long, 580-foot-high, rock-and-earth-filled dam; a 2.03-million acre-foot reservoir that covers 12,960 acres; and a powerhouse containing three units with a combined capacity of 168 megawatts. Don Pedro Dam is operated by the Districts under various agreements with the U. S. Army Corps of Engineers, the City and County of San Francisco (CCSF), and the California Department of Fish and Game (CDFG).

The Districts also own La Grange Dam, a non-project diversion dam located on the Tuolumne River 2.3 miles downstream of Don Pedro Dam. It is 130 feet high and impounds about 500 acre-feet. The Districts divert water into their canal systems for consumptive purposes upstream of La Grange Dam.

The license established a minimum flow for the first 20 years of project operation, and required the Districts to study the Tuolumne River fishery and report the results to the Commission. In 1992, the Districts filed a request to implement proposed changes in minimum flows. In 1996, after a contested amendment proceeding resulted in a settlement agreement, the Commission amended Articles 37 and 58 of the license to implement portions of the settlement.

[1] See 76 FERC 61,117 (1996)

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Article 37, as amended by the 1996 order, requires the Districts to maintain minimum streamflows in the Tuolumne River at La Grange Bridge for fish purposes in accordance with a set table and schedule. The flows are based on the Water Year classification,[2] as determined by forecasts of the San Joaquin River Basin run-off. The Districts, the U. S. Fish and Wildlife Service (USFWS), and the CDFG, can agree to an alternative flow schedule, but any schedule different from that specified by Article 37 must be filed with the Commission within 30 days of the date of the agreement.

Article 58 required the Districts to implement a program to monitor the Chinook salmon (*Oncorhynchus tshawytscha)* population and habitat in the Tuolumne River. The program was to include six elements:

(1) Spawning Escapement Estimates;
(2) Quality and Condition of Spawning Habitat;
(3) Relative Fry Density/ Female Spawner;
(4) Fry Distribution and Survival;
(5) Juvenile Distribution and Temperature Relationships; and
(6) Smolt Survival.

The program was to be developed in consultation with the USFWS and the CDFG, and the monitoring frequencies and methods were to be agreeable among the Districts and the agencies. Any disagreements regarding the conduct of the studies not resolved among the Districts and the consulted agencies were to be filed with the Commission for determination.

The monitoring information was to be documented in annual reports filed with the Commission by the Districts by April 1 of each year, and to be available for public review. The results of any fishery studies already completed and not yet filed with the Commission were to be filed by the Districts by April 1, 2005.

Based on the information provided by the Districts' study results to be filed by April 1, 2005, the Commission would determine whether to require further monitoring studies and changes in project structures and operations to protect fishery resources in the Tuolumne River, after notice and opportunity for hearing.

[2] A Water Year begins on October 1 and ends September 30.

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SUMMARY REPORT

As noted, the Districts filed their ten-year summary report on March 25, 2005. The Summary Report contains data on the Districts' monitoring efforts under Article 58, as well as data on their non-flow mitigation efforts, and data on their participation in other programs to improve fisheries in the San Joaquin River Basin. The report contains five sections and six appendices, and much of the information presented pertains to the Districts' efforts conducted under a 1995 Settlement Agreement (SA) among the Districts, the resource agencies, and non-governmental organizations (NGO).[3]

Section 3 of the Summary Report presents data from the monitoring programs the Districts undertook. The programs included measurement of physical parameters such as streambed substrate composition, water temperature, dissolved oxygen, and turbidity levels; and biological parameters such as spawning escapement counts, juvenile Chinook salmon production, Chinook salmon smolt survival, flow fluctuation impacts, fish species assemblages, and invertebrate population sampling. Section 5 of the report contains the Districts' proposals for its future actions to protect and enhance the Tuolumne River Chinook salmon resource.

Between 1996 and 2004, the Districts collected data on fish populations other than Chinook salmon, and on invertebrate species inhabiting the Tuolumne River. They found 37 species of fish utilize the Tuolumne River, including American shad (*Alosa sapidissima*), large- and smallmouth bass (*Micropterus salmoides* and *M. dolomieui*, respectively) and rainbow trout (*O. mykiss*).

The Districts also conducted snorkeling and spawning surveys to determine whether steelhead (the anadromous form of *O. mykiss*) occur in the Tuolumne River. They reported that the CDFG conducted electrofishing to obtain rainbow trout DNA and otoliths for additional steelhead analysis.

The Districts also identified in the Summary Report that they are two of the six water users who agreed in 2000 to participate in the Vernalis Adaptive Management Program (VAMP).[4] They provide supplemental water to assist juvenile salmonids

[3] The Settlement Agreement was filed with the Commission on February 5, 1996. The Districts proposed the amendment of Articles 37 and 58, but stipulated that the agreement itself was not filed for approval.

[4] The 12-year-long VAMP is also an experiment to study salmon survival rates

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emigrating from the Merced, Tuolumne, and Stanislaus Rivers through the Sacramento – San Joaquin River Delta. The group provides up to 110,000 acre-feet of water from their storage reservoirs to meet target flows of between 2,000 and 7,000 cubic feet per second (cfs) in the San Joaquin River as measured at Vernalis, California.

The Turlock Irrigation District (TID) constructed a drinking water infiltration gallery and intake in the Tuolumne River approximately 24 miles downstream of La Grange Dam. The use of this intake for both irrigation and drinking water needs, rather than the existing intake upstream of La Grange Dam, would allow more water to flow further downstream before being diverted for domestic uses, but is currently not in operation.

The Districts also indicated that they coordinate with the U. S. Army Corps of Engineers (Corps) to maintain sufficient flood storage volume in Don Pedro Reservoir, while limiting flows in the Tuolumne River at Modesto, California to 9,000 cfs, which limits flood damage in the lower river. Their task is complicated by Dry Creek, a low elevation creek located downstream of La Grange Dam and which can add significant flow to the Tuolumne River quickly. The Districts installed a gage in the creek's headwaters to improve their ability to predict run-off and limit flood damage.

Based on the information contained in the Summary Report, the Districts recommend that the current Article 37 flow requirements and the limits on flow fluctuations be maintained, and that flexibility in setting and adjusting flow schedules with USFWS and CDFG be maintained.

As stated in the Summary Report, the Districts propose to continue the fall spawning surveys and water temperature monitoring through the term of the license. They also propose to continue other monitoring elements (seine and snorkel surveys, spring rotary screw trapping, and invertebrate sampling) if adequate funding sources are available. The Districts do not support additional coded-wire-tag (CWT) smolt survival evaluations, citing costs and risks that outweigh the benefits.

The Districts also propose the continuation of the Tuolumne River Technical Advisor Committee (TRTAC – an advisory committee established by the 1995 SA), and to continue submitting annual reports on their efforts to the Commission.

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based on San Joaquin River flow, the export of water from the Delta by both Federal and state projects, and the use of a barrier to guide fish around these projects' pumps.

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The Districts propose to complete the ten habitat restoration efforts (non-flow measures) identified under the 1995 SA. They propose to pursue these projects as long as outside funding is available.

The Districts also propose to implement additional salmon recovery measures, as discussed in the SA. These included the use of temporary spawning barriers to prevent redd superimposition,[5] the release of turbid water to aid smolt outmigration, predator removal efforts, and the use of water temperature and water velocity control to obtain spatial separation of smolts and their predators.

COMMENTS AND INTERVENTIONS

The Commission noticed the Districts' filing of the Summary Report on June 24, 2005, and solicited comments, motions to intervene, and protests. Comments were due by July 25, 2005, and replies to comments were due August 25, 2005. Requests for additional time to comment were filed by the CDFG and the Friends of the Tuolumne (FOT) on July 25, 2005. These were granted by order issued September 20, 2005, with revised filing dates of November 22, 2005 for comments, and December 22, 2005 for responses to comments.

Motions to intervene were filed by the Department of the Interior, the National Marine Fisheries Service (NMFS), the CDFG, the San Francisco Bay Area Water Users Association (Water Users), the California Rivers Restoration Fund, the Tuolumne River Preservation Trust, California Trout, and Friends of the River (acting jointly as the Conservation Groups), the CCSF, the FOT, and the Stanislaus Fly Fishermen (SFF) on July 25, 2005.

The USFWS filed comments on July 22, 2005 and August 18, 2005. The NMFS, CDFG, CCSF, the California and Nevada Chapter of the American Fisheries Society (AFS – CN), SFF, and the FOT filed comments on July 25, 2005. Additional comments were filed by the FOT on November 22, 2005, and by the CDFG on July 25, 2005 and November 23, 2005. The Districts filed responses to comments on August 23, 2005, and December 22, 2005. The CCSF filed responses to comments on January 3, 2006.

The USFWS stated the Summary Report failed to recognize that the Tuolumne River Chinook salmon population has not increased in response to the measures

[5] A physical barrier that prevents later-arriving adult salmon from digging a redd (a gravel nest) where eggs have already been deposited by earlier spawning salmon.

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implemented by the Districts, and that the monitoring program has been inadequate to determine why the measures have not resulted in increased salmon production. They presented an analysis that indicated the pre- and post-1996 Chinook salmon production (the sum of escapement and ocean harvest) were not significantly different (an average of 15,405 fish before the new Article 37 flow regime and 13,862 fish after). They recommended that an adaptive management program be established to oversee the fisheries monitoring, that new flow-related studies be implemented, and that nine of the high priority, non-flow studies be completed. Earlier, n letters dated February 27, 2004 and October 1, 2004, the USFWS had also expressed concern that the monitoring program did not include studies on steelhead.

In a letter dated July 25, 2005,[6] NMFS stated that the Districts did not meet the

[6] The NMFS limited its July 25, 2005 comments to the Chinook salmon resource based on a then-pending court-ordered review of its listing of steelhead. NMFS listed the Central Valley steelhead as threatened under the Endangered Species Act (ESA) on March 19, 1998. It requested in letters dated June 9, 2002, and November 19, 2002, that the Commission initiate formal consultation concerning the effects of the project on the species pursuant to Section 7 (a)(2) of the ESA. It filed with the Commission on May 3, 2003, a petition to amend the license to modify the minimum streamflows as necessary to protect both steelhead and Chinook salmon in the Tuolumne River. The Commission requested that the Districts act as the Commission's non-federal representatives for the purposes of informal consultation on March 6, 2003, and the Districts agreed by letter dated March 31, 2003. The Commission's order issued December 22, 2003, deferred action on the NMFS petition pending completion of informal consultation.

Several parties, including the Districts, subsequently filed suit on the listing of the Central Valley steelhead as a threatened species, and the United States District Court for the Eastern District of California found on April 12, 2004, that the listing was invalid. The listing was remanded for revision by the NMFS's administrative process, with the revision due by December 15, 2005. The District Court included in its order a condition that NMFS not prosecute its petition with the Commission on steelhead until the administrative review of the steelhead listing was completed. The NMFS's July 25, 2005, filing of comments on the Summary Report included a request for a partial stay of action on its 2003 petition so that NMFS would not violate the court-ordered condition.

The NMFS issued its revised ruling on Central Valley steelhead on January 5, 2006. See 71 Fed. Reg. 834 (Jan. 5, 2006). It determined the listing of this distinct population segment as threatened under the ESA was warranted. It also found that its

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goals of assessing spawning habitat quality and condition; determining whether poor gravel quality was limiting Chinook salmon production; assessing any relationship between changes in flow and water temperature, and the distribution of Chinook salmon fry; and enumerating the overall annual smolt production in the Tuolumne River. They recommended additional studies of flow- and non-flow-related issues, funding to enable long-term monitoring studies, and procedural changes to allow the fisheries agencies to prescribe and approve all monitoring studies.

The NMFS, after revising its ruling on the listing of the Central Valley steelhead as a threatened species, filed comments on steelhead in the Tuolumne River by letter dated June 26, 2006. The NMFS attached a copy of its 2003 petition concerning Central Valley steelhead and stated that the Commission must initiate consultation with NMFS on the annual operating plans and the Commission's reserved discretion under Articles 37, 58, and Standard Article 10 to address the revised listing and designation of critical habitat for this species. NMFS also requested that it be added as a participant in the flow and habitat monitoring programs under Articles 37 and 58. The petition is currently pending before the Commission and will be addressed in a subsequent order.

Lastly, the NMFS reported in its June 26, 2006 letter that the Central Valley spring-run Chinook salmon and the North American green sturgeon (*Acipenser medirostris*) were listed as threatened species on June 28, 2005, and April 7, 2006, respectively. The NMFS stated that the Commission must also initiate consultation on these species for the project annual operating plans and the Commission's reserved discretion under Articles 10, 37, and 58.[7]

The CDFG commented that the Summary Report was flawed. They stated the Districts focused on forces outside the Districts' control, such as ocean salmon harvest rates and Delta export pumping, as factors affecting Chinook salmon production in the Tuolumne River, rather than those associated with project operation. They contend that

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September 2, 2005, designation of the Tuolumne River from its confluence with the San Joaquin River upstream to La Grange Dam, as critical habitat did not require revision. See 70 Fed. Reg. 52488 (Sept. 2, 2005).

[7] Review of the listings for these two species indicates that neither species is present in the Tuolumne River, and the green sturgeon may never have utilized the river. Additionally, no critical habitat was designated in the Tuolumne River by the NMFS for either species. The Commission will address the need for consultation for these species in connection with its order on the 2003 petition.

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data were altered, misused, or misinterpreted in the Summary Report. They identified the salmon escapement data as an example, stating that the estimates in the report are different than the estimates produced by the CDFG, which completed the escapement surveys.

The CDFG recommended conducting additional CWT smolt survival studies with hatchery fish over the next 10 years; completing a water temperature model; retaining the TRTAC, but with modifications so that it would be more effective; constructing a small hatchery on the Tuolumne River; and revising the spring flows required by Article 37 to attain a higher Chinook salmon escapement.

The CDFG proposed spring flows of between 2,500 cfs (critically dry water year) and 5,000 cfs (wet water year), from 2006 through 2011; flows between 3,500 cfs and 7,000 cfs between 2012 and 2016; and flows between 5,000 cfs and 9,000 cfs from 2017 through 2026. They also proposed durations of the flows from 30 days in a critically dry year, to 90 days in a wet year.

The CCSF concurred with the Summary Report's conclusions and the Districts' recommendations.

The AFS – CN expressed concern that the report and the SA did not address the project's effects on the Central Valley steelhead and resident rainbow trout; that the effects of the project-altered stream hydrograph on the activities of non-native piscivores was poorly analyzed; and that the effects of the flows required by Article 37 were not adequately assessed. They recommended that the monitoring program be modified, that an adaptive management program be initiated, and that monitoring directed at steelhead be undertaken.

The SFF expressed concern that the effects of the project on *O. mykiss* have largely been ignored, and that the studies done on this species were inadequate. They recommended the initiation of studies on *O. mykiss;* modification of the license to increase the summer flow requirement; completion and operation of the TID's drinking water infiltration gallery associated with the habitat restoration work at special run pool (SRP)9; [8] and the use of accurate streamflow gages to prevent errors in releasing and monitoring streamflows.

[8] Special run pools are unnaturally wide sections of river channel caused by human activities (i.e., gravel extraction), which provide habitat favorable to predators of juvenile salmonids.

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The Conservation Groups stated that the monitoring results presented in the Summary Report do not show that the protection and restoration goals identified in the SA have been met. They expressed concern that the Districts relied too heavily on modeling results, rather than data collected by the monitoring program to assess the effects of the flow and non-flow measures on the Chinook salmon habitat and population. They requested additional monitoring. They also expressed concern that the existing flow schedule is inadequate to protect both Chinook salmon and steelhead.

The Conservation Groups recommended that the Districts fund a rigorous monitoring program that includes greater oversight by the resources agencies and the stakeholders; modification of the TRTAC composition and procedures; continuation of a modified reporting procedure; acquisition of additional water to augment flows in the Tuolumne River, as described in the SA; continued control of river level fluctuations; reevaluation of the habitat restoration projects to ensure anticipated benefits are realized; and development of a flow schedule and monitoring program for steelhead. The Conservation Groups also requested that the Commission convene a technical conference to discuss disputed issues of fact and law.

The FOT stated that resident and steelhead rainbow trout have not been adequately studied and recommended monitoring to determine appropriate streamflows to sustain them, including increased summer flows to allow a complete and thorough study. The FOT identified studies that the Districts should be required to implement. They also recommended operation of TID's drinking water infiltration gallery at SRP 9, modification of the TRTAC, and licensee funding of an independent facilitator/river keeper. The FOT requested that a formal hearing or technical conference be held to discuss management of the project over the next 10 years.

PUBLIC MEETINGS

Commission staff conducted two public meetings in Sacramento, California concerning the Summary Report and Article 58 requirements. The first meeting, held on July 25, 2006, was conducted to discuss: (1) information concerning the Districts' Chinook salmon studies, monitoring, and non-flow mitigation efforts on the Tuolumne River; (2) information on Central Valley steelhead; and (3) whether to require further monitoring studies and changes in project structures and operations to protect fishery resources in the Tuolumne River. The second meeting was held on August 8, 2007, to discuss the design and schedule concerning the Districts' fisheries study plan filed with the Commission on March 20, 2007, and revised on July 16, 2007. The meetings were noticed on June 23, 2006, and July 18, 2007, respectively.

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A. July 2006 Meeting

The USFWS and CDFG presented information on their analysis of the relationship between flow and Chinook salmon production in the Tuolumne River. They concluded that spring river flow is the most significant factor affecting Tuolumne River juvenile Chinook salmon survival, and that the flows required by Article 37 were not sufficient to achieve the spawning escapement increases envisioned in 1996. They proposed a new flow schedule that consisted of three flow tiers: 750 cfs; 2,000 cfs; and 4,000 cfs, depending on the type of water year. Flow for fry rearing would be held at 2,000 cfs for a specified number of days, while flows for smolt emigration would decrease in drier water years.

The NMFS presented information about rainbow trout and steelhead in the Tuolumne River. They recommended additional study elements be added to improve the understanding of Tuolumne River rainbow trout and steelhead requirements.

The CDFG reported that the Tuolumne River Chinook salmon population was declining despite the absence of any critically dry water years. They presented suggestions for improving the methodologies used during the 10-year study period, and for additional studies to collect a broader range of information about the Tuolumne River fisheries resources.

Commission staff requested at the conclusion of the July 2006 meeting that any additional comments on the issues discussed during the meeting be filed with the Commission by September 25, 2006.

The CDFG filed on September 22, 2006, a request that the deadline for filing additional comments be extended so that it could pursue with the Districts an ongoing, collaborative and adaptive scientific process in order to develop needed additional fisheries information. The filing included the Districts' and CDFG's signatures showing their concurrence with the extension request and implementation of the collaborative process**.** No responses were received from other resource agencies supporting the Districts' and CDFG's collaborative scientific process.

The Conservation Groups filed comments on September 25, 2006. They stated they had not been involved in the development of the CDFG proposal to create a collaborative scientific process, and expressed concern that an "open-ended" process would prevent a final decision on a flow schedule before the start of the process to issue a

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new license.[9] They supported the flow schedule presented by the fisheries agencies at the July, 2006 meeting and the continued study of flow and habitat measures to restore and maintain wild Chinook salmon. They opposed any fish augmentation program in the Tuolumne River, particularly a hatchery. They agreed the presence or absence of steelhead in the Tuolumne River is an important question, but stated all rainbow trout in the river downstream of La Grange Dam require protection. Finally, they requested the Commission adopt a final minimum stream flow schedule.

B. August 2007 Meeting

Commission staff's December 20, 2006 letter requested the Districts prepare a fisheries study plan to address data needs identified during the review process. The Districts filed the fisheries study plan with the Commission on March 20, 2007, including comments received on the plan and the Districts' responses to the comments. Prior to the August 2007 meeting, staff provided to the parties the results of its review, dated June 15, 2007, of the Districts' plan. The Districts filed a revised study plan on July 16, 2007.

The Districts' fisheries study plan included six study areas: flow; habitat restoration; Chinook salmon fry survival; steelhead trout; predator control; and water temperature. These studies would generally be conducted annually through 2011 with analysis of data and reports completed in 2012.

To address instream flow issues as related to the salmonid fish resource, the Districts proposed an expanded analysis of existing CWT data; the release of higher experimental flows in the winter; paired rotary screw-trap monitoring at two locations; and acoustical tracking of smolts' habitat use and passage at three test flows. The Districts proposed to conduct studies to assess the success of the completed habitat restoration efforts. To assess salmon fry survival, they proposed to continue to monitor fry density and fry movement using paired rotary screw traps and seining and to include a micro-chemical analysis of adult salmonid otoliths to determine the length of juvenile freshwater residency.

The Districts proposed to conduct studies of rainbow trout in an effort to determine if steelhead are present in the Tuolumne River. They would also implement several studies to assess the impacts of predation on salmonid juveniles, and the effect of various management techniques on the rate of predation. The Districts proposed to

[9] The current license expires in 2016; the process for relicensing would begin in 2011.

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continue monitoring water temperatures at nine locations in the Tuolumne River and two locations in the San Joaquin River.

In a letter dated March 5, 2007, the USFWS, the NMFS, and the CDFG, submitted joint comments on the Districts' proposed fisheries study plan. The agencies stated that the Districts' plan did not include many of the following basic study elements: appropriate management questions framed as testable hypotheses; metrics that can be measured at both the site-specific and population levels; methods that provide relatively accurate measurements of the test metrics; experimental conditions that, to the extent possible, vary one habitat variable at a time; and, statistical designs that provide assurance that a sufficient number of observations will be made and that specify how the data will be assessed to adequately test the hypothesis and reach statistically valid conclusions.

The agencies provided specific recommendations for improving each of the six study areas and included a draft paper entitled "Limiting Factor Analysis and Recommended Studies for Fall-Run Chinook Salmon and Rainbow Trout in the Tuolumne River", related to a model developed by the agencies. According to the agencies, winter and spring flows are key factors controlling the production of Chinook salmon, and winter and spring flows, in addition to summer flows and water temperatures, are key controlling factors for Central Valley steelhead.

The CDFG, in a letter filed May 29, 2007, re-iterated and clarified its earlier comments regarding the need for implementation of a robust monitoring plan using adaptive management strategies, increased flow releases from the project, and consideration of developing a plan for a fish hatchery on the Tuolumne River.

The SFF, the CSPA, the FOT, the Sierra Club, the Conservation Groups, and the Golden West Women Flyfishers (GWWF), filed letters of comment on June 11, June 13, June 15, June 19, June 19, and July 2, 2007, respectively, expressing opposition to a fish hatchery on the Tuolumne River. The CSPA, the GWWF, and the Conservation Groups also provided comments on the Districts' proposed fisheries study plan. The Conservation Groups stated that the plan was not responsive to comments and should therefore be revised by the Commission. The CCSF, in a letter dated April 4, 2007, supported the fisheries study plan filed by the Districts.

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DISCUSSION

As the comments demonstrate, the issues raised by the Summary Report are contentious, particularly with regard to the adequacy of the studies completed by the Districts. Under Article 58, the monitoring frequencies and methods were to be agreeable to the Districts and the agencies and any disagreements were to be filed with the Commission for determination. No party sought to raise any disagreements concerning the study elements or their design during the 10-year study period

The Summary Report and comments from the parties often mentions the 1995 SA. The agreement, occasionally referred to as the FERC SA, was not filed with the Commission for approval and was not made part of the license. The scope of our review is limited to the Districts' compliance with the license requirements, and does not include the adequacy of the Districts' efforts pertaining to the goals or methods of the settlement.

Information on fisheries resources, including Article 58 study elements presented in the Districts' Summary Report, is discussed below.

A. Spawning Escapement Estimates

The Districts reported that spawning escapement estimates were successfully monitored by the CDFG throughout the 10-year study period. The monitoring typically consisted of surveys of spawning redds and population estimates using post-spawning salmon carcasses. The report also provides Chinook salmon spawning escapement estimates for the Tuolumne, Stanislaus, and Merced Rivers (all tributaries of the Lower San Joaquin River).

Spawning Chinook salmon in the Tuolumne River are generally 2 to 3 years of age. The spawning escapement data, therefore, reflect juvenile rearing and emigration conditions that occurred several years prior to their return to the river. The data also reflect the conditions the fish experience in the Sacramento – San Joaquin River Delta, San Francisco Bay, and the Pacific Ocean.

The data reported show that Chinook salmon escapement to the Tuolumne River increased from 4,400 fish in 1996 to 17,900 fish in 2000, and then declined to 1,900 fish in 2004, the last year data were available for the Summary Report. Subsequent annual reports submitted by the Districts showed escapements of 700 fish in 2005 and 600 fish

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in 2006.[10] A preliminary estimate of the 2007 escapement is 180 fish.[11]

The escapement estimates for the Stanislaus River (a tributary of the San Joaquin River located adjacent to and north of the Tuolumne River) show an increase from 200 fish in 1996 to 11,000 fish in 2000, followed by decline to 3,000 fish in 2006. The preliminary estimate for 2007 is 405 fish. A similar trend is seen in the escapement estimates for the Merced River (a tributary of the San Joaquin River located adjacent to and south of the Tuolumne River): an increase from 3,800 fish in 1996 to 11,000 fish in 2000, followed by a decline to 3,000 fish in 2006. The preliminary estimate for 2007 is 573 fish.

The Summary Report, annual reports, and other available information showed declines in Chinook salmon escapement in the Tuolumne, Stanislaus, and Merced Rivers between 2000 and 2007, thus indicating that factors outside of the rivers were having an impact on the returns. Juvenile salmon from each river experience nearly the same conditions upon leaving their natal streams, and adults are likely subjected to similar environmental conditions on their return to spawn.

B. Quality and Condition of Spawning Habitat

Previous studies of lower Tuolumne River salmon habitat conducted by the Districts have attributed low salmonid survival-to-emergence to poor spawning gravel quality, which has resulted from deposition of fine sediments. Data in the Summary Report, collected by the Districts in 1987 and 1988, found the level of fine sediments (< 0.85 millimeters) averaged 17 per cent in 1987 and 11 per cent in 1988, which indicated poor spawning gravel quality. Predicted egg-to-emergence survival was 15.7 per cent in 1987 and 34.1 per cent in 1988.

The Districts also conducted alevin[12] trapping experiments that indicated survival ranged between 1 per cent in 1988 (attributed more to elevated water temperatures than to poor gravel quality) and 32 per cent in 1989. The Districts surmised from these data that Chinook salmon egg survival-to-fry emergence in the Tuolumne River was greatly

[10] Filed March 26, 2006, and March 27, 2007.

[11] Found at http://sanjoaquinbasin.com/fishbio-san-joaquin-basin-newsletter.html.

[12] The developmental life stage of young salmonids between the egg and fry stage.

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reduced from the 90 per cent survival seen in some clean gravel experiments.

In response to the large volumes of fine sediments deposited in the Chinook salmon spawning areas downstream of the project by floods that occurred in 1997, the Districts measured gravel permeability[13] throughout the lower Tuolumne River in 1998, 1999, and 2000. The Districts developed a model for predicting survival-to-emergence based on gravel permeability studies and fry emergence data from other researchers. Using the Districts' field measurements of gravel permeability, the model predicted survival rates in the Tuolumne River that ranged from 34 to 51 per cent, generally decreasing with downstream distance in the Tuolumne River.

The Districts also studied permeability in several artificial redds of different sand and gravel mixtures. The Districts used the survival model and the artificial redd study results to assess Tuolumne River egg-to-fry survival. They found differences between the permeability of Tuolumne River spawning gravels and artificial redds of similar composition, and concluded that fry emergence in the Tuolumne River was lower than predicted.

C. Relative Fry Density Per Female Spawner

The Summary Report provided data collected by the Districts on the sex ratios of spawning Chinook salmon in the Tuolumne River from 1971 to 2003. During this period, the number of females ranged between 25 per cent (1983) and 67 per cent (1978). The Districts also utilized beach seining and snorkeling surveys annually to derive relative fry density estimates. These data were used to report a significant positive relationship between the number of female spawners and the average fry density, except in 1997 when flood flows likely scoured the spawning gravels and moved most emerged fry downstream of the sampling sites.

The significant positive relationship between the number of female spawners and the average fry density is, however, intuitive. More spawning females should produce more fry, barring any significant difference in spawning habitat quality or a major catastrophic event that damages or destroys a year class.

[13] Increased proportions of fine sediments reduce gravel permeability, impeding intra-gravel flow and affecting oxygen delivery and waste removal, crucial for egg and alevin survival.

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D. Fry Distribution and Survival

The Summary Report provided the results of annual seining surveys conducted by the Districts from 1986 to 2004 in the Tuolumne and San Joaquin Rivers. Between 1996 and 2004, annual fry captures in the Tuolumne River ranged between 379 (1997) and 5,983 (2003). The abundance of fry increased rapidly in mid-January before declining in mid-March. Snorkeling surveys and rotary screw trapping undertaken from 1996 through 2004 also provided some data on fry abundance over time.

The Summary Report provided considerable information on fry stranding surveys conducted between 1986 and 2002. The Districts developed inundation maps for flows between 620 cfs and 8,400 cfs, and noted surface slope and substrate size at locations between La Grange Dam and Basso Bridge (about 5 miles downstream). They found the number of fry stranded depended upon the base flow, the density of fry, the amount of flow reduction, and the rate of the flow reduction. However, the significance of the concern over the stranding of juvenile salmon has diminished, as the Don Pedro Project no longer operates as a peaking facility.

E. Juvenile Distribution and Temperature Relationship

The Districts reported they have collected Tuolumne River water temperature data since 1987. They initially used five thermographs, but added more to better document water temperatures in the Tuolumne River. Some locations were changed because of site-specific issues. They reported they currently collect data at nine Tuolumne River sites and two San Joaquin River sites, and found that annual water temperature ranges vary with river flow and ambient air temperatures.

Data collected between 1995 and 2004 shows the average daily water temperature at La Grange Dam ranged between 10 and 13 º Centigrade (C). Fifteen miles downstream, the average daily water temperature rarely exceeded 23 º C. The average daily water temperature often exceeded 23 º C at locations more than 28 miles downstream of La Grange Dam, as well as in the San Joaquin River, over 50 miles downstream of the dam.

The Districts analyzed their water temperature and seine catch data to assess the effect of the former on juvenile salmon distribution. They concluded that because daily water temperature between March 1 and May 31 rarely exceeded 13 º C, and because few juvenile salmon remained in the Tuolumne River past May 31, the distribution of juvenile salmon in the river is not well-correlated with water temperature.

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F. Smolt Survival

The Summary Report provided data from the results of CWT smolt survival studies conducted from 1996 to 2002 using juvenile Chinook salmon from the Merced River Fish Facility. The report also included the results of CWT smolt release studies conducted in 1986, 1987, 1990, and 1994-95. Tagged fish were released at flows between 550 and 7,700 cfs. The number of tagged fish released ranged from 50,000 to 100,000, and the releases were made between mid-April and early May. Several tag recovery methods were used, including trawling, fish capture at screened downstream diversions, and ocean catch.

A survival index was developed from the relationship between the number of recovered tags and the numbers of fish released. The survival indices ranged from a low of about 0.3 at flows less than 700 cfs, to a high of 1.1 at flows greater than 8,000 cfs. The majority of indices fell between 0.35 and 0.75. Using apparent survival percentages,[14] we determined that smolt survival in the Tuolumne River between 1996 and 2002 averaged 42 per cent, but with considerable uncertainty about the accuracy of this estimate (± 13 per cent).

These studies, funded by the Districts, were discontinued after the 2002 season. The Districts then employed reach-specific, rather than river-wide studies in order to better assess their habitat restoration efforts.

G. Steelhead

In a letter dated August 23, 2003, Commission staff requested information related to steelhead from the Districts. In response, the Districts identified additional *O. mykiss* monitoring for the 2004 season that would be included in the Summary Report. This included: (1) fall spawning surveys; (2) seining surveys; (3) screw trap monitoring; (4) additional snorkel surveys; (5) temperature monitoring; (6) placement of additional thermographs in the upper river reach; (7) a water quality survey in the upper river reach; and (8) a winter/spring float survey with CDFG in 2004. Additionally, the Districts revised their sediment management plan in 2004 to specifically incorporate aspects of design for both Chinook salmon and *O. mykiss* in the Tuolumne River upstream of Roberts Ferry Bridge (located about 11 miles downstream of La Grange Dam).

[14] Table 3.5.2.5-3 on Page 3-116 of the Summary Report.

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To date, no steelhead have been identified. The Districts also stated that screw trap monitoring over the past 10 years has resulted in an average of less than one smolt per season, suggesting that anadromy[15] is very limited or that rotary screw-trapping is not an effective monitoring method at the Tuolumne River sampling sites.

The preliminary results from the CDFG otolith study indicated no anadromy was detected. However, the fish sampled were considered small for steelhead, and vaterite, a form of calcium carbonate typically found in anadromous fish, was detected. The *O. mykiss* genetics study conducted by the CDFG in 2003 was reported to be inconclusive. The Districts concluded the origin of the rainbow trout downstream of La Grange Dam is unknown, but suggested they may have come from planted trout or had escaped from a CDFG hatchery located upstream of the Don Pedro Project.

H. Habitat Restoration

The Districts stated that the 1995 SA directed the TRTAC to identify ten habitat restoration projects (non-flow mitigative measures) to implement by the year 2005, with the provision that other parties would help seek additional funding. The TRTAC plan for these ten projects was completed in 2000 and included four channel and riparian restoration projects, two predator isolation projects, and four sediment management projects.

The objective of the channel and riparian restoration projects is to restore river reaches where terrace aggregate mining is currently active, thereby increasing salmonid spawning and rearing areas. For the predator isolation projects, the objective is to reduce predator habitat where in-channel mining has created the special run pools, by recreating riverine habitat more suitable for juvenile salmonid rearing and outmigration survival. The goal for sediment management in the lower Tuolumne River is to provide an adequate quantity of high course sediment deposits for salmonid spawning and rearing.

The Districts reported in the Summary Report that one channel restoration and riparian project was completed in 2003. A second project was fully funded for 2005, a third was funded for design work in 2006 and fully funded for 2007, and a fourth was identified for potential construction in 2007. The Districts also reported that one predator isolation project was completed in 2001. A second project was funded for design in 2005 and potential construction in 2006. Four sediment management projects were also

[15] Anadromy refers to those fishes that are born in freshwater, migrate to saltwater for their adult lives, then return to freshwater to spawn.

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reported to have been funded: two fine sediment management efforts in 2005 and 2006; one coarse sediment management project in 2005, and a gravel augmentation effort in 2005 through 2007. The Districts' 2005 annual report stated the sediment management project scheduled for 2005 was completed.

The Districts also included in the Summary Report the results of monitoring studies related to the non-flow mitigative measures. Project-specific monitoring plans were designed to assess: whether the physical features were constructed as designed; geomorphic and riparian vegetation responses to channel and floodplain reconstruction during high and low flows; and changes in habitat suitability and utilization by target fish species.

Under the 1995 SA, the Districts and CCSF contributed $1 million for implementation of the non-flow mitigative measures. According to the Summary Report, over $34 million was needed for funding the ten projects.[16] Examples for sources of state and federal funds included USFWS's Anadromous Fish Restoration Program, the Central Bay-Delta Authority, and the California Department of Water Resources. The Districts indicated they are still seeking ways to attract additional funds to complete some of the projects.

The Commission's July 31, 1996 Order Amending License did not require these non-flow mitigative measures to be identified and filed for Commission approval prior to their implementation. The Commission, in ordering paragraph (G) of the 1996 order, only required the Districts to file in their annual report with the Commission a description of the non-flow mitigative measures implemented in the previous year and planned for implementation in the coming year. The Commission also required that the final study report identify all non-flow mitigative measures implemented to date, and the results of all monitoring studies related to the non-flow mitigative measures. The Districts met all of these Commission filing requirements. The Districts should continue to cooperate with the resource agencies and other parties on the completion of the habitat restoration projects in the Tuolumne River.

I. Flow Fluctuations

The Districts included in their 10-year Summary Report a discussion of the results of all monitoring studies related to the effects of flow release fluctuations on the salmon

[16] Table 3.3-1 on Page 3-22 of the Summary Report.

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resources in the lower Tuolumne River. The Districts reported that, based on studies related to the effects of flow fluctuations on lower Tuolumne salmon resources, there have been no major problems identified with fish losses resulting from flow changes for flood management, pulse flow, and base flow requirements resulting from project operation. The Districts found that the number of fry stranded depended upon base flow, fry density, the amount of flow reduction, and the rate of flow reduction. Fry/juvenile stranding has diminished, however, as the project no longer operates as a peaking facility that would cause large flow fluctuations.

J. Article 37 Flows

Article 37 of the 1996 license amendment requires the release of varying flows at different times of the year for fisheries purposes. The flows required under Article 37 can vary between 50 and 300 cfs, depending on the time of the year and the type of water year forecast.[17] The Summary Report indicates run-off in the San Joaquin River Basin was classified as normal or above normal in the 1996 through 2000 Water Years, and below normal or dry in the 2001 through 2004 Water Years. The final San Joaquin Basin run-off averaged 4.16 million acre-feet during the former period and decreased to an average of 2.4 million acre-feet during the latter.[18] The Annual Reports filed March 27, 2006, and March 27, 2007, describe the 2005 and 2006 Water Years, respectively, as above normal or wet.

Article 37 of the 1996 license amendment requires minimum stream flows greater than those of the original license. For example, Article 37 currently requires flows between 50 and 250 cfs during the summer months (June 1 thru September 30), depending upon the type of water year. Prior to the 1996 license amendment, the license required 3 cfs downstream of La Grange Dam from May thru September.

[17] All flow schedules also include a pulse flow to assist juvenile salmon in their outmigration, and flow schedules during wetter years include an attraction pulse flow to provide improved habitat conditions to encourage spawning salmon to move up-river.

[18] As stated earlier, the flows released by the Districts are dependent upon the forecasted basin run-off.

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Pursuant to Article 37, the Districts were required to release the following minimum flows (in cfs) from 1997 through 2006:

Year	October 1 – October 15	October 16 – May 31	June 1 – September 30
1997	300	300	250
1998	300	300	250
1999	300	300	250
2000	300	300	250
2001	300	300	250
2002	150	150	75
2003	150	150	75
2004	200	175	75
2005	150	150	75
2006	300	300	250

Review of the Summary Report, and the 2005 and 2006 Annual Reports show that the Districts met or exceeded their required releases under Article 37.

Information included in the Summary Report indicated that total flow in the river before and after project construction has not changed significantly (756,000 acre-feet between 1955 and 1970, or 40 per cent of the unimpaired runoff of 1,876,000 acre-feet; and 773,000 acre-feet between 1971 and 2005, or 39 per cent of the unimpaired runoff of 1,992,000 acre-feet).

The USFWS, the NMFS, and the CDFG have recommended significantly higher flow releases than are currently required. Higher flows in the spring and summer are meant to improve rearing and migration conditions for juvenile salmonids, with the expectation of greater returns of adults 2 to3 years later. Higher flows in the fall are intended to enhance Chinook salmon spawning success.

The Districts expressed major concerns regarding the significant increases in flows recommended by the agencies. They stated that these recommended flows would have substantial adverse socioeconomic and environmental impacts to the Districts and their water and electric customers, and to the CCSF and its water customers. They also stated that the increased flow recommendations indicate a lack of understanding of project operational constraints, such as the Corps' flood control requirements.

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The Districts presented information in the Summary Report that the Tuolumne River Chinook salmon population had experienced dramatic shifts in abundance over several decades prior to the completion of the Don Pedro Project in 1971. They reported escapements of less than 1,000 fish in the 1960's, in addition to the 1970's and 1990's.

The decline in the Tuolumne River fall-run Chinook salmon population since 2000 has been attributed by many respondents to the current Article 37 flow regime. Data presented in the Summary Report show that Chinook salmon escapement numbers initially increased in the Tuolumne River under the increased Article 37 flow requirements from 1996 to 2000, and then declined through 2004. The years 2001 through 2004, however, were classified as below normal or dry water years, which generally have a negative affect on salmonid production. Data since 2004 show that Chinook salmon escapement continued to decline through 2007, even though the expectation was for increased 2007 escapement numbers associated with the higher flows occurring in the above normal or wet 2005 Water Year in the Tuolumne River.

The most recent data on the fall-run Chinook salmon population in the entire California Central Valley area (includes the Sacramento and San Joaquin rivers and their tributaries) also show a continued decline in both harvest and spawning escapement since 2004.[19] Ocean conditions are monitored by the NMFS and since 2004 it found water temperatures to be too warm for good salmon production.[20] Preliminary data presented in an Internet newsletter prepared under contract with several resource agencies and water rights holders indicates the 2007 fall Chinook salmon escapements to the San Joaquin River tributaries were extremely low compared to past years.[21]

The Pacific Fishery Management Council (PFMC) [22] issued a press release on January 29, 2008, that reported Chinook salmon stocks in the California Central Valley

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[19] Review of 2006 Ocean Salmon Fisheries. Pacific Fisheries Management Council; February 2007.

[20] Peterson, W. T. et al; Ocean Conditions and Salmon Survival in the Northern California Current; Northwest Fisheries Center, NMFS; Newport, Oregon; November 2006.

[21] Found at http://sanjoaquinbasin.com/fishbio-san-joaquin-basin-newsletter.html.

[22] The PFMC is one of eight regional fishery management councils formed by the Magnuson Fishery Conservation and Management Act of 1976.

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appear to be undergoing a significant decline. They reported the 2007 return of Sacramento River stocks failed to meet its escapement goal for the first time in 15 years. They also reported the return of jack Chinook salmon (precocious males that are an indicator of run strength) was a record low, indicating the 2008 escapement is also likely to be low.

The PFMC reported a decline has also occurred in Oregon, Columbia River, and British Columbia stocks. The PFMC could not identify a cause for the significant declines of both hatchery and wild Chinook salmon stocks, but believes it is related to ocean conditions.

The recent findings by both the NMFS and the PFMC indicate conditions in the marine environment are having adverse impacts on Chinook salmon populations along the entire West Coast. The information presented to date does not indicate that the flow requirements of Article 37 are responsible for the decline of Chinook salmon in the Tuolumne River. Therefore, the recommended increases in flow requirements are not warranted and the current flow requirements under Article 37 should continue to be maintained.

K. Districts' Studies

As stated in the Summary Report, the Districts proposed to continue the fall spawning surveys and water temperature monitoring through the term of the license. They also proposed to continue other monitoring elements (seine and snorkel surveys, spring rotary screw trapping, and invertebrate sampling) if adequate funding sources are available. In addition, the Districts subsequently provided study schedules in their 2007 fisheries study plan that would also extend studies into the relicensing process that begins in 2011.

The record for this proceeding began with the Commission's issuance of its 1996 amendment order revising the license to require the release of higher minimum flows to protect Chinook salmon in the Tuolumne River and to require monitoring of fish resources under the new flow requirements. After more than ten years of monitoring, there is wide disagreement among the parties to this proceeding on the adequacy of the monitoring studies and interpretation of the results. There are now recommendations to continue studies into the relicensing process.

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I have concluded that the information presented and analyzed to date does not warrant a change in the existing Article 37 flow requirements. I also prefer that studies needed to support an application for relicensing of the Don Pedro Project be determined during the relicensing process for the project. Therefore, except as discussed below, I am not requiring the continuation of studies into the relicensing process. However, the Districts may consider conducting studies between now and relicensing in order to support their relicense application. In this regard, Commission staff has provided guidance in its review of the Districts' fisheries study plan and has encouraged a collaborative approach among the parties to address the kind and details of additional studies.

L. Required Monitoring and Reports

Under Article 58, I am requiring the Districts to file reports with the Commission on the results of specific monitoring for Chinook salmon and steelhead. The Districts will be required to provide the Commission with an annual report concerning Chinook salmon. In addition, the Districts will be required to implement their proposed steelhead monitoring plan, with the modifications described below, in order to provide the Commission additional information related to steelhead in the Tuolumne River.

The Districts should file with the Commission spawning escapement data for Chinook salmon. These data have been included in the Districts' annual reports and Summary Report typically as survey results of spawning redds and population estimates using post-spawning salmon carcasses

The Districts should continue to provide this information to the Commission. The Districts should report annually on the Chinook salmon escapement numbers for the Tuolumne River. The report should also include a comparison of the Tuolumne, Stanislaus, and Merced River Chinook salmon escapement numbers. The first report should be filed with the Commission by April 1, 2009. Subsequent reports should be filed by April 1 for the preceding escapement year.

There are opposing views regarding the presence or absence of steelhead in the Tuolumne River, and whether anadromy exists in the resident population of *O. mykiss* downstream of La Grange Dam. Anecdotal reports persist of fish with adult steelhead characteristics in the Tuolumne River, but such reports have not been confirmed.

The only evidence of steelhead in the Tuolumne River provided to the Commission was contained in a NMFS letter dated April 23, 2004, and filed with the

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Commission on May 7, 2004. The letter included fish counts from Dennett Dam at RM 17 on the Tuolumne River in 1940. A total of 66 adult steelhead were counted at the Dennett Dam weir between October 1 and November 30, 1940.[23]

According to the NMFS's Status Review of West Coast Steelhead, there are reports of a remnant steelhead run in the Stanislaus River, and steelhead were observed in the Tuolumne River in 1983.[24] The NMFS also reports the natural population of California Central Valley steelhead is unlikely to be self-sustaining, given the loss of habitat and reductions in streamflow due to water allocations. They also identified genetic introgression from large-scale production of hatchery steelhead as a threat to natural stocks.

At the July 25, 2006 public meeting, the NMFS stated they have not documented the recent presence of anadromous *O. mykiss* in the Tuolumne River, only in the Merced and Stanislaus Rivers.[25] The lack of a hatchery on the river, the loss of habitat due to dam construction, and the reduction of summer flows between 1972 (completion of the Don Pedro Project) and 1996 (when the flows required by Article 37 were increased) may explain the lack of data regarding the presence of steelhead in the Tuolumne River.

At the July meeting, the resource agencies and NGOs expressed the need to modify existing monitoring programs to include steelhead, to implement new monitoring programs related to steelhead, and to examine flows and temperatures necessary for the protection of steelhead. The NMFS stated that the following information was needed regarding steelhead: (1) more information on trends in adult abundance and migration timing relative to the flow in the Tuolumne River; (2) determination of the percentage of steelhead versus resident *O. mykiss* from year to year, and the effects of increased flows on these percentages; (3) determination of juvenile and adult distribution of *O. mykiss* relative to flow operations; (4) identification of any water quality impacts on *O. mykiss*;

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[23] Memorandum to George Neillands and Steve Baumgartner from William Loudermilk, California Department of Fish and Game, dated February 4, 1993.

[24] NOAA-NWFSC Tech Memo-27. Status Review of West Coast Steelhead, August 1996.

[25] Page 62, Lines 9 – 14, Transcript of July 25, 2006, public meeting held in Sacramento, CA to discuss the Summary Report; found at http://elibrary.ferc.gov/idmws/nvcommon/NVViewer.asp?Doc=11104963:0.

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(5) determination of habitat availability for *O. mykiss* during low-flow years, and overall availability under different flow scenarios; and (6) determination of the relative impact of other limiting factors, such as poaching and illegal fishing on *O. mykiss*.

No *O. mykiss* anadromy has been identified in the Tuolumne River; however, reproductive contribution of non-anadromous parents to anadromous offspring can occur when the anadromous run size is small, suggesting a genetic compensation between the anadromous and non-anadromous life-history forms.[26]

It is apparent that monitoring efforts, to date, have been inconclusive in determining the presence or absence of steelhead populations in the Tuolumne River. The origin and nature of rainbow trout downstream of La Grange Dam is unclear, and it is unclear if steelhead occur in the Tuolumne River downstream of La Grange Dam.

The Districts, therefore, should initiate a monitoring effort to determine if the Tuolumne River currently supports anadromous forms of rainbow trout. The Districts' fisheries study plan, filed March 20, 2007, and revised July 16, 2007, identifies the following four monitoring activities to assist in determining the status of *O. mykiss* in the Tuolumne River: (1) conduct a (June and July) summer population estimate survey using two-phase snorkel surveys calibrated by electrofishing to determine population abundance by habitat type; (2) conduct a sampling study to test for anadromy by collecting otoliths from juveniles and adults; (3) conduct a adult tracking study by acoustic tagging adults from January through March to determine movement patterns and habitat associations; and (4) conduct a compilation of past and future study results.

Regarding the population estimate survey, the resource agencies recommended that surveys be conducted at specific intervals throughout the year when more *O. mykiss* are likely to be present and not only during June and July.

To ensure that the Districts' *O. mykiss* monitoring provides sufficient data to determine the status of *O. mykiss* in the Tuolumne River, the Districts should be required to conduct population estimate surveys during February and March, in addition to June

[26] Hitoshi Araki, Robin S. Waples, William R. Ardren, Becky Cooper, and Michael S. Blouin (2007). Effective population size of steelhead trout: influence of variance in reproductive success, hatchery programs, and genetic compensation between life-history forms. Molecular Ecology 16 (5), 953–966.

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and July. Additionally, the Districts should use any applicable *O. mykiss* data from the Stanislaus, Merced, Mokelumne, and Calaveras Rivers in the development and refinement of their *O. mykiss* monitoring and resulting analysis.

The resource agencies also recommended that additional instream flow studies be conducted for *O. mykiss*. The Districts disagree and argue that their study plan includes monitoring of *O. mykiss* habitat use at restoration and project sites as well as river-wide acoustic tracking, which would include the collection of pertinent habitat information at recovery and observation locations of *O. mykiss*.

The Districts also reference the analysis of an existing Instream Flow Incremental Methodology study to determine the effective weighted useable area (EWUA) for juvenile and adult *O. mykiss* life stages in support of data requests by NMFS regarding summer water temperatures. The Districts state that the analysis indicated that managed flows necessary to substantially increase the downstream extent of suitable water temperatures for *O. mykiss* are associated with higher velocities and a reduction in EWUA for juvenile life stages. As a result, the Districts state that their proposed additional monitoring in their fisheries study plan should be completed prior to considering additional instream flow studies.

At this time, we find no basis for requiring additional instream flow studies. *O. mykiss* monitoring should first be completed in order to determine if steelhead are present in the Tuolumne River.

The Districts should therefore implement their proposed *O. mykiss* monitoring plan, filed March 20, 2007, and revised July 16, 2007, with the following modifications:

(1) The Districts, beginning in 2008, should conduct population estimate surveys using two-phase snorkel surveys calibrated by electrofishing to determine population abundance by habitat type. The Districts' proposed population estimate survey should be modified to include February and March, in addition to June and July sampling periods, unless agreed upon otherwise by the NMFS, the USFWS, and the CDFG;

(2) The Districts should conduct their proposed sampling testing for anadromy in juvenile and adult *O. mykiss* beginning in 2008;

(3) The Districts should conduct their proposed adult *O. mykiss* tracking study beginning in January 2009;

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(4) Any changes to the *O. mykiss* monitoring methods or schedules should be filed for Commission approval and include the comments of the agencies on the changes. Any change to the methods or schedules should not be implemented until approved by the Commission; and

(5) By January 15, 2010, the Districts should file a report with the Commission that includes the results of the *O. mykiss* monitoring. The report should include a discussion of the results and, for Commission approval, recommendations for *O. mykiss* protection and/or for additional *O. mykiss* monitoring. The report should be prepared in consultation with the NMFS, the USFWS, and the CDFG. The Districts should allow the agencies 30 days to provide comments on the report prior to filing the report with the Commission. The report should include the agencies' comments and the Districts' response to any such comments.

The Districts noted in the Summary Report that they had not yet been granted an ESA Section 10 permit to conduct additional monitoring (specifically hook-and-line angling, a primary method for collecting adult *O. mykiss*). They also reported the CDFG declined to approve a permit for their proposed hook-and-line sampling under the CDFG scientific collection program.

NMFS Permit No. 1280 was issued to the Turlock Irrigation District on September 15, 2005, and expires on December 31, 2010. [See 71 Fed. Reg. 4897 (Jan. 30, 2006)]. It authorizes the capture (using seines, rotary screw traps, hook-and-line angling, electrofishing and stranding surveys) and release of ESA-threatened adult and juvenile Central Valley steelhead in the lower Tuolumne River. The permit states that all lethal take is expected to be unintentional and authorizes unintentional mortality associated with research activities not to exceed 1 percent of the captured ESA-listed fish (e.g., 1 adult or 1 juvenile Central Valley steelhead).

The purpose of the study is to monitor juvenile fall-run Chinook salmon density and distribution, steelhead life history, and salmonid outmigration patterns, and to assess predator populations in the lower Tuolumne River. An ESA Section 10 permit has been issued; therefore, the licensee should collect data on adult *O. mykiss*. The Districts should also obtain the required permit from the CDFG to utilize hook-and-line angling as an authorized capture technique for steelhead.

M. Tuolumne River Technical Advisory Committee (TRTAC)

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The Commission has received comments as a part of this proceeding regarding the functioning of the TRTAC, an advisory committee established by the 1995 SA. Most comments have expressed the need for some change to the organization of the committee to ensure decisions are properly made and that information is timely disseminated. However, the Commission has no TRTAC oversight, and therefore cannot ensure that the TRTAC's processes and decisions are the best possible for ensuring compliance with the environmental requirements of the Don Pedro license. The Commission's responsibility is to ensure that the Districts are complying with their license requirements, including consultation requirements and plans submitted for Commission approval.

The Director Orders:

(A) The Ten-Year Fisheries Summary Report filed by the Modesto and Turlock Irrigation Districts on March 25, 2005, and supplemented by filings of March 26, 2006, and March 27, 2007, complies with the requirements of Article 58.

(B) The Districts shall report annually on the Chinook salmon escapement numbers to the Tuolumne River. The report shall also include a comparison of the Tuolumne, Stanislaus, and Merced River Chinook salmon escapement numbers. The first report shall be filed with the Commission by April 1, 2009; subsequent reports shall be filed by April 1 for the preceding escapement year.

(C) The Districts shall implement their proposed *O. mykiss* monitoring plan, filed March 20, 2007, and revised July 16, 2007, with the following modifications:

(1) The Districts, beginning in 2008, shall conduct population estimate surveys using two-phase snorkel surveys calibrated by electrofishing to determine population abundance by habitat type. The Districts' proposed population estimate survey shall be modified to include February and March, in addition to June and July sampling periods, unless agreed upon otherwise by the National Marine Fisheries Service (NMFS), the U.S. Fish and Wildlife Service (USFWS), and the California Department of Fish and Game (CDFG);

(2) The Districts shall conduct their proposed sampling testing for anadromy in juvenile and adult *O. mykiss* beginning in 2008;

(3) The Districts shall conduct their proposed adult *O. mykiss* tracking study beginning in January 2009;

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(4) Any changes to the *O. mykiss* monitoring methods or schedules shall be filed for Commission approval and include the comments of the agencies on the changes. Any change to the methods or schedules shall not be implemented until approved by the Commission; and

(5) By January 15, 2010, the Districts shall file a report with the Commission that includes the results of the *O. mykiss* monitoring. The report shall include a discussion of the results and, for Commission approval, recommendations for *O. mykiss* protection and/or for additional *O. mykiss* monitoring. The report shall be prepared in consultation with the NMFS, the USFWS, and the CDFG. The Districts shall allow the agencies 30 days to provide comments on the report prior to filing the report with the Commission. The report shall include the agencies' comments and the Districts' response to any such comments.

(D) Based on the results of the monitoring required in (B) and (C) above, the Commission reserves its authority to require changes in project structures and operations to protect fishery resources of the Tuolumne River, after notice and opportunity for hearing.

(E) This order constitutes final agency action. Request for rehearing by the Commission may be filed within 30 days from the date of issuance of this order, pursuant to 18 C.F.R. ' 385.713.

J. Mark Robinson
Director
Office of Energy Projects

Document Content(s)