CITY AND COUNTY OF SAN FRANCISCO

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04/04/07

ELECTRONIC FILING

Philis J. Posey, Acting Secretary
Federal Energy Regulatory Commission
888 First Street NE
Washington, D.C. 20426

Re: FERC No. P-2299-060 – Don Pedro Project Fisheries Studies
City and County of San Francisco comments on District's Tuolumne River Fisheries Study Plan that was submitted on March 20, 2007.

Dear Secretary Posey:

Enclosed for filing please find comments prepared by Dr. Peter Moyle and Dr. Ron Yoshiyama on behalf of the San Francisco Public Utilities Commission regarding Modesto and Turlock Irrigation Districts' Tuolumne River Fisheries Study Plan that was submitted on March 20, 2007. We support the Districts' Study Plan, and offer these comments for your consideration as you determine whether to order such studies.

Very truly yours,

DENNIS J. HERRERA
City Attorney

Donn W. Furman
Deputy City Attorney

cc: Michael Carlin
Tim Ramirez

plus: attachments

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Tuolumne River Fisheries Study Plan for the Don Pedro Project	))	Docket No. P-2299-060

CITY AND COUNTY OF SAN FRANCISCO'S COMMENTS ON MODESTO AND TURLOCK IRRIGATION DISTRICTS' TUOLUMNE RIVER FISHERIES STUDY PLAN

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April 4, 2007

March 30, 2007

Statement on the Tuolumne River Fish Study Plan as Proposed by the Turlock and Modesto Irrigation Districts

Peter B. Moyle and Ronald M. Yoshiyama

The Districts' proposed Study Plan for the Tuolumne River and the agency response to it present a thoughtful foundation for attaining a greater scientific understanding of what regulates Chinook salmon and rainbow trout populations in the Tuolumne River. The plans include elements for gauging the following topics: (1) the abundance and spatial distribution of Chinook salmon life-stages and, to a lesser extent, rainbow trout (*O. mykiss*); (2) selected exploratory elements addressing, for example, predation intensity and mechanisms that affect it, gravel-quality effects on eggs and fry, assessment of fry-versus-smolt contributions to overall population production, and coarse-scale temperature monitoring; and (3) retrospective analyses of previously collected information (e.g., Delta temperature effects on migrating salmon). Even these proposals may not address all the key questions. We suggest that the following may be areas that also deserve examination.

1. A largely unacknowledged benefit of the current flow regime is that native resident fishes, including hardhead, are abundant and diverse. This represents a reversal of the general trend in these species in the Tuolumne and elsewhere. This benefit should continue to be considered in the determination of flow regimes. Benefits to riparian communities of organisms also should be considered (including benefits of energy and nutrients from salmon carcasses).

2. What is the relationship between smolt and fry production and the timing of adult runs? If smolt production is the key to Tuolumne salmon numbers, then some effort should be made to understand what factors create smolts in the river. Are smolts largely the progeny of early spawners? If so, are there ways to manipulate the system to promote more smolts (e.g., barriers to prevent superimposition on earliest redds?). Will extending the period of higher flows into May actually result in more smolts that survive to return as adults, given increasingly detrimental conditions in the Delta during late spring?

3. The fish agencies indicate that high spring flows are the only significant factor that correlates positively with smolt survival. The Districts say that the correlation is actually with high outflows from the SJR and tributaries in general. Presumably high flows move the smolts through the unproductive, predator-rich, habitat-poor Delta while keeping water quality high (cool temperatures, diluted pollutants). If this is true, then the smolt survival/high flow experiments for the river should be designed to show the relative importance of high Tuolumne flows alone versus the combined tributary flows. However, we realize that that such flow experiments may not be feasible until Stanislaus and Merced river flows can be better coordinated with Tuolumne River experimental high flows, which currently is problematic due to VAMP-related constraints.

4. More predator studies would seem to be desirable, to determine if predation is an important limiting factor under low flow conditions, although predators should include striped bass, pikeminnow, and rainbow trout as well as smallmouth and largemouth bass. The study should be designed to contribute to a bioenergetic model to determine likely population-level impacts. One question that might be asked is "Do the predators capture many smolts, or is the predation mainly on fry?" Smolts are bigger, faster, and distributed more in the water column so they should be able to escape predation more easily, except possibly from striped bass. Is it possible that the fry buffer smolts from predation to a certain extent by being so abundant and available?—i.e., late-growing fry may serve to saturate predators and so contribute to smolt production even though those fry themselves would not have become surviving smolts. Large-scale predator removal programs are probably not desirable until better data have been collected and models developed to clarify these predator-prey interactions.

5. Steelhead/rainbow trout have presumably recently colonized the river because of the higher summer flows which provide more suitable habitat during warmer periods. While it would be nice to know if these fish really are steelhead versus resident rainbow trout (based on otolith studies) or if they really are native Central Valley steelhead as opposed to Nimbus Hatchery (American River) strays (genetic studies), this information is not essential if they are regarded as CV steelhead regardless of life history or origin. However, their effects on other fish should be more clearly understood. Increasing steelhead-rainbow trout numbers will increase the number of a possible predator/competitors of salmon, and in somewhat marginal habitat for the trout (i.e., lower Tuolumne River). Hence, more stable summer flows will have the benefits of increasing the trout population and other native fishes, but eventually may be detrimental to the Chinook salmon population if predation levels by trout upon salmon juveniles significantly increase.

6. The agency models suggest that salmon fry now saturate available habitat in the river but even so they are not important contributors to the number of returning adults. If this is true, then it suggests that (1) improving fry survival outside the system should be an important goal of the agencies in order to take advantage of river productivity and (2) improving spawning habitat and fry habitat further should be a *low* priority for the river until out-of-river conditions significantly improve.

7. A long-term study and management plan should include the likelihood that extrinsic factors and trends (e.g., Delta and ocean effects) may significantly affect the salmonid studies and management efforts in the lower Tuolumne River, especially given the likelihood of large-scale changes to hydrology and habitats of the Delta. The evaluation of the efficacy of studies and the interpretation of the salmonid population data should allow for the possibility that such extrinsic factors may sometimes override salmon-recovery management actions or may compromise statistical study designs. For example, a significant impact of Delta-water export pumping has been shown by a recent statistical reevaluation of the data (K. Newman 2006 Report to the CalFed Science Program: "An evaluation of four Sacramento-San Joaquin River Delta juvenile salmon survival studies"). Other potentially important Delta factors include the lack of rearing habitat

and poor water quality due to contaminants from agricultural drainage water and urban discharges.

Similarly, the influence of ocean environmental factors on Pacific salmon populations has been increasingly recognized (e.g., see a recent summary by Peterson et al. 2006 at http://www.nwfsc.noaa.gov/research/divisions/fed/ecosysrep.pdf). The fact that ocean effects have not yet been clearly demonstrated for San Joaquin basin salmon stocks most likely reflects the paucity of relevant data rather than the non-existence of such ocean effects. Hence, more studies are needed on this aspect but in the meantime managers should be mindful that ocean factors could affect outcomes of research and management actions.

The present Study Plan and the response to comments which feature both monitoring and experimental elements serve to extend the present salmon and river monitoring program embodied by the 1995 FERC Settlement Agreement. While the Study Plan presents a credible framework for studying salmonid population trends and their environmental correlates, the Study Plan can only be expected to provide initial clarification of the limiting factors and mechanisms operating on the populations--i.e., by selective hypothesis testing--but it cannot fully evaluate those environmental mechanisms because of the relatively short time-frame. It must be recognized that to achieve a comprehensive understanding of the interactions between these salmonid populations and their environment will likely require decades of study and investment of considerable funds. Such a study program has not yet been fully accomplished in any major system including the Sacramento River basin. Hence, it may be more realistic to first identify the key limiting processes by preliminary studies and then concentrate the study-monitoring efforts on only those key processes to develop the corresponding management actions to improve the populations.

We recommend that a matrix be generated from the study plan and response that provides the following:

1. Proposed study
2. Question (s) to be answered
3. Number of years needed to fully answer question.
4. Potential for resources (fish, money, water) being available [high, medium, low] for entire study period
5. Likelihood that study will answer question 2 in 5 yrs [high, medium, low]
6. Likelihood that the study results can be utilized in management actions to substantially improve the salmon and *O. mykiss* populations.

We attach herewith a preliminary example of such a matrix containing our subjective assessments together with a list of basic questions addressed by, or related to, the Districts' Study Plan.

Study Plan Matrix: Subjective Feasibility Assessment (Preliminary) of Districts' Study Plan. **March 30, 2007**

Study Component	Expected # of years for study	Availability of resources (water, funds)	Likelihood of answering questions in 2-5 years	Likelihood of using study results in 5-10 yrs
Flow Effects				
Answer initial specific questions (see Basic Questions list; #1.3 to 1.6)	3-5	medium- high	medium	medium
Fully answer flow-related questions	10 +	low- medium	--------	low-medium
Fry-Smolt Production				
Importance of fry versus smolts for adult escapemenmt	2-3	high	high	low-medium
Habitat Restoration				
Preliminary assessment	3-5	high	medium-high	medium-high
Fully assess projects effectiveness	5-20	medium-high	medium-high	low-medium
Predation				
Identify greatest predation risks	2-4	medium-high	medium-high	medium
Evaluate measures to reduce predation	5-10	medium	medium	medium
Temperature				
Tuolumne River monitoring	5-10	high	high	medium-high
Delta temperature evaluation	3-4	high	high	low
Develop bioenergetic model	1-3	high	high	medium

Steelhead-Trout Presence & Protection

Population level and habitat use	3-4	medium-high	high	medium-high
Limiting factor analysis	3-5 +	low-medium	low-medium	low-medium
Evaluate effects of restoration on Non salmonids				
Fish	10+ ?	medium ?	low-medium	medium ?
Native riparian plants	10-20 ?	low-medium ?	low	low-medium ?
Birds and mammals	10+ ?	low-medium ?	low	low-medium ?

Basic Study Questions related to the Districts' Tuolumne River Study Plan

Ronald M. Yoshiyama and Peter B Moyle

March 30, 2007

Flow

1.1 What are the mechanisms through which instream flows affect the survival and abundance of salmon juveniles and smolts?
1.2 How can flows be managed to facilitate increased salmon production?
1.3 How can flows be managed to maximize benefits to native aquatic and riparian organisms?

Specific flow-related questions

1.3 Is there a flow threshold level such that increasing the volume of managed flows (i.e., non-flood flows) beyond that threshold would not be cost-effective for producing salmon juveniles and smolts?

1.4 Can specified volumes of spring flows be manipulated in terms of timing and flow patterns to further enhance salmon production?

1.5 Can specified volumes of winter flows be manipulated in terms of timing and flow patterns to further enhance salmon production?

1.6 How do changes in flows (flow pulses) affect juvenile salmon behavior?

Fry-Smolt Production

2.1 What is the life-stage that should be primarily managed (i.e., emphasized) in order to maximize production of adult salmon--i.e., is it down-migrating fry and juveniles or smolts?

Habitat Restoration

3.1 Can the amount of spawning and rearing habitat be substantially increased or its quality improved enough to result in higher juvenile survival and production?

3.2 Have the habitat restoration projects, on the whole, substantially benefited the salmon population?
3.3 Have the habitat restoration projects resulted in lower predation pressure on juvenile salmon at the restoration sites?

3.4 How much more habitat restoration needs to be done to substantially benefit the salmon population?

Predation

4.1 What circumstances cause significant predation mortality of juvenile salmon due to various fish predators?

4.2 Can such circumstances be substantially minimized through cost-effective habitat restoration or flow management of the Tuolumne River within the foreseeable future?

Temperature

5.1 What are the temperature-related limitations on the salmon and *O. mykiss* populations in the lower Tuolumne River, and can they be significantly ameliorated by cost-effective measures?

Trout

6.1 What is the nature of the *O. mykiss* population (resident vs. anadromous, self-sustaining vs. contiguous with other stocks) and approximate population level (e.g., hundreds vs. thousands) in the lower Tuolumne River?

6.2 What are the actual limiting factors, including habitats, for the *O. mykiss* population?

Additional trout questions for future study (Trout)

6.3 What is the biological significance of *O. mykiss* to the salmon population and to the lower Tuolumne River aquatic community (e.g., food web)?

6.4 What would be an ideal population level for *O. mykiss* in the lower Tuolumne River?

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