

ORIGINAL

FEDERAL ENERGY REGULATORY COMMISSION

MATERIAL TO BE FILED WITH DOCKETS

DATE: August 16, 2007

FROM: John K. Novak
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TO: Commission files for Don Pedro Hydroelectric Project,
FERC No. 2299- CA

SUBJECT: Presentations from the Don Pedro Project Public Meeting

2007 AUG 16 P 4:34

The attached material was presented by the Modesto and Turlock Irrigation Districts, the National Marine Fisheries, and the U.S. Fish and Wildlife Service on the fisheries study plan at the Don Pedro Project public meeting held on August 8, 2007, in Sacramento, California. This material needs to be filed under P-2299, Don Pedro Project.

Fisheries Study Plan for the Don Pedro Project

**Modesto Irrigation District
Turlock Irrigation District**

**FERC Docket No. 2299-060
Sacramento, California
August 8, 2007**

Background

2005 Apr - Ten Year Summary Report (1996 FERC Order)

May-Jun - Procedural requests and motions (various)

Jun - FERC request for comments (Due 7/25/05)

Nov - FERC request for comments (Due 12/22/05)

2006 Jun - Notice of Public Hearing (7/26/06)

Jul - FERC request for comments (Due 9/25/06)

Aug - Study Plan workshop in Stockton

Sep - TRTAC Meeting in Turlock (TRTAC Study Plan Mtg. cancelled at Agency request)

Nov - TRTAC Study Plan Mtg. in Turlock

Dec - FERC Request for Draft Study Plan (Due 3/20/06)

2007 Feb-Mar - Draft Study Plan to Agencies and FERC

May-Jun - Comment and responses to Study Plan (various)

Jun - FERC Preliminary Staff Assessment

Jul - Notice of Public Hearing (8/8/07)

Issues Identified in FERC Study Plan Request of December 2006

- I Instream Flow**
- II Habitat Restoration**
- III Fry Survival**
- IV Steelhead Presence/Protection**
- V Predator Control**
- VI Water Temperature**

I Instream Flow

Issue:

Inconclusive evidence that smolt survival or escapement has increased (or decreased) in response to current flow schedule

Action:

Continued and additional data collection and analysis via 5 study elements to relate fry and smolt production to flow

I 1. Expanded CWT Analysis

Objective: Determine flow thresholds associated with higher smolt survival and subsequent escapement

Methods: Analysis of validated CWT recovery data from all recovery locations.

Metrics: a) Goodness of fit of proposed models.
b) Survival prediction interval for particular spring pulse flow levels (e.g., 1,000 cfs, 2,000 cfs, etc.).

Schedule: Initial analysis in 2008 (including TRTAC discussions regarding costs and benefits of future coded-wire tag studies per FERC PSA comment).

Report: Complete by 7/1/2011

I Instream Flow

2. Experimental Winter Pulse Flows

Objective: Determine whether early fry outmigration is associated with higher subsequent escapement (See No. 4 for RST monitoring as well as Fry Survival and Predator Control).

Methods: Up to six winter pulse flow events (500 cfs, 1000 cfs, 1500 cfs) of variable timing and duration. *Schedule and use of flows discussed with TRTAC, per FERC PSA comment.*

Metrics: Pulse flow magnitude, frequency and duration (USGS Gages at La Grange and Modesto).

Schedule: Late January to March for the period 2008–2011 (extend through March 2016 depending on WY type)

Report: Annual FERC reports detailing flow operations. Complete by 7/1/2012 unless study period extended.

I Instream Flow

3. High Flow Release During April/May

Objective: Investigate relationships between spring outflow, smolt production and subsequent escapement (See No. 4 for RST monitoring as well as Predator Control)

Methods: 4,000 cfs in one season (*per FERC PSA comment*) based upon current and preceding water year types and USACE and VAMP flow requirements

Metrics: Flow magnitude, frequency and duration (USGS Gages at La Grange and Modesto)

Schedule: April through May of one year within the period of 2008–2011, subject to specified conditions

Report: Annual FERC reports detailing flow operations. Complete by 7/1/2012

I Instream Flow

4. Paired Rotary Screw Trap Monitoring

Objective: Quantify relationships between flow, fry movement, fry production and smolt production.

Methods: Deploy and monitor RSTs at RM 29 and RM 5 between January and early June (2007–2011). *Protocol review with TRTAC per FERC PSA comment.*

Metrics:

- a) Daily fry counts in response to flow levels and flow change.
- b) Annual fry and smolt production.
- c) Ratio of fry to smolt production as related to subsequent escapement.

Schedule: January to May/June for the period 2007–2011

Report: Data reports and preliminary analysis with annual FERC reports (2007–2011). Complete by 7/1/2012.

I Instream Flow

5. Reach and Riverwide Acoustic Tracking

Objective: Determine reach-specific smolt survival vs. flow and habitat associations of smolts at various flow levels (See *Predator Control for associated monitoring*).

Methods: Fixed and one mobile hydrophones in the river with releases of 30–50 smolts with tags at each location for 3 test flows: < 1,000 cfs; 1,000–4,000 cfs; and > 4,000 cfs.

Metrics: Reach and riverwide survival at three flows

Schedule: April/May for the period 2008–2011, but may be extended through spring 2016 depending upon water year types.

Report: Data reports and preliminary analysis with annual FERC reports. Complete by 7/1/2012 unless study period extended.

Instream Flow Summary

- **Expanded CWT analysis to improve survival versus flow relationships**
- **Winter pulse experiment to look at flow effects**
- **Spring pulse experiment to look at flow effects**
- **RST study to look at river-wide flow and production relationships**
- **Acoustic study to look at reach-level survival and behavior**

II Habitat Restoration

Issue:

3 of 10 TRTAC priority restoration projects have been completed to date with insufficient time to demonstrate increases in spawning and rearing habitat use, riverwide production and subsequent escapement.

Action:

Five restoration actions regarding implementation and effectiveness monitoring of planned augmentation and sediment control projects as well as continued development of remaining projects. Work with TRTAC to secure additional funding

II Habitat Restoration

1. Coarse Sediment Augmentation

Objective: Increased salmon production and escapement through increased spawning habitat area and quality (See No. 2 through 4 for associated monitoring).

Methods: Direct augmentation of coarse sediment having suitable spawning size characteristics at 5–6 sites. Comparison of actual distribution of spawning sites and hydraulic conditions with River2D modeling results.

Schedule: Conducted over two years (2008–2009).

Report: Report included with annual FERC report when project completed.

II Habitat Restoration

2. Spawning habitat utilization

Objective: Effectiveness monitoring of gravel augmentation

Methods: 1) Delineation of suitable spawning gravel between RM 51–38 based on depth, velocity and particle size criteria; 2) detailed redd measurements

Metrics: Comparison of redd densities at reference and reconstructed riffle sites, relative to spawning habitat availability and river mile location

Schedule: 1) Spawning use mapping in each January between 2008–2010; 2) Detailed redd measurements and superimposition study in one year between 2008–2010. *Decision Point to delay as needed by the TRTAC.*

Report: Monitoring under ERP-02-P29 will be included in FERC reports. Complete report by 7/1/2012.

II Habitat Restoration

3. Egg survival studies

Objective: Effectiveness monitoring of gravel augmentation

Methods: Egg chamber experiments combined with gravel quality and in-situ conditions (velocity, temp, DO).

Metrics: Egg survival of treatment and control redds in response to gravel quality indices and permeability.

Schedule: Studies in each of two years (fall 2008 and 2009), depending upon availability of eggs. *Decision Point to delay as needed and to extend or terminate study by the TRTAC.*

Report: Monitoring under ERP-02-P29 will be included in FERC reports. Complete report by 7/1/2012.

II Habitat Restoration

4. Redd monitoring and emergence trapping

Objective: Effectiveness monitoring of gravel augmentation

Methods: Emergence traps placed over natural redds at treatment and control sites. Permeability and bulk sampling at control riffles and at augmentation sites to assess gravel quality.

Metrics: 1) Daily fry counts, timing and production of treatment and control redds; 2) Estimates of egg survival response to gravel quality indices and permeability.

Schedule: Once during 2008-2010 depending on project status and river flows. *Decision Point to delay as needed and to extend or terminate study by the TRTAC.*

Report: Data reports and preliminary analysis in annual FERC reports. Complete report by 7/1/2012.

II Habitat Restoration

5. Assessment of the 1995 FSA Section 12 Program

Objective: Evaluate effectiveness of non-flow measures in increasing salmon production and subsequent escapement.

Methods: Evaluate current projects including: predator isolation, channel reconstruction and augmentation projects.

Metrics: Compare project specific geomorphic and biological response metrics.

Schedule: Associated data collection and analysis from 2007–2011.

Report: Complete report by 7/1/2012.

Habitat Restoration Summary

- **Increase spawning area and quality**
- **Evaluate spawning habitat use**
- **Evaluate gravel augmentation effectiveness through egg survival study**
- **Evaluate gravel augmentation effectiveness through emergence study**
- **Synthesis of data on effectiveness of current projects**

III

Fry Survival

Issue:

Inconclusive evidence of increased or decreased fry production in response to current flow schedule.

Action:

Continued and additional data collection and analysis of fry production, fry distribution, and fry transport relative to flow via 4 study elements.

III Fry Survival

1. Paired Rotary Screw Trap Monitoring

Objective: Quantify relationships between flow, fry movement timing, fry production and smolt production (See No. 2 under *Instream Flows* for associated experimental flows).

Methods: Deploy and monitor RSTs at RM 29 and RM 5

between January and early June (2007–2011).

Protocol review with TRTAC per FERC PSA comment.
a) Daily fry counts in response to flow levels and flow change; b) Annual fry and smolt production; c) Ratio of fry to smolt production as related to subsequent escapement.

Schedule: January to May/June for the period 2007–2011

Report: Data reports and preliminary analysis with annual FERC reports (2007–2011). Complete by 7/1/2012.

III Fry Survival

2. River-wide Seining Surveys

Objective: Quantify relationships between flow, fry movement, fry distribution as well as assessing juvenile condition.

Methods: Bi-weekly seine surveys in the Tuolumne River (R1A, R5A, R23C, R57, R74, Legion, Venn, Shiloh Rd.) and San Joaquin River (Laird Park and Gardner Cove).

Metrics: 1) Relative density and fork length by location; 2) Estimates of fry movement rate in response to river flow.

Schedule: January to May/June for the period 2007–2011

Report: Data reports and preliminary analysis with annual FERC reports (2007–2011). Complete by 7/1/2012.

III Fry Survival

3. Micro-chemical Analysis of Otoliths Collected from Annual Escapement Surveys

Objective: Determine whether early outmigrating fry contribute to subsequent escapement.

Methods: Sr:Ca ratios in otoliths growth rings of adult Chinook carcass recoveries from several water year types.

Metrics: Duration of juvenile residency in fresh water.

Schedule: Otolith collection in 2007 and 2008. Analysis in 2009

Report: Data reports and preliminary analysis with annual FERC reports (2009–2010). Complete by 7/1/2012.

III Fry Survival

4. Synthesis of Ongoing and Planned Studies with RST Data

Objective: Assess effectiveness of flow and non-flow measures in terms of fry production, smolt production and subsequent escapement.

Methods: Compare RST production and escapement estimates with estimates from fry emergence, and superimposition results.

Metrics: Relationships of escapement to fry production, fry survival, gravel quantity, gravel quality, and redd superimposition.

Schedule: Associated data collection and analysis from 2007–2011.

Report: Data reports and preliminary analysis with annual FERC reports (2009–2010). Complete by 7/1/2012.

Fry Survival Summary

- **RST study for production and flow relationships**
- **Seining study for flow, distribution, and condition assessment**
- **Otolith analysis for escapement contributions**
- **Synthesis of relevant data to date**

IV Steelhead Presence/Protection

Issue:

Lack of information regarding the presence of a self-sustaining steelhead population on the Tuolumne River.

Action:

Collection of additional data regarding habitat use, population size and anadromy of *O. mykiss* in the Tuolumne River for comparison with studies on nearby rivers.

IV Steelhead Presence/Protection

1. Summer Population Estimate

Objective: Determine “closed” population size for *O. mykiss* and habitat distribution.

Methods: Two-phase snorkel surveys calibrated by electrofishing.

Metrics: Population abundance by habitat unit type

Schedule: June and July 2008-2011

Report: Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

IV Steelhead Presence/Protection

2. Sampling of *O. mykiss* for Anadromy

Objective: Determine anadromy of *O. mykiss* captured during winter and spring.

Methods: Collect otoliths from juvenile and adult *O. mykiss*.

Metrics: Micro-chemical testing of Sr:Ca ratio within otolith growth rings

Schedule: Associated data collection and analysis from 2008–2011.

Report: Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

IV Steelhead Presence/Protection

3. Adult *O. mykiss* Tracking Study

<u>Objective:</u>	Determine movement patterns and habitat associations of <i>O. mykiss</i> during winter (See associated acoustic tracking studies under <i>Instream Flows and Predator Control</i>).
<u>Methods:</u>	Acoustic tagging of adult <i>O. mykiss</i> during winter. Monitor riverwide movement and habitat use. Movement patterns and habitat associations.
<u>Schedule:</u>	Associated data collection and analysis from January through March of 2008–2009.
<u>Report:</u>	Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

IV Steelhead Presence/Protection

4. Synthesize Results of Past and Ongoing Studies

Objective: Compare population estimates, anadromy and habitat associations with nearby rivers to develop hypotheses and management strategies.

Methods: Compare *O. mykiss* abundance and distribution at habitat restoration sites implemented between 2001 and 2009. Assess downstream extent of rearing habitat and compare to pre- and post project studies. *Include assessment of data from nearby rivers, per FERC PSA comment.*

Metrics: Change in distribution and abundance of *O. mykiss*

Schedule: Associated data collection and analysis from January through March of 2008–2009

Report: Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

Steelhead Summary

- **Quantification of *O. mykiss* population**
- **Sampling for anadromy**
- **Acoustic study to evaluate movement and habitat use**
- **Synthesis of relevant data to date, including nearby river data**

V Predator Control

Issue:

Restoration of existing in-channel mining pit habitat in the Tuolumne River is practically infeasible within the near future and predation continues to be a major factor limiting salmon production.

Action:

Continued development and assessment of planned predator isolation projects as well as other methods to reduce predation.

V Predator Control

1. Predator and Smolt Tracking Studies within Restored and Unrestored Mining Pits

<u>Objective:</u>	Assess effectiveness of isolation projects in comparison with spatial separation using high flows.
<u>Methods:</u>	Electrofishing or angling followed by acoustic-tracking at test flows of 300–500 cfs and in excess of 2,500 cfs. Document predation rate by stomach content analysis.
<u>Metrics:</u>	1) Predator habitat use, 2) relative density, 3) No. and proportion of salmonids in diet, 4) River2D comparison of actual vs. predicted habitat use. 10 days each spring in two years (2008–2011 or through 2016 depending upon water year types. Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.
<u>Schedule:</u>	
<u>Report:</u>	

V 2. Direct Predator Sampling Predator Control

<u>Objective:</u>	Document predation rates on salmonids by species encountered under a range of flow and turbidity (See <i>Instream Flows for associated experimental flows</i>).
<u>Methods:</u>	Electrofishing or angling of predators followed by stomach content analysis.
<u>Metrics:</u>	1) Predator habitat use, 2) relative density, 3) No. and proportion of salmonids in diet.
<u>Schedule:</u>	Three weeks during winter and spring in each of two years between 2008–2011
<u>Report:</u>	Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

V

3. Predator Removal

Predator Control

Objective: Reduce predation during spring as a means of increasing riverwide production and subsequent escapement.

Methods: Removal of Tuolumne River predators and re-planting in Turlock Lake, Modesto Reservoir, and Don Pedro Reservoir.

Metrics: Numbers and sizes of predators captured in each year, catch per unit effort estimates.

Schedule: One week annually within Spring to Fall during 2008–2011.

Report: Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

V Predator Control

4. Paired Rotary Screw Trap Monitoring

<u>Objective:</u>	Document fry and smolt movement in response to flow and turbidity levels in the river (See <i>Instream Flow No. 2-4 and Fry Survival No. 1 for experimental flows and associated monitoring</i>).
<u>Methods:</u>	Deploy and monitor RSTs near Grayson (RM 5) and Waterford (RM 29) between January and early June.
<u>Metrics:</u>	Daily trap counts, flow and water quality.
<u>Schedule:</u>	January to May/June for the period 2007–2011
<u>Report:</u>	Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

Predation Summary

- **Tracking of predator and smolts to assess strategies for reducing predation**
- **Document predation rates through predator sampling under varying river flow and turbidity conditions**
- **Predator removal actions**
- **Evaluation of RST results in relation to river conditions for predators**

VI

Water Temperature

Issue:

Additional assessment of project operations upon instream temperatures and fishery resources needed.

Action:

Continued and additional data collection and analysis to compare actual versus modeled temperatures, as well as fish distribution in relation to river flows and instream temperatures.

VI Water Temperature

1. Continue Temperature Monitoring

Objective: Document temperature conditions in response to flow and meteorology.

Methods: Continue to maintain the current water temperature data logger monitoring network.

Metrics: Mean, maximum, minimum water temperature in addition to temperature metrics (e.g., MWAT) by RM location.

Schedule: Annual deployment and retrieval between 2007–2011

Report: Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

VI Water Temperature

2. Synthesize Results of Existing and Ongoing Studies by 2011

Objective: Document the fish habitat use in relation to water temperature in comparison to previous studies (e.g., summer flow studies).

Methods: Compare actual versus modeled temperatures, as well as fish distribution in relation to river flows and instream temperatures

Metrics: Fish habitat use by RM in relation to temperature and flow.

Schedule: Associated data collection and analysis from 2007–2011.

Report: Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

VI Water Temperature

3. Delta Temperature Evaluation

Objective: Examine the influence of upstream operations on Delta temperatures during smolt and adult migration periods.

Methods: Use San Joaquin basin HEC-5Q model under historical and synthesized flow regimes.

Metrics: Mean, maximum, minimum water temperature in addition to temperature metrics (e.g., MWAT) by RM. Comparisons to published habitat suitability criteria and agency fish monitoring data.

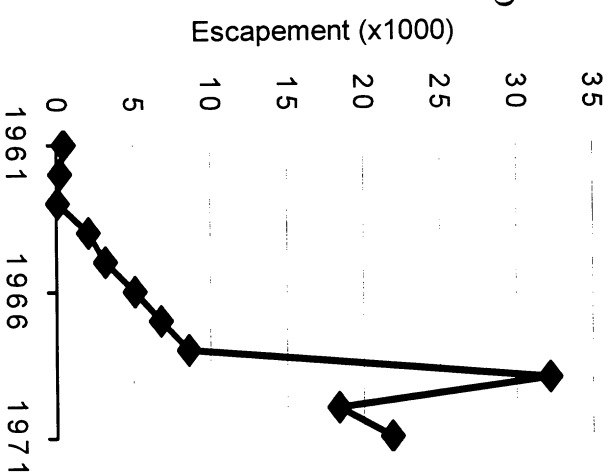
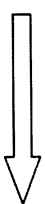
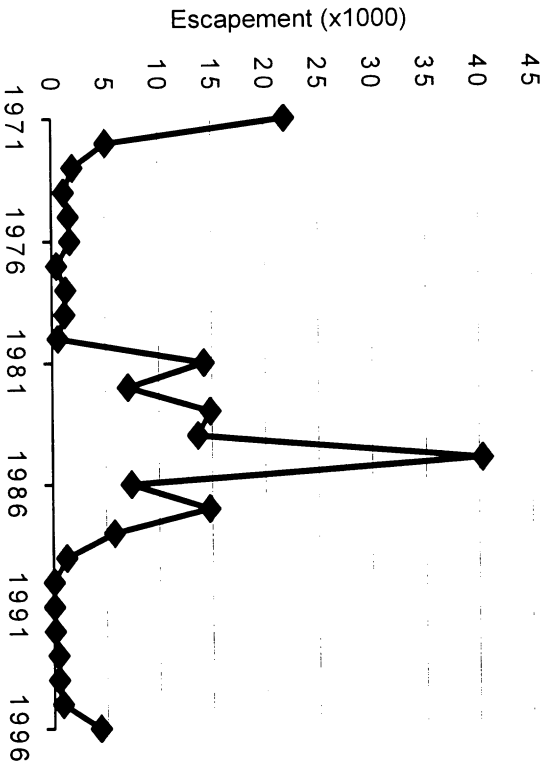
Schedule: One time study covering observed water conditions and fish monitoring data collected by agencies between 2007–2011.

Report: Data reports and preliminary analysis with annual FERC reports (2008–2011). Complete by 7/1/2012.

Water Temperature Summary

- **Maintain monitoring systems**
- **Synthesize results of ongoing studies**
- **Evaluate potential downstream temperature effects of operations**

“Immediately prior to the operation of the New Don Pedro Project, fall-run salmon numbers annually reached 20,000 to 25,000 escaping adults ...”



“By the time of the 1996 Fisheries Settlement Agreement, salmon numbers had progressively declined to less than 1,000 adults annually.”

Figure 1. CDFG narrative characterizations of Tuolumne River escapement trends and graphs of the historical data ostensibly characterized. Of course any short verbal description must necessarily involve some degree of subjectivity. We leave it to the reader to form his or her opinion about what constitutes the period “[i]mmediately prior to the operation of the New Don Pedro Project”, or whether the escapement pattern between the onset of New Don Pedro operations in 1971 and the 1996 Agreement is best described as “progressive decline.”

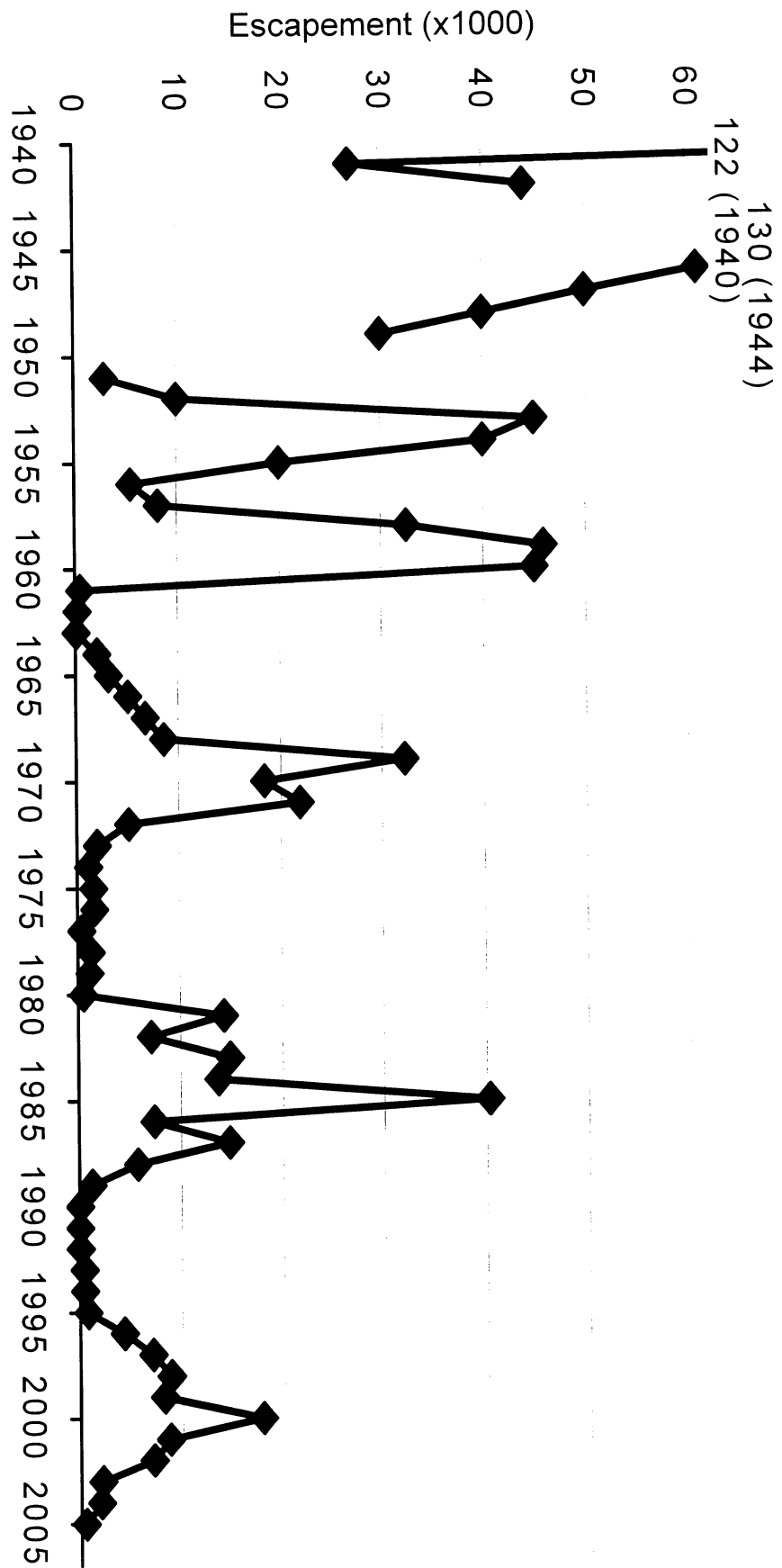


Figure 2. Historical escapement to the Tuolumne River. Two points are off the vertical scale: the estimated escapement for 1940 was 122,000 fish, and the estimate for 1944 was 130,000 fish. No estimates are on record for 1943 or 1945.

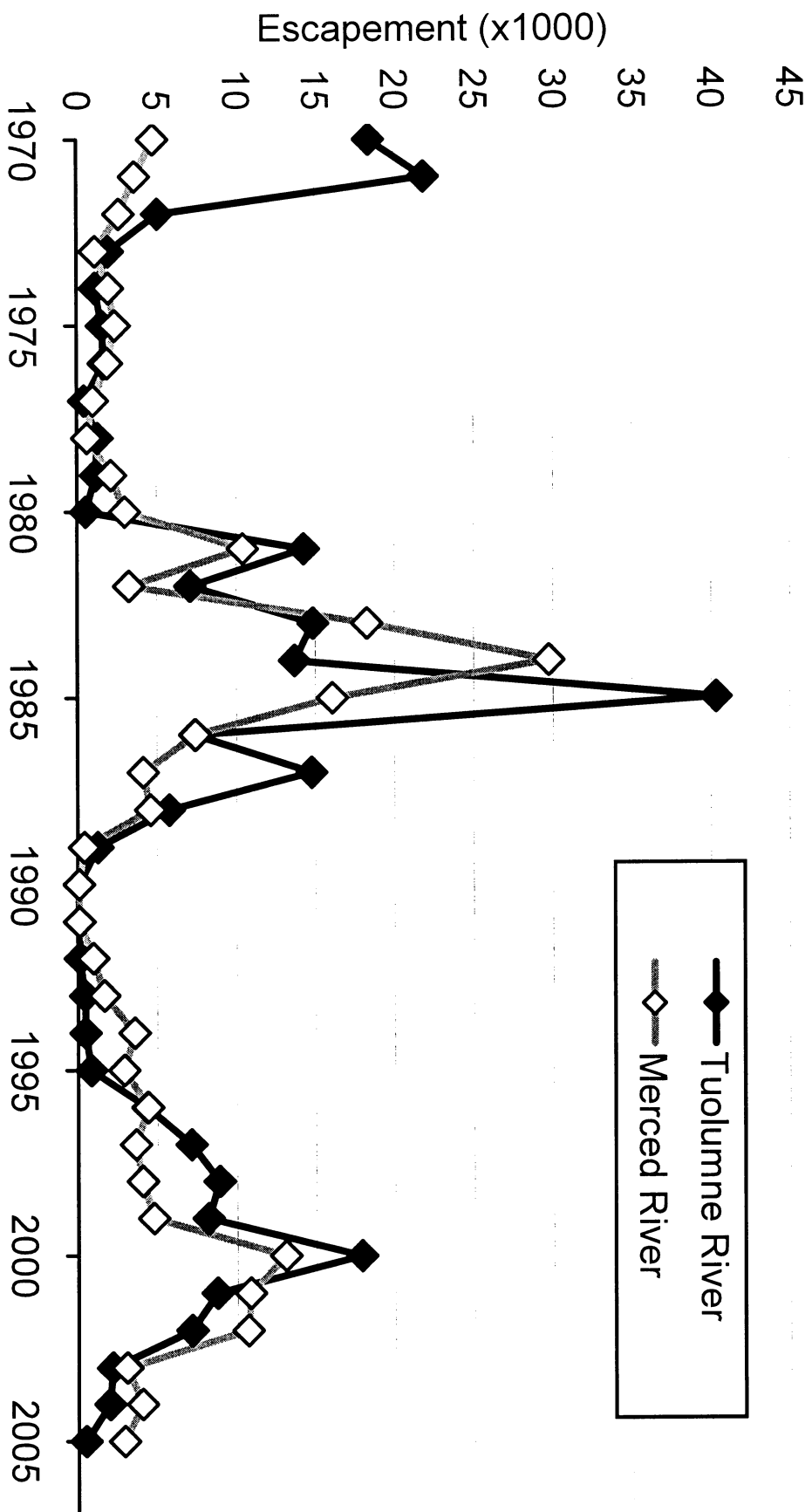
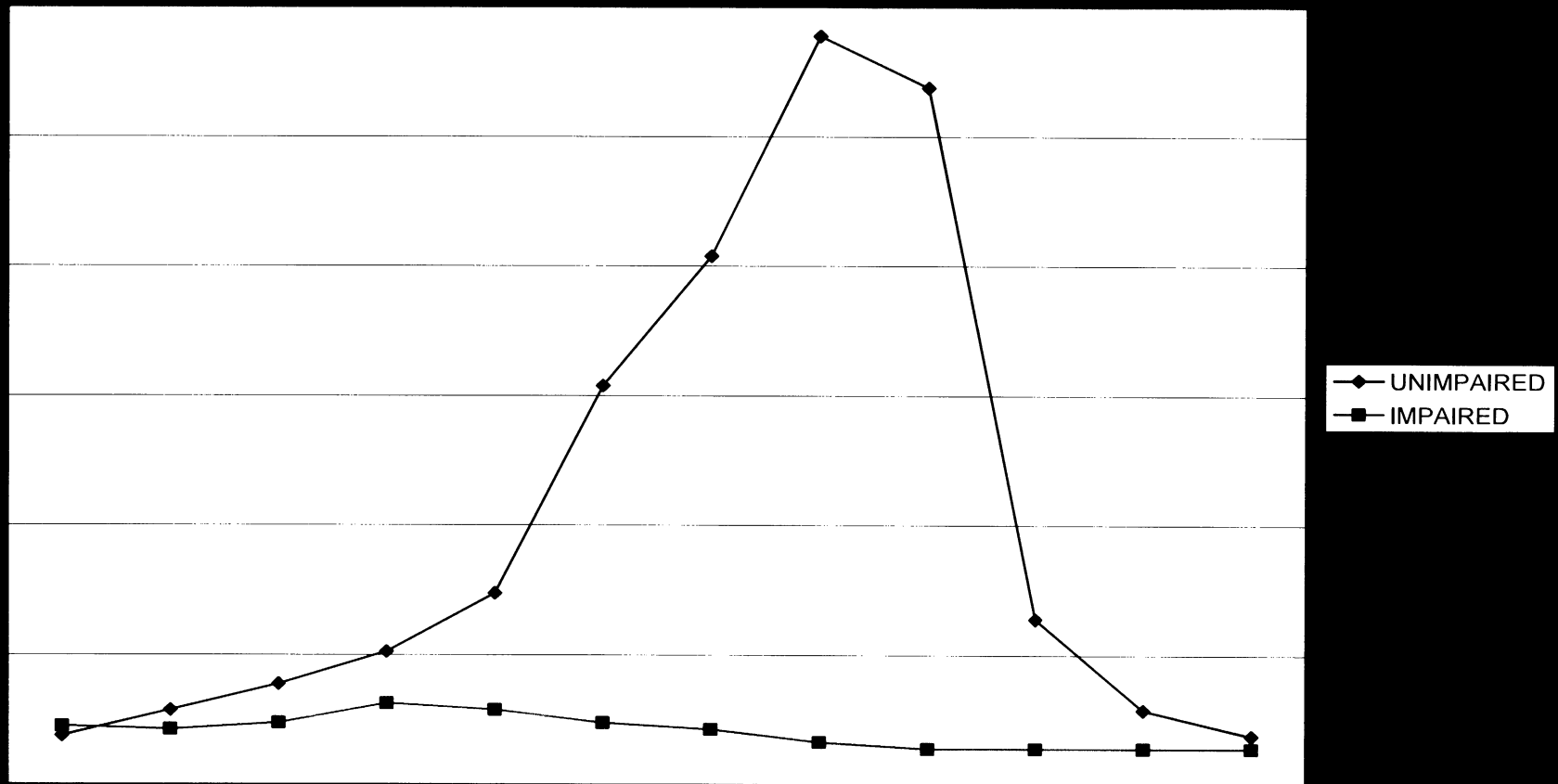


Figure 3. Historical escapement to the Tuolumne and Merced Rivers. Merced estimates include recoveries at the Merced River Fish Facility (MRFF). The first year for which fish were recovered at the MRFF was 1970. It is not clear from what point juvenile survival is to be considered “regularly artificially supported.”

National Marine Fisheries Service's Interest in the Don Pedro Project

Stacy K. Li, Ph.D.
Habitat Conservation Division
NOAA
National Marine Fisheries Service
Southwest Region
Santa Rosa, California

Impaired Hydrology



[illegible]

Steelhead Status

➤ California Central Valley Steelhead Discrete Population Segment:

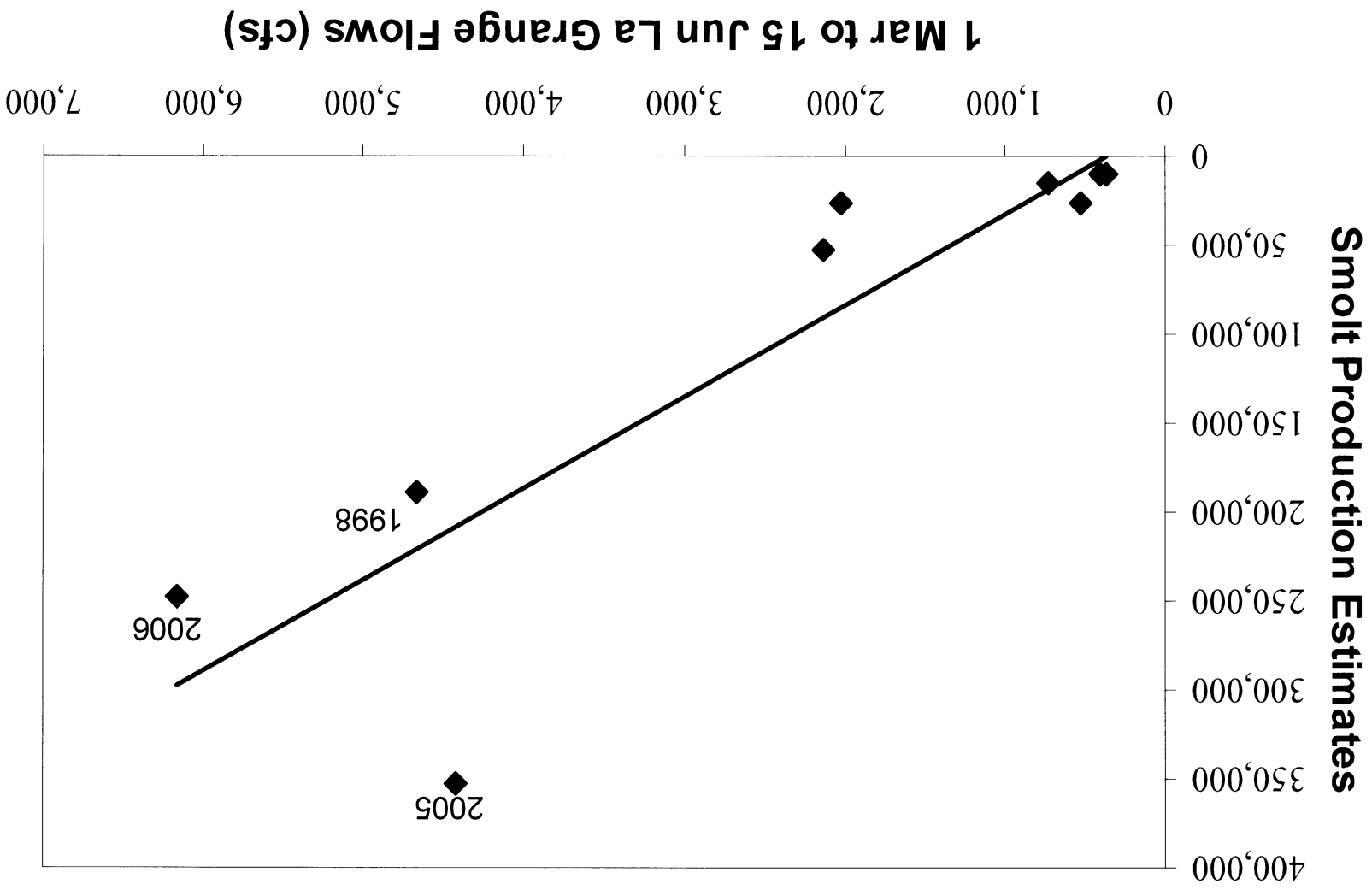
- Threatened 19 March 1998
- Reaffirmed 5 January 2006
- Protective Regulations (4d Rule) 28 January 2005

Alternatives

1. Improve anadromous salmonid habitat conditions downstream of the dams.
2. Provide access to anadromous salmonid habitat upstream of the dams.

Carl Mesick, Ph.D.
Anadromous Fish Restoration Program
U.S. Fish and Wildlife Service
Stockton, CA
August 8, 2007

Grayson-Shiloh Rotary Screw Trapping 1998-2006



Grayson Screw Trap Smolt Efficiency Tests 1999-2006

