

RECLAMATION

Managing Water in the West

OCAP RPA Action IV.2.2: Six year acoustic tag experiment



U.S. Department of the Interior
Bureau of Reclamation

Overview

- **OCAP RPA**
- **Multiple Stressors**
- **Survival Model**
- **Analytical Approach**
- **Delta Science Program Science Advisors Review**
- **Next steps**



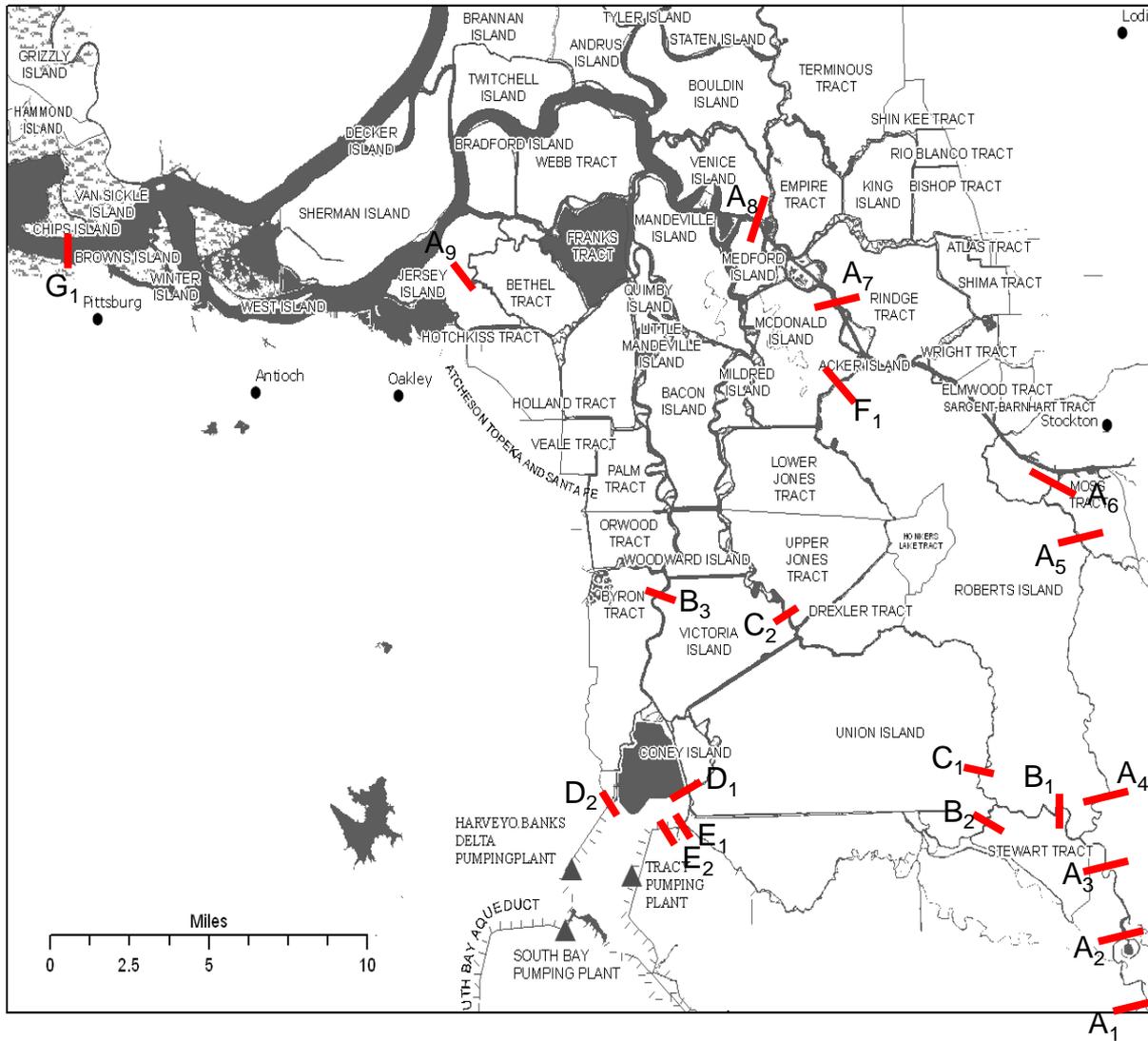
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OCAP RPA IV.2.2: Six-year acoustic tag study

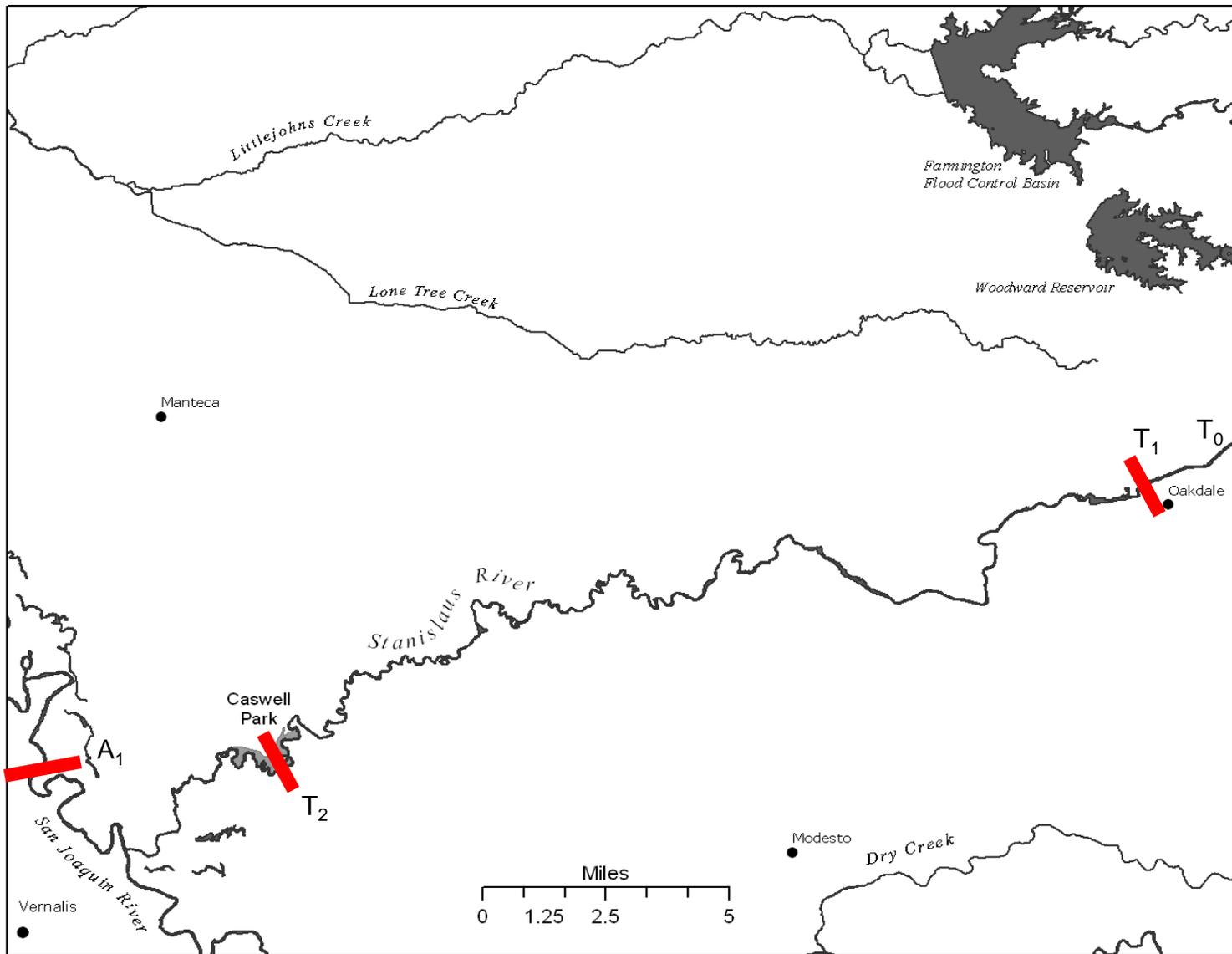
- **Research-oriented assessment of behavior and movement of outmigrating fish in lower San Joaquin River and Delta.**
- **3 identified periods of operations**
 - **March 1 through March 31**
 - **April 1 through May 31**
 - **June 1 through June 15**

OCAP RPA IV.2.2: Six-year acoustic tag study

- **Survival of emigrating smolts from**
 - **tributaries into the mainstem of the San Joaquin River**
 - **mainstem San Joaquin River downstream into the Delta**
 - **Delta to Chipps Island**
- **Reach-specific mortality and/or export loss of tagged fish.**
- **Influence of flow and exports on survival and route entrainment in these migratory reaches.**
- **Test effectiveness of experimental technologies on route entrainment and selection by tagged fish.**

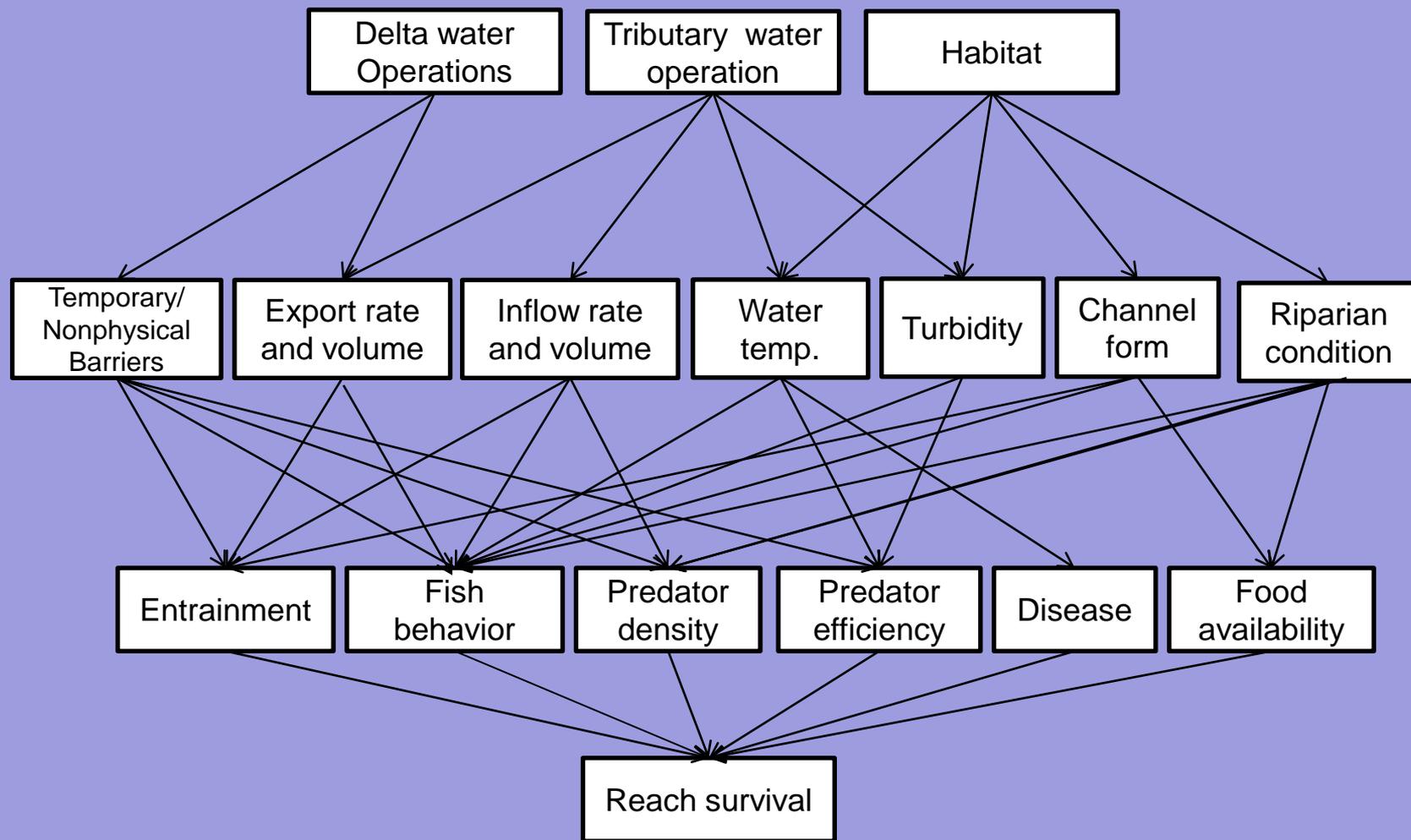


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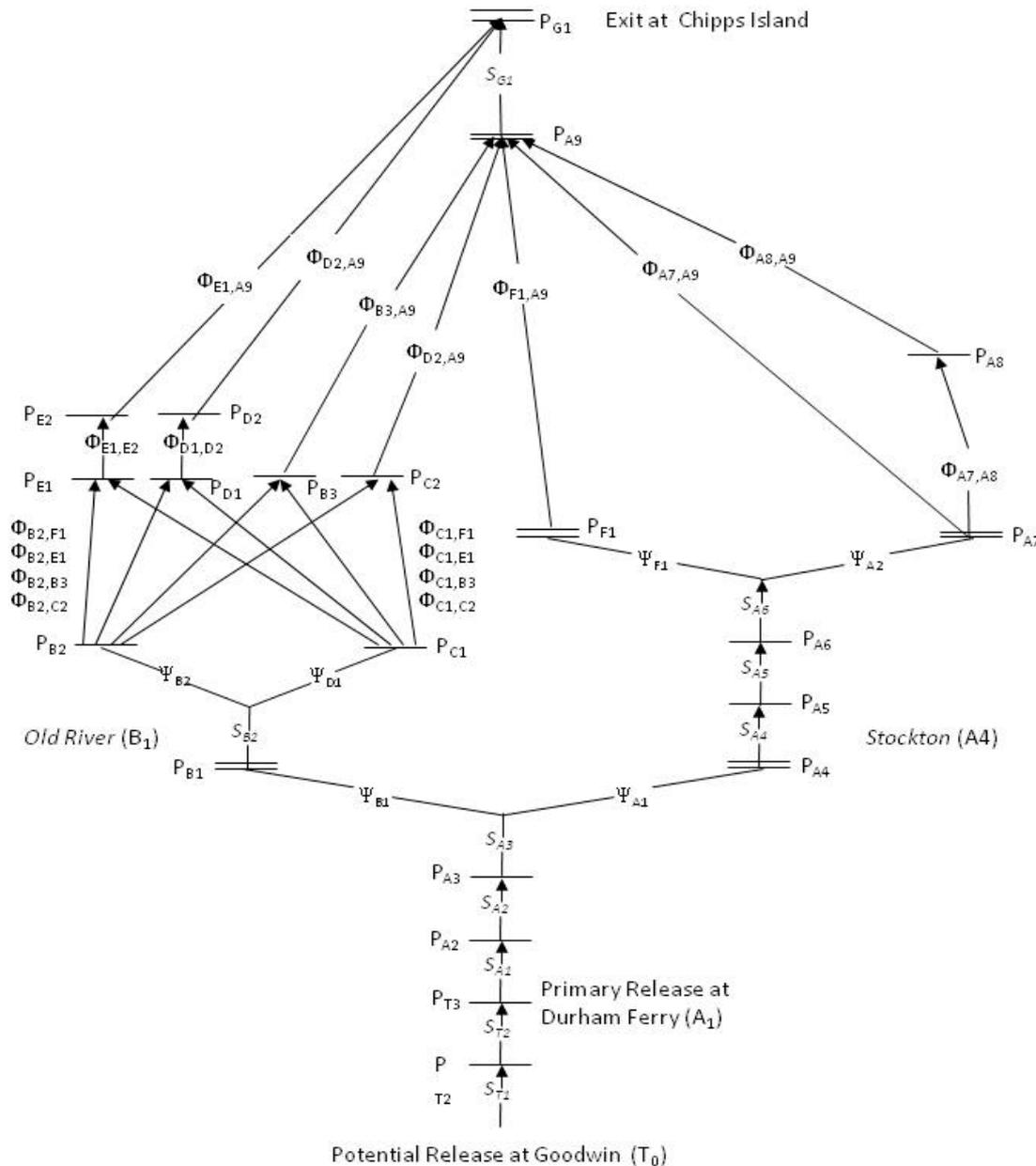


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Multiple stressors



Survival model adapted from VAMP



Release- recapture Data

- Route selection
- Reach survival
- Overall survival

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Study Plan (Years 1 through 3)

- **Study fish**
 - Mokelumne River Hatchery yearling steelhead (requested)
- **Acoustic technology**
 - HTI array and tags in coordination with VAMP & SDTB fish monitoring studies
 - Vemco array and tags for remaining 5 years in coordination with California Fish Tagging Consortium

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Study Plan (Year 1)

- Release group size
 - 480 fish per week (Buchanan 2010)
- Release Schedule
 - Week of March 21 *OMR controlled via fish triggers IV.2.3*
 - Week of April 25 *VAMP pulse flow*
 - Week of May 2 *w/ export regulation via IV.2.1*
 - Week of May 23 *OMR controlled via fish triggers IV.2.3*

OCAP RPA Action IV.2.2: Six-year acoustic tag study results

Answer specific questions annually

Develop information on conceptual model parameters for first three years to understand critical parameters influence survival model

Determine most informative parameters using model selection approach (e.g. Akaike Information Criteria)

2011 Investigation

What influence do exports and flows have on emigrating steelhead smolt survival and route selection through the south Delta to Chipps Island?

Methods: Measuring route specific survival between the San Joaquin River and Old River to evaluate flow and export conditions during the releases as potential parameters affecting survival.

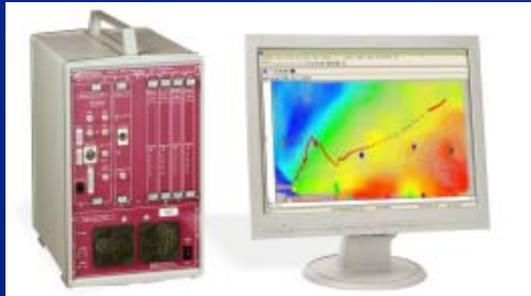


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2011 Investigation

What is the survival of emigrating steelhead smolts through the mainstem of the San Joaquin River downstream to Chipps Island?

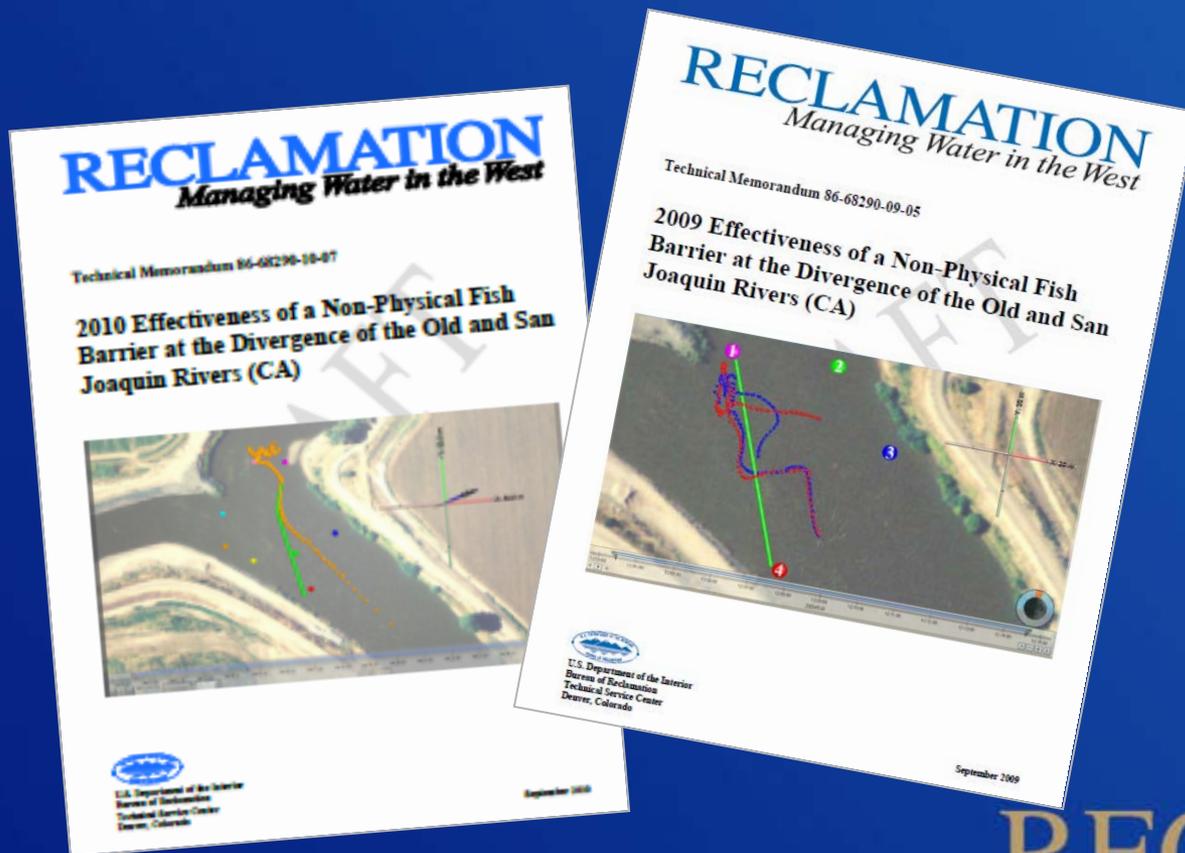
Methods: Survival through the Delta will be measured by this study from Mossdale to Chipps Island using acoustic tags and an array of receivers at Chipps Island.



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2011 Investigation

Are outmigrating juvenile steelhead deterred from entering Old River by the non-physical barrier installed at this location during the VAMP period?



Methods: Monitoring of Head of Old River non-physical barriers' during 2011 as part of this study.

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2011 Investigation



Does quantity of predator habitat influence reach specific survival rates of juvenile steelhead?



Methods:

1. Quantify SAV/FAV located along reaches as an indicator of predatory fish habitat.
2. Quantify a predator activity index using VAMP predator results. Predator activity will be quantified as the fraction of time spent by a predator (or group of predators) within a reach.

Evaluate if there exists a relationship between reach-specific survival and predator activity.

2011 Investigation

Are juvenile fall run Chinook salmon reasonable surrogates for juvenile steelhead?

Methods:

Multiple identical releases of juvenile Chinook salmon and steelhead will be paired in the lower San Joaquin River during 2011.

Survival and route entrainment probabilities will be compared in common reaches of the river and Delta to examine how these variables change between species.



Delta Science Program Science Advisor Review

1. Greater detail of how sources of mortality are to be proportioned
2. Establishment of *a priori* criteria for surrogacy based on RPA needs and first principles
3. Description of technology transition uncertainties: data management & processing, array deployment
4. Development and implementation of manipulative experiment on flows/export.
5. Articulation of adaptive management framework with decision points based on results

Steps towards study implementation

Revise study plan based on Science Advisors' recommendations

Continue planning for 2011 field season

Refine acoustic technology transition

Engage in discussion about manipulative experiments on flow and exports from a Valley-wide salmonid survival perspective

Consider adaptive management framework for integrating results on ESA-listed species