



# Salmon Survival Engineering Solutions Program

DWR, Bay-Delta Office  
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## Salmon Survival Engineering Solutions Program-Completed Projects and Background

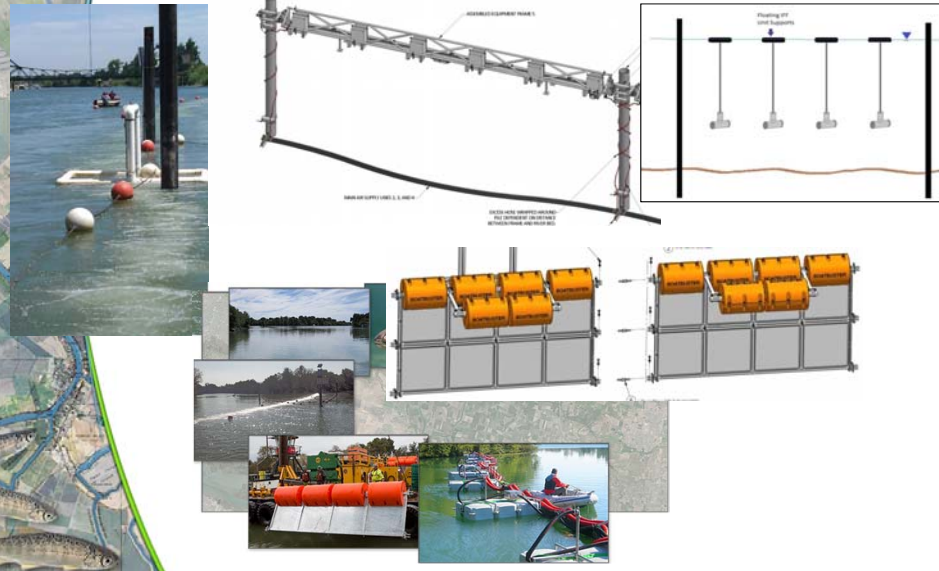
2009 NMFS BiOp RPA IV.1.3 “Engineering Solutions” Compliance Actions

- Phase I (Complete)
  - 2013 Initial Findings Report
- Phase II (Complete)
  - 2011 and 2012 BAFF Study
  - 2014 FFGS Study
  - 2015 Recommended Solutions Report
- Phase III (Current)
  - DWR planning longer-term multi-benefit project-SPTS






## Behavioral Barrier Technologies

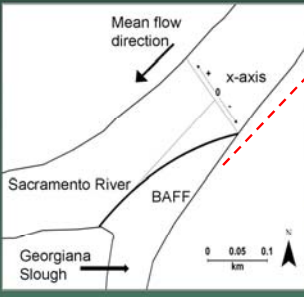



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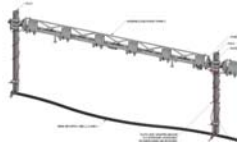
## 2011 and 2012 Study Results

### Bioacoustic Fish Fence (BAFF)

Entrainment into Georgiana Slough:

<b>2011:</b>	$\frac{2}{3}$ Entrainment Reduction (22.3% Off $\rightarrow$ 7.7% On)
<b>2012:</b>	$\frac{1}{2}$ Entrainment Reduction (24.1% Off $\rightarrow$ 11.4% On)


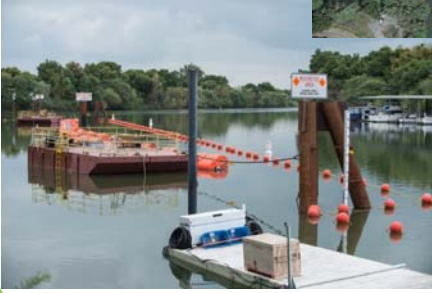
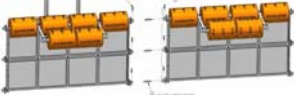


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**2014 Results**

**Floating Fish Guidance System (FFGS)**

- 2014: 1/5 Entrainment Reduction
  - (23.9% off → 19.1% on)
  - At ~7,000-14,000 CFS
- 2014 Sacramento River was abnormally low -4,350 CFS to 21,090 CFS

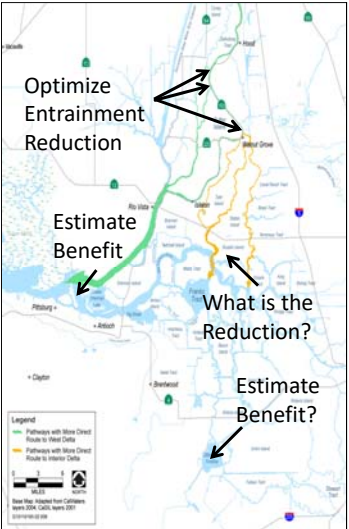





**Current Project Work**

**Salmon Protection Technology Study (SPTS)**

Planning and analysis to:

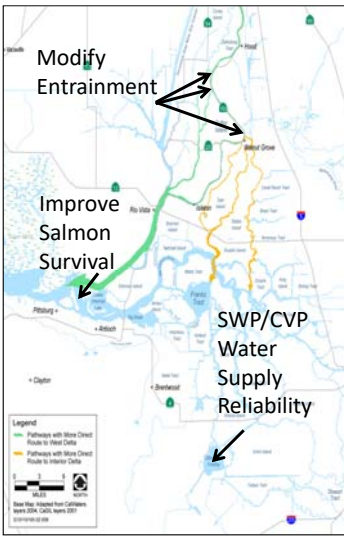
- Construct/operate behavioral barriers
  - 3 Sac River Junctions
    - Sutter Slough
    - Steamboat Slough
    - Georgiana Slough
- Minimize salmonid entrainment into the south Delta and:
  - Maximize salmonid survival to Chipps Island
  - Increase potential for SWP operational flexibility





## Salmon Protection Technology Study Planning Goals

- Develop project description collaboratively with USBR and NMFS
  - Identify project elements that:
    - Specifically address BiOp compliance
    - Provide USBR cost-share opportunities
- Optimize project design and operation to quantify project cost versus benefit (i.e. salmon survival improvement)
- Seek synergistic opportunities with other efforts such as:
  - Delta WIIN Act
  - Cal WaterFix
  - Salmon Resiliency Strategy
  - ROC on LTO
  - Shasta Dam Fish Passage Evaluation



The map shows the Sacramento-San Joaquin River Delta with various project goals highlighted. 'Modify Entrainment' is indicated by two arrows pointing to the upper reaches of the river. 'Improve Salmon Survival' is indicated by a green arrow pointing to a section of the river. 'SWP/CVP Water Supply Reliability' is indicated by an arrow pointing to a dam structure. A legend in the bottom left of the map area defines the symbols used.



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## Tentative Project Schedule

- 2018 Complete Project Analysis, Project Description, and Design Criteria
- 2019 Complete Permitting, and Engineering Design
- 2020 Procurement and Marine Construction
- 2021-25 Operation and Efficacy Testing



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## Salmon Survival Engineering Solutions Program Summary

- Initiated by 2009 NMFS BiOp RPA IV.1.3 “Engineering Solutions” Requirements
- Completed Work:
  - Initial Findings Report
  - BAFF Study
  - FFGS Study
  - Recommended Solutions Report
- Current Work:
  - Multi-benefit project planning: Salmon Protection Technology Study
- Opportunities:
  - Collaborative planning with USBR and NMFS technical staff
  - Several on-going project synergy opportunities

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## Questions

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