

MAKING THE CONNECTION BETWEEN FISH PREDATION HOT SPOTS AND REGIONAL HYDRODYNAMICS

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State of the Science Workshop on Fish Predation on Central Valley Salmonids in the Bay-Delta Watershed

Sponsors: California Department of Fish and Wildlife, Delta Science Program, NOAA's National Marine Fisheries Service

The purpose of this workshop is to have an independent panel of experts summarize the current state of knowledge on predation of Central Valley salmonids by other fish. This information will clarify the understanding of the role of fish predation on salmonids and associated factors in salmonid life history for policy decisions focused on improving Central Valley salmonid populations. Additionally, the Panel will be asked to identify data and science gaps that exist and identify a framework for research to support future management decisions.

Workshop Details

[Agenda \(PDF\) - Revised 7-12-13](#)

Dates: July 22-23, 2013

Tentative Times: July 22, 9:00 AM to 6:00 PM; July 23, 1:00 PM to 4:00 PM

Location: [UC Davis Conference Center](#)

This workshop is free and open to the public. Funding for the workshop is provided by the Ecosystem Restoration Program.



Chinook salmon in Big Chico Creek



DELTA STEWARDSHIP COUNCIL

The Delta Stewardship Council was created in legislation to achieve the state mandated coequal goals for the Delta. "Coequal goals" means the two goals of providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. The coequal goals shall be achieved in a manner that protects and enhances the unique cultural, recreational, natural resource, and agricultural values of the Delta as an evolving place." (CA Water Code §85054)

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Independent Review of the Draft Bay Delta Conservation Plan Effects Analysis, Phase 3 - Chapter 5: Effects Analysis and Associated Technical Appendices

Transmittal Letter from Dr. Peter Goodwin to the U.S. Bureau of Reclamation and California Department of Water Resources (March 17, 2014)

Delta Science Program Independent Review Panel Report: BDCP Effects Analysis Review, Phase 3

KEYWORD SEARCH

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Dynamics of Fish Predation

A change in a single demographic parameter at one location

Example: Juvenile abundance @
Chippis Island

Cumulative survivorship of a particular life stage

Example: time of marine entry

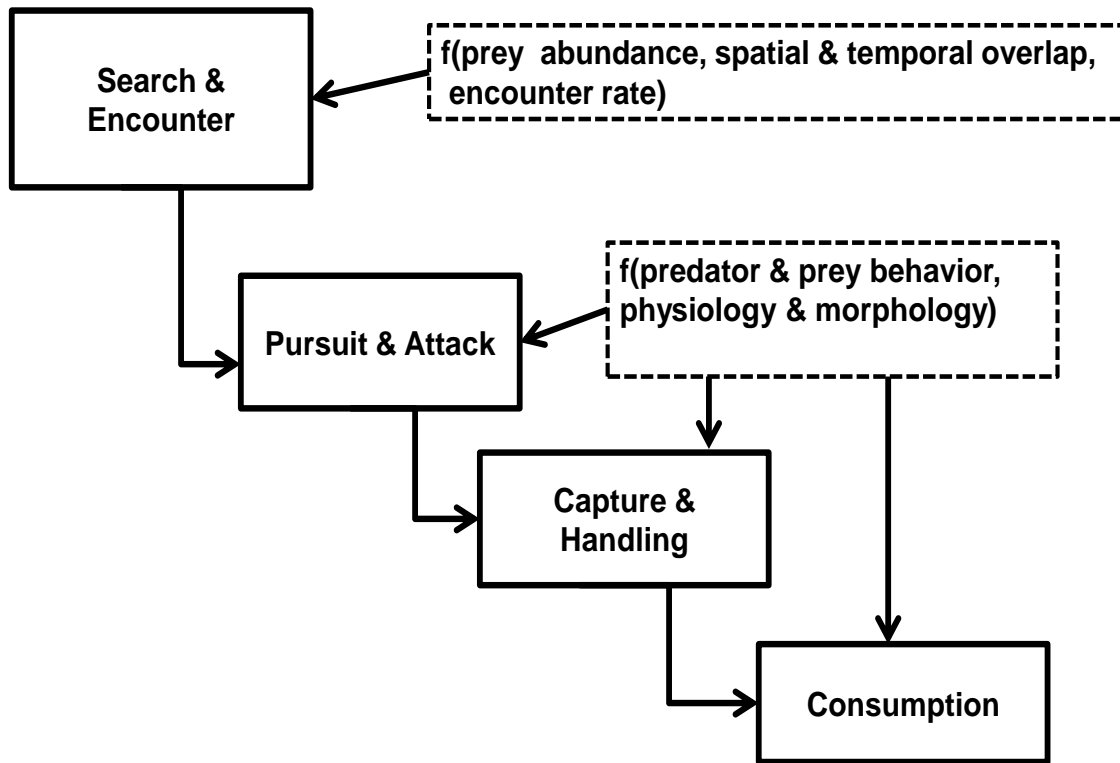
Cumulative survivorship across all life-history stages of a cohort **at a single location or time**

Quantifying cohort-specific survivorship at **multiple spatial scales over ecologically significant time spans.**

The Problem

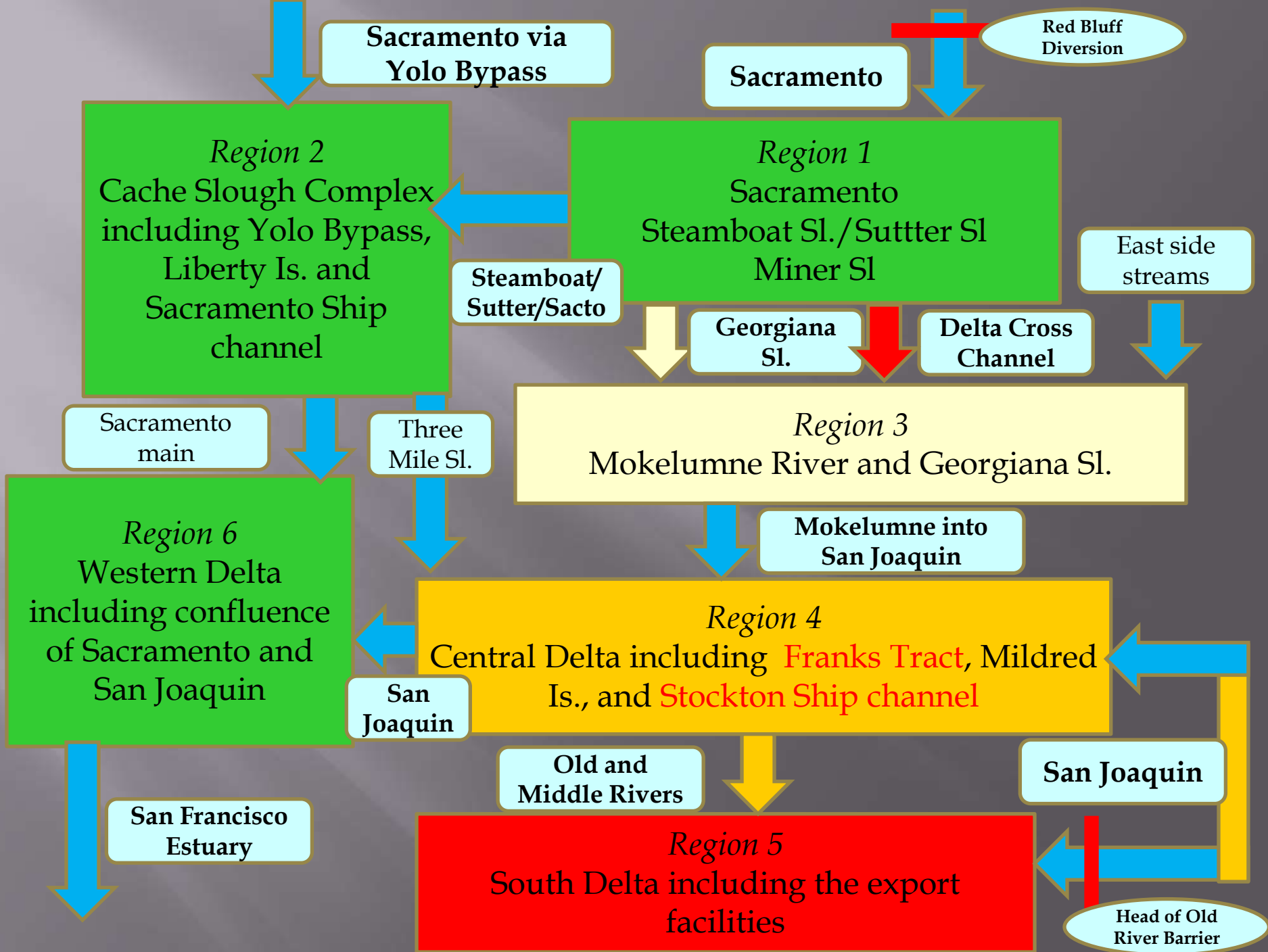
The Delta has a complex geography and hydrology that creates significant spatial heterogeneity in ecological processes such as fish predation rates.

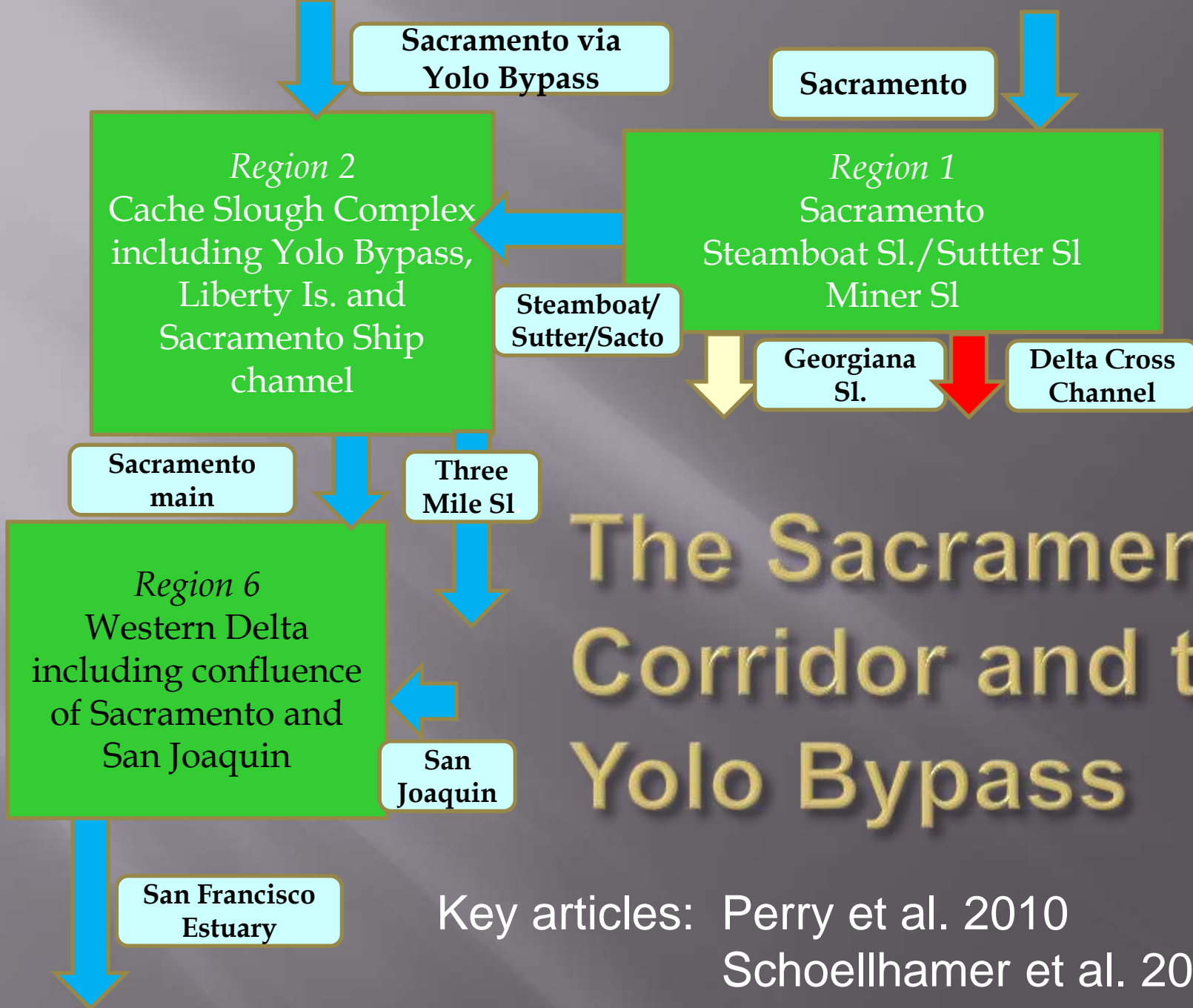
Fundamental Components of the Predation Process



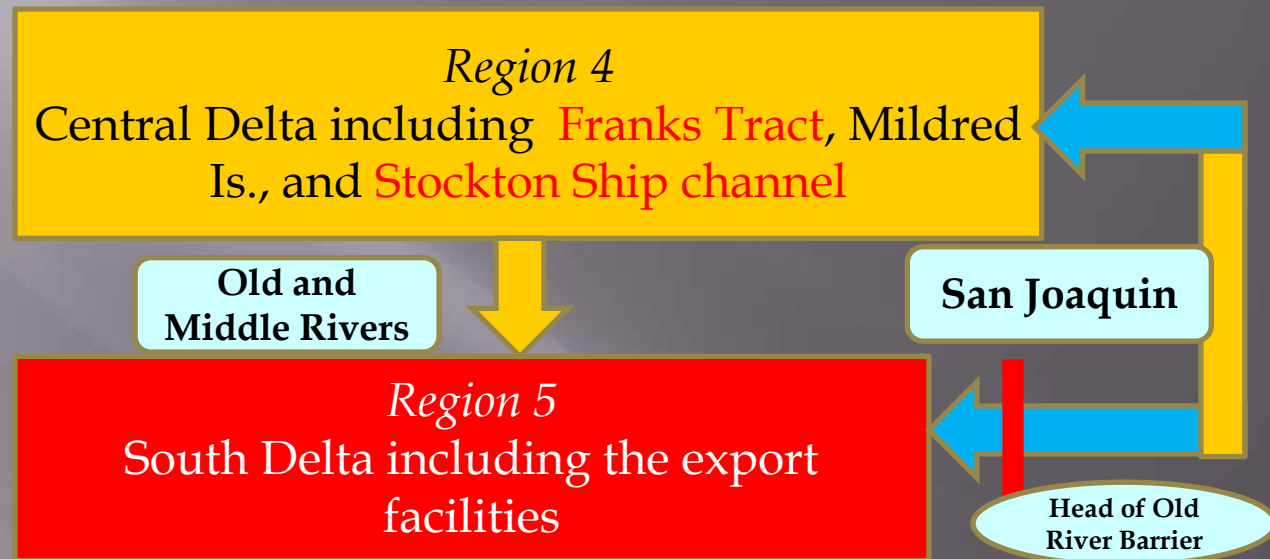
- ▣ Prey abundance: hot spots – localized but intense predation
- ▣ Role of operational facilities in creating these hot spots
- ▣ Habitat complexity
- ▣ Turbidity
- ▣ Temperature
- ▣ Natural flow patterns

Hot Spots	Region	References
Painterville Bridge (Junction of Sacramento and Sutter Slough)	Region 1	BDCP 2013
Georgiana Slough	Region 1; Region 3	BDCP 2013
Delta Cross Channel	Region 1; Region 3	Perry et al. 2010
Franks Tract	Region 4	BDCP 2013
Mildred Island	Region 4	Nobriga and Feyrer 2007
Stockton Ship Channel (Vogel 2011)	Region 4	Vogel 2011
Clifton Court Forebay 1) deep scour hole by radial gates (Gingras 1997) 2) trash gates @ Tracy Fish Collection Facility (Vogel 2011) 3) Old River adjacent to the radial gates	Region 5	Vogel 2011 Gingras 1997 BDCP 2013 CFG 2011 Vogel 2010
Borden Highway Bridge (Old River & Hwy 4)	Region 5	Vogel 2011
Seasonal South Delta Physical Barrier	Region 5	Bowen et al. 2009 BDCP 2013 Vogel 2010
Scour hole directly downstream of the Head of Old River Barrier	Region 5	Vogel 2010





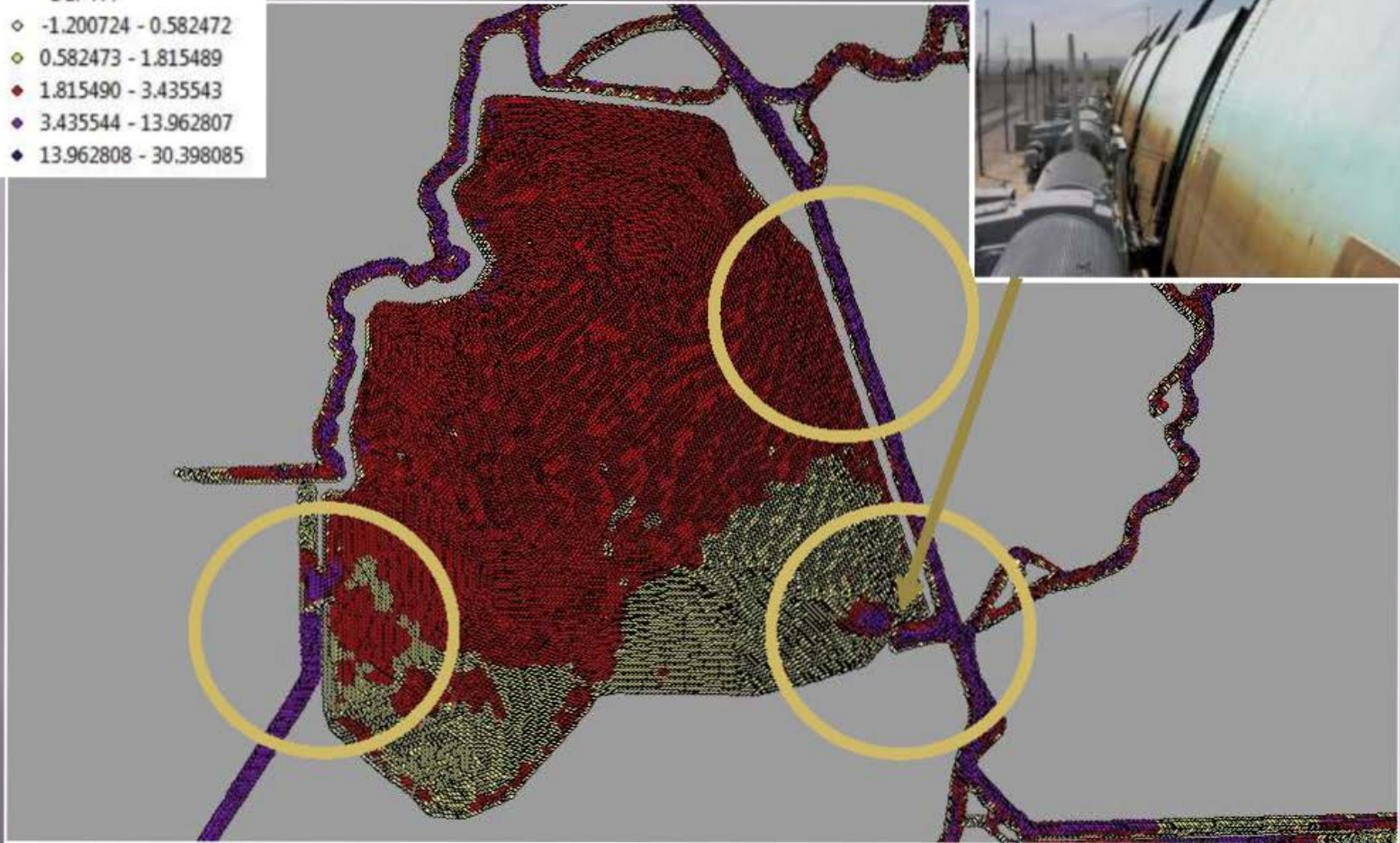
South Delta



- ▣ Multiple mortality hot-spots
 - Clifton Court Forebay (3 major locations within CCFB)
 - Seasonal temporary barriers
 - Deep hole directly downstream of the Head of Old River Barrier

Clifton Court Forebay

- bathysjrcvpswp
DEPTH
- ◇ -1.200724 - 0.582472
 - ◇ 0.582473 - 1.815489
 - ◆ 1.815490 - 3.435543
 - ◆ 3.435544 - 13.962807
 - ◆ 13.962808 - 30.398085





Swap Video & Slide

Thumbnails

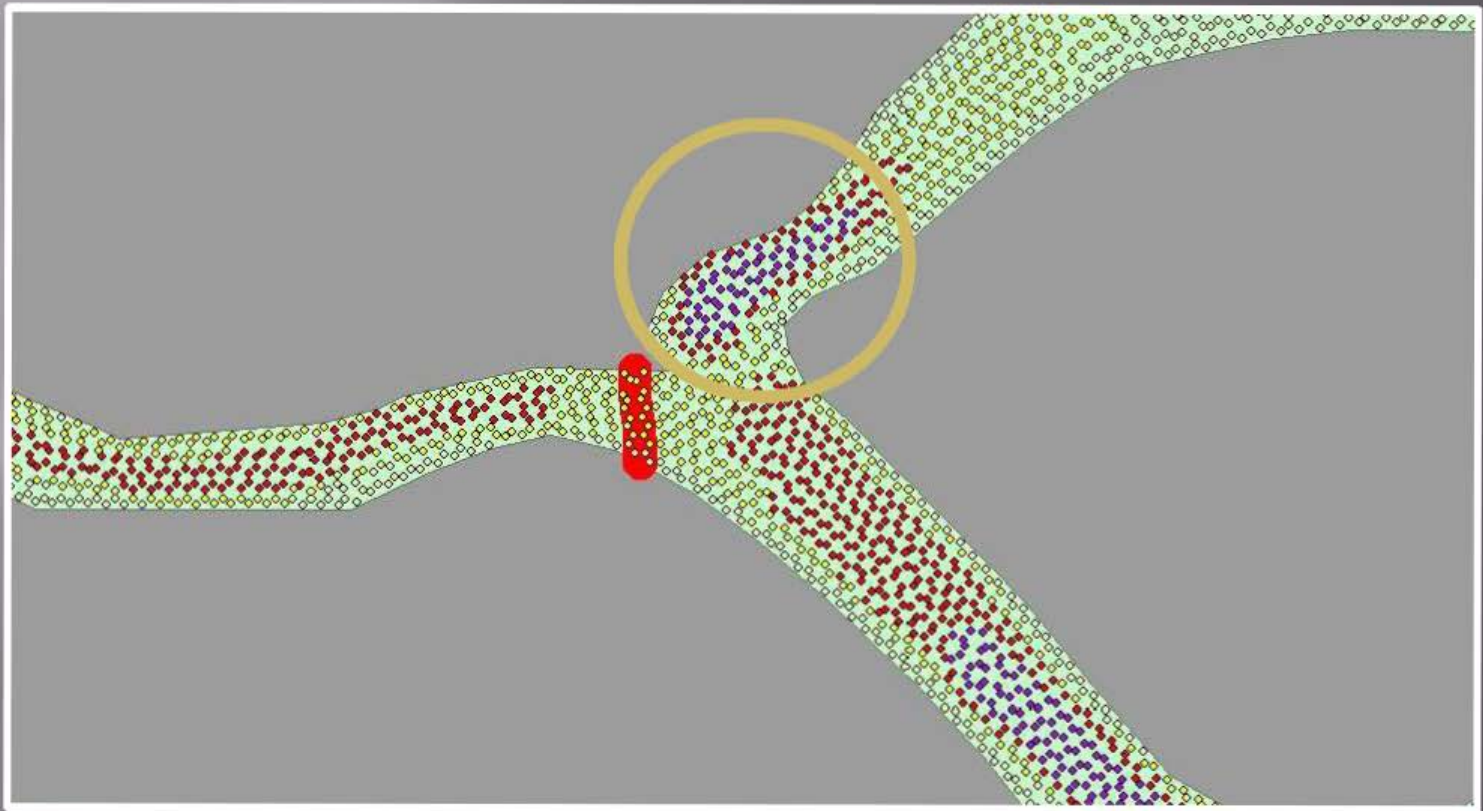
Zoom Slide

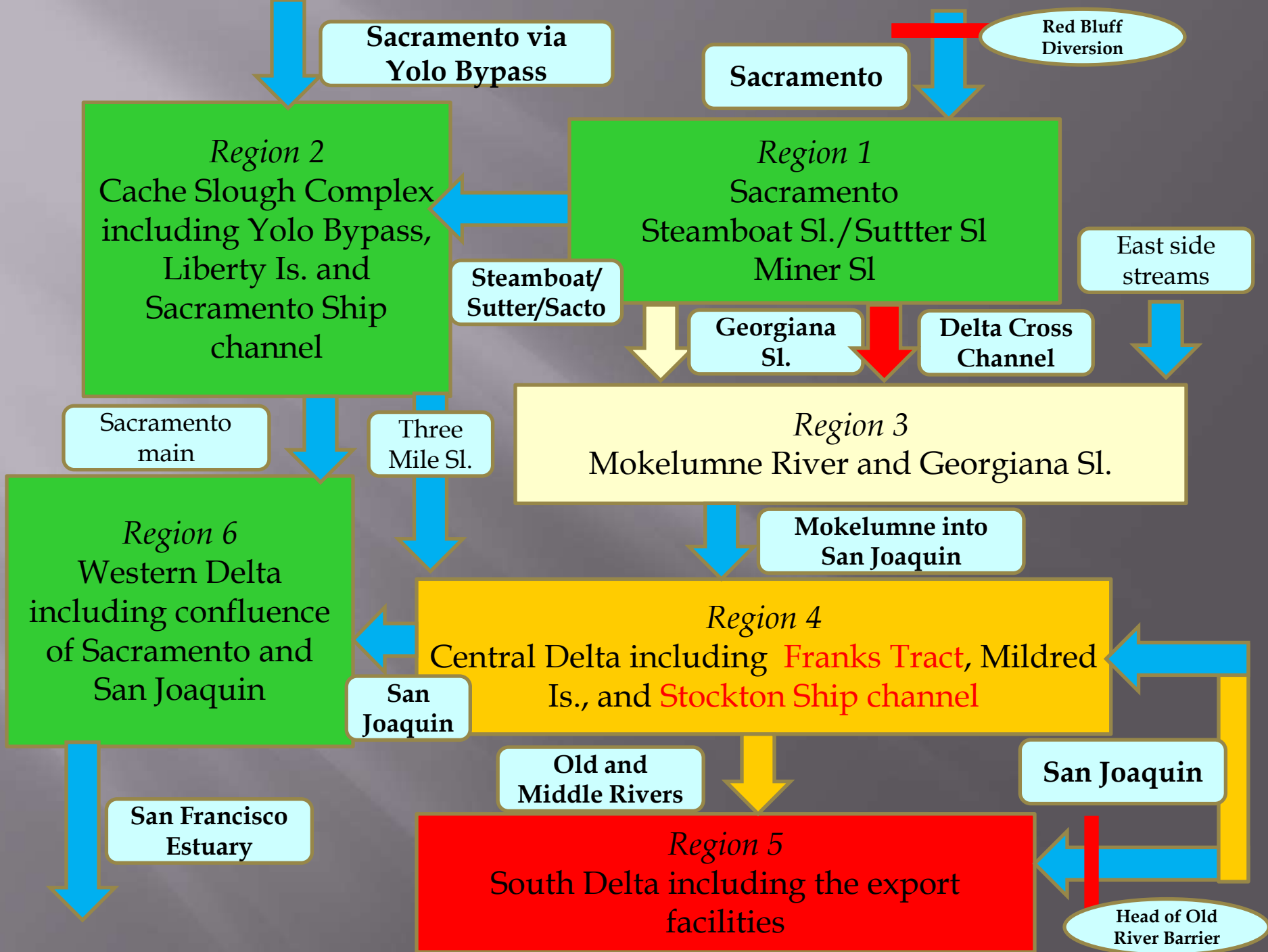


Info Topics Resources

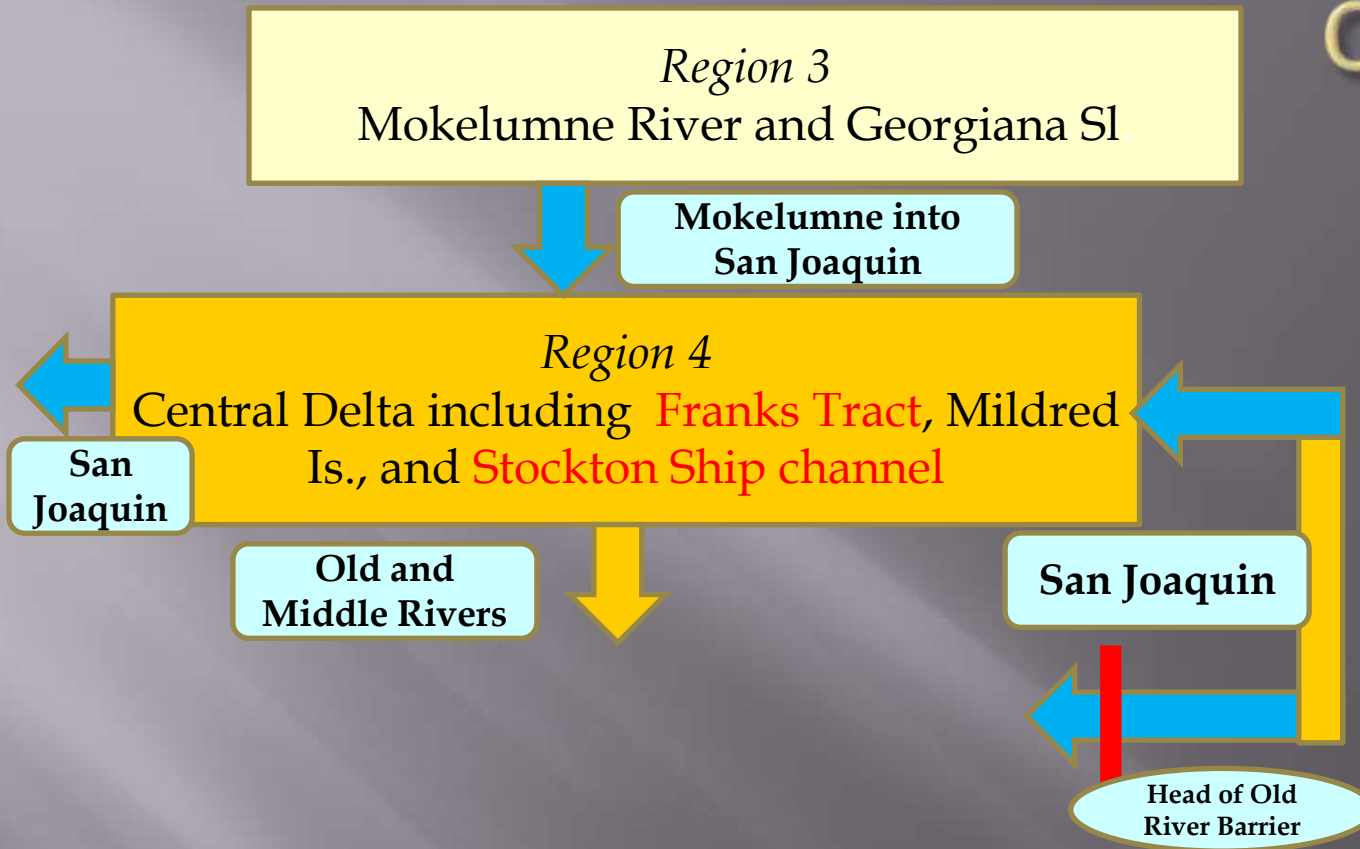
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Head of Old River Barrier





Central Delta



- ❑ Water source: BOTH Sacramento and San Joaquin river sources
- ❑ Franks Tract (BDCP 2013: Conservation Measure 13)
- ❑ Stockton Ship channel (Vogel 2011)

Central Delta: Franks Tract

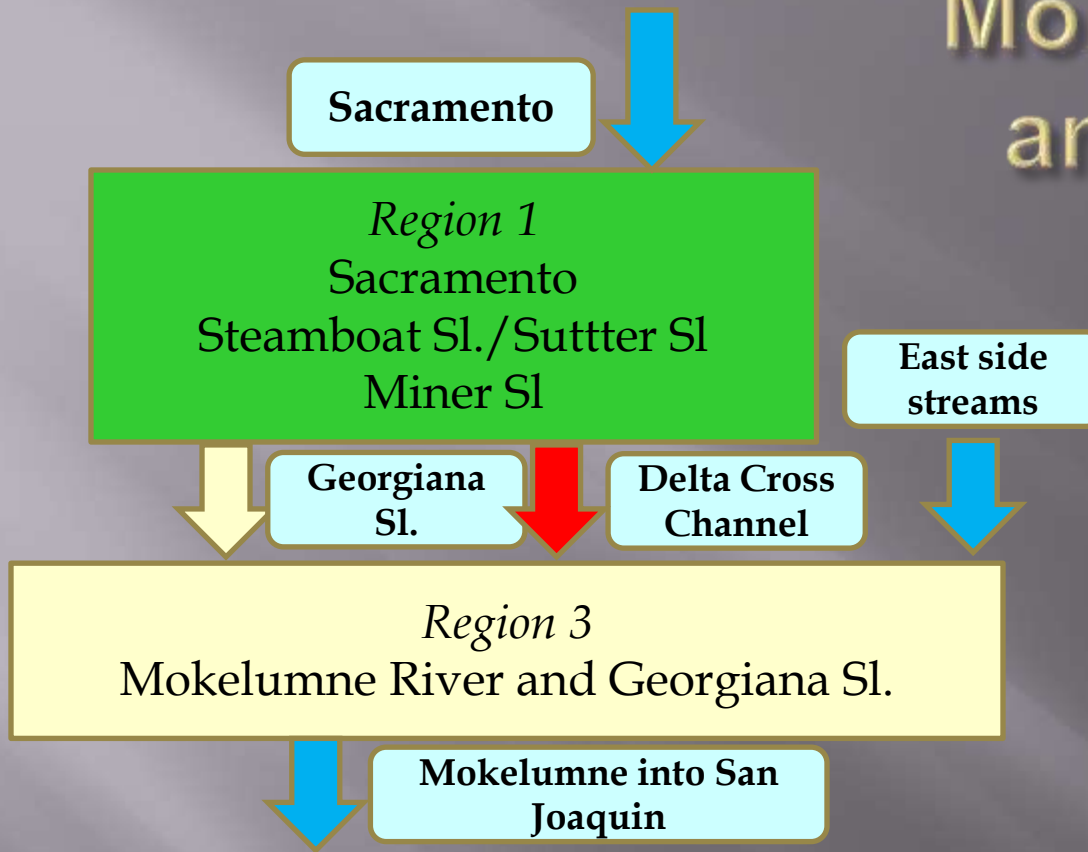


Google Earth: 8/2003

- ▣ Turbidity
- ▣ Residence Time/
Exposure Time
- ▣ Circulation patterns and
exchange
- ▣ Velocity
- ▣ Temperature
- ▣ Net sink of phytoplankton
- ▣ Egeria formation patterns

BDCP Conservation Measure 13:
Invasive Aquatic Vegetation Control

Mokelumne River and Georgiana Slough



- Landscape: mostly rip-rapped levees and channel widths from 50-150 m
- Some dead-end sloughs
- Very light suspended sediment loads
- Deep scour hole at the junction of Georgiana Slough and the Mokelumne
- Georgiana Slough identified as a mortality “hot spot” (BDCP 2013)

