Current Science Projects, Future Science Needs, and Emerging Stressors

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CALFED Science Program

CALFED Bay-Delta Program

soon to be the Delta Science Program

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National Research Council Panel

Sustainable Water and Environmental Management in the California Bay-Delta

Vision, Mission, and Objectives of the CALFED (Delta) Science Program

- **Vision – All Bay-Delta water and environmental policy is founded on the highest caliber science**
- **Mission – Provide the best possible scientific information for water and environmental decision-making in the Bay-Delta system**
- **Strategic Objectives – 1) Support research 2) Synthesize scientific information 3) Facilitate independent peer review 4) Coordinate science 5) Communicate science**

CALFED (Delta) Science Program

- Led by an Independent Lead Scientist
- Interdisciplinary, interagency staff of ~14
- Works collaboratively with state and federal agencies
- Provides independent, transparent, and unbiased science to inform decision-making
- Budget 06/07 $5.0 M; 07/08 $7.0 M; 08/09 $11.8 M; 09/10 ???

Science Program Awards (2003-2009)

- 43 pre-doctoral and postdoctoral fellows (23 current)
- 34 research awards (22 current)
- Bond-funded (bond freeze December 2008 – June 2009)
- ~ $26.8 million dollars in total awards

Recent and Current Science Program Funding Portfolio

1. **Salmonids and sturgeon ($8.0 M)**
2. **Foodwebs, invasive species, and contaminants ($6.2 M)**
3. **Climate and global change ($4.4 M)**
4. **Streams and rivers, wetlands, and floodplains ($3.9 M)**
5. **Delta smelt ($ 3.7 M)**
6. **Hydrodynamics and flows ($ 0.6 M)**

Some Ongoing Delta Smelt Studies

Studies of the foodweb supporting delta smelt (Kimmerer – SFSU)

Mark-recapture study of adult and juvenile delta smelt to quantify entrainment losses (Castillo – USFWS)

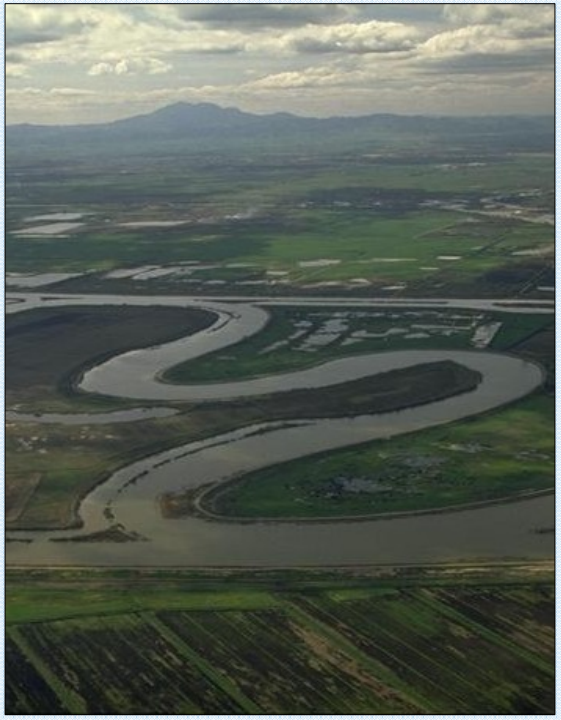
Prey selection of larval and juvenile planktivorous fish (Sullivan – SFSU)

Some Ongoing Salmonid Studies

Survival and migratory patterns of Central Valley juvenile salmonids (Klimley – UCD)

Statistical model of Central Valley Chinook incorporating mortality from all phases of life history (Hendrix – R2 Resource Cons.)

Geochemical markers to determine timing and duration of salmon use of Delta and Bay (Ingram – UCB)



2010 (formerly 2009) Proposal Solicitation Package - Topics

- Native Fish Biology and Ecology
- Food Webs of Key Delta Species and their Relationship to Water Quality and Other Drivers
- Coupled Hydrologic and Ecosystem Models
- Water and Ecosystem Management Decision Support System Development

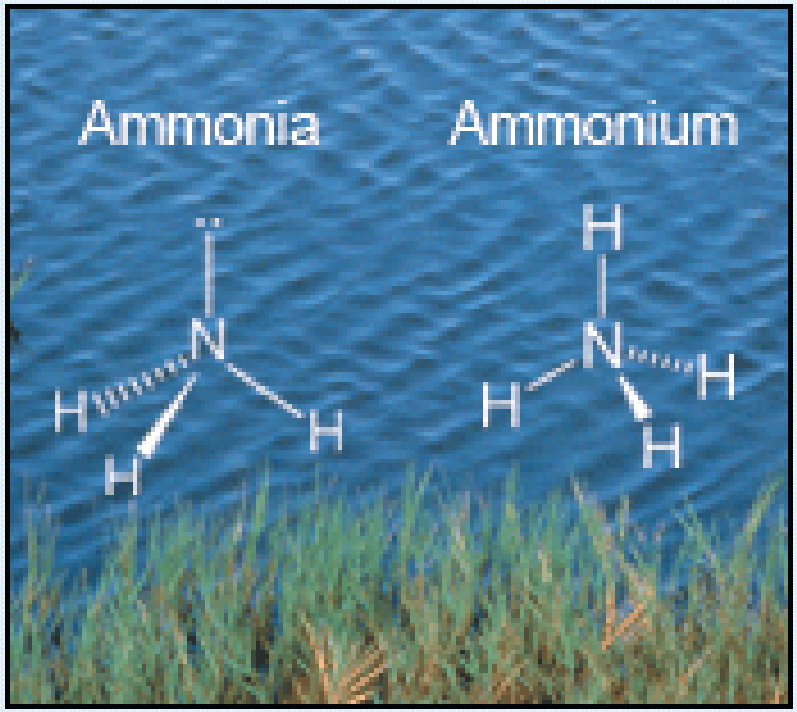


Causes of Native Fish Declines Multiple Potential Stressors

- Water Movement
  - Export pump effects
  - Salinity location changes
- Food Availability
  - Reduced zooplankton
  - Impacts of invasive clams
- Toxicants/Nutrients
  - Microcystis blooms (HABS)*
  - Pesticides*/Nutrient loading*
- Aquatic Habitat Changes
  - Wetland reduction
  - Channelized rivers

Ammonia and Ammonium Effects

- **Ammonia/Ammonium Science Program Workshop (March 2009):**
  - Transport and fate
  - Effects on foodwebs
  - Toxicity
  - Research framework
- **Effects of ammonium on phytoplankton community structure and growth rates (Dugdale – SFSU)**



Harmful Algal Blooms (HABS)

- Environmental controls on the distribution of harmful algae and their toxins (Mioni – UCSC)
- Long-term trends and trophic interactions of plankton dynamics in the Delta (Winder – UCD)

- Microcystis blooms and toxins in the Delta (Lehman et al. 2005, 2008)

Pesticides - Pyrethroids

- **Widely used and widely detected class of insecticides in the Sacramento and American rivers**
- **High sensitivity to pyrethroids by many aquatic invertebrates (e.g. *Hyalella azteca*)**
- **Lethal concentrations often measured during increased flows**

Additional Information

CALFED Science Program:

http://www.science.calwater.ca.gov/science_index.html

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Delta Science Program on February 3, 2010