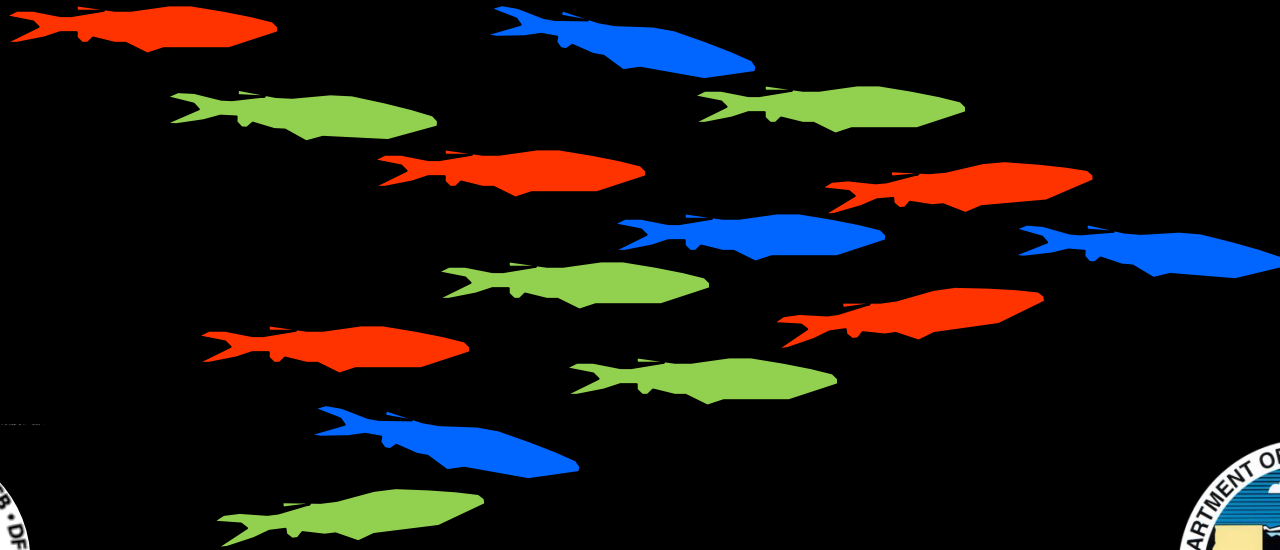


# The Ecology and Management of Delta Smelt:

Insights Into The Most Important Non-Game Fish in the U.S.



Interagency  
Ecological Program

COOPERATIVE ECOLOGICAL  
INVESTIGATIONS SINCE 1970



*Ted Sommer*

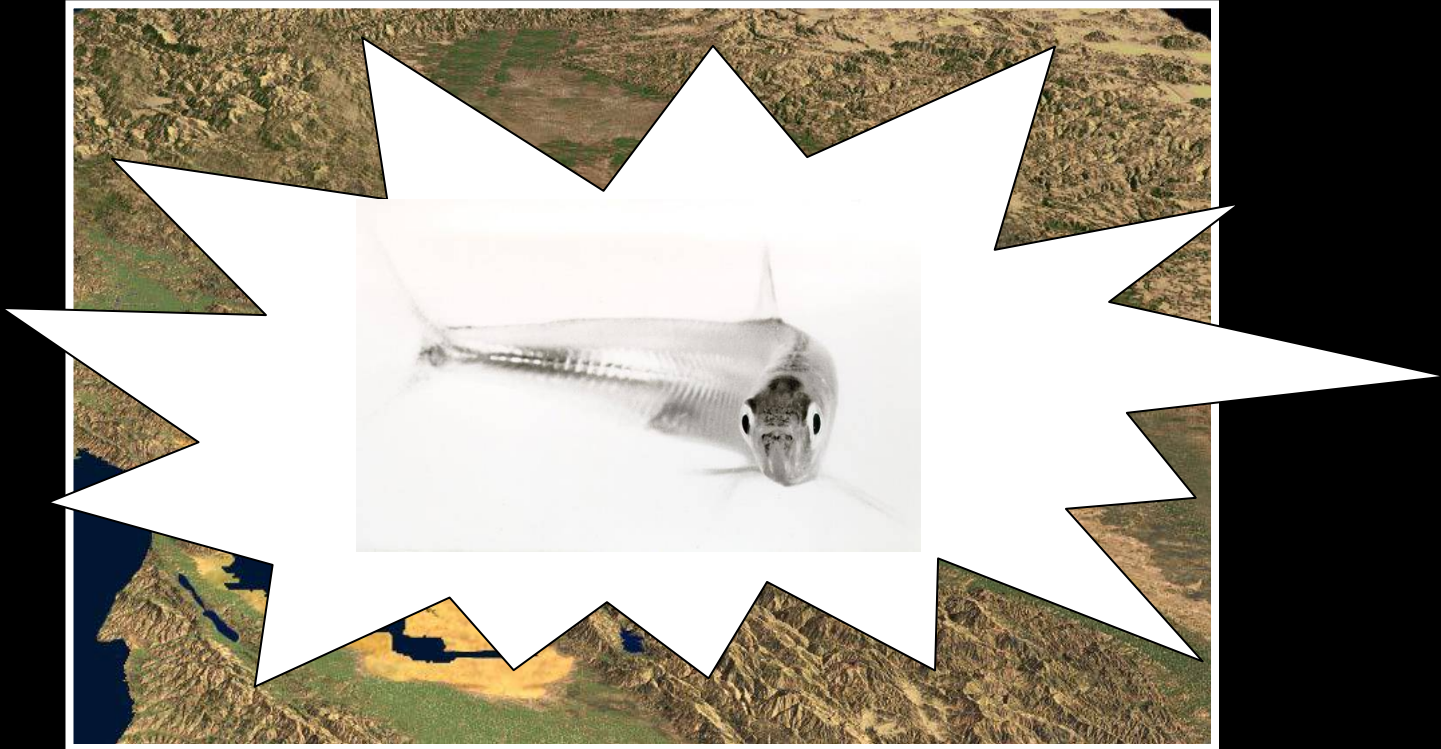
Department of Water Resources



HAIL TO THE KING!

# Delta Smelt

*Hypomesus transpacificus*



# Delta Smelt Life History



Maturation  
Low salinity habitat

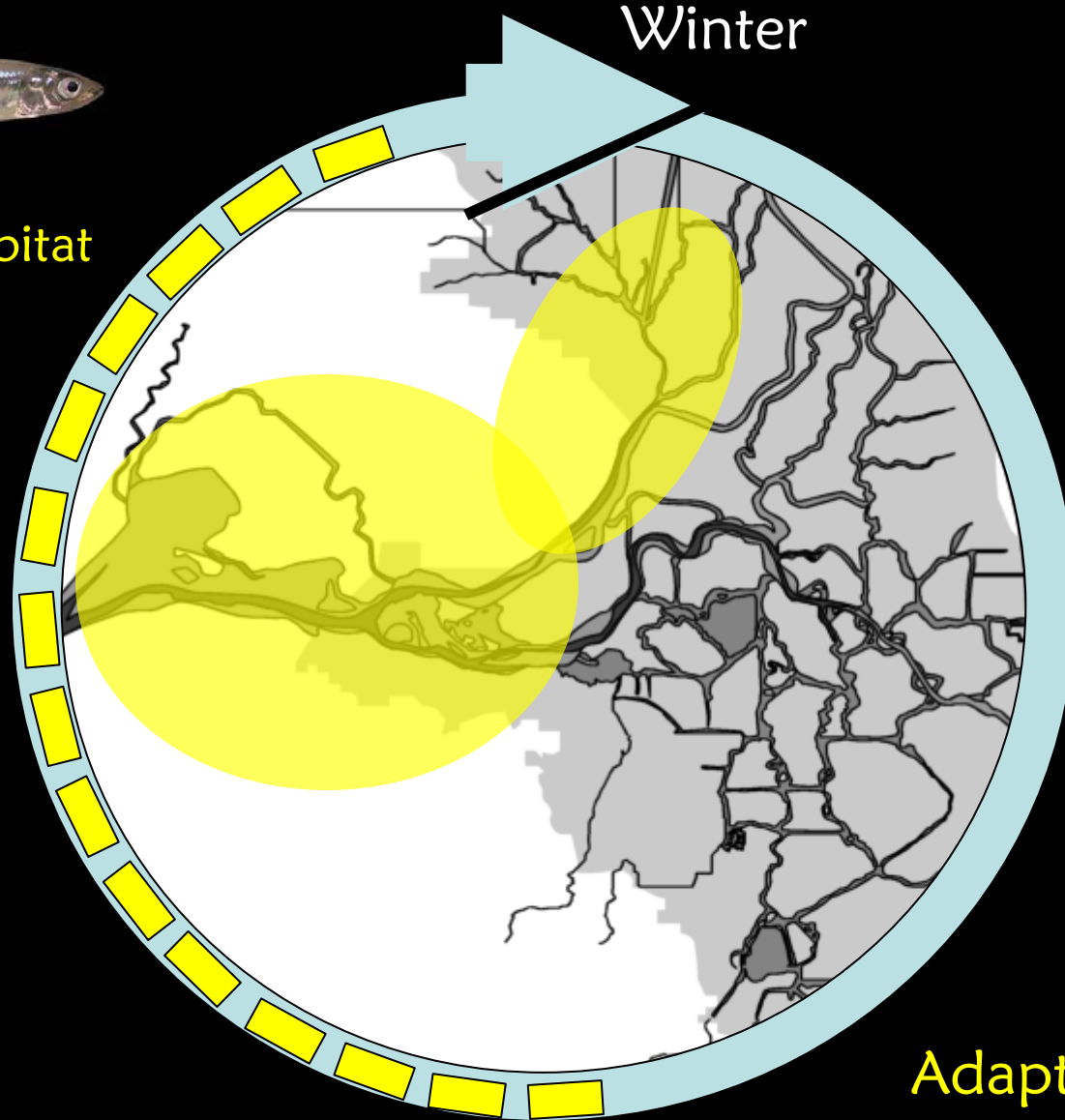
Fall

Winter

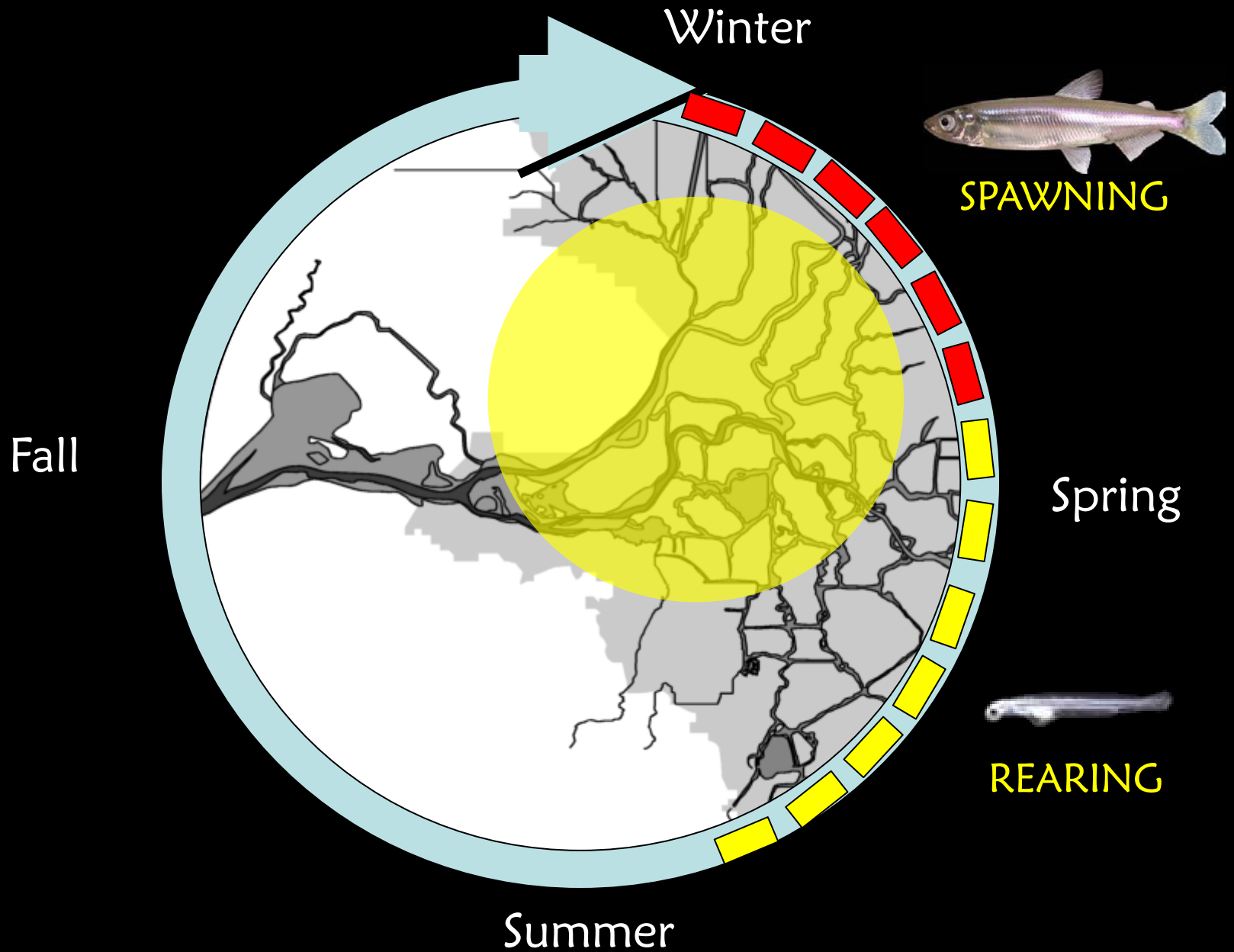
Spring

Summer

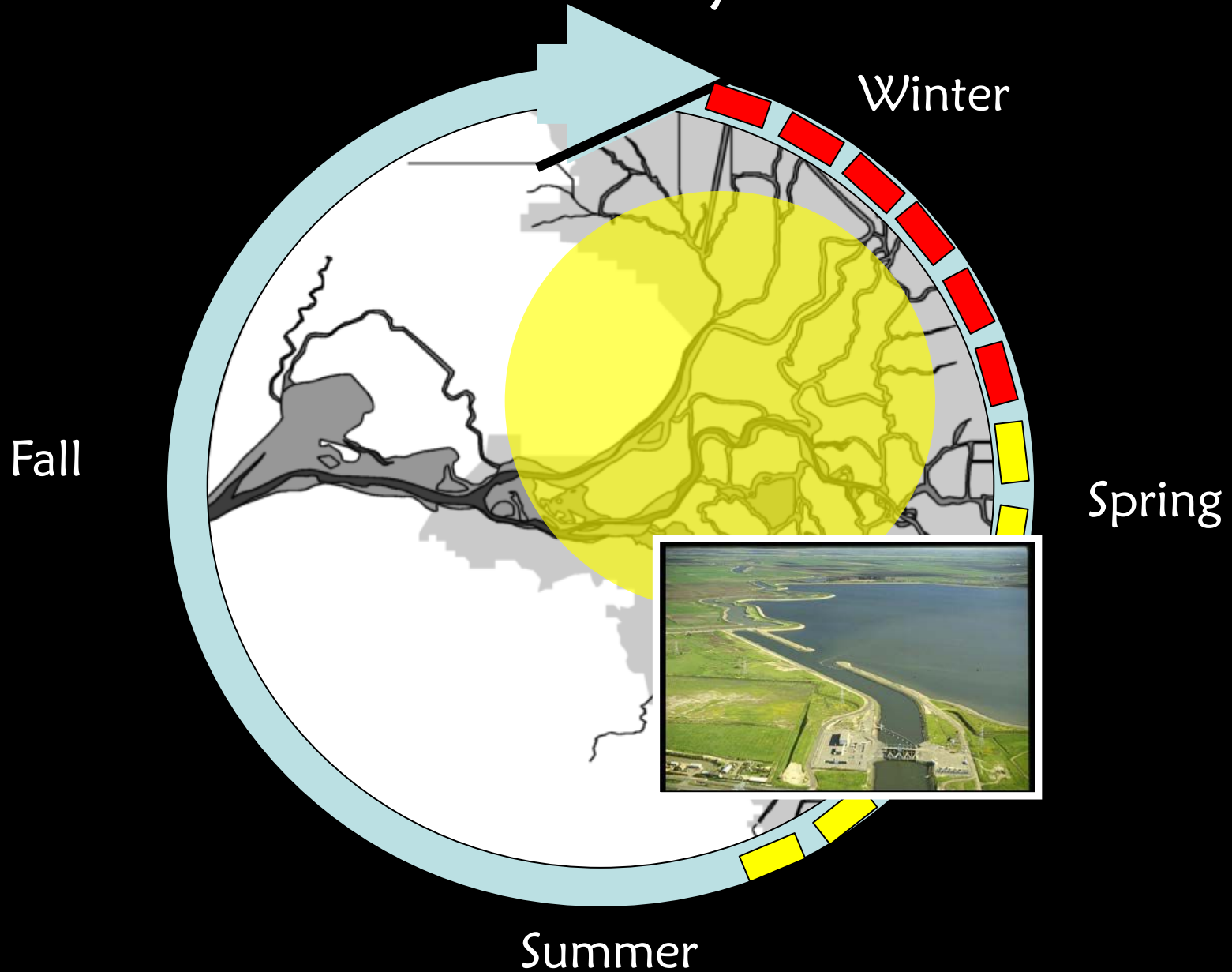
Adapted from Fred  
Feyrer, USGS



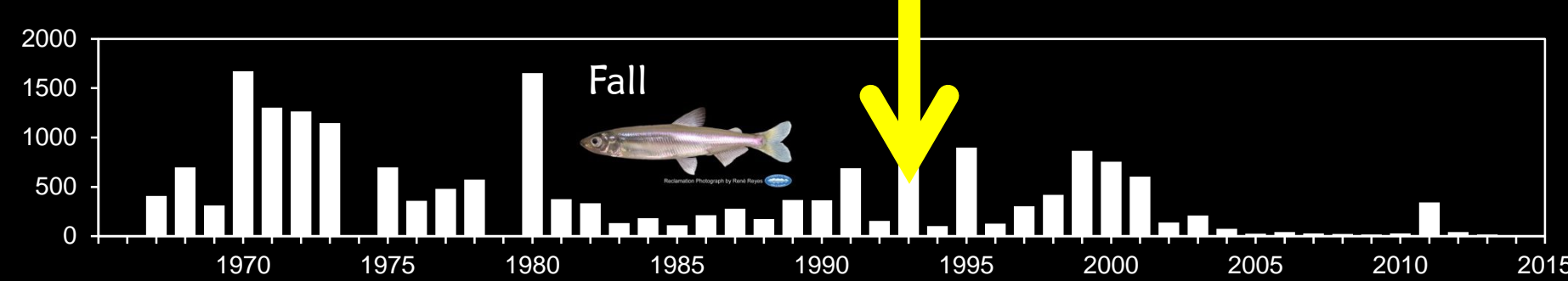
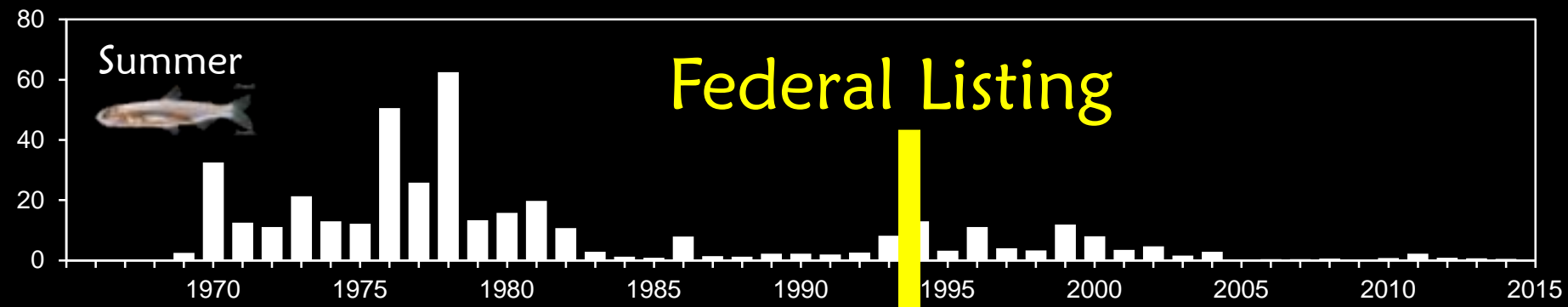
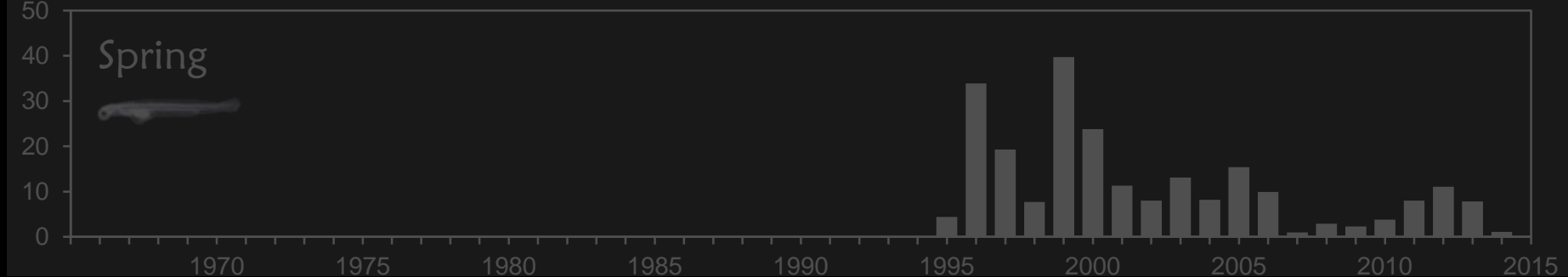
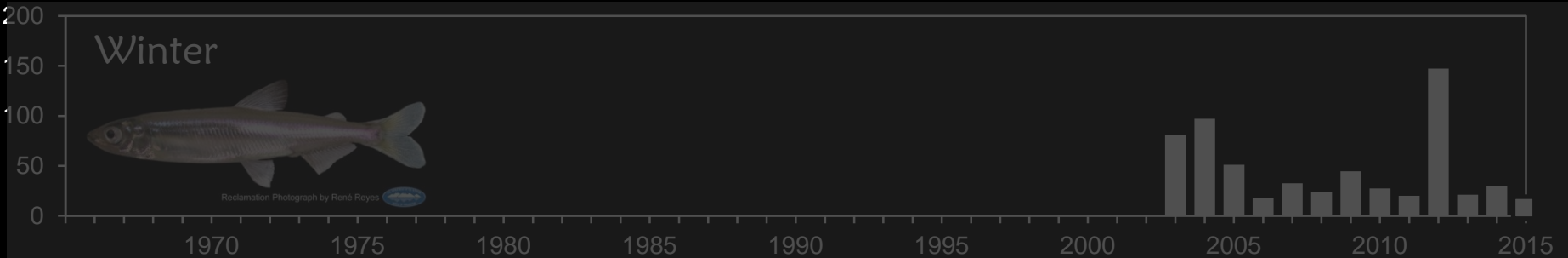
# Reproduction



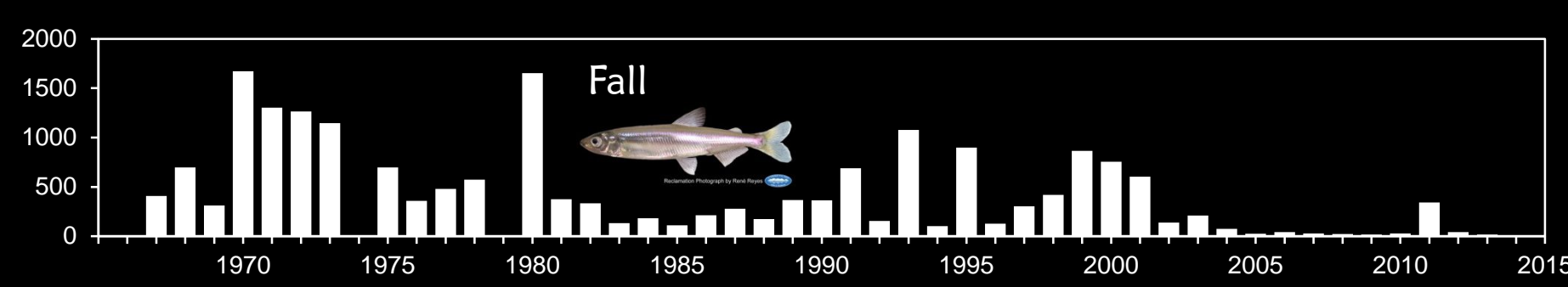
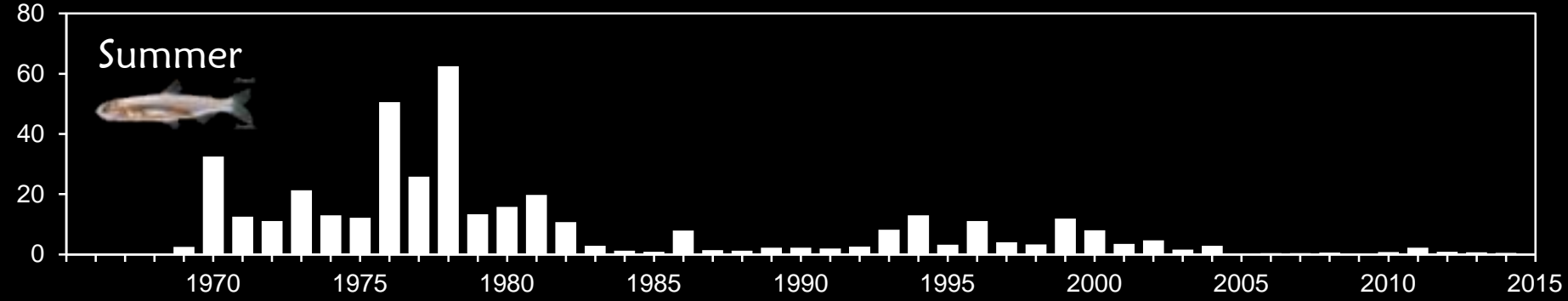
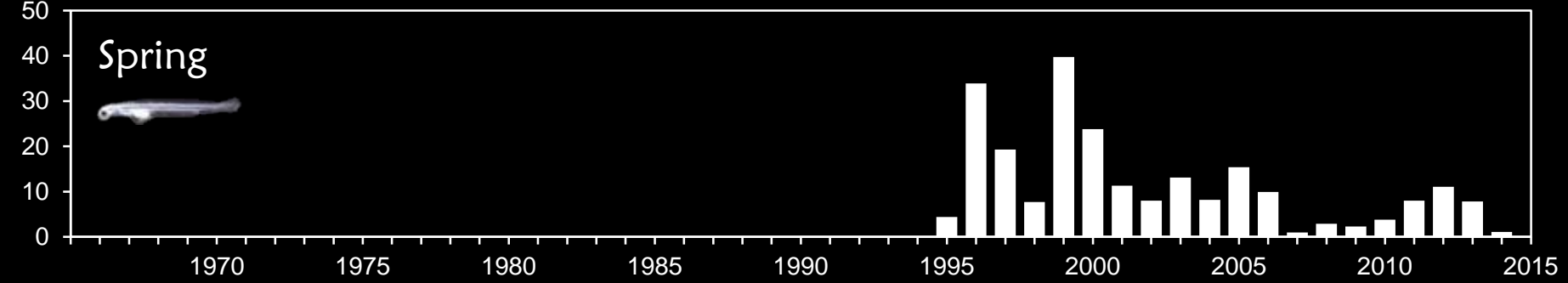
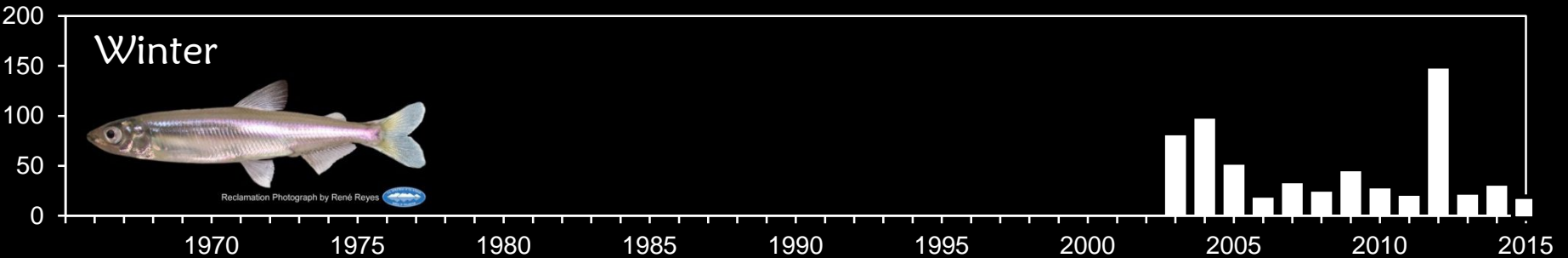
# Range Overlaps With State's Water Distribution System



# Delta Smelt Abundance Indices

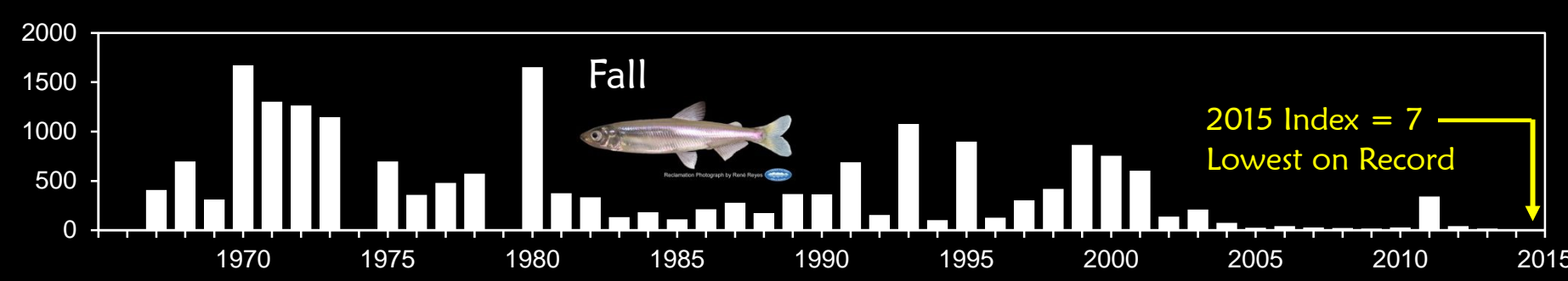
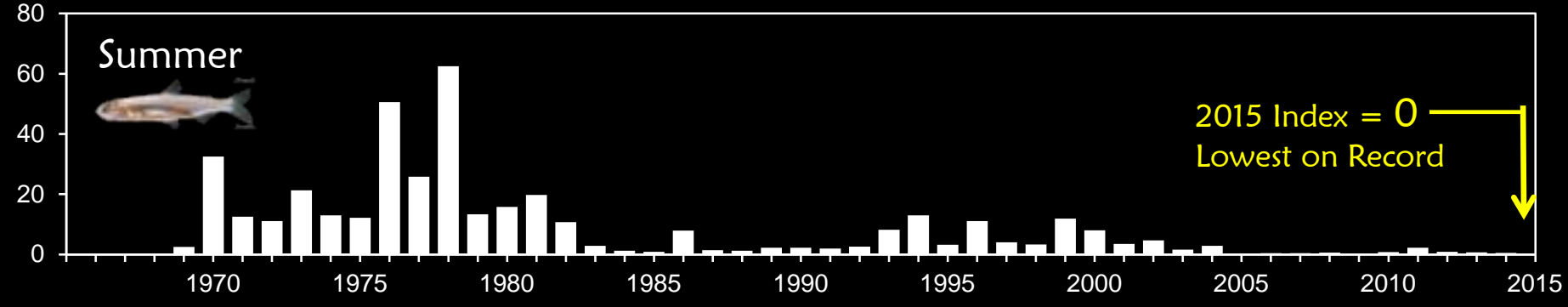
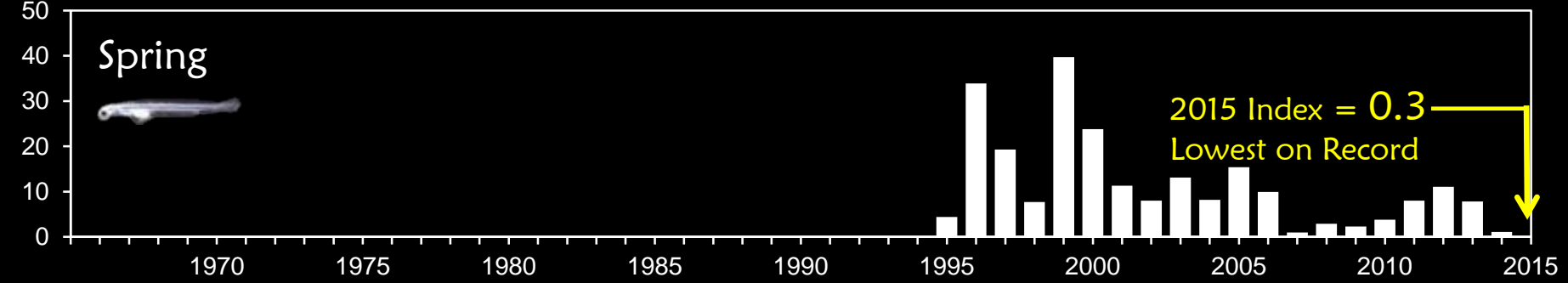
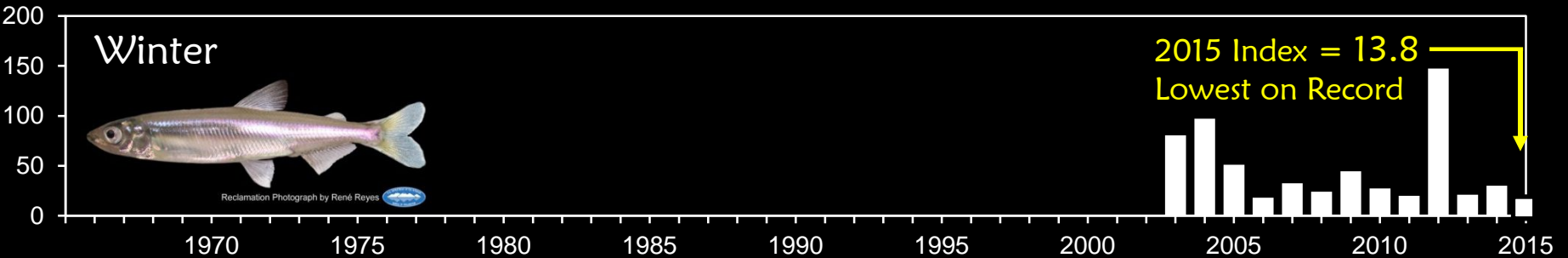


# Delta Smelt Abundance Indices



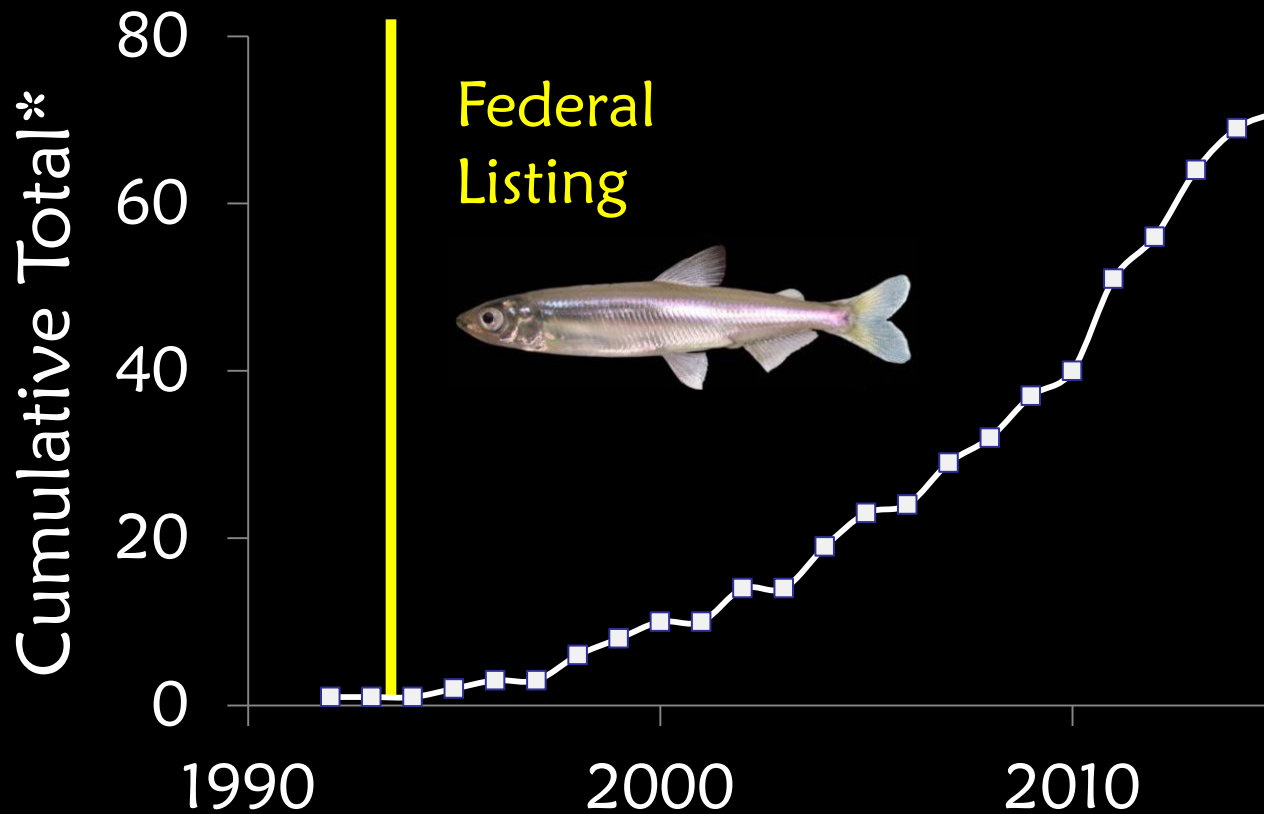


# Delta Smelt Abundance Indices at Historic Lows





# Trends in Delta Smelt Publications



\*Publications with Smelt as a Major Focus

# Recent Delta Smelt Synthesis Report

INTERAGENCY ECOLOGICAL PROGRAM, MANAGEMENT, ANALYSIS, AND SYNTHESIS TEAM

An updated conceptual model  
of Delta Smelt biology:  
our evolving understanding of an estuarine fish

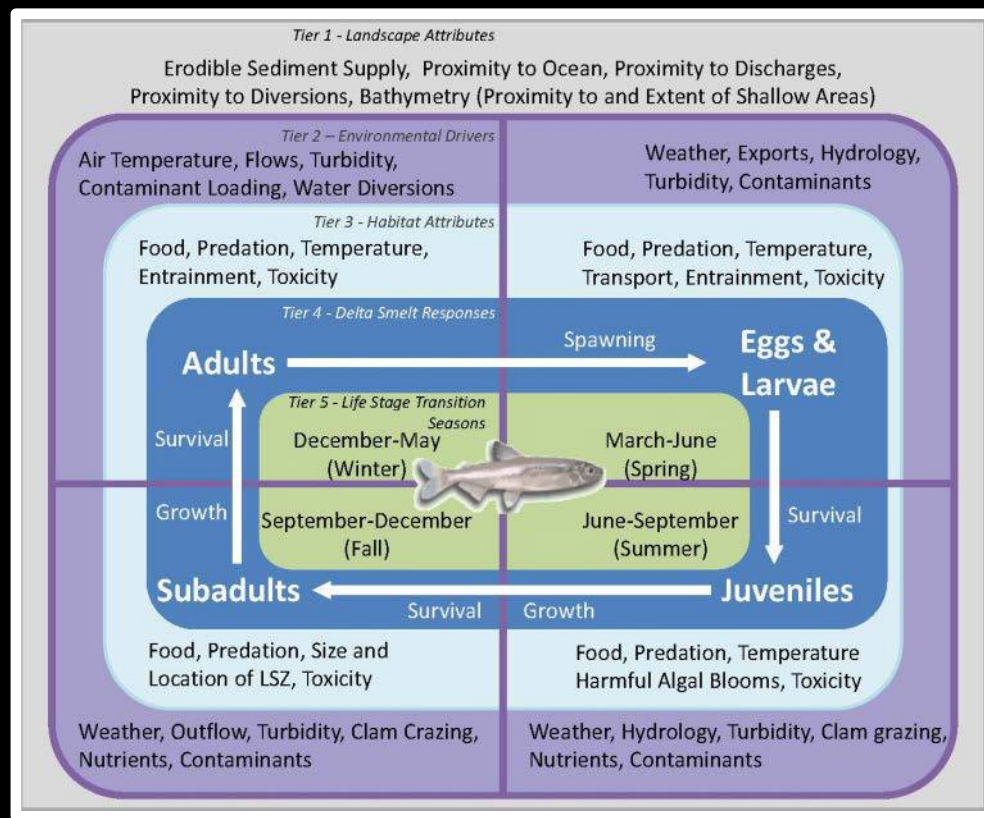


**Technical Report 90**  
**January, 2015**

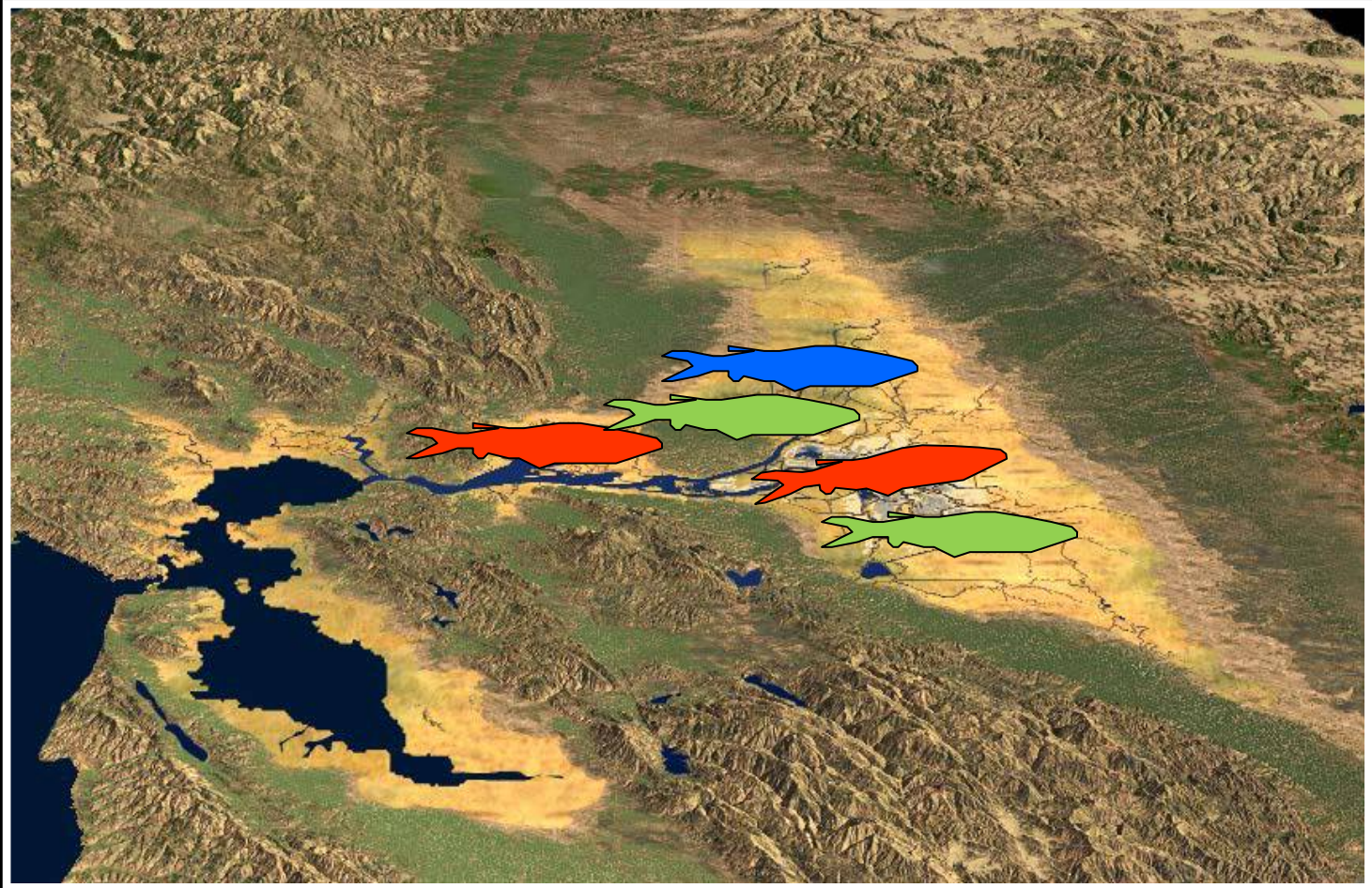
Interagency Ecological Program  
for the  
San Francisco Bay/Delta Estuary

A Cooperative Program of:

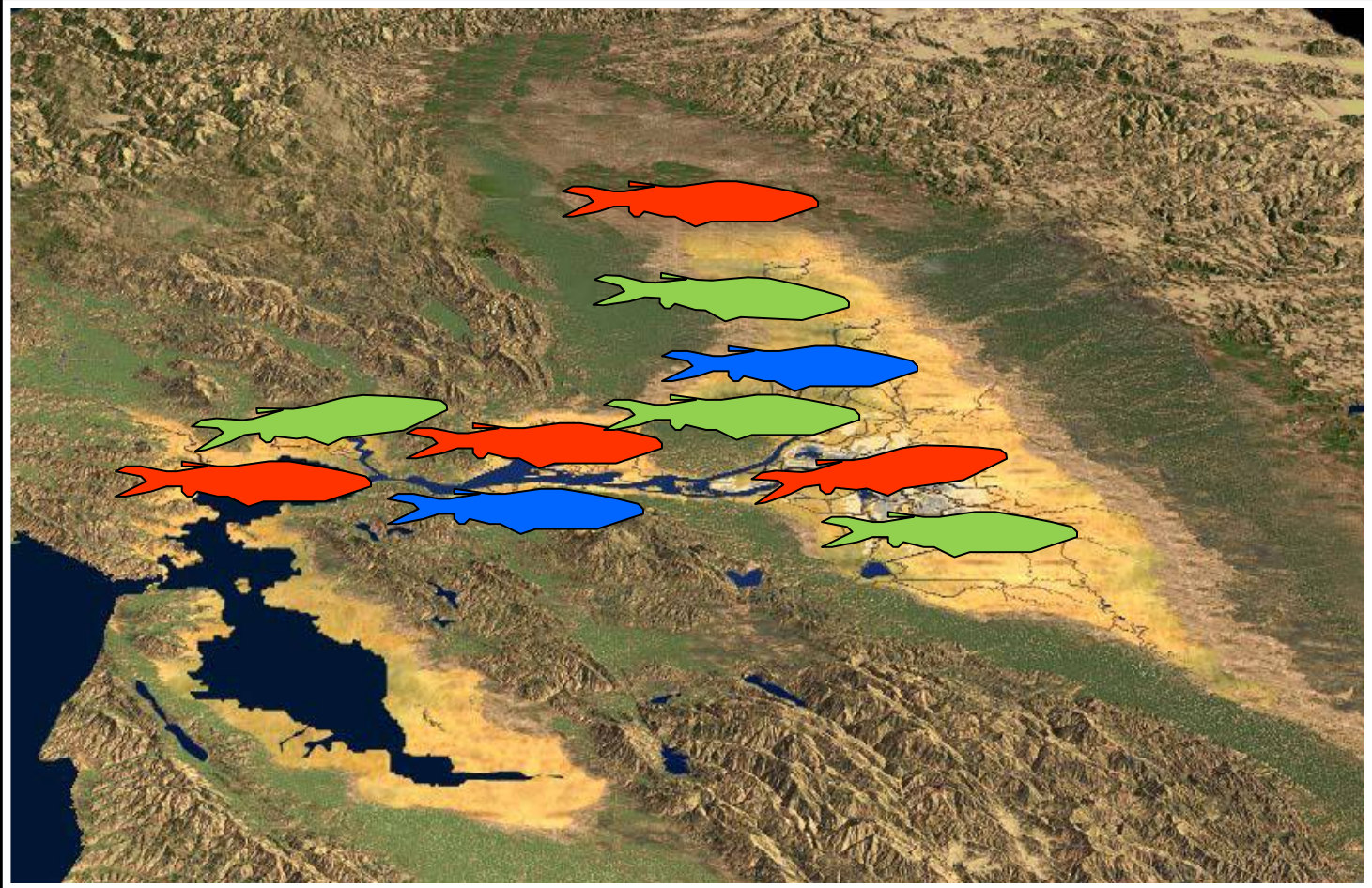
|  |                                      |
|--|--------------------------------------|
| California Department of Water Resources   | State Water Resource Control Board   |
| California Department of Fish and Wildlife | U.S. Fish and Wildlife Service       |
| U.S. Bureau of Reclamation                 | U.S. Geological Survey               |
| U.S. Army Corps of Engineers               | U.S. Environmental Protection Agency |
|  | National Marine Fisheries Service    |



# Delta Smelt □ .or?



# □ ..Bay-Delta Smelt?




# Not Such a Picky Eater?

SEPTEMBER 2014

**SAN FRANCISCO SCIENCE**  
**ESTUARY & WATERSHED**

Sponsored by the State Science Program and the U.C. Davis John Muir Institute of the Environment



**Diet, Prey Selection, and Body Condition of Age-0 Delta Smelt, *Hypomesus transpacificus*, in the Upper San Francisco Estuary**

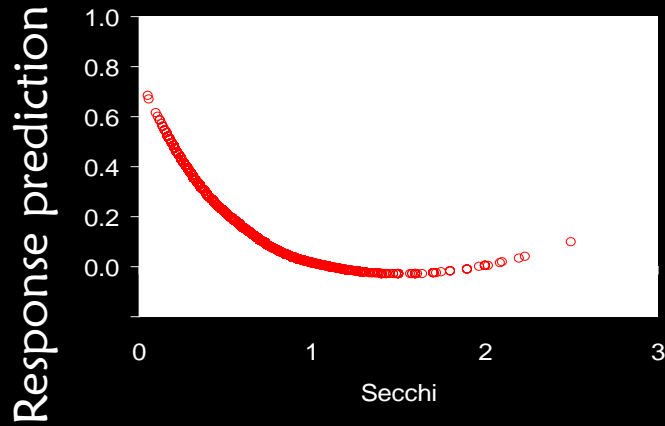
Steven B. Slater\* and Randall D. Baxter

2006 - % weight

| Category | Prey                           | April | Sept |
|----------|--------------------------------|-------|------|
| Pelagic  | <i>Eurytemora</i>              | 16.1  | 0    |
|          | <i>Pseudodiaptomus</i>         | 4     | 53.9 |
|          | <i>Other calanoid copepods</i> | 12.4  | 3.4  |
|          | <i>Cyclopoid copepods</i>      | 67.1  | 12.3 |
|          | <i>Cladocerans</i>             | 0     | 2.4  |
| Demersal | <i>Harpacticoid copepods</i>   | 0     | 22.6 |
|          | <i>Amphipods</i>               | 0     | 3.7  |

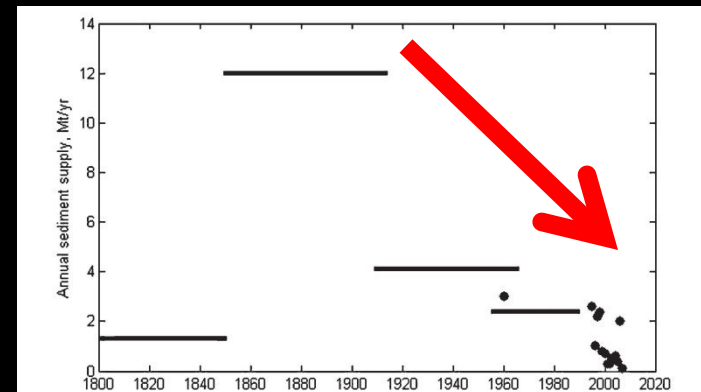
# □ Love That Dirty Water □

## Smelt Require High Turbidity



Feyrer, F., M. Nobriga, and T. Sommer. 2007. CJFAS 64:723-734.

## Long Term Reduction in Sediment Supply

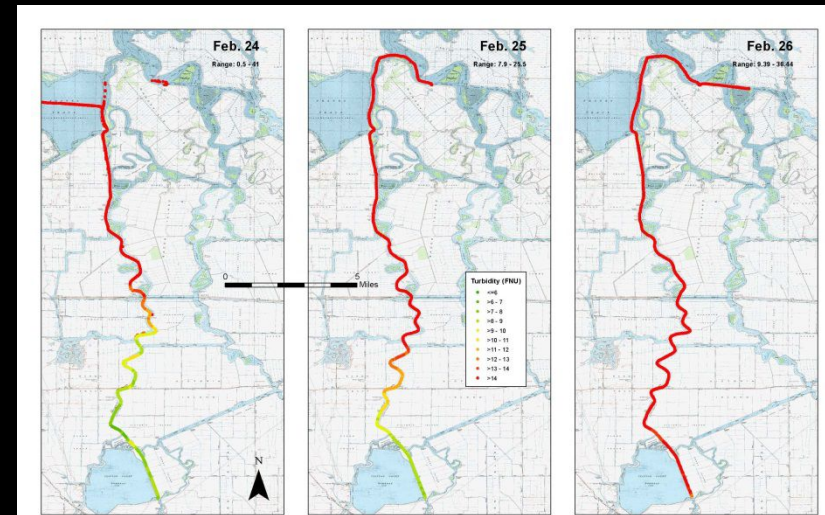
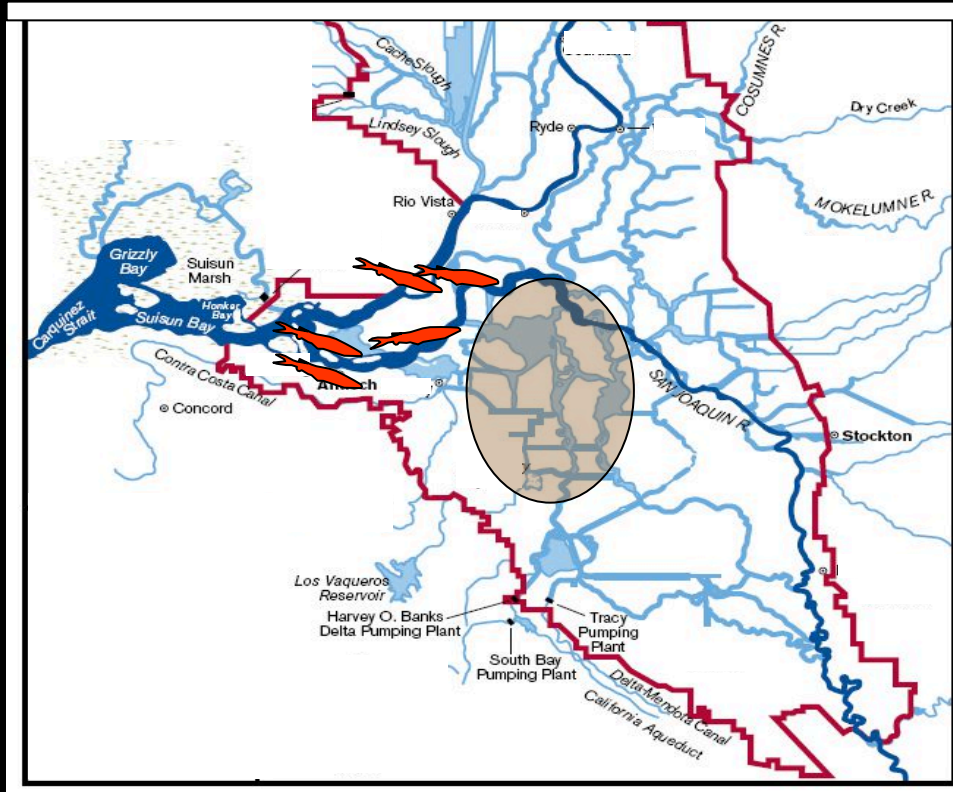


**Fig. 3** Estimated annual sediment supply from the Central Valley to San Francisco Bay. Estimates from Gilbert (1917), Krone (1979), Porterfield (1980), Ogden Beeman and Associates (1992), McKee et al. (2006), and David et al. (2009). *Bars* indicate estimates over entire period, and *points* indicate yearly estimates. A bulk density of 850 kg/m<sup>3</sup> was assumed (Porterfield 1980)

Schoellhamer, D. 2011. Estuaries and Coasts 34:885-899

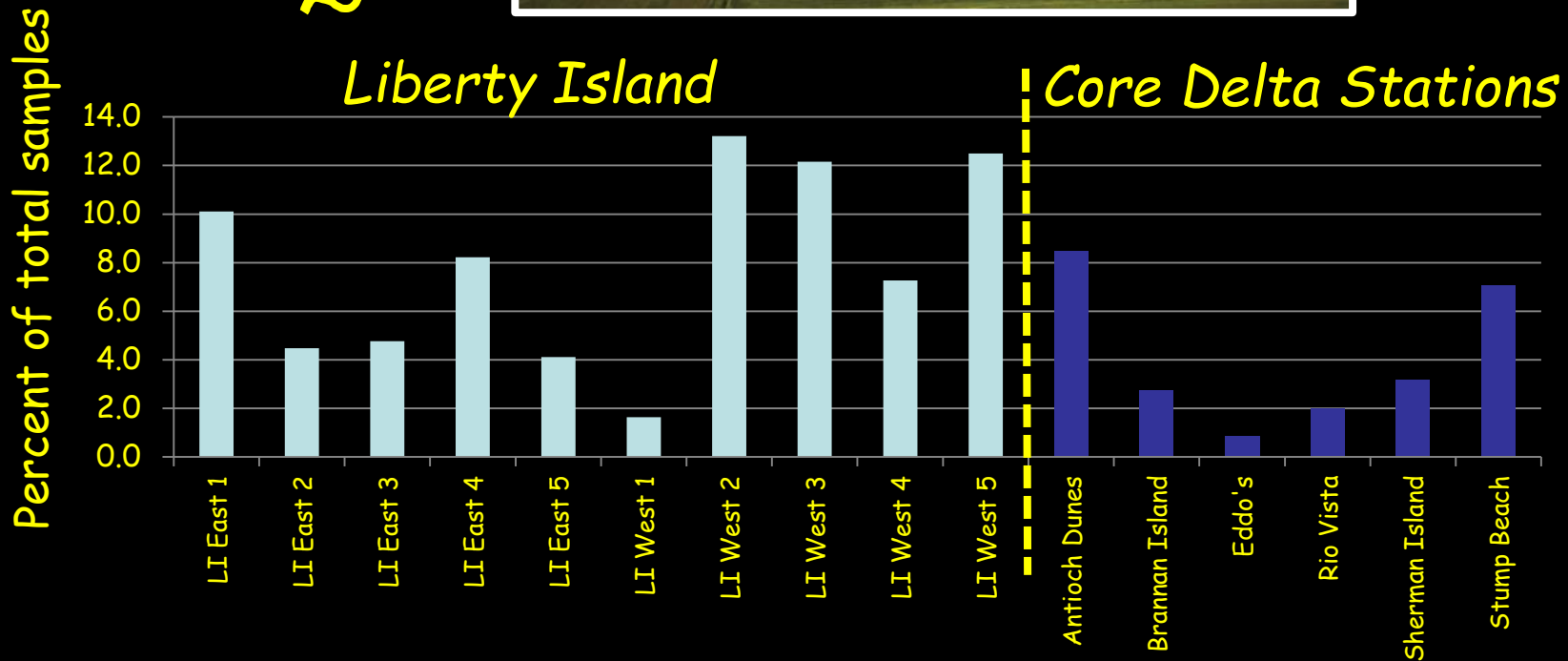
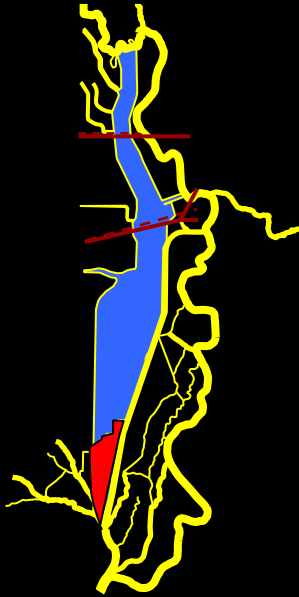


# Management of Turbidity to Reduce Fish Entrainment



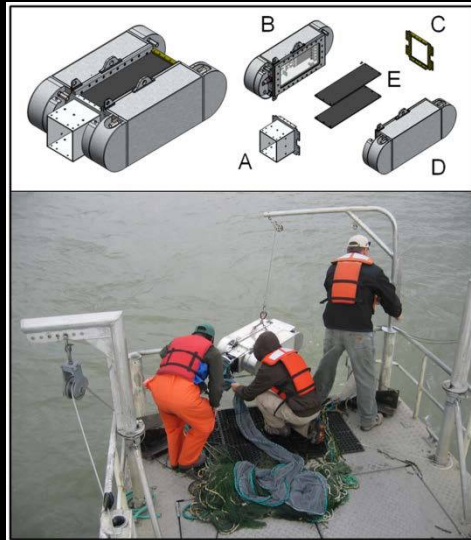
NOTE: Reports have not undergone initial quality assurance and quality control procedures.

# Habitat = Not Just Pelagic



# Monitoring Improvements

- SmeltCAM (*USGS*).
- □Early Warning□ trawling in channels leading to water diversions (*USFWS*).
- Genetic estimation of effective population size. (*UC Davis*)
- Environmental DNA sampling (*UC Davis*).
- Gear efficiency (*DFW*)



*Questions?*

