

# **Delta Habitat**

## **Can a Healthy Delta Habitat Be Restored?**

**Christina Swanson**

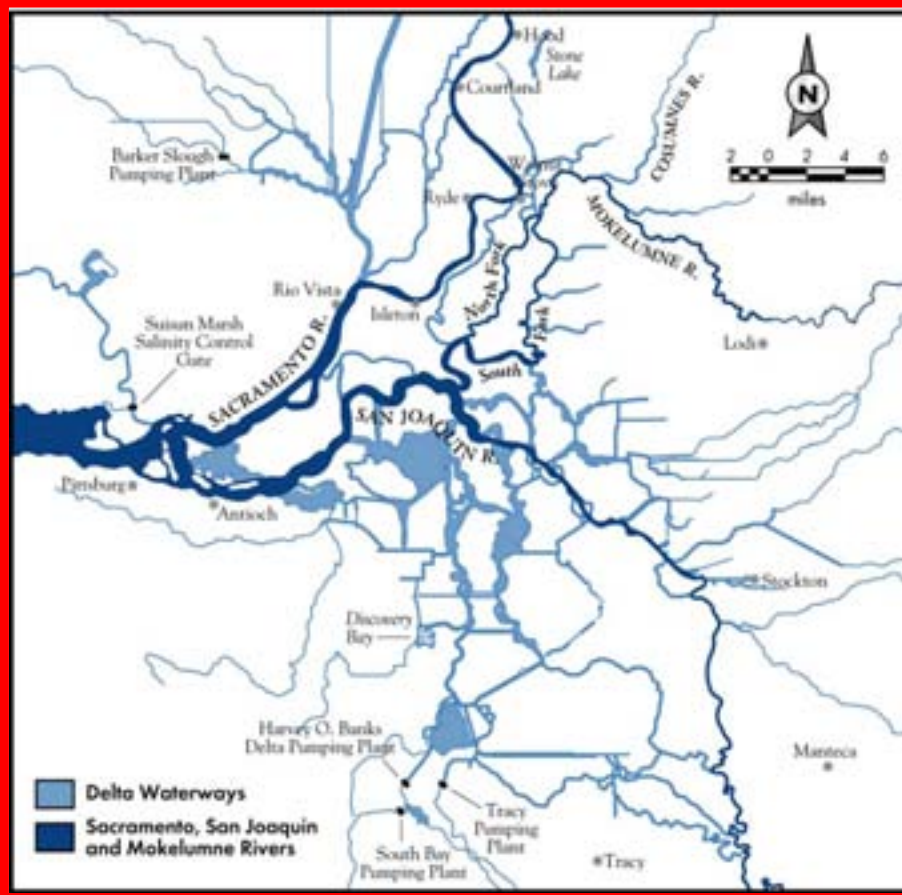


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**www.bay.org**

**League of Women Voters of the Bay Area**  
**Water: California's New Gold**  
January 31, 2009





# Sacramento-San Joaquin Delta

# Key Elements of Delta Habitat

## Environment

### WATER

- Amount
- Timing
- Pattern
- Pollution

### LANDSCAPE

- Amount
- Geometry
- Elevation
- Land use

+

**Plants and Animals**

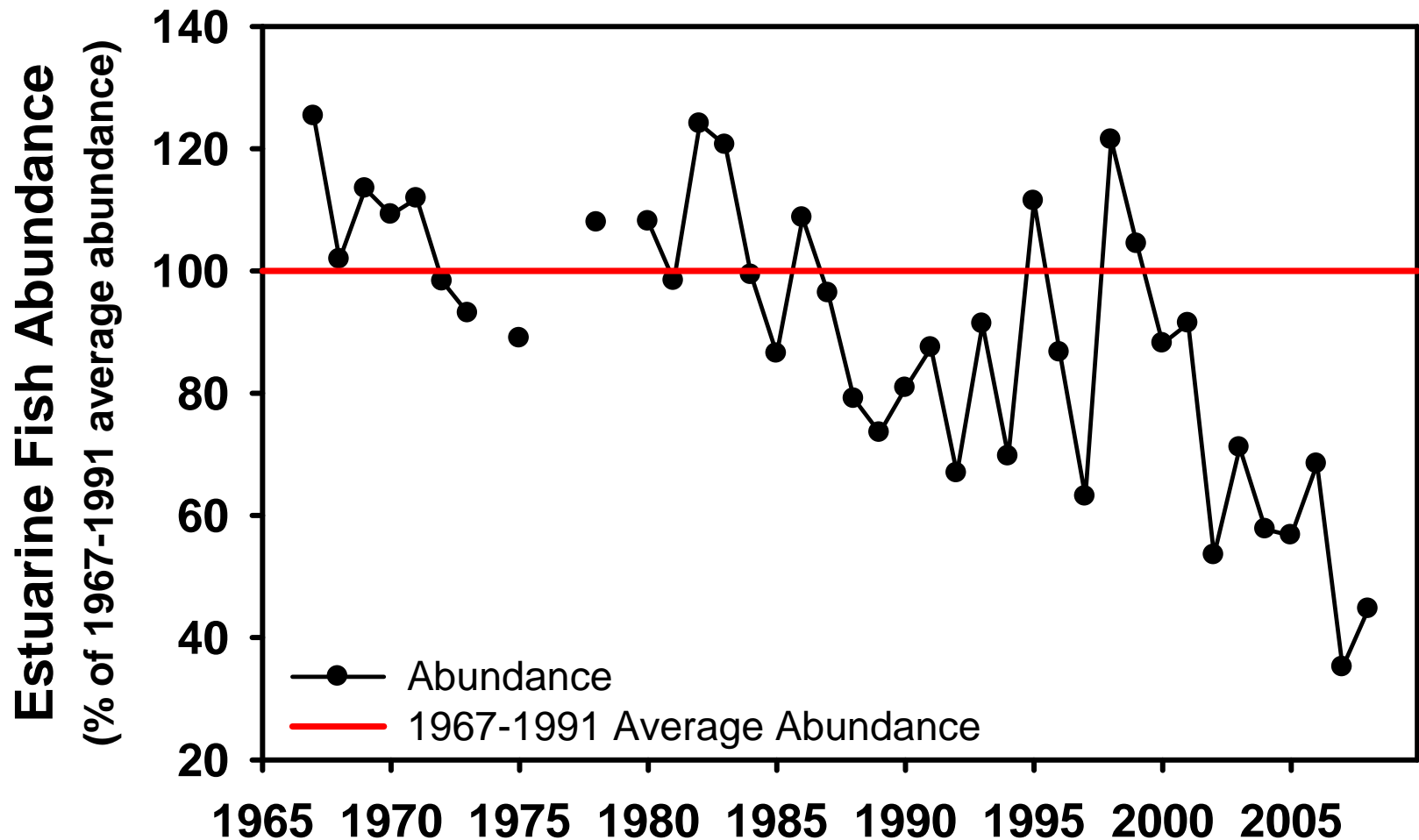
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**ECOSYSTEM**



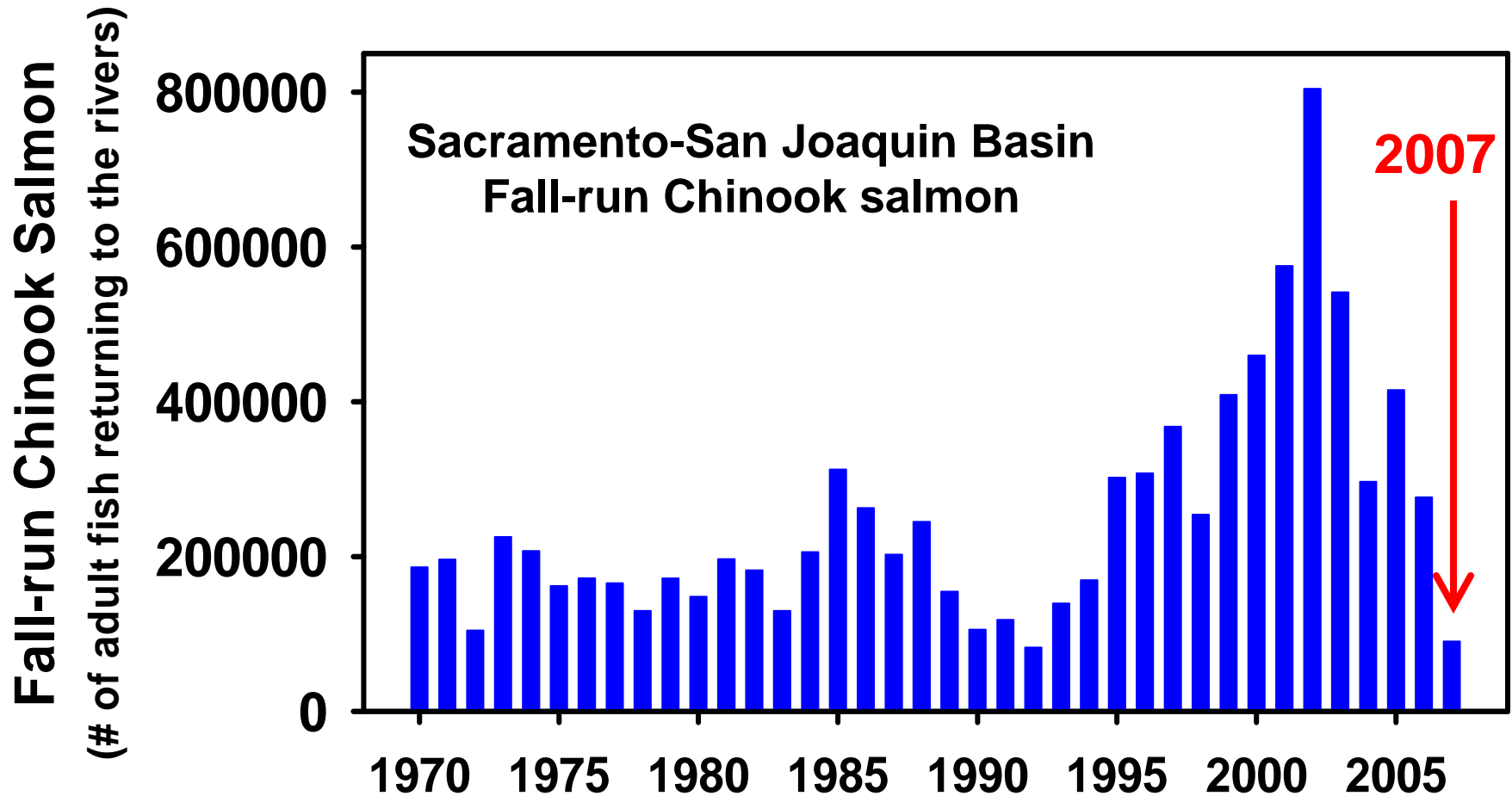
# Recent trends in Delta fishes

- Delta smelt, longfin smelt, splittail, striped bass fall to record or near record lows



# Recent trends in salmon

- Winter-run Chinook salmon decline sharply
- Fall-run Chinook salmon fall to near record lows



# The Delta's Transformed Watershed

**Dams**

**Water Diversions**

- In-stream

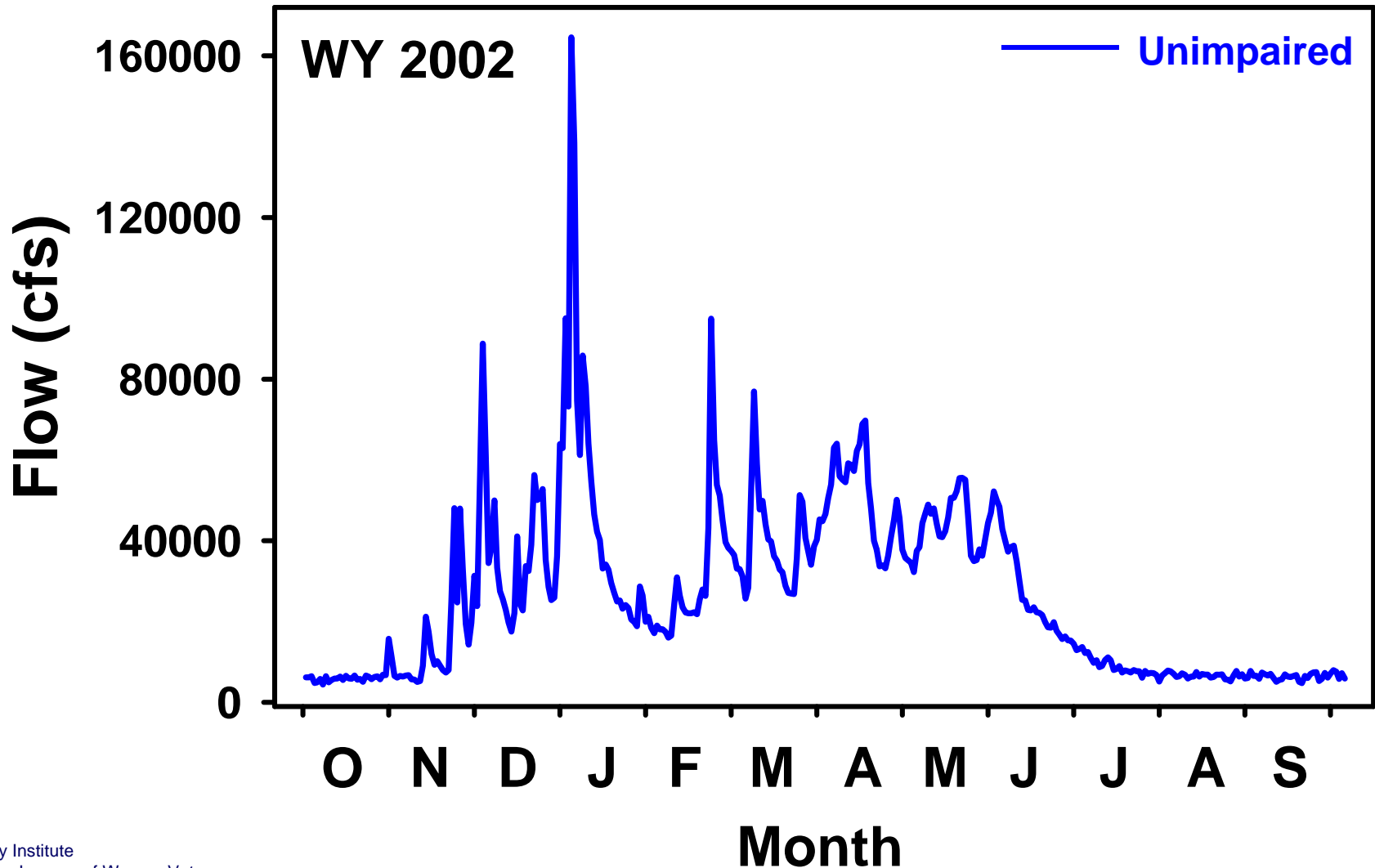
- Delta (upper estuary)

**Land Use**

From: *Sierra to the Sea* (TBI 1998)

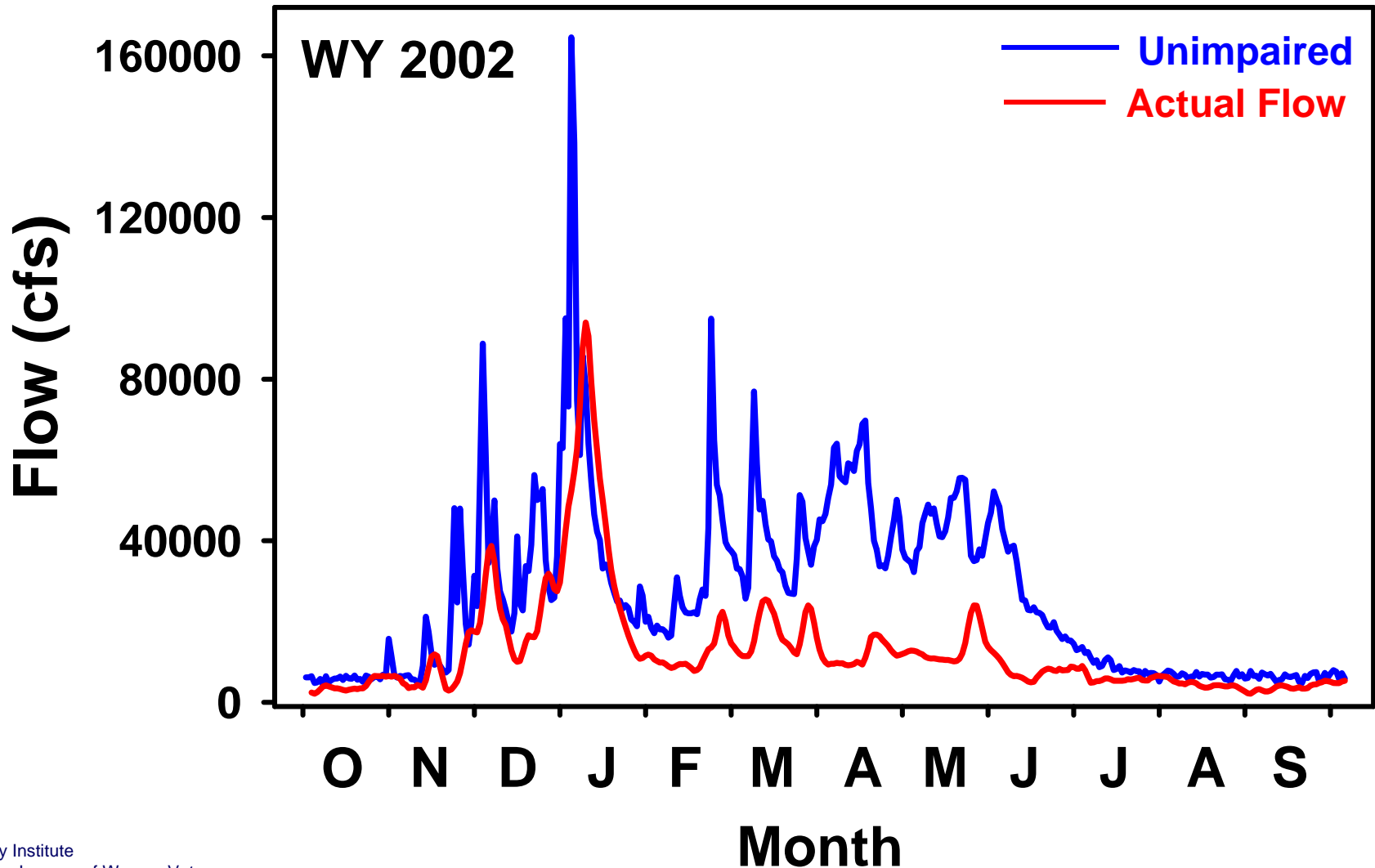


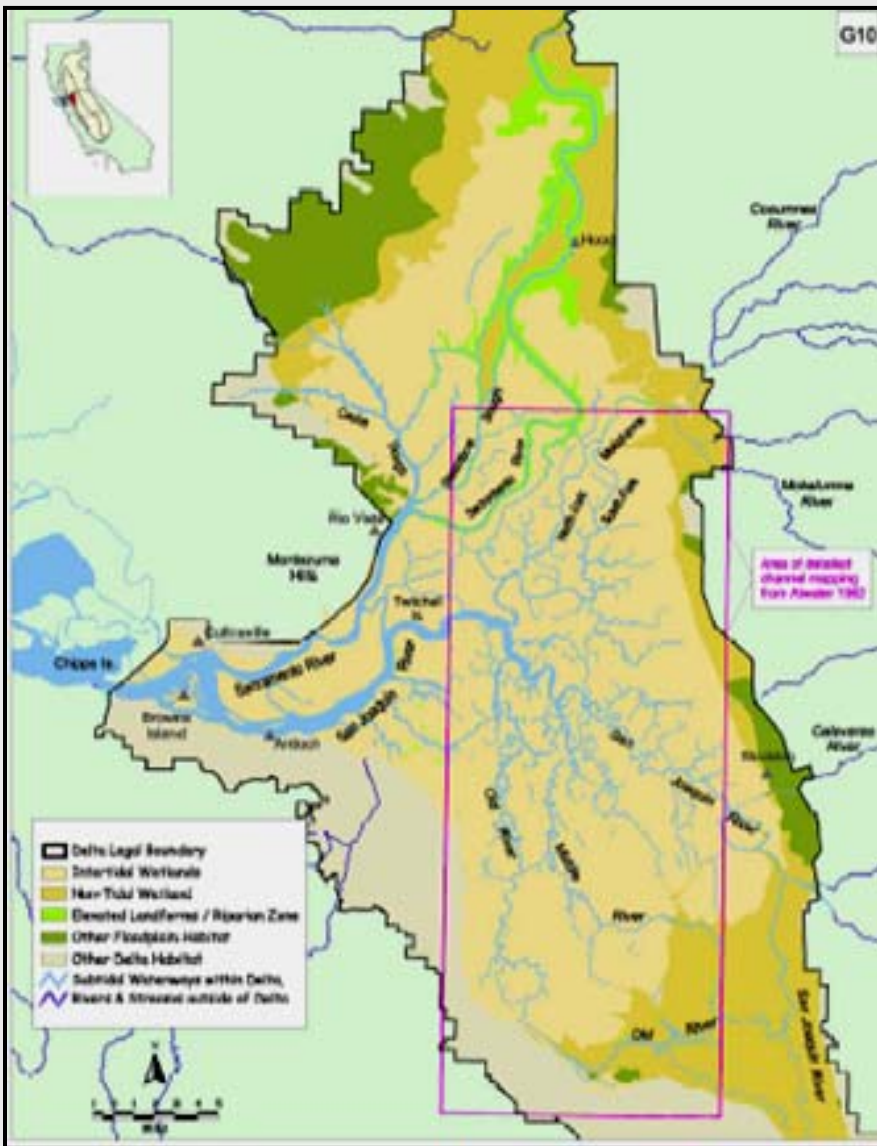
# Freshwater flow through the Delta



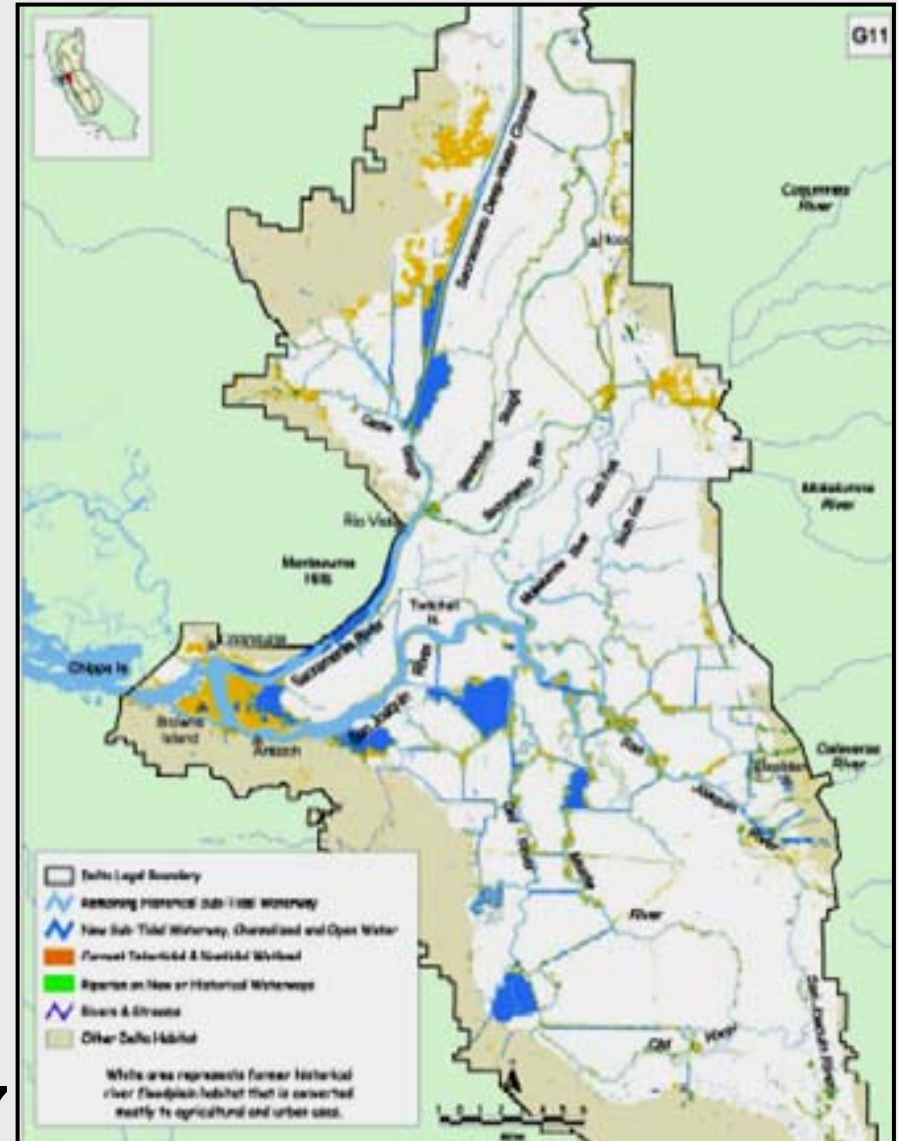


# Freshwater flow through the Delta



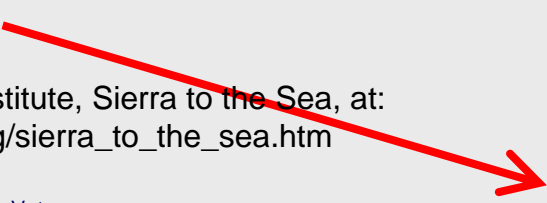


- Wetlands
- Tidal marsh
- Seasonal floodplains

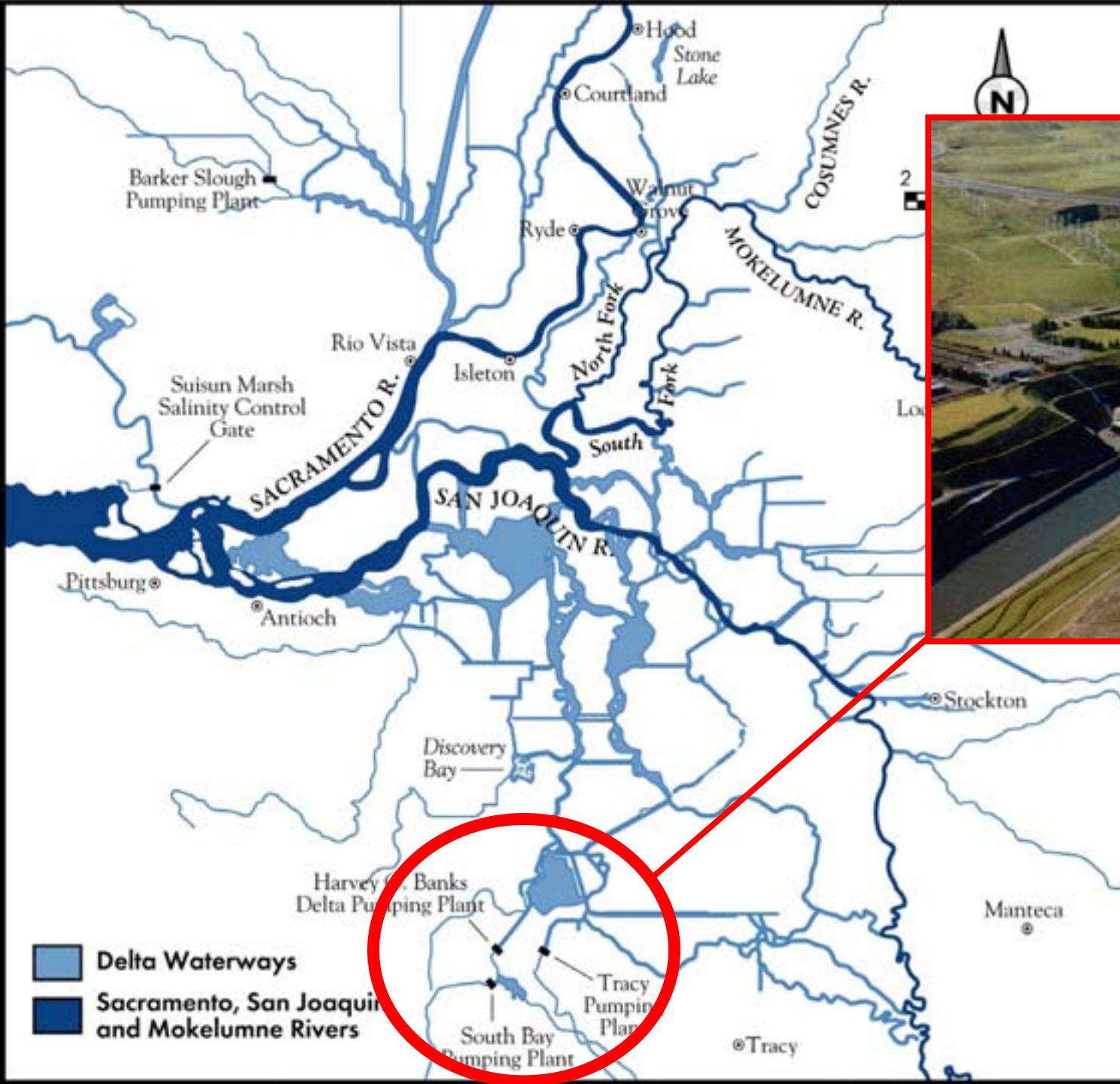


**c. 1850**

**1997**

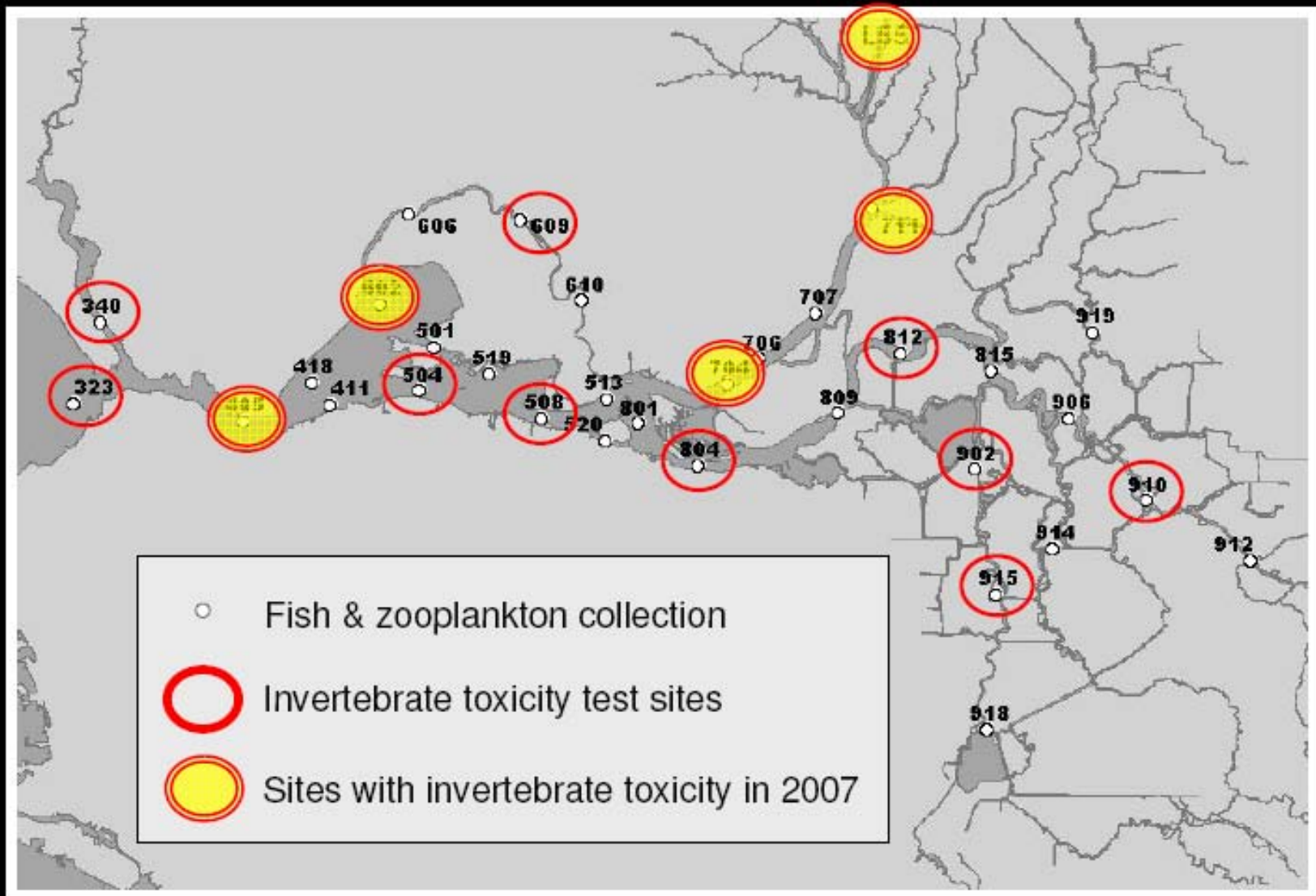


From: The Bay Institute, Sierra to the Sea, at:  
[http://www.bay.org/sierra\\_to\\_the\\_sea.htm](http://www.bay.org/sierra_to_the_sea.htm)



# Jan. - July 2007 Toxicity in the North Delta

Inge Werner, UCD



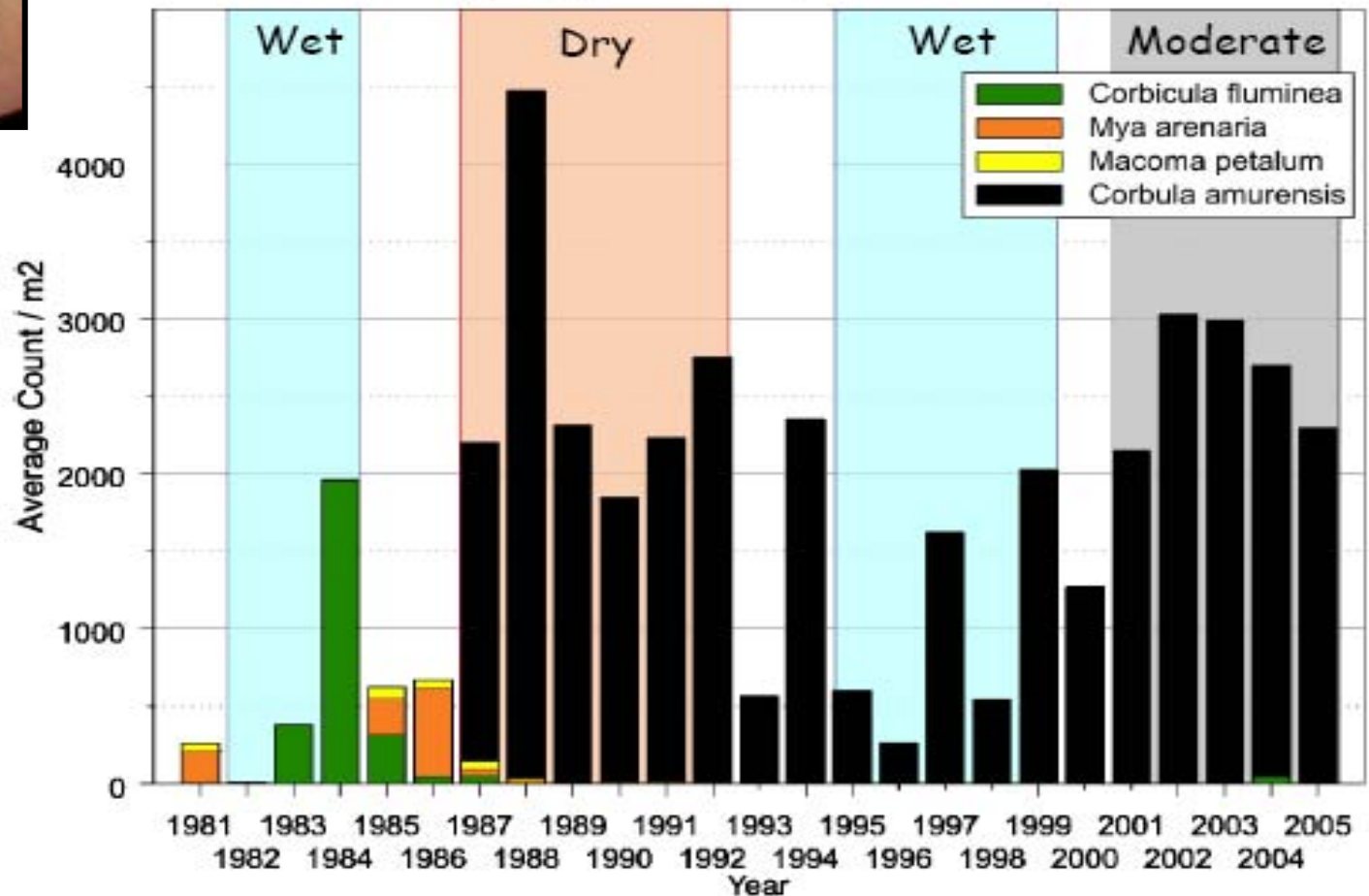
From: IEP presentation to the SWRCB, 1/22/08, available at:

[http://www.waterrights.ca.gov/baydelta/docs/pelagicorganism/012208\\_pod\\_podmt\\_ppt.pdf](http://www.waterrights.ca.gov/baydelta/docs/pelagicorganism/012208_pod_podmt_ppt.pdf)

# Invasive Species

## Salinity variation also affects clams

Grizzly Bay (1981-2005) - Bivalves

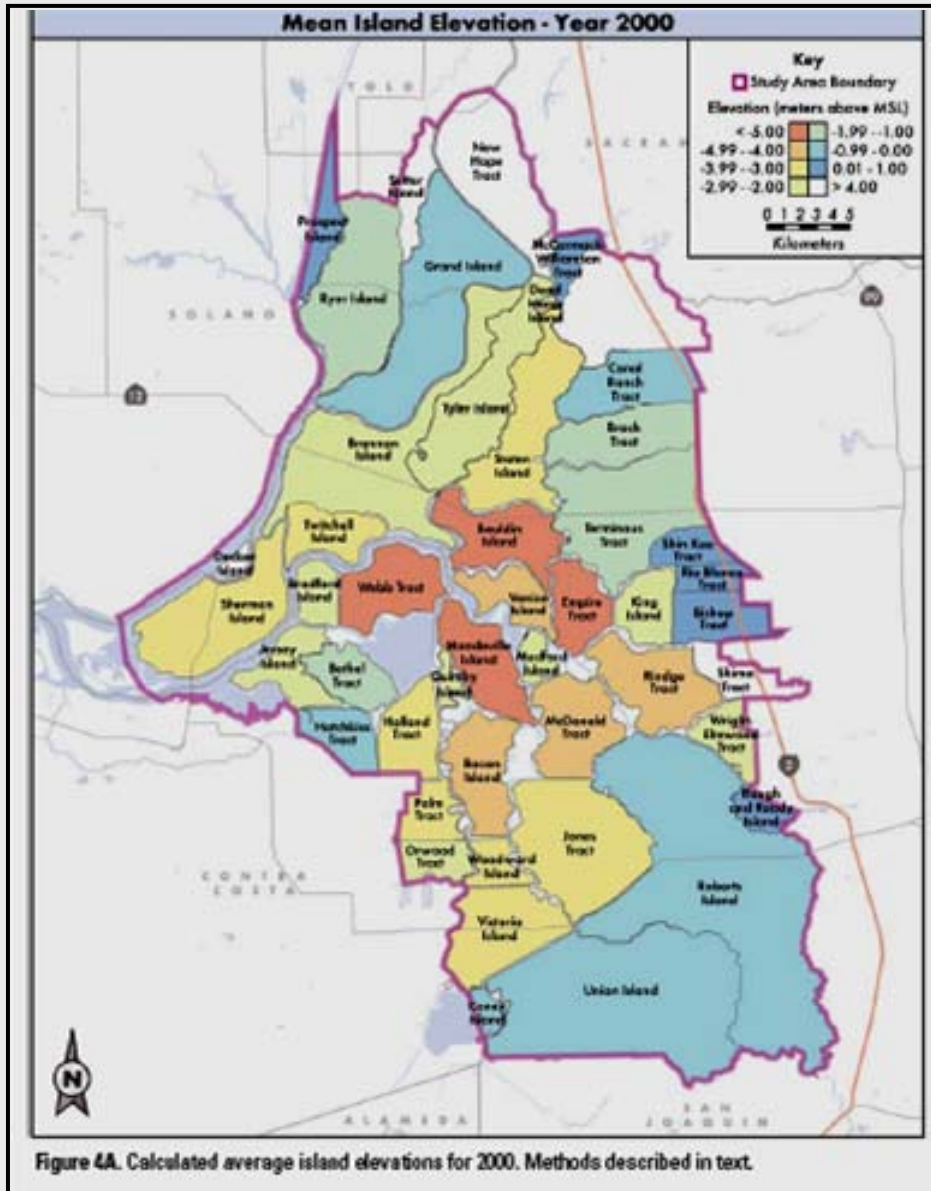


Source: Marc Vaysierres and others (DWR)

From: IEP presentation to the SWRCB, 1/22/08, available at: [http://www.waterrights.ca.gov/baydelta/docs/pelagicorganisms/012208\\_pod\\_podmt\\_ppt.pdf](http://www.waterrights.ca.gov/baydelta/docs/pelagicorganisms/012208_pod_podmt_ppt.pdf)



# Delta at high risk of catastrophic levee failure



**Can the Delta be restored?**

**No**

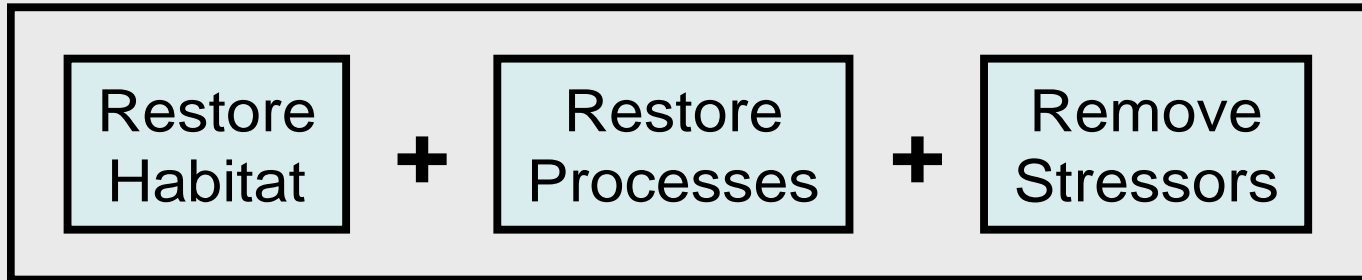
- **Permanent changes in Delta landscape**

**Can healthy habitat in the Delta  
be restored?**

**Yes**

- **Use the Restoration Recipe**

# Restoration Recipe\* for a Healthy Delta Habitat



Improved and Resilient  
Ecosystem Functions

Desired Ecosystem  
Characteristics

\* Developed by the  
Delta Vision  
Ecosystem Restoration  
Workgroup



# Restore Habitat

- Shoreline and intertidal habitat (marshes)
- Floodplain habitat
- Open water habitat

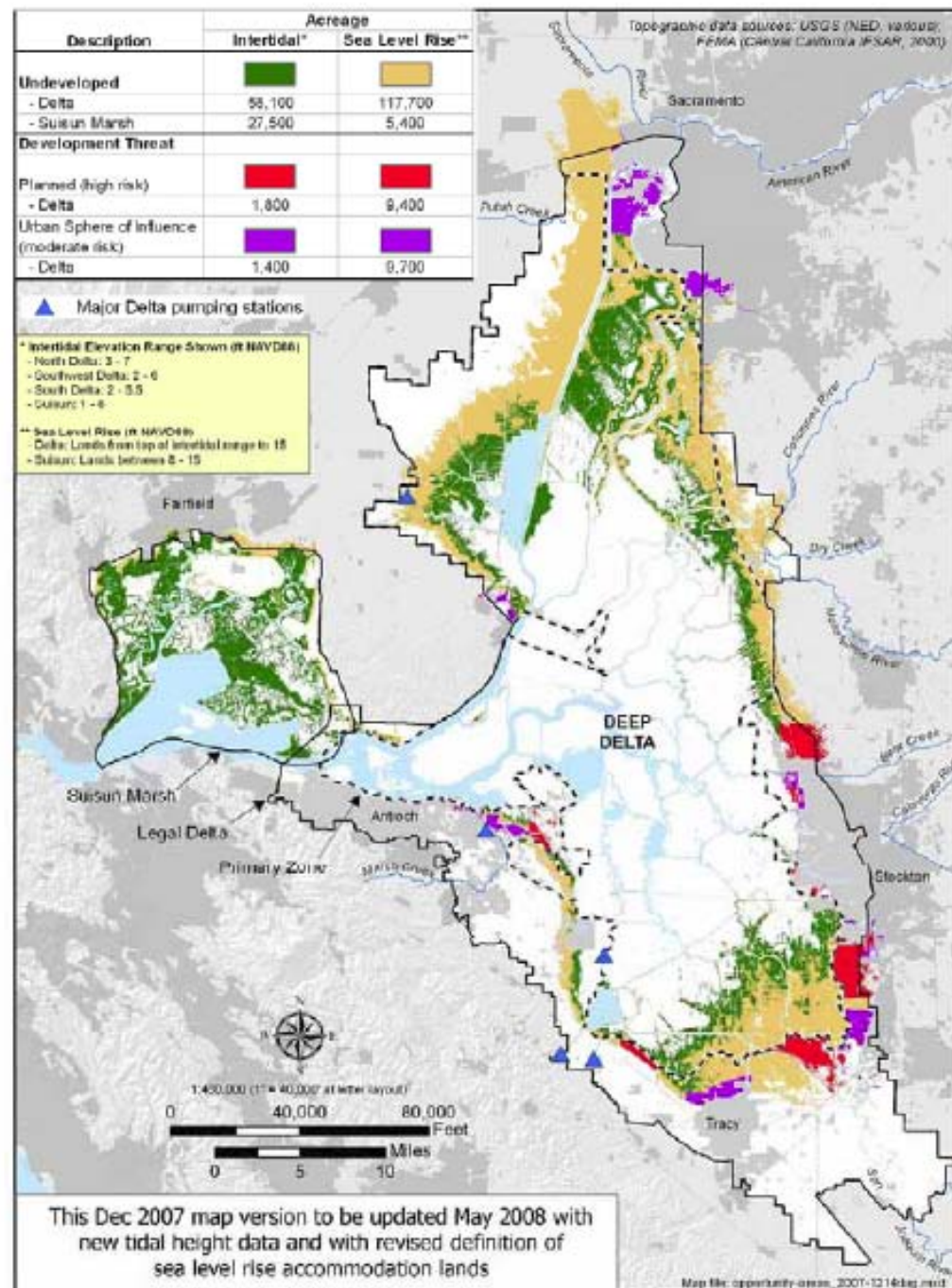
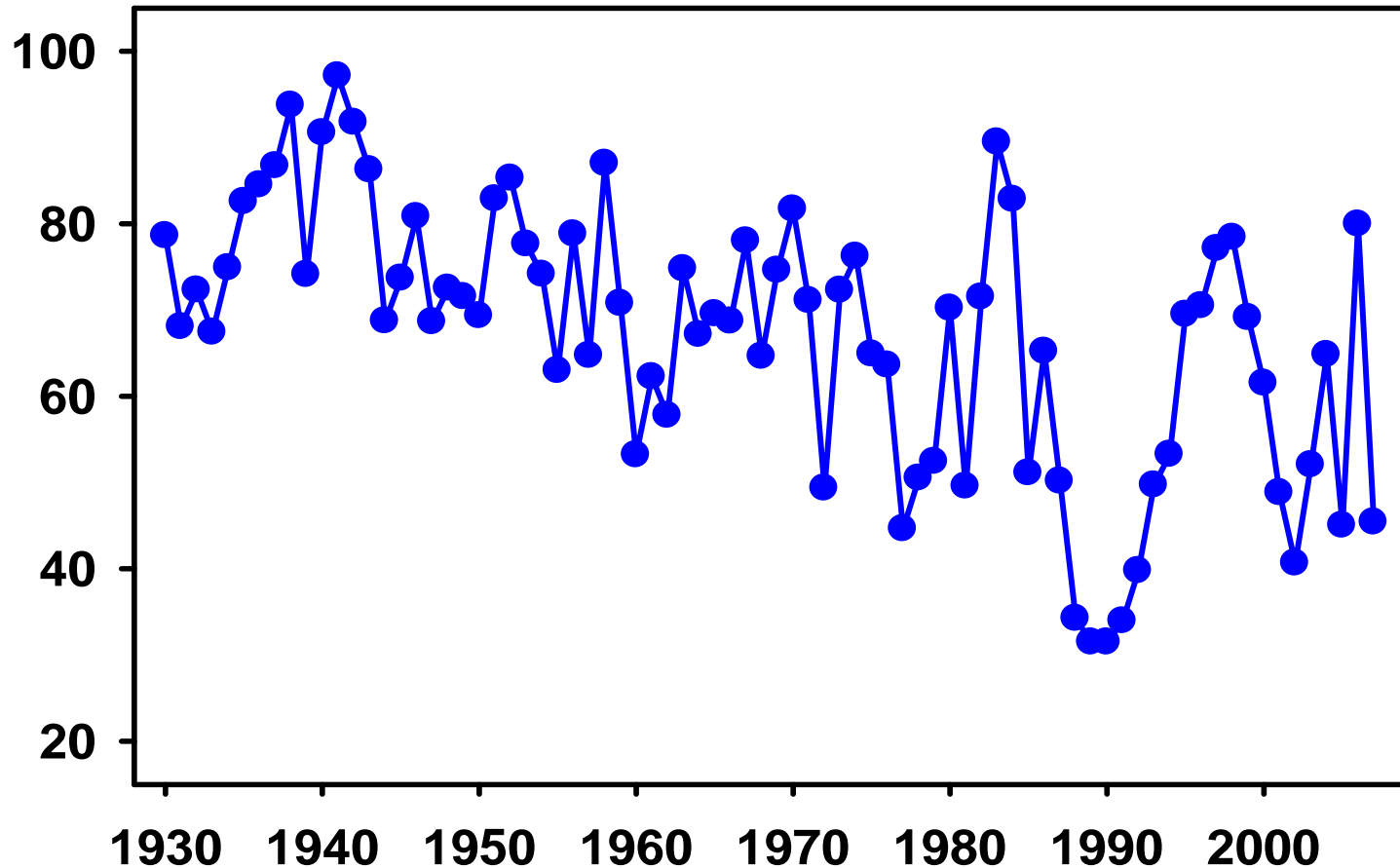


Figure 6. Intertidal and Low-Lying Uplands Elevations in the Delta and Suisun

# Restore Processes

- Flow and transport
- Key ecological driver
- Open water habitat
- Floodplain habitat

Freshwater Flow through the Delta  
(% of unimpaired flow)

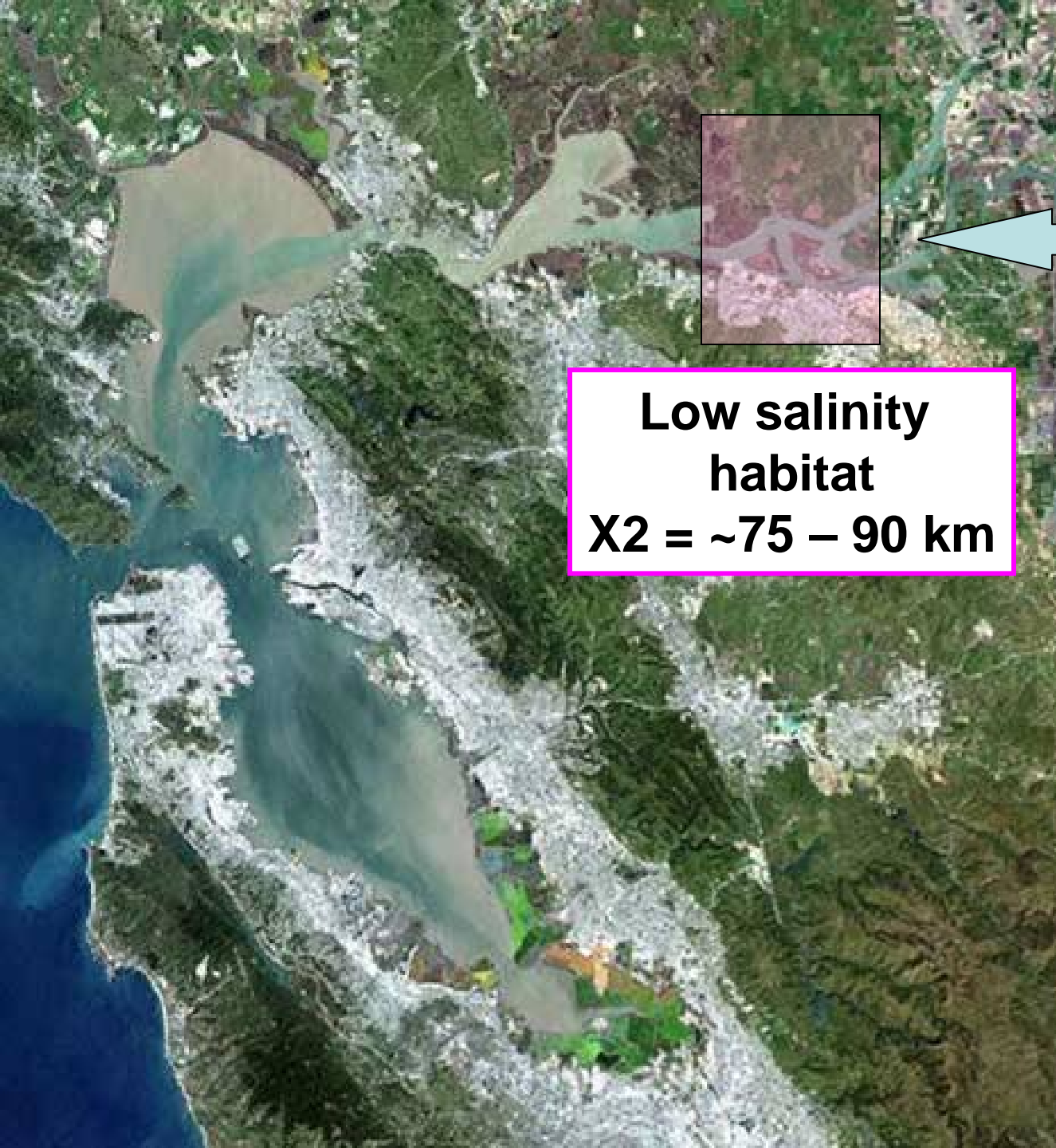




**Low salinity habitat  
X2 = ~45 – 70 km**



**High inflows  
shift low  
salinity  
habitat (X2)  
downstream**

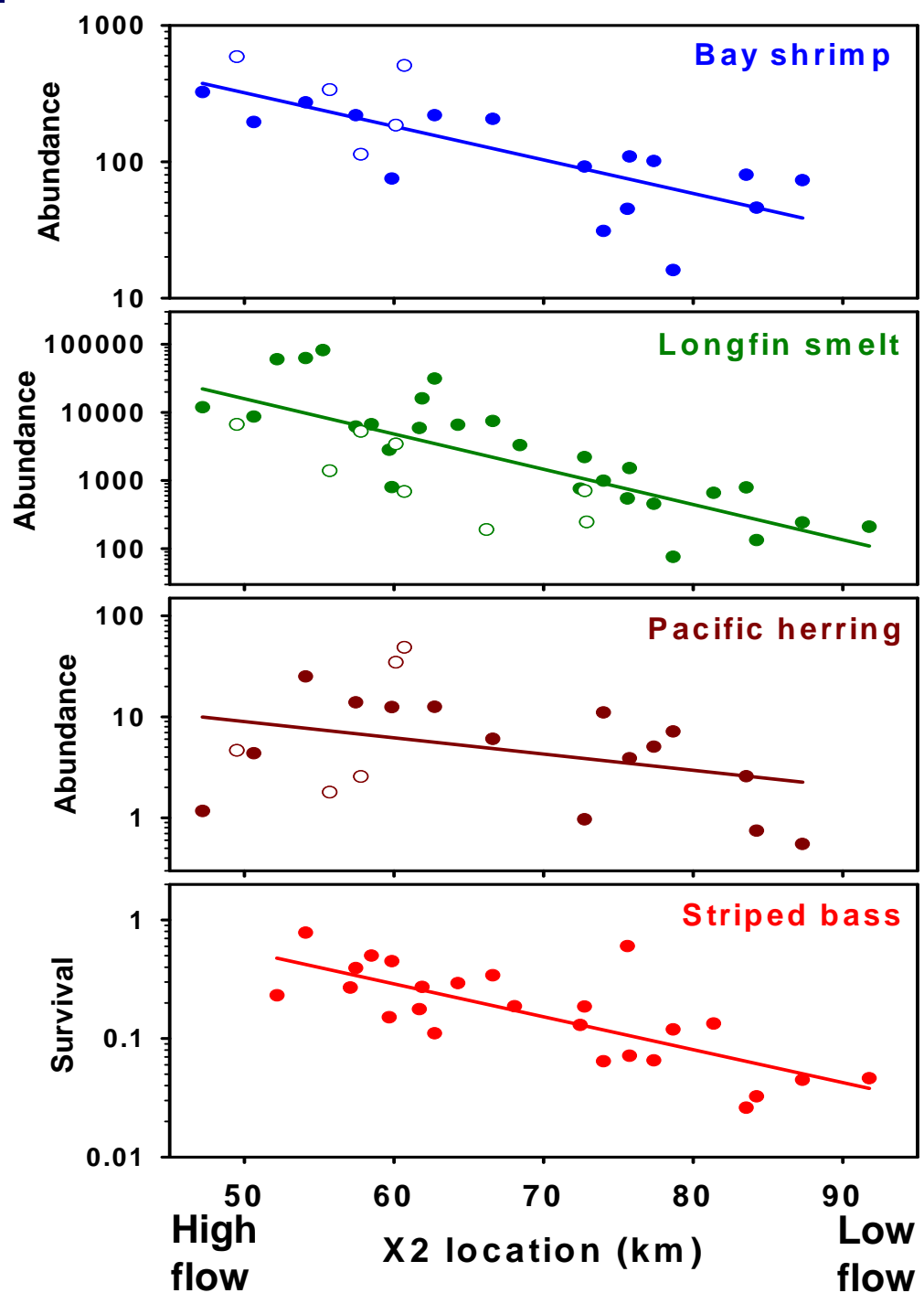


**Low salinity  
habitat  
X2 = ~75 – 90 km**

**Low inflows  
shift low  
salinity  
habitat (X2)  
upstream**

**Freshwater outflow  
determines the  
location of low  
salinity habitat (X2)**

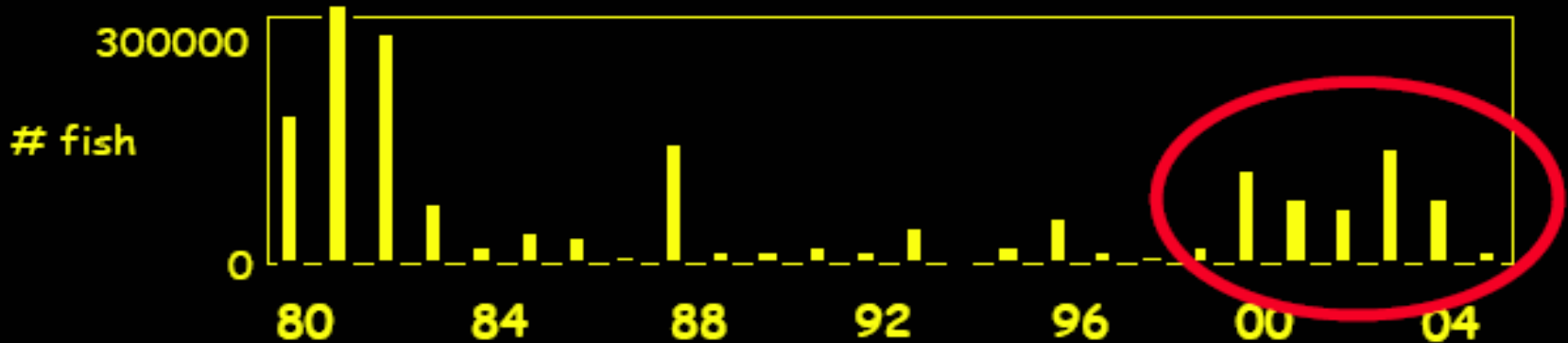
**Springtime X2  
correlated with  
population  
abundance and/or  
survival of many  
Delta species**



# Reduce Stressors

- Mortality at pumps
- Pollution
- Competition/predation from invasives

## Winter Salvage of Delta Smelt (Nov-Mar)

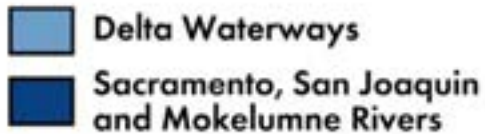


Source: IEP (2005)

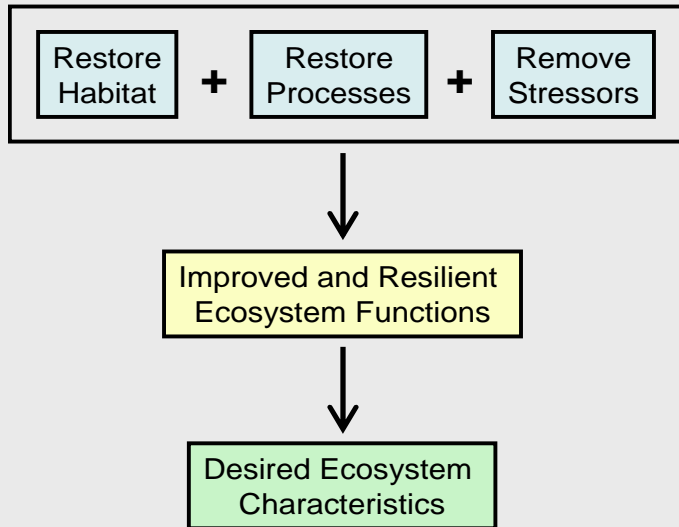
**Export effects on  
in-Delta flow patterns**  
**Water flows “uphill”  
towards the pumps**

**Old River**

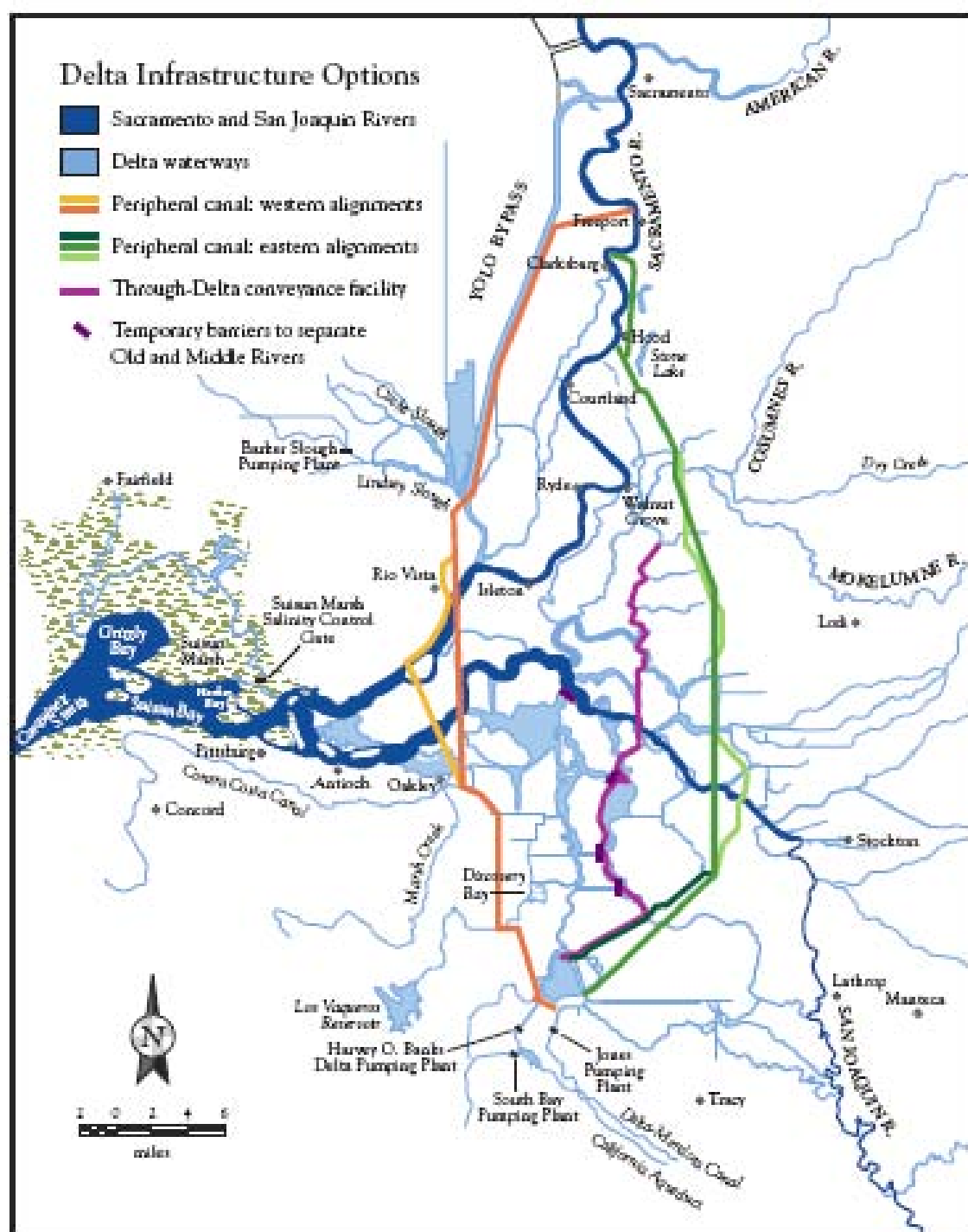
**Middle River**

 Delta Waterways  
Sacramento, San Joaquin  
and Mokelumne Rivers

# Return of the Peripheral Canal



From: Lund et al. 2008. Comparing Futures for the Sacramento-San Joaquin Delta.  
 Available at:  
[http://www.ppic.org/content/pubs/report/R\\_708EHR.pdf](http://www.ppic.org/content/pubs/report/R_708EHR.pdf)







# Questions?



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**www.bay.org**