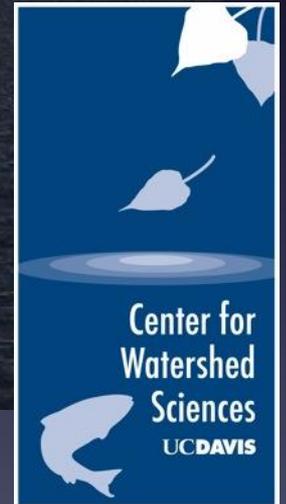


A Primer on the Sacramento-San Joaquin Delta: Not-so-Novel Problems in a Novel Ecosystem



Photo C. Jeffres



Jeffrey Mount

Trotting Out the Elephants



ENVISIONING FUTURES FOR THE SACRAMENTO-SAN JOAQUIN DELTA

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Biologist:

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**Lead authors*

More Elephants: Comparing Futures for the Sacramento-San Joaquin Delta



Supported with funding from
Stephen D. Bechtel, Jr.
David and Lucile Packard
Foundation

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Where the Wild Things Aren't: Making the Delta a Better Place for Native Species



Peter Moyle, William Bennett, John Durand, William Fleenor,
Brian Gray, Ellen Hanak, Jay Lund, Jeffrey Mount



PPIC

PUBLIC POLICY
INSTITUTE OF CALIFORNIA

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The Sacramento-San Joaquin Delta: Past, Present and Uncertain Future



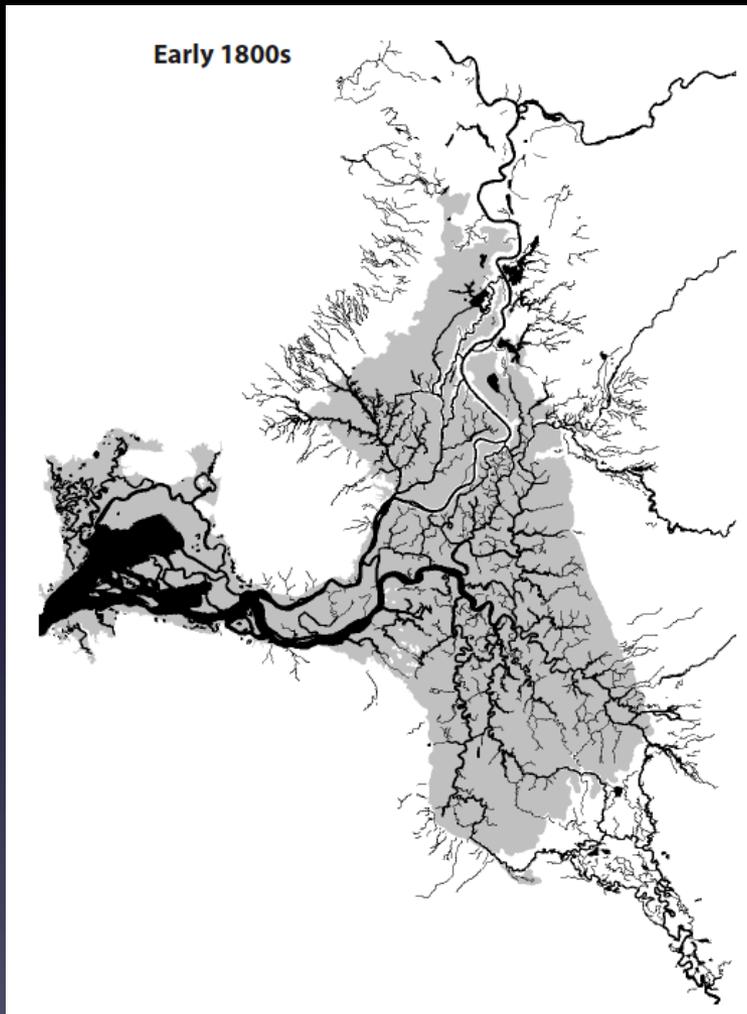
- Delta a landscape of fundamental change
- Landscape evolution of the past and future linked to human activity
- Pace and nature of change a significant management challenge

Delta of the Past



- 700,000 acre tidal marsh
- Mostly fresh water, with brackish water at western end
- A product of Holocene rise in sea level
- Extraordinary productivity
- Major sink for carbon

A complex, highly productive, dynamic estuary



- Mosaic of intertidal marsh, floodplain, riparian, and tidal channels
- Very high:
 - Connectivity
 - Hydrologic Variability
 - Physical Complexity
- Self-adjusting

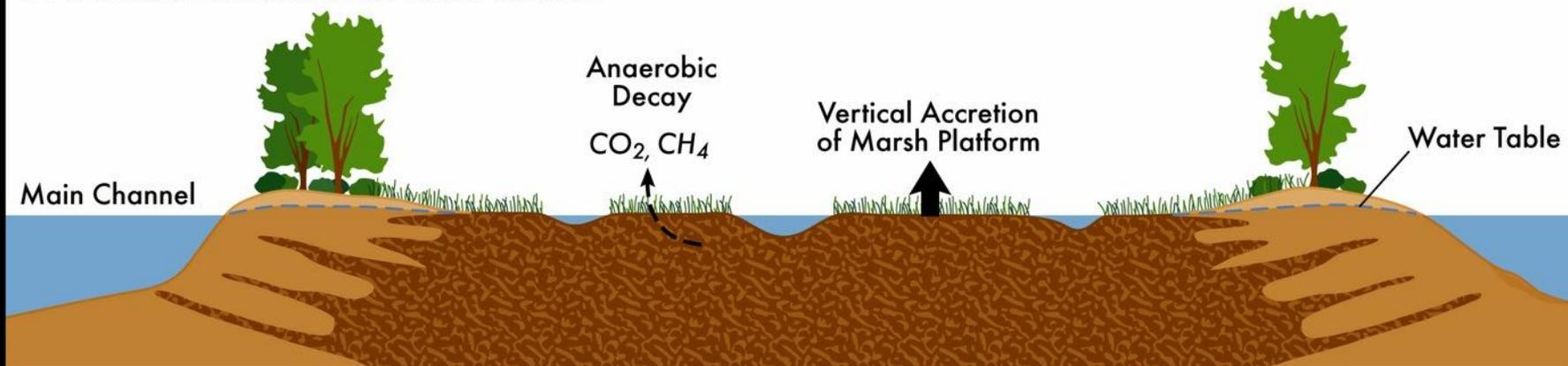
Transition to the 20th Century Delta



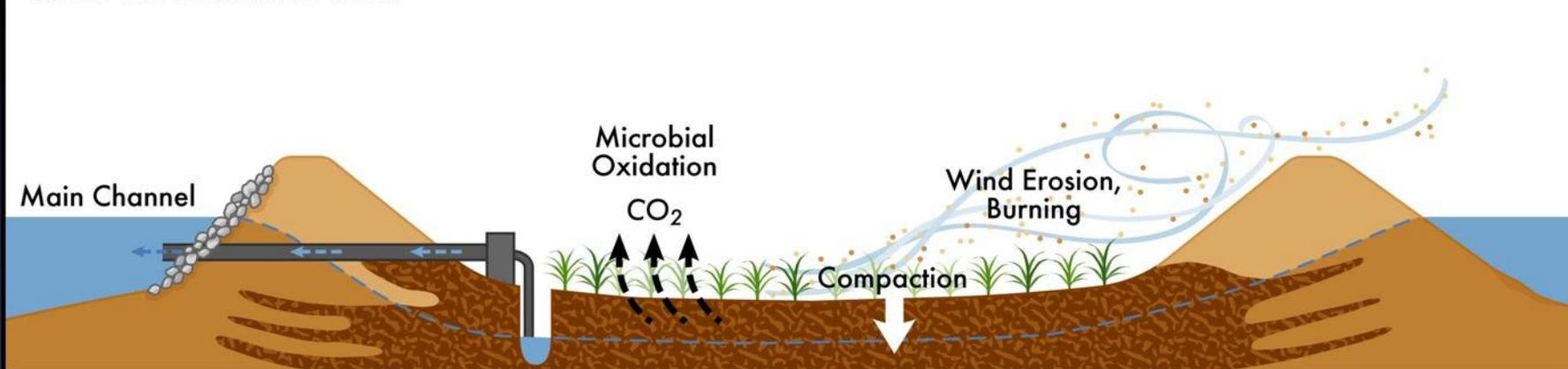
- Reclamation of 700,000 acres of tidal freshwater marsh
- 1100 miles of levees separate land from water (most of the time)



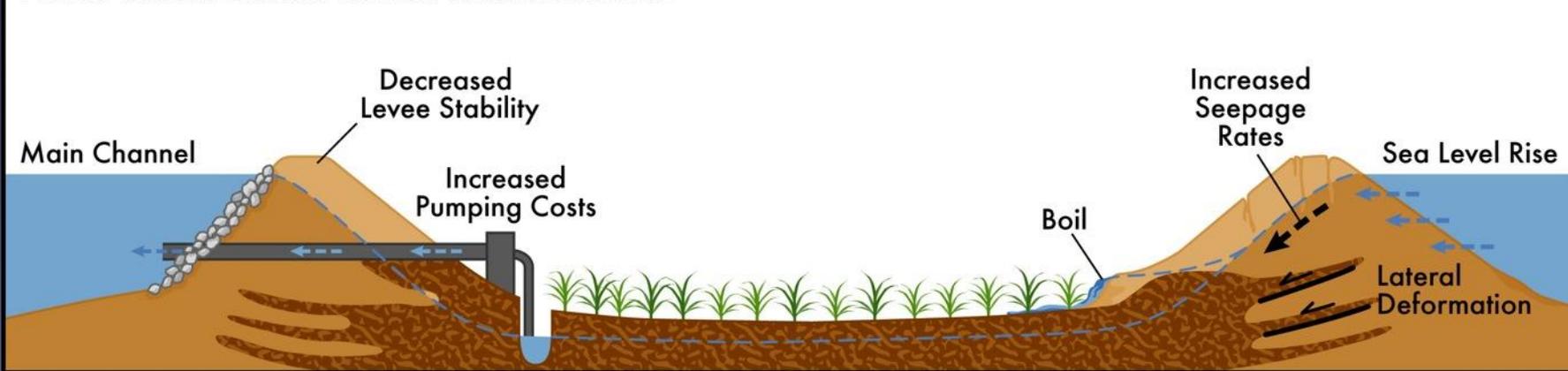
Pre-1880: Freshwater Tidal Marsh



1900's: Elevation Loss



2000's: Increased Levee Maintenance



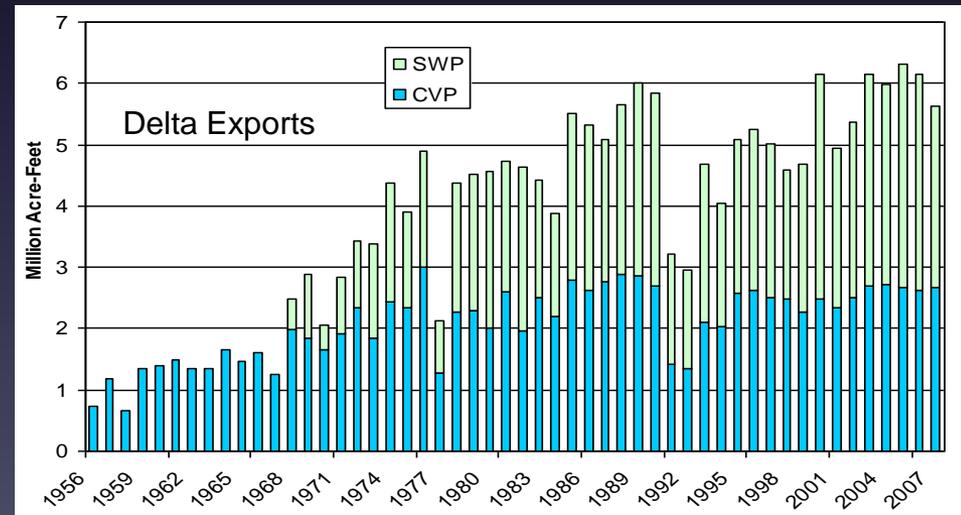
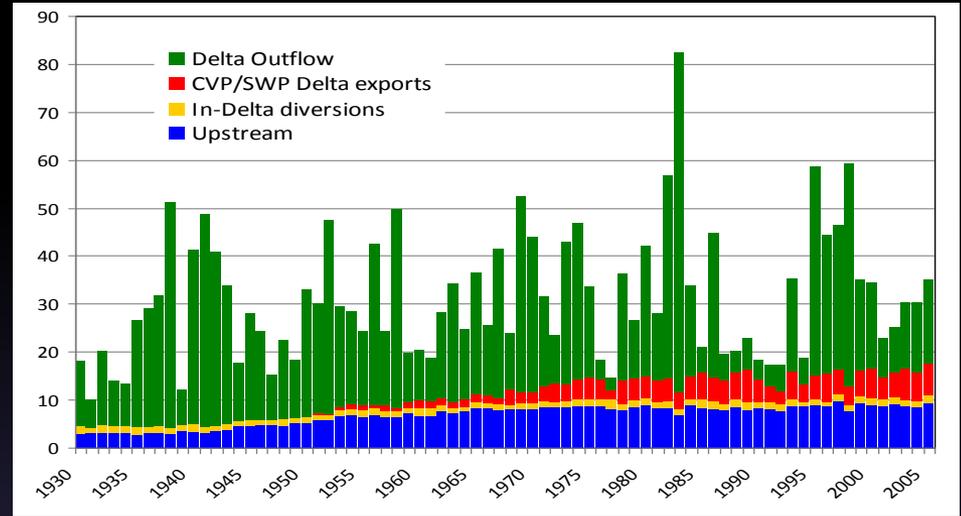
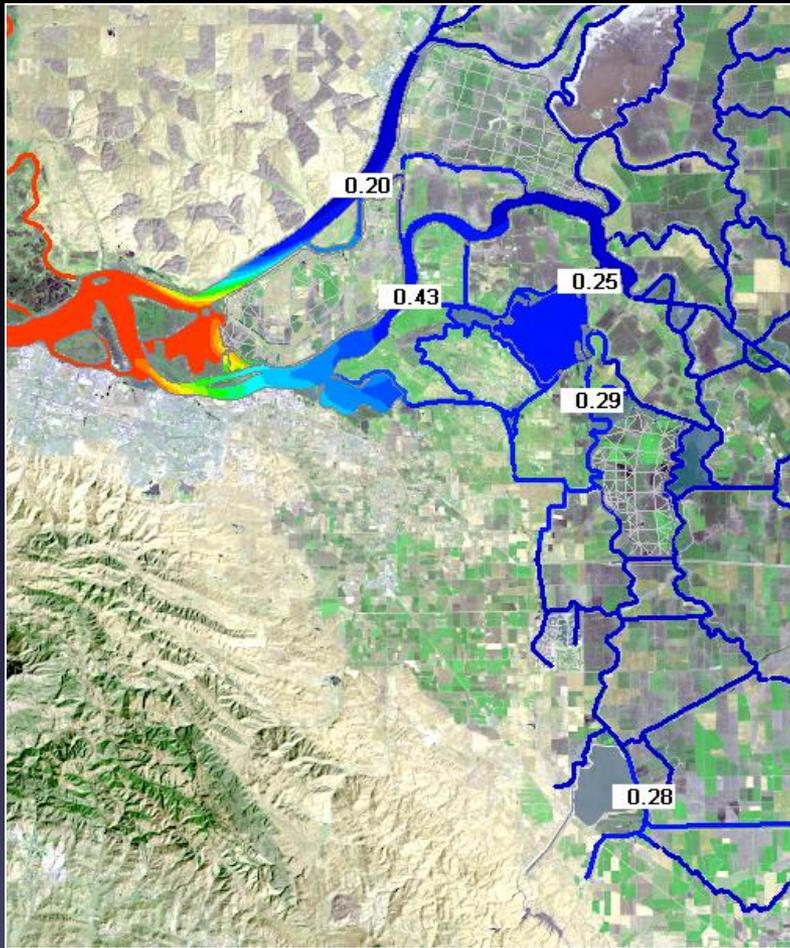
Water Supply



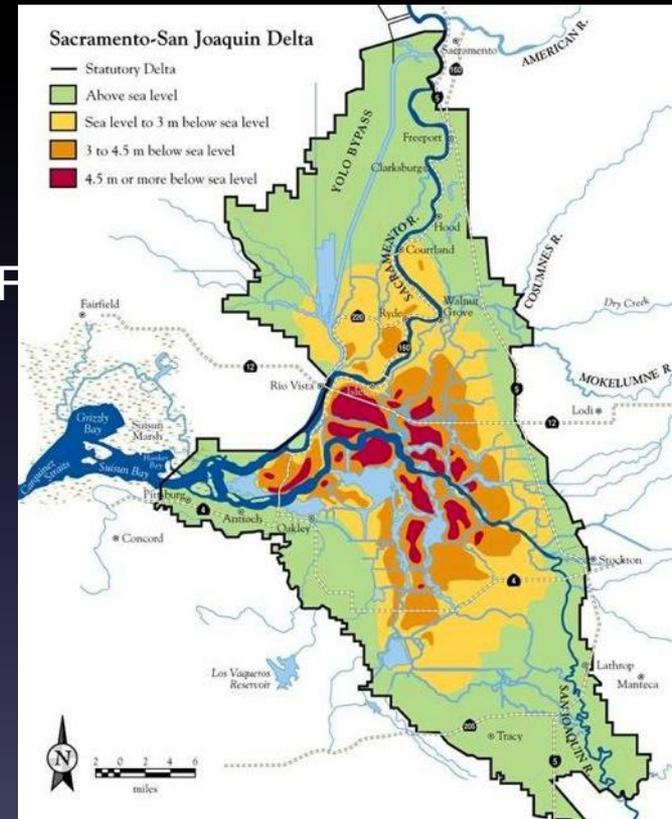
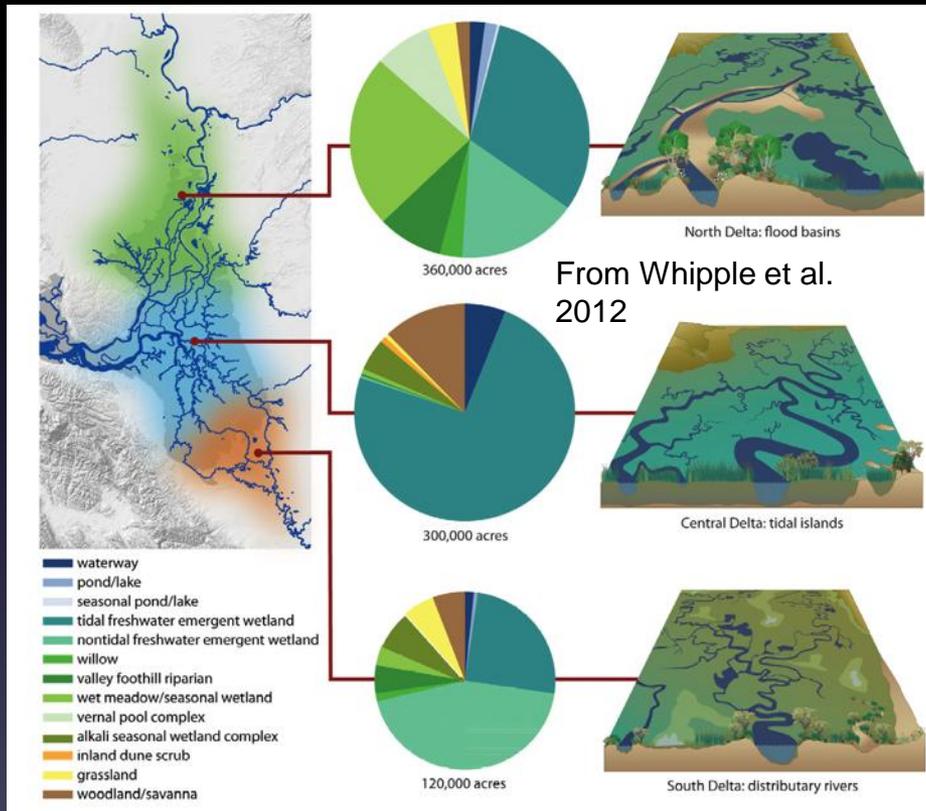
- Second largest ecosystem service of the Delta
- 1800 diversions
- 5- 6 MAF/year export



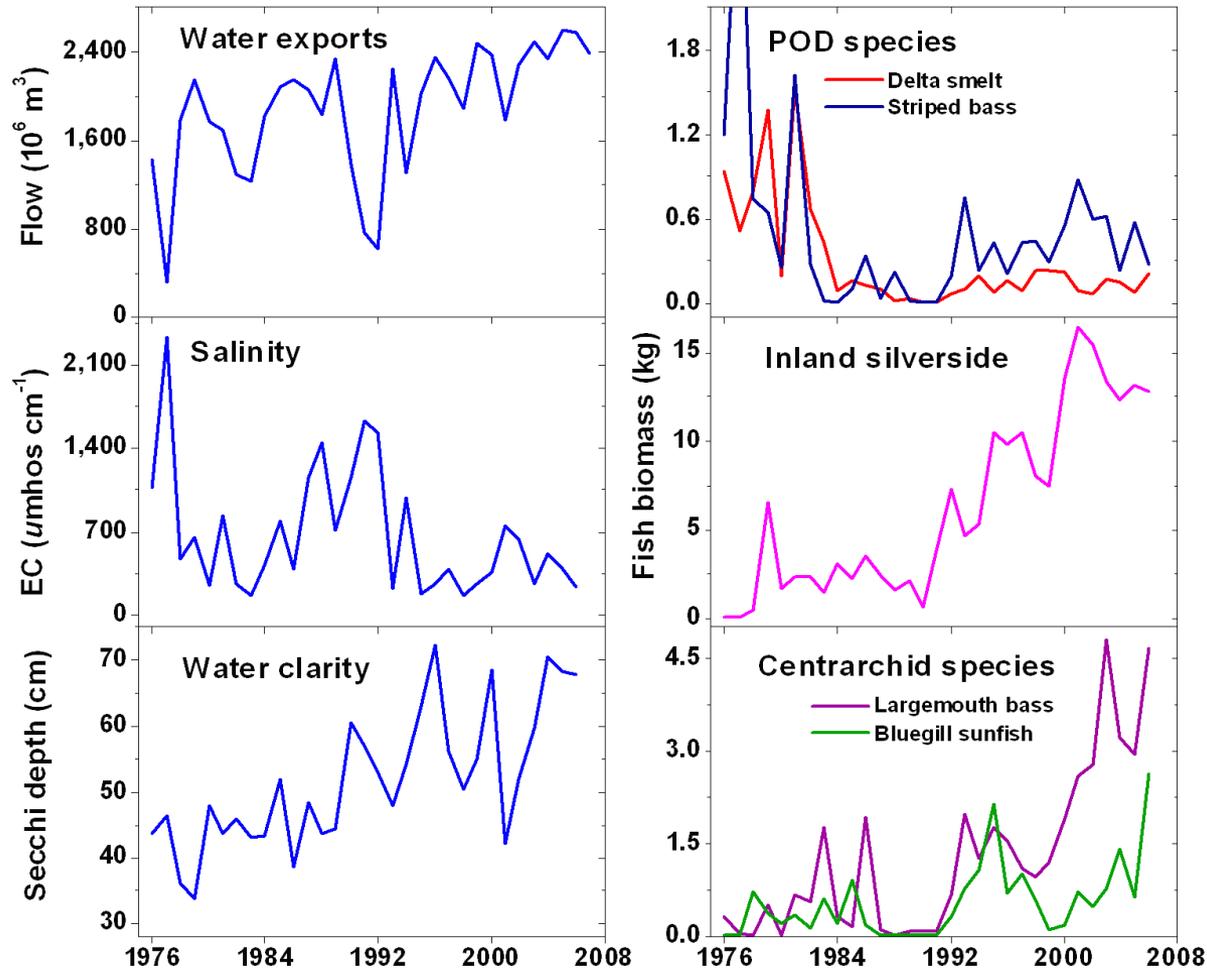
Keeping the Delta fresh, all the time



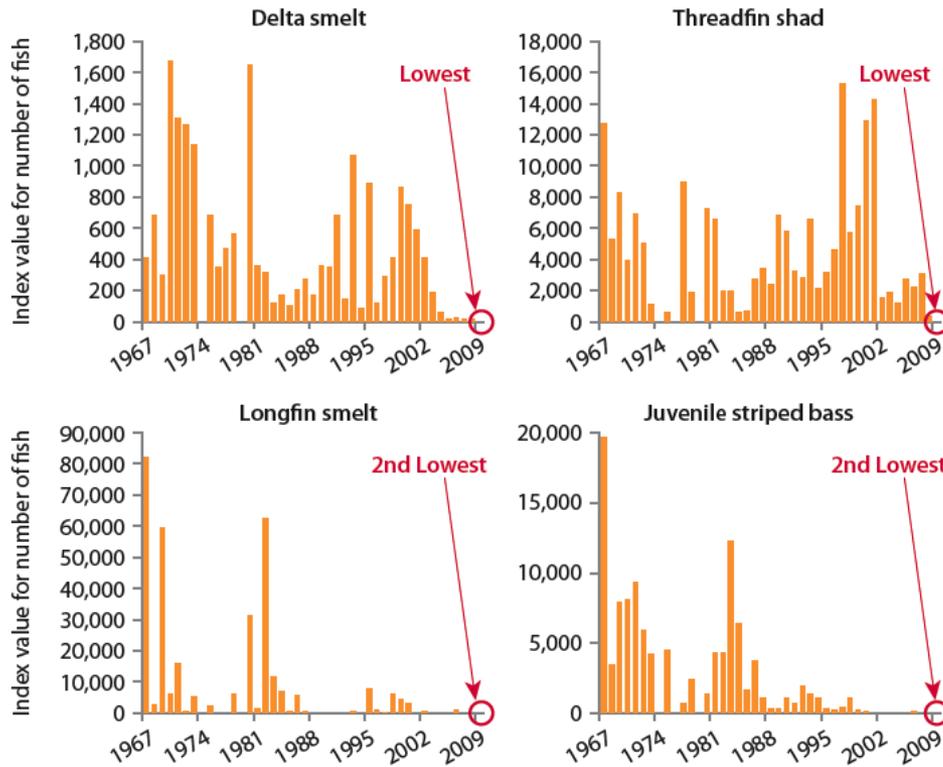
The "New" Delta: Disconnected, Unvarying, Simplified and Novel



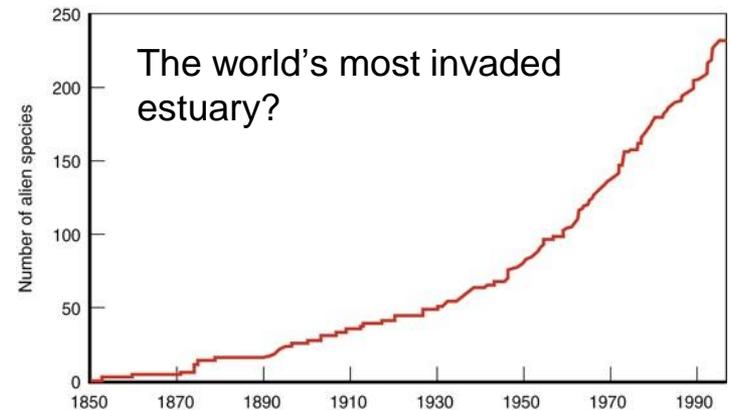
Ecological Regime Shift



An Ecosystem Unfriendly to Natives

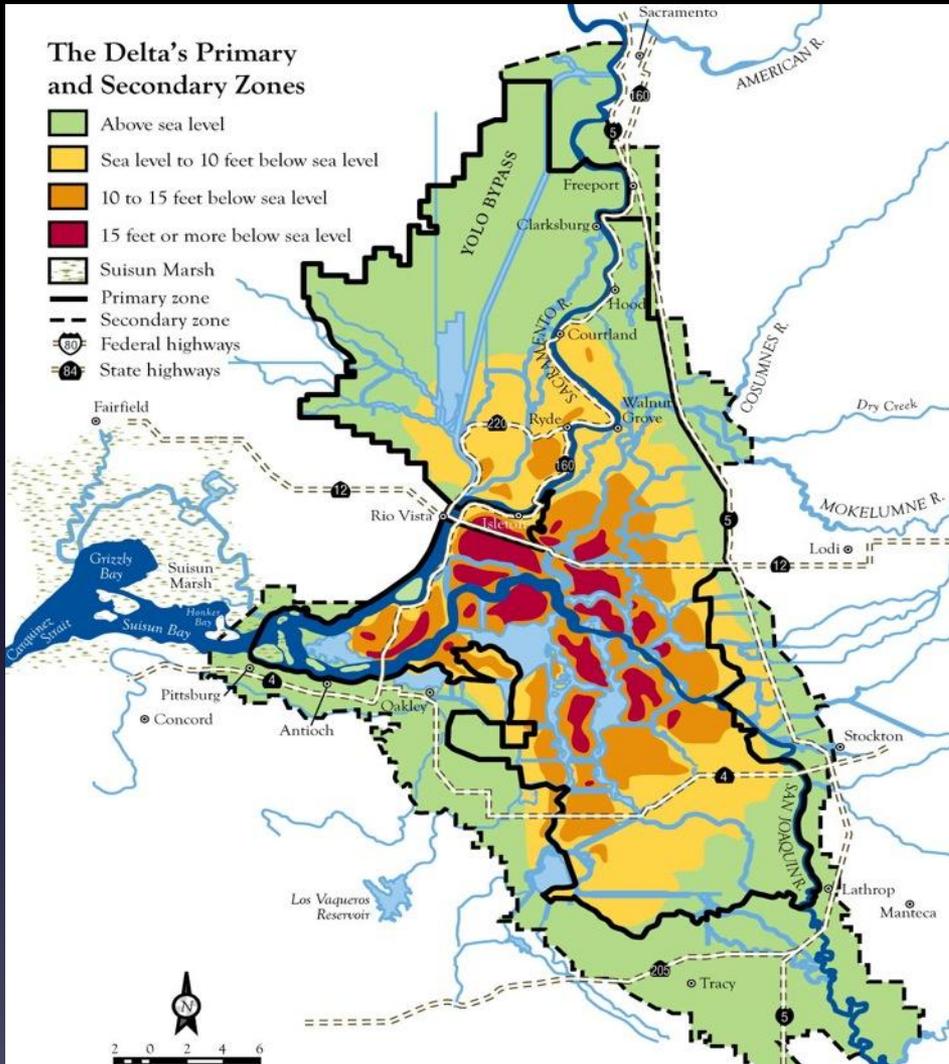


SOURCE: California Department of Fish and Game.

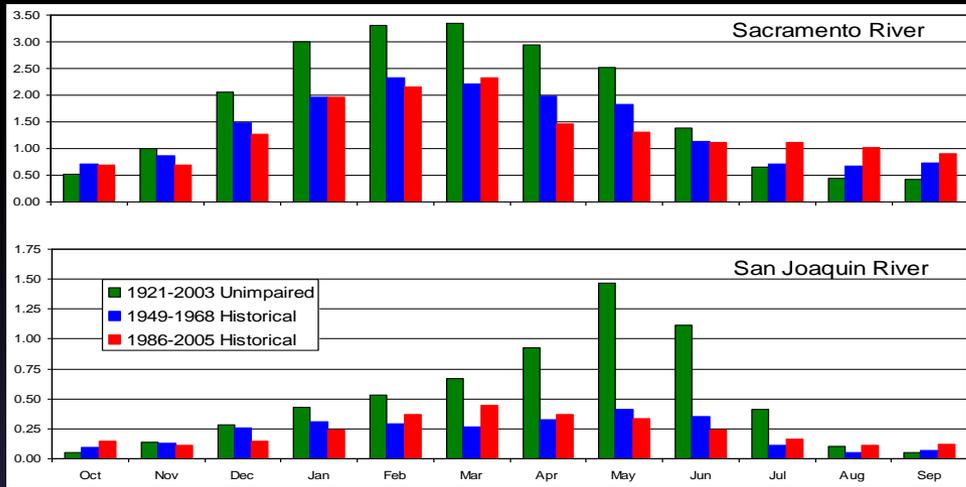


SOURCE: Cohen and Carlton (1998).

The 20th Century Sacramento-San Joaquin Delta

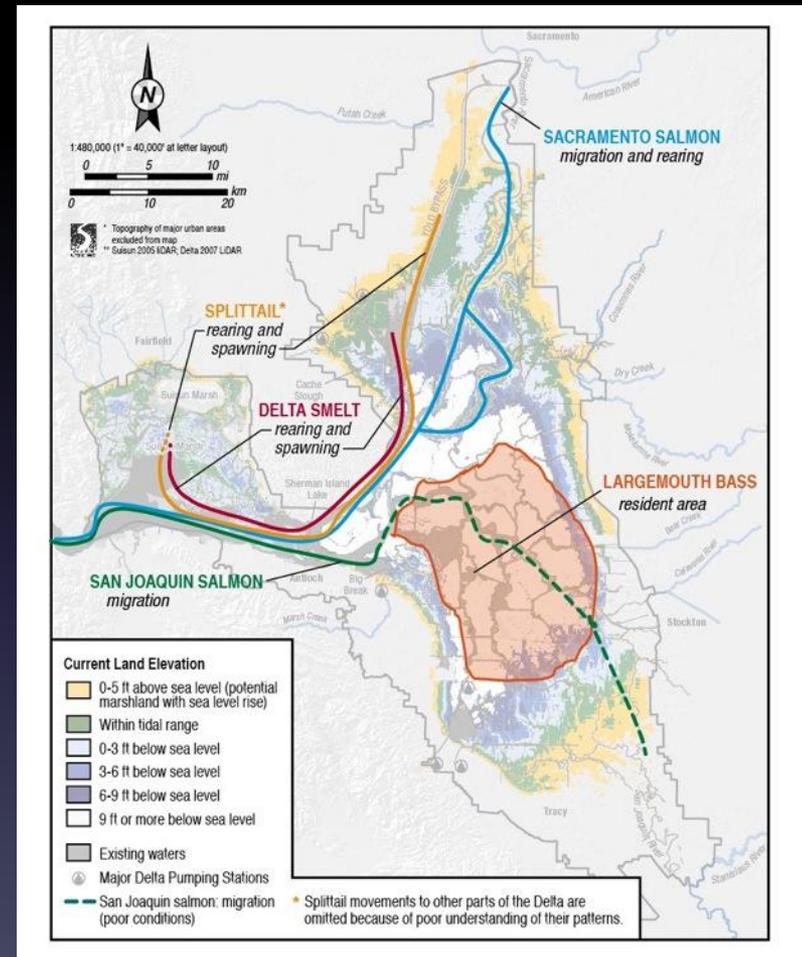


Things to Reconcile: Multiple Stressors Within and Outside of the Delta

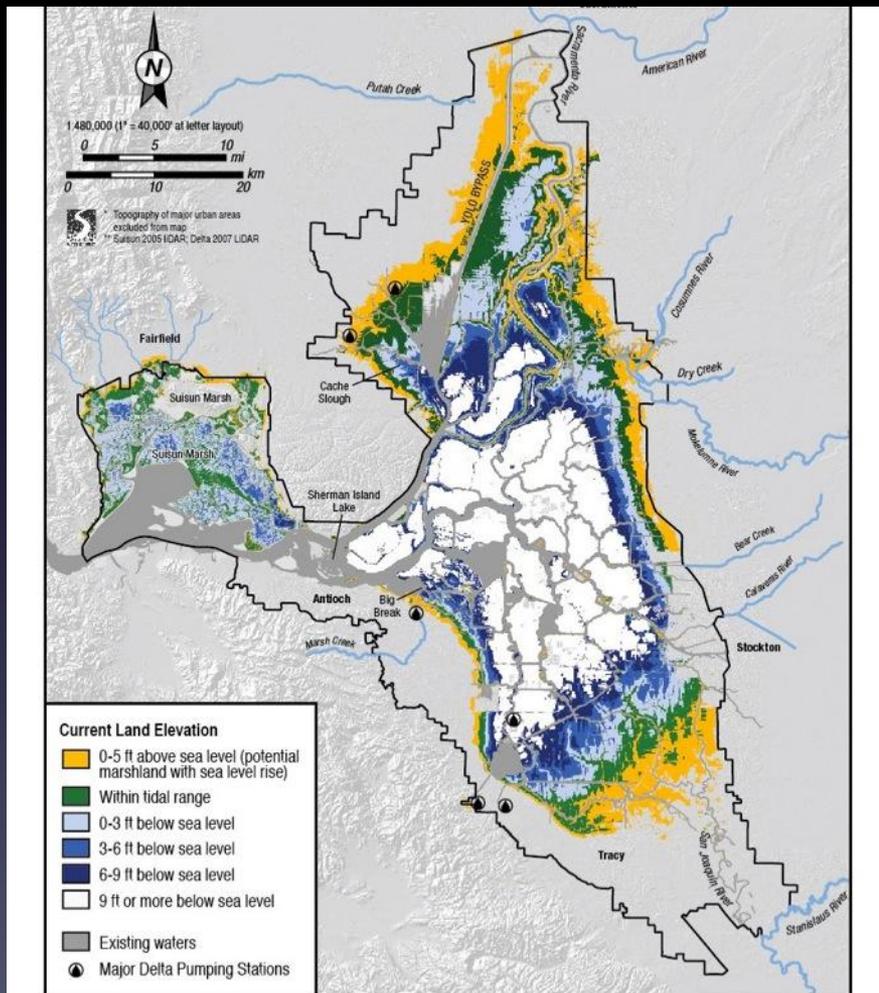


Stressor Classes:

- Flow Regime
- Habitat Loss
- Invasive Species
- Harmful Discharges
- Fisheries Management
- Ocean Conditions



Things to Reconcile: There are Significant Constraints on Options



- **Physical Constraints**
 - Elevation
 - Tidal Energy
 - Space
 - Water availability
 - Salt
 - Temperature
 - Sediment
- **Biological Constraints**
 - Alien species
 - Habitat requirements
 - Endangered species
 - Productivity
 - Algae and blooms
 - Contaminants

Things to Reconcile: A Scientific, Management and Regulatory Adhocracy

- More than 100 agencies and programs gathering data
- More than 200 public agencies with some jurisdiction
- Parallel, not well integrated planning and science efforts



A simplified “conceptual model”

Things to Reconcile: Transition to the 21st Century Delta



- Sea Level Rise
- Subsidence
- Changing Inflows
- Seismicity
- Warming
- Invasions

Conclusions



Photo C. Jeffres