Introduction to the Presentations to the National Research Council Delta Issues

DELS-WSTB-09-09
1/26/10

Jerry Johns
Deputy Director
California Department of Water Resources

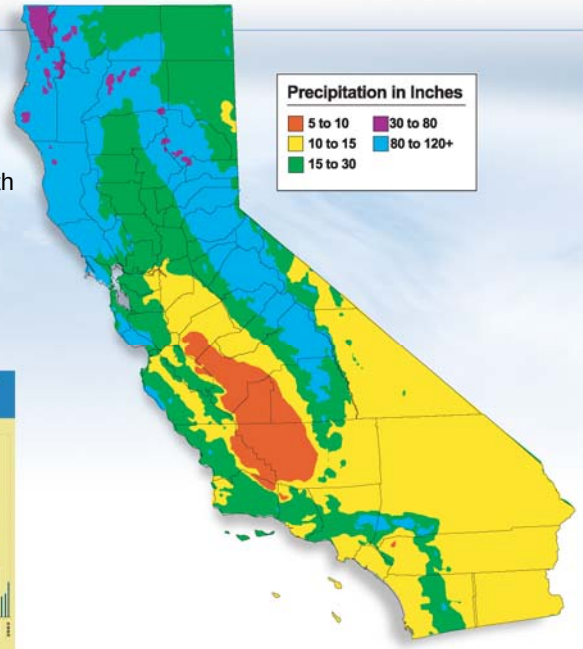
Overview

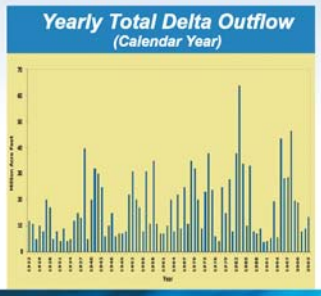
- Water in California
- Water Supply Impacts of the Biological Opinion RPA's
- Four Basic Facts About the Delta
- Alternatives to the Fish Agency RPA's
  - Better Tools – Smelt PEI
  - Better Protective Actions – Salmon Barrier
  - Better Approach – Food – tidal habitat / N

2

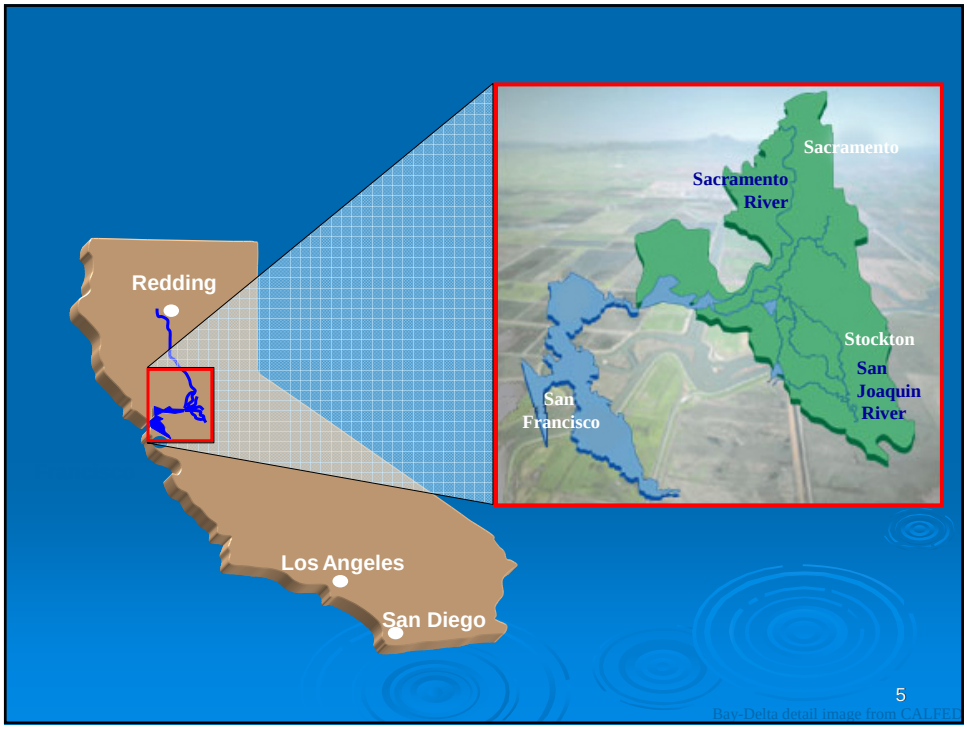
Water Variability and Use

- 2/3 of precipitation in north
- 2/3 of use in south





California Water Systems


Redding
Los Angeles
San Diego
Sacramento
Sacramento River
Stockton
San Joaquin River
San Francisco
5
Bay-Delta detail image from CALFED

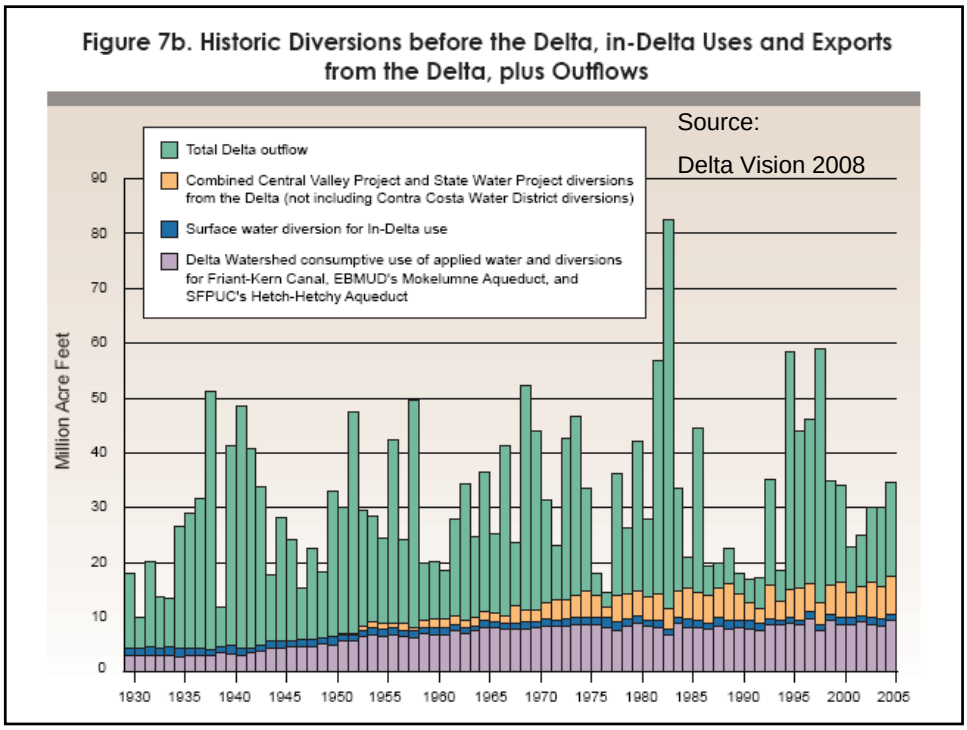


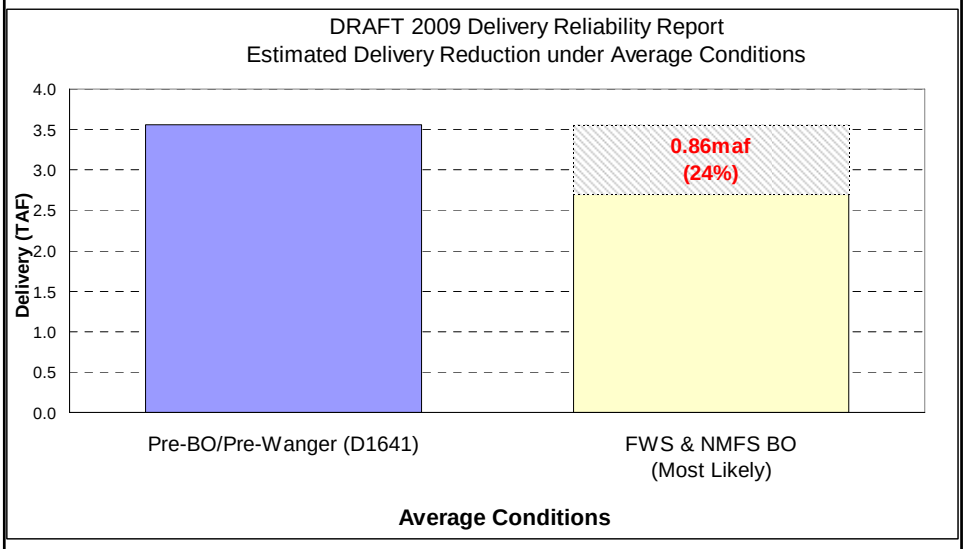
Figure 7b. Historic Diversions before the Delta, in-Delta Uses and Exports from the Delta, plus Outflows
Source:
Delta Vision 2008
Total Delta outflow
Combined Central Valley Project and State Water Project diversions from the Delta (not including Contra Costa Water District diversions)
Surface water diversion for In-Delta use
Delta Watershed consumptive use of applied water and diversions for Friant-Kern Canal, EBMUD's Mokelumne Aqueduct, and SFPUC's Hetch-Hetchy Aqueduct
Million Acre Feet
0
10
20
30
40
50
60
70
80
90
1930
1935
1940
1945
1950
1955
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005

Importance of the Delta to California

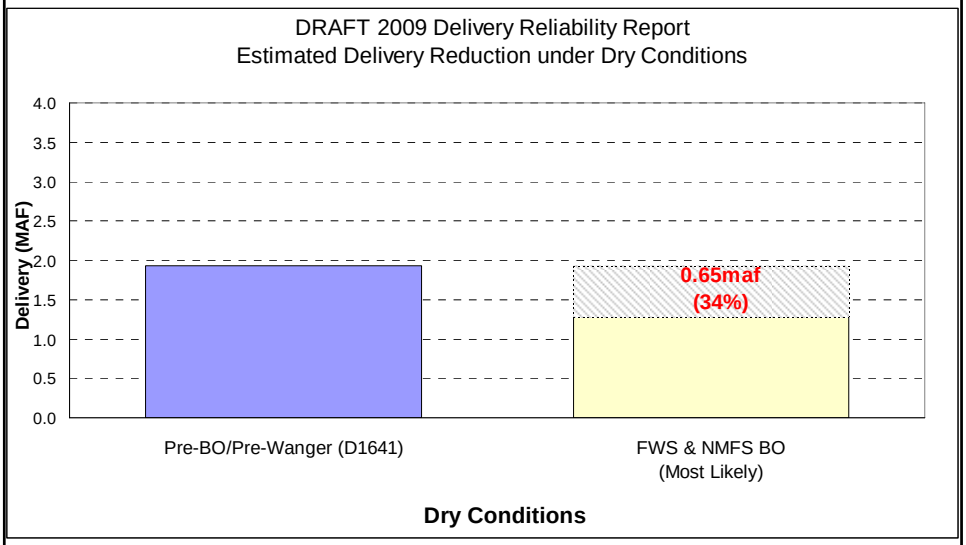
- Water Supply
  - 25 million Californians and 3 million acres of agriculture rely on the Delta for water
  - Water supply for $400 billion of annual economic activity
- In-Delta Land Use
  - 558,000 acres in agricultural production
  - 64,000 acres of urban and commercial development
- Environment
  - Confluence of California's two largest watersheds (Sacramento River and San Joaquin River)
  - More than 750 plant and animal species
  - More than 40 threatened or endangered species

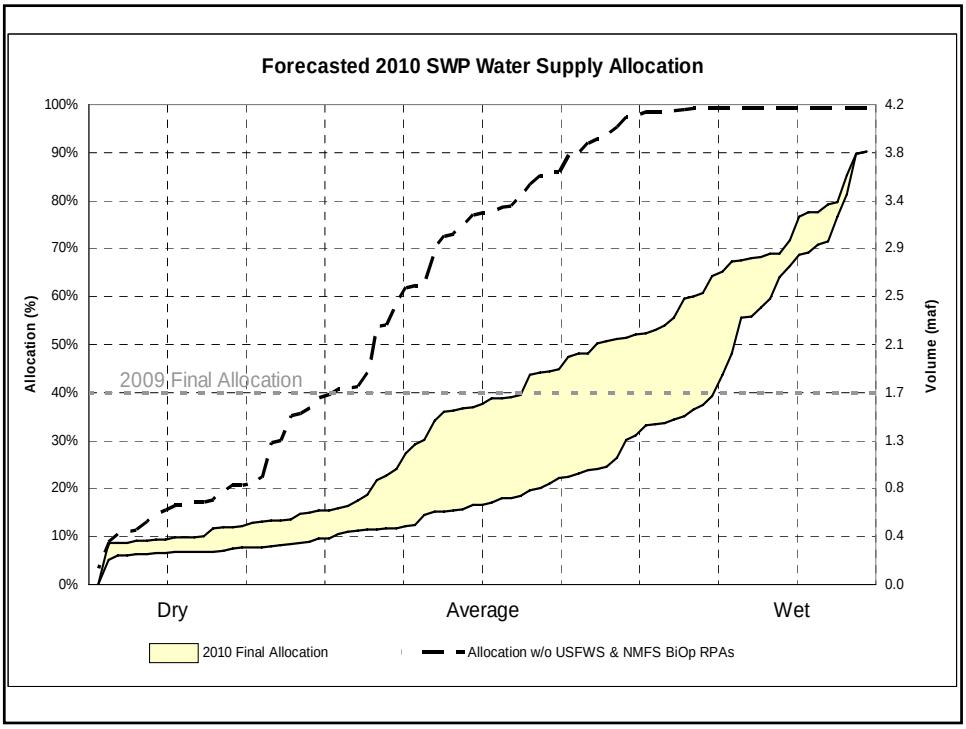
7 15

Water Supply Impacts to the State Water Project (SWP)



Water Supply Impacts to the State Water Projects (SWP)



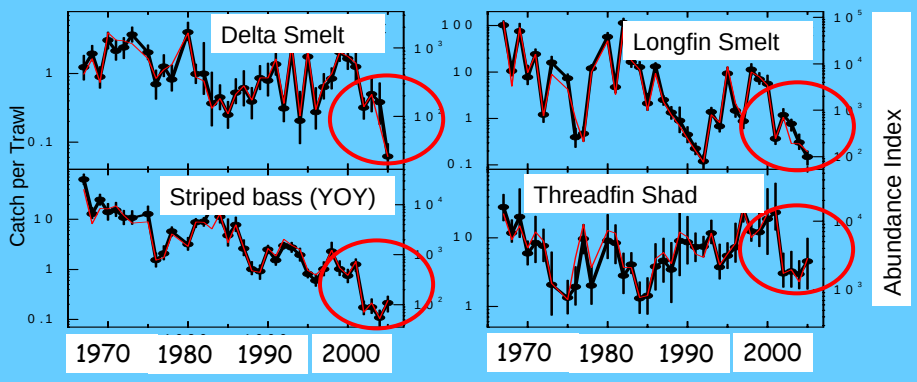


Four Basic Bay/Delta Facts

- (1) The fishery food web recently altered
- (2) The Delta is a Tidal Estuary
- (3) Some good relationship exist between Delta flows and "take" (salvage) at SWP/CVP pumps in South Delta
- (4) Relationship between fish take and fish abundance – "small to negligible"
  - Need comprehensive solution to the many fish stressors and "reasonable" controls on SWP/CVP exports

11

Exhibit D
The Pelagic Organism Decline



Source: Kimmerer and Nobriga (2005); Sommer et al. (In Press, Fisheries 32(6))

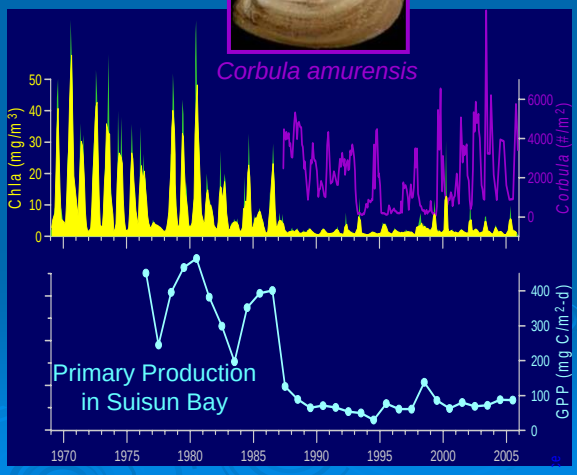
(1) The fishery food web recently altered

- Invasive Species
  - Corbula clams in Suisun Bay –Phytoplankton crash
  - Limnoithona – now most dominant zooplankton and not a good food source for fish
  - Aquatic weeds – Egeria – reduce turbidity and provide cover to predators in the Central and Southern Delta
- Increased ammonia discharges
  - Change in Nitrogen to Phosphorus ratios
  - Related to more green and blue green algae (microcystis) fewer Diatoms

13

Phytoplankton Primary Production

… CRASHED in Suisun Bay right after the 1987 *Corbula* invasion

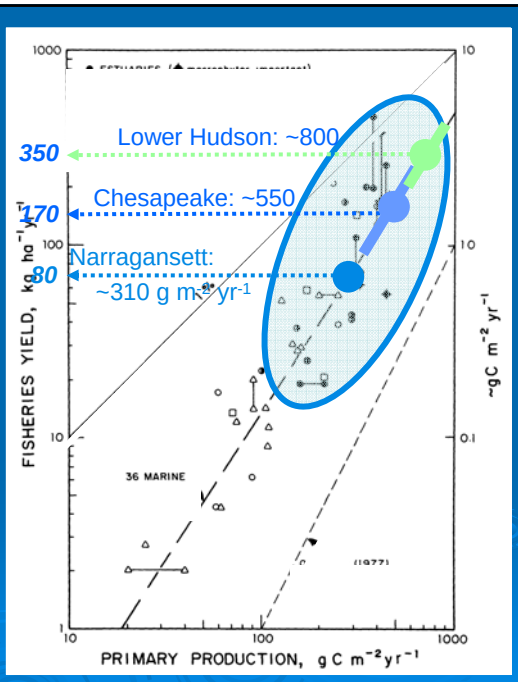


Source: J. Cloern (USGS): Oral presentation at the 2007 Annual IEP Workshop, Asilomar, CA

14

Phytoplankton Primary Production

… in Estuaries is typically very HIGH

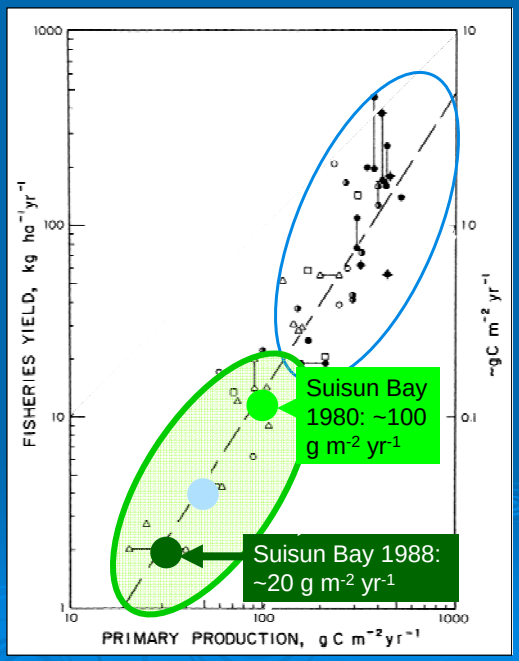


Source: S. Nixon, Limnology and Oceanography 1988

15

Phytoplankton Primary Production

… CRASHED in Suisun Bay right after the Corbula invasion



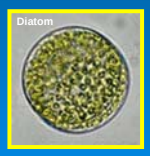
Sources: J. Cloern (USGS) & A. Jassby (UCD): Oral presentations at the 2007 Annual IEP Workshop, Asilomar, CA

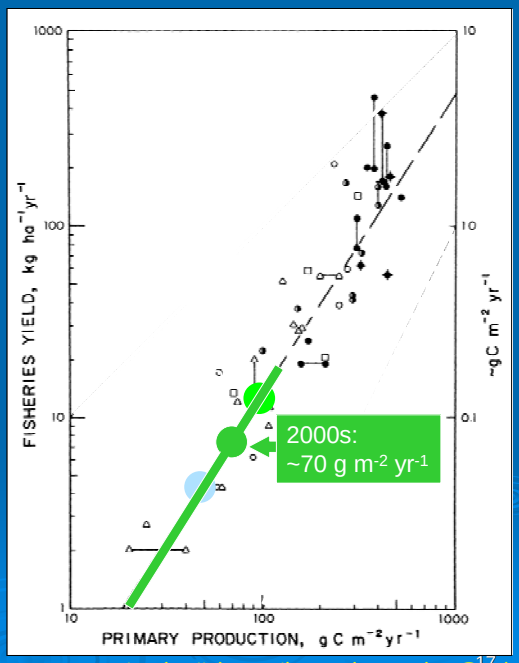
16

Phytoplankton Primary Production

… during the POD years is slightly UP in the Delta & Suisun Bay.

Quality???

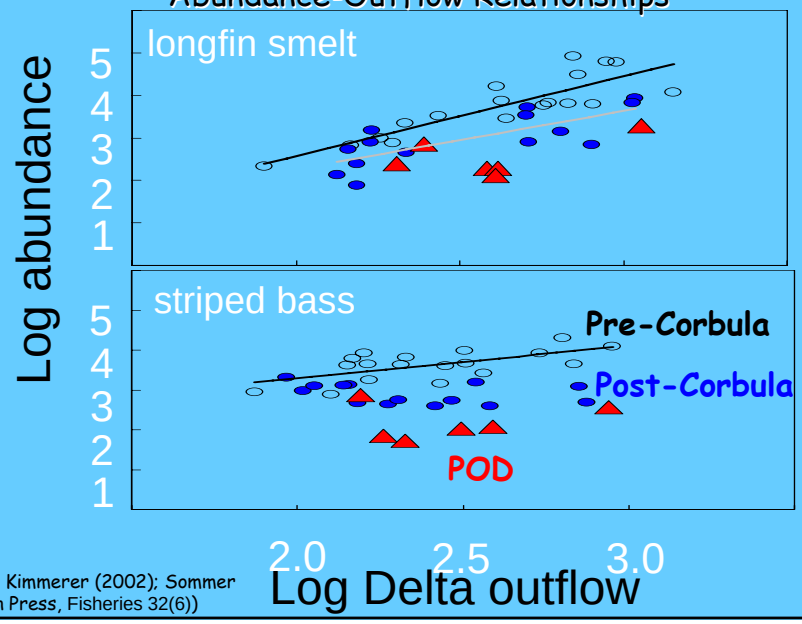




Sources: A. Jassby (UCD), J. Cloern (USGS), IEP data

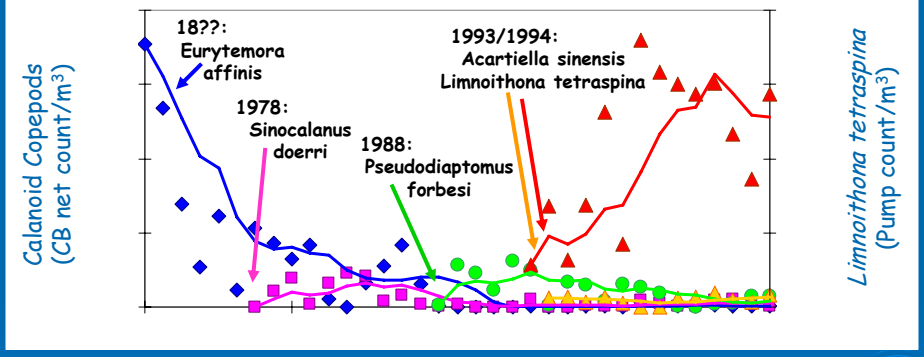
17

POD Has Further Shifted Abundance-Outflow Relationships



Source: Kimmerer (2002); Sommer et al. (In Press, Fisheries 32(6))

Zooplankton Species Invade in "Waves"



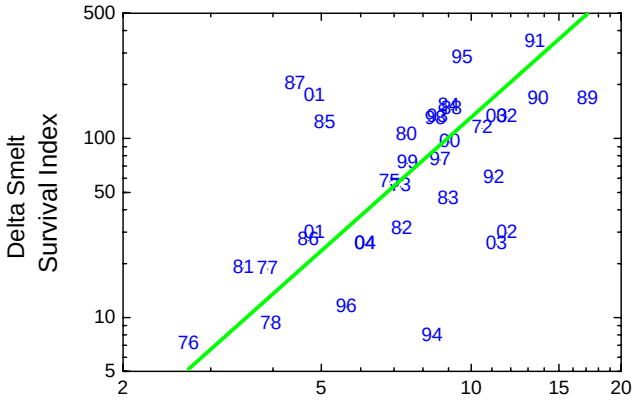
Adult copepods at Chipps Island, yearly average densities with 5-year moving average lines

Source: A. Mueller-Solger, DWR; IEP data



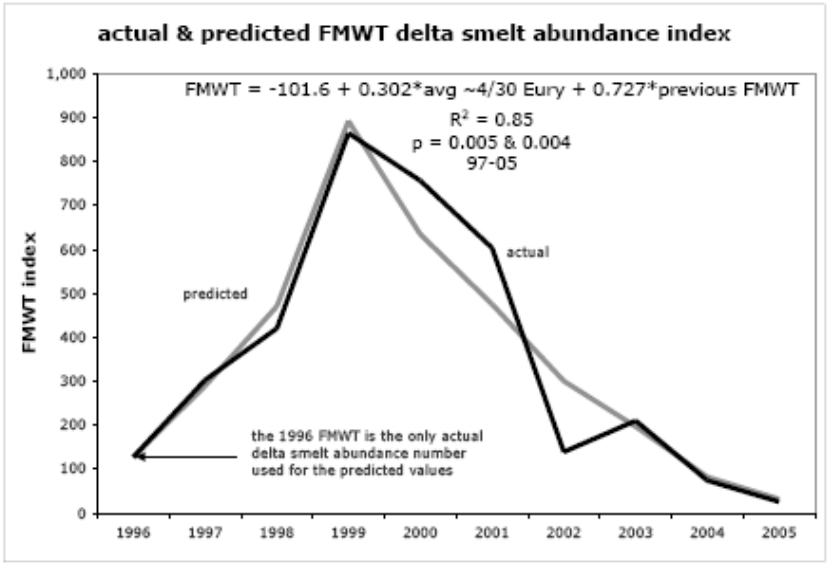


There is Evidence That Zooplankton Biomass Affects Delta Smelt Survival in Summer

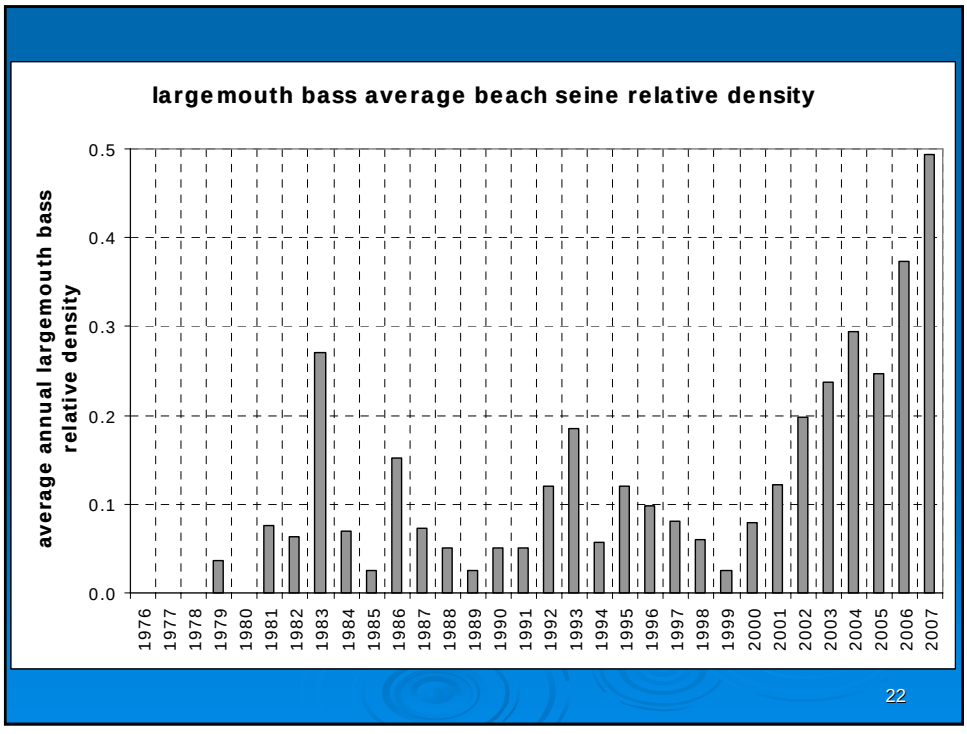


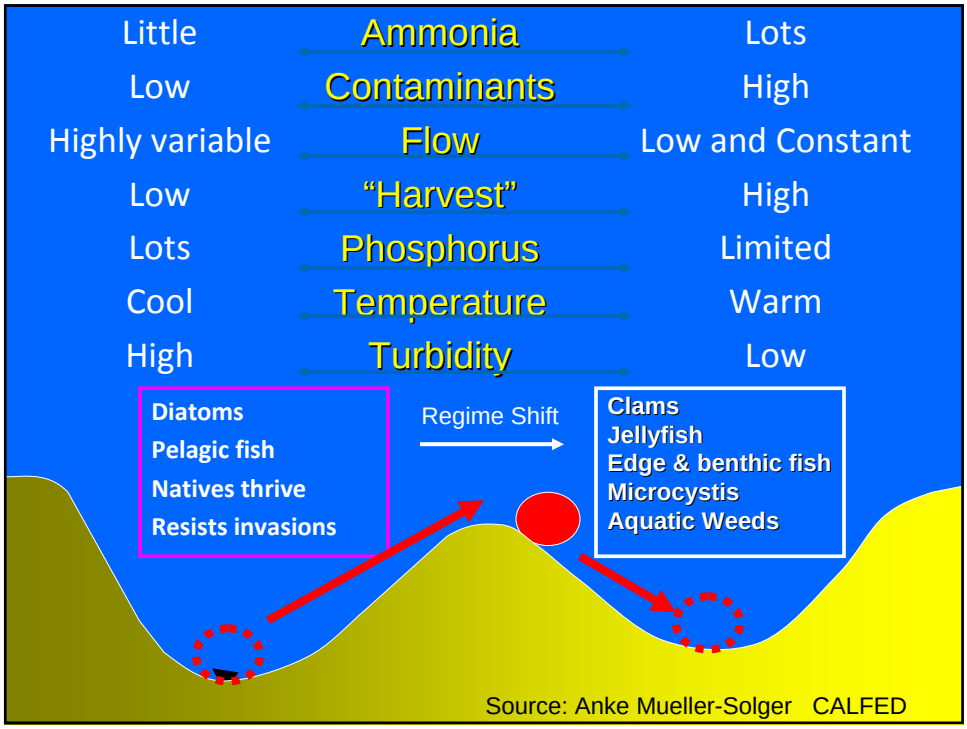
Source: Kimmerer (2008)

Spring Food Abundance also Important to Delta Smelt



Source: BJ Miller

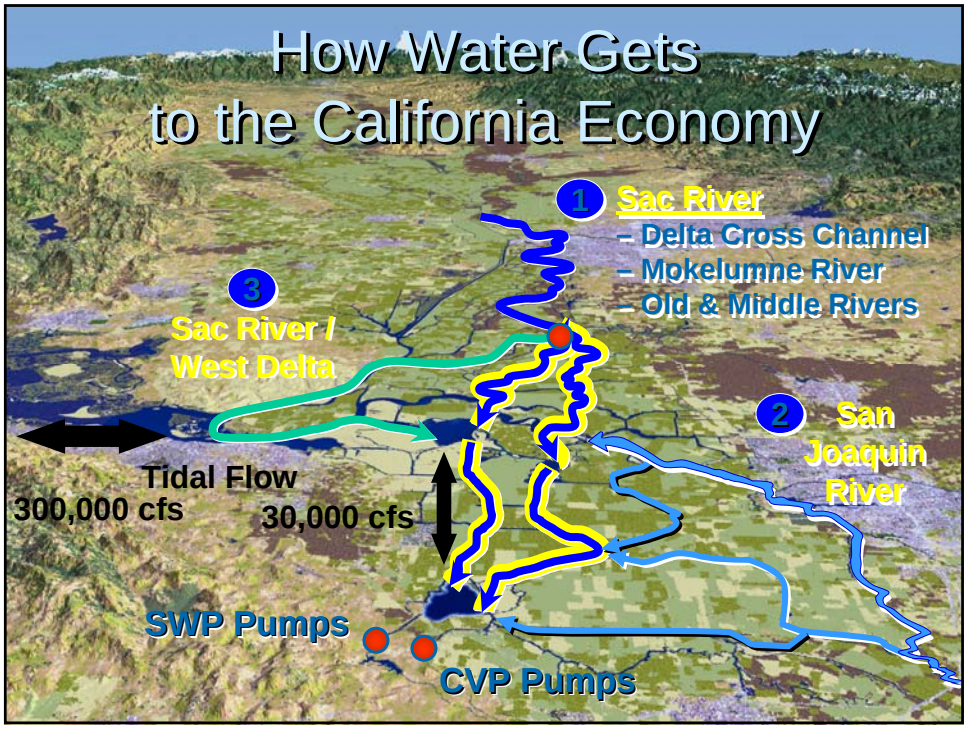




(2) The Delta is a Tidal Estuary

- The Deta Not a river - Need to understand Tidal effects
  - 2 high tides and 2 low tides per day
- Delta Outflow - +6,000 cfs net daily flow
  300,000 cfs tidal flow
- Old and Middle River flows
  -3,000 cfs net daily flow
  30,000 cfs tidal flow

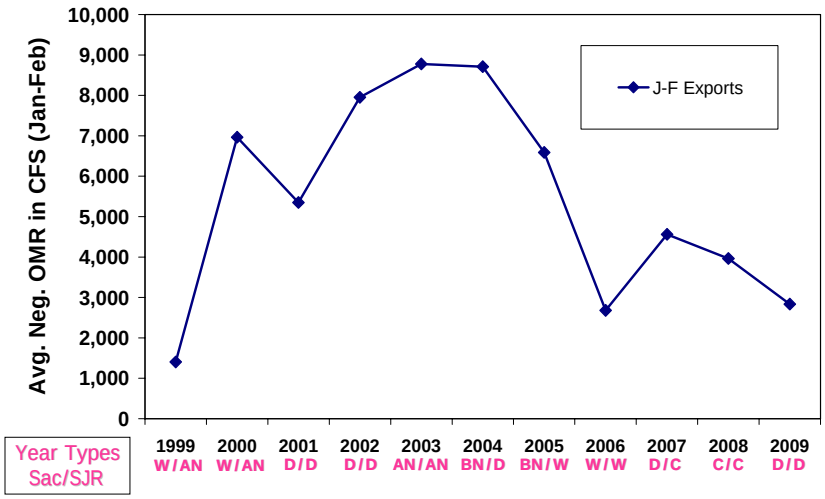
24



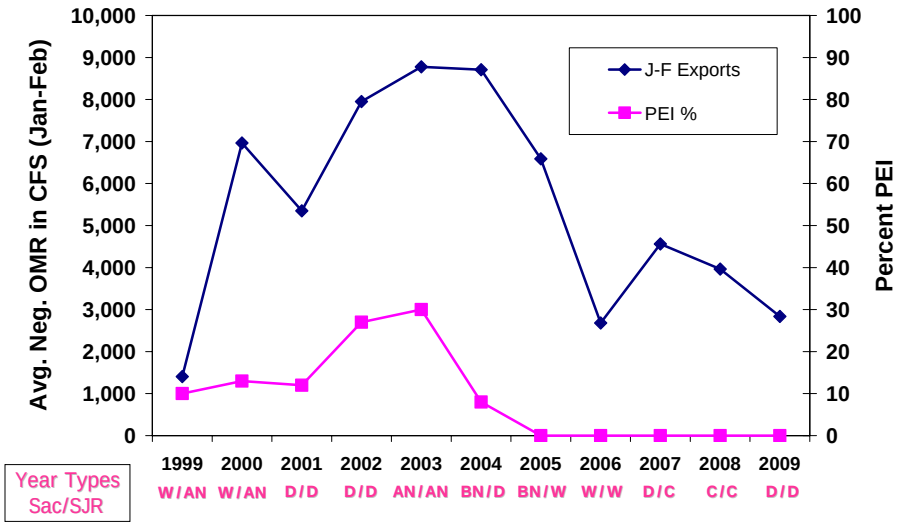
- (3) Some good relationship exist between Delta flows and "take" (salvage) at SWP/CVP pumps in South Delta
  - Non-linear relationship between January and February OMR flows and Salvage of many fish species - -6,000 cfs
  - Particle tracking and young smelt salvage
- (4) No substantial relationship between "take" and fish abundance
  - Reducing "take" will not restore fish populations
  - Look at last four years
  - Take should be "reasonably" limited to avoid rare high take events

26

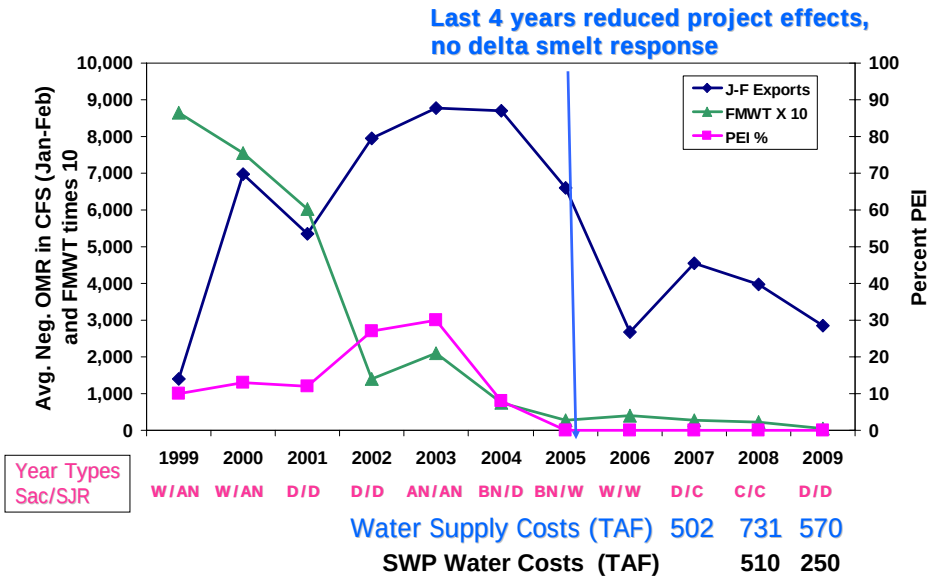
Project Effects and Delta Smelt Response



Project Effects and Delta Smelt Response



Project Effects and Delta Smelt Response



Frustrations with ESA Section 7 Process

- One Stressor / One Fish at a time
  - Need more Holistic / Systems approach
- Delta is one of the most studied systems
  - We need to be looking at all this data
- Hammer / Nail syndrome
- "Take" focus instead of population effects
- "Critical Habitat" has become "Any Habitat"

30

Conclusion

- Exports - the only source of fish mortality evaluated
- Many factors affecting “at-risk” fish species in the Delta
  - Controlling exports only has not improved delta smelt abundance
- Reasonable export constraints are prudent to prevent peak entrainment events
- A comprehensive effort is needed to better protect “at-risk” fish species –
  - Bay Delta Conservation Plan (BDCP)
- RPAs should be adjusted to use
  - Better Tools - Delta Smelt PEI
  - Better Actions – Salmon Non-Physical Barrier – SJR
  - Better Approach - Food - Tidal Habitat / N loading

31

End

32