

Introduction to the Presentations to the National Research Council Delta Issues

DELS-WSTB-09-09

1/26/10

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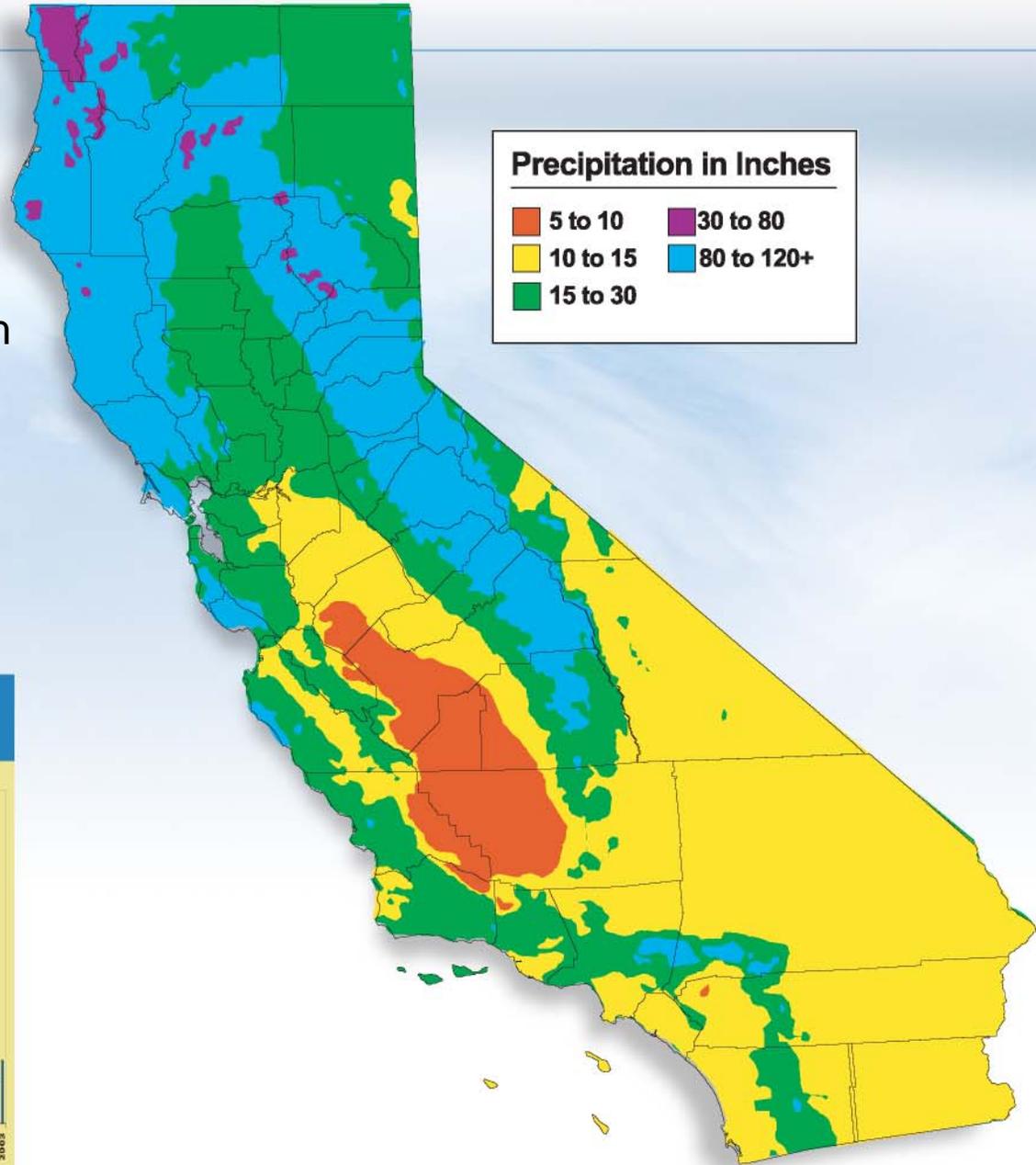
California Department of Water Resources

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

Water Variability and Use

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



**Yearly Total Delta Outflow
(Calendar Year)**

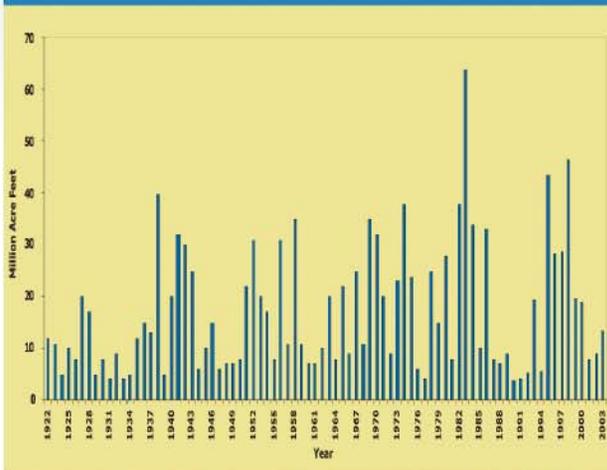
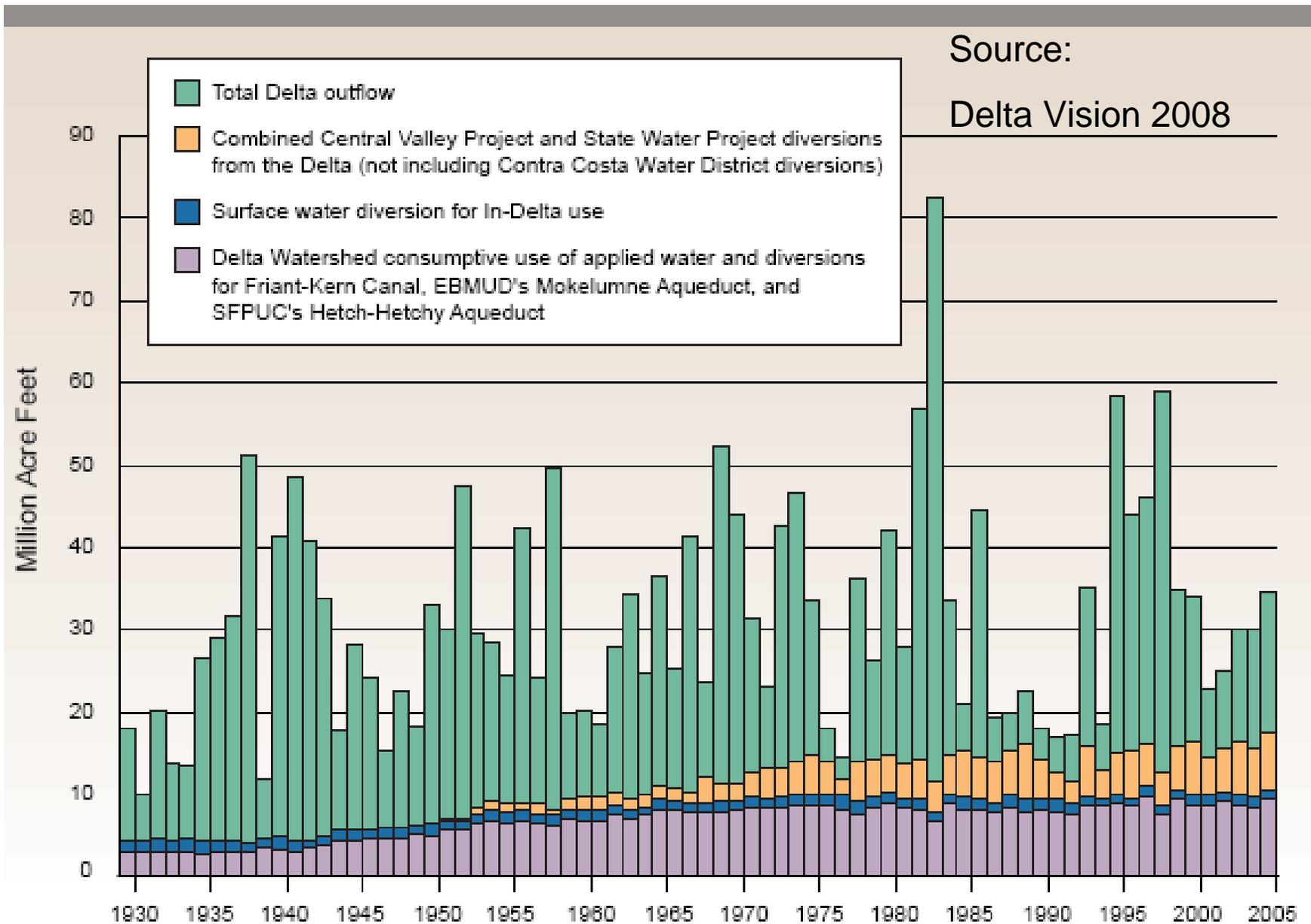


Figure 7b. Historic Diversions before the Delta, in-Delta Uses and Exports from the Delta, plus Outflows



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

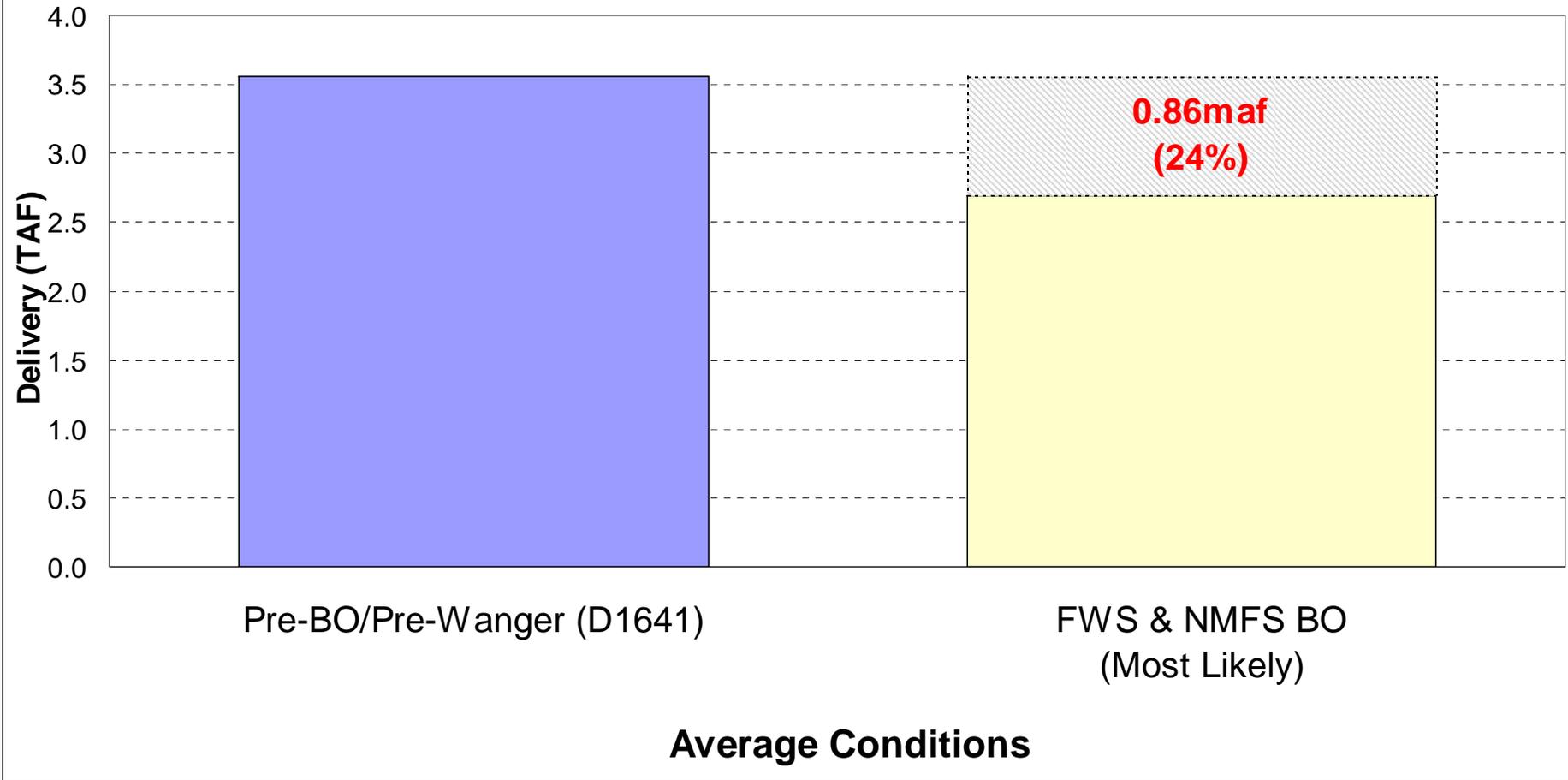
- 558,000 acres in agricultural production
- 64,000 acres of urban and commercial development

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

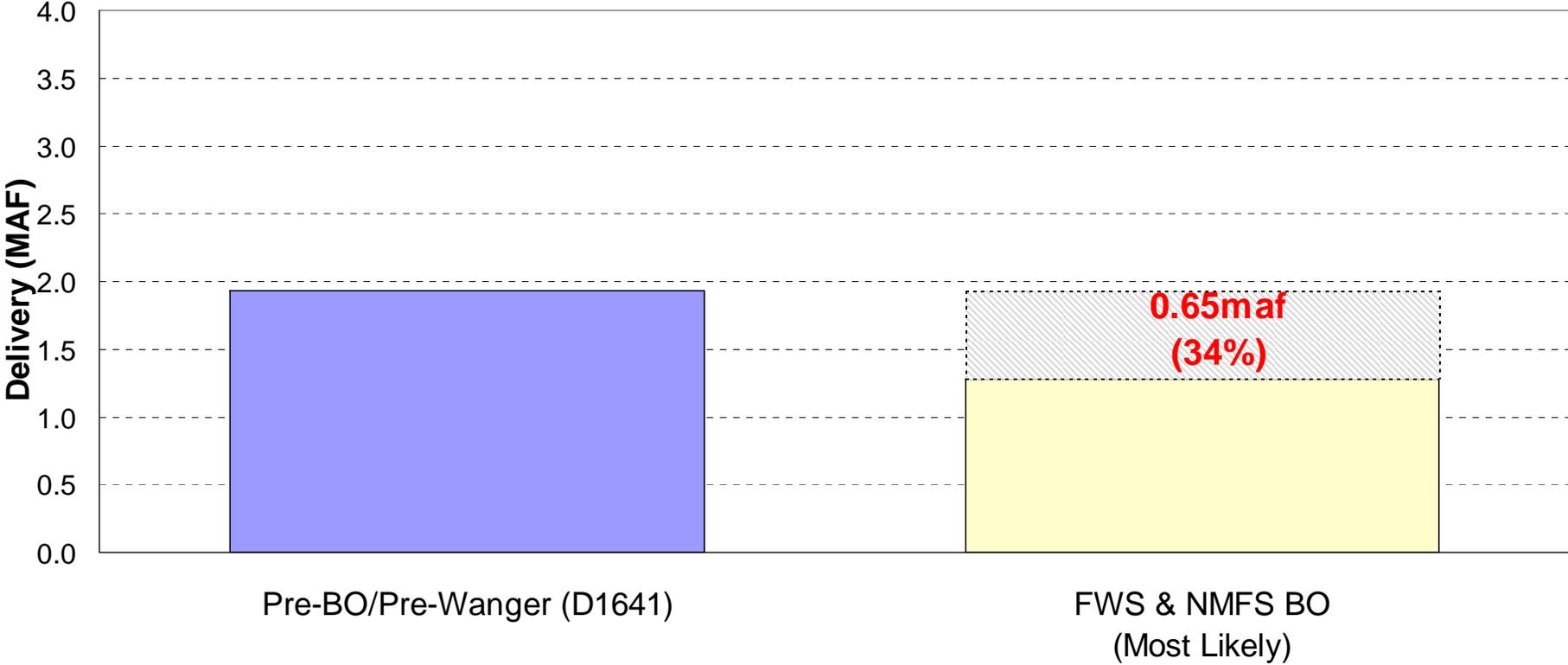
Water Supply Impacts to the State Water Project (SWP)

DRAFT 2009 Delivery Reliability Report
Estimated Delivery Reduction under Average Conditions



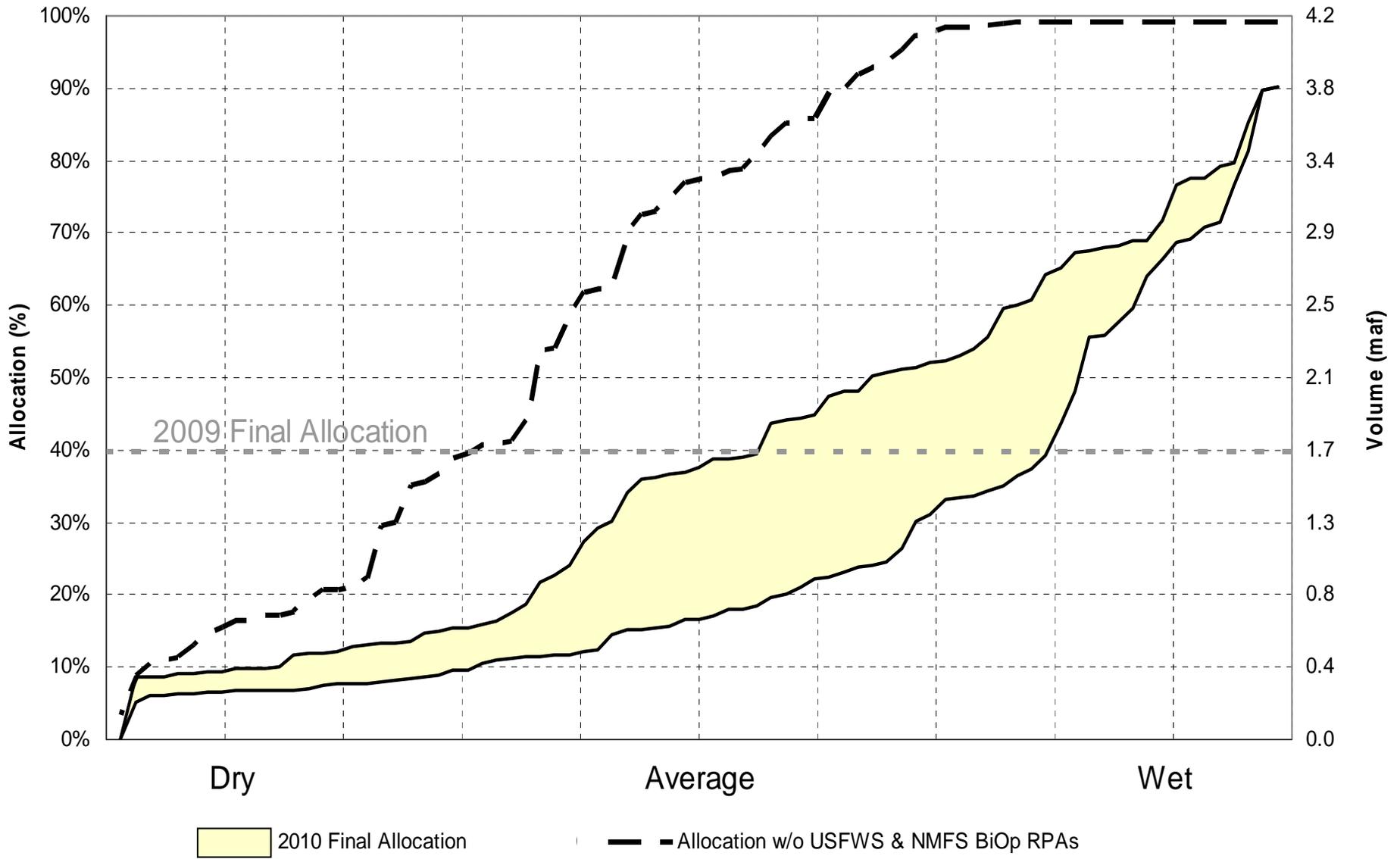
Water Supply Impacts to the State Water Projects (SWP)

DRAFT 2009 Delivery Reliability Report
Estimated Delivery Reduction under Dry Conditions



Dry Conditions

Forecasted 2010 SWP Water Supply Allocation

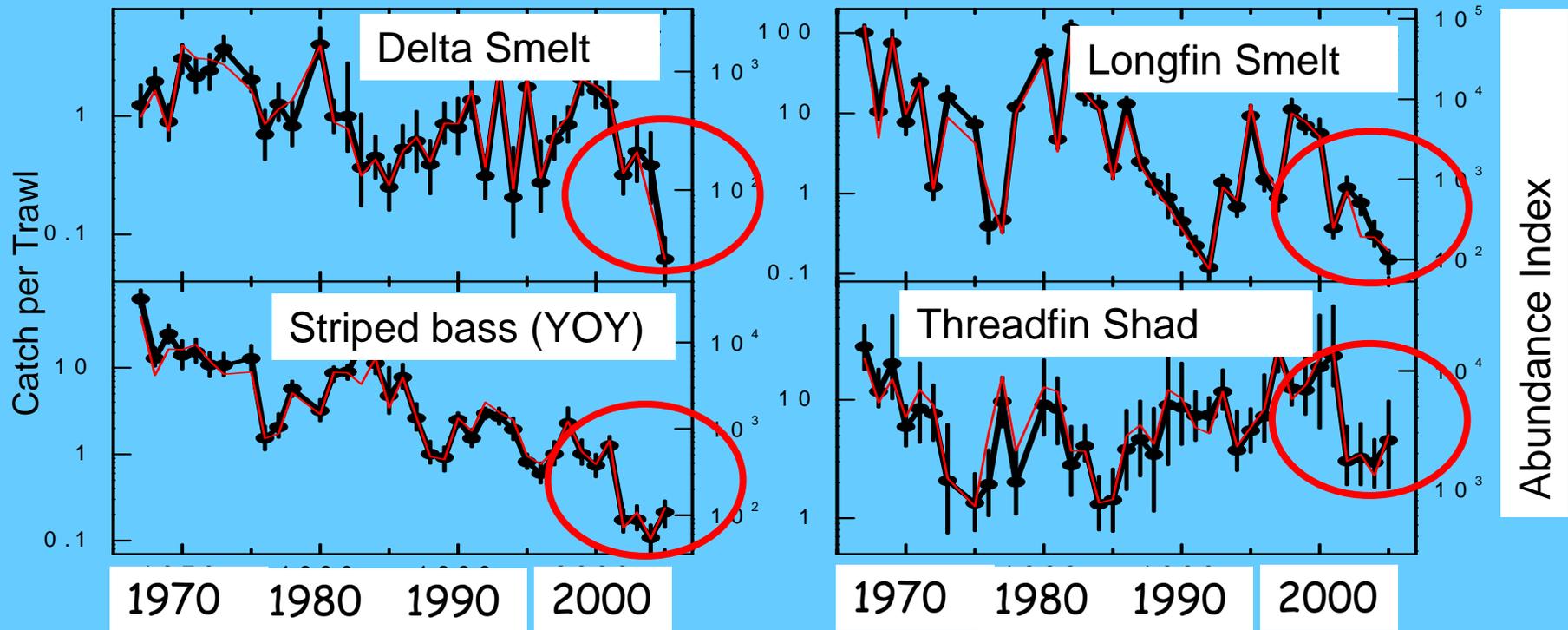


Four Basic Bay/Delta Facts

- (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

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

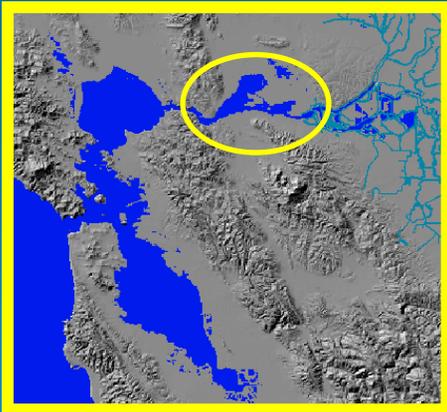
- Corbula clams in Suisun Bay –Phytoplankton crash
- Limnoithona – now most dominant zooplankton and not a good food source for fish
- Aquatic weeds – Egeria – reduce turbidity and provide cover to predators in the Central and Southern Delta

➤ Increased ammonia discharges

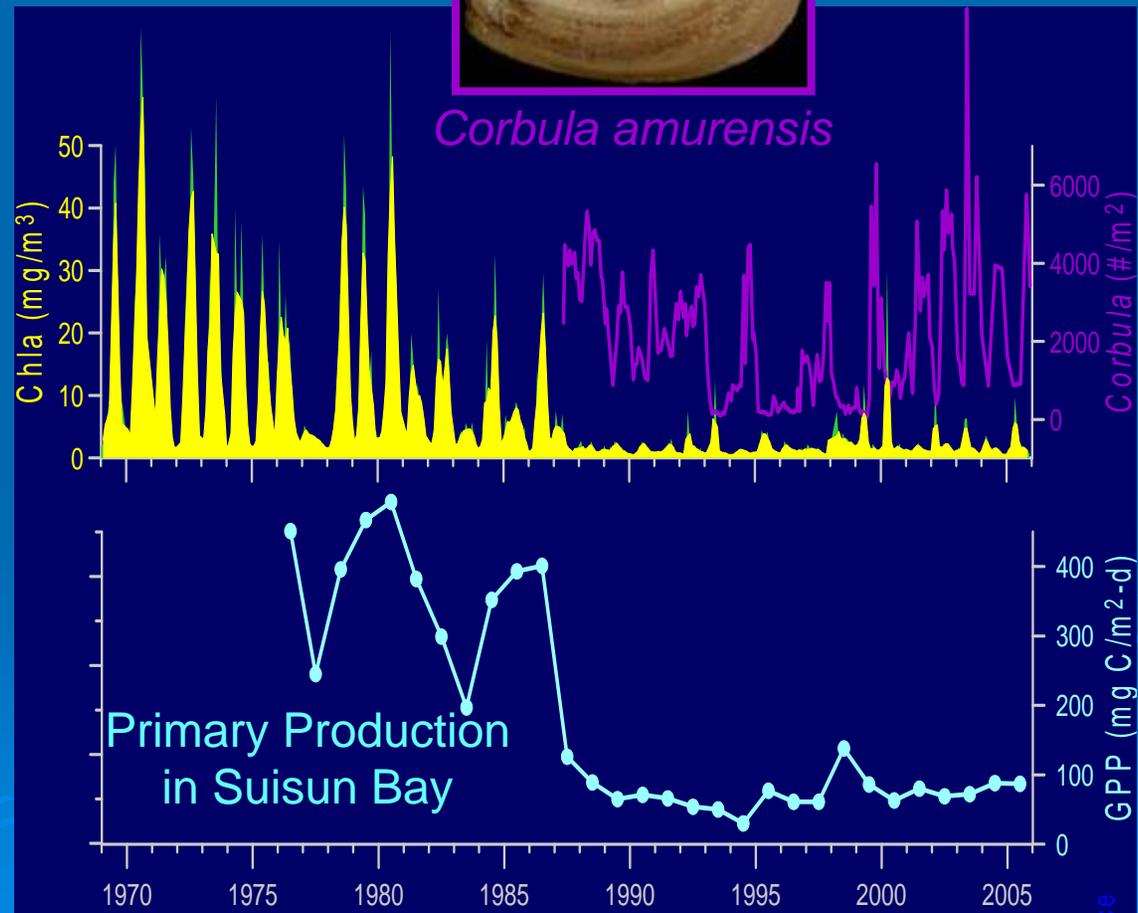
- Change in Nitrogen to Phosphorus ratios
- Related to more green and blue green algae (microcystis) fewer Diatoms

Phytoplankton Primary Production

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

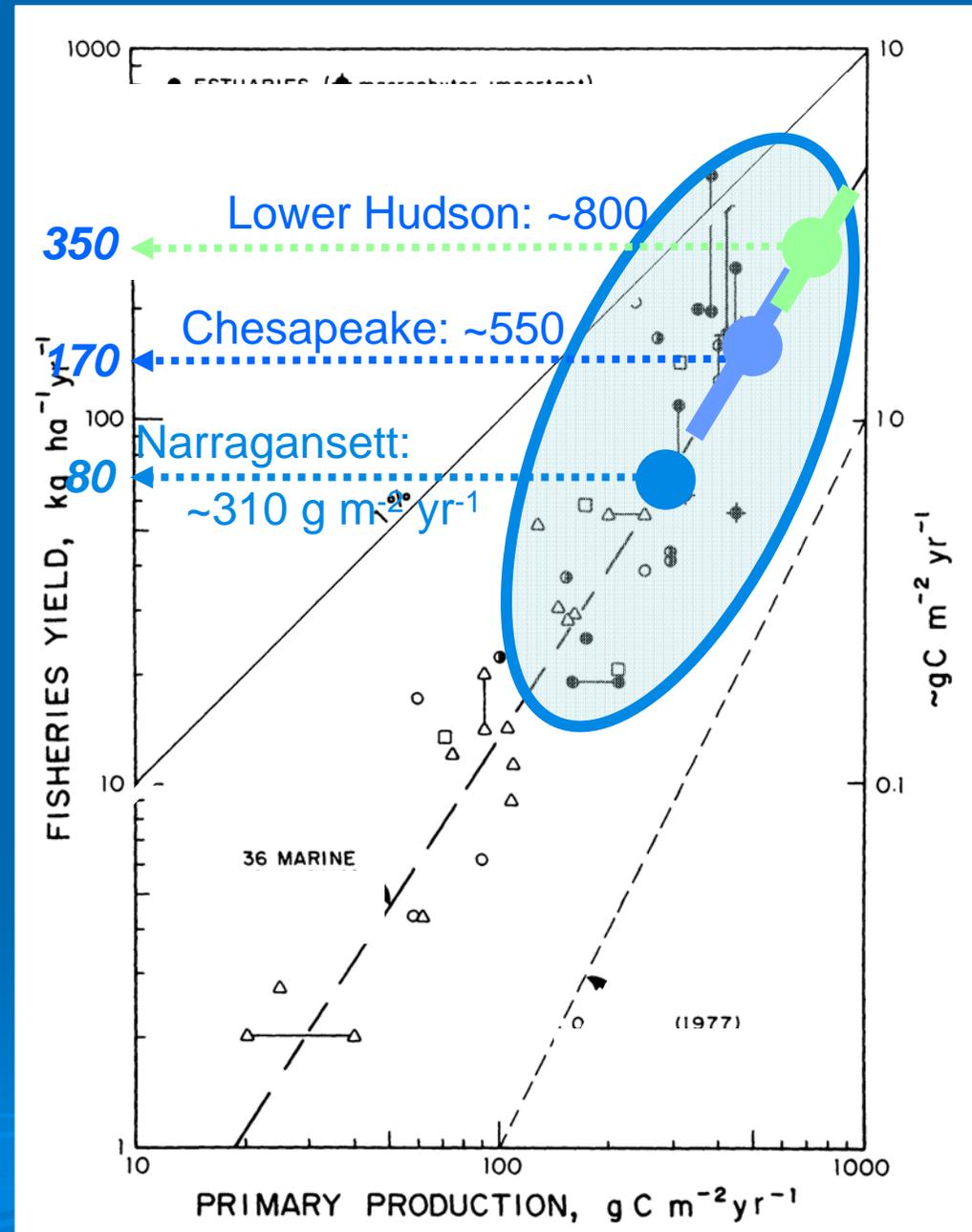


Corbula amurensis



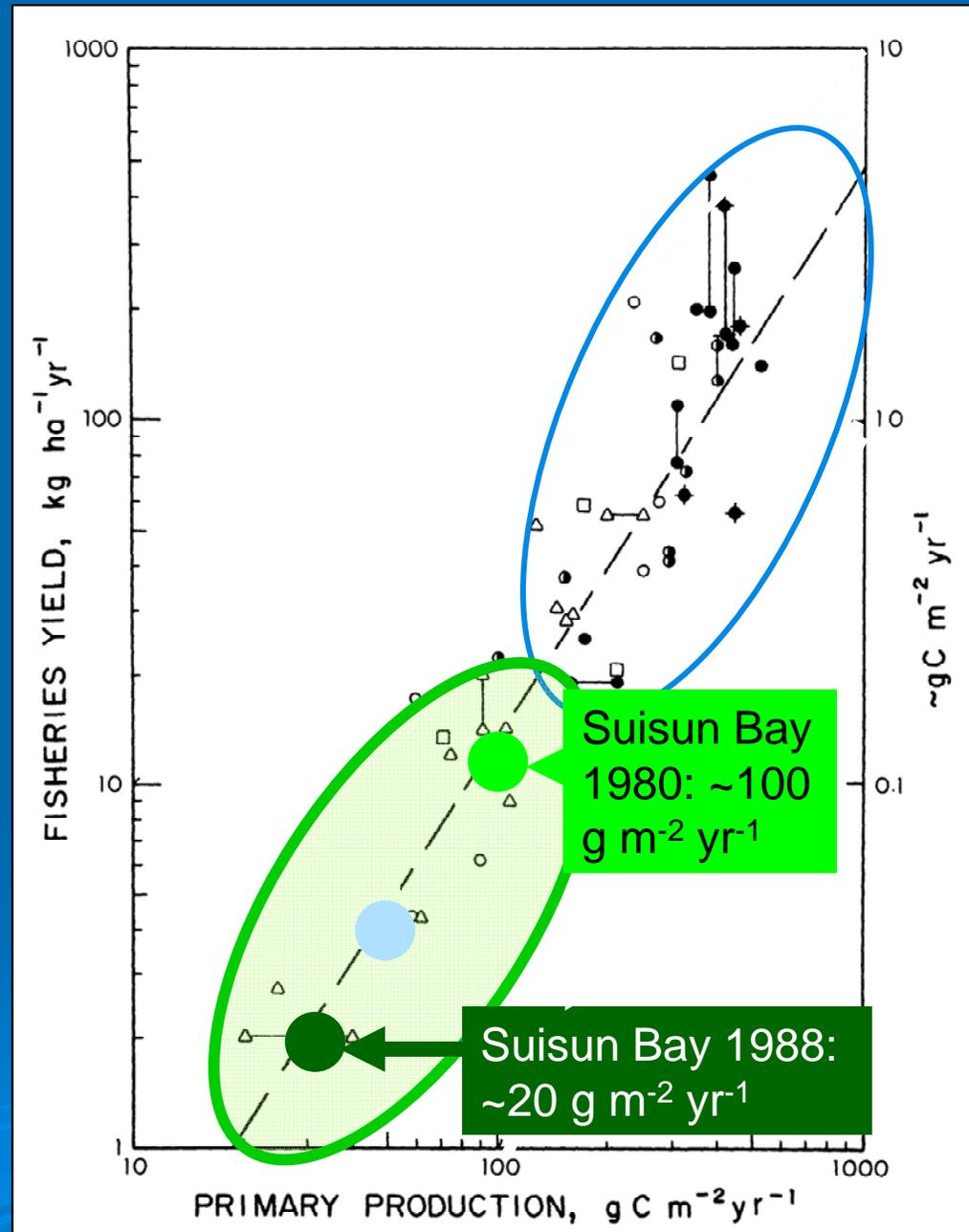
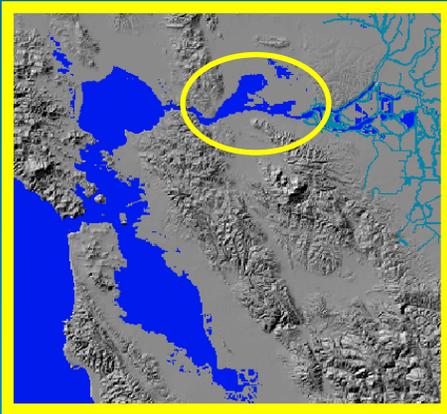
Phytoplankton Primary Production

... in Estuaries is
typically very HIGH



Phytoplankton Primary Production

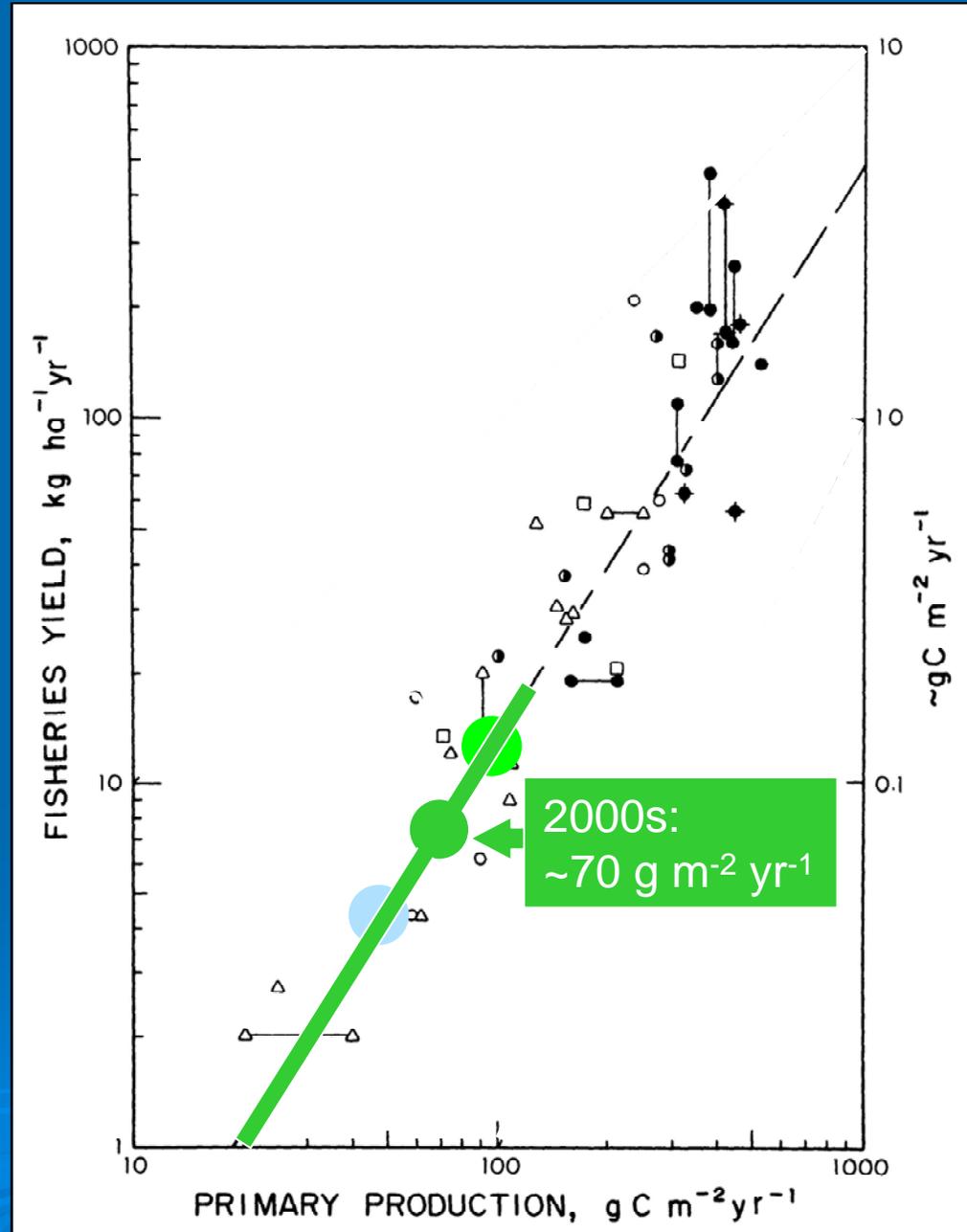
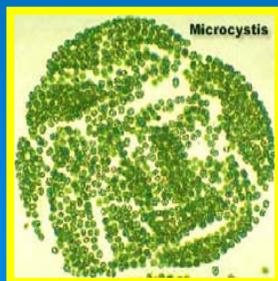
... CRASHED in
Suisun Bay right
after the *Corbula*
invasion



Phytoplankton Primary Production

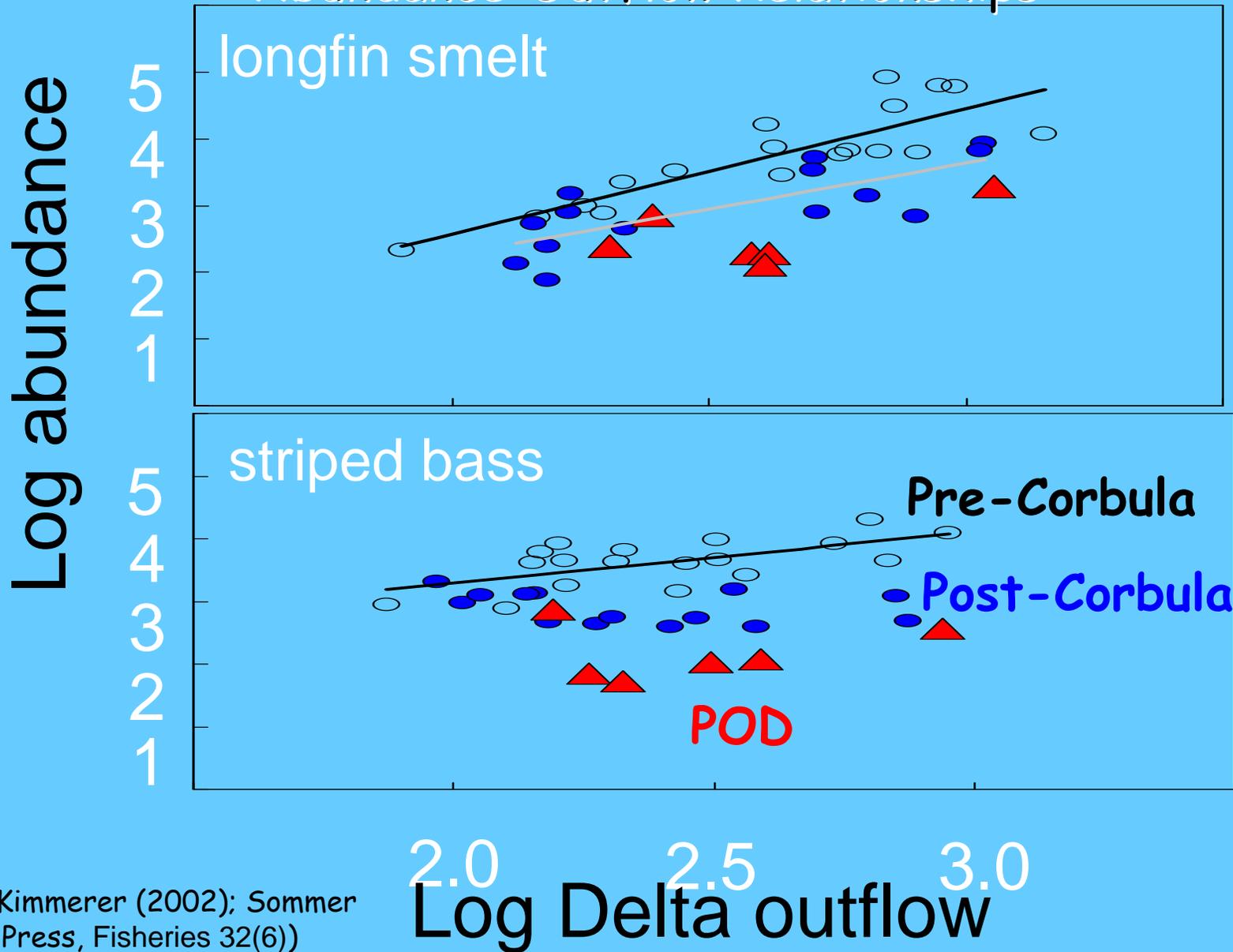
... during the POD
years is slightly UP
in the Delta &
Suisun Bay.

Quality???



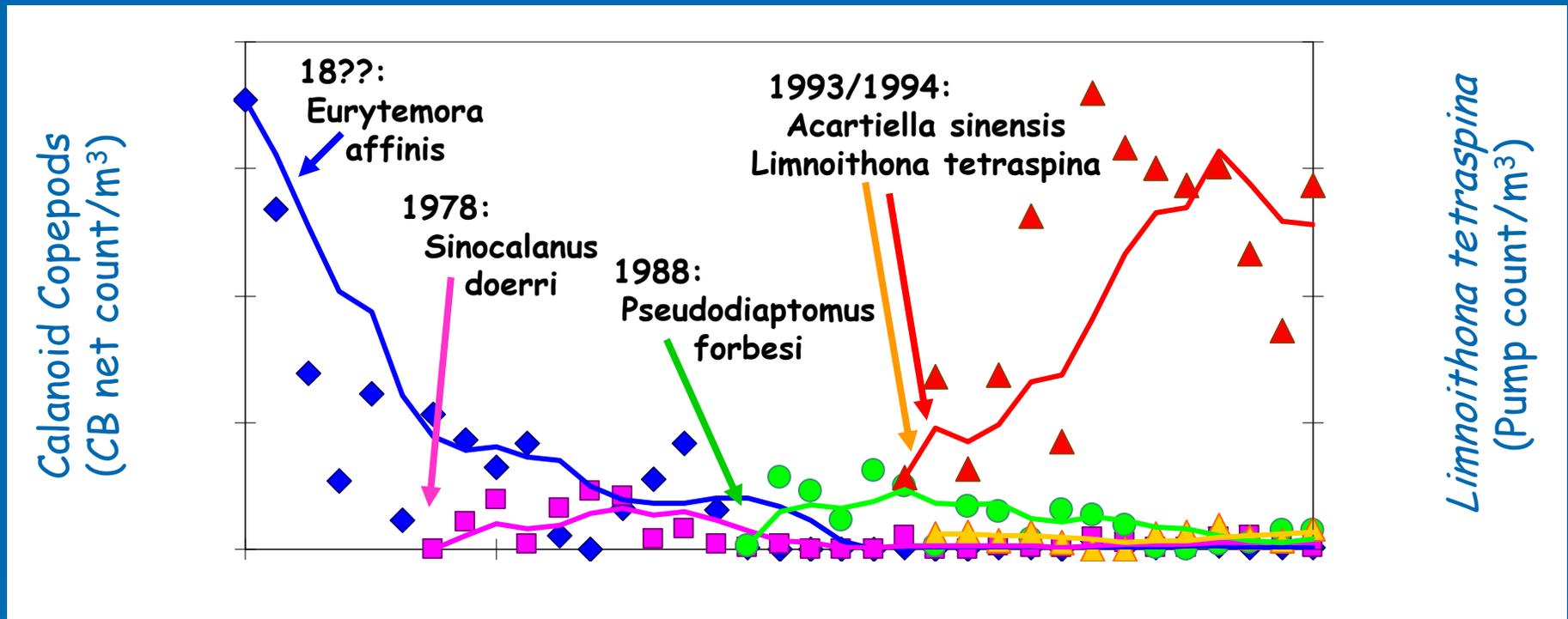
Sources: A. Jassby (UCD), J. Cloern (USGS), IEP data

POD Has Further Shifted Abundance-Outflow Relationships



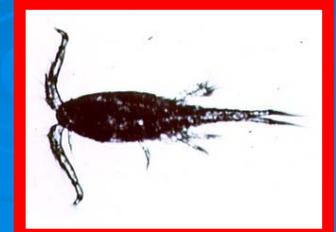
Source: Kimmerer (2002); Sommer et al. (In Press, Fisheries 32(6))

Zooplankton Species Invade in "Waves"

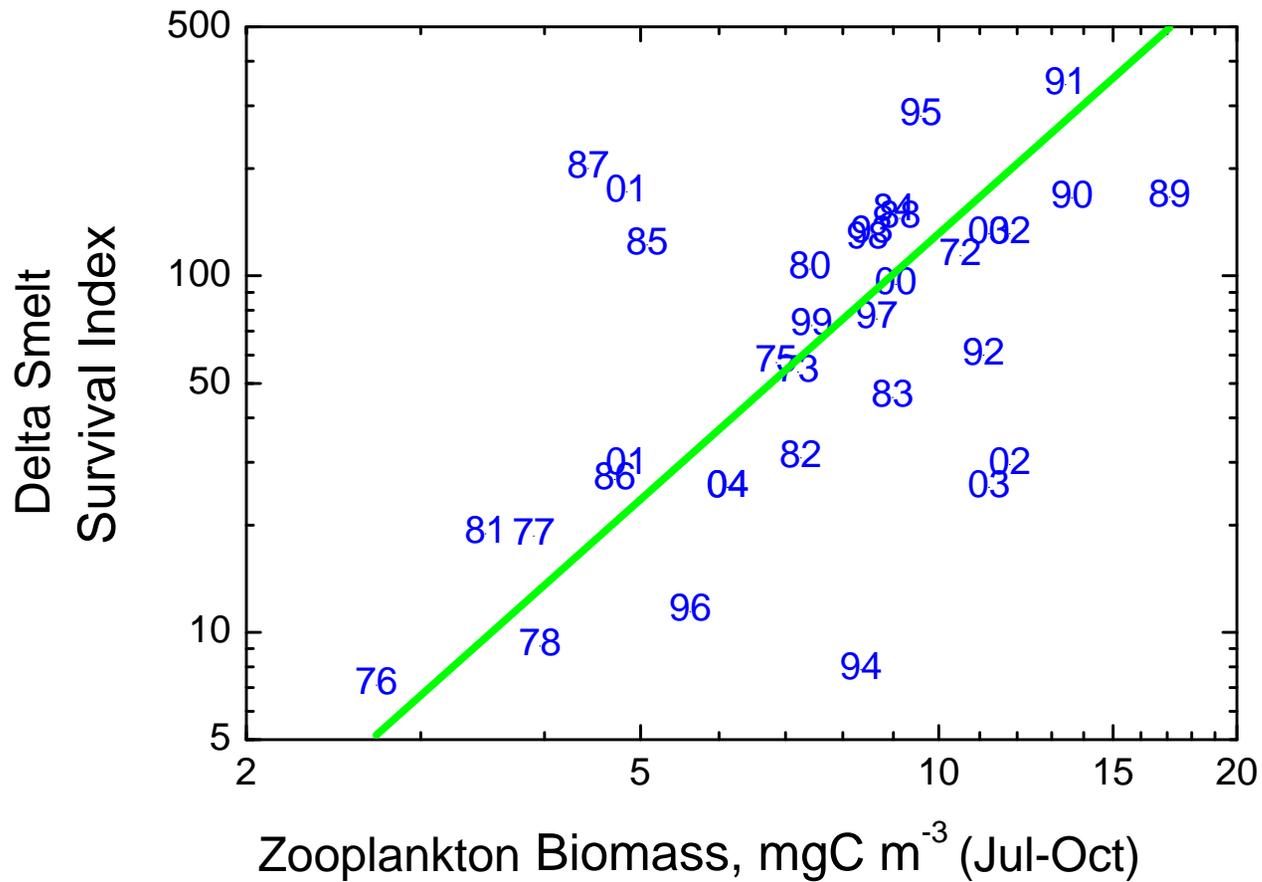


Adult copepods at Chipps Island, yearly average densities with 5-year moving average lines

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

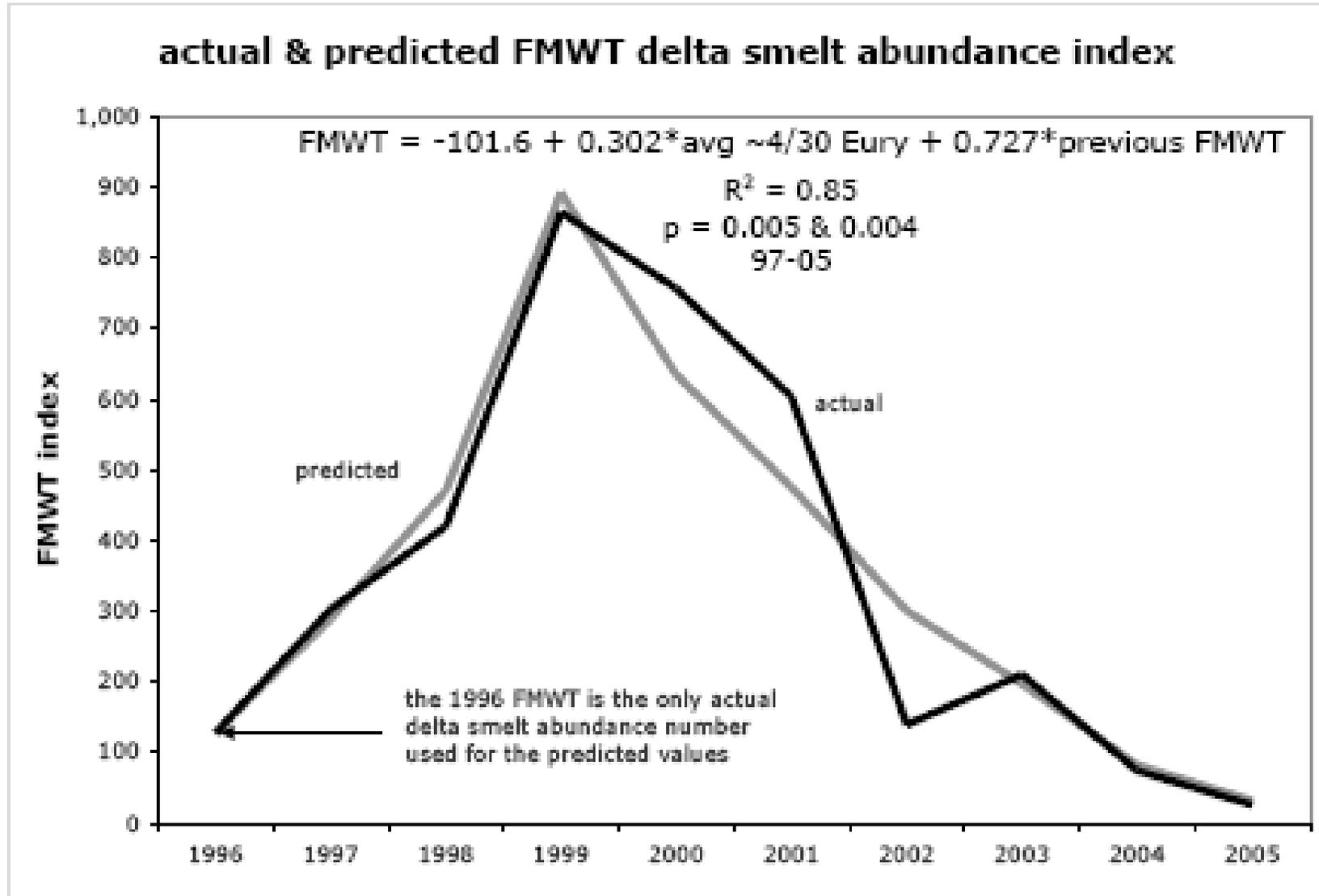


There is Evidence That Zooplankton Biomass Affects Delta Smelt Survival in Summer



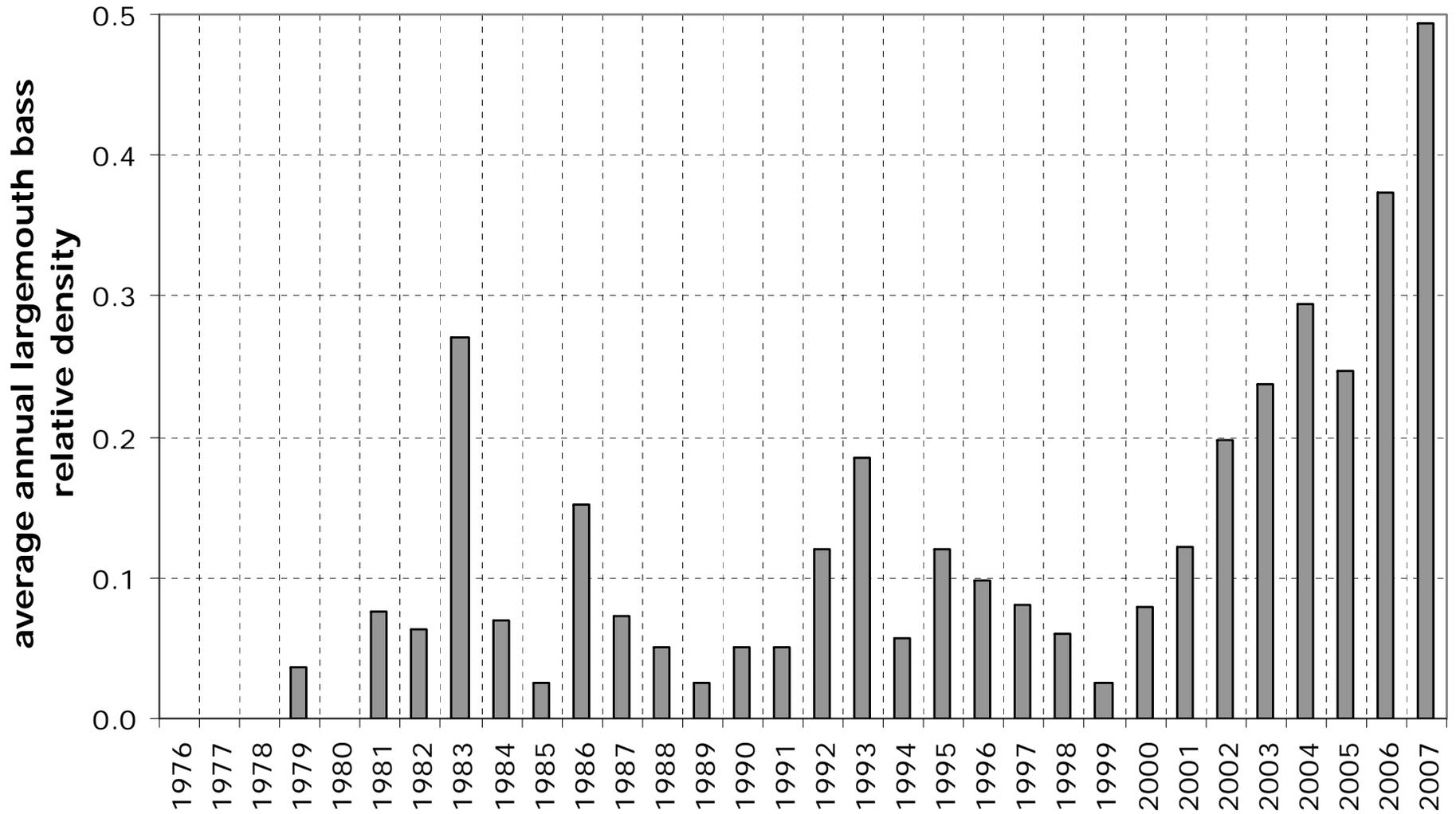
Source: Kimmerer (2008)

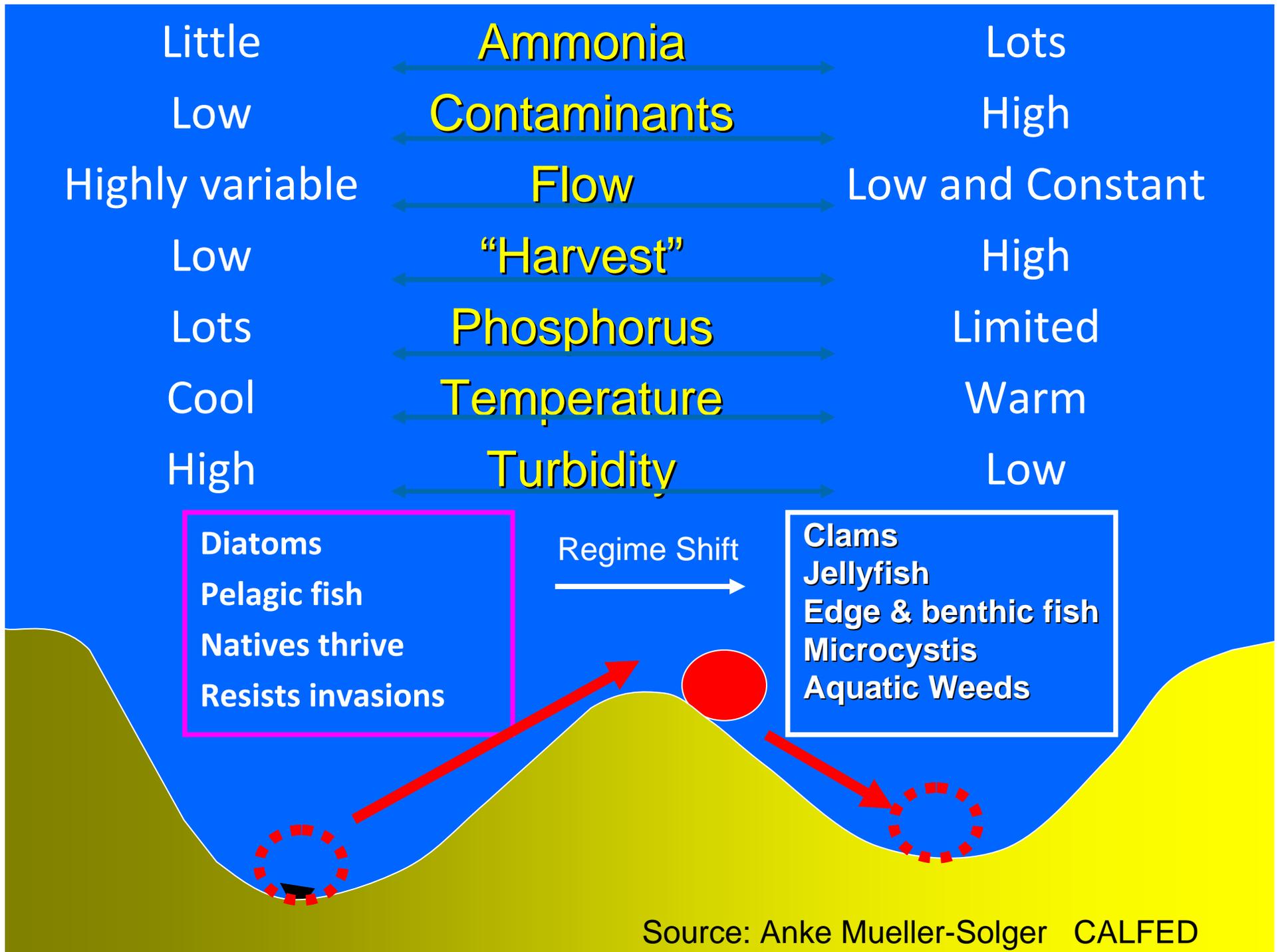
Spring Food Abundance also Important to Delta Smelt



Source: BJ Miller

largemouth bass average beach seine relative density



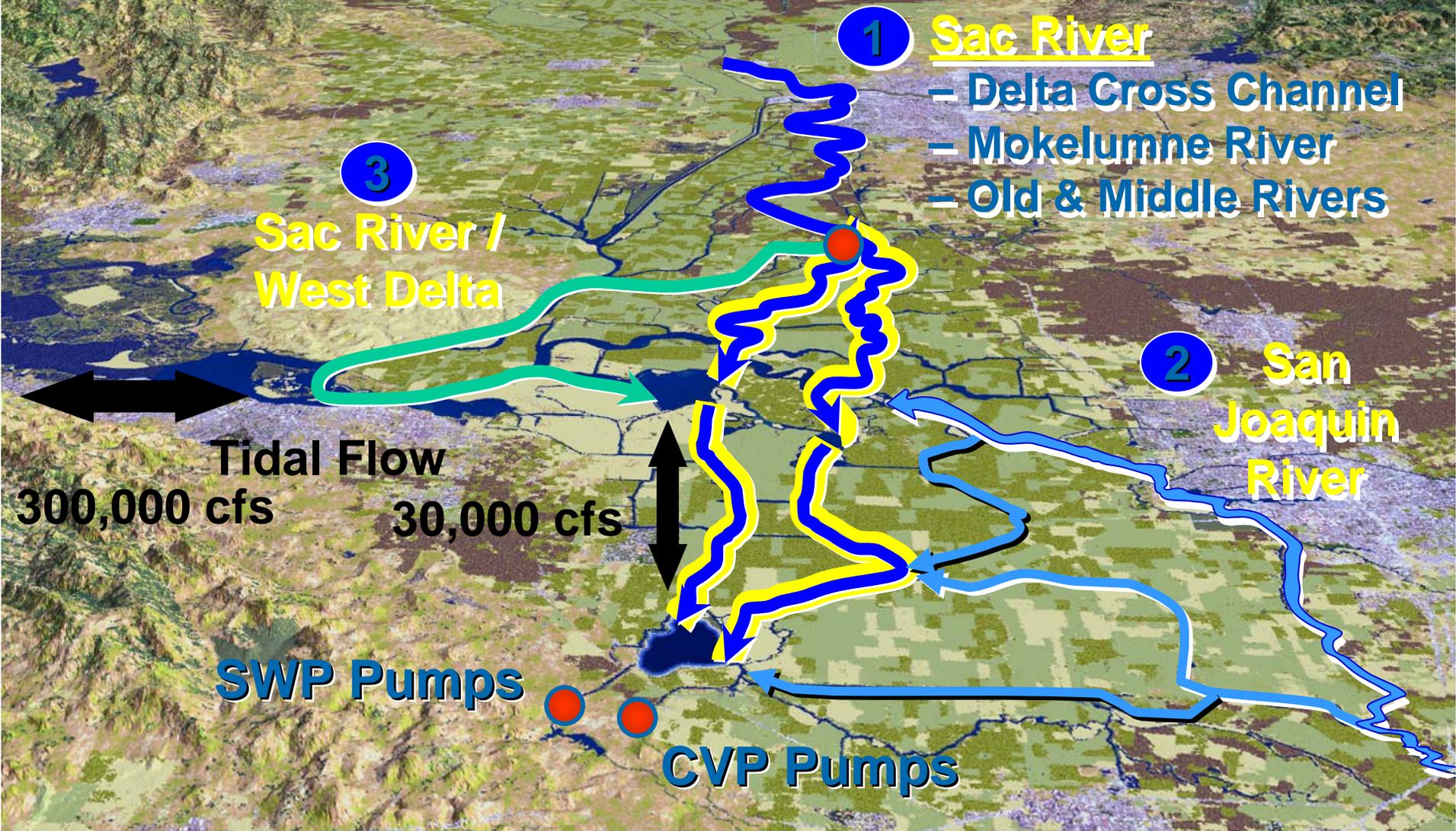


Source: Anke Mueller-Solger CALFED

(2) The Delta is a Tidal Estuary

- The Delta 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

How Water Gets to the California Economy



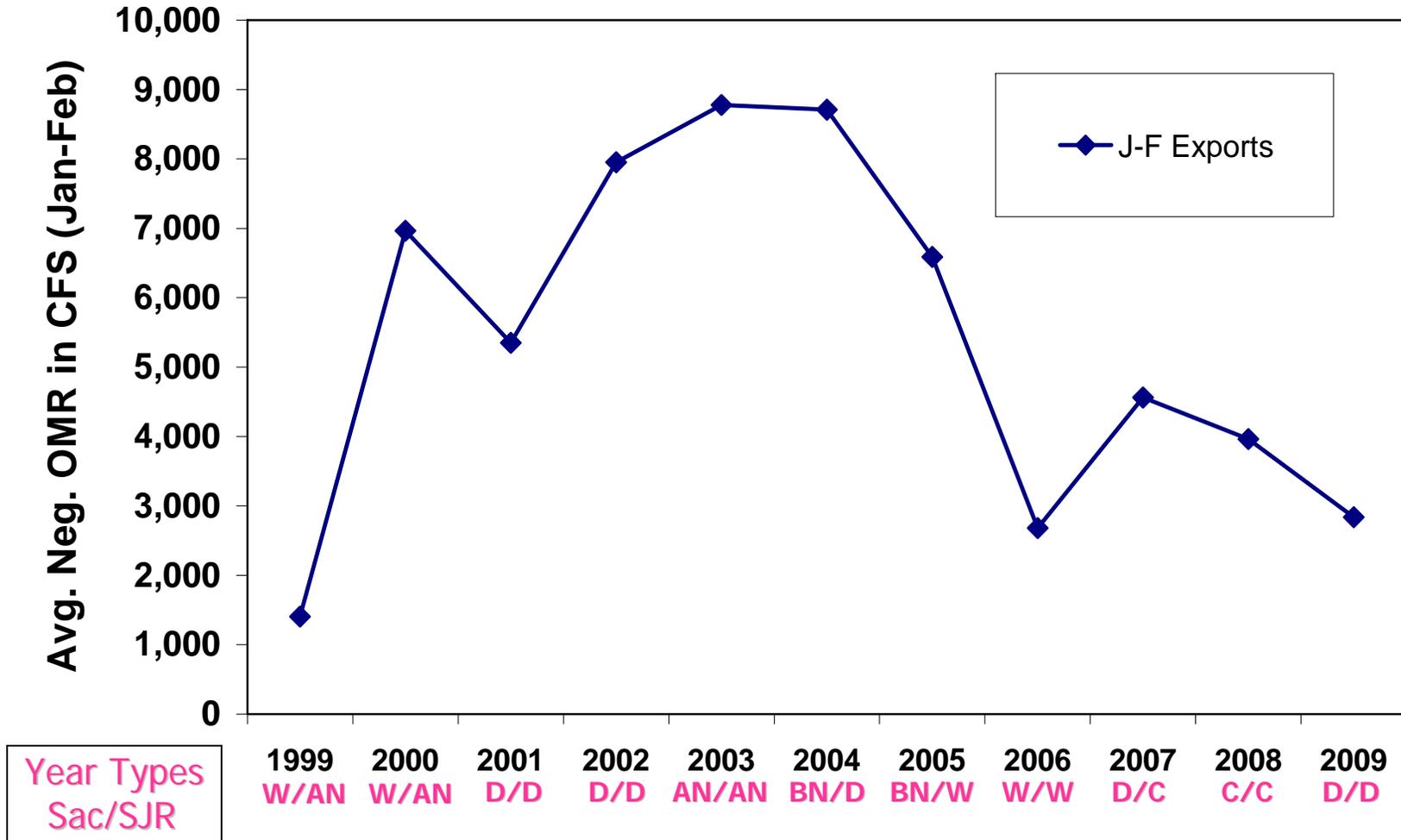
➤ (3) Some good relationship exist between Delta flows and “take” (salvage) at SWP/CVP pumps in South Delta

- Non-linear relationship between January and February OMR flows and Salvage of many fish species - -6,000 cfs
- Particle tracking and young smelt salvage

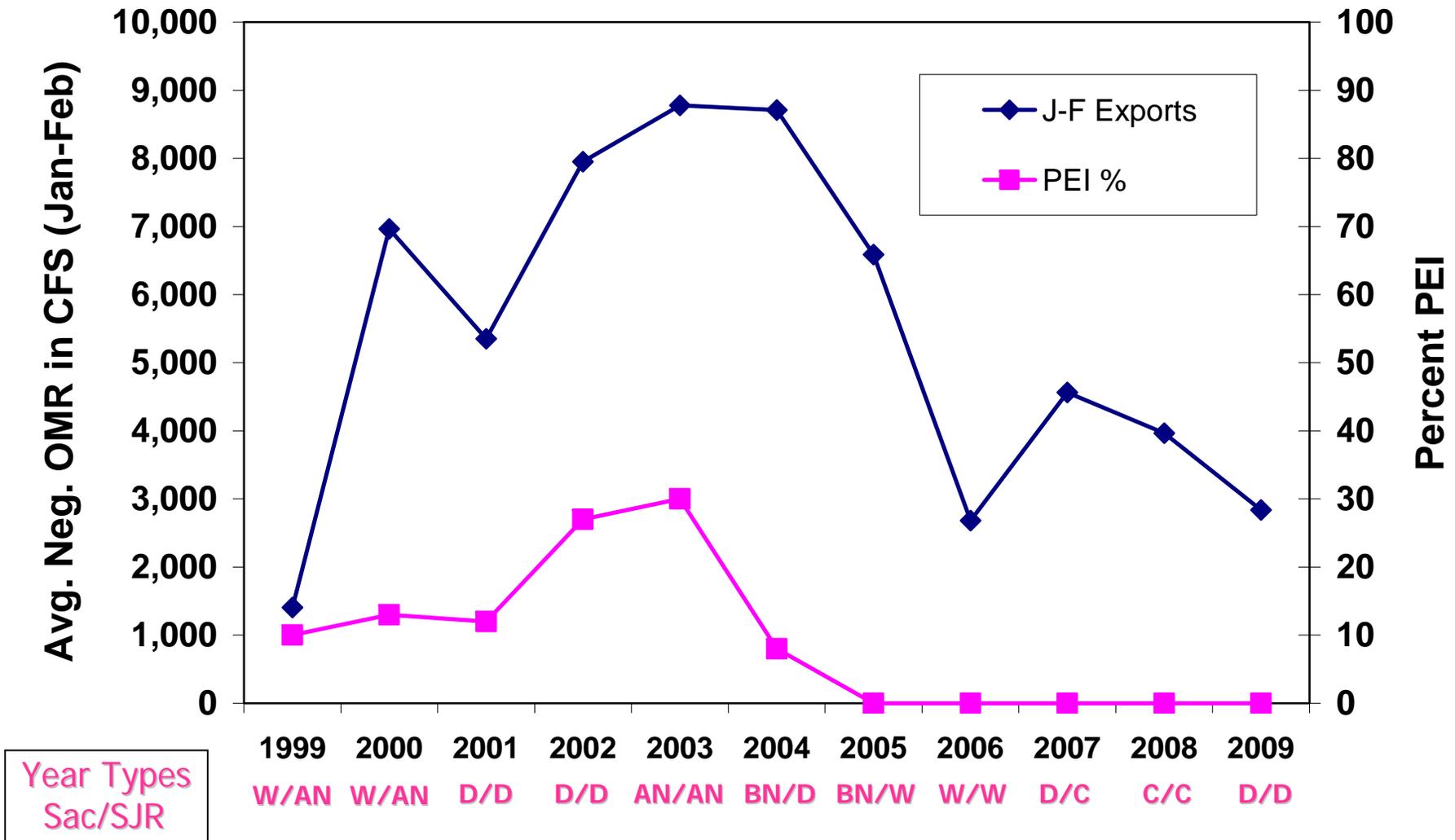
➤ (4) No substantial relationship between “take” and fish abundance

- Reducing “take” will not restore fish populations
- Look at last four years
- Take should be “reasonably” limited to avoid rare high take events

Project Effects and Delta Smelt Response

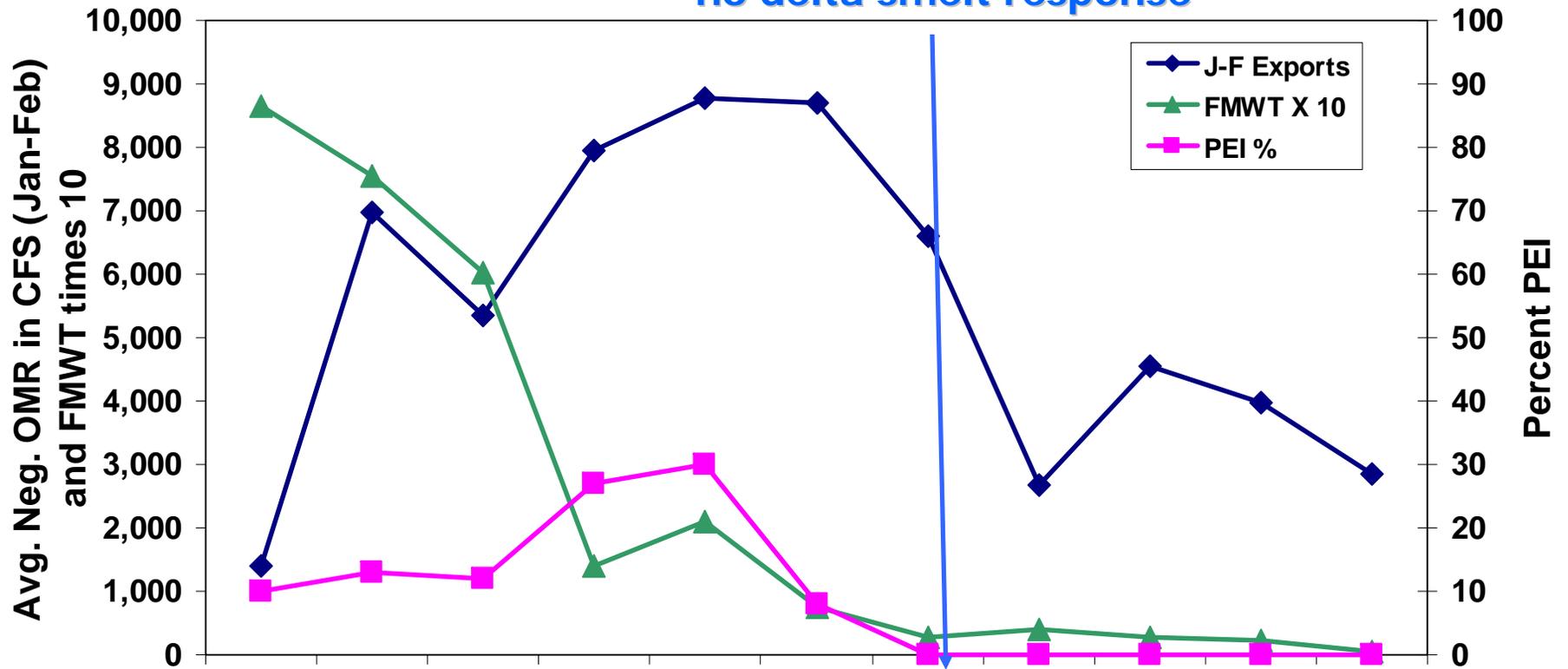


Project Effects and Delta Smelt Response



Project Effects and Delta Smelt Response

Last 4 years reduced project effects,
no delta smelt response



Year Types
Sac/SJR

1999 W/AN 2000 W/AN 2001 D/D 2002 D/D 2003 AN/AN 2004 BN/D 2005 BN/W 2006 W/W 2007 D/C 2008 C/C 2009 D/D

Water Supply Costs (TAF) 502 731 570
SWP Water Costs (TAF) 510 250

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”

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

End