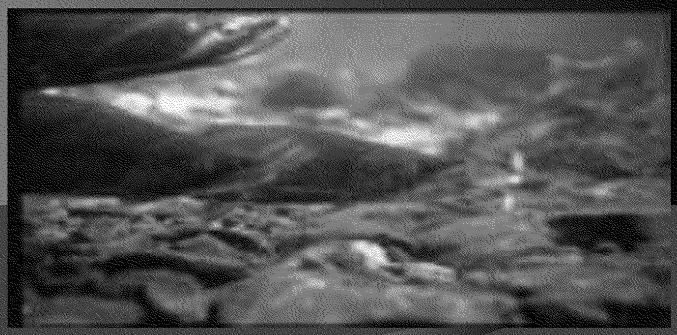
San Francisco Bay Delta Estuary



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Region 9 Team

- Karen Schwinn (Associate Director)
- Tom Hagler (attorney)
- Bruce Herbold (biologist)
- Carolyn Yale → Valentina Cabrera-Stagno
- Erin Foresman
- Tim Vendlinski
- Sam Ziegler (Watersheds Office mgr)

Agenda

- Setting
- Significance of estuary
- Issues
- Interagency efforts
- EPA priorities
- Bay Delta Conservation Plan

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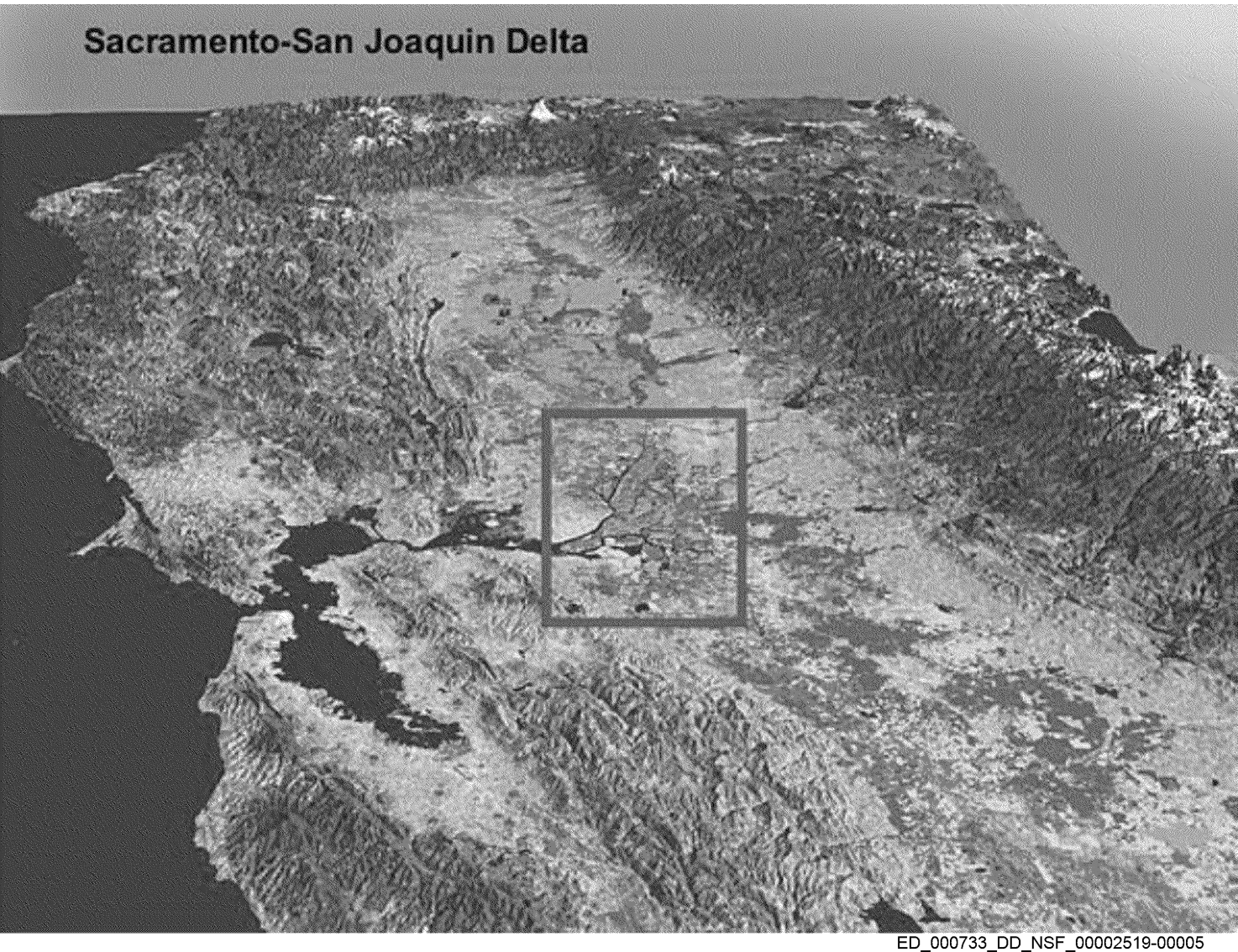
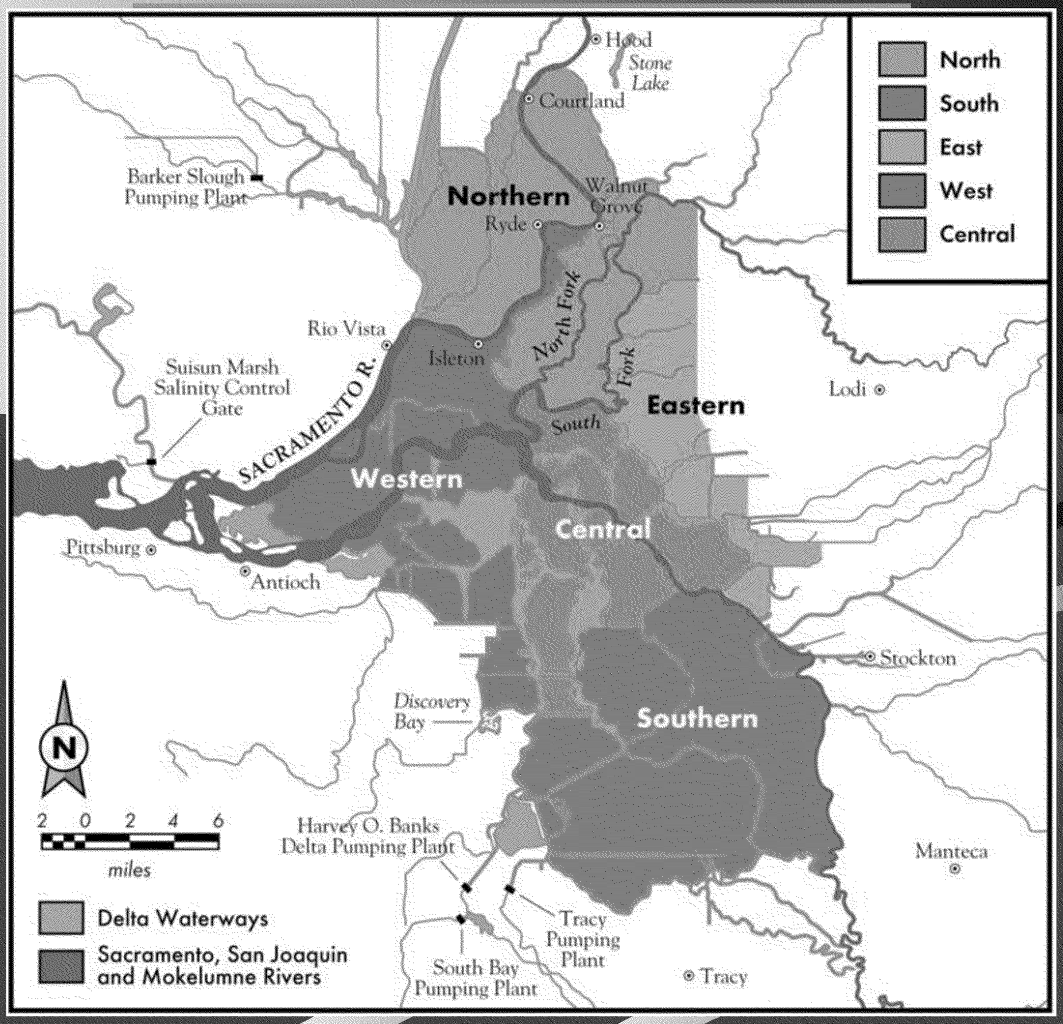
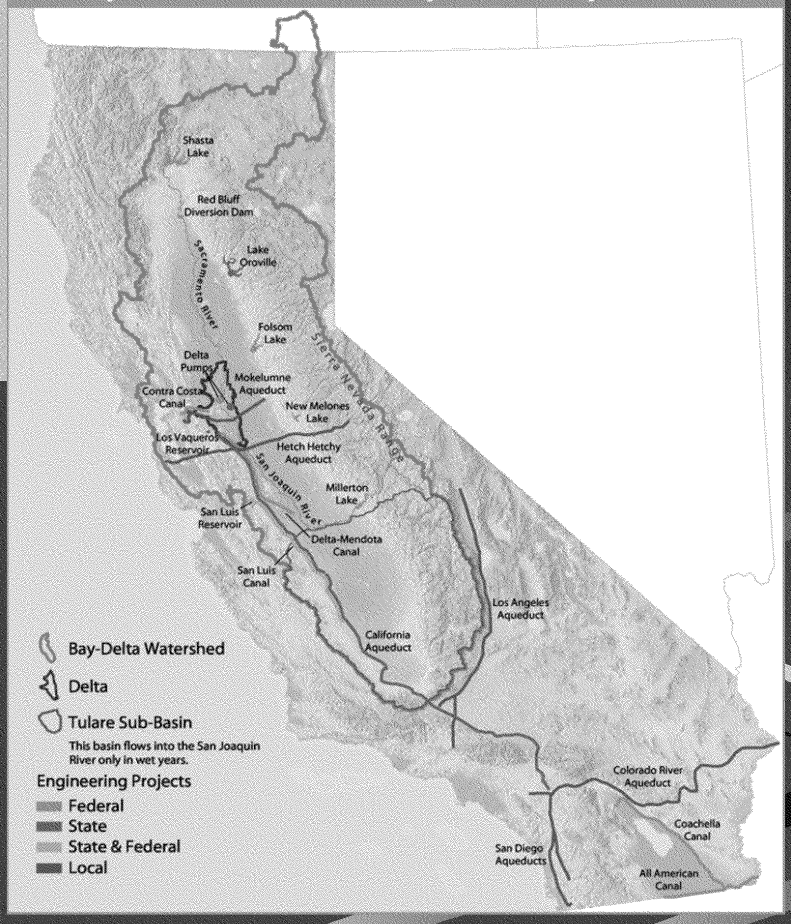
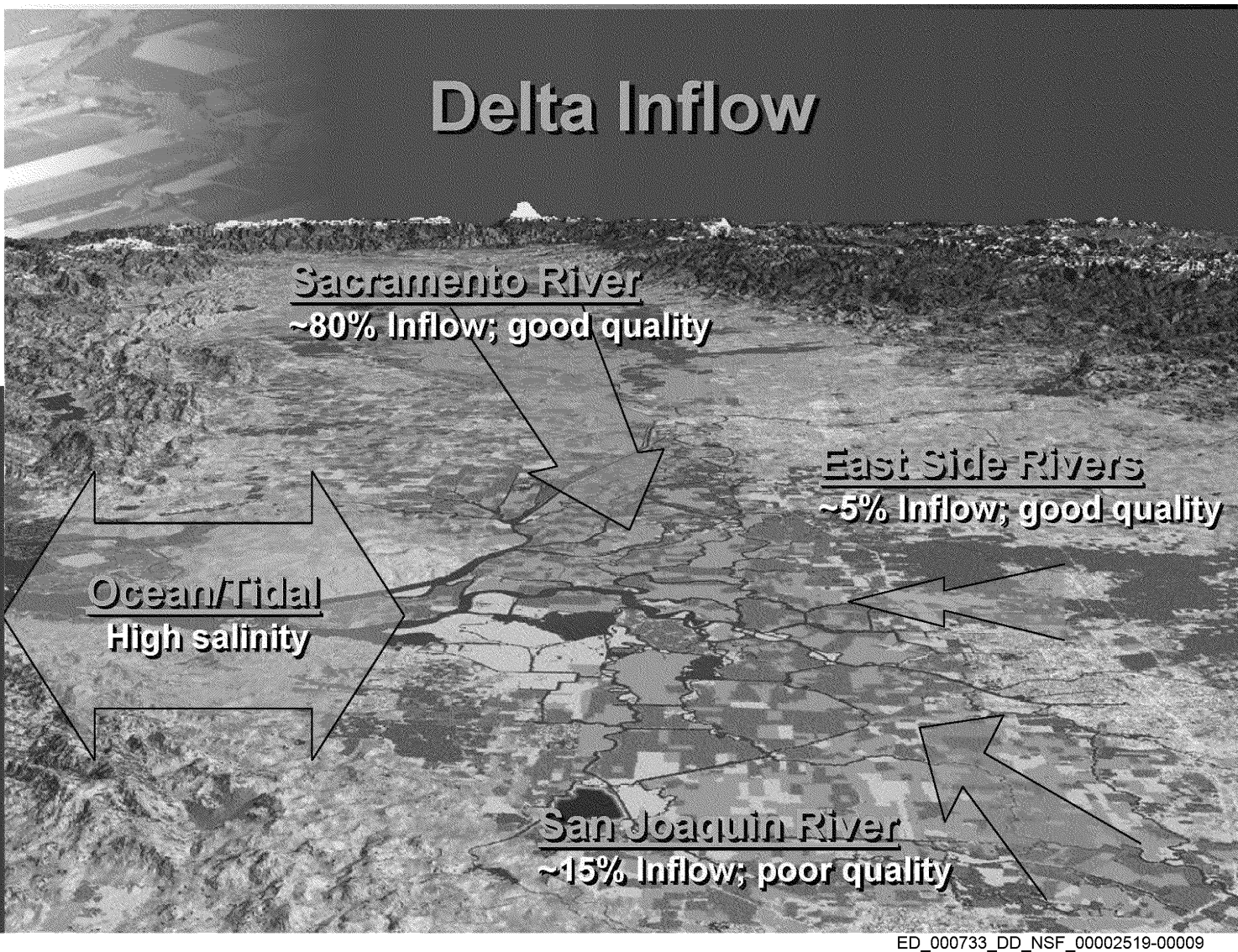

Sacramento-San Joaquin Delta


North
South
East
West
Central
Hood
Stone Lake
Courtland
Barker Slough Pumping Plant
Northern
Walnut Grove
Ryde
North Fork
Rio Vista
Isleton
South Fork
Suisun Marsh Salinity Control Gate
SACRAMENTO R.
Eastern
Lodi
Western
Central
Pittsburg
Antioch
Stockton
Discovery Bay
Southern
N
2 0 2 4 6
miles
Harvey O. Banks Delta Pumping Plant
Manteca
Tracy Pumping Plant
South Bay Pumping Plant
Tracy
Delta Waterways
Sacramento, San Joaquin and Mokelumne Rivers

The Bay-Delta Watershed and Major Water Projects




Delta Inflow
Sacramento River
~80% Inflow; good quality
East Side Rivers
~5% Inflow; good quality
Ocean/Tidal
High salinity
San Joaquin River
~15% Inflow; poor quality

Why is the Delta important?

- Largest West Coast estuary
- Habitat for 800 species
- Commercial & recreational fishery
- 2/3 of Californian's rely on Delta water
- Irrigation for 45% of the nation's fruits and vegetables (& most of the nuts)
- Recreation and tourism

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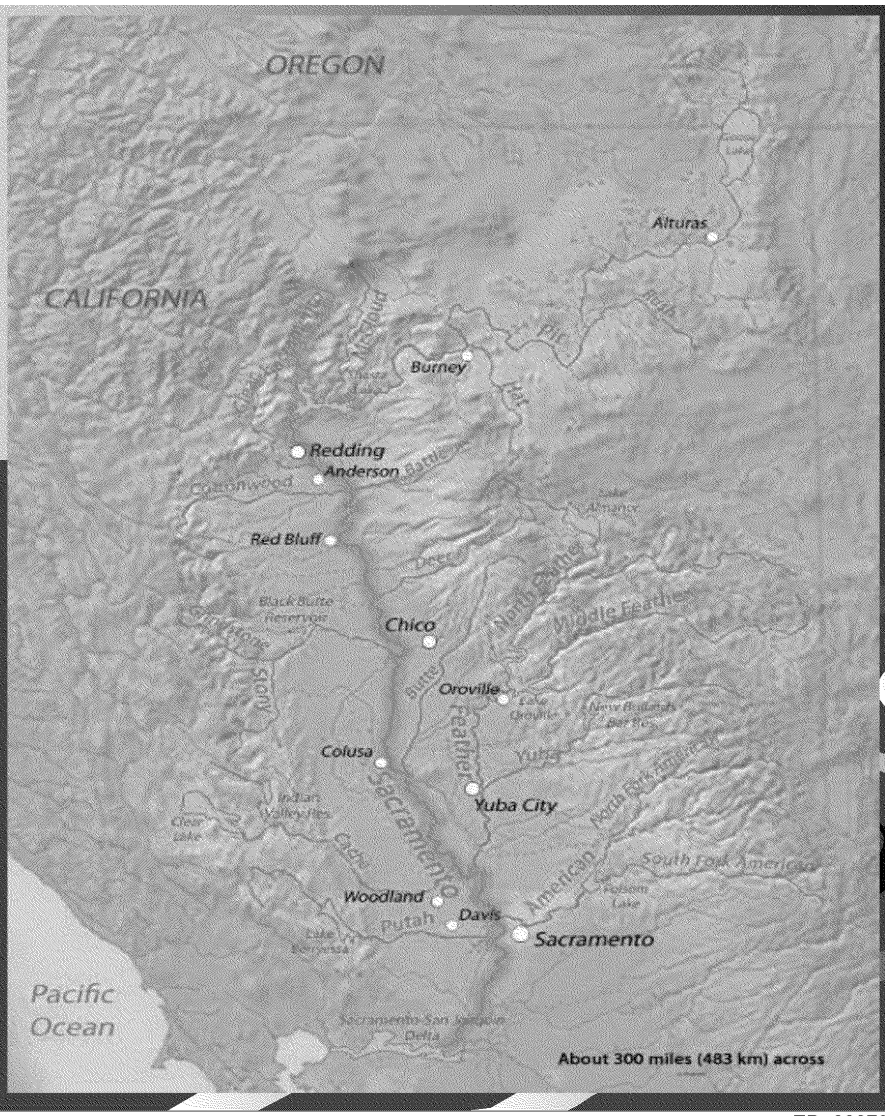
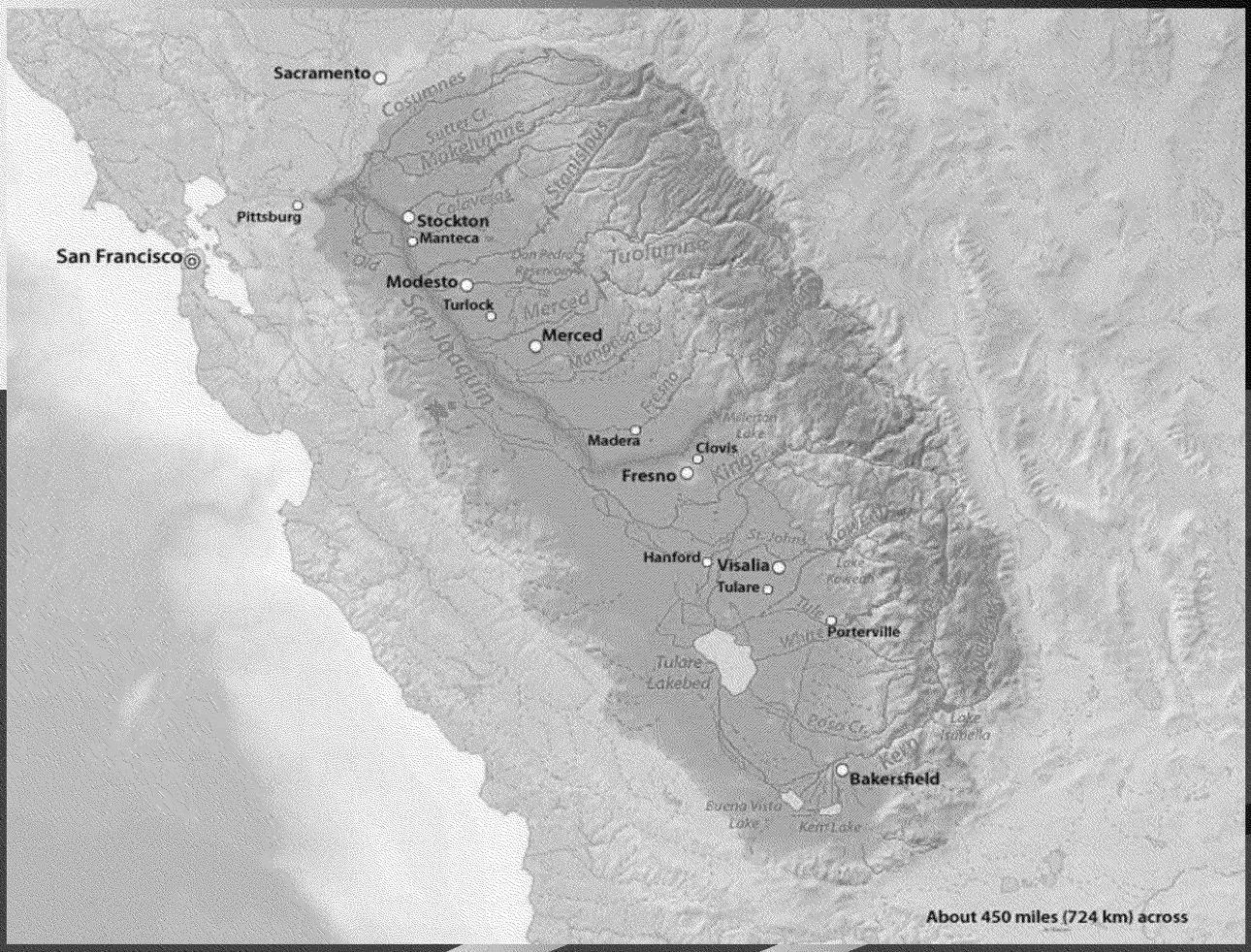
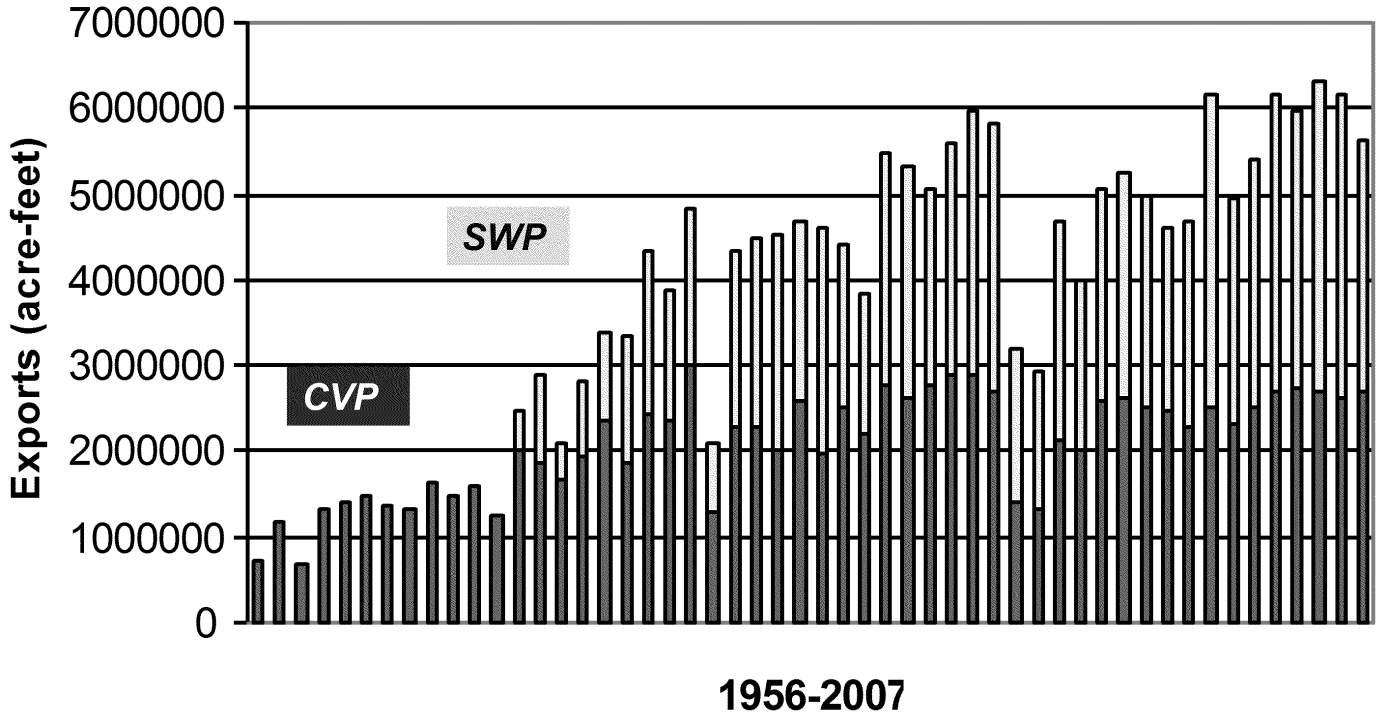

OREGON
CALIFORNIA
Alturas
Pit
Hat
Burney
McCloud
Redding
Anderson
Cottonwood
Battle Cr.
Lake Almanor
Red Bluff
Deer
North Fork
Middle Feather
Black Butte Reservoir
Chico
Stony
Butte
Oroville
Lake Oroville
Feather
Colusa
Yuba
Yuba City
Sacramento
Indian Valley Res.
Clear Lake
Cache
American
North Fork American
South Fork American
Folsom Lake
Woodland
Davis
Putah
Sacramento
Lake Berryessa
Pacific Ocean
Sacramento-San Joaquin Delta
About 300 miles (483 km) across

AP / Marcio Jose Sanchez, File


Sacramento
Cosumnes
Sutter Cr.
Mokelumne
Stanislaus
Calaveras
Pittsburg
Stockton
Manteca
San Francisco
Tuolumne
Modesto
Turlock
Merced
Merced
San Joaquin
Mariposa Cr.
Fresno
Madera
Millerton Lake
Clovis
Fresno
Kings
St. Johns
Kaweah
Hanford
Visalia
Tulare
Lake Kaweah
Tule
Porterville
White
Tulare Lakebed
Poso Cr.
Lake Isabella
Kern
Bakersfield
Buena Vista Lake
Kern Lake
About 450 miles (724 km) across

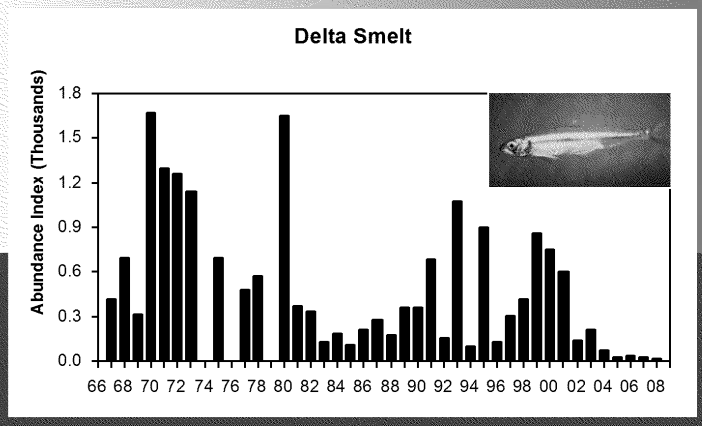
What's the problem?

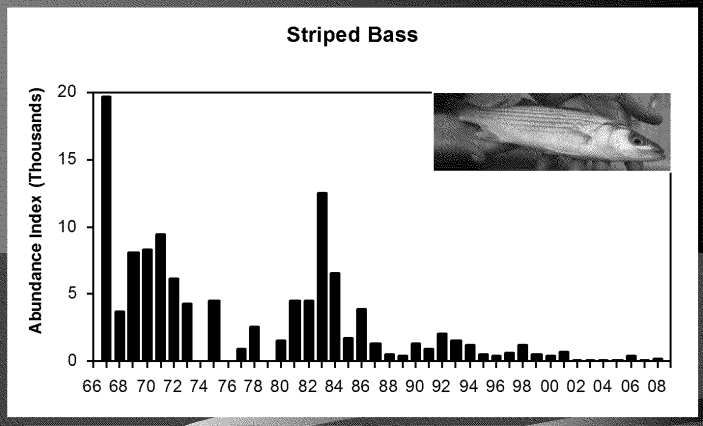
- Competing needs for water
- Unreliable water supply
- Ecosystem degradation
- Drinking water quality degradation
- Levee vulnerability
- Climate change exacerbating problems

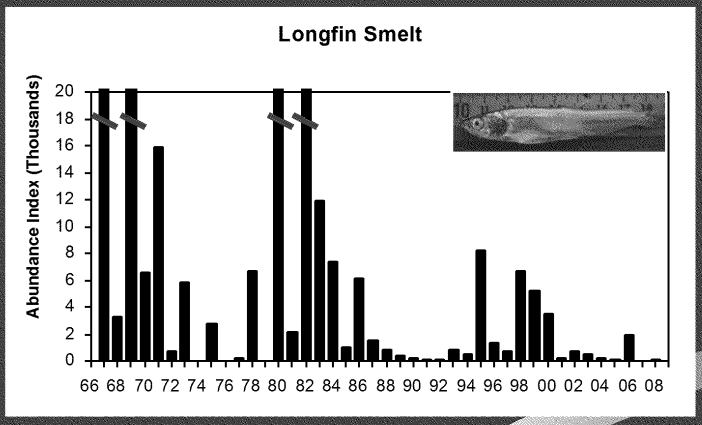

7000000
6000000
5000000
4000000
3000000
2000000
1000000
0
Exports (acre-feet)
SWP
CVP
1956-2007

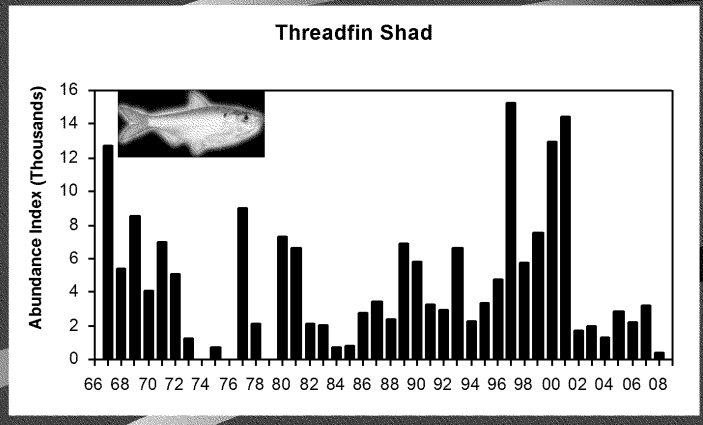
Fall abundance in 2008 continued low for all POD fishes.

Source DFG 2008 Fall MW Trawl
No sampling 1974 and 1979

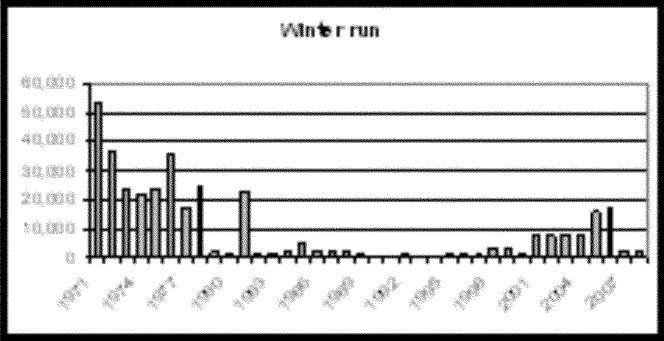


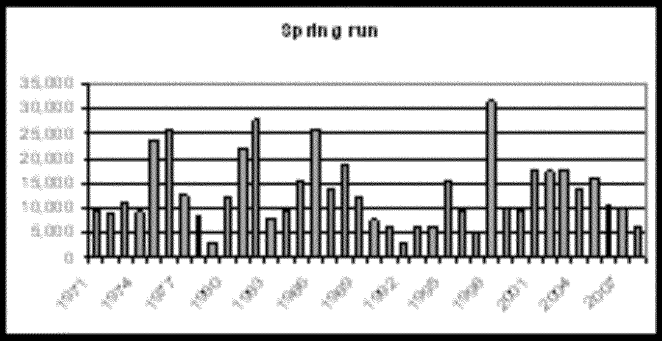


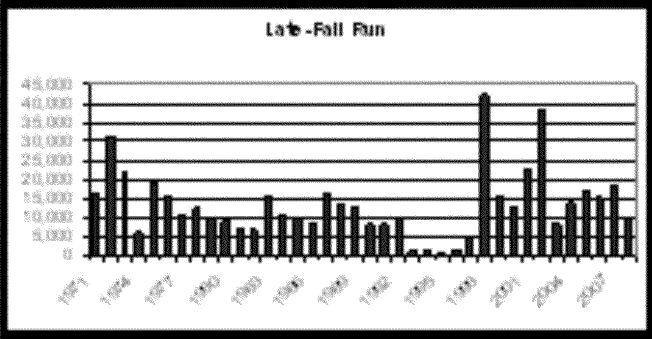


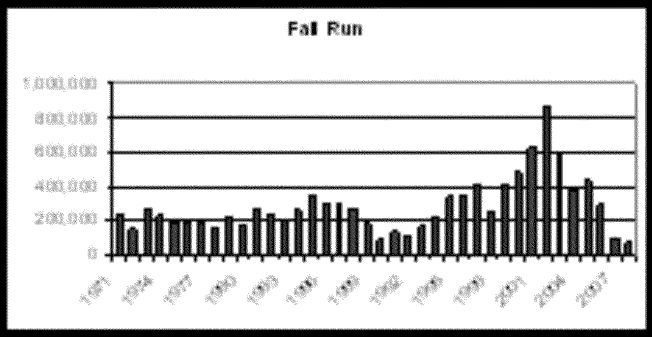


Chinook Salmon









Water quality issues

Aquatic life issues

- Salinity/ flow
- Temperature
- Dissolved oxygen
- Pesticides
- Ammonia
- Selenium
- Invasive species
- CECs

Drinking Water

- DBP precursors
- Pathogens
- Nutrients

Ag water

- Salinity

Fish consumption

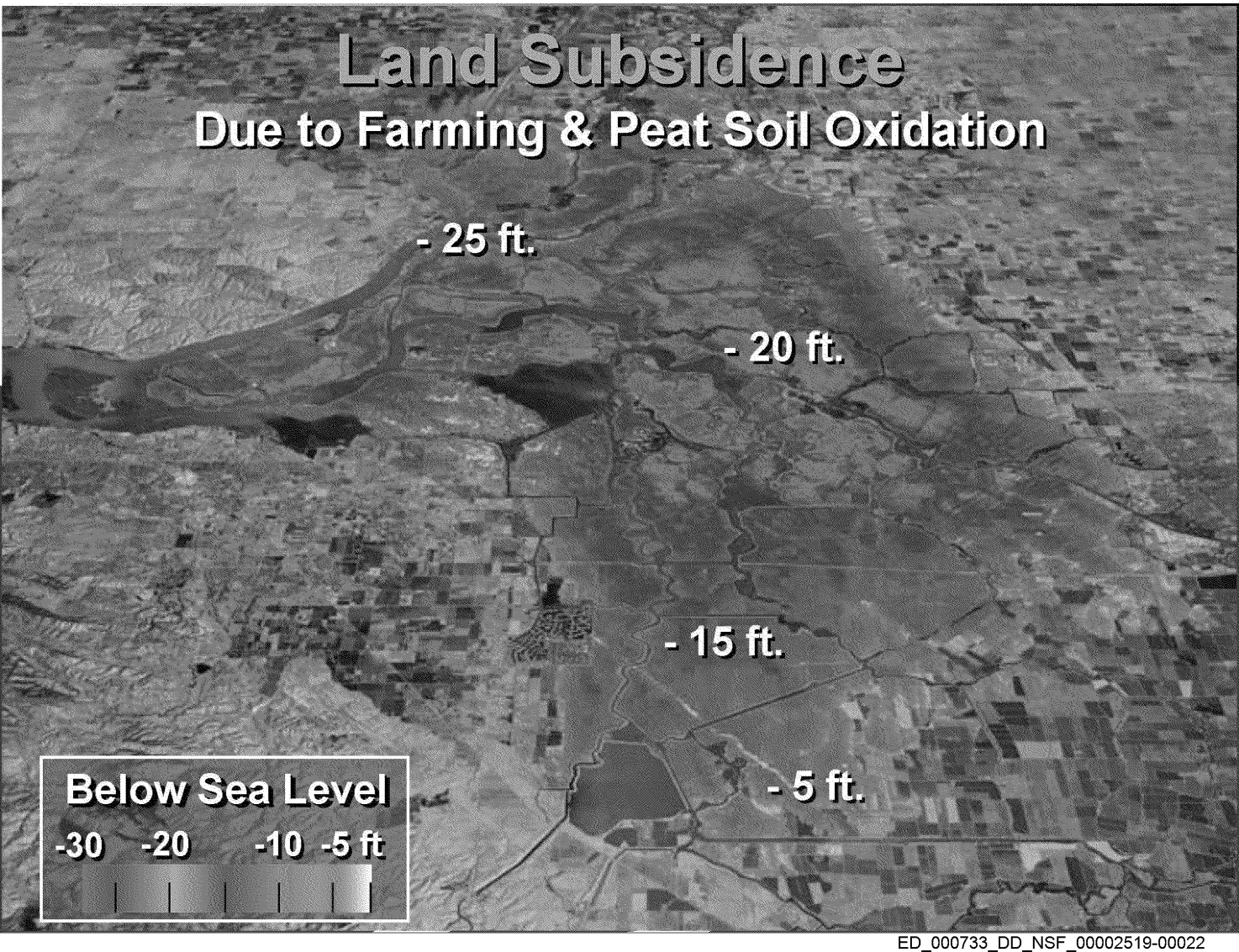
- Mercury

Recreation

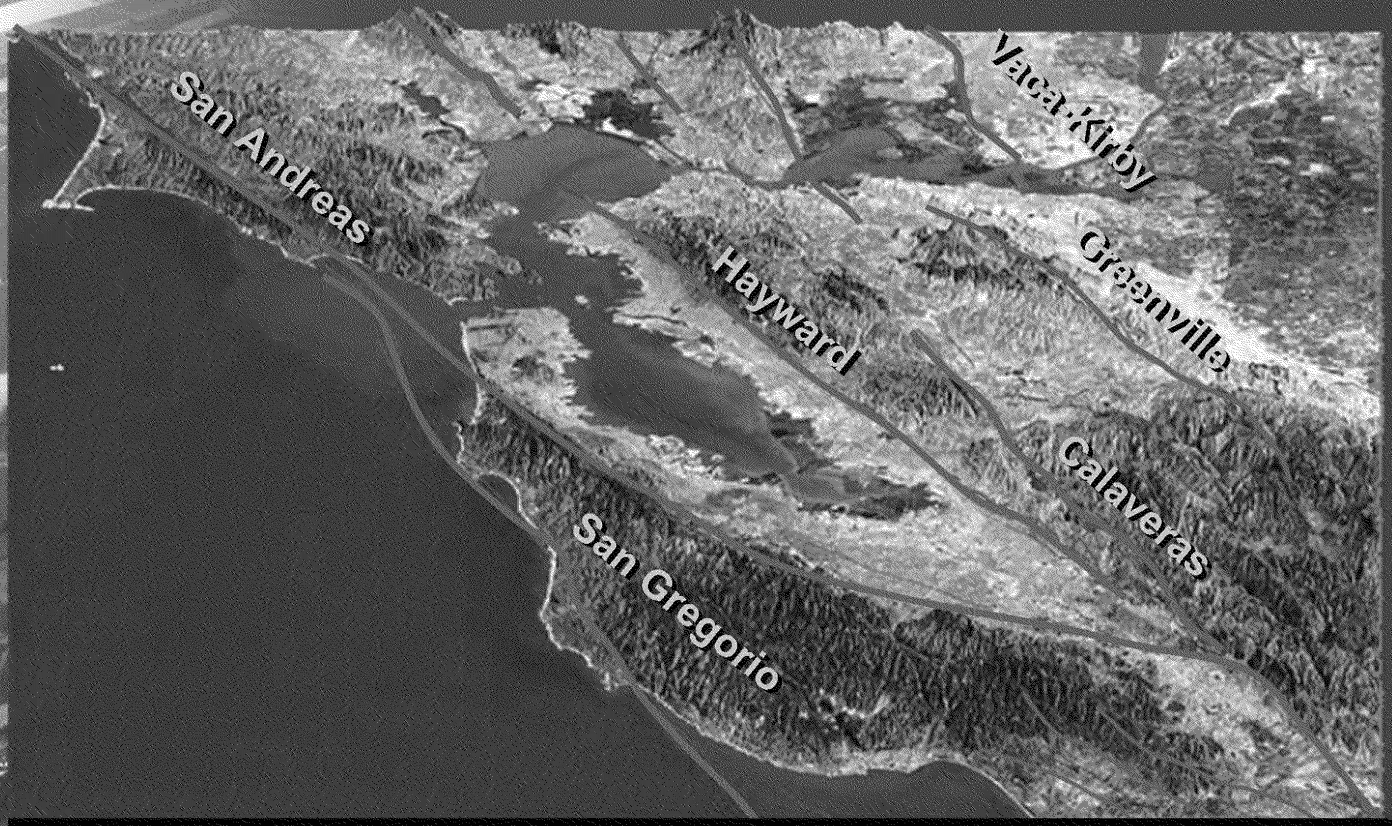
- Microcystis

Levee vulnerability

- Subsidence
- Earthquakes
- Floods
- Sea level rise

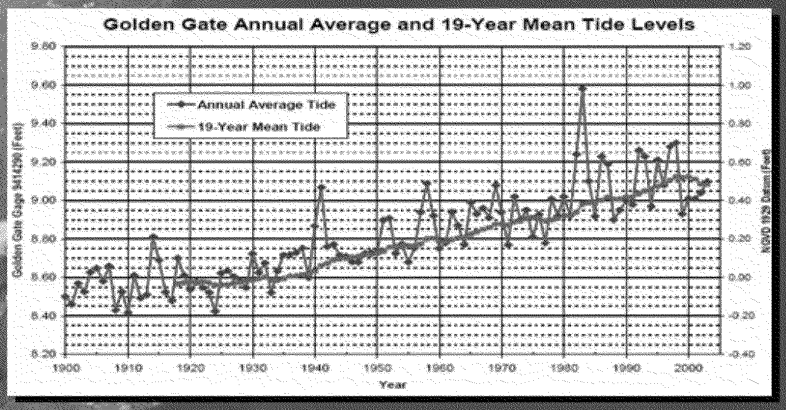

Land Subsidence
Due to Farming & Peat Soil Oxidation
- 25 ft.
- 20 ft.
- 15 ft.
- 5 ft.
Below Sea Level
-30 -20 -10 -5 ft

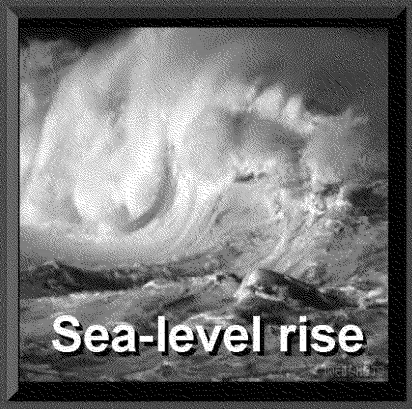
Seismic Vulnerability



Bay Delta Region Major Faults

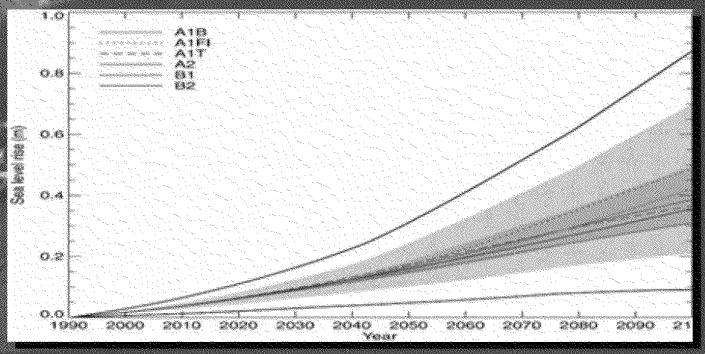
Sea Level Rise





Past (1900 – 2000)

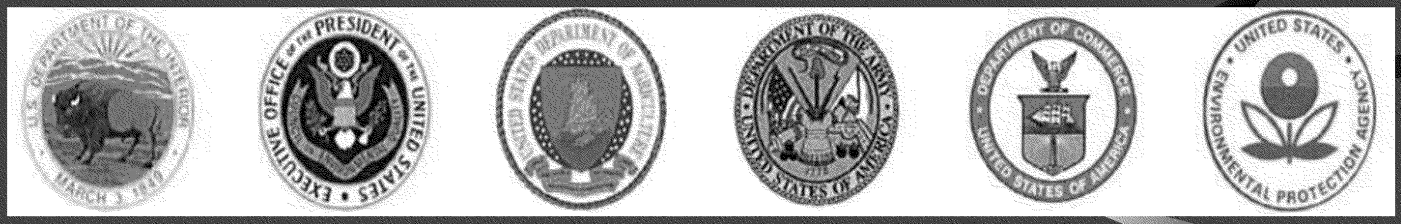
+ ½ ft sea level rise



Future (2000 – 2100)

2 to 3 ft sea level rise

Interim Federal Action Plan (Dec 2009)



Advanced Notice of Proposed Rulemaking
February 2011

Contaminants:

ammonia
selenium
pesticides
contaminants of emerging concern

Habitat:

estuarine conditions
migratory corridors
wetlands

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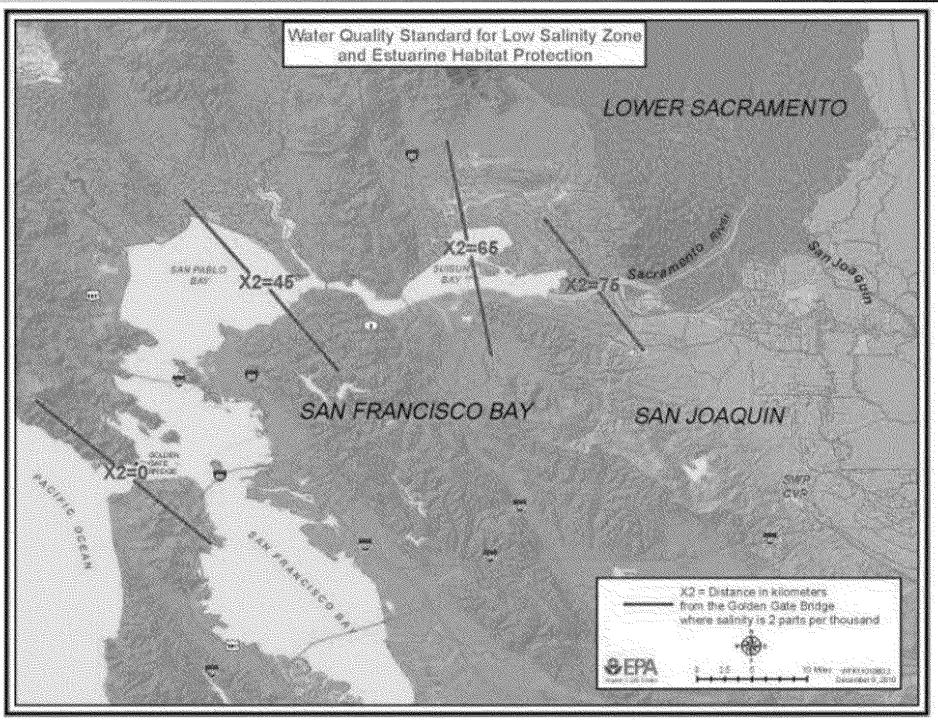
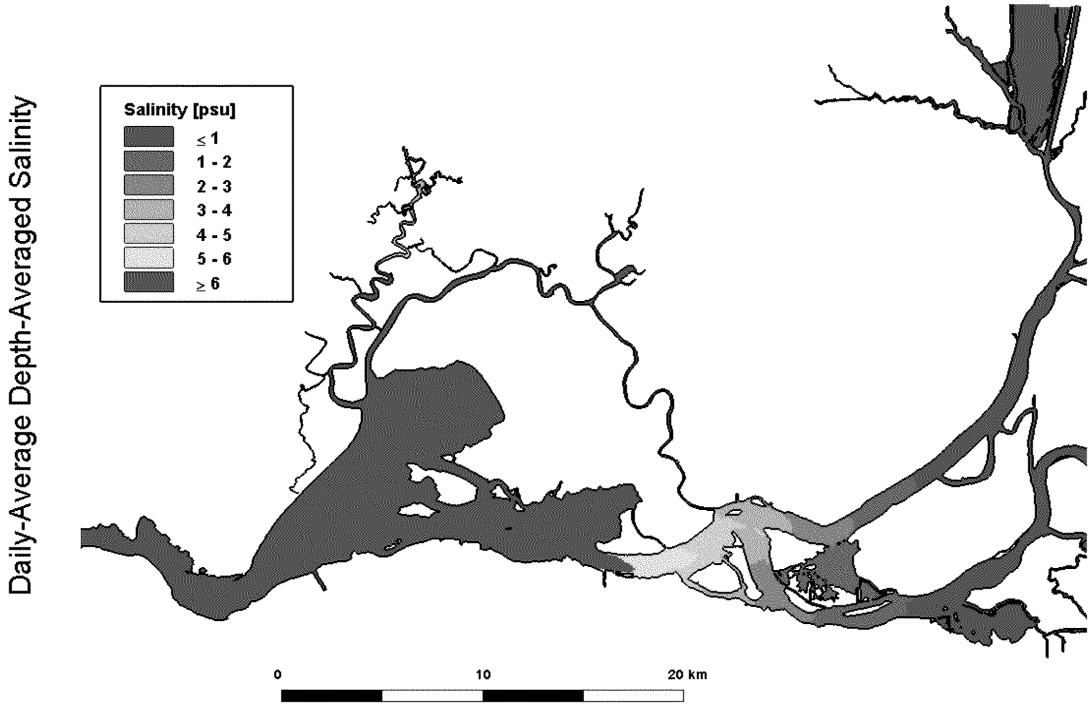
EPA's top priorities in B-D Estuary

- Estuarine habitat water quality standard
- Regional Water Quality Monitoring Program
- Selenium criteria
- San Joaquin River restoration
- TMDL implementation
- Methylmercury control in wetlands
- CWA-FIFRA interaction

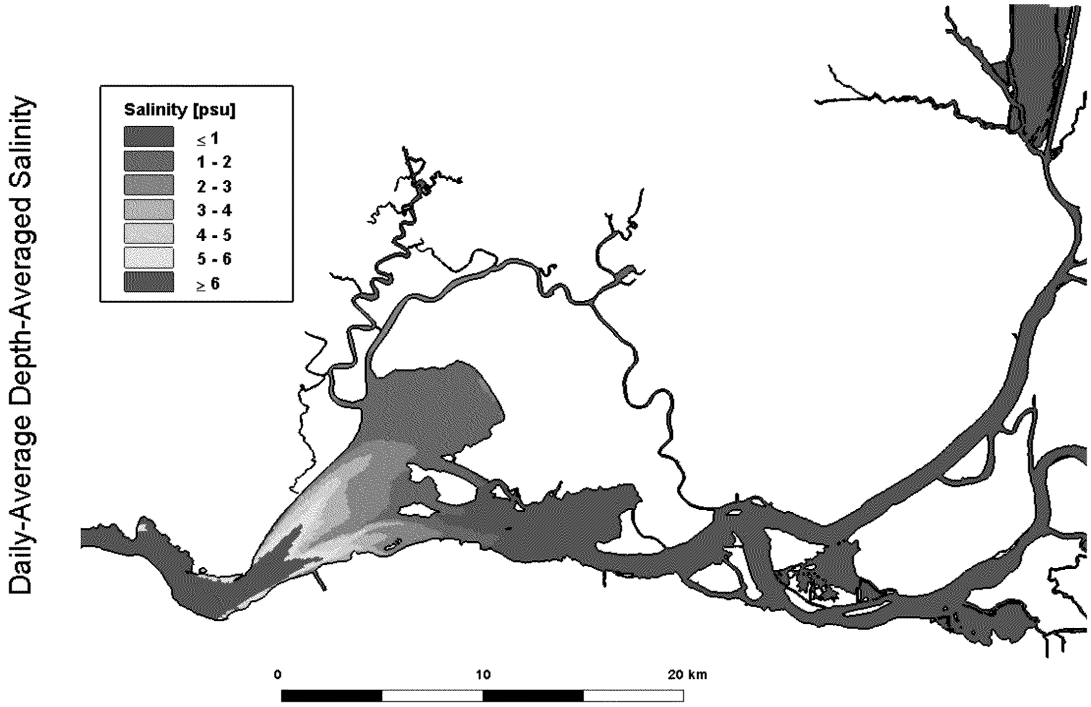
Estuarine habitat standard



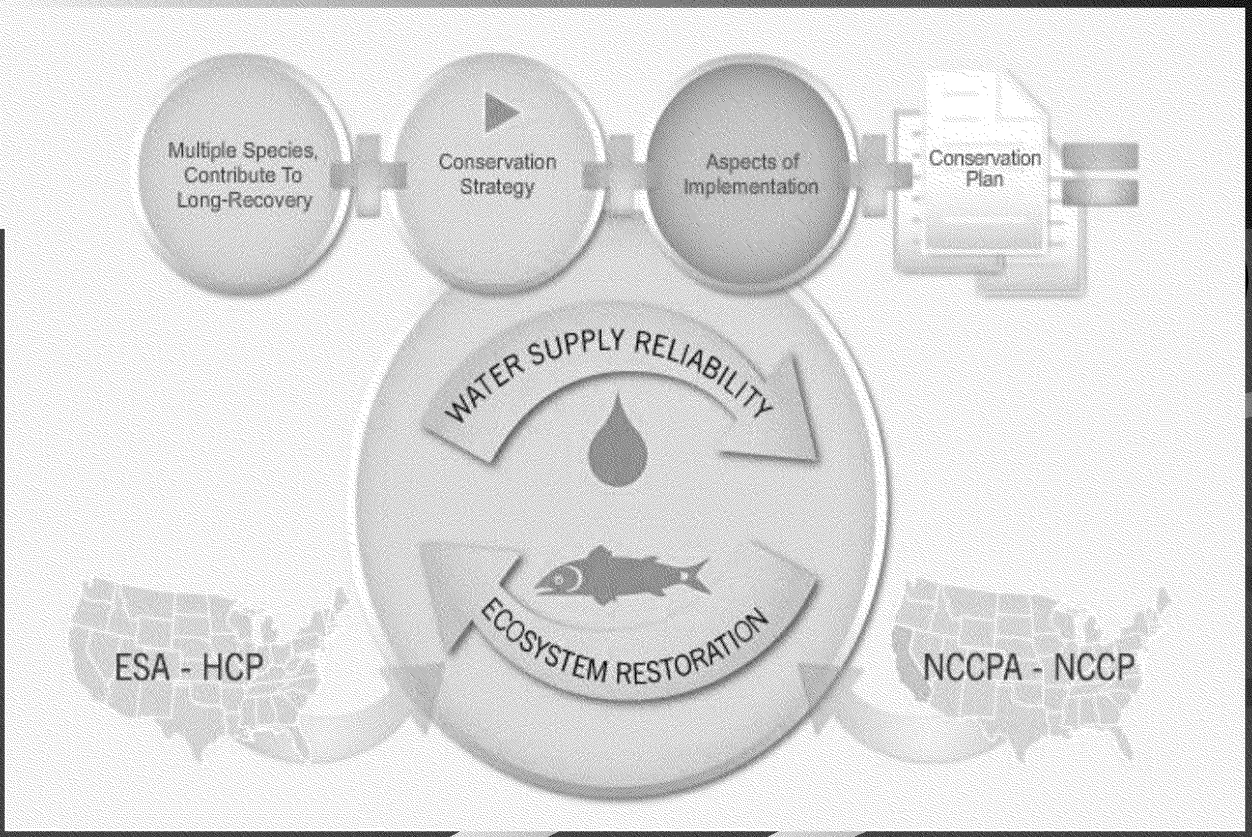
LSZ squeezed in Delta channels = ☹ Fish

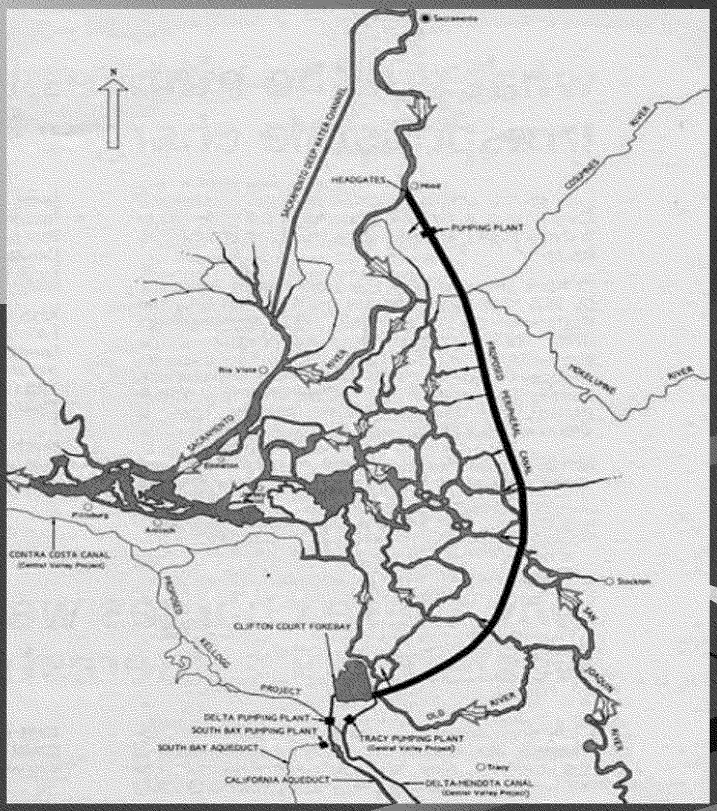


LSZ spread across Suisun Bay = ☺ Fish



Bay Delta Conservation Plan




Sacramento
N
SACRAMENTO DEEP WATER CHANNEL
HEADGATES
Hood
PUMPING PLANT
COSUMNES
RIVER
Rio Vista
RIVER
PROPOSED INTERNAL CANAL
MOKELUMNE
RIVER
SACRAMENTO
Stockton
Pittsburg
Antioch
CONTRA COSTA CANAL
(Central Valley Project)
Stockton
PROPOSED
KELLOGG
CLIFTON COURT FOREBAY
PROJECT
DELTA PUMPING PLANT
SOUTH BAY PUMPING PLANT
SOUTH BAY AQUEDUCT
TRACY PUMPING PLANT
(Central Valley Project)
OLD
RIVER
SAN
JOAQUIN
RIVER
Tracy
CALIFORNIA AQUEDUCT
DELTA-MENDOTA CANAL
(Central Valley Project)

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Drinking water

- Salt + Organic Carbon
- Vulnerability to levee failure

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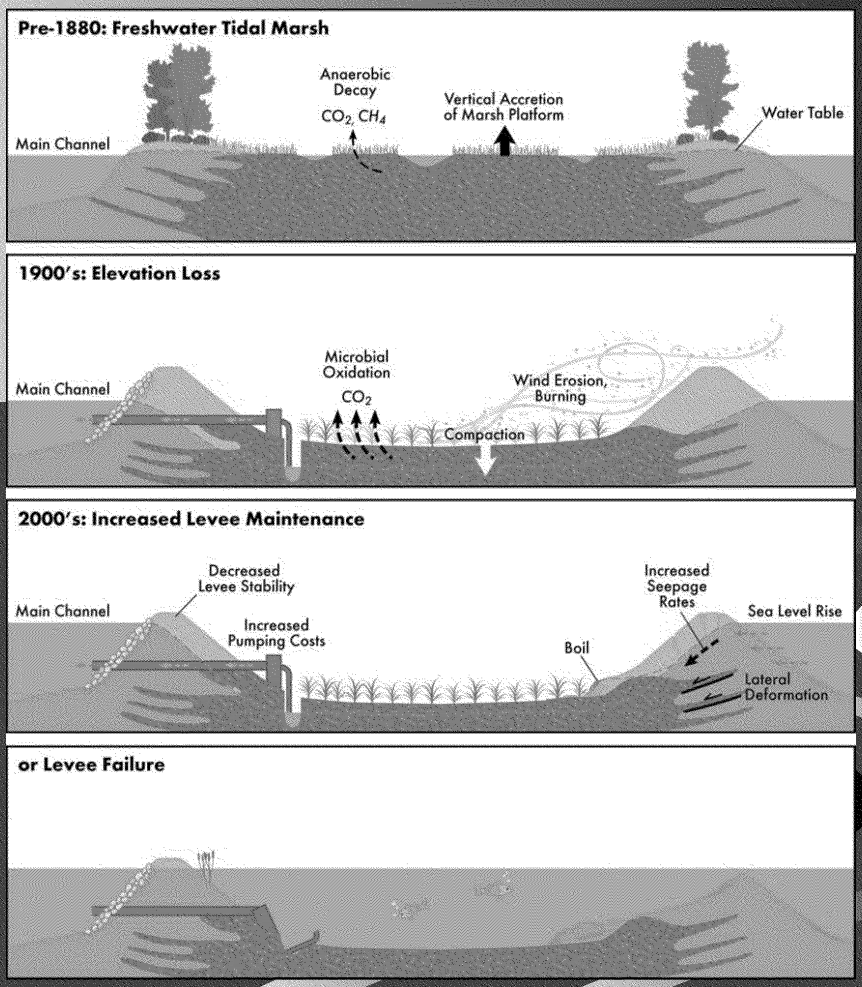
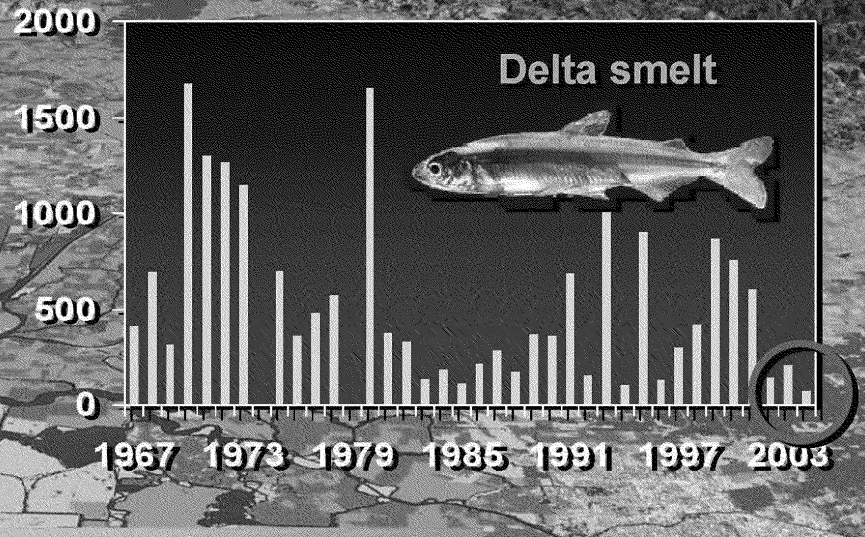

Pre-1880: Freshwater Tidal Marsh
Anaerobic Decay
CO_2, CH_4
Vertical Accretion of Marsh Platform
Water Table
Main Channel
1900's: Elevation Loss
Microbial Oxidation
CO_2
Wind Erosion, Burning
Main Channel
Compaction
2000's: Increased Levee Maintenance
Decreased Levee Stability
Increased Seepage Rates
Main Channel
Sea Level Rise
Increased Pumping Costs
Boil
Lateral Deformation
or Levee Failure

The Delta – The Risks are Intensifying

Hurricane Katrina



Jones Tract (2004)

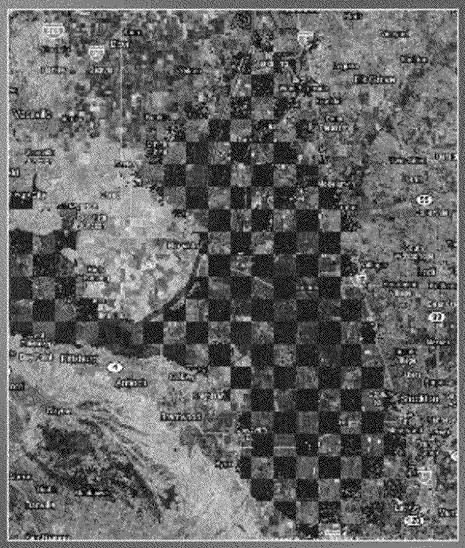
Climate change predictions

- Loss of snowpack
- Earlier runoff
- More dry years
- More floods
- Higher air and water temperatures
- Sea level rise

California's Delta

Today

With 1 meter sea level rise



Source: Google Earth

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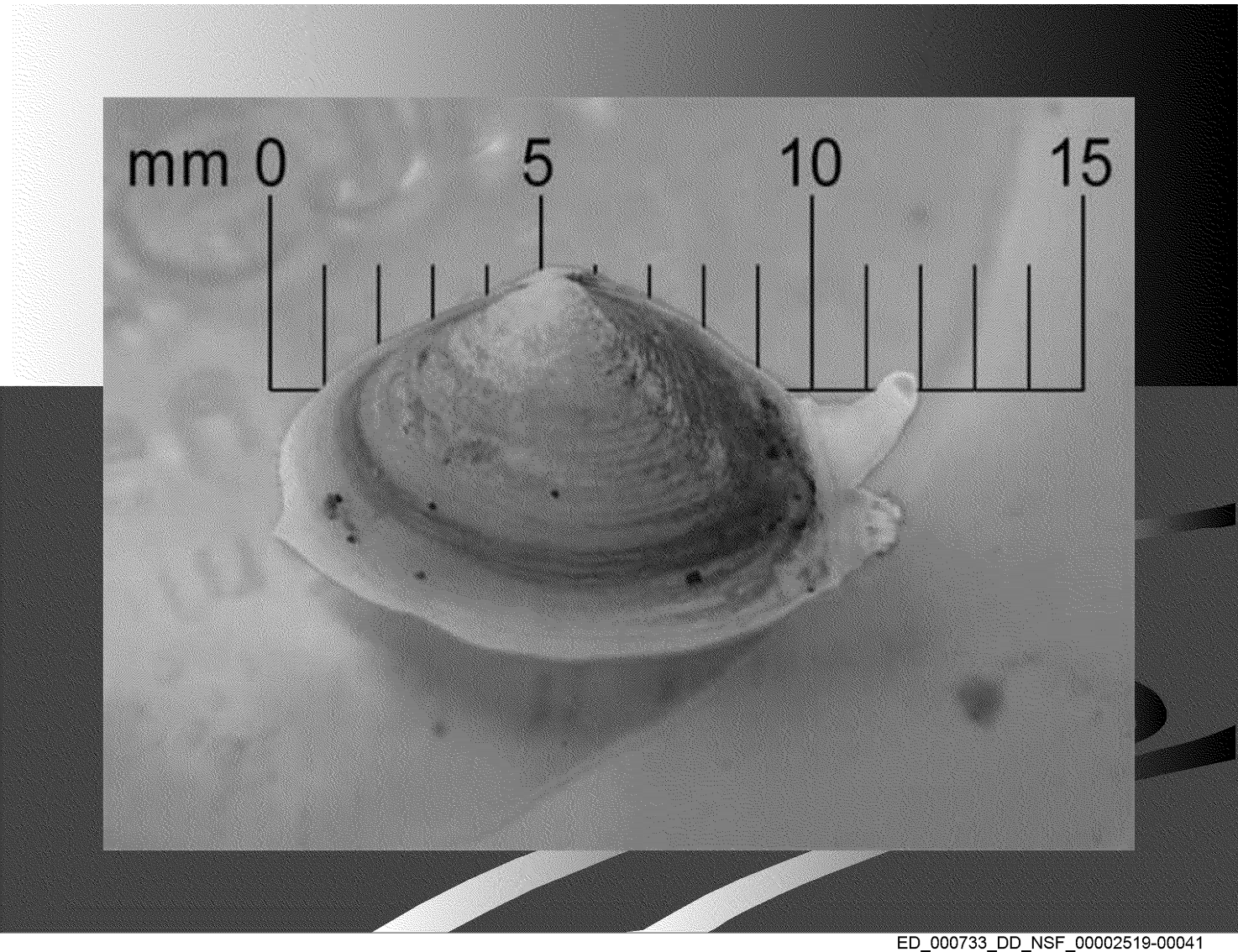
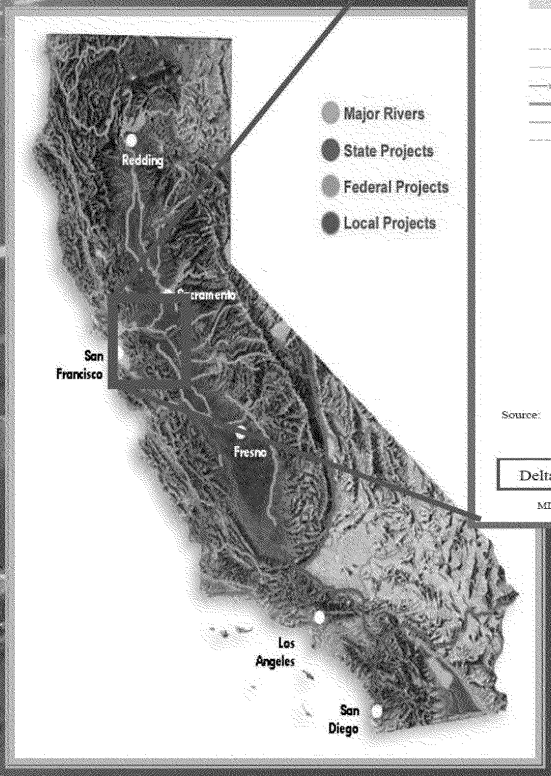
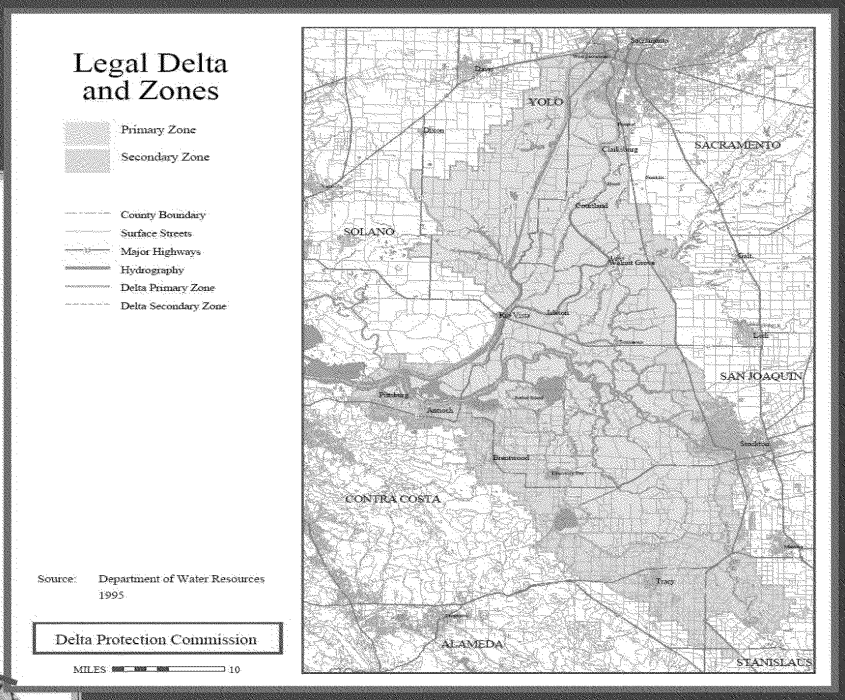

mm 0
5
10
15

209
California Department
of
Fish & Game

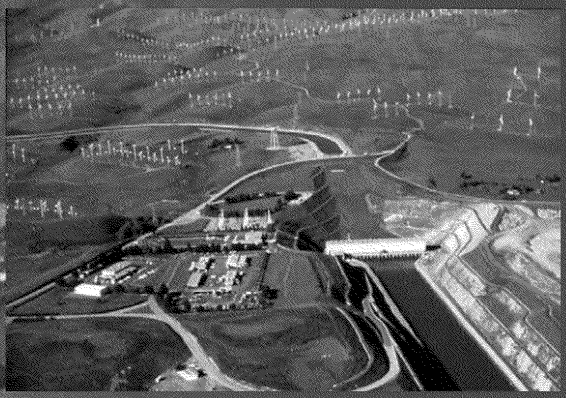
Sacramento-San Joaquin Delta





Jones Tract (2004)

Six Factors that Intensify Future Risks



- Subsidence
- Sea level rise
- Regional climate change
- Seismicity
- Exotic species and ecosystem change
- Population growth and urbanization

Regional Climate Change

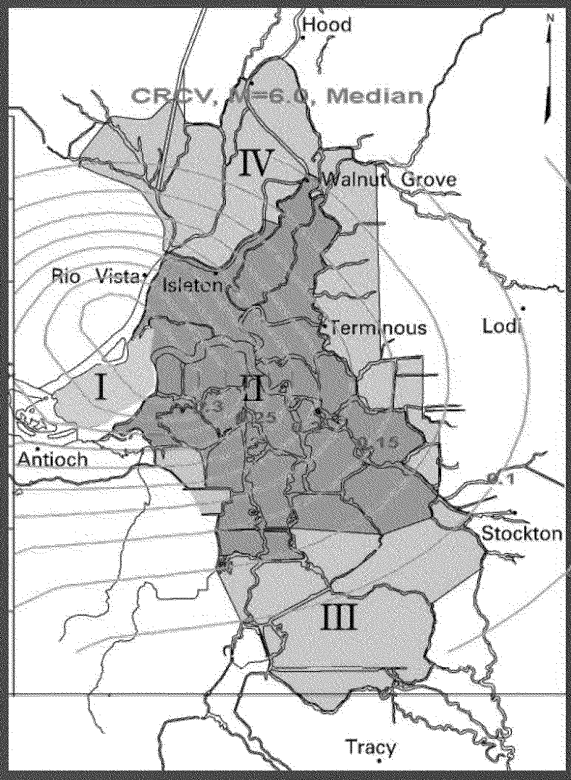
By 2100
+ 1.4 – 5.8 °C degrees

By 2050
1/3 loss of snowpack

Hypothetical Scenario

A 6.5 magnitude earthquake in the western Delta:

- 30 levee breaks
- 20 islands flooded
- Water quality degraded
- 200 miles of levees weakened by slumping, cracking and increased seepage
- Increased pressure on the system - future levee failures



Urbanization

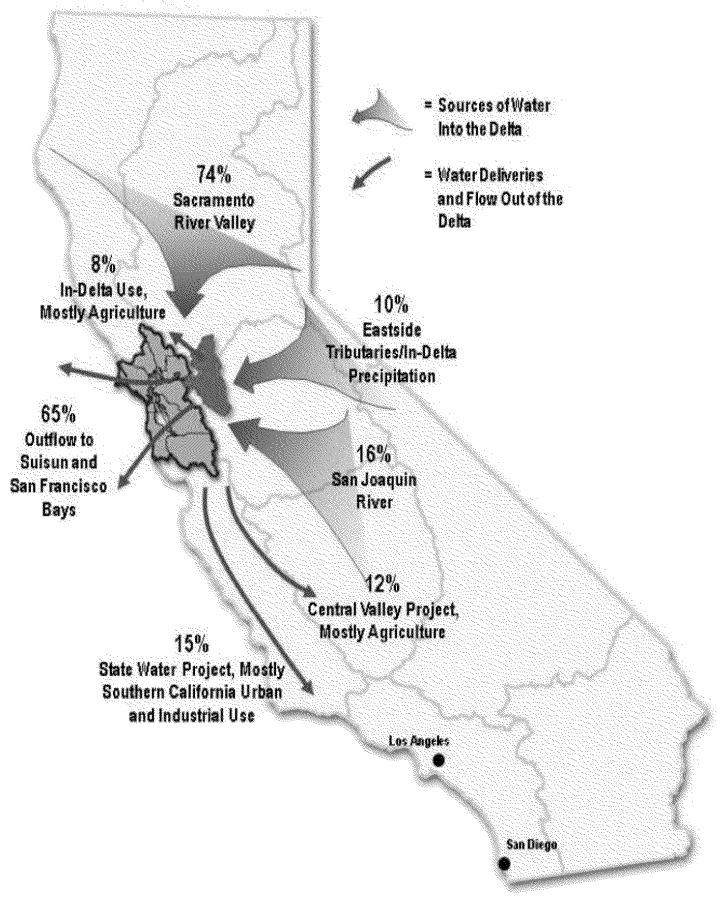
- Fastest growing region in California
- Increasing population and water supply pressures
- Demand for conversion of the Delta to homes
- 130,000 homes = about 55,000 acres

Historic Flood & Levee Failures

- 162 levee failures in last 100 years
- 64% chance of major earthquake or flood by 2032

iPad 7:16 PM 8%
DSC White Paper Template
deltacouncil.ca.gov/sites/default/files/docu...
Google

Figure 3-1
Water Movement through the Delta
Source: LAO, 2008



Goals & Opportunities

2. Address water quality problems with regulatory and financial tools and technical assistance

- Support to Water Board and Fish agencies
- Seek cooperation from BOR & DWR
- Promote innovative agricultural practices
- Advance a Regional Monitoring Program

Goals & Opportunities

1. Influence water management through:

- Supporting water conveyance around the Delta – a "peripheral canal" of appropriate size, location and operations, funded by beneficiaries

- Upgrading Delta water quality standards