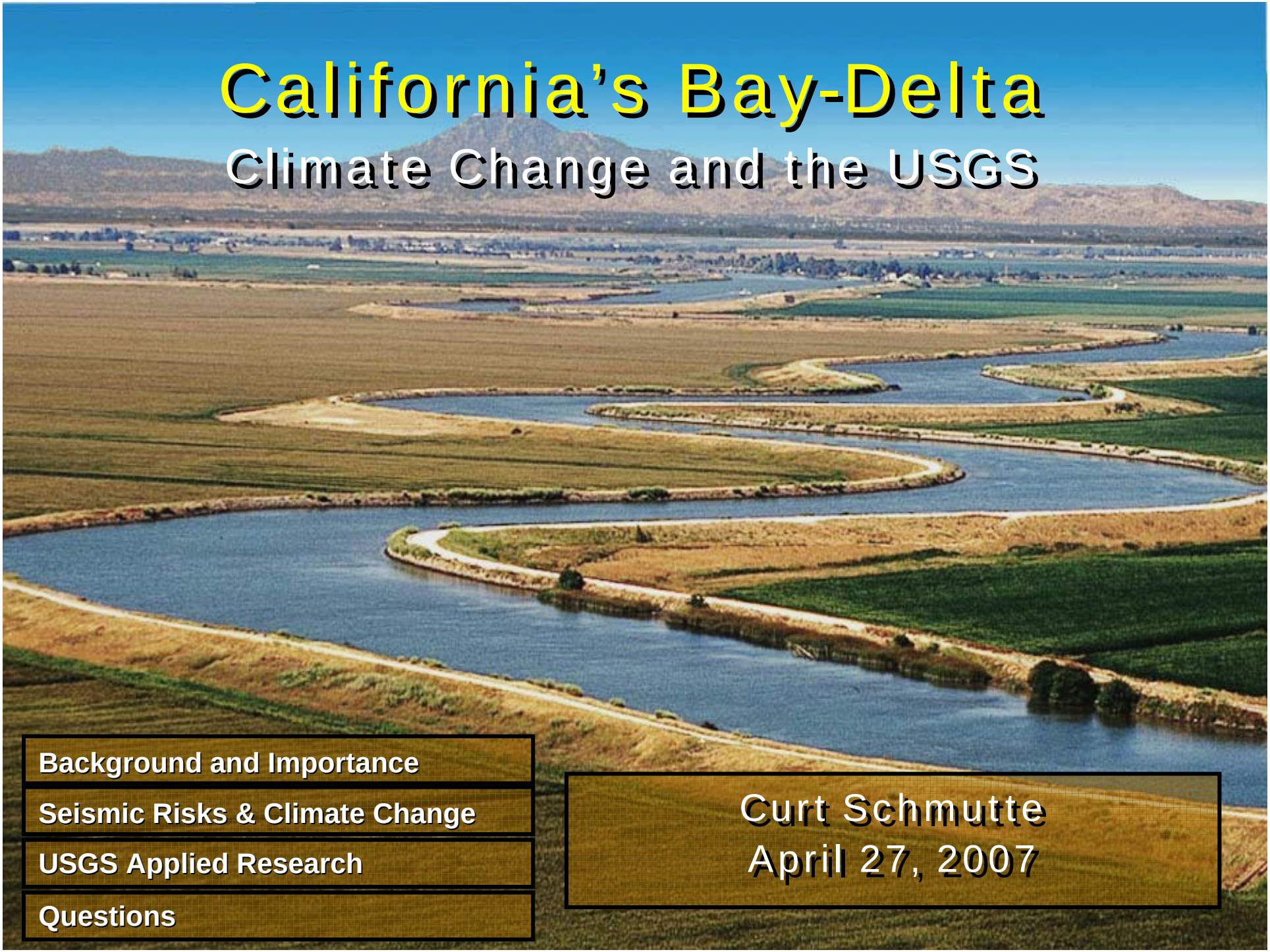


California's Bay-Delta

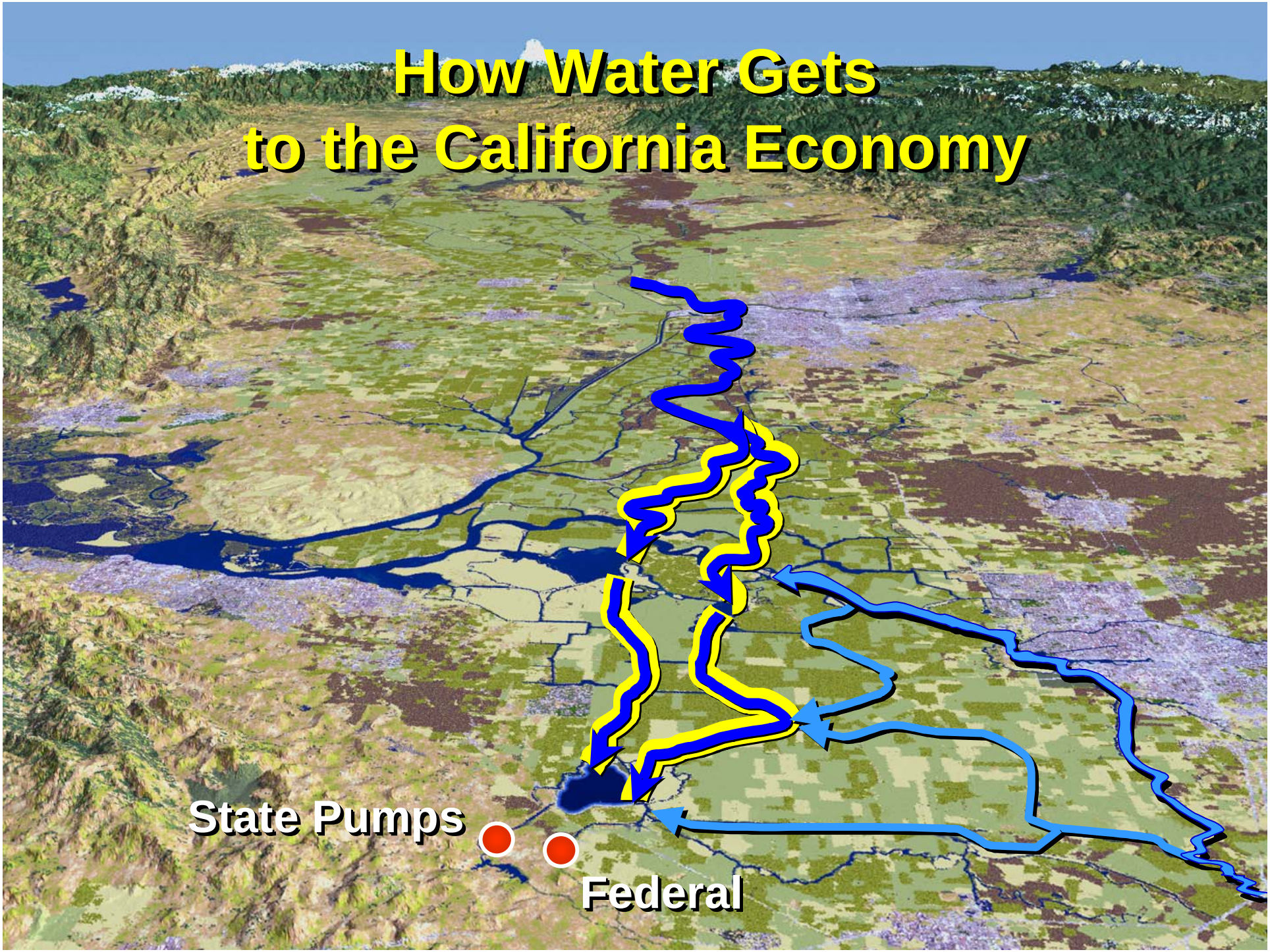
Climate Change and the USGS

- Background and Importance
- Seismic Risks & Climate Change
- USGS Applied Research
- Questions

Curt Schmutte

April 27, 2007

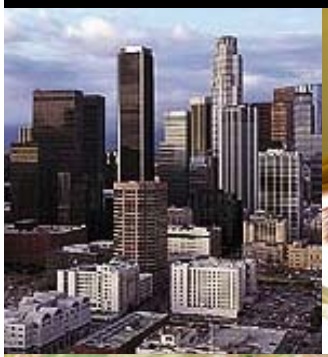
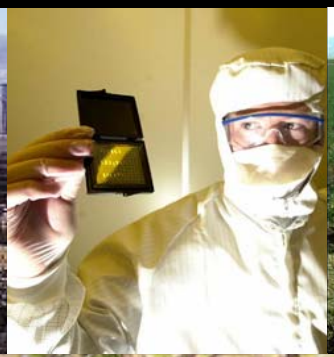

PRECIPITATION AND
POPULATION


How Water Gets
to the California Economy
State Pumps
Federal

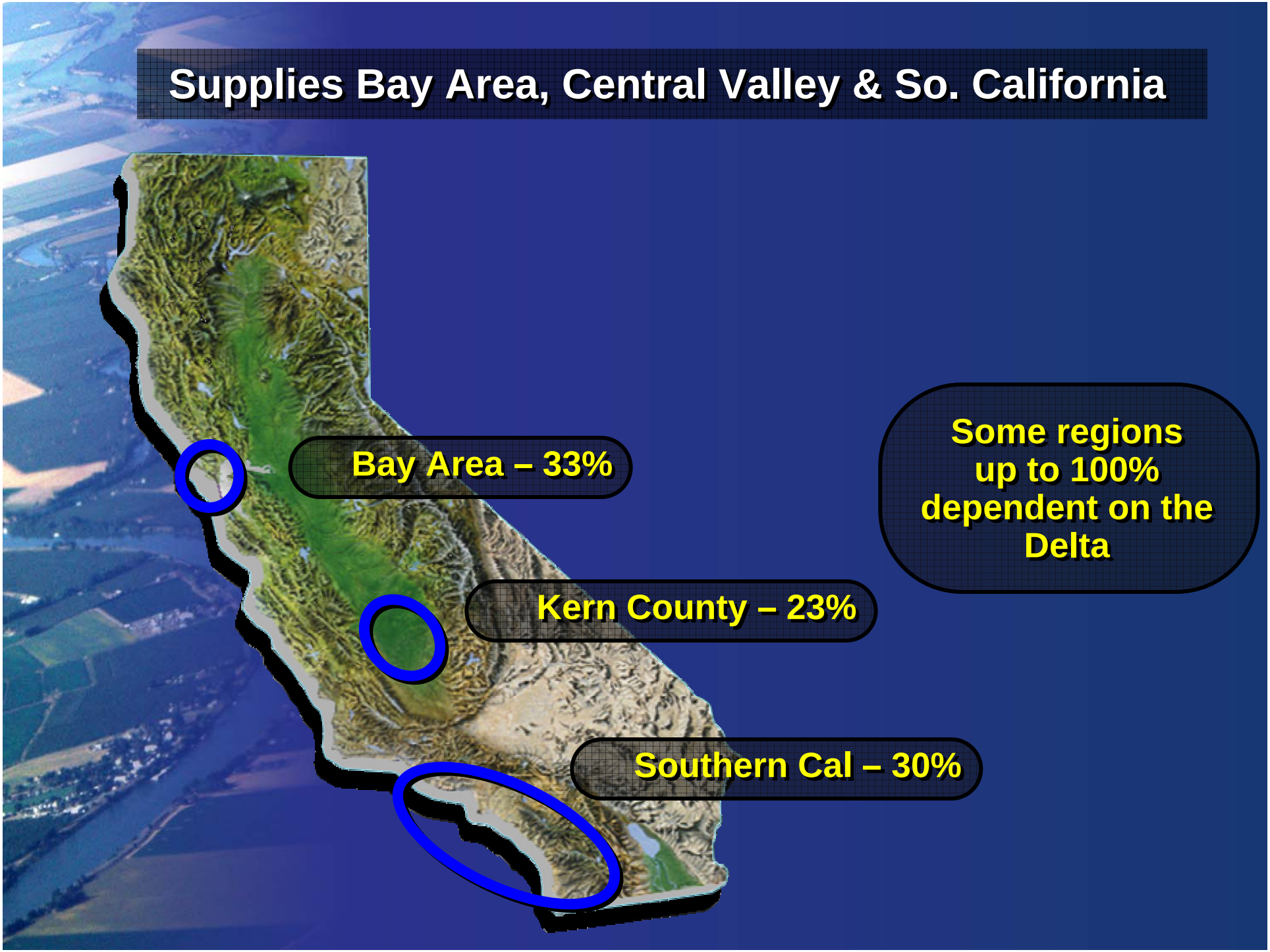
Importance of the Bay-Delta

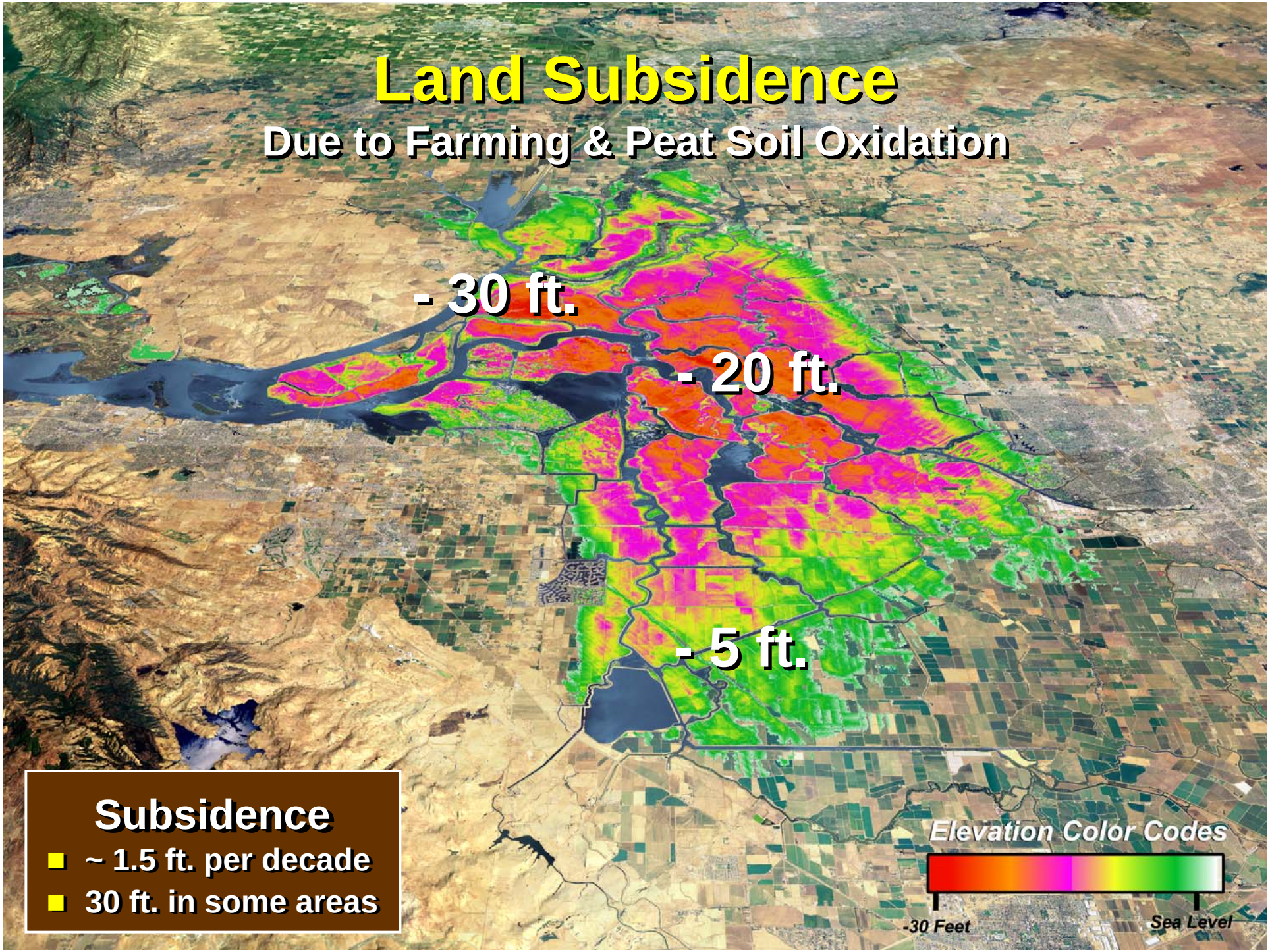
- 2/3 of residents rely on Delta
- Supplies Bay Area, Central Valley & So. California
- Irrigates 45% fruits & vegetables produced in US
- 55 fish, 221 bird, 45 mammal & 16 reptile species
- 10% of remaining wetlands in California

Urban Needs | Agriculture | Fisheries & Habitat

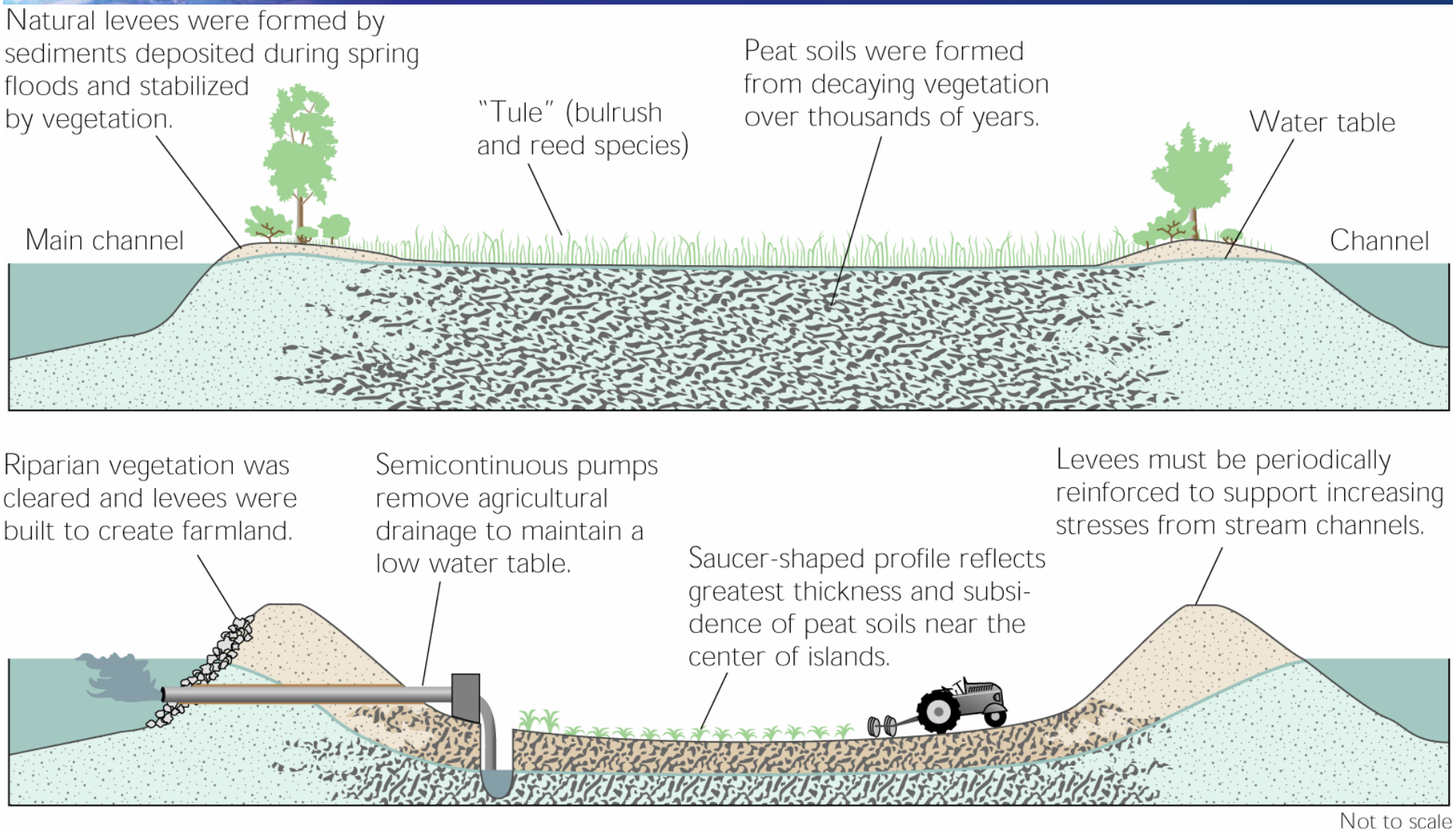




Supplies Bay Area, Central Valley & So. California




Land Subsidence
Due to Farming & Peat Soil Oxidation
- 30 ft.
- 20 ft.
- 5 ft.
Subsidence
~ 1.5 ft. per decade
30 ft. in some areas
Elevation Color Codes
-30 Feet
Sea Level

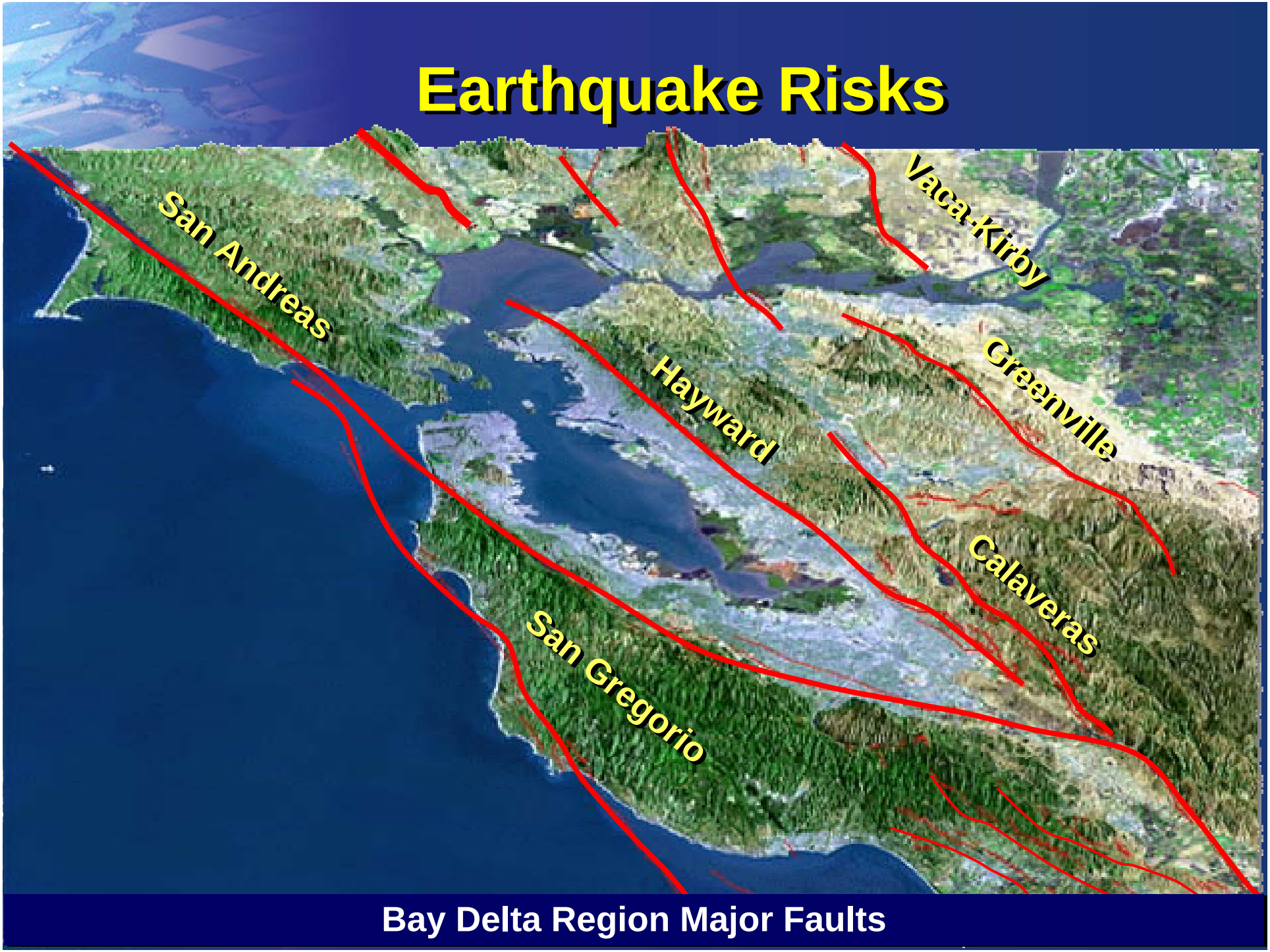
Delta Land Subsidence



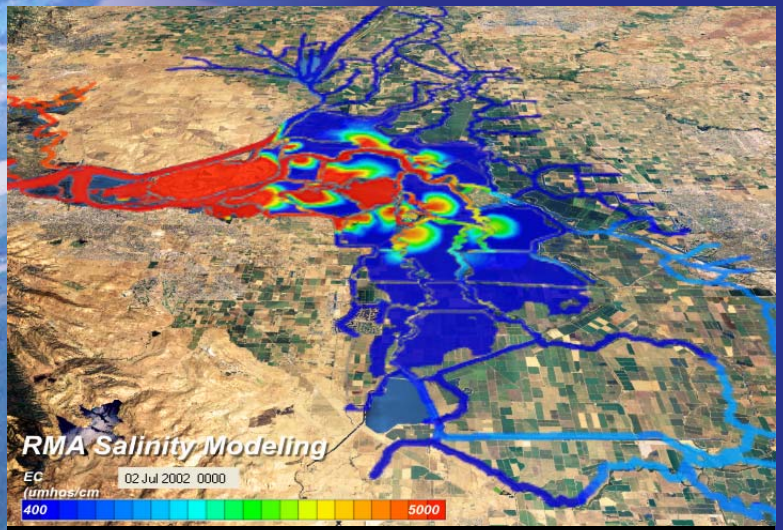
Sea-level rise changes salinity

- Depth - Shoreline - Tides - Floods Delta islands

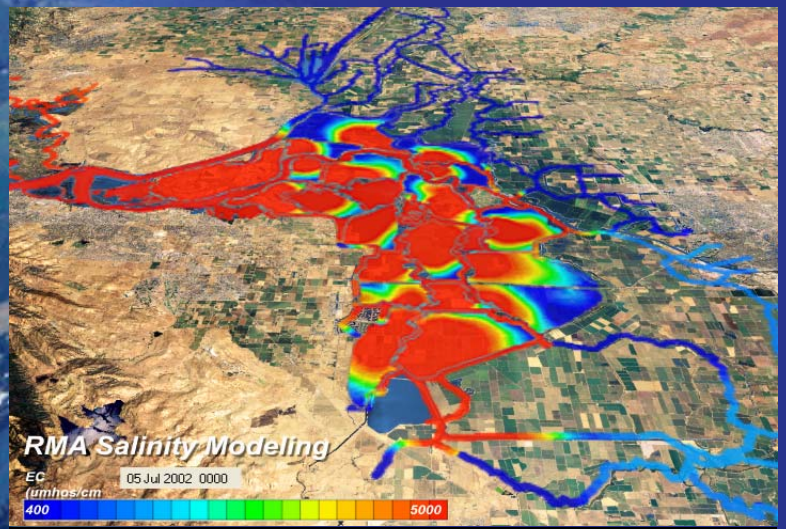
Earthquake Risks



Bay Delta Region Major Faults



12 – 24 hours: Salt water intruding into Delta



1 – 7 days: Salt water throughout Delta

Magnitude 6.5 Earthquake causing 20-Island Failure (very complex analysis)

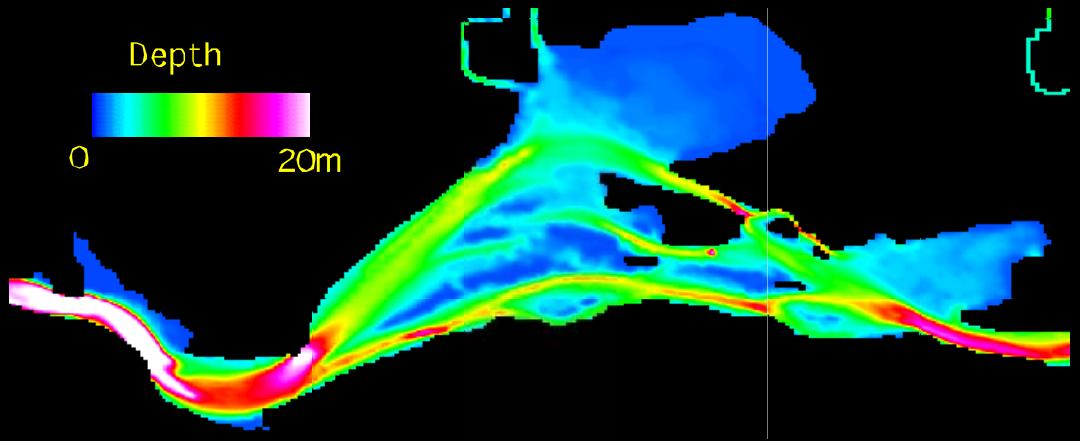
USGS contributions

1. Salt/Freshwater Mixing
2. Channel Bathymetry
3. Model Development

Net Delta Outflow

USGS data

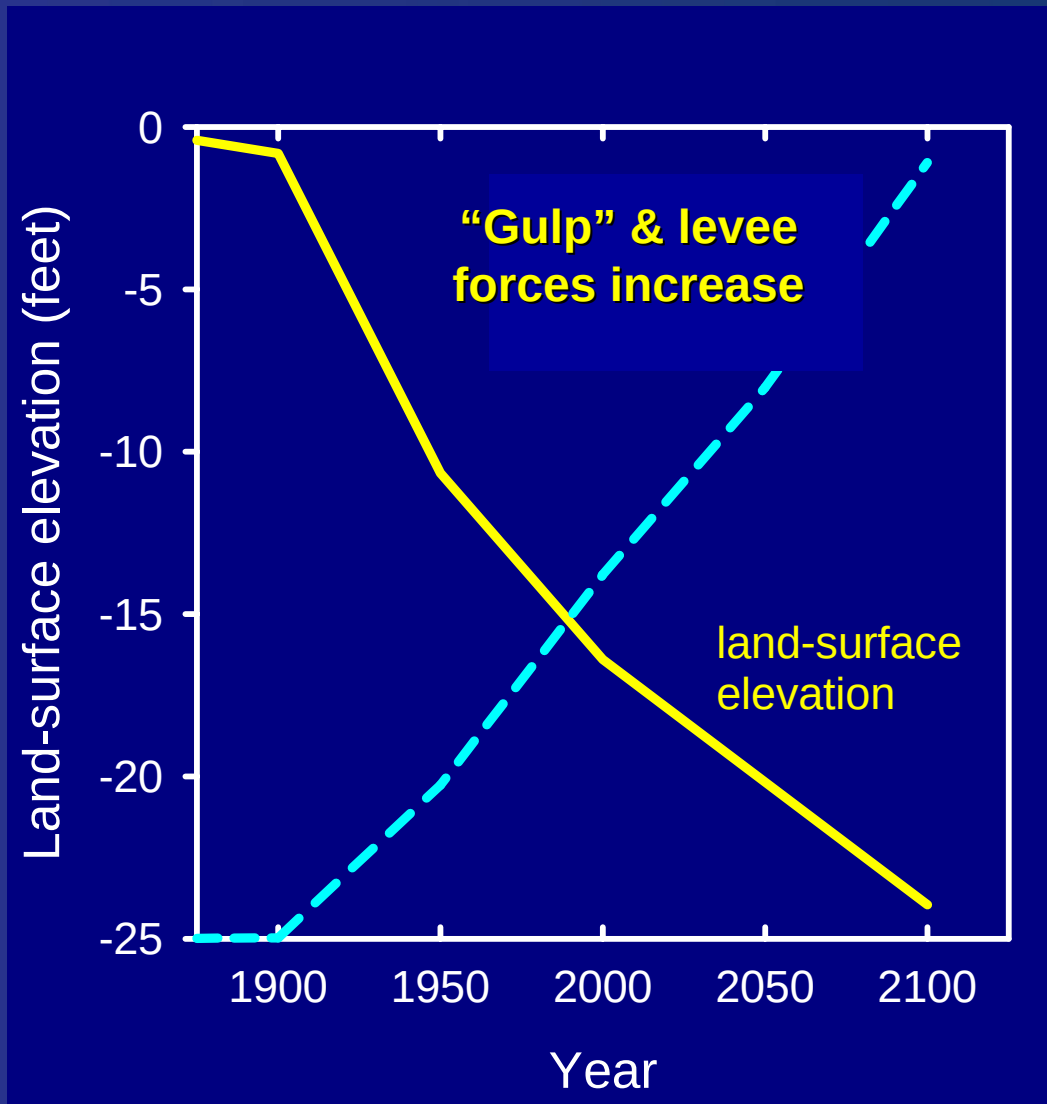
Bathymetry



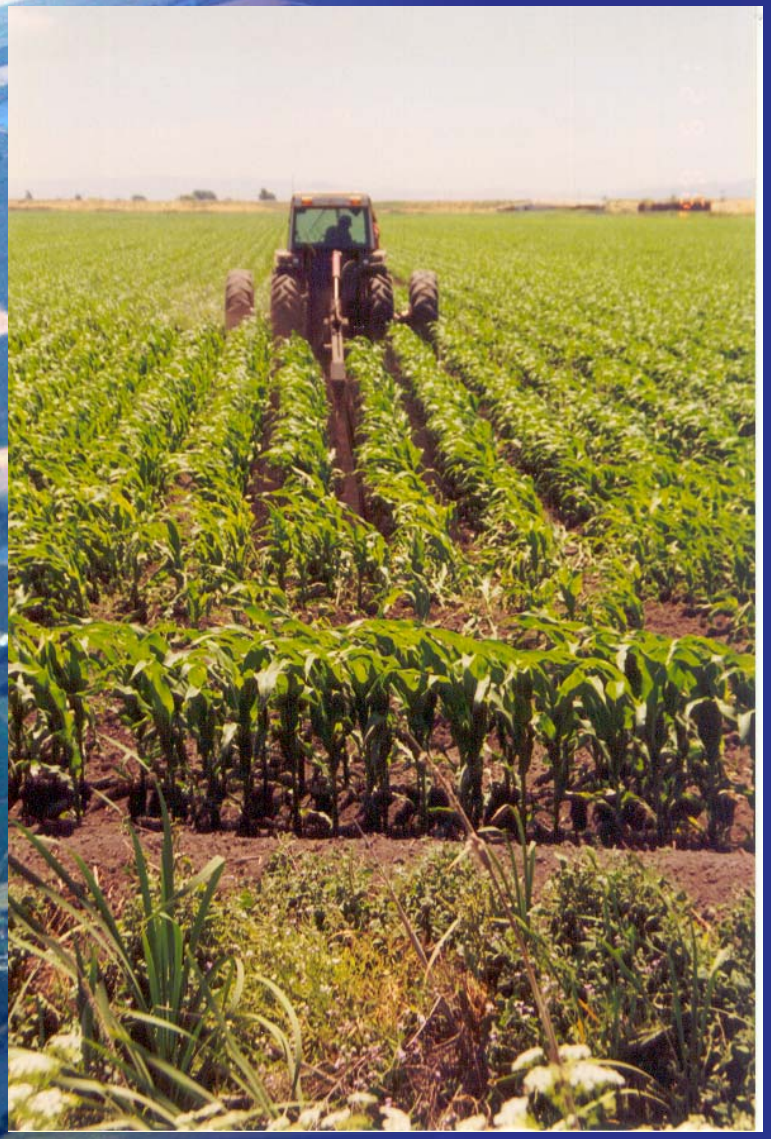
Why subsidence matters

Increases risks from

1. **earthquakes**
2. **sea-level rise**



Delta Farming Promotes Carbon (CO_2) & Soil Losses



1. Causes subsidence

2. Contributes to greenhouse gas emissions

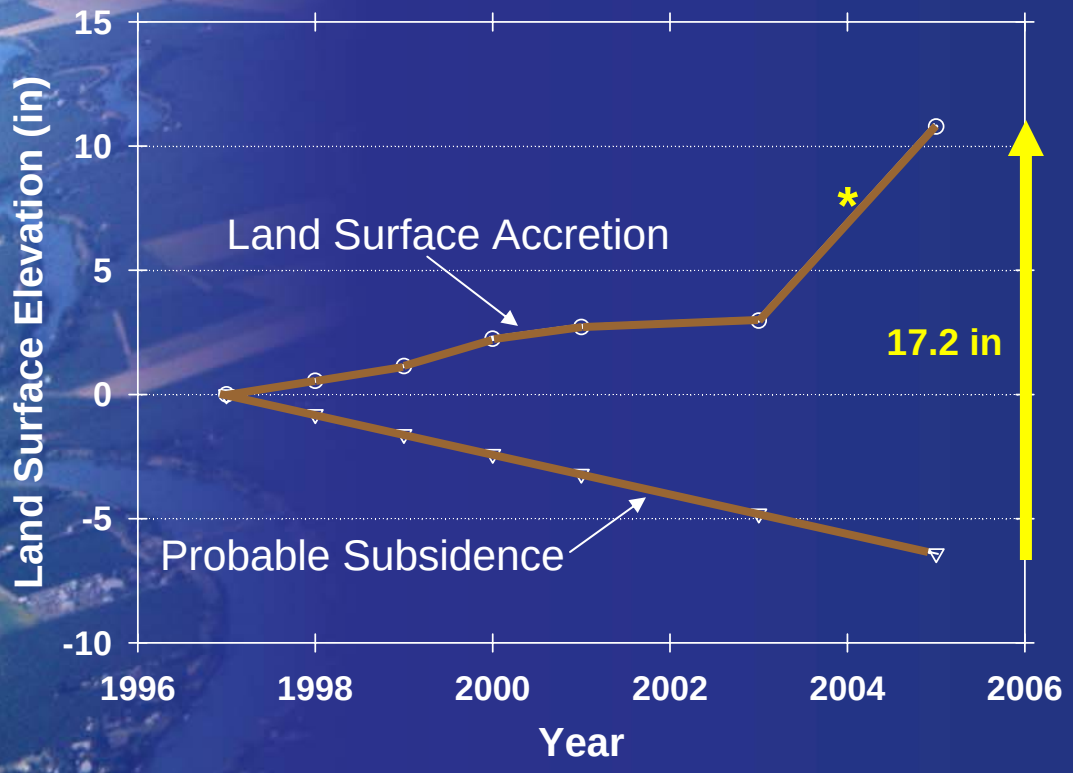
Restoring Natural Processes

Wetlands Reverse Problem

1. Raise land surfaces

2. Capture CO_2 gas

Delta Land Surface Elevation

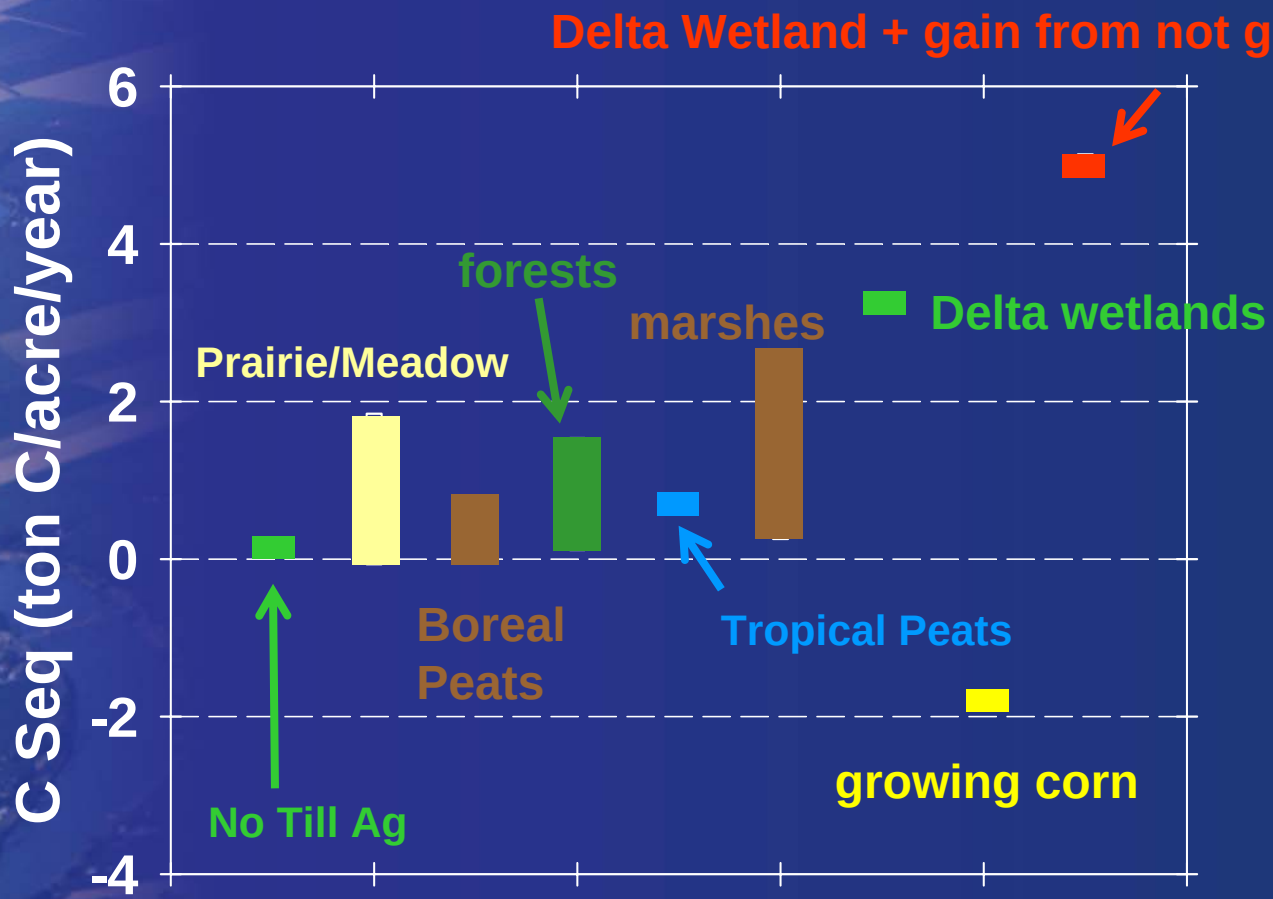


17.2 inches / 8 years = 2.15 inches/year

*** 2003 - 2005: 3.9 inches/year**

USGS data

Carbon Sequestration for Different Land Uses



USGS data


The Delta's Current Course
is Non-sustainable
Sacramento
Suisun Bay
Stockton
State & Federal
Pumping Plants
California's Bay-Delta