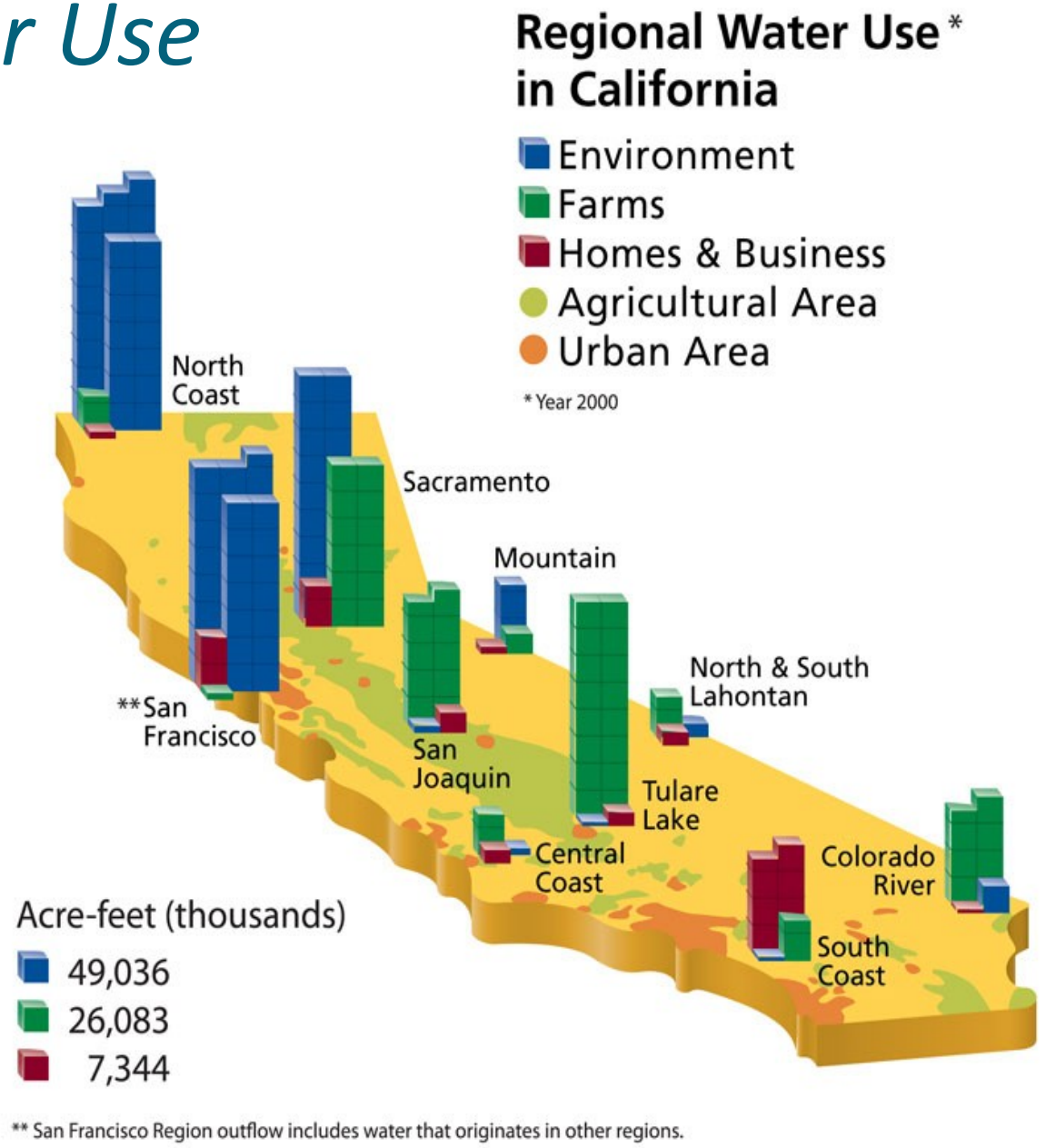
California Water Issues

Agricultural Water Use Efficiency and Conservation

Brandon Souza
Agricultural Water Management Council

About the Agricultural Water Management Council

California Water Use



California farming…

- 7.3 million irrigated acres
- $38 billion farm gate value
- More than 400 different types of commodities
- 81,700 farms in California

California farming…

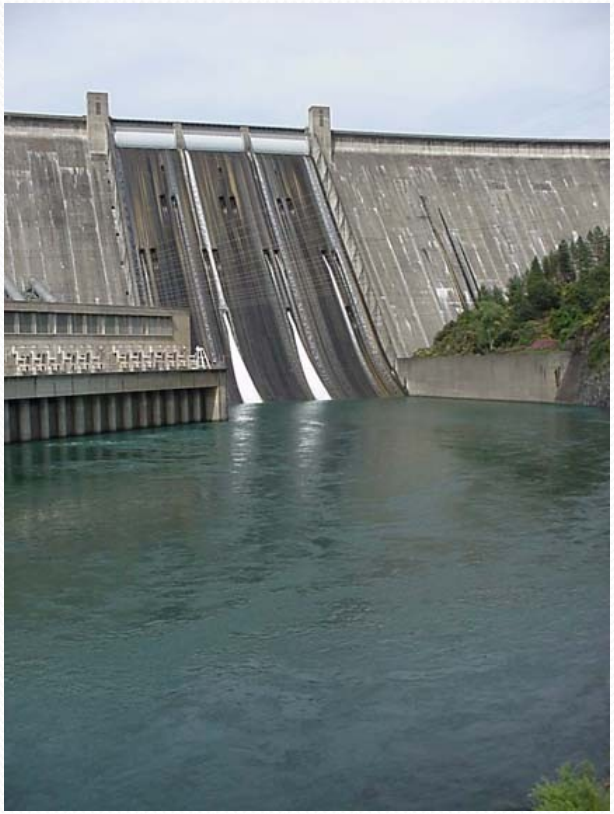
- Average irrigated farm is small, only 162 acres
- $11,100/acre irrigated, $3,500/acre dryland
- Surface water prices vary greatly, from less than $10/af to in excess of $450/af.

California farming…

Top 20 Commodities for 2008-2010						
	Value and Rank					
Commodity	2008		2009		2010	
			$1,000			
Milk and Cream	6,924,121	(1)	4,537,171	(1)	5,928,150	(1)
Grapes, All	2,923,015	(2)	3,260,172	(2)	3,201,112	(2)
Almonds (shelled)	2,343,200	(4)	2,293,500	(4)	2,838,500	(3)
Nursery	2,726,160	(3)	2,510,290	(3)	2,744,900	(4)
Cattle & Calves	1,884,660	(5)	1,676,375	(7)	2,089,194	(5)
Berries, All Strawberries	1,578,175	(8)	1,725,232	(6)	1,796,574	(6)
Lettuce, All	1,580,831	(7)	1,743,573	(5)	1,642,249	(7)
Tomatoes, All	1,317,321	(9)	1,539,923	(8)	1,274,213	(8)
Pistachios	569,900	(14)	592,850	(16)	1,158,840	(9)
Walnuts	558,080	(16)	747,270	(12)	1,061,330	(10)
Flowers and Foliage	1,060,489	(10)	936,689	(11)	1,012,221	(11)
Hay, All	1,797,032	(6)	926,660	(10)	971,090	(12)
Rice	826,143	(11)	936,958	(9)	789,003	(13)
Chickens, All	724,667	(12)	691,518	(14)	721,724	(14)
Oranges, All	558,974	(15)	595,909	(15)	716,059	(15)
Cotton Lint, All	296,531	(24)	285,797	(24)	610,042	(16)
Broccoli	663,319	(13)	750,600	(13)	606,082	(17)
Carrots	517,663	(17)	499,766	(17)	525,858	(18)
Avocados	328,350	(23)	200,640	(33)	414,948	(19)
Celery	354,979	(20)	389,141	(18)	380,974	(20)

Major California Farm Regions

Basic Areas of Ag Water Issues



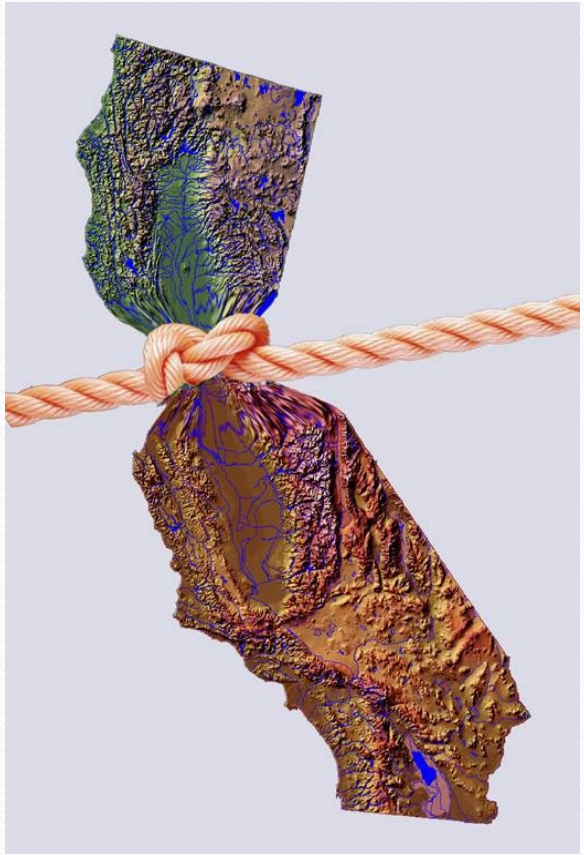
- Supply Issues
  - Stability
  - Infrastructure Management
  - Meeting the changing demands
- Demand Issues
  - Demand Hardening

Statewide Supply Issues

- Instability of Surface Water Supply
  - Natural Variability (Normal CA)
  - Changes in System Operations
    - Storage Operations Changes
    - Diversion Changes

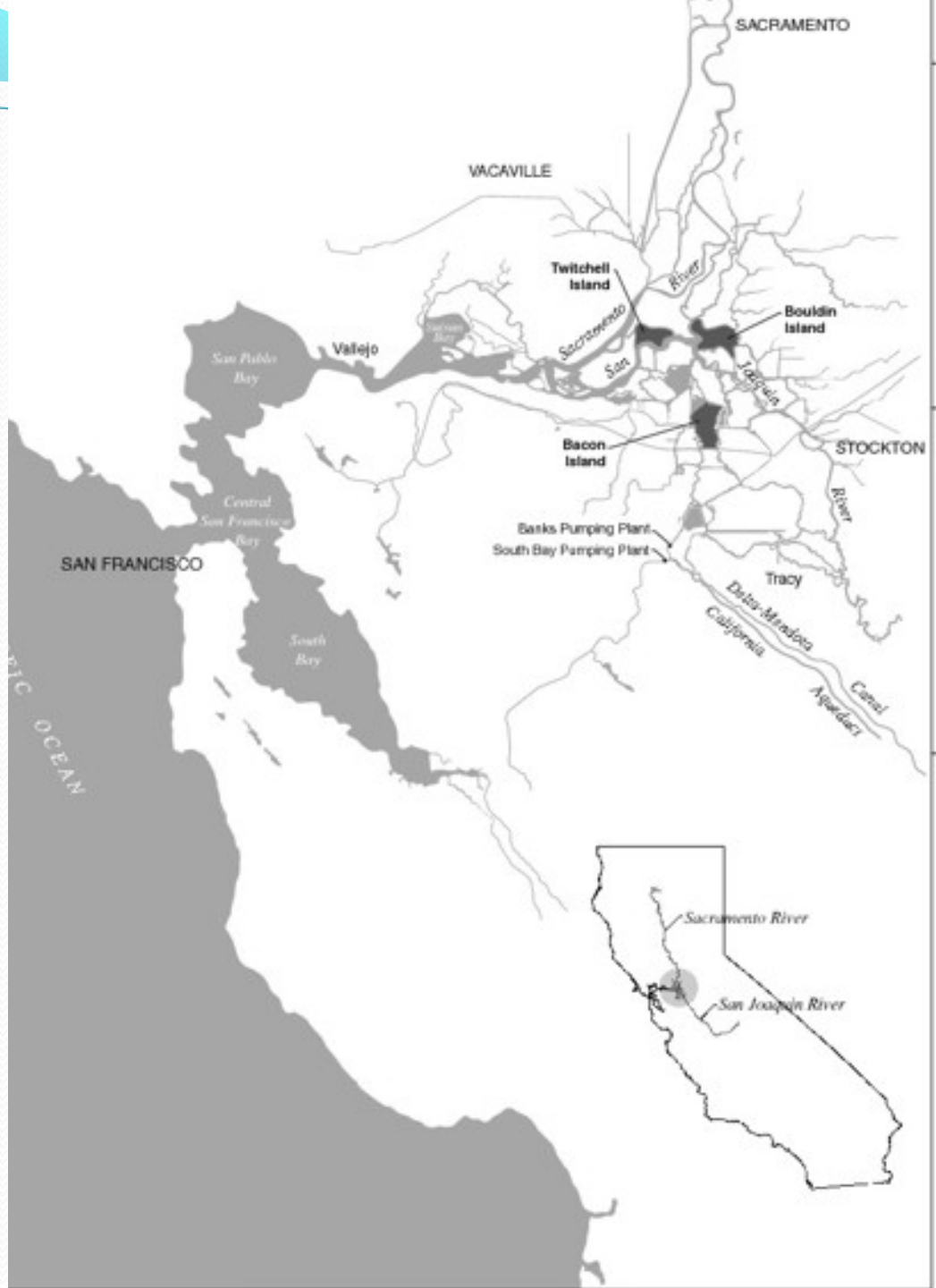
Statewide Supply Issues

- Instability of Surface Water Supply



The Sacramento-San Joaquin River Delta

- Critical to California's Water Supply
- Home to 5 listed endangered species
- Critical, but heavily engineered ecosystem



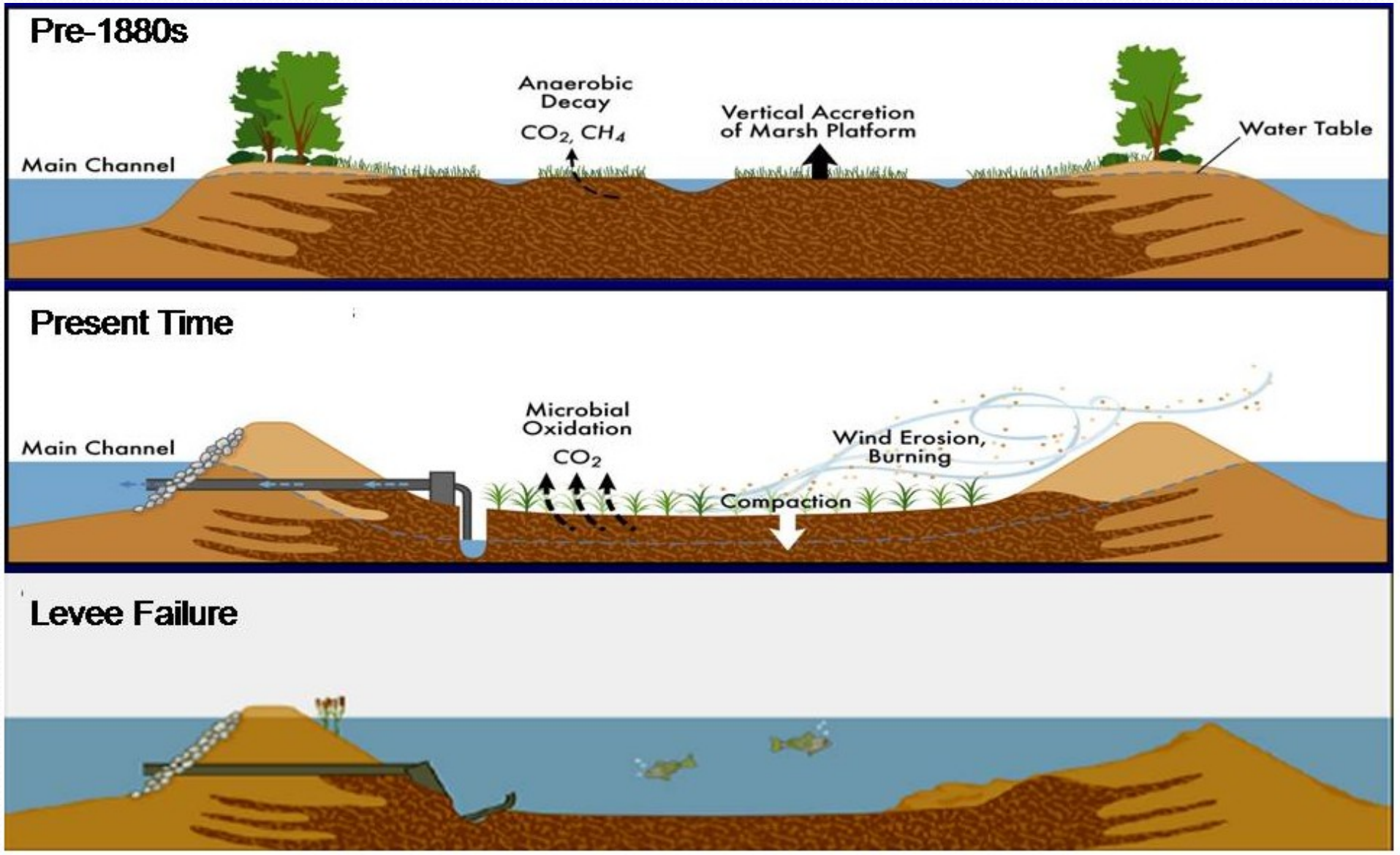
C.W. “Bill” Jones Pumping Plant (Federal)

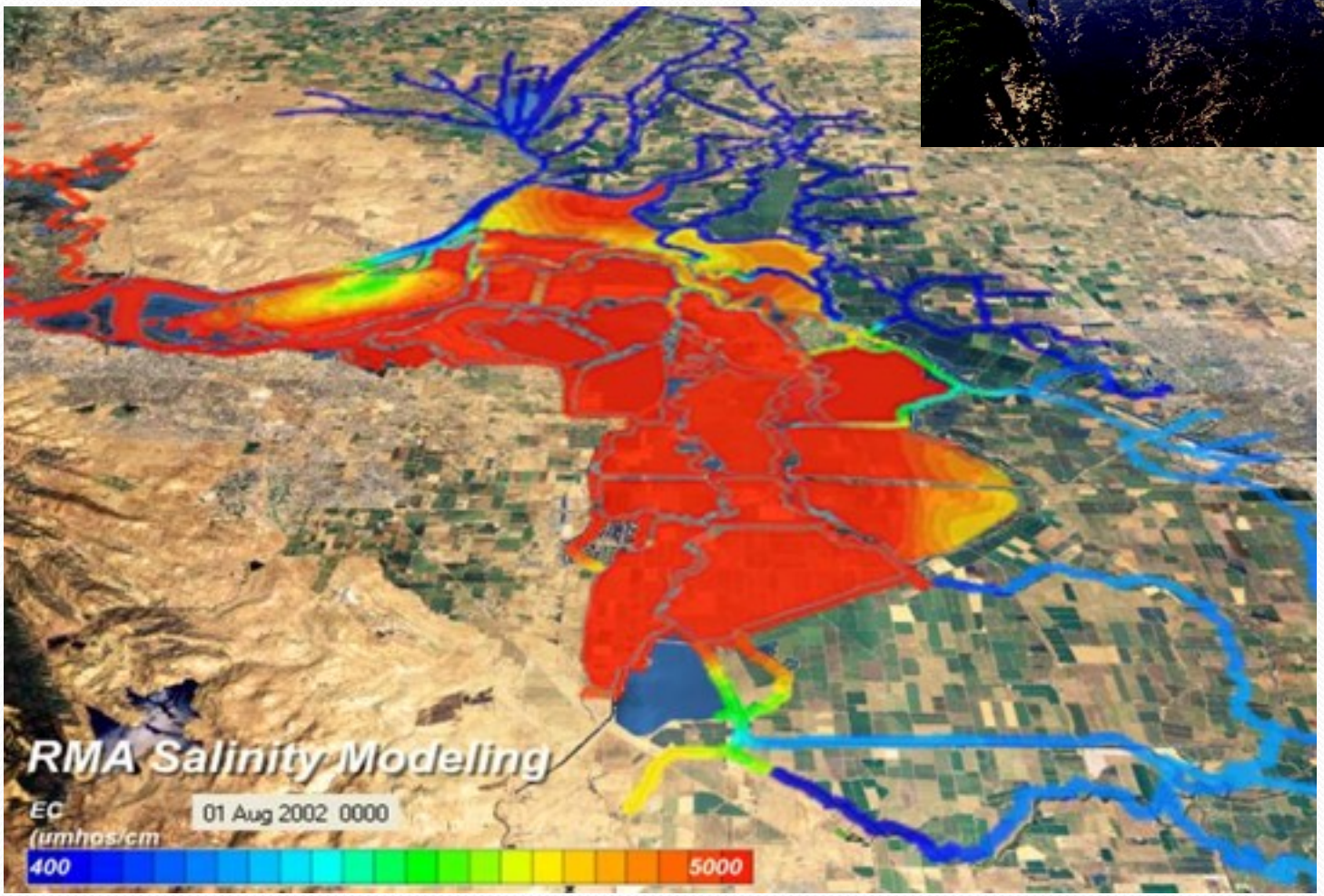
Harvey O. Banks Pumping Plant (State)

California Water Projects

Statewide Supply Issues

- Largest estuary on West Coast
- Over the past 150 years, 1,000 miles of levees built to create islands
- 95% of wetlands disappeared


Pre-1880s
Anaerobic Decay
CO_2, CH_4
Vertical Accretion of Marsh Platform
Water Table
Main Channel
Present Time
Microbial Oxidation
CO_2
Wind Erosion, Burning
Main Channel
Compaction
Levee Failure


RMA Salinity Modeling
EC
(umhos/cm
01 Aug 2002 0000
400
5000

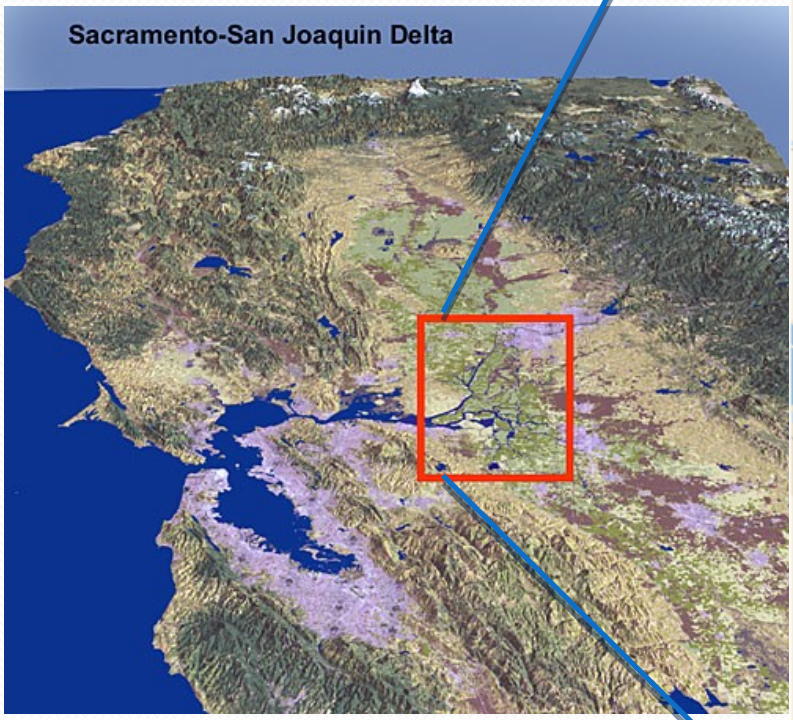
Delta Smelt

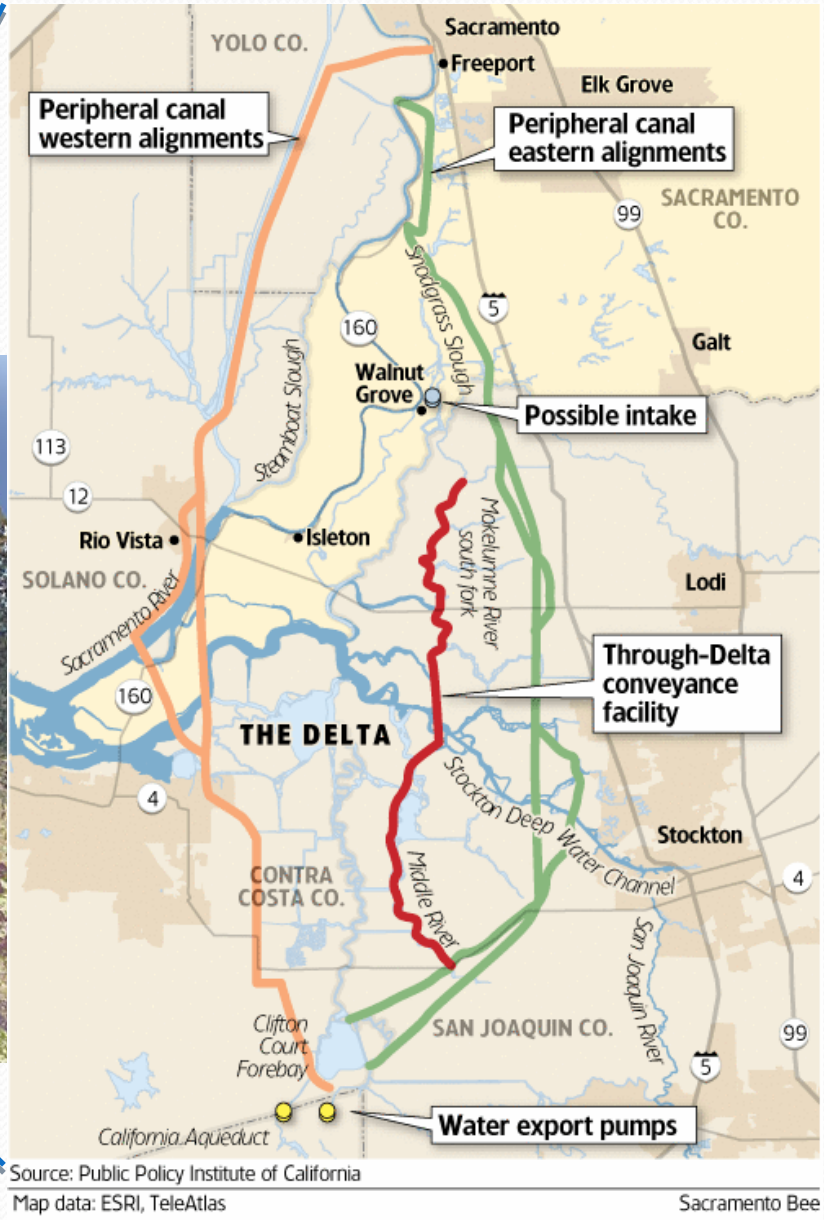
Salmon

Supply Issues

- Infrastructure Management
  - Diversion Pumps
  - Reservoir Dams
  - Levees

Peripheral Canal





Demand Issues

- Agricultural Water Needs are “Hardening”

  CA cropping pattern shifting toward permanent plantings

What about Water Use Efficiency?

• California's legislature has directed the Department of Water Resources to develop a method to quantify the efficiency of agricultural water use.

• Leaving aside the legal process, how can we help to:

- Improve water supplier delivery efficiency?
- Improve grower efficiency? (Distribution Uniformity, etc.)

Water Supplier Efficiency

Water suppliers can experience significant benefits from regularly evaluating their system and conducting water management planning.

When appropriate, implementation of Efficient Water Management Practices (EWMPs) can help to improve efficiency

Efficient Water Management Practices (EWMPs)

The Agricultural Water Management Council, The United States Bureau of Reclamation, and the California Department of Water Resources all require water suppliers to conduct some EWMPs.

Others are voluntary and subject to cost-benefit analysis.

Grower Efficiencies-Techniques and Technologies

Opportunities to help growers improve their irrigation efficiency exist. Ensuring they have access to the tools they need is crucial

Improving access to tools and techniques such as advanced irrigation scheduling and application device selection and improvement can help growers to improve their efficiency.

Grower Efficiencies-Techniques and Technologies

National Center For Appropriate Technologies (NCAT) Irrigation Methods Assistance

CSU Fresno, In-Field Research Facility CATI

California Department of Water Resources Regional Evapotranspiration data, CIMIS

USDA- NRCS Technical Toolkit

Conservation Potential or Appropriate Irrigation Portfolio?

Irrigation Method	**Acres Under Method**	**Average AF/ Acre Applied**
Gravity (Furrow/Flood)	4,189,852	3.3 AF/Acre
Sprinkler	1,367,179	2.5 AF/Acre
Drip/Micro	2,336,140	2.6 AF/Acre
Subsurface	66,282	.8 AF/Acre

Water Use Efficiency

- 1967 – 2000

  AF applied per acre…2% increase

  Production volume increase…89% increase

Questions?