

Adapt, Flee, or Perish



Lyell Glacier, Yosemite National Park, California, USA circa 1903 (upper) and 2003 (lower)

J. T. Andrew
Calif. Department of Water Resources
Sustainable Water Resources
Roundtable
April 27, 2010
Palo Alto, California



Lyell Glacier, Yosemite National Park, California, USA circa 1903 (upper) and 2003 (lower)

DRAFT

EXPANDED LIST OF EARLY ACTION MEASURES TO REDUCE GREENHOUSE GAS EMISSIONS IN CALIFORNIA RECOMMENDED FOR BOARD CONSIDERATION



Lyell Glacier, Yosemite National Park, California, USA circa 1903 (upper) and 2003 (lower)

SEPTEMBER 2007



Today's Topics

- Climate change mitigation in the water sector
- Projected climate change impacts to water resources
- Adaptation to climate change in the water sector
- Multi-sector climate change adaptation

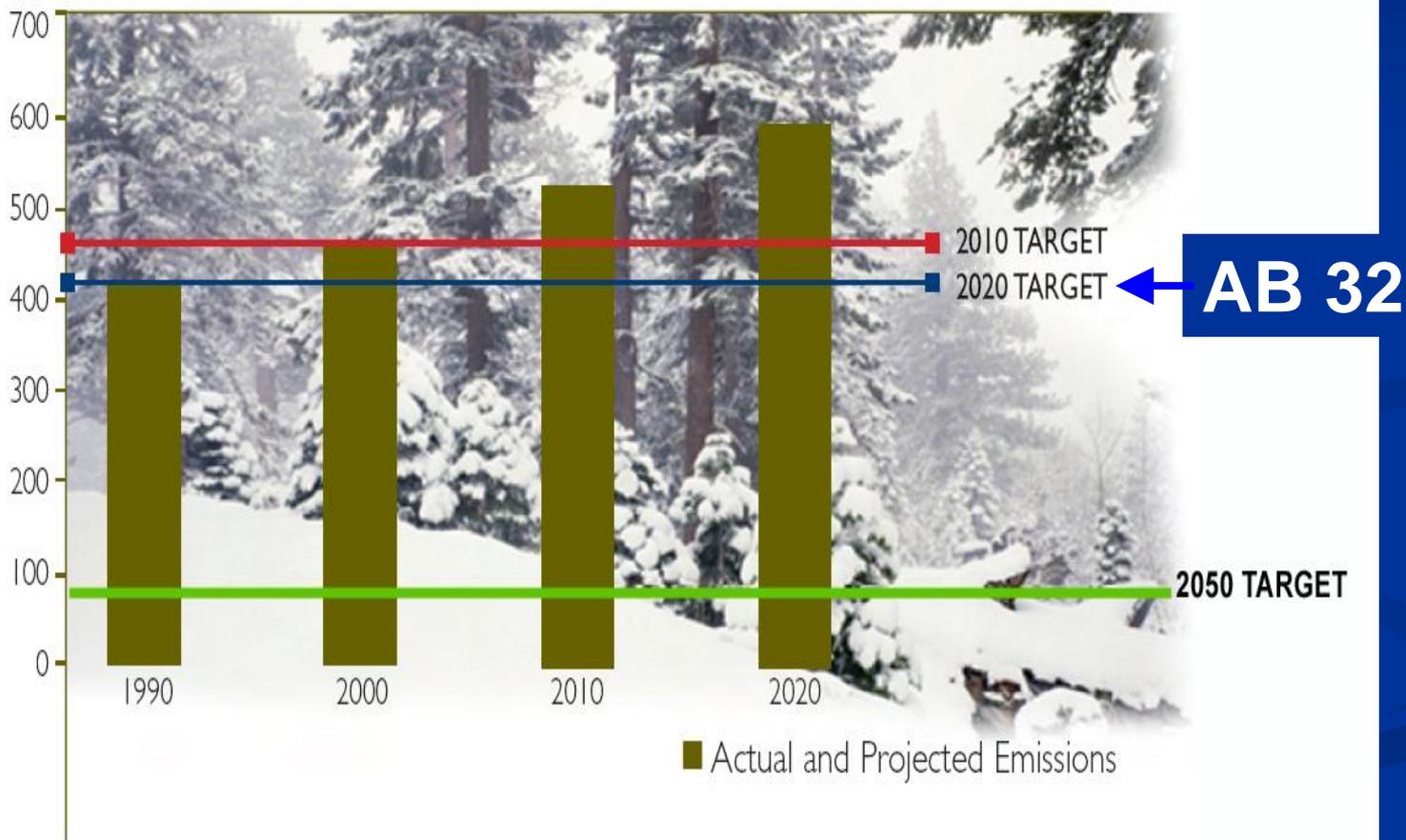


AB 32 (Global Warming Solutions Act)

- Sets in statute Governor's target (1990 levels by 2020)
- Equals approximately 169 million tons emission reduction
- 30% below projected business-as-usual levels
- Air Board lead, with Cal EPA and other State agencies
- Mix of regulatory and market approaches
- Detailed, aggressive schedule



Calif. Emissions Reduction Targets



California's GHG Emissions

cars and trucks = 40%



energy = 33%



industrial = 20%



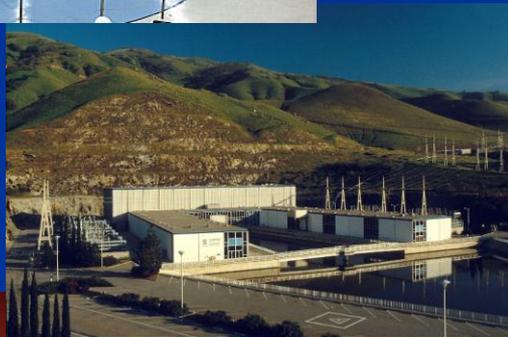
agriculture = 6%



waste = 1%



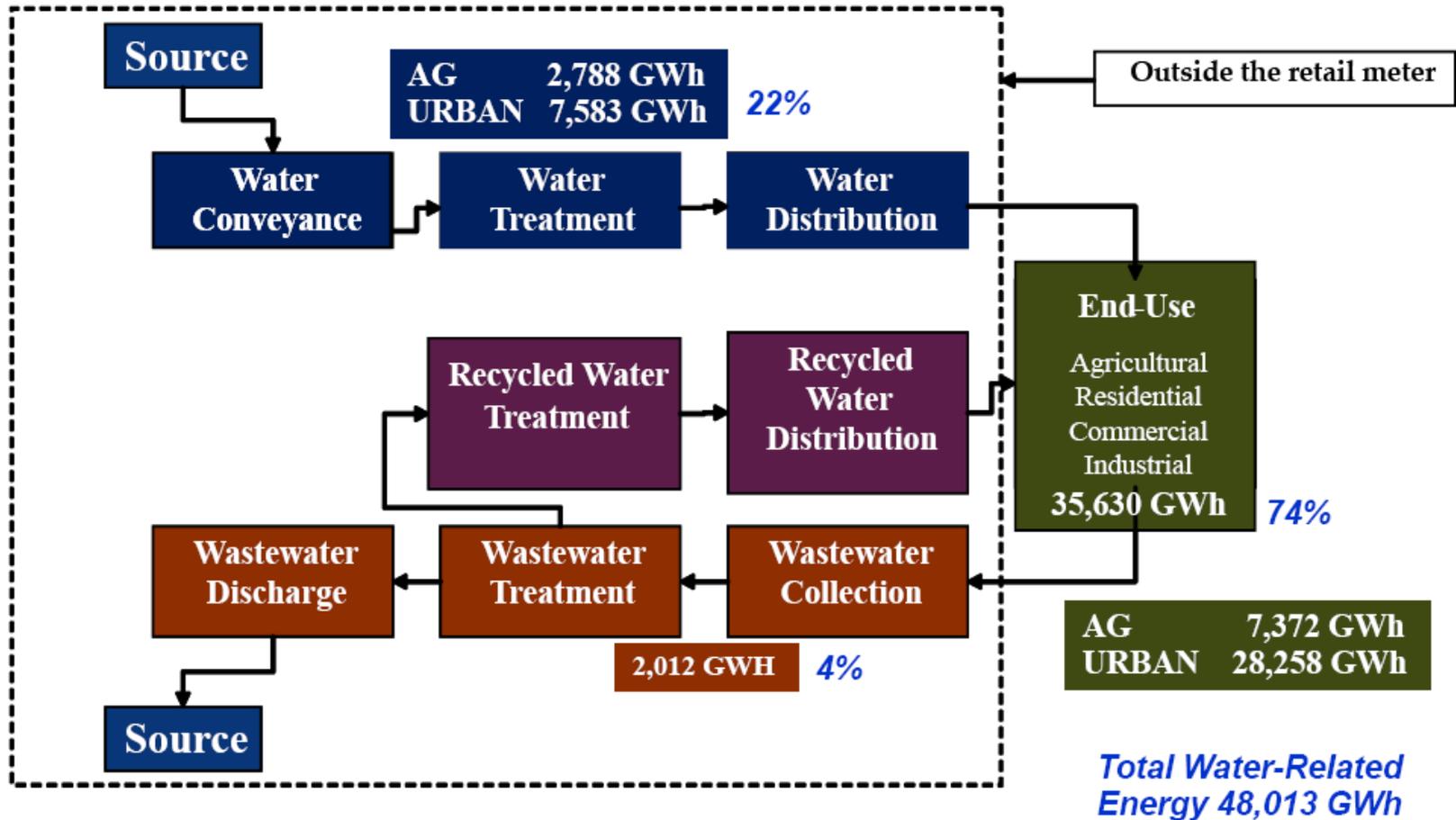
Water, Energy and Climate Change



Future water management activities must carefully consider strategies to reduce greenhouse gas emissions.

Framework The Water Use Cycle

Estimates adjusted Oct 2006



Governor's Climate Action Team Water-Energy Subgroup



- Water conservation
- Water recycling
- Energy intensity of water systems
- Urban runoff and stormwater reuse
- Renewable energy production

O'Shaughnessy Dam

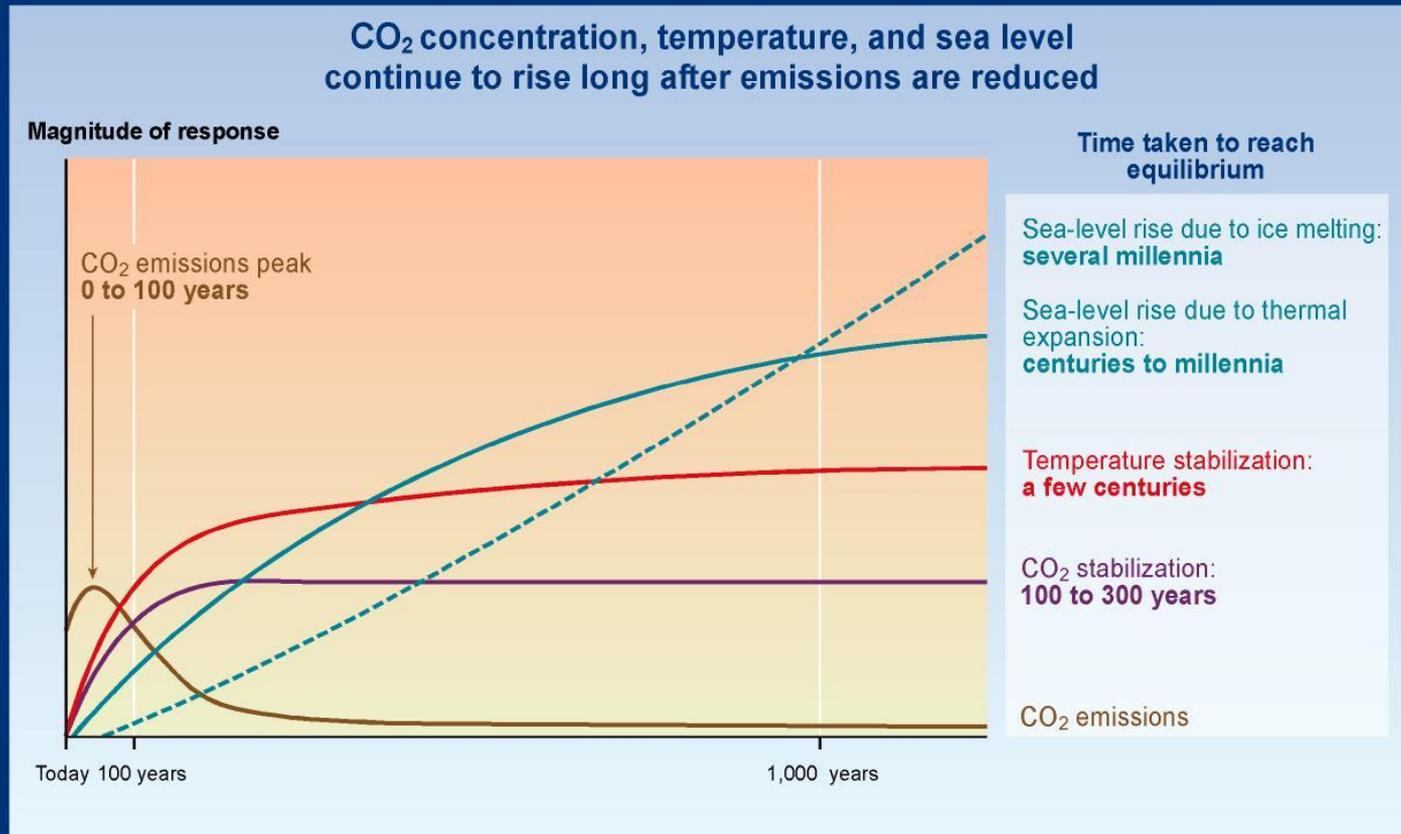


Climate Change Impacts on California's Water Resources



- Reduced snowpack, impacting water supply and hydropower
- Earlier snowmelt results in increased flood control demand on reservoir space
- Higher water temperatures impacts ecosystem
- Sea level rise impacts the Delta, threatens levees and increases salinity
- Increased demand in all sectors

Adaptation is a Necessity



SYR - FIGURE 5-2

STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
OCTOBER 2008



MANAGING AN UNCERTAIN FUTURE

Climate Change Adaptation Strategies
for California's Water

Climate Change Water Adaptation White Paper
www.climatechange.water.ca.gov



Comprehensive Strategy for Adaptation

- **Regional Strategies**
 - Fully implement Integrated Regional Water Management (IRWM)
 - Aggressively increase water use efficiency





Comprehensive Strategy for Adaptation

■ Statewide Strategies

- Practice and promote integrated flood management
- Enhance and sustain ecosystems
- Advance and expand conjunctive management of surface and groundwater resources
- Fix the Delta

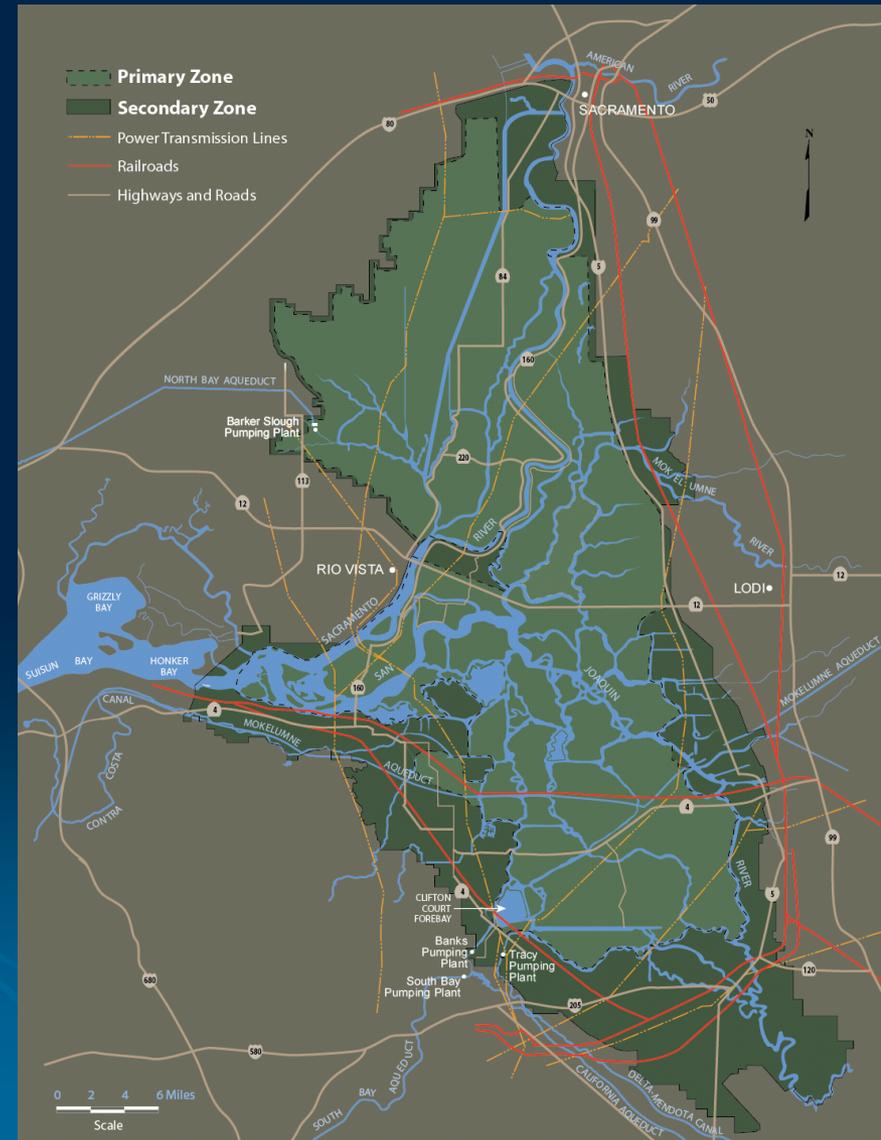


What Could Happen to Bay-Delta Estuary?



Implications of Sea Level Rise in the Delta

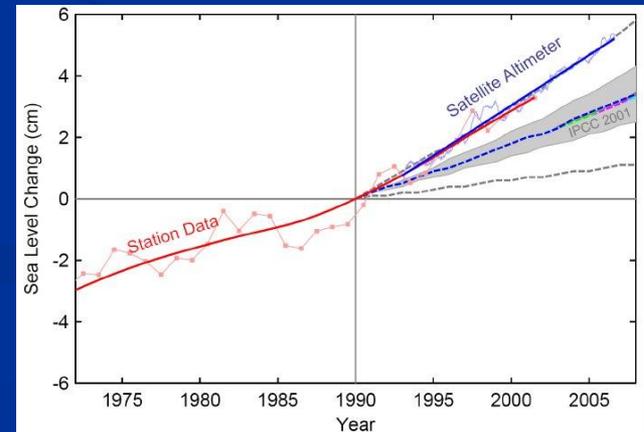
- Salinity intrusion degrades water quality, requires additional releases
- Habitat changes, losses
- Levee failure
- Inundation
- Interruption of water supplies





Comprehensive Strategy for Adaptation

- **Improving Management and Decision-Making Capacity**
 - Preserve, upgrade, and increase monitoring and data analysis and management
 - Plan for and adapt to sea level rise
 - Identify and fund focused climate change impacts and adaptation research and analysis





DEPARTMENT OF
WATER RESOURCES

Comprehensive Strategy for Adaptation

Investment Strategies

- Provide sustainable funding for statewide and integrated regional water management



California **Water Plan** Highlights

INTEGRATED WATER MANAGEMENT



Update 2009 • Department of Water Resources

Public Review Draft

January 14, 2009

www.waterplan.water.ca.gov

EXECUTIVE SUMMARY

2009 CALIFORNIA CLIMATE ADAPTATION STRATEGY DISCUSSION DRAFT

A Report to the Governor of the State of California
in Response to Executive Order S-13-2008



Public Review Draft



www.climatechange.gov/adaptation

CLIMATE ADAPTATION STRATEGY

- Executive Order S-13-08
- Statewide adaptation plan covering seven sectors:
 - Water
 - Transportation and Energy Infrastructure
 - Forestry
 - Oceans and Coastal Resources
 - Agriculture
 - Biodiversity and Habitat
 - Public Health
- NAS Sea Level Rise Study
- Transportation systems vulnerability assessment

Cross-sector Strategies

- Research
- Monitoring
- Integration into plans, policies and common procedures
- Cross-sector collaboration
- Emergency preparedness and response
- Land use planning
- Training and education
- Measuring adaptation success

Adaptation Actions

- Public Health
Promote community resilience
- Biodiversity and Habitat
Establish a system of sustainable habitat reserves
- Oceans and Coastal Resources
Establish State policy to avoid future hazards and protect critical habitat
- Water Management
Develop the full potential of Integrated Regional Water Management

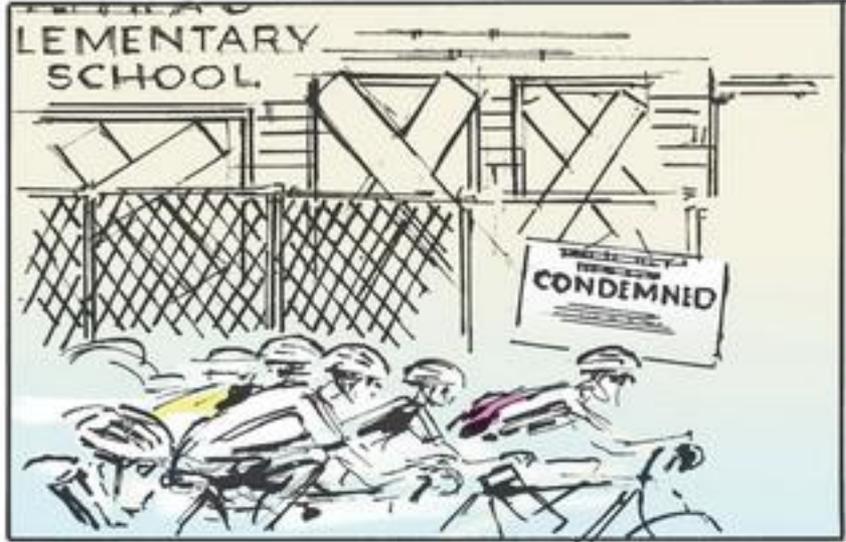
Adaptation Actions (continued)

- Agriculture
Agrobiodiversity
- Forestry
Incorporate existing climate information into policy development and program planning
- Energy
Increase energy efficiency in climate vulnerable areas
- Transportation
Develop a detailed climate vulnerability assessment and adaptation plan for California's transportation infrastructure

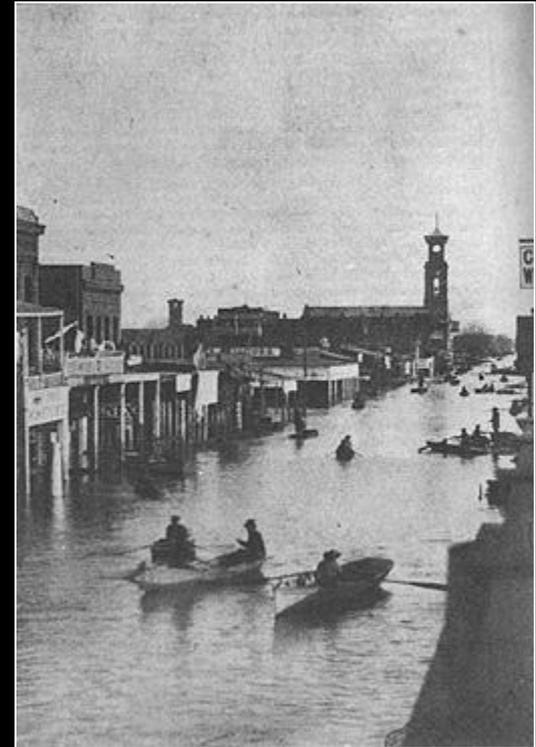
California Water Management and Climate Change

- Climate change presents significant challenges for the management of California's water resources.
- California water managers must focus on mitigation and especially adaptation.
- Climate change responses must be thoughtfully integrated with water supply reliability, environmental protection, public safety, and public health actions.
- We must embrace an entirely new way of thinking about water resources planning and management.

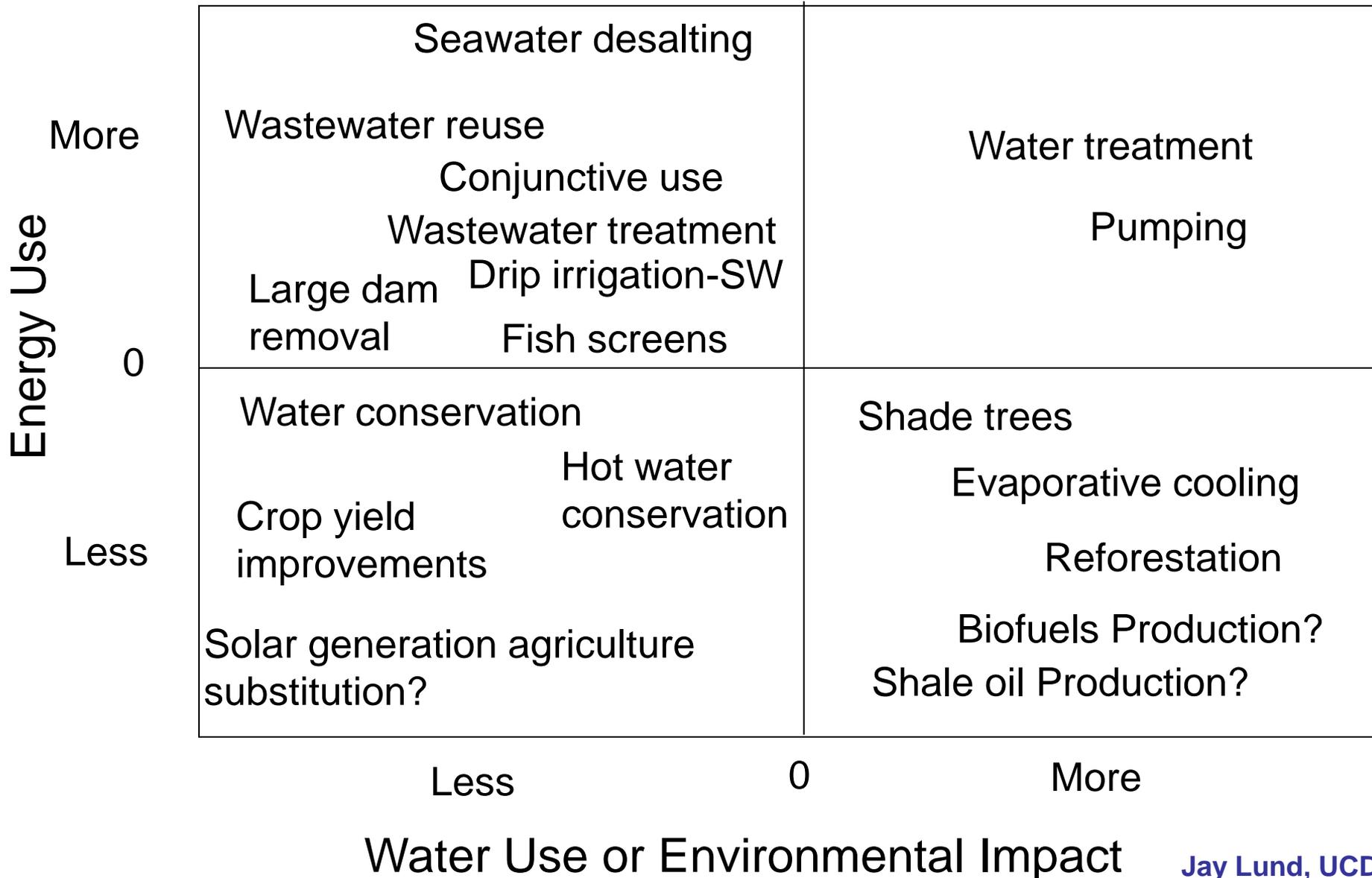
TOUR OF CALIFORNIA



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Common Energy-Water Tradeoffs



california

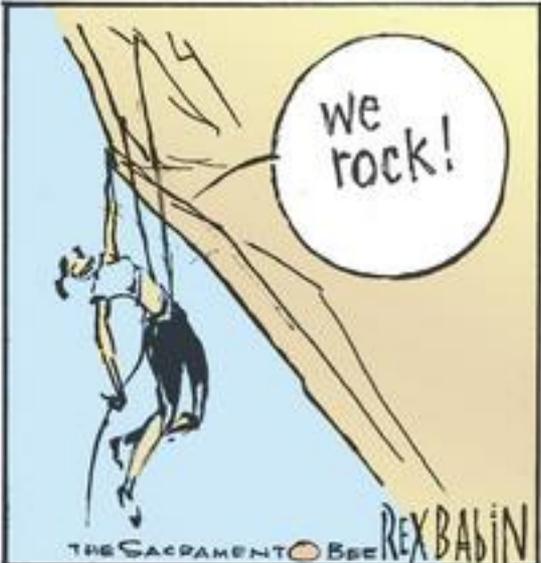
FIND YOURSELF HERE



We fly!



We shred!



We rock!

THE SACRAMENTO BEE REX BABIN



We borrow!



We tax!



We furlough!

California Water Background

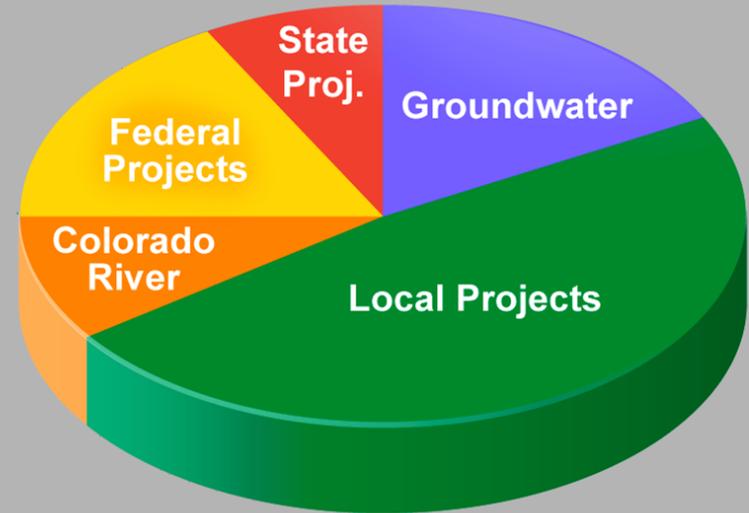


- **Population:**
 - 2005 36 million
 - 2030 48 million
- **Irrigated Acreage: 9.5 million**
- **About 2/3 of the State's surface water runoff occurs north of Sacramento**
- **About 2/3 of the State's water needs occur south of Sacramento**

California's Major River Systems



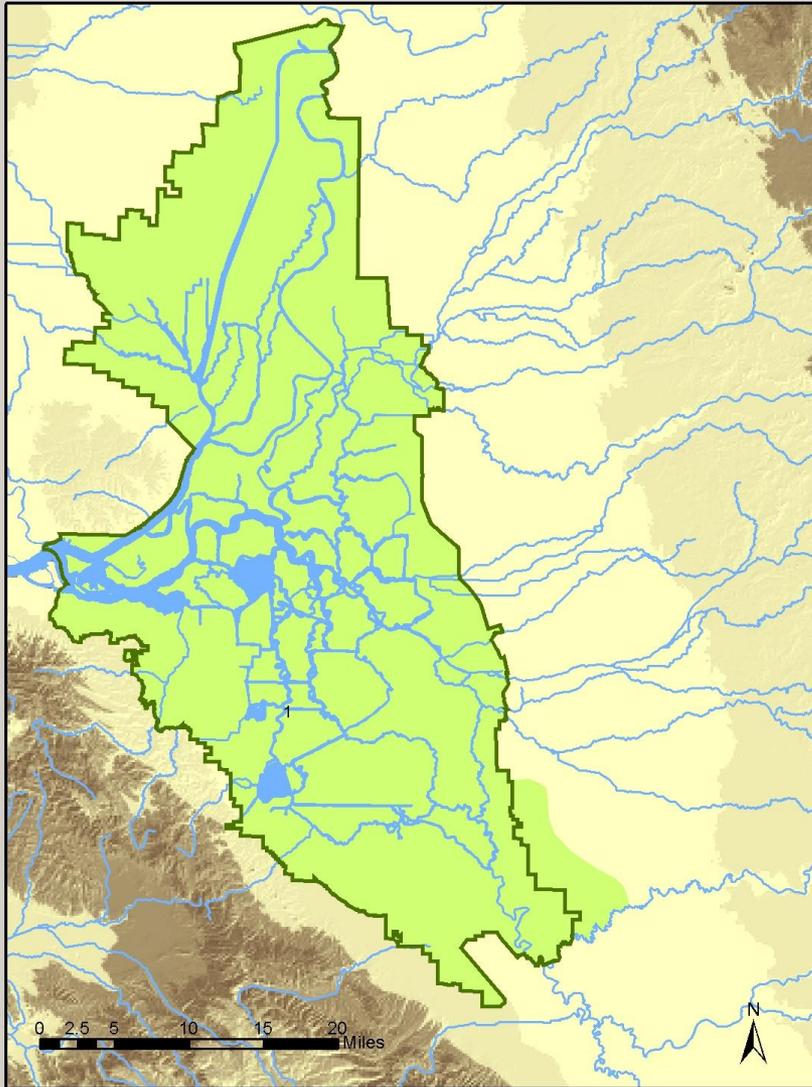
Statewide Water Management Systems



	Local – 20.6 maf
	Colorado – 5.3 maf
	Federal – 7.5 maf
	State – 3.6 maf
	Groundwater – 7.8 maf

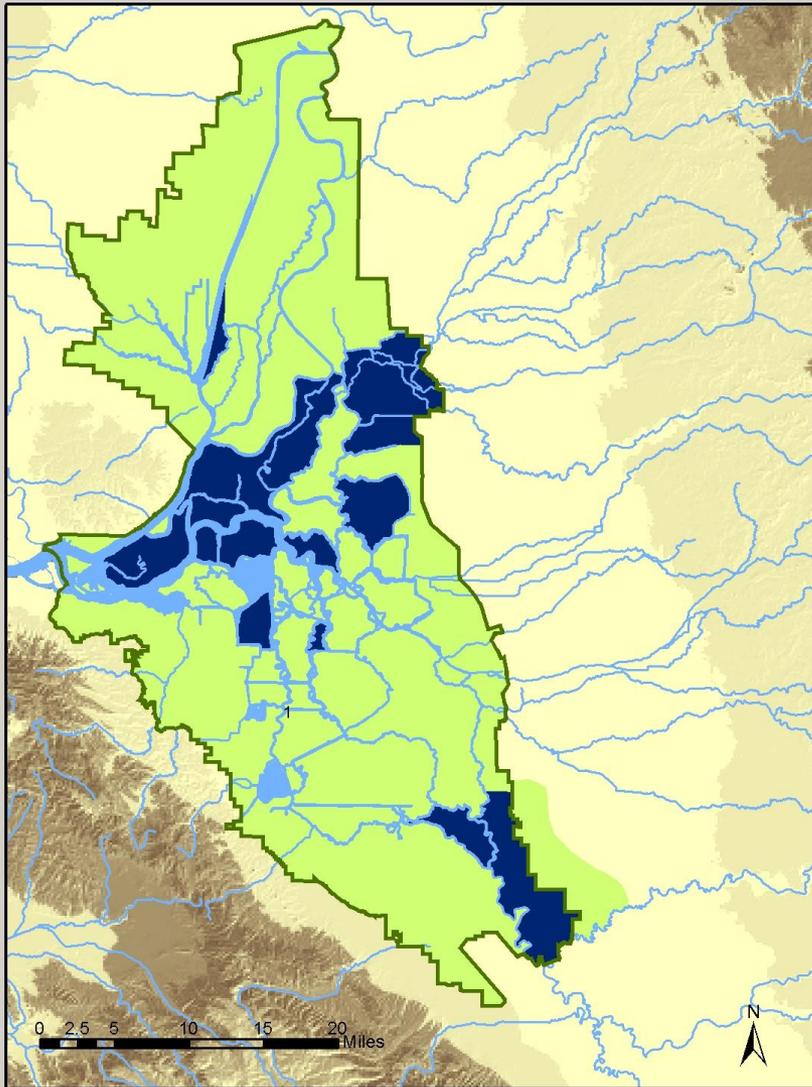
Year 2000 data. Does not include re-use. Quantities vary by year.

Projected Sea Level Rise



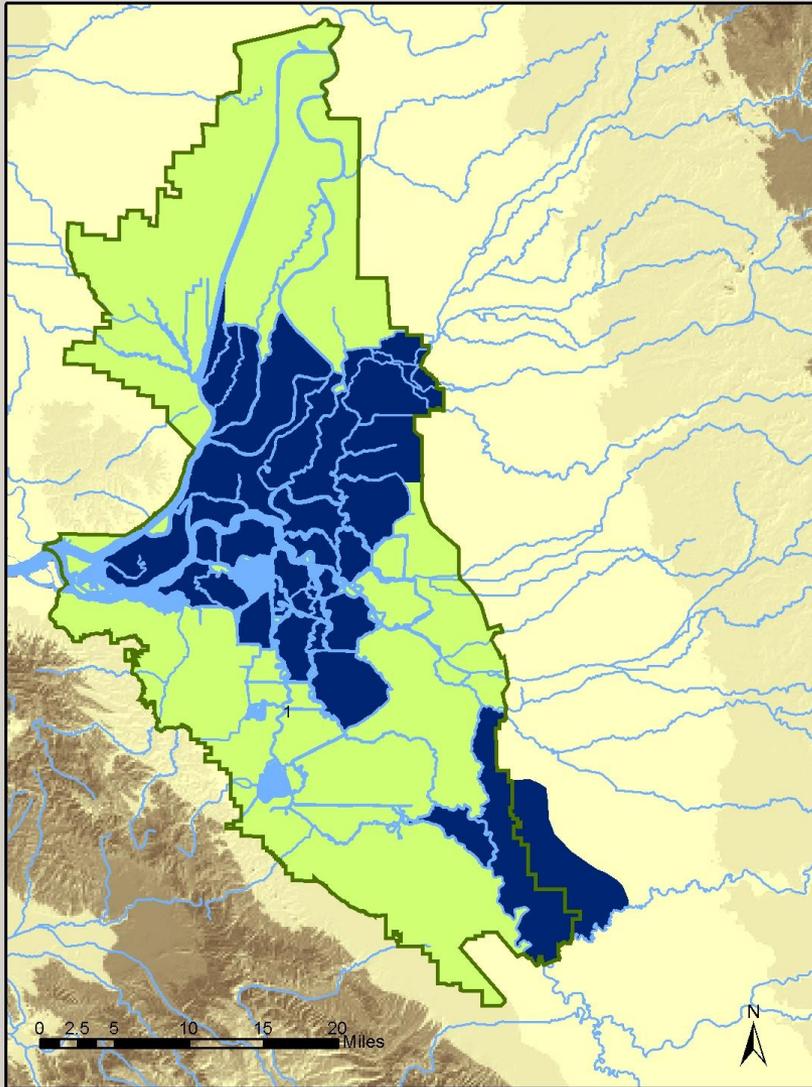
The Delta today.

Projected Sea Level Rise



Areas most at risk in the Delta with 1-foot sea level rise.

Projected Sea Level Rise



Areas most at risk in the Delta with 2-foot sea level rise.