Lyell Glacier, Yosemite National Park, California, USA circa 1903 (upper) and 2003 (lower)
EXPANDED LIST OF EARLY ACTION MEASURES TO REDUCE GREENHOUSE GAS EMISSIONS IN CALIFORNIA RECOMMENDED FOR BOARD CONSIDERATION

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

SEPTEMBER 2007
Today’s Topics

- Adaptation to climate change in the water sector
- Multi-sector climate change adaptation in California
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
Adaptation is a Necessity

CO\textsubscript{2} concentration, temperature, and sea level continue to rise long after emissions are reduced

- Sea-level rise due to ice melting: several millennia
- Sea-level rise due to thermal expansion: centuries to millennia
- Temperature stabilization: a few centuries
- CO\textsubscript{2} stabilization: 100 to 300 years

Today 100 years 1,000 years

CO\textsubscript{2} emissions

Magnitude of response

CO\textsubscript{2} emissions peak 0 to 100 years

SYR - FIGURE 5-2

IPCC INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE
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
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
Comprehensive Strategy for Adaptation

Investment Strategies

- Provide sustainable funding for statewide and integrated regional water management
California Water Plan
Highlights

INTEGRATED WATER MANAGEMENT

Public Review Draft
January 14, 2009

www.waterplan.water.ca.gov
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.
California:
Find yourself here.

We fly!

We shred!

We rock!

We borrow!

We tax!

We furlough!

Sale

State offices closed
John T. Andrew, P.E.
Assistant Deputy Director
Department of Water Resources
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CAS – What it Does

- Prepares state agencies for climate impacts
- Centralizes information sources for consistency and statewide coordination
- Coordinates development of climate adaptation planning tools for statewide use
- Calls for unprecedented planning and coordination at all levels
- Provides an example approach for addressing adaptation
Elements of the CAS

- Adaptation – explanation and approach
- Synthesize statewide impacts from the latest research
- Assess impacts on climate-sensitive sectors (Oceans/Water/Infrastructure/Public Health/Forestry/Agriculture/Biodiversity)
- Sector adaptation strategies (near-term, long-term)
- Overall strategies (Executive Summary) – a comprehensive approach to adaptation
Calif. Emissions Reduction Targets

![Graph showing emissions targets for 1990, 2000, 2010, and 2020, with 2010 and 2020 targets set higher than actual and projected emissions. The 2050 target is also shown.]
California’s GHG Emissions

cars and trucks = 40%  
energy = 33%

industrial = 20%  
agriculture = 6%  
waste = 1%
Future water management activities must carefully consider strategies to reduce greenhouse gas emissions.
Estimates adjusted Oct 2006

Source

Water Conveyance → Water Treatment → Water Distribution

AG 2,788 GWh
URBAN 7,583 GWh 22%

End-Use

Agricultural Residential Commercial Industrial 35,630 GWh 74%

Wastewater Discharge → Wastewater Treatment → Wastewater Collection

Recycled Water Treatment → Recycled Water Distribution

AG 7,372 GWh
URBAN 28,258 GWh

Total Water-Related Energy 48,013 GWh
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
# Common Energy-Water Tradeoffs

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<td>Jay Lund, UCD</td>
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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