"WATER POLICY THROUGH A CARBON LENS"

Responding to Climate Change Impacts to California's Water Resources

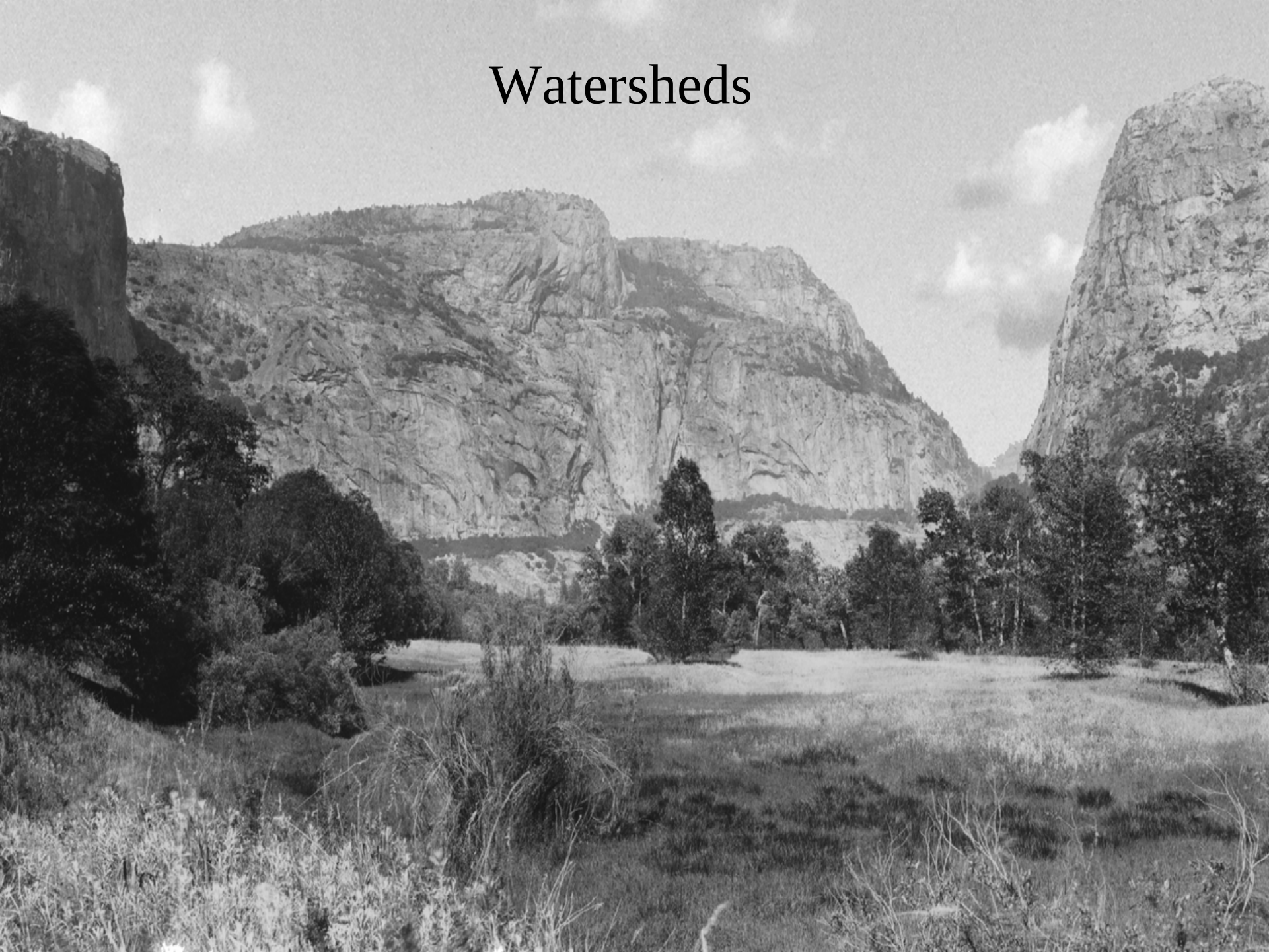
August 23, 2007

John T. Andrew
California Department of Water Resources

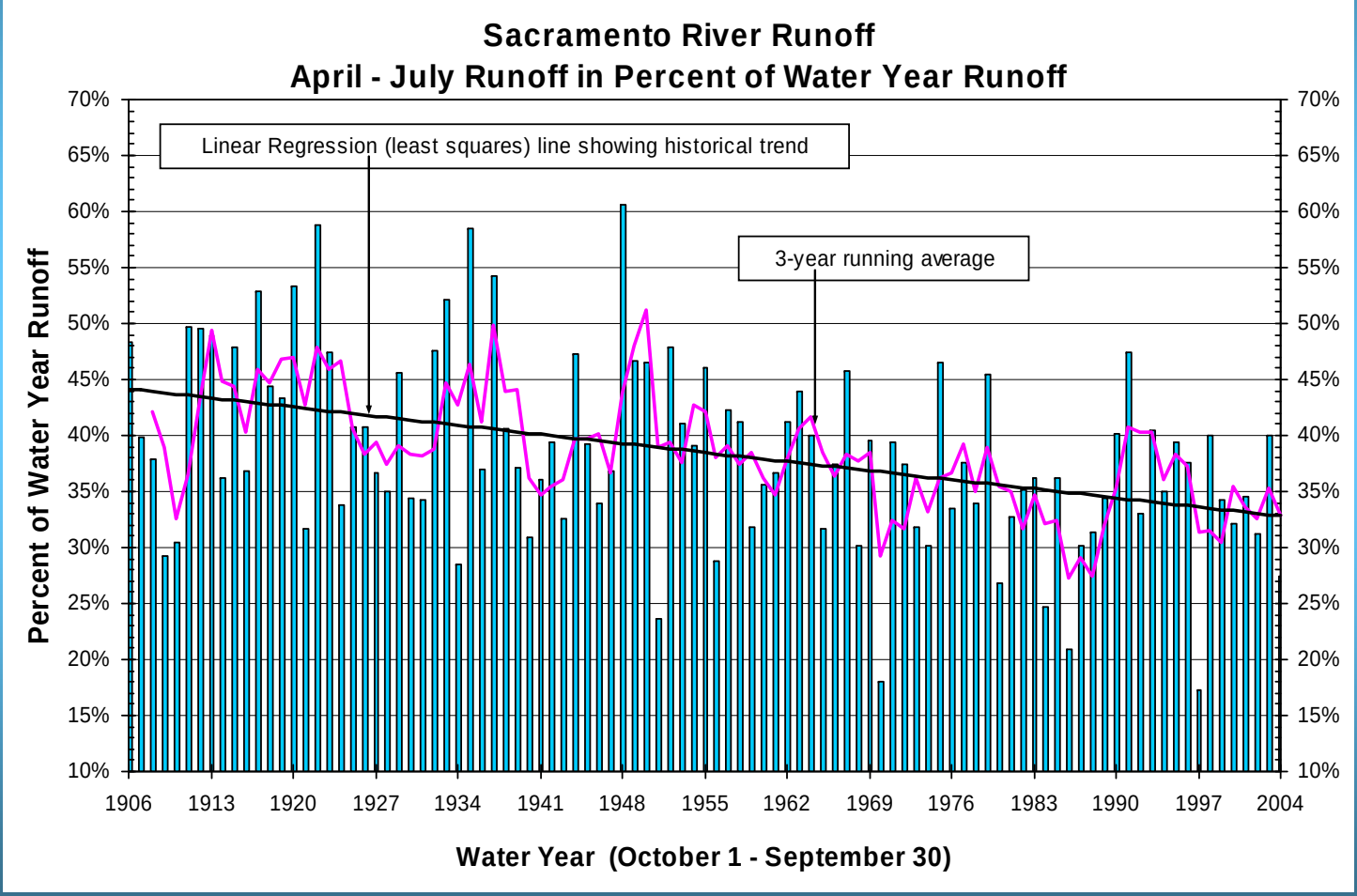
Climate Change Impacts on California's Water Resources

- Reduced snowpack
- 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

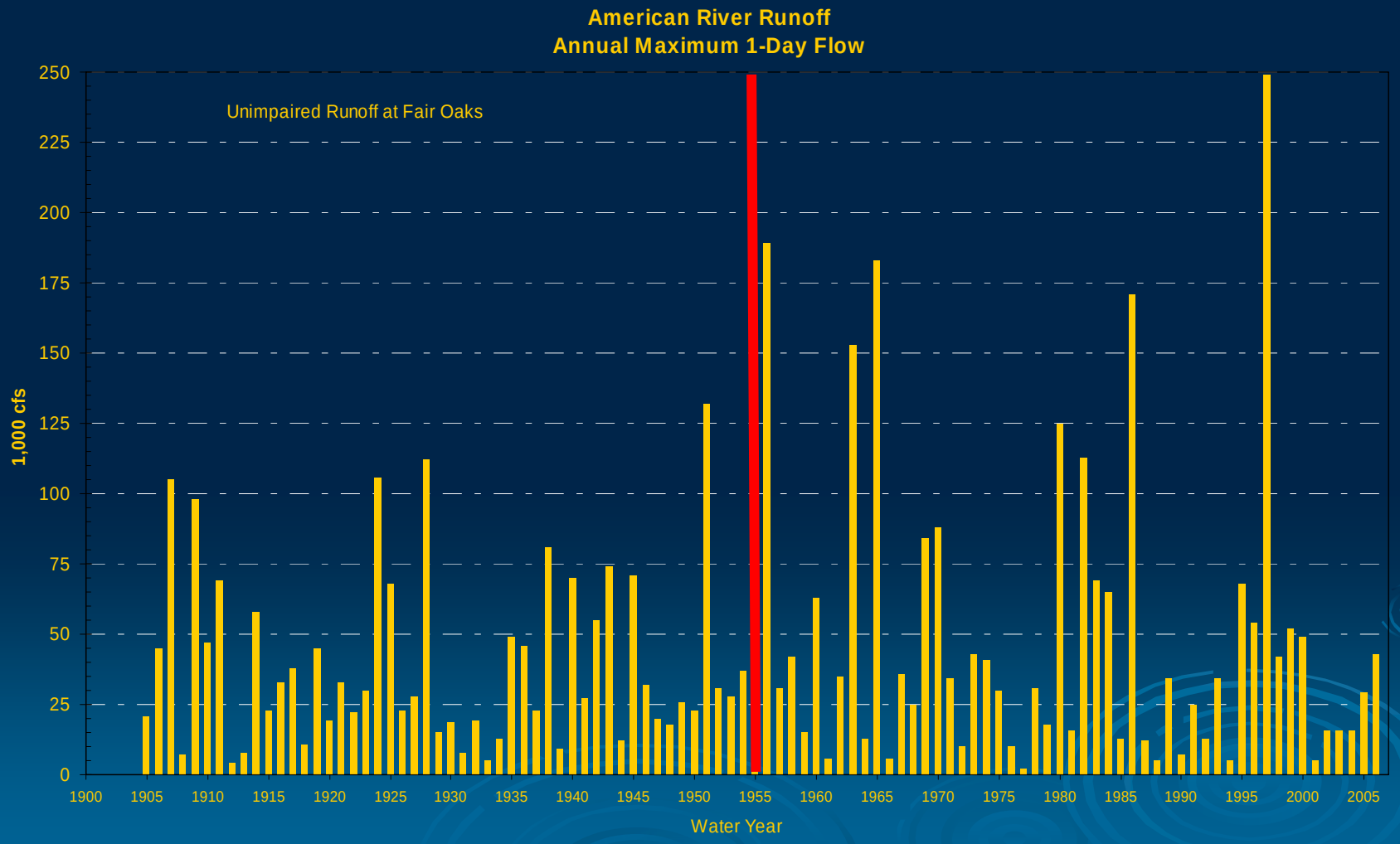
Watersheds



Changes in Runoff Timing

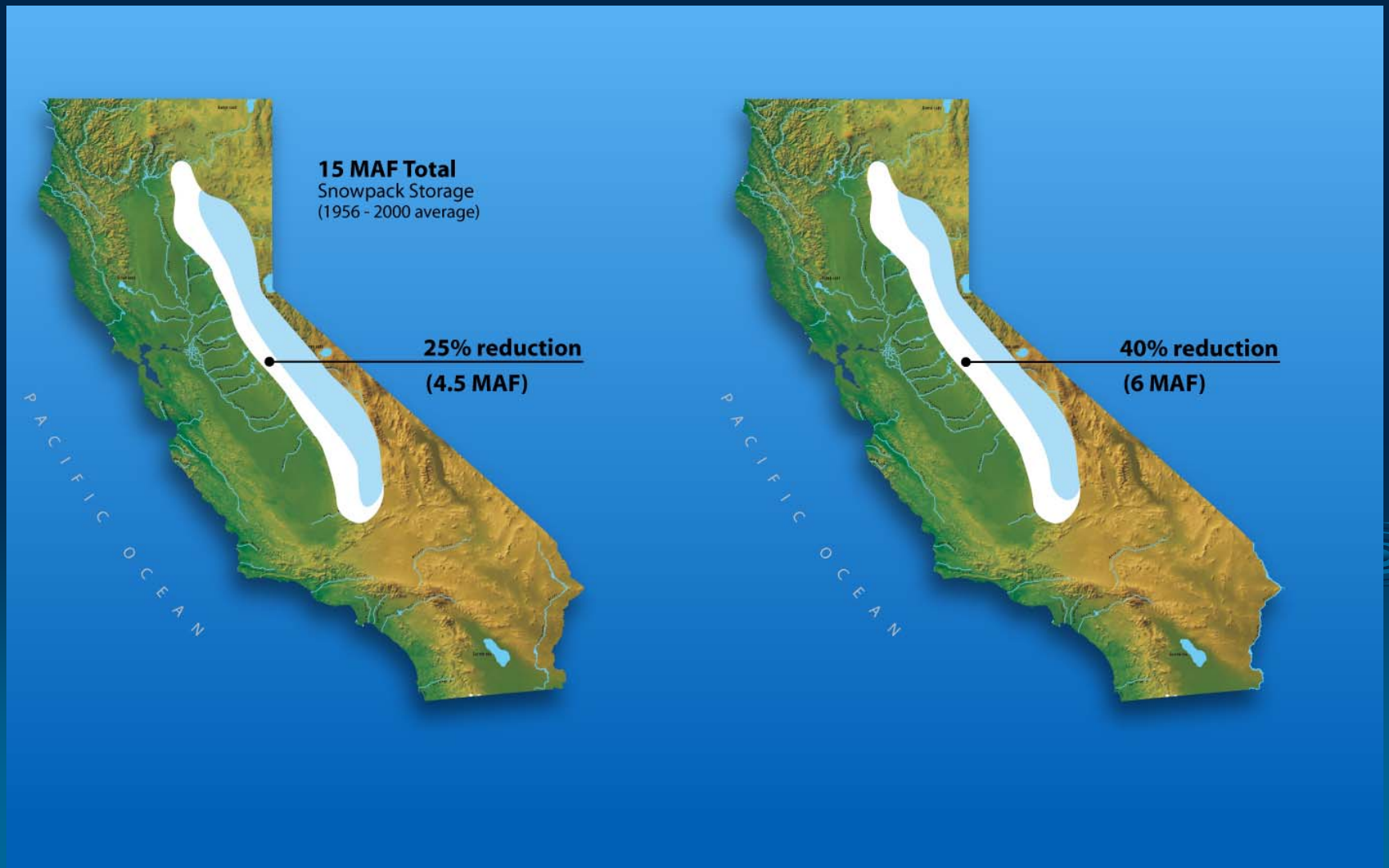


Changes in Peak Flows
American River



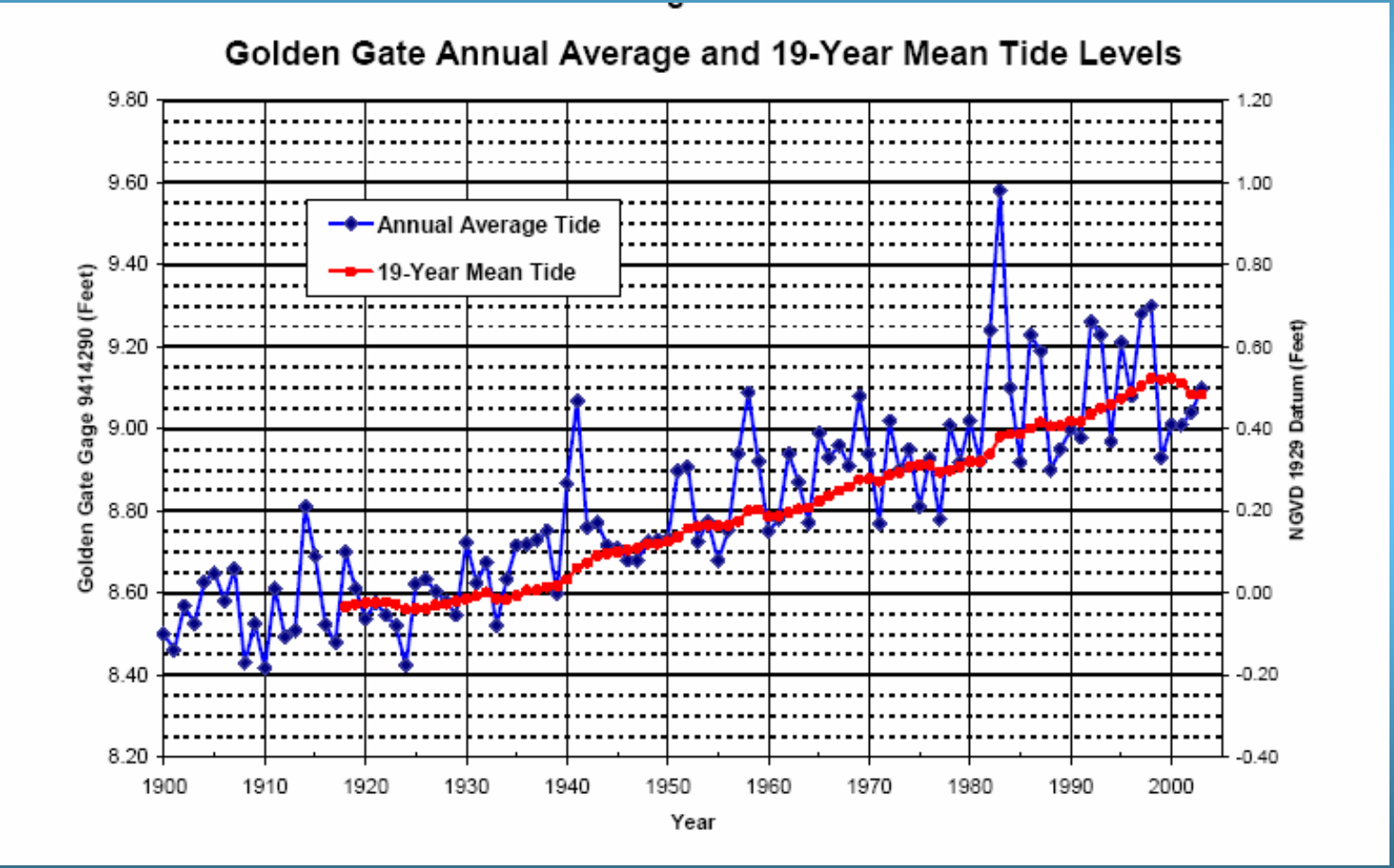
Red Line = Construction of Folsom Dam

Range of Snowpack Reductions
Projected by 2050



Sea Level Rise

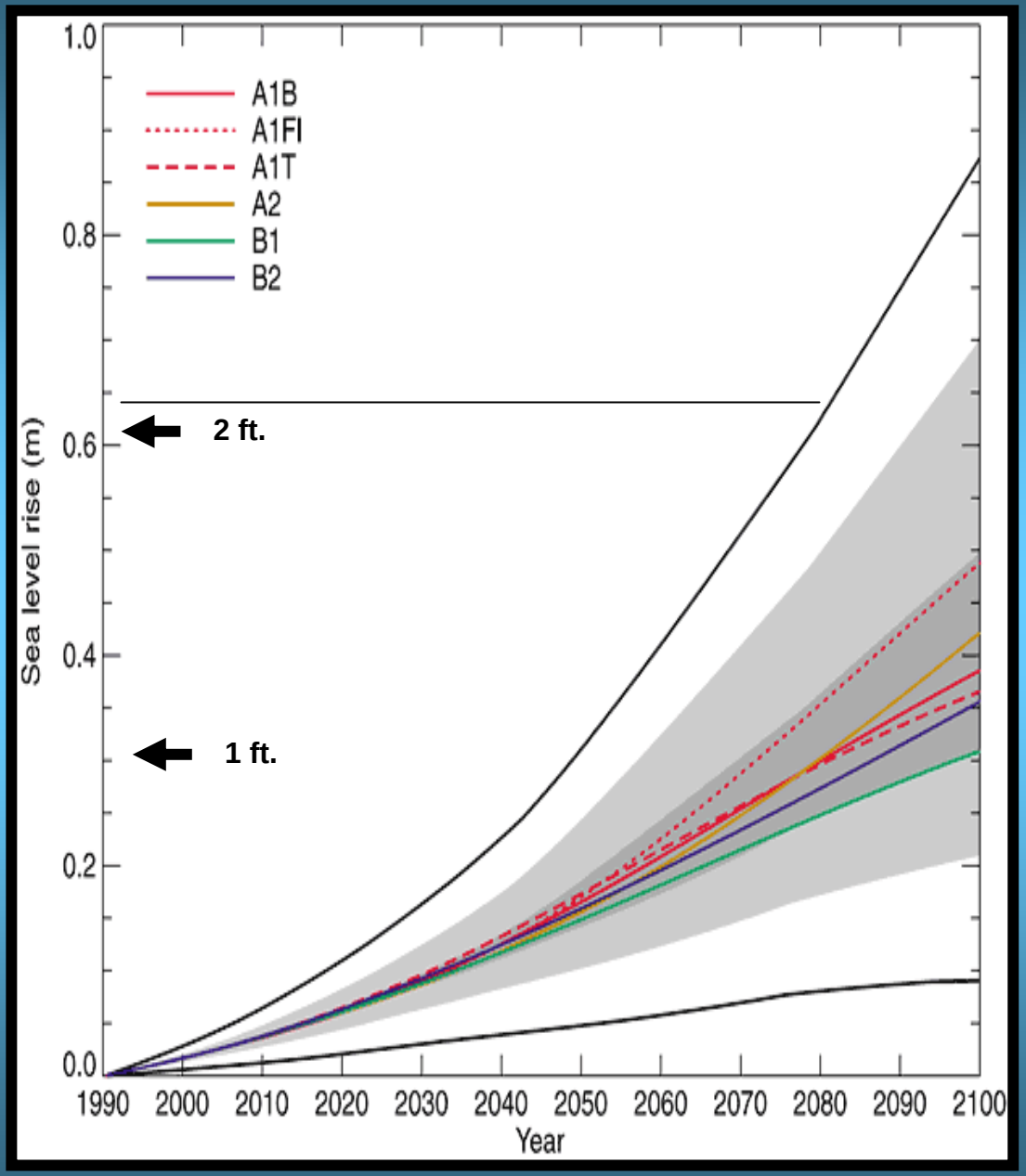
Sea Level Rise



Source: Roos 2003

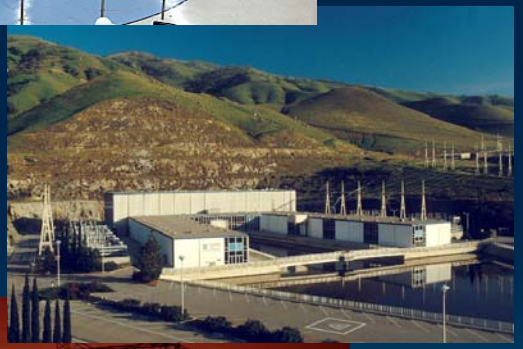
Sea Level Rise

Projections



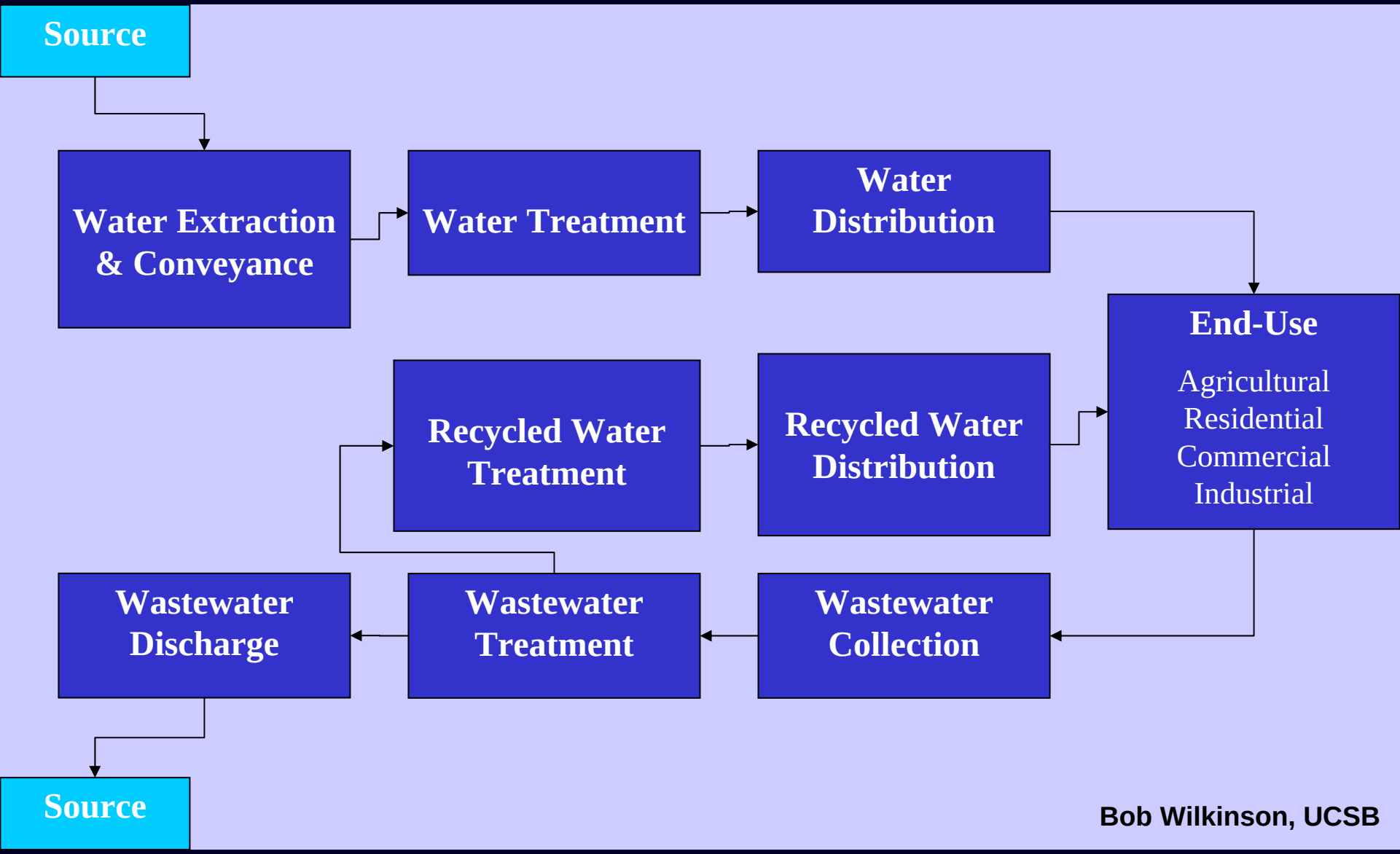
Source: IPCC, 2001

Water, Energy and Climate Change



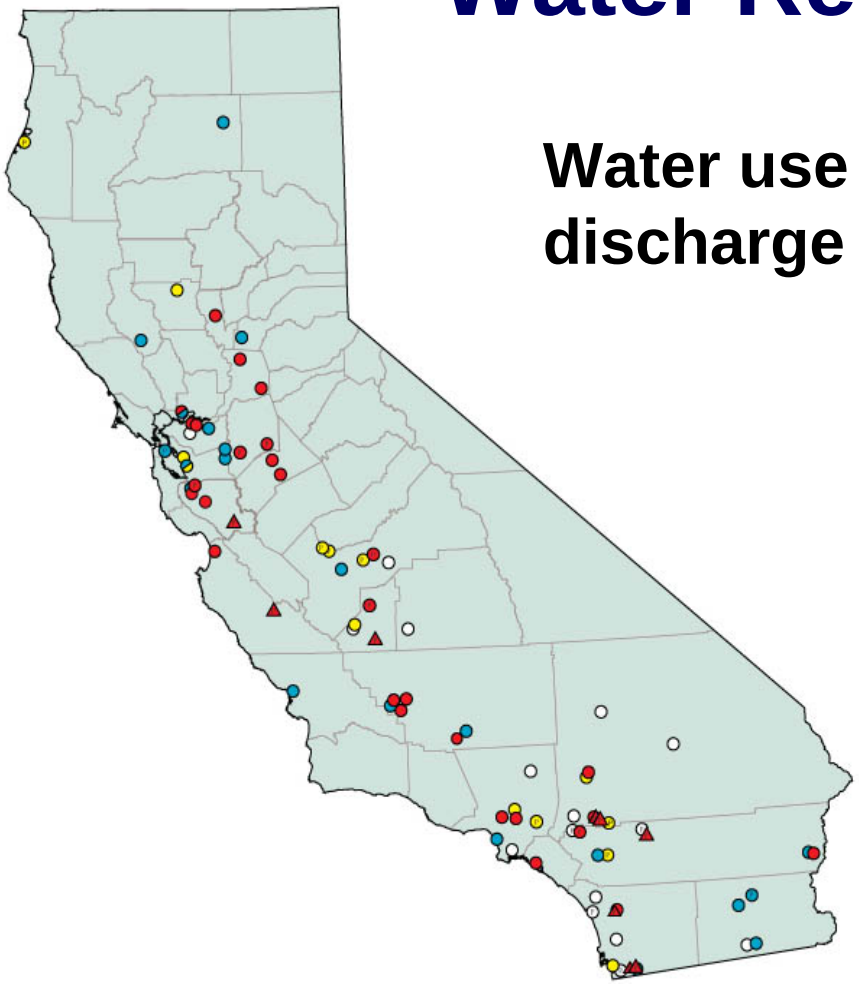
Future water management activities must carefully consider strategies to reduce greenhouse gas emissions

Energy Inputs to Water Systems



Bob Wilkinson, UCSB

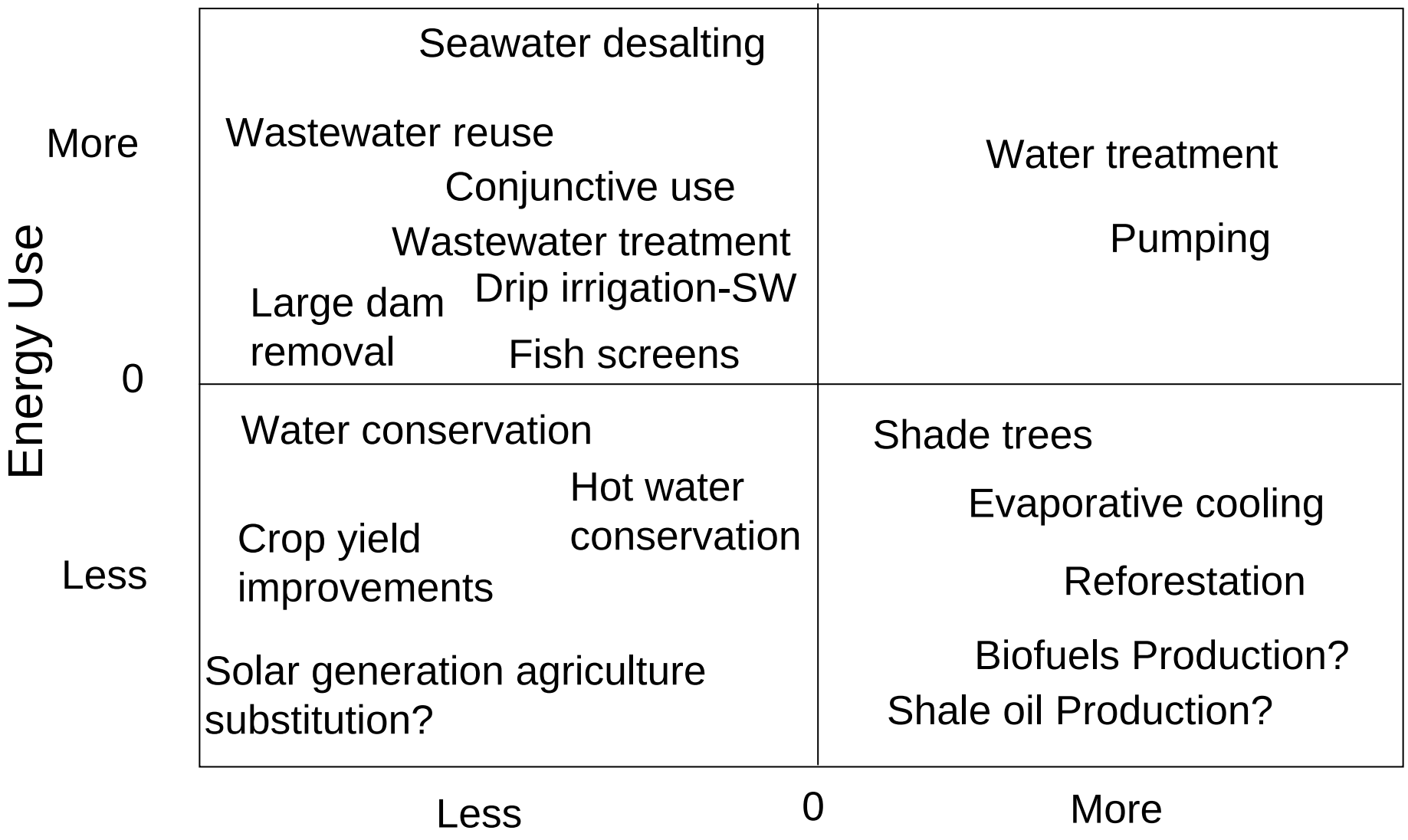
Water Related Impacts



Water use and wastewater discharge by power plants can:

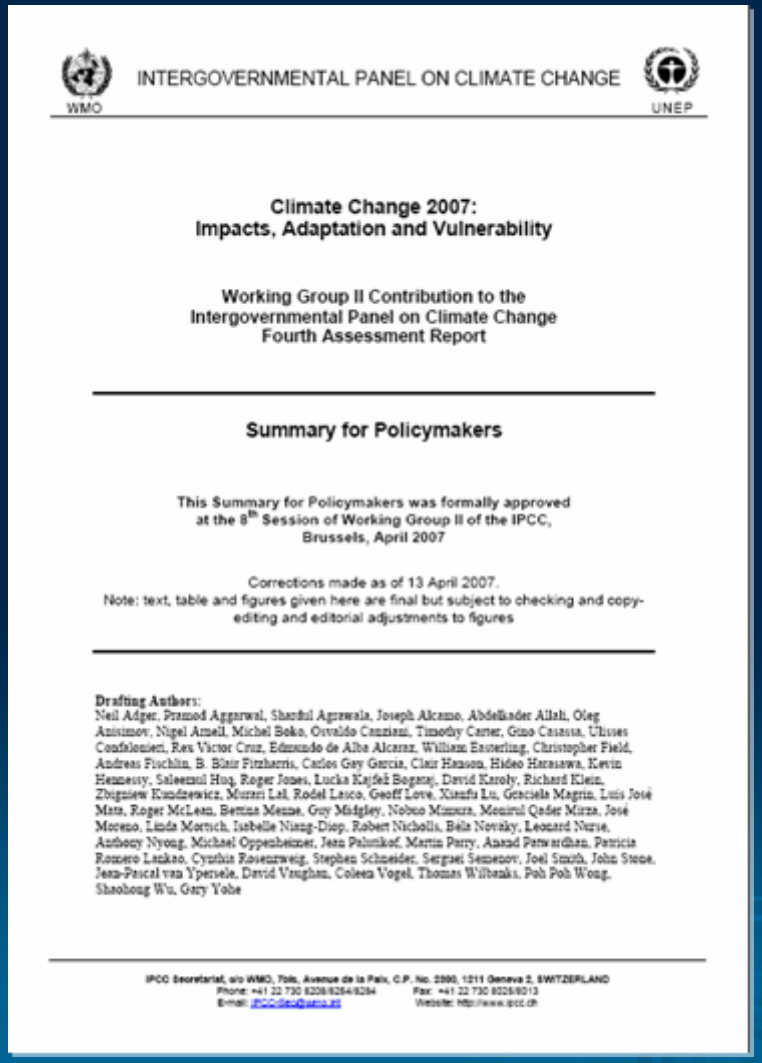
- Reduce fresh water available to current and future water users (residential, commercial and other users)
- Alter marine and aquatic ecosystems
- Degrade surface and groundwater resources

Common Energy-Water Tradeoffs



Jay Lund, UCD

New IPCC Findings



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

WMO UNEP

Climate Change 2007:
Impacts, Adaptation and Vulnerability

Working Group II Contribution to the
Intergovernmental Panel on Climate Change
Fourth Assessment Report

Summary for Policymakers

This Summary for Policymakers was formally approved
at the 8th Session of Working Group II of the IPCC,
Brussels, April 2007

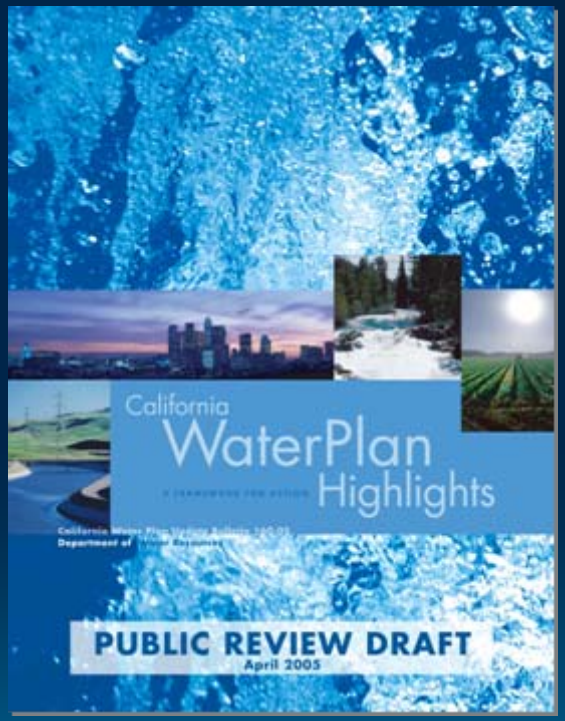
Corrections made as of 13 April 2007.
Note: text, table and figures given here are final but subject to checking and copy-editing and editorial adjustments to figures

Drafting Authors:
Neil Adger, Pramod Aggarwal, Shardul Agrawala, Joseph Alcamo, Abdelkader Allali, Oleg Anisimov, Nigel Arnell, Michel Boko, Osvaldo Canziani, Timothy Carter, Gino Casassa, Ulisses Confalonieri, Rex Victor Cruz, Edmundo de Alba Alcaraz, William Easterling, Christopher Field, Andreas Fischlin, B. Blair Fitzharris, Carlos Gay Garcia, Clair Hanson, Hideo Harasawa, Kevin Hennessy, Saleemul Huq, Roger Jones, Lucka Kajfež Bogataj, David Karoly, Richard Klein, Zbigniew Kundzewicz, Murari Lal, Rodel Lasco, Geoff Love, Xianfu Lu, Graciela Magrin, Luis José Mata, Roger McLean, Bettina Menne, Guy Midgley, Nobuo Mimura, Monirul Qader Mirza, José Moreno, Linda Mortsch, Isabelle Niang-Diop, Robert Nicholls, Béla Nováky, Leonard Nurse, Anthony Nyong, Michael Oppenheimer, Jean Palutikof, Martin Parry, Anand Patwardhan, Patricia Romero Lankao, Cynthia Rosenzweig, Stephen Schneider, Sergei Semenov, Joel Smith, John Stone, Jean-Pascal van Ypersele, David Vaughan, Coleen Vogel, Thomas Wilbanks, Poh Poh Wong, Shaohong Wu, Gary Yohe

IPCC Secretariat, c/o WMO, 7bis, Avenue de la Paix, C.P. No. 2300, 1211 Geneva 2, SWITZERLAND
Phone: +41 22 730 8208/8254/8284 Fax: +41 22 730 8025/8013
E-mail: IPCC-Sec@wmo.int Website: http://www.ipcc.ch

- Confirms impacts we are already witnessing
- Emphasizes the importance of adaptation
- Impacts dependent upon both climate change and adaptive capacity
- Recommends a portfolio approach

Framework for Action
Sustainable & Reliable Water in 2030



Climate change is the sole focus of one of the 14 major recommendations

Resource Management Strategies

Reduce Water Demand

- Agricultural Water Use Efficiency
- Urban Water Use Efficiency

Improve Operational Efficiency & Transfers

- Conveyance
- System Reoperation
- Water Transfers

Increase Water Supply

- Conjunctive Management & Groundwater Storage
- Desalination –Brackish & Seawater
- Precipitation Enhancement
- Recycled Municipal Water
- Surface Storage – CALFED
- Surface Storage - Regional/Local

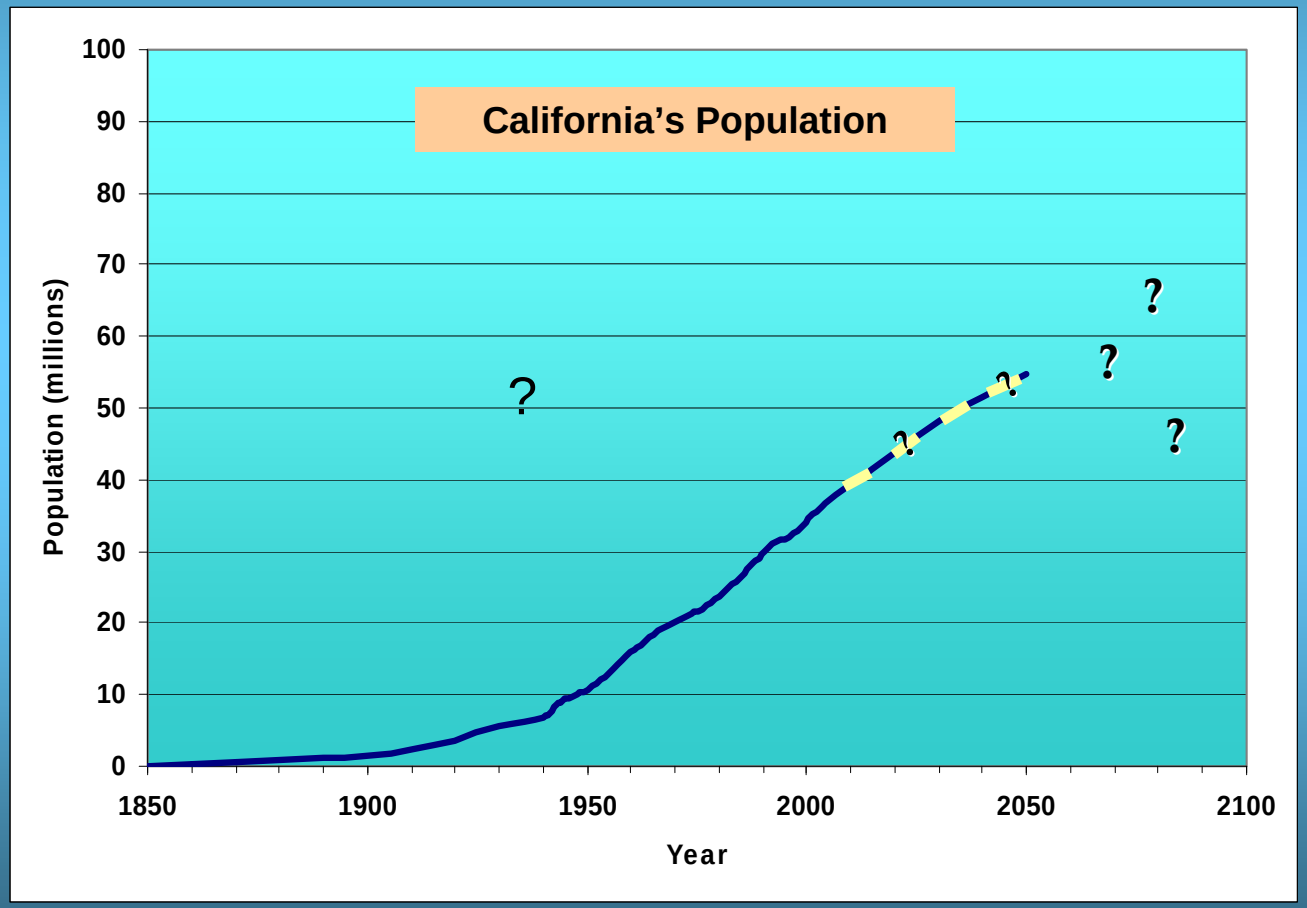
Improve Water Quality

- Drinking Water Treatment and Distribution
- Groundwater/Aquifer Remediation
- Matching Quality to Use
- Pollution Prevention
- Urban Runoff Management

Practice Resource Stewardship

- Agricultural Lands Stewardship
- Economic Incentives (Loans, Grants, and Water Pricing)
- Ecosystem Restoration
- Floodplain Management
- Recharge Areas Protection
- Urban Land Use Management
- Water-Dependent Recreation
- Watershed Management

Climate change is not the only uncertainty…



Source: California Department of Finance, 2005.

California Water Management and Climate Change

- Climate change presents significant challenges for the management of California's water resources.
- Climate change is occurring incrementally and will likely continue to do so based on historical records over the past 100 years and most projections.
- California's water management systems already provide a some degree of operational flexibility.
- We should have time to plan for future climate change and adapt to it.

John T. Andrew, P.E.
Executive Manager for Climate Change
Department of Water Resources
(916) 651-9657
jandrew@water.ca.gov