The Future of California's Water

Sustainability in an Uncertain World

Dr. Peter Gleick

Pacific Institute, Oakland, California

Water Connects to Everything

Public Health

Infrastructure

Forestry

Water

Energy

Environment

Agriculture

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Overview

- Peak Water: What does it mean?
- California's water: a quick glance
- New trends and thinking about solutions
- New challenges
- Moving forward
  - New state efforts
  - New Pacific Institute efforts

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Peak Water

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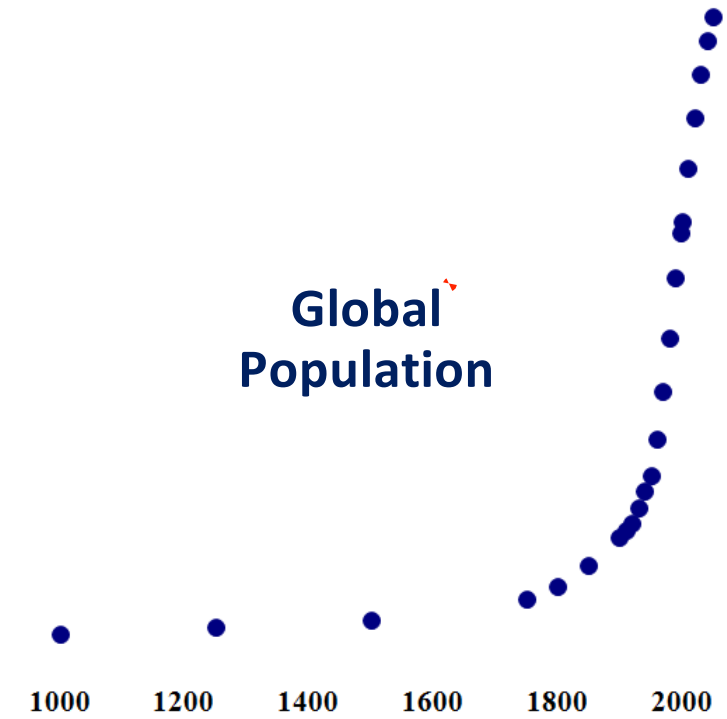
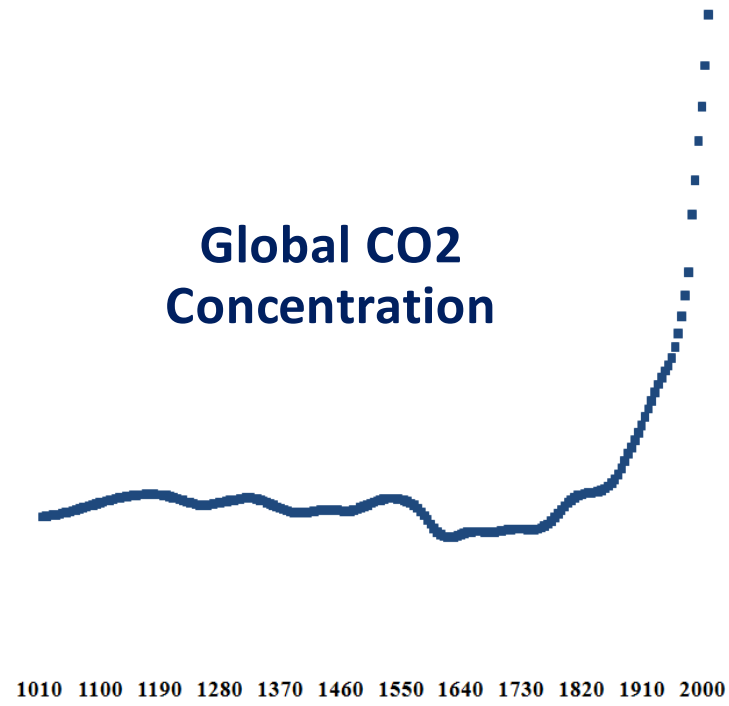
Global Population



Global CO2 Concentration



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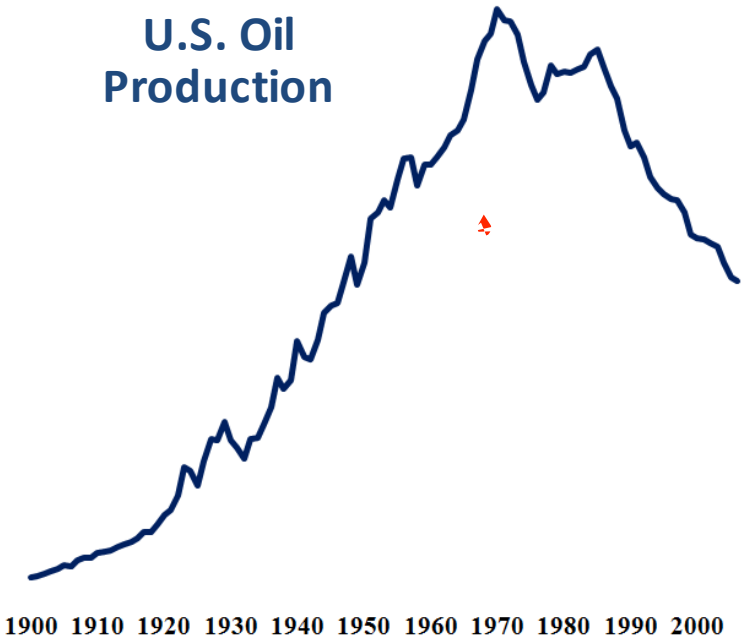
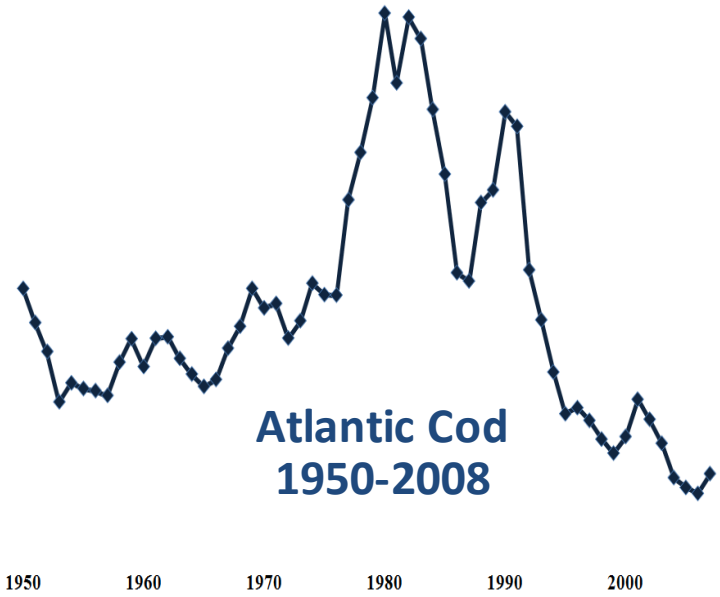
U.S. Oil Production





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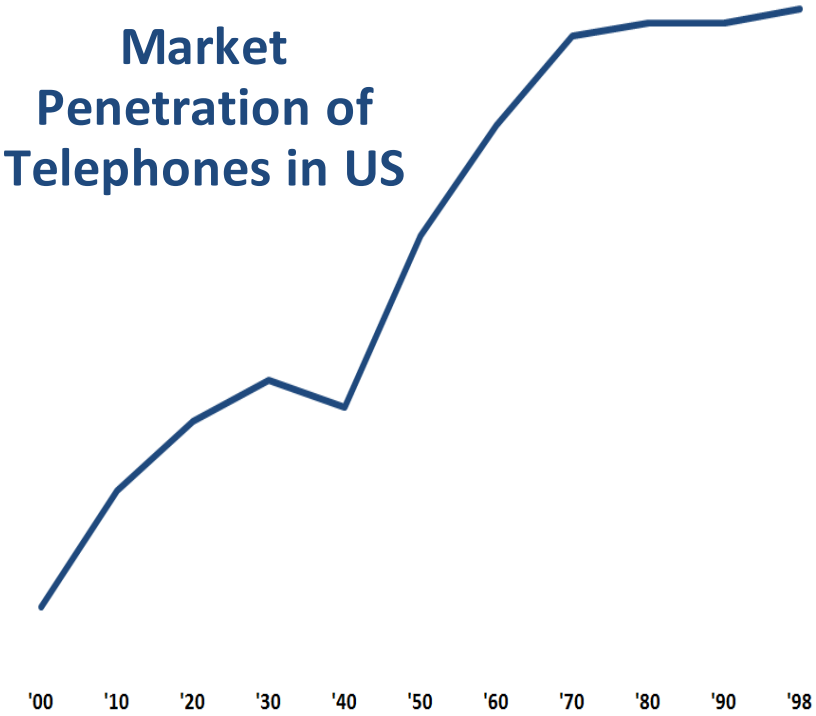
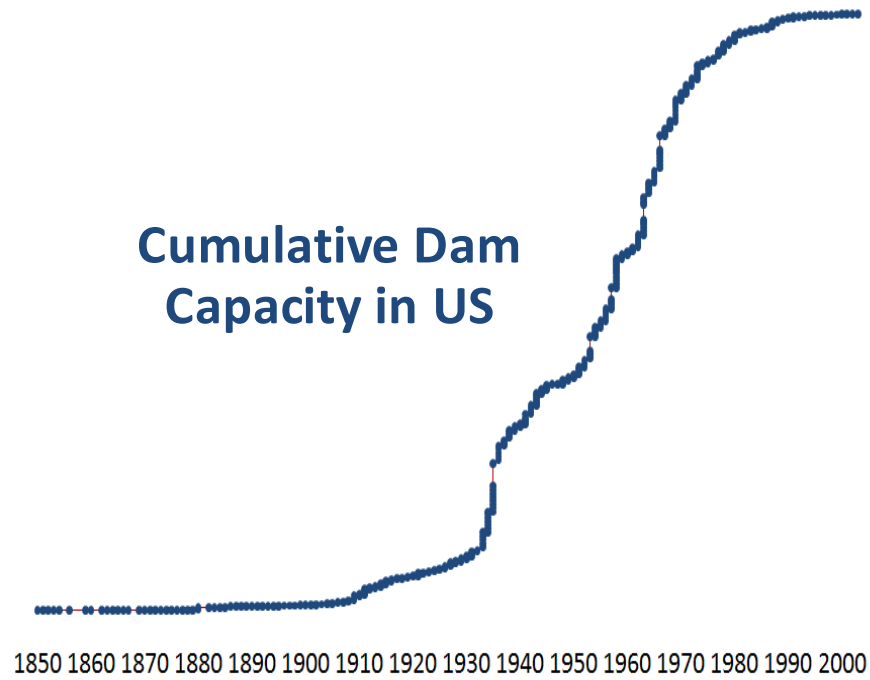
Market Penetration of Telephones in US



Ecosystem carrying capacities

Cumulative Dam Capacity in US



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Renewable or Non-Renewable?

- Non-renewable resources are "stock" limited.
- Renewable resources are "flow" limited.

- Water uniquely exhibits characteristics of both: overall renewable but with some fixed, isolated non-renewable stocks.

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Peak Renewable Water

Total Renewable Supply →

But, how much can we actually use??
How much ***should*** we actually use?

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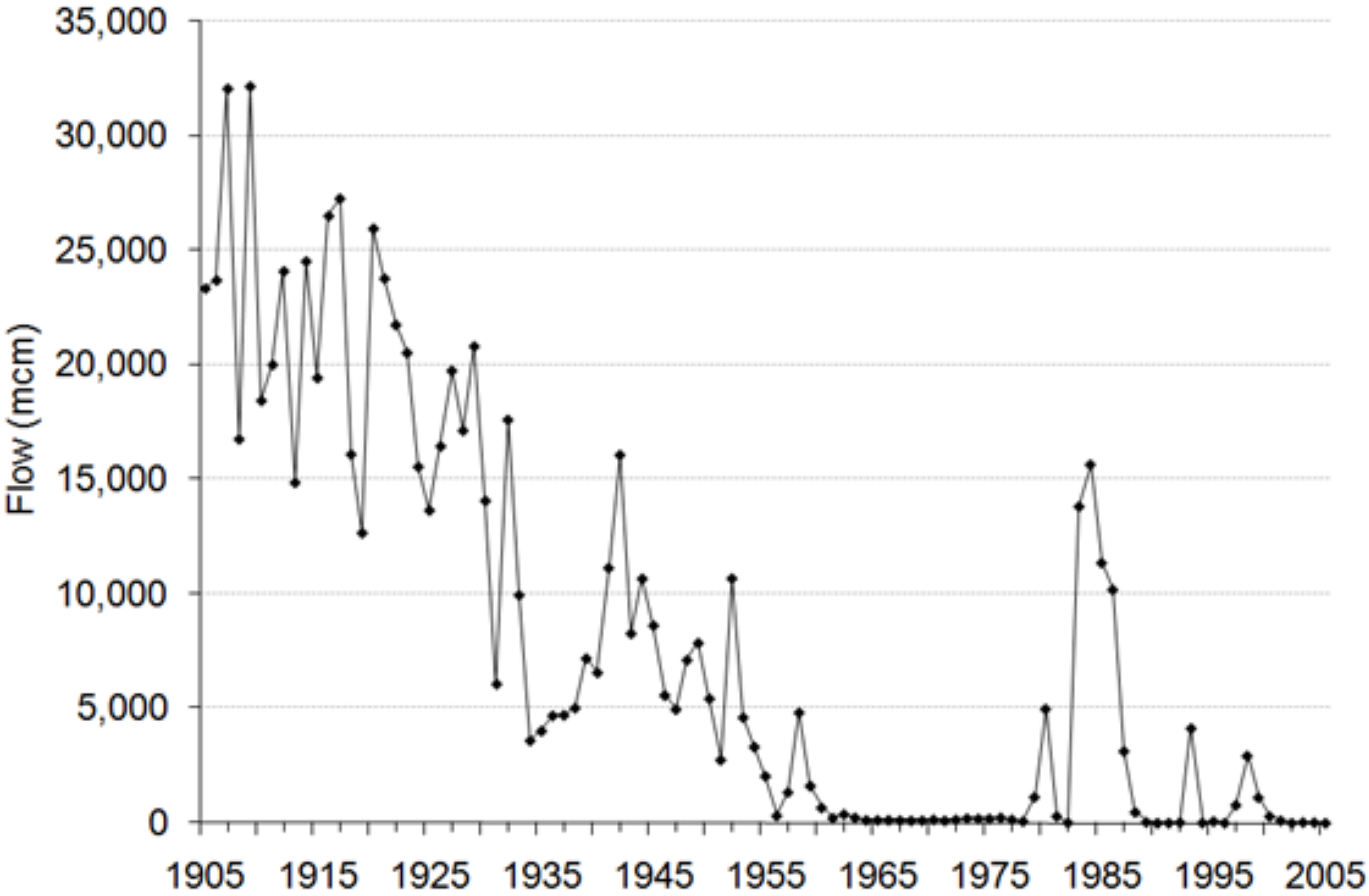
Total Colorado River Flow at the Delta



Gleick and Palaniappan 2010

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Peak “Non-Renewable” Water

Such as fossil groundwater (Central Valley, Ogallala, Libya, North China Plains, central India…)

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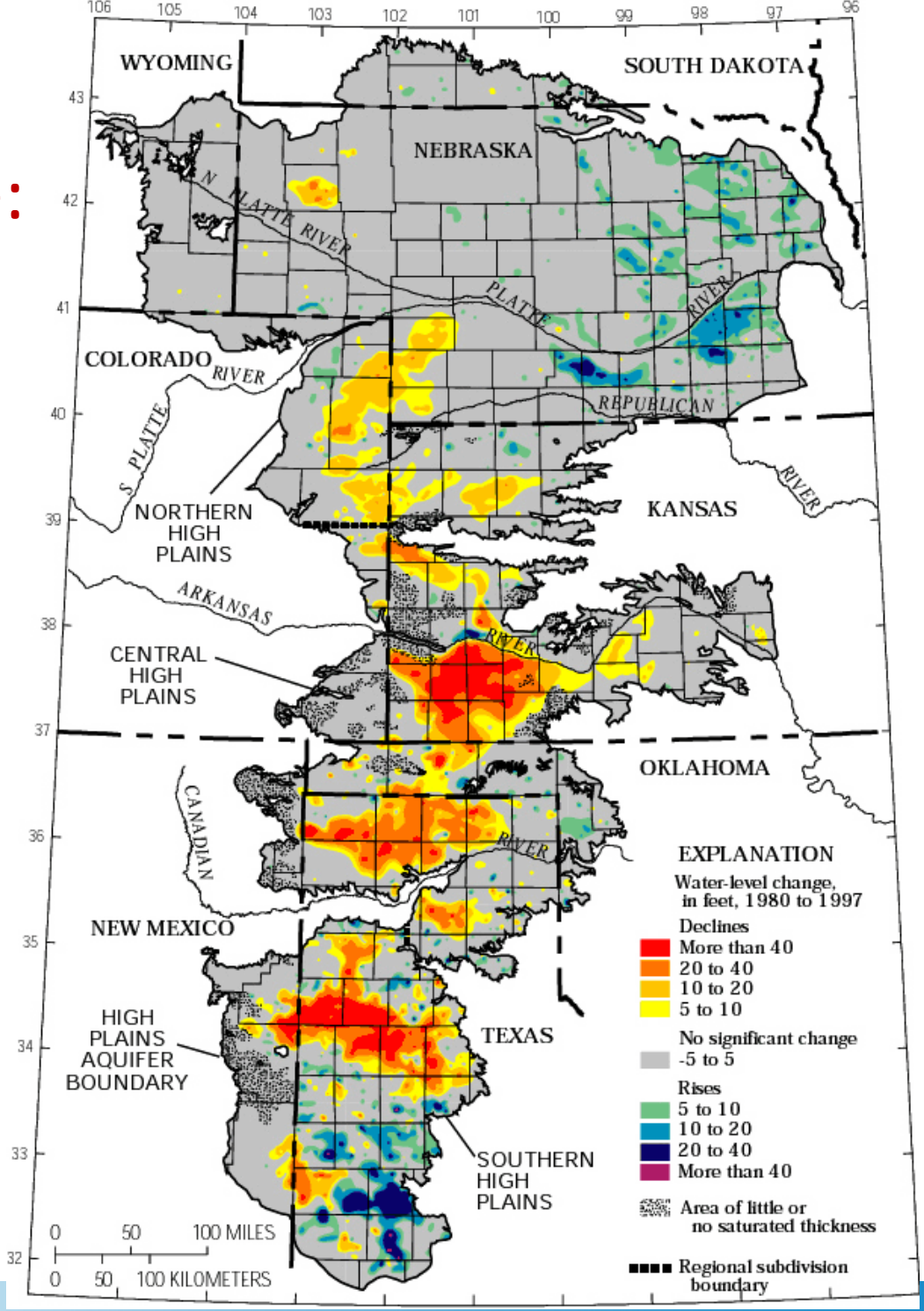
Non-Renewable Groundwater Use: Ogallala Aquifer



Source: USGS, Fischer et al. Open-File Report 99-197

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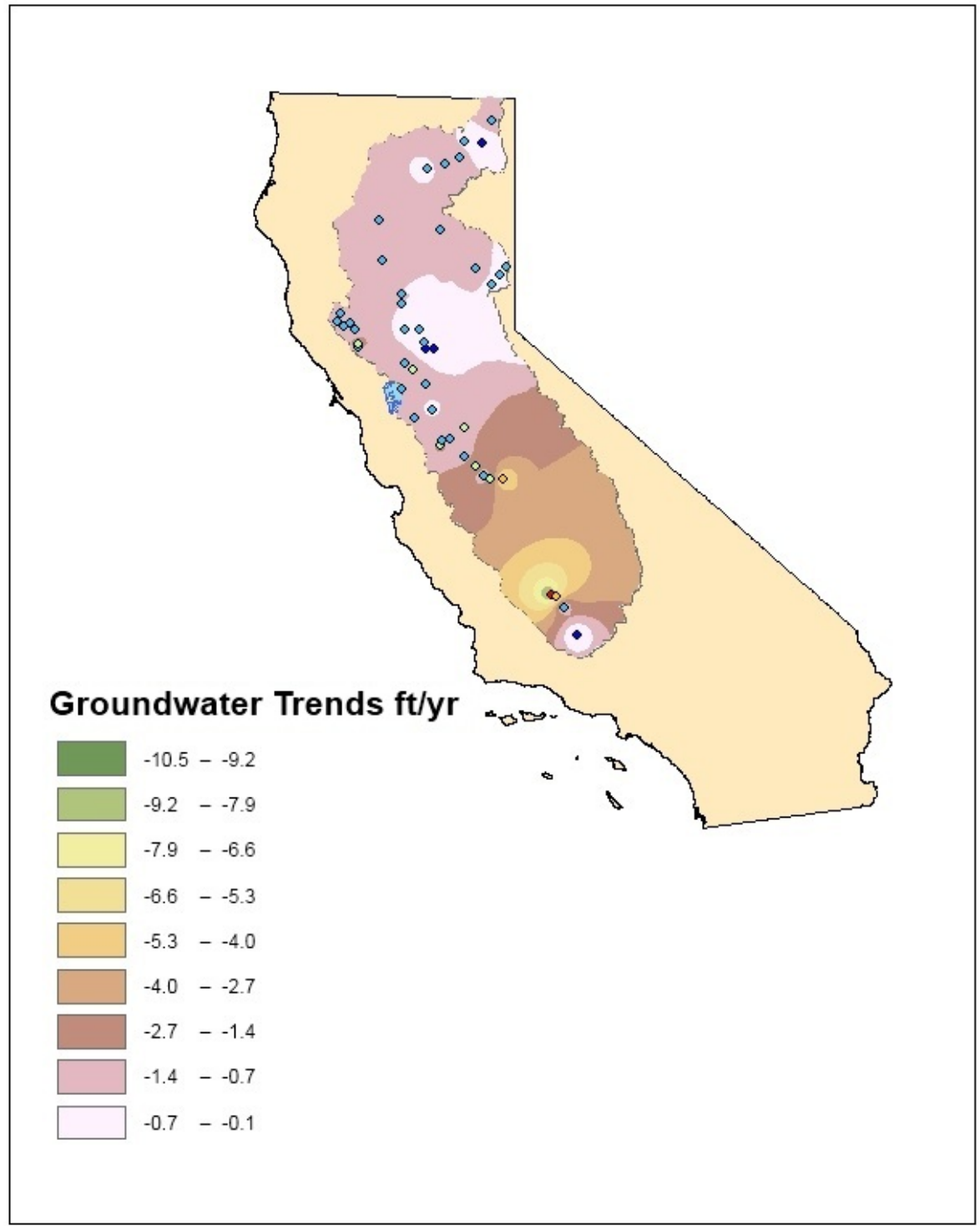
Approaching Peak Non-Renewable Groundwater

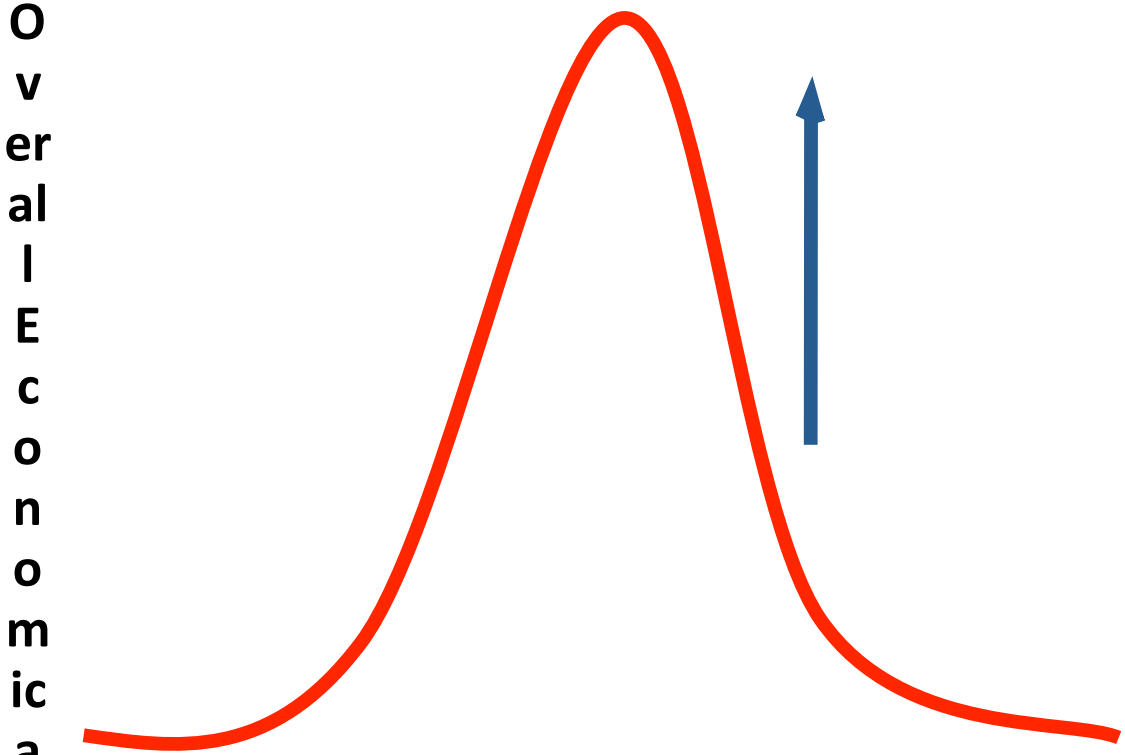
Observed groundwater trends in the Sacramento and San Joaquin River basins

Oct. 2003 to March 2009

(Image courtesy of NASA).



Peak "Ecological" Water



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So, What Does Peak Water Mean?

- We'll never "run out" of water overall. It is (mostly) renewable.
- Where water is "non-renewable" we *will* run into stock constraints.
- We will run up against "flow" limits that are a combination of natural and economic constraints.
- We are increasingly hitting (or exceeding) peak "ecological" water limits.

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California's Water

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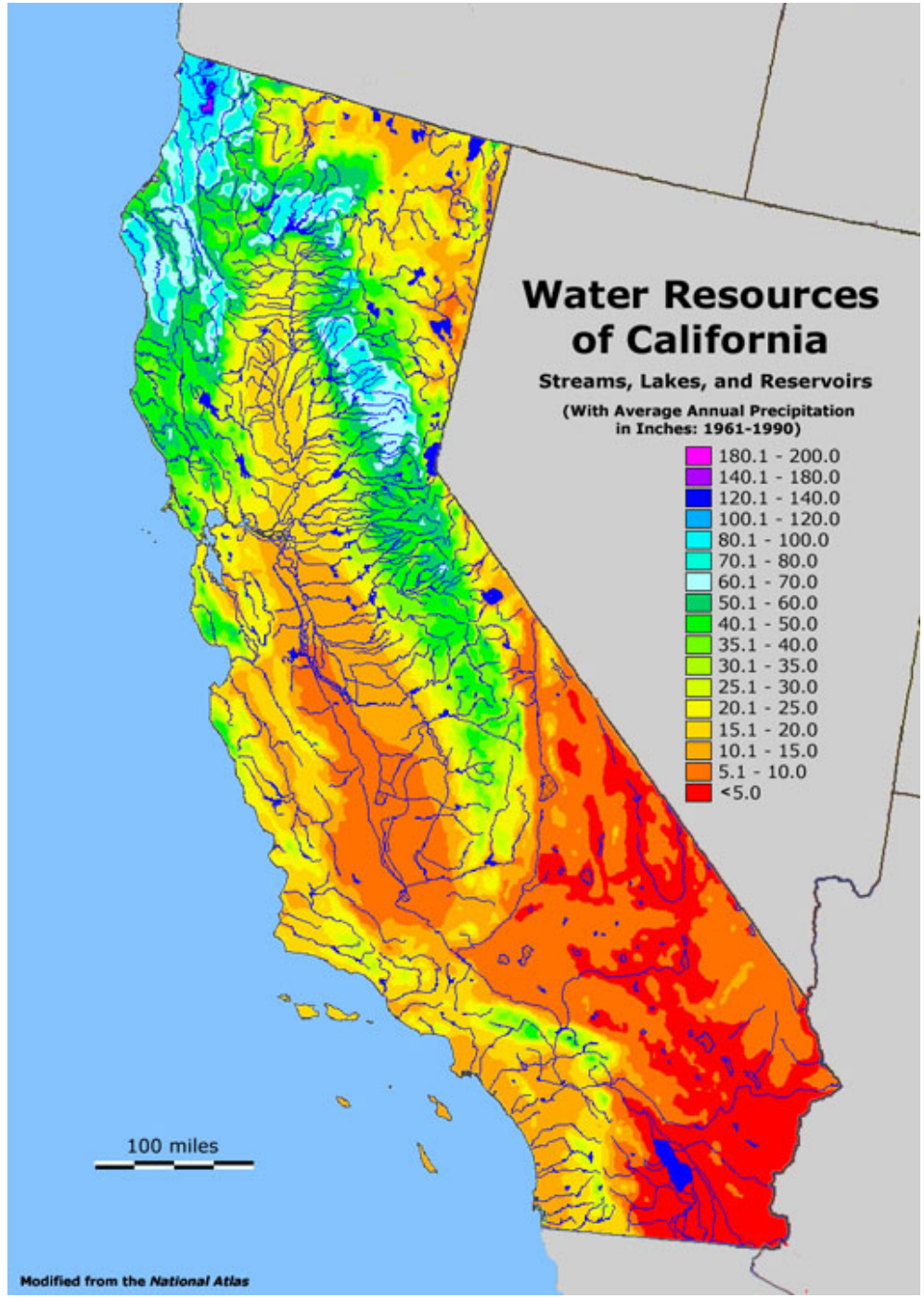

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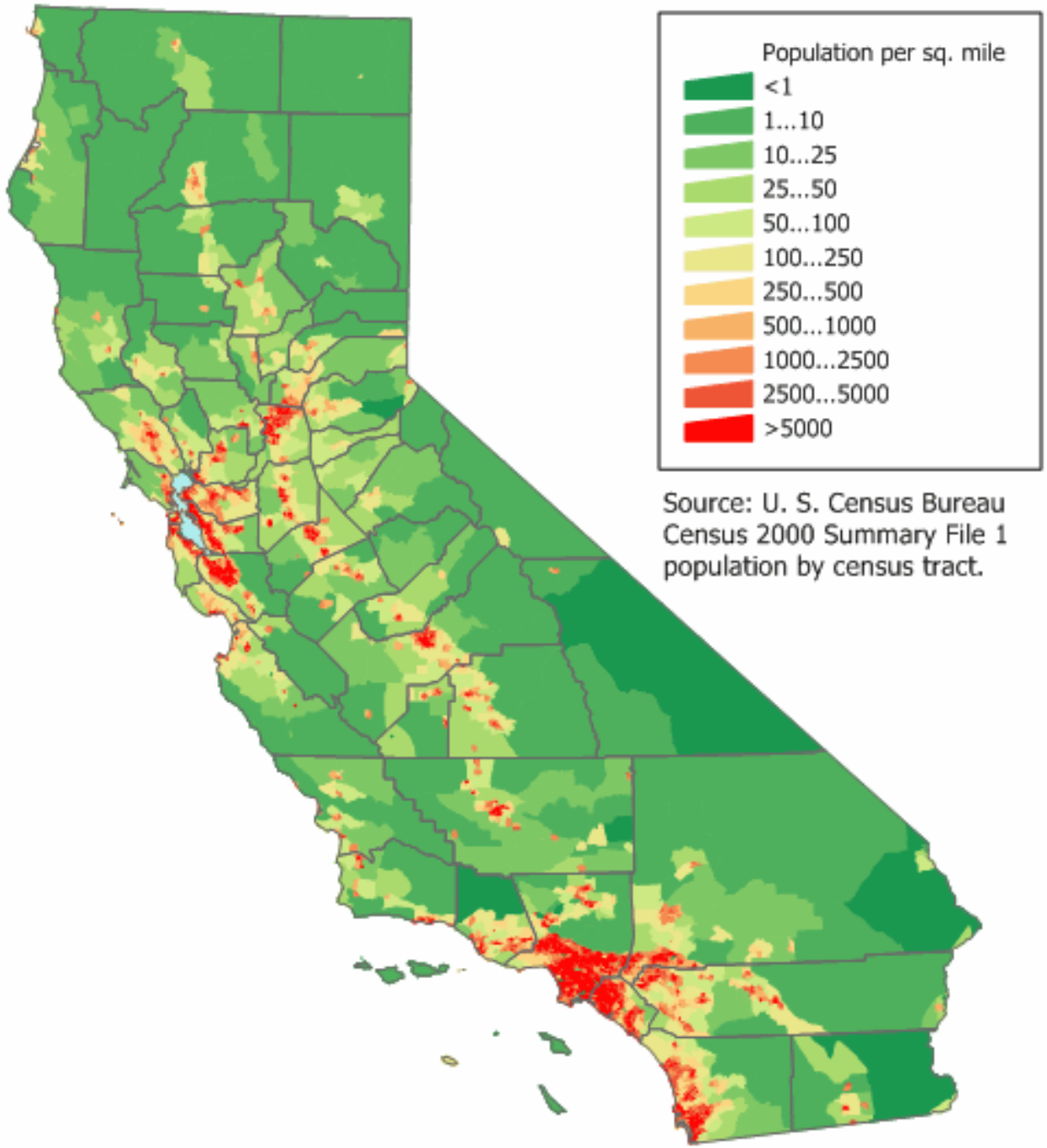

Source: U. S. Census Bureau
Census 2000 Summary File 1
population by census tract.

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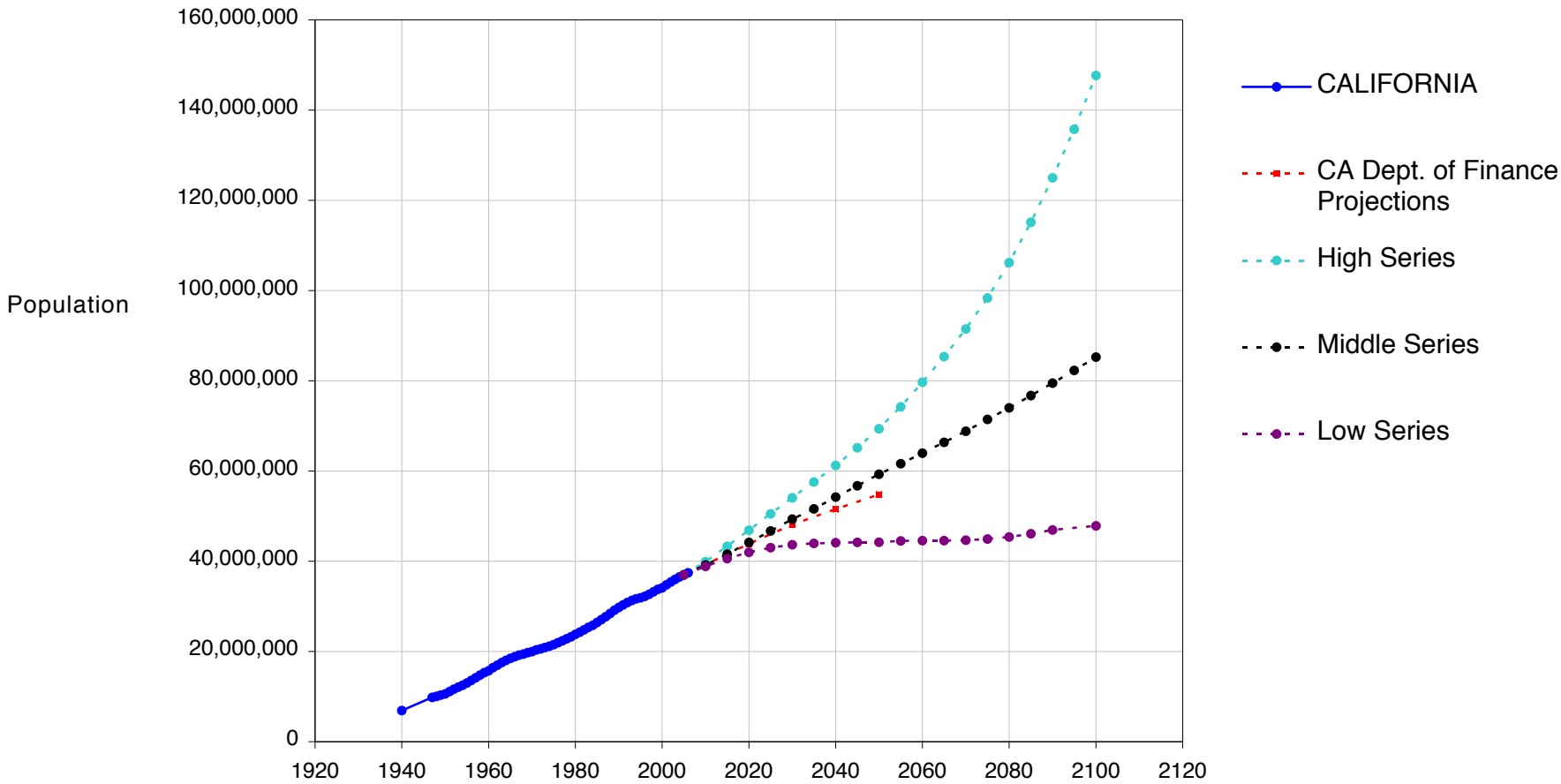
California's Population



Source: California Department of Finance, Demographic Research Unit
http://www.dof.ca.gov/Research/Research.asp

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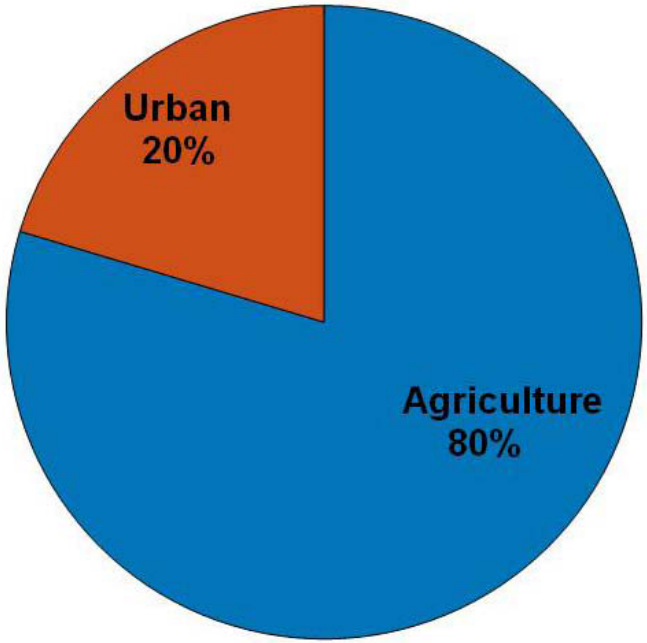
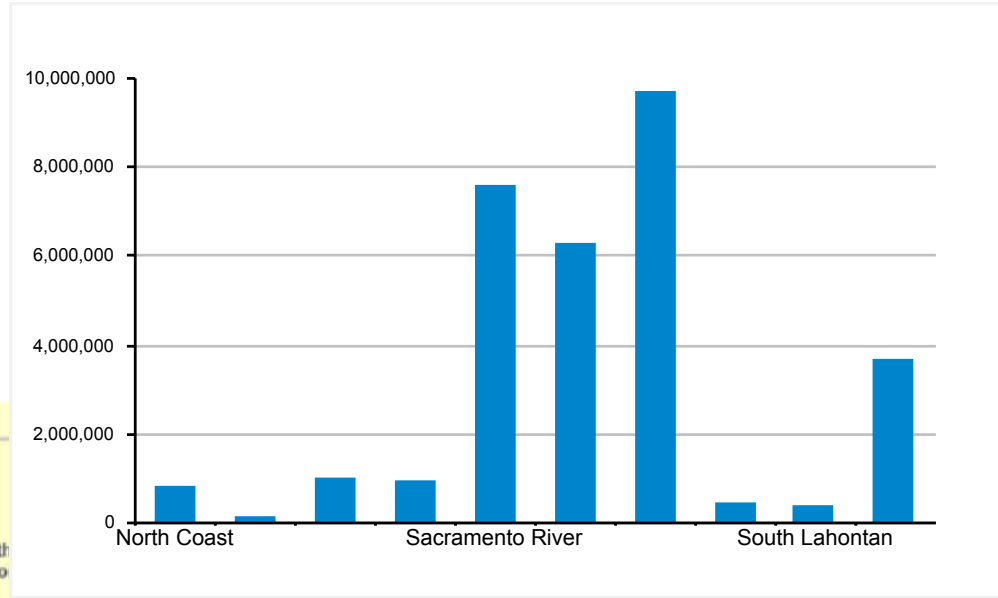
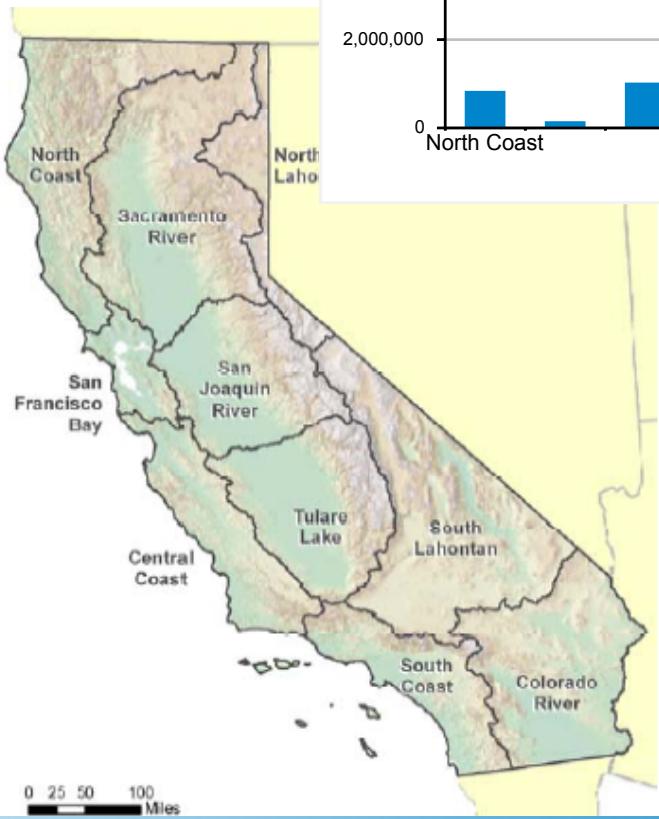
How does California use its water?



Source: DWR 2005a





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Challenges for California water

- Droughts, floods, and limited water availability (peak renewable)
- Overpumped aquifers (peak non-renewable)
- Water quality
- Collapsing Delta ecosystems and fisheries (peak ecological water)
- Growing demands
- Long-term climate change

How should we respond?

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Sacramento-San Joaquin Delta

- The Delta is the “heart” of California’s water system.
- Historically – a very rich inland aquatic ecosystem.
- It is the center of California’s water distribution system: from North/Sierra to South/Coastal.
- Ecosystems are collapsing there and new laws and court rulings say water must be returned to the environment.

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Sources: California Department of Water Resources, Delta Habitat Conservation and Conveyance Program. Graphics reporting by BETTINA BOXALL

PAUL DUGINSKI Los Angeles Times

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Some New Challenges:
Energy
Climate
Money

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