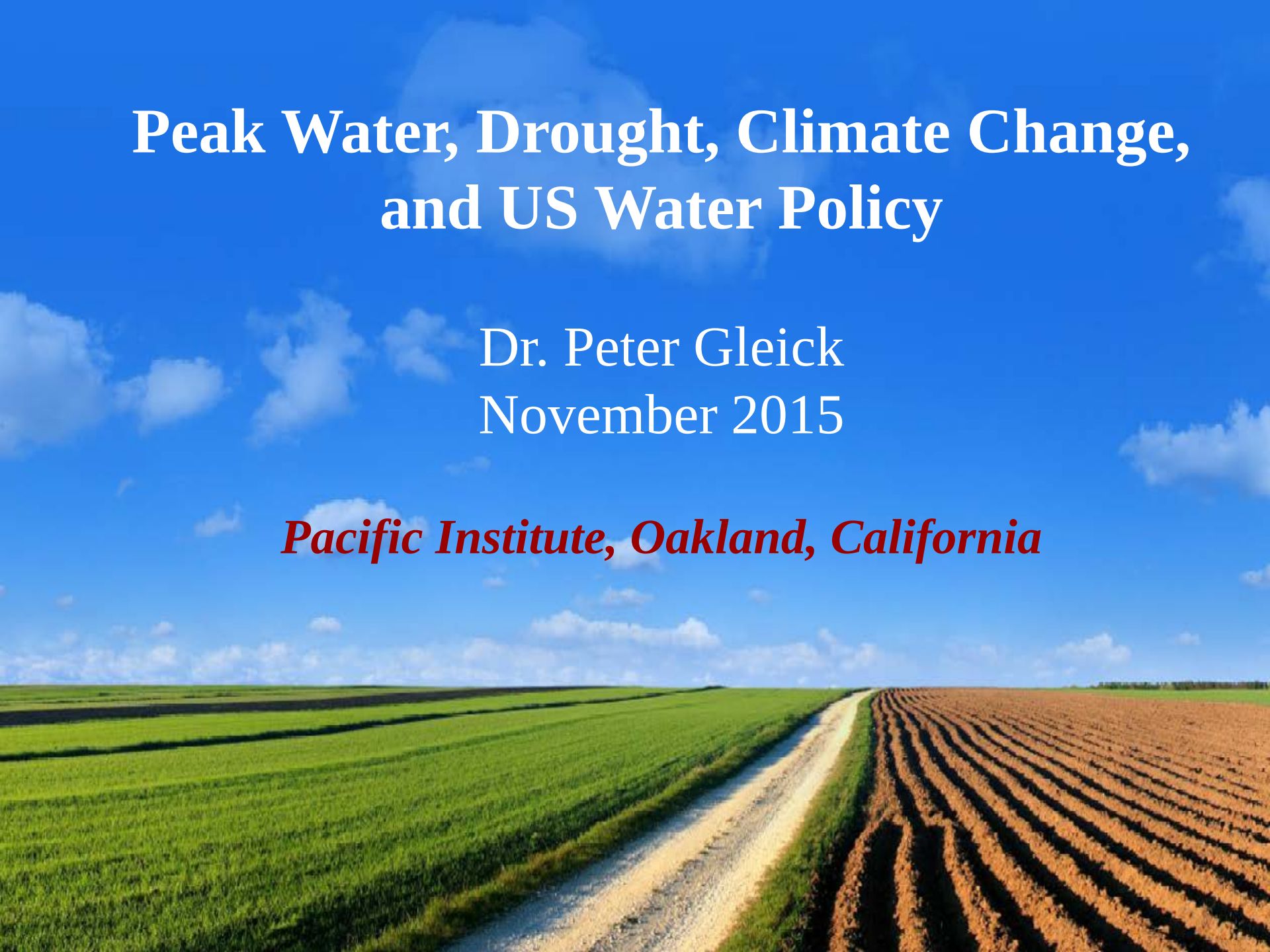
Peak Water, Drought, Climate Change, and US Water Policy

Dr. Peter Gleick

November 2015

Pacific Institute, Oakland, California



Challenges for Water Management

- Droughts, floods, and limited water availability (peak renewable)
- Overpumped aquifers (peak non-renewable)
- Water quality
- Collapsing ecosystems (peak ecological water)
- Political conflict over water
- Long-term climate change

How should we respond?

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Some Global Context

- Billions without access to basic water services.
- Deteriorating natural ecosystems.
- Deteriorating infrastructure; lack of investment.
- Little public awareness of water problems.
- Ongoing disputes and violence over water.
- Few coherent international water policies.
- Few coherent national water policies.

Overview

- Trends in U.S. Water Use: Peak Water?
- Western/California Drought
- Climate Change and Water
- US Water Policy Strategies

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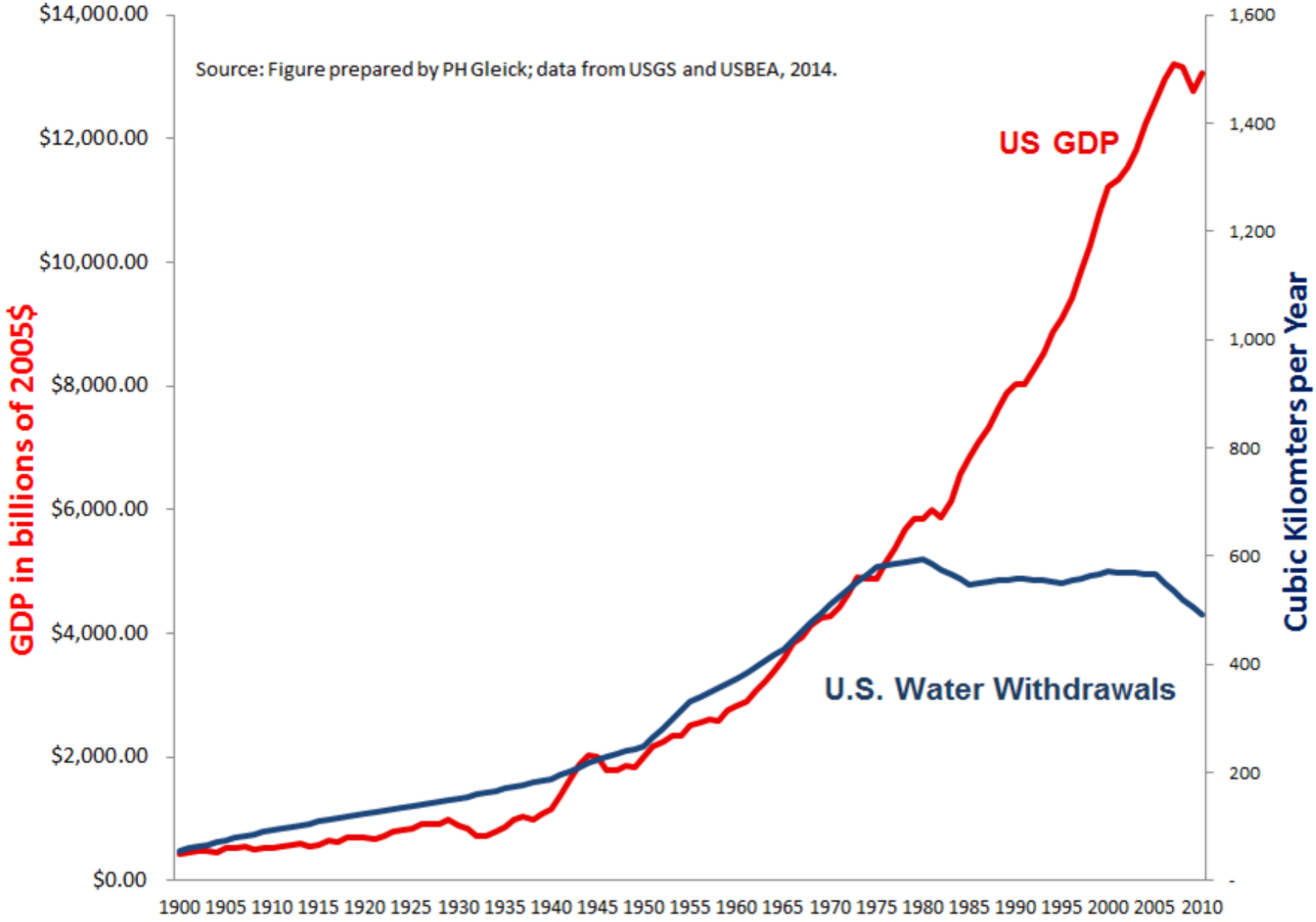

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Water Use Trends in the United States

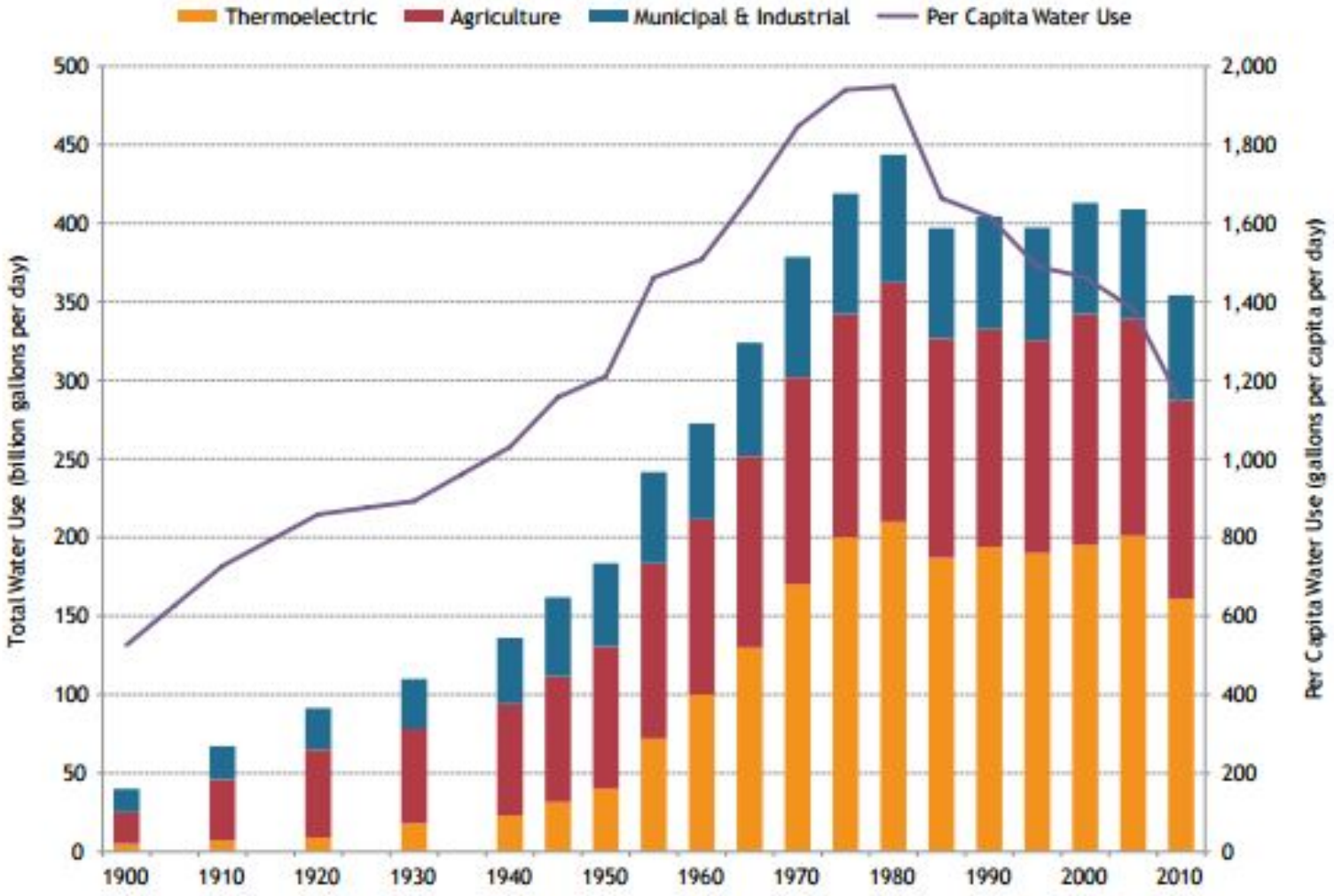

Figure 1. Total Water Use (Freshwater and Saline Water), by Sector (1900-2010)

Source: Donnelly and Cooley, 2015 Water Use Trends in the United States, Pacific Institute.

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The Western Drought

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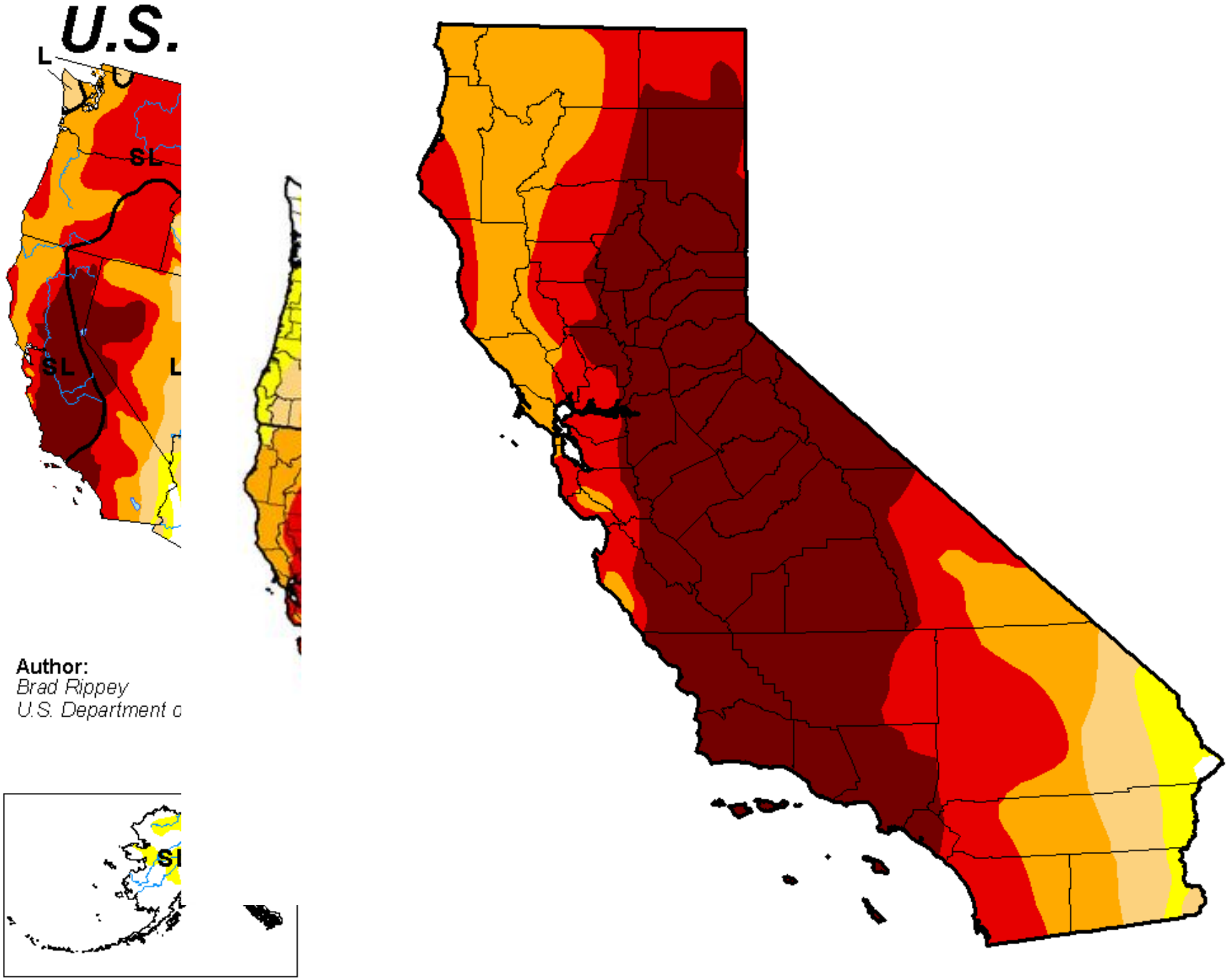
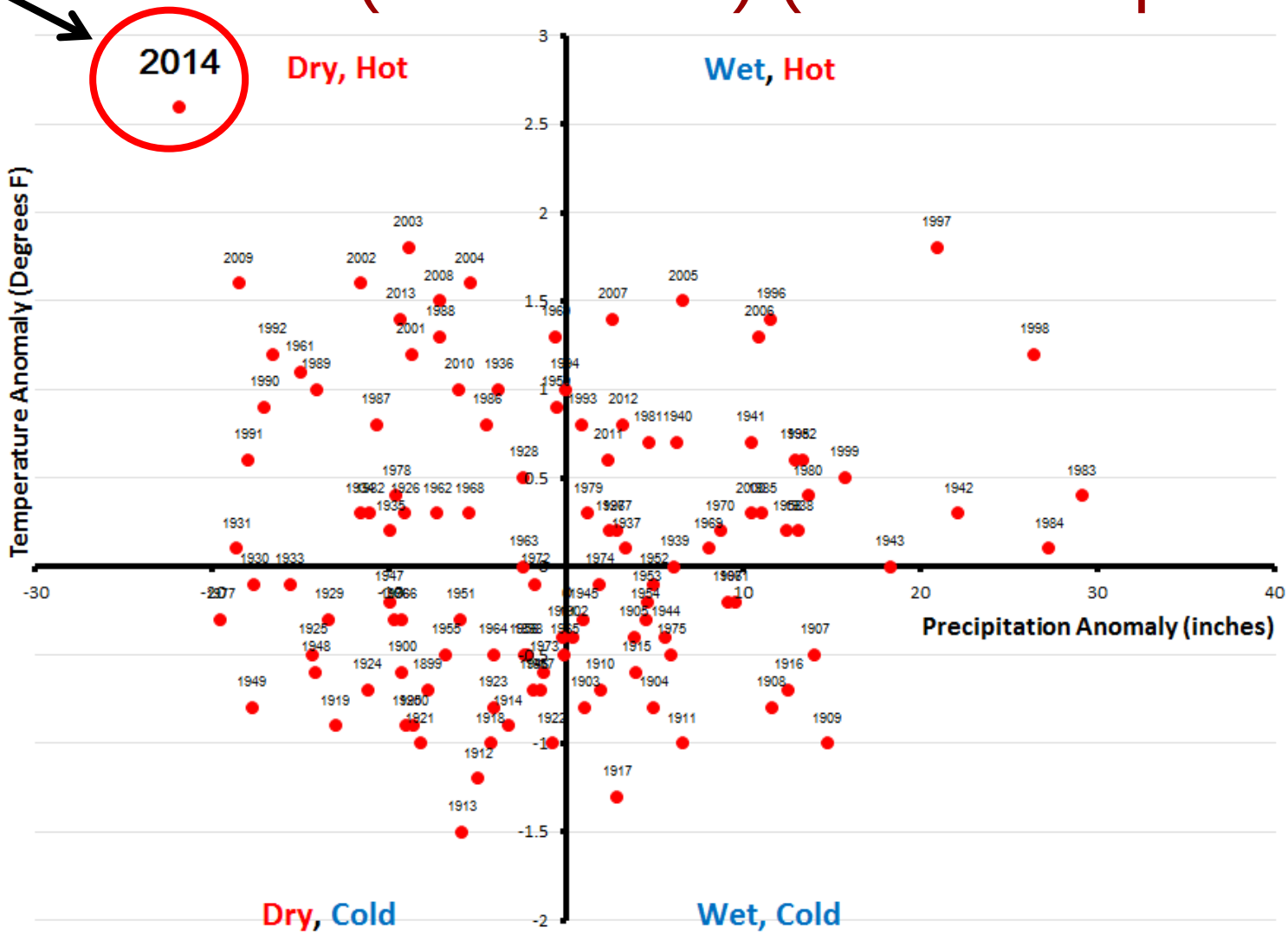


Author:
Brad Rippey
U.S. Department o

California Temperature and Precipitation Anomalies (1895-2014) (36-month periods)



Source: Mann and Gleick, 2015, PNAS. NOAA/NCDC ClimDiv data, 12-12-14

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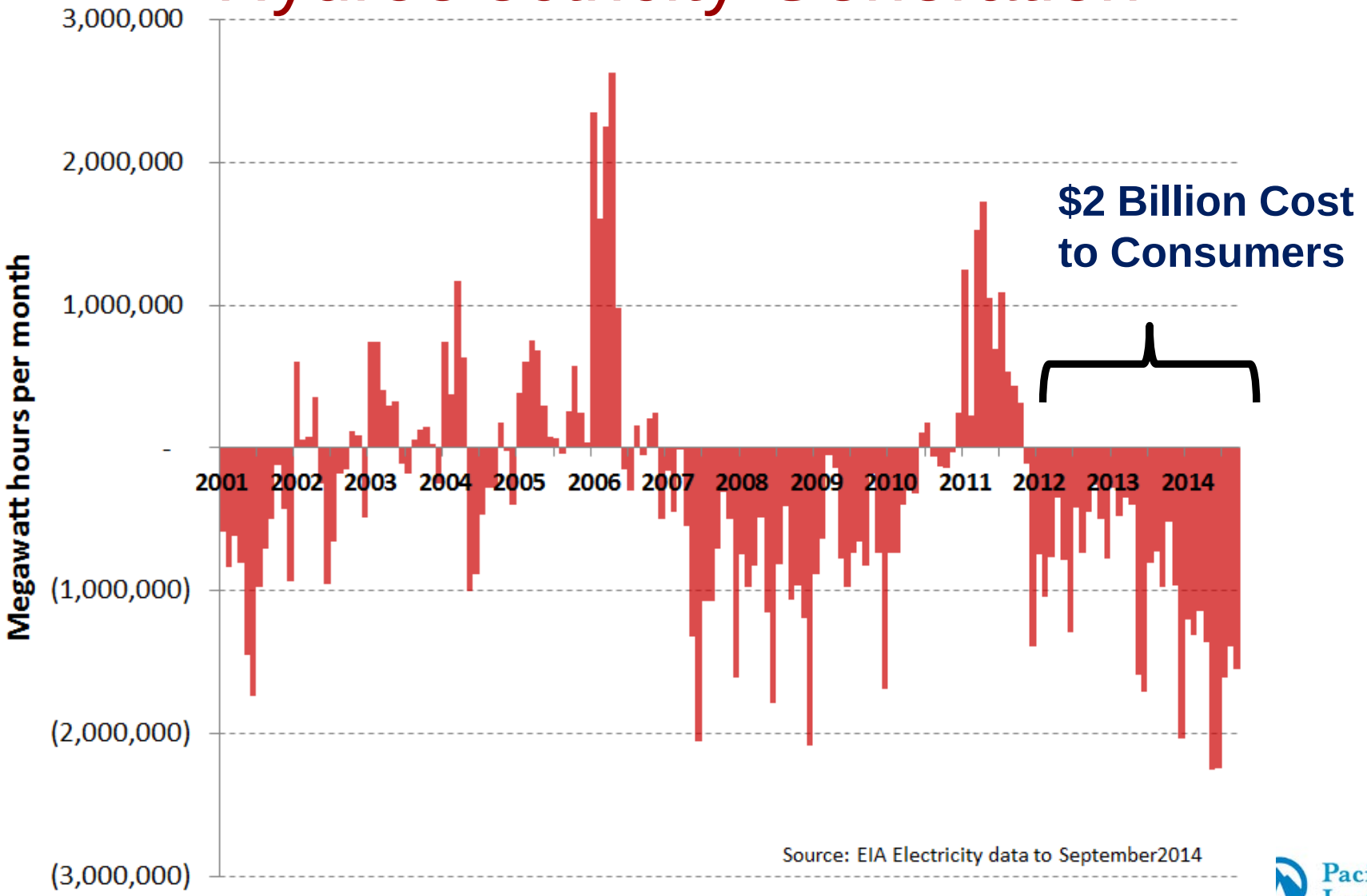
California Drought Has Cut Hydroelectricity Generation



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Climate and Water

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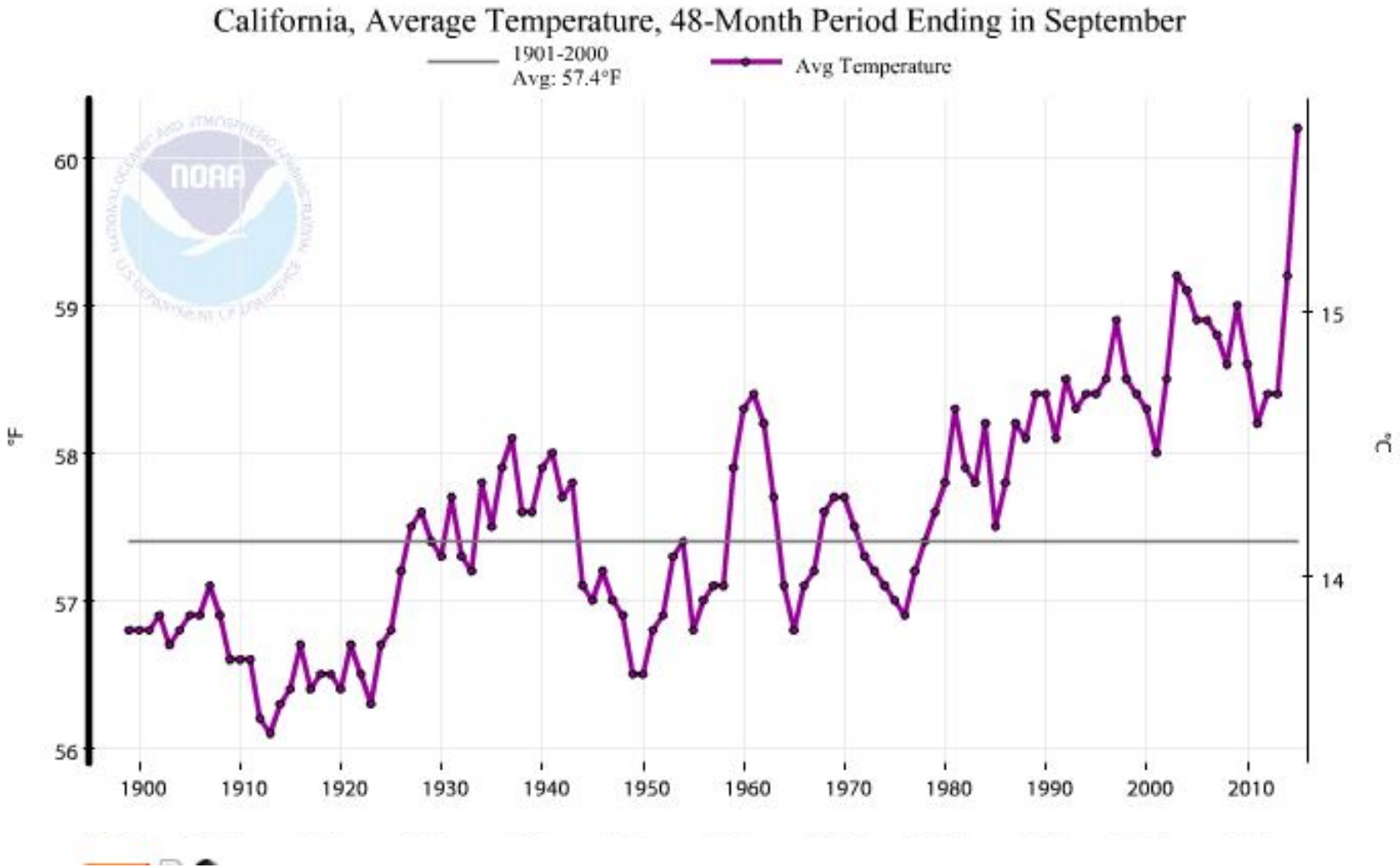

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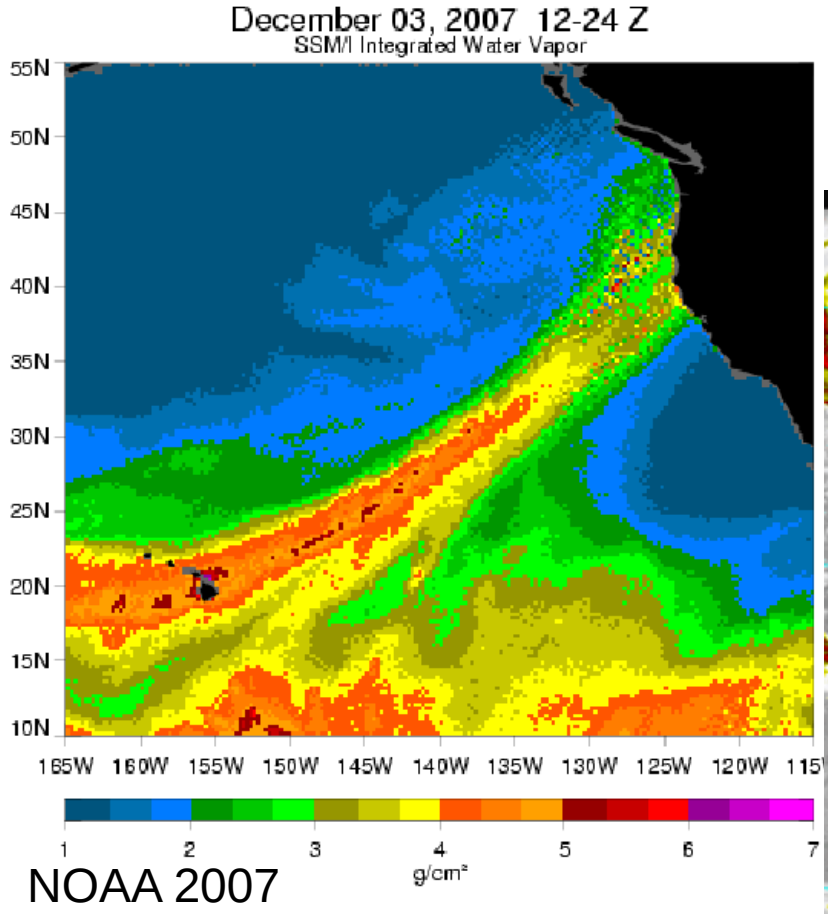
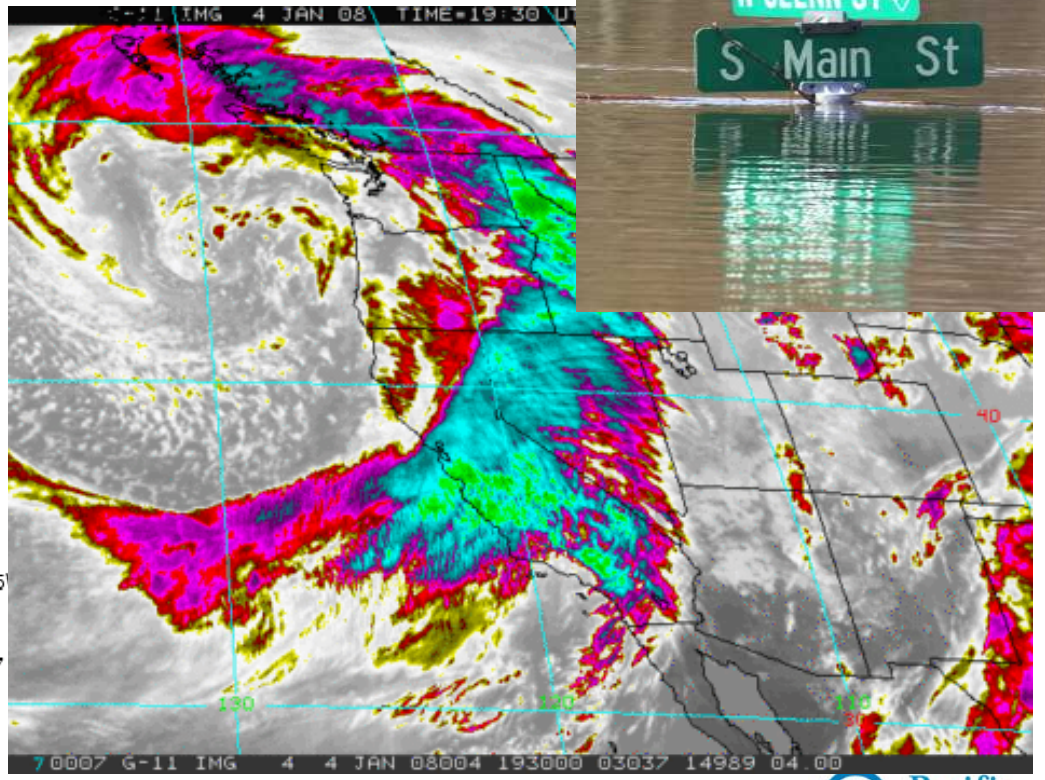
Improving Understanding of Extreme Events



NOAA 2007



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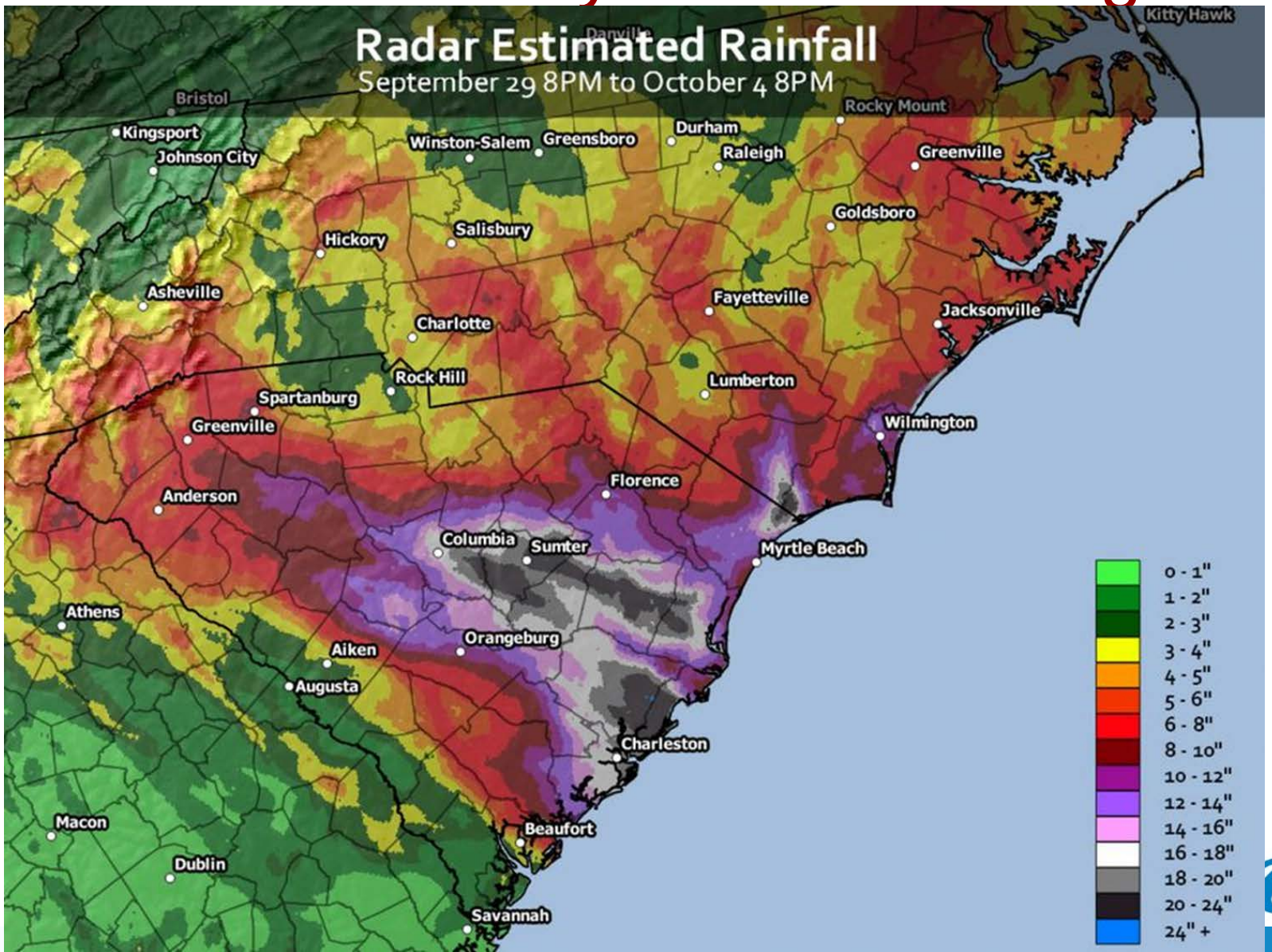
Extreme Events are Increasingly Influenced by Climate Change



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Munich Re:
(one of the world's leading reinsurers)

- "The only plausible explanation for the rise in weather-related catastrophes is climate change."

http://www.munichre.com/en/media_relations/press_releases/2010/2010_09_27_press_release.aspx.

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We've Built Vast Water Systems, Now Vulnerable to Changing Climate

Source: Peter Gleick

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Traditional solutions are tapped out, or no longer appropriate (or are the problem!)

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Water Strategies in a Changing World

- Traditional approaches: physical transfers of water; surface storage; supply focus.

But we are entering a world of "Peak Water"

- New risks require new strategies:
  - Rethinking water "supply" and "demand"
  - Integrate food-water-energy-climate issues
  - Transfers of goods and services (and water)
  - Smart(er) economic and legal strategies
  - Changes in water management/institutions/laws

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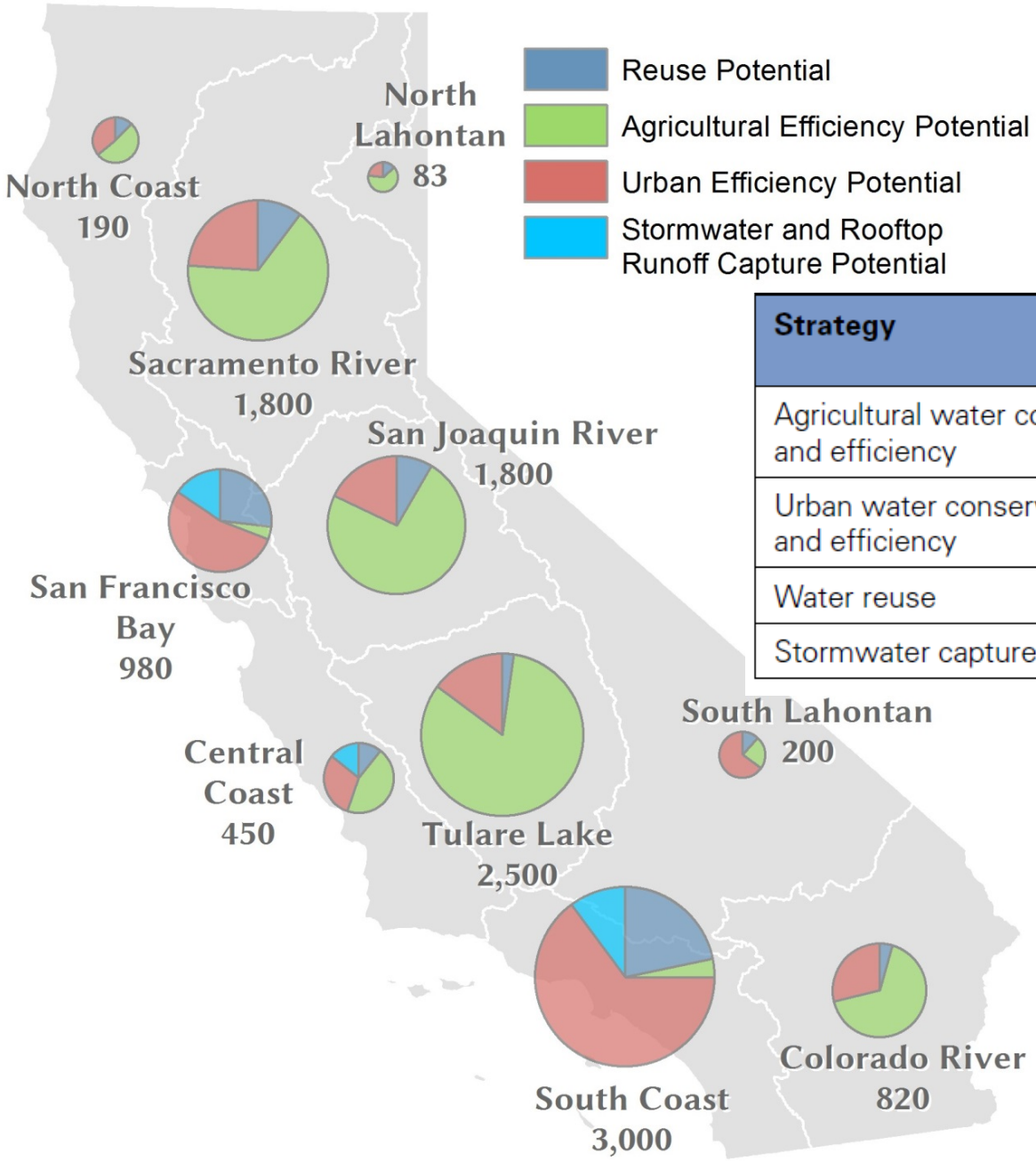

Strategy	Water Savings (million acre-feet per year)
Agricultural water conservation and efficiency	5.6 – 6.6
Urban water conservation and efficiency	2.9 – 5.2
Water reuse	1.2 – 1.8
Stormwater capture	0.4 – 0.6

Source: Cooley et al. 2015. "Untapped Potential." Pacific Institute, Oakland, California

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New Thinking about Solutions

- Rethink "supply" and infrastructure
  - Conjunctive use, treated wastewater, innovative transfers, desalination, rainwater harvesting
- Rethink "demand" and use
  - Improve water use productivity, reduce waste, rethink economic priorities and choices
- Rethink "management" and institutions
  - New institutions, improve existing institutions, federal law, better water monitoring, interdisciplinary efforts (energy, climate, food…)

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SECTIONS SEARCH

Los Angeles Times

SUE

WEDNESDAY NOV. 4, 2015 MOST POPULAR LOCAL ENTERTAINMENT SPORTS POLITICS EDUCATION OPINION PLACE AN AD

LOC

Planned purification plant would eliminate need for imported water, officials say

An artist's rendering, released by the Water Replenishment District of Southern California, of the planned $95-million water recycling plant in Pico Rivera. (Water Replenishment District of Southern California)

By Monte Morin · Contact Reporter

In Case You Missed It

Airbnb wins the vot
Francisco, but city's
debate rages on

7:40 AM

Quentin Tarantino
police boycott calls:
complete conversati

3:00 AM

LAX's air traffic co
exhausted; overtim
2,000% in last deca

3:00 AM

See More

Note: This project is **one-tenth** the cost of desalination at Carlsbad.

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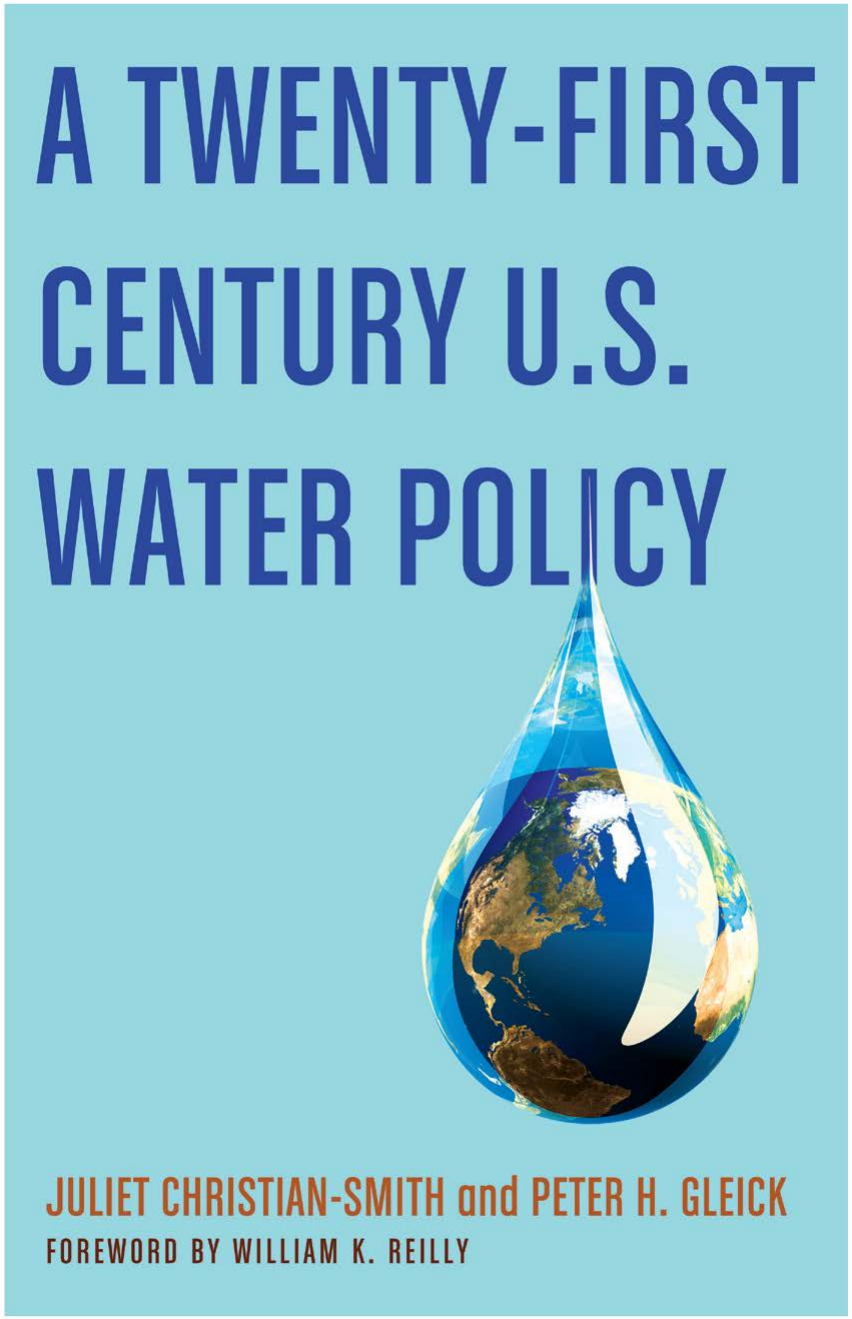

Oxford University Press, New York 2012

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