Indicators of Sustainability: A Report on the Sustainable Water Resources Roundtable

California Water Plan

Sacramento
October 22, 2007

Points to Cover

1. SWRR
2. The Sustainability Concept
3. Applications to California Water Planning

Sustainable Water Resources Roundtable

http://acwi.gov/swrr/

PURPOSE:

Serve as a forum to share information and perspectives that will promote better decision making in the U.S. regarding the sustainable development of our nation's water resources.

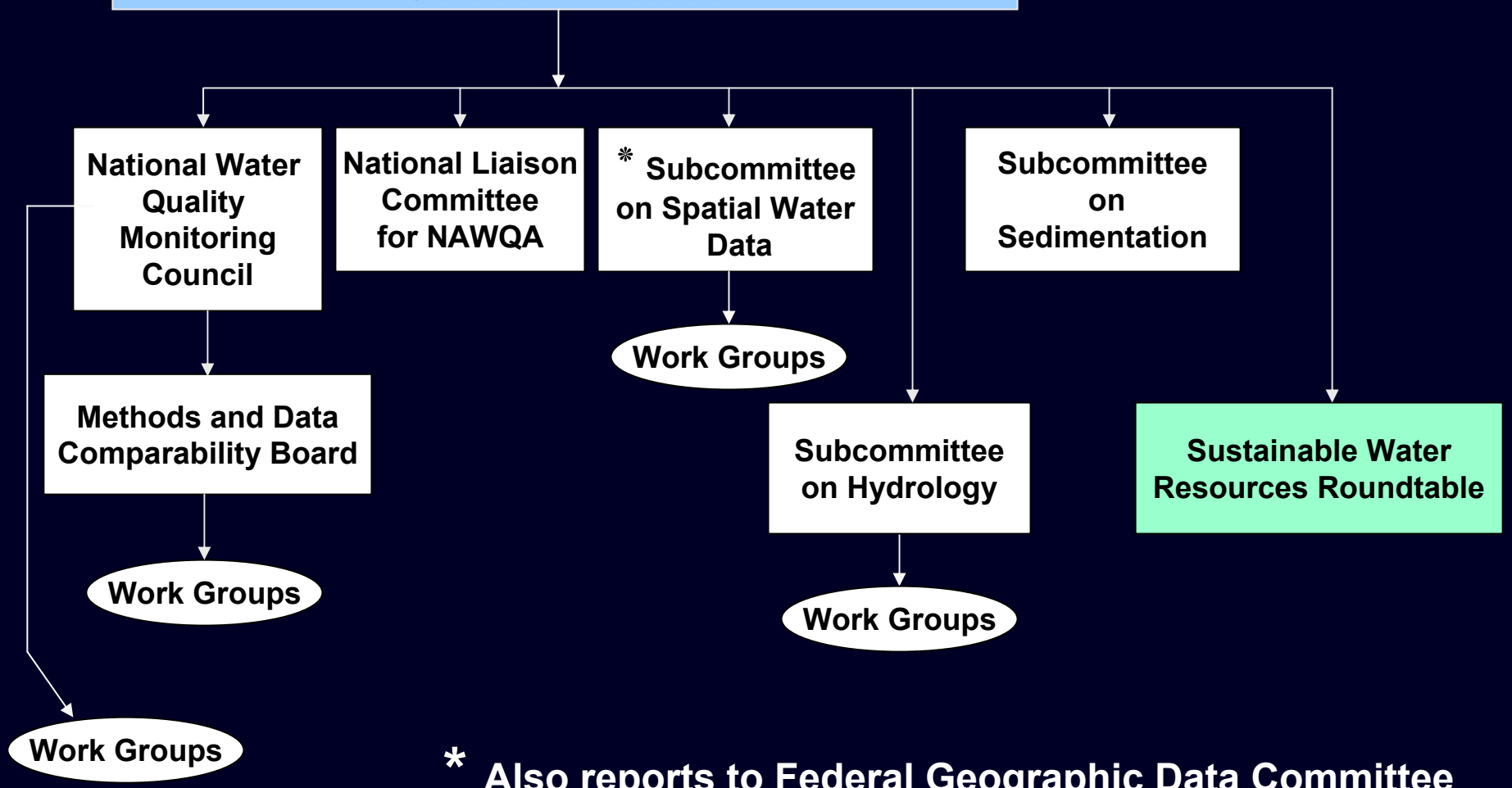
SWRR is a subgroup of the Advisory Committee on Water Information

- Interior Department
- EPA
- NOAA
- USDA
- White House CEQ
- State of Minnesota
- Electric Power Research Institute
- University Council On Water Resources
- WEF
- AWRA
- Ecological Society of America

WICP Water Information Coordination Program

ACWI Advisory Committee on Water Information

Advisory Committee on Water Information Subcommittees



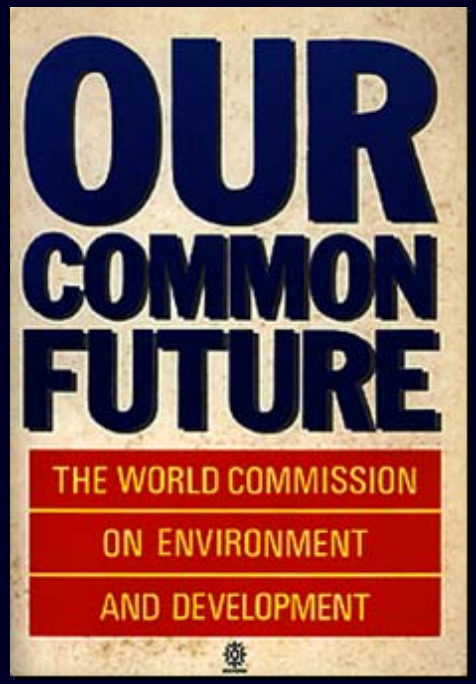
* Also reports to Federal Geographic Data Committee

SWRR Activities

- Development of principles, criteria and indicators to support decision-making
- Identification of opportunities for collaboration on research needs
- Expand SWRR participation to states, non-profits, academia and corporations

Our Common Future

"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."



The World Commission on Environment and Development

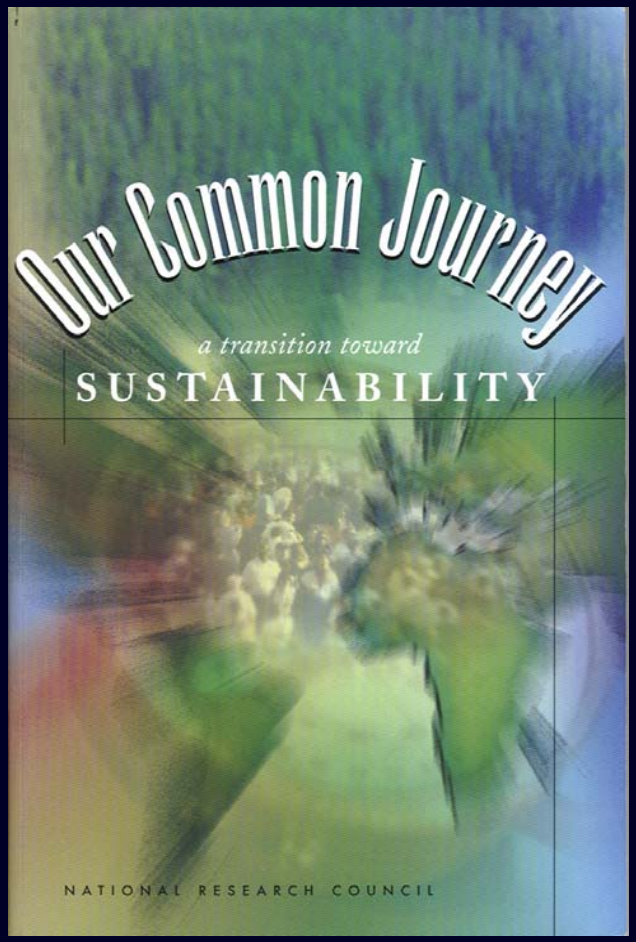
Why We Need a Tracking Framework?

- Agenda 21 of the 1992 UN Earth Summit on Environment and Development

- The nation needs a framework for tracking and understanding changes to the health of its fresh and coastal waters, surface and groundwater, wetlands and watersheds.

Our Common Journey

A Transition Toward Sustainability



U.S. National

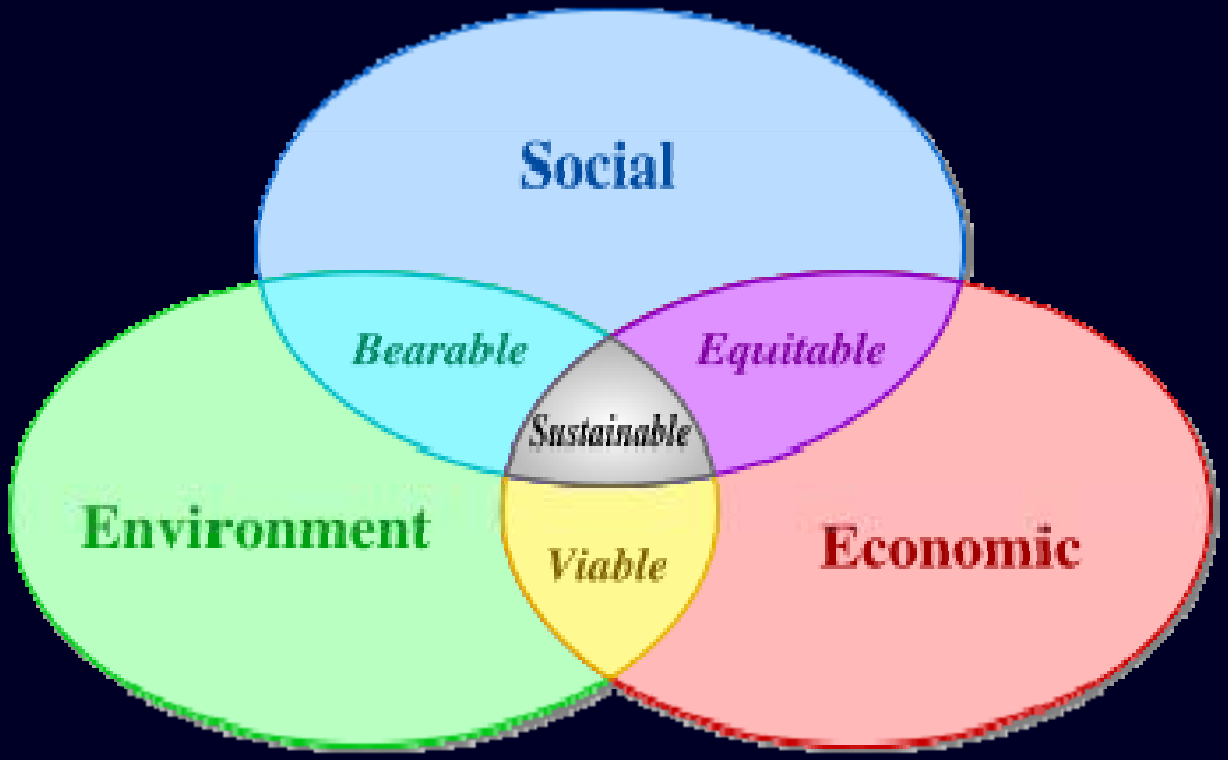
Research Council

www.nap.edu

Three Elements of Sustainability

1. Environment
2. Equity
3. Economy

Diagram of Sustainable Development



Source: Wikipedia, the free encyclopedia (2007). “Sustainable Development”

Questions About Water Sustainability

- What are the key questions to ask to determine the degree to which the nation is on a sustainable course in its use and management of water resources? What are the important issues?
- For what purposes would indicators be helpful?
- What indicators would be most useful in addressing these questions and defining sustainability?

Criteria for Selecting Good Indicators

- The indicator must be ***measurable***;
- The indicator should measure something believed to be ***important in its own right***;
- There should only be a short lag time between the state of affairs referred to and the indicator becoming available;
- The indicator should be based on information that can be used to compare different ***geographical*** areas;
- ***International comparability*** is desirable.

Taking the Long View

"The journey toward sustainable water resources management begins by determining the most important water issues and indicators"

taking the long view

The journey toward sustainable water resources management begins by determining the most important water issues and indicators

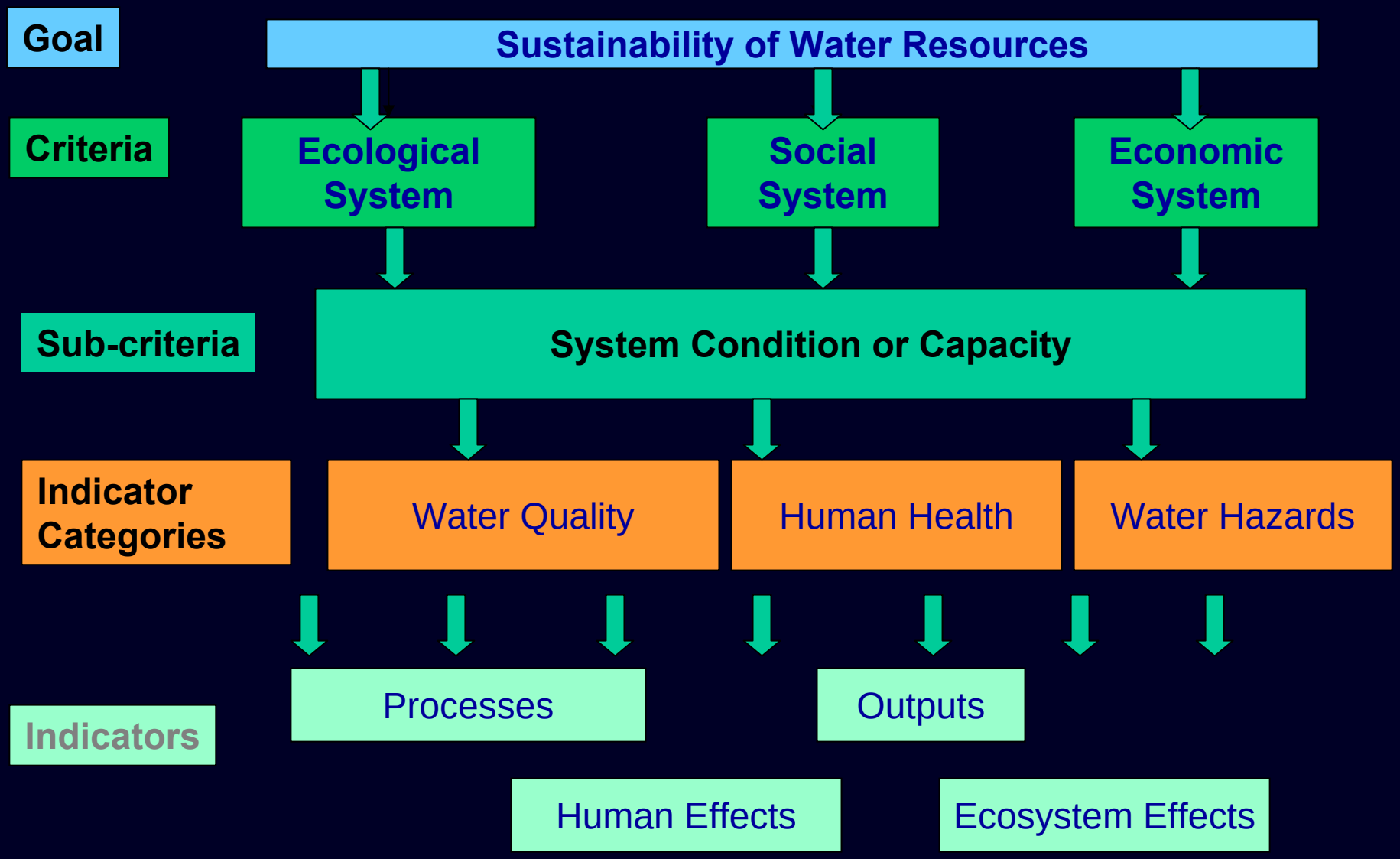
Ethan T. Smith and Harry X. Zhang

As water quality professionals work toward sustainable management of water resources, we are constrained by institutional arrangements designed for past conditions. While our institutions have served us well, they are limited to physical, chemical, engineering, and other traditional water concerns. For the future, we must take a holistic view of wetlands, watersheds, and habitats — simultaneously considering water quality and availability; freshwater and coastal waters; surface water and groundwater; water and land use; and physical, chemical, and ecological characteristics. Furthermore, we must consider this great variety of water resources in relation to other environmental and natural resources, as well as our national economy and culture.

Definition of Sustainable Development

Consumption of renewable resources	State of environment	Sustainability
More than nature's ability to replenish	Environmental degradation	Not sustainable
Equal to nature's ability to replenish	Environmental equilibrium	Steady-state Sustainability
Less than nature's ability to replenish	Environmental renewal	Sustainable development

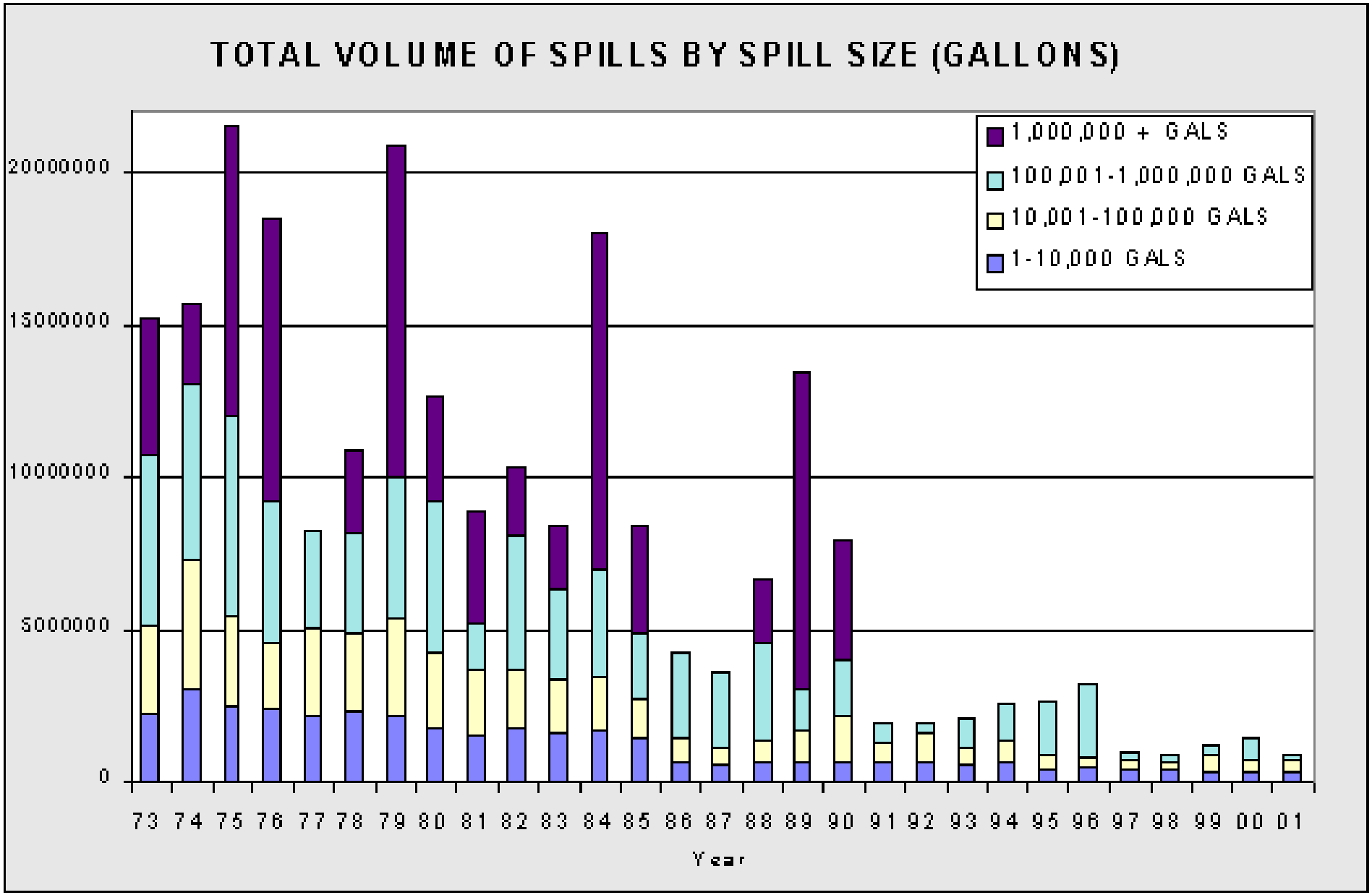
A Criteria & Indicators Model



8 Indicator Framework for Water Sustainability

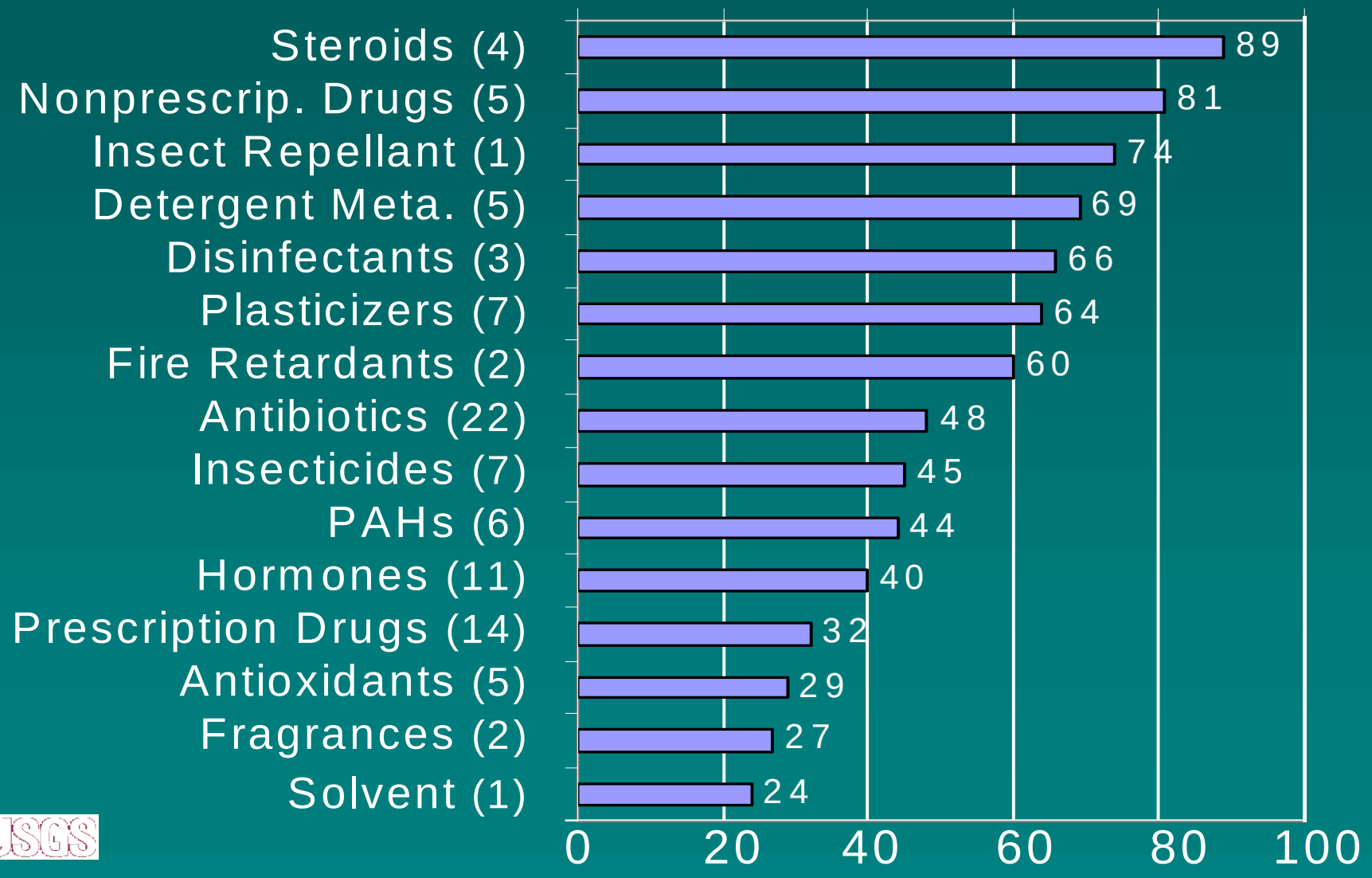
- #1 Oil Spills in U.S. Waters (Coast Guard)
- #2 Emerging Contaminants (USGS)
- #3 Contaminated Sediments (EPA)
- #4 U.S. Climate Extremes Index (NOAA)
- #5 Water Consumption & Availability (USGS)
- #6 U.S. Water Withdrawals (USGS)
- #7 Aquatic Species at Risk (Nature Conservancy)
- #8 Agricultural Runoff (NRCS)

#1 (of 8): Oil Spills in U.S. Waters

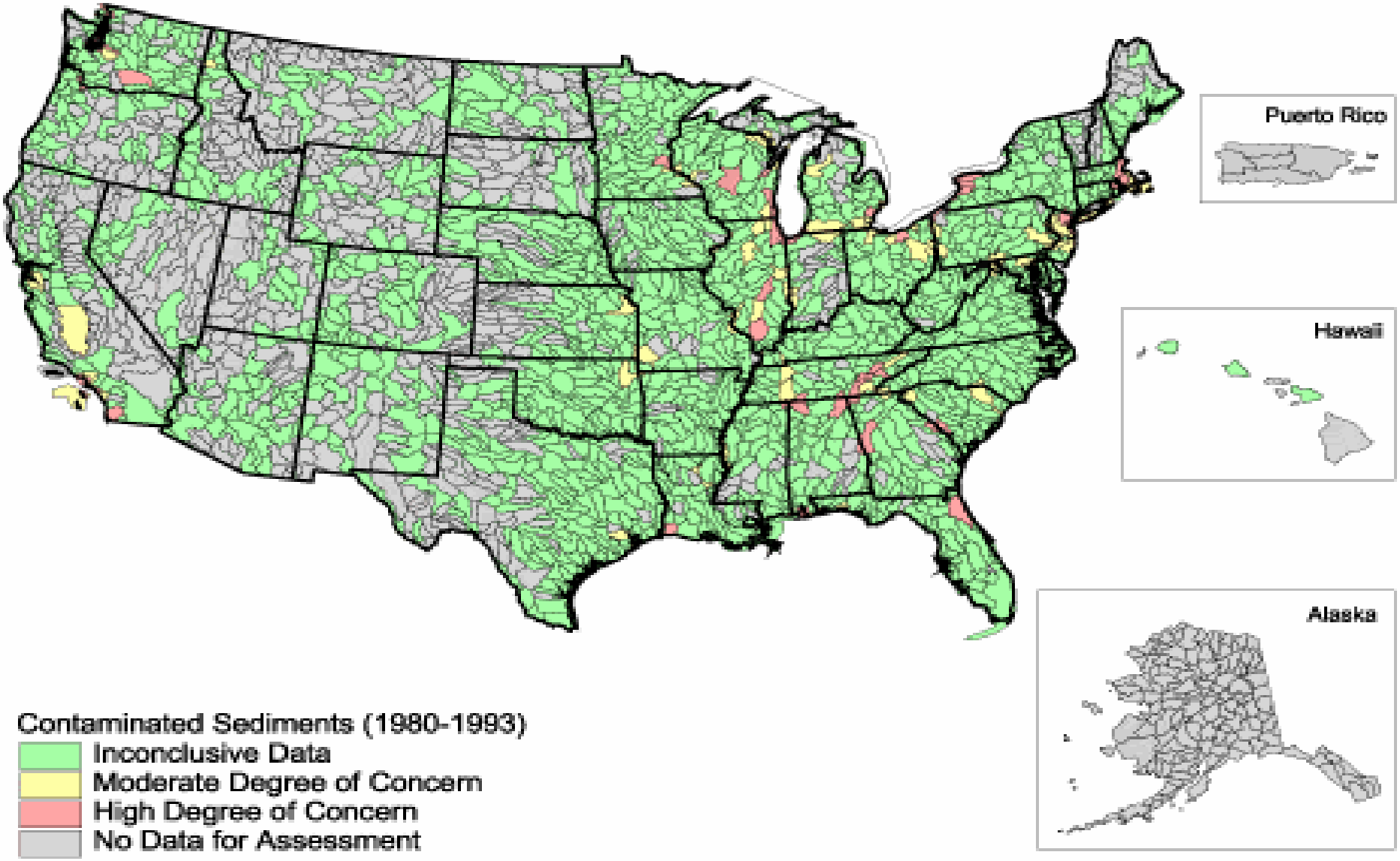


#2 (of 8): Emerging Contaminants

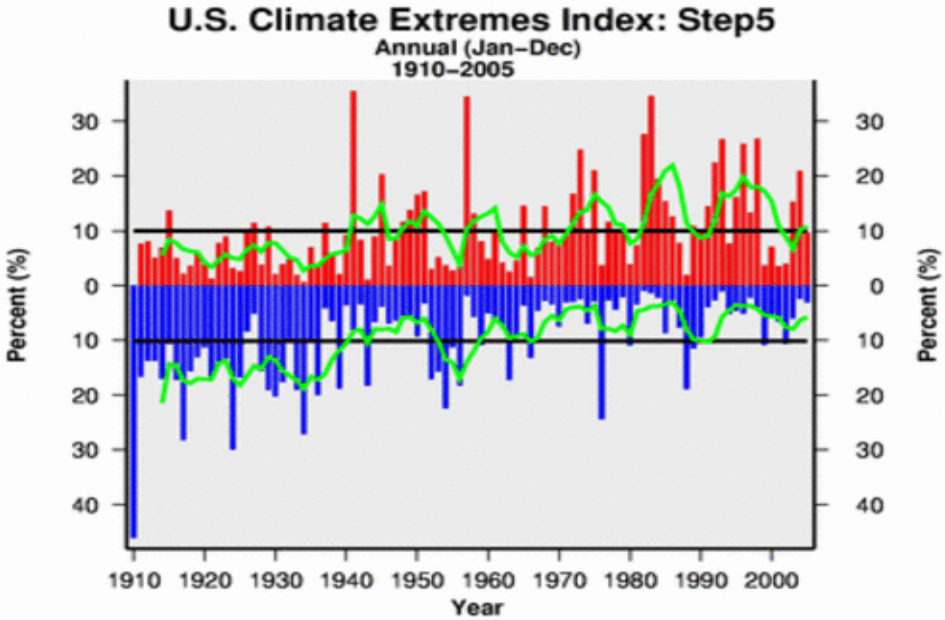
Stream Recon (detection frequency)

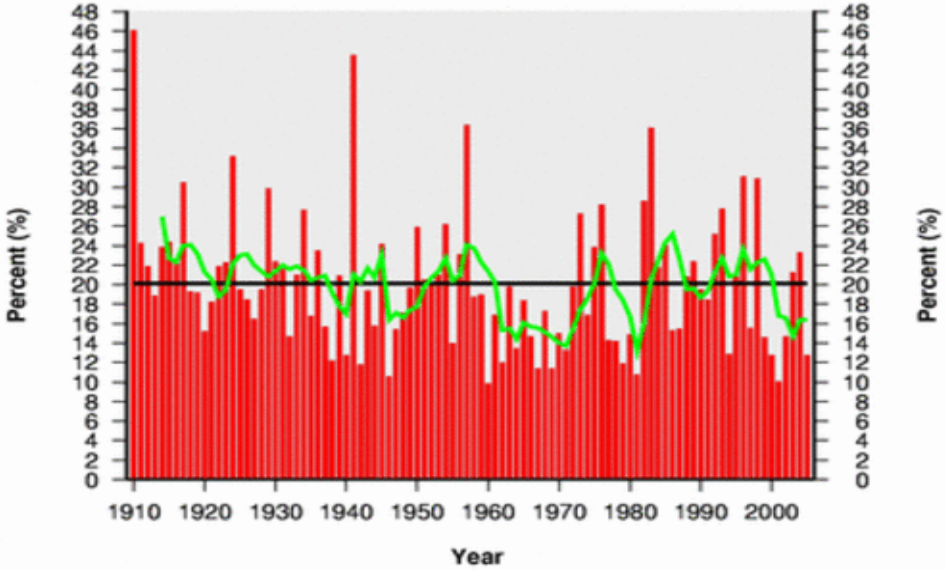


#3 (of 8): Contaminated Sediments

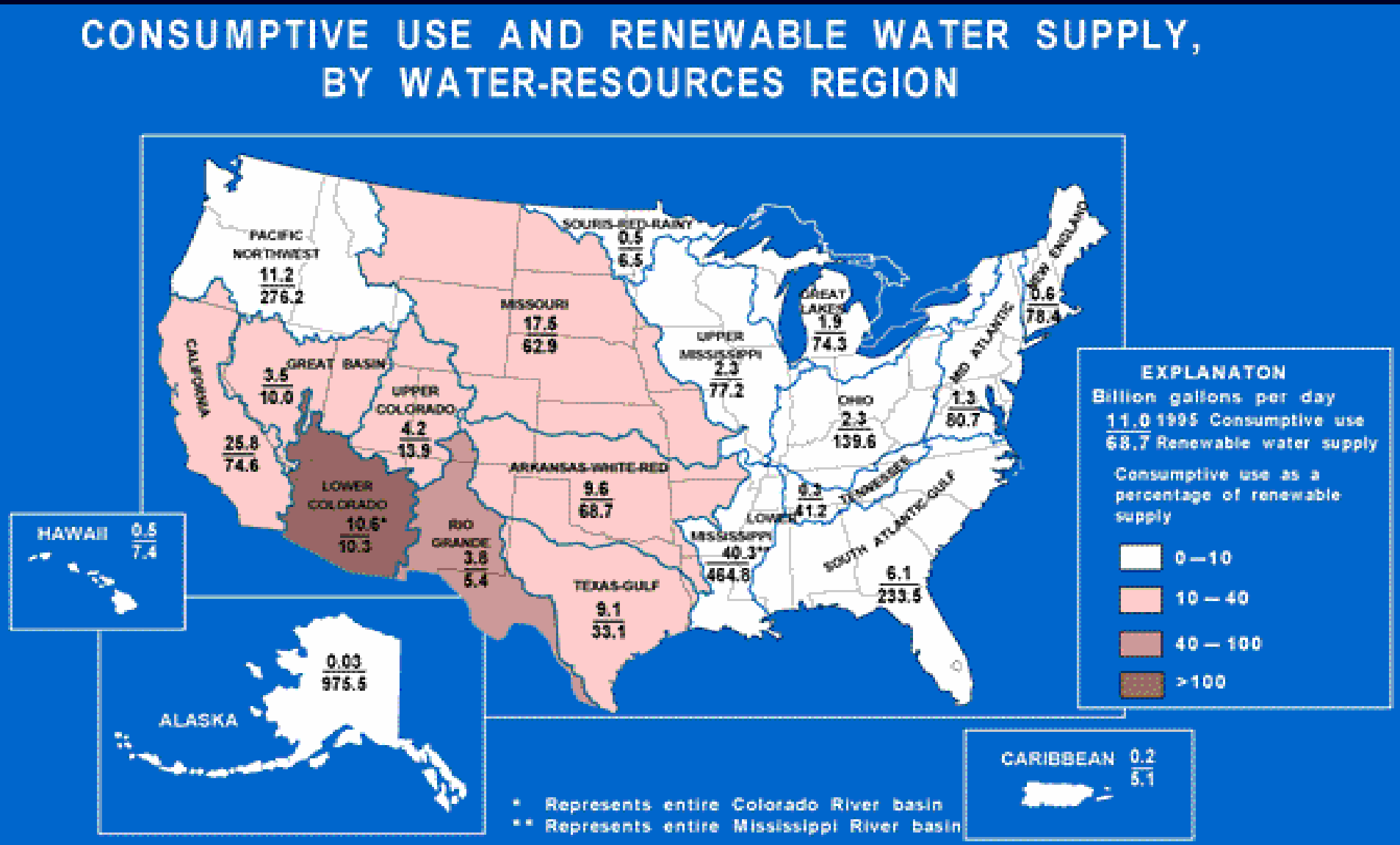


#4 (of 8): Climate Extremes Index



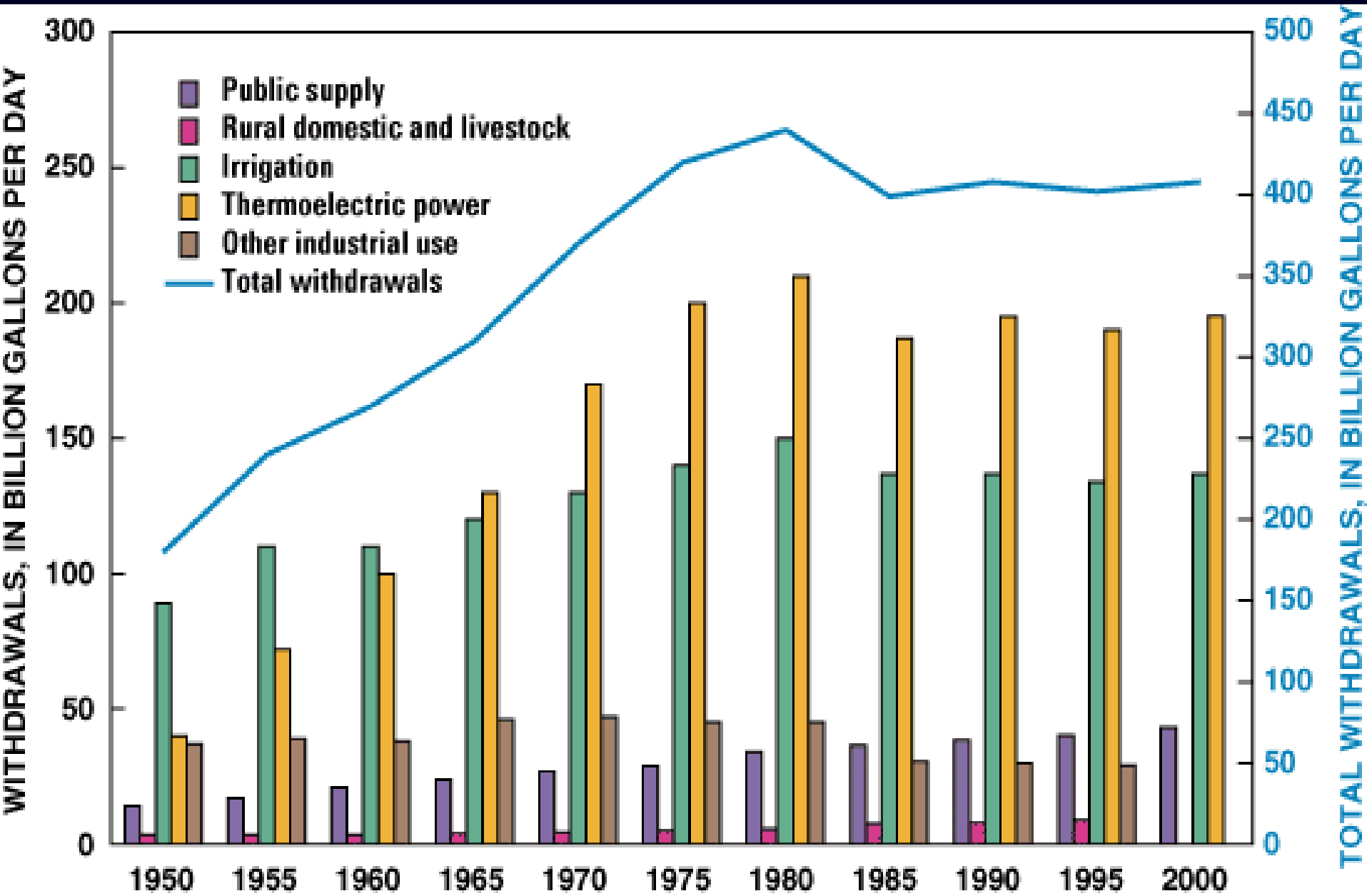


#5 (of 8): Water Consumption and Availability

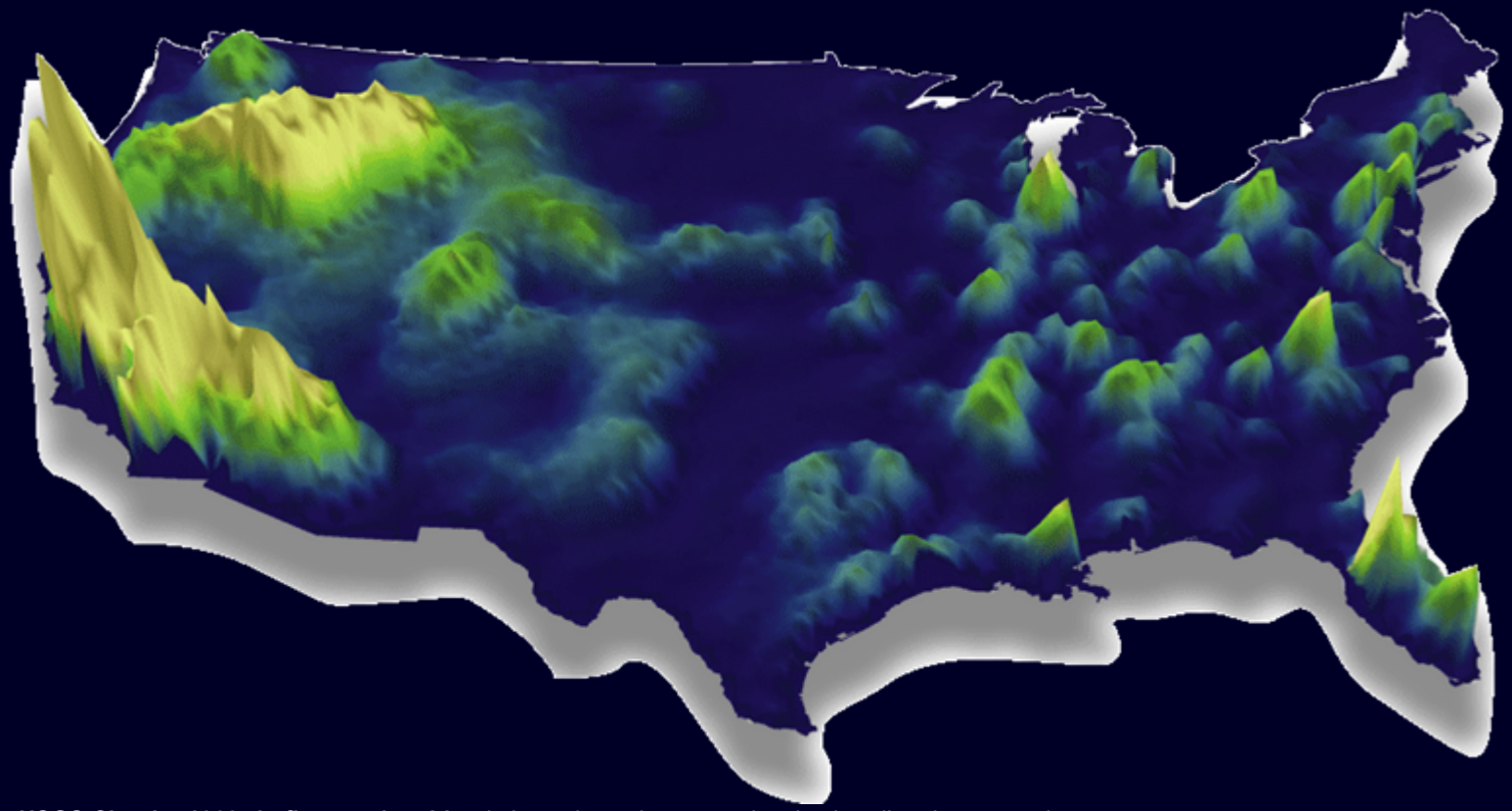


USGS

#6 (of 8): Water Withdrawals by End Use



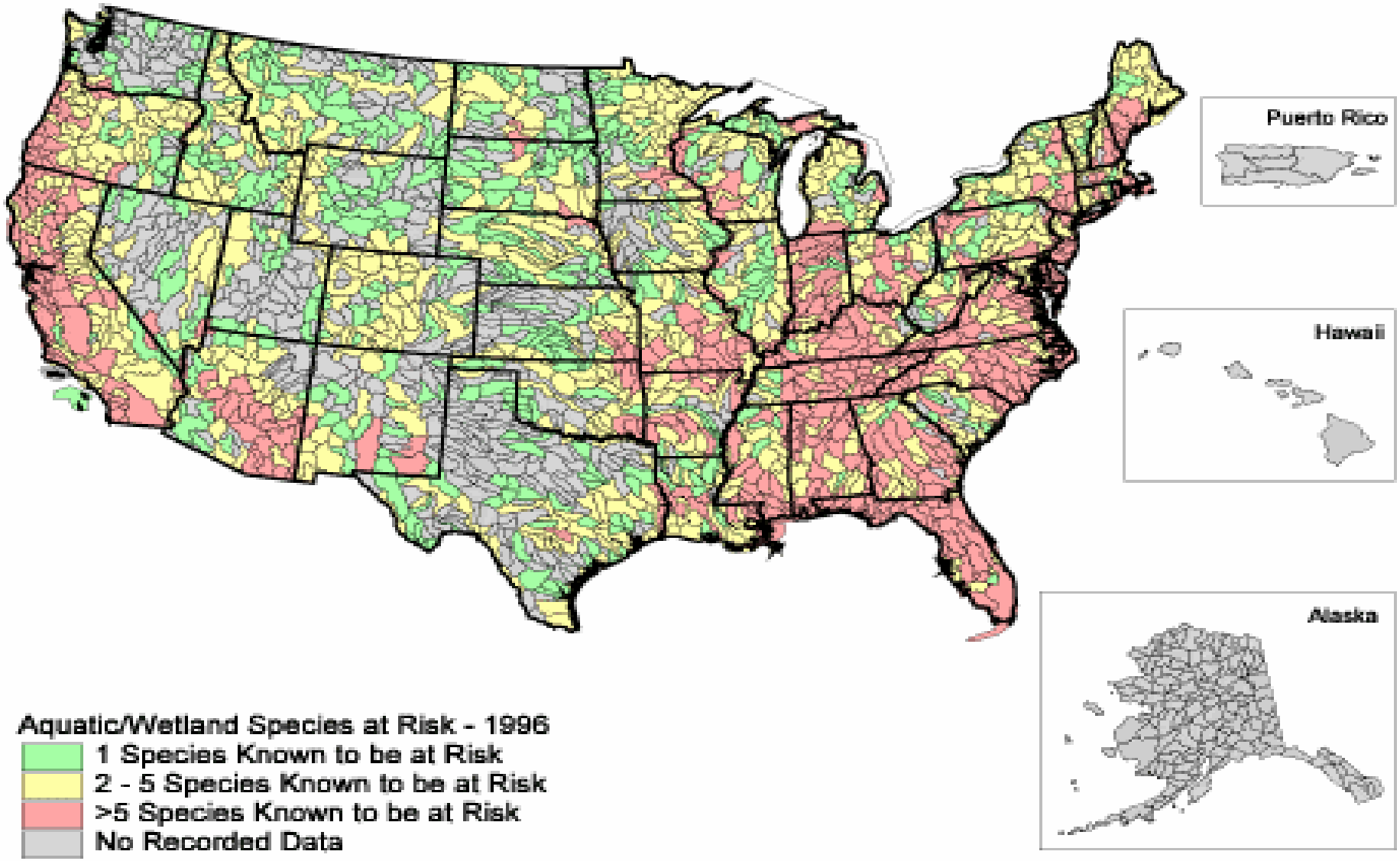
Total Water Withdrawals



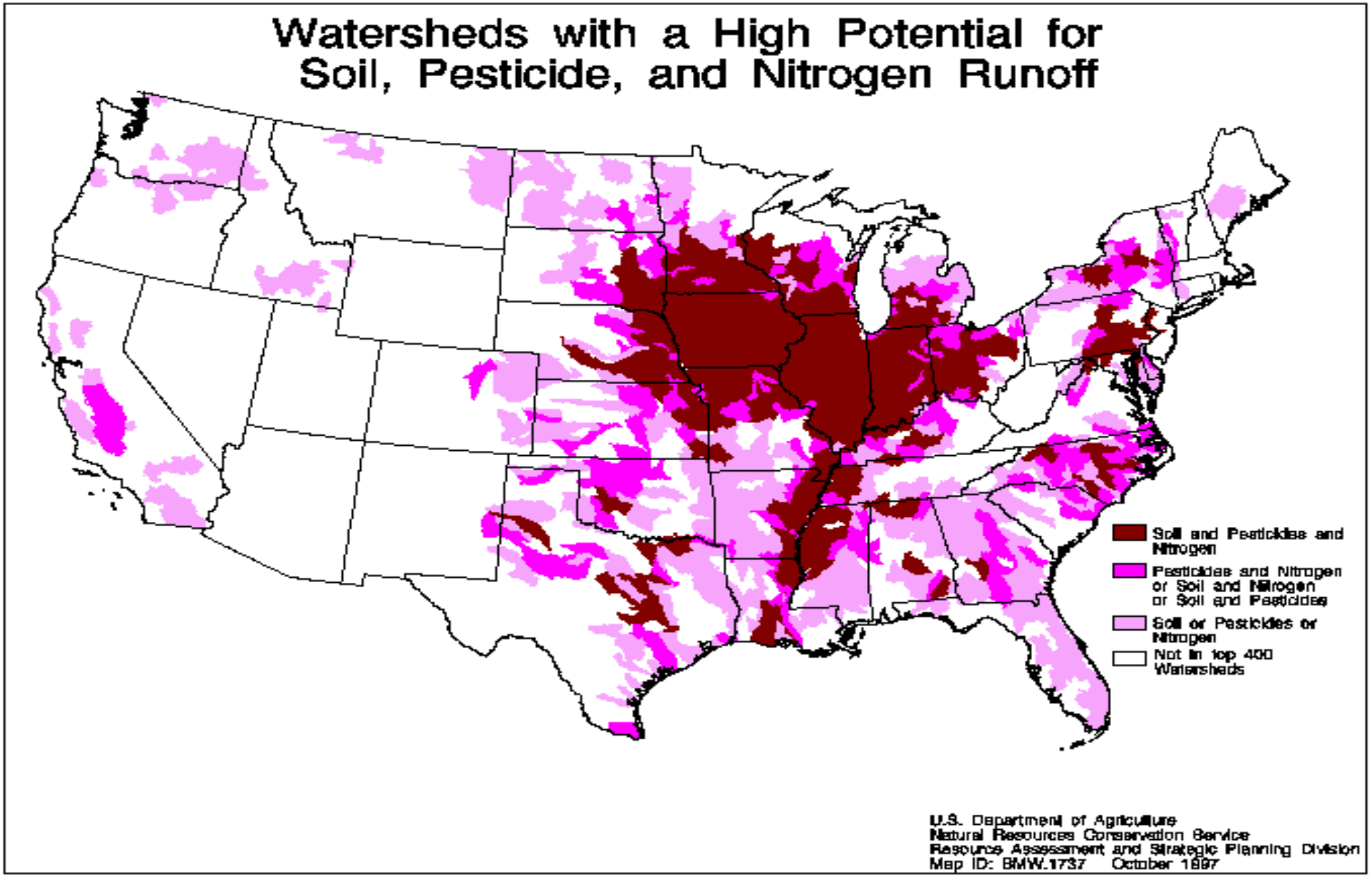
Source: **USGS Circular 1268, 15 figures, 14 tables** (released March 2004 and revised April and May 2004)

Available at: http://water.usgs.gov/pubs/circ/2004/circ1268/index.html

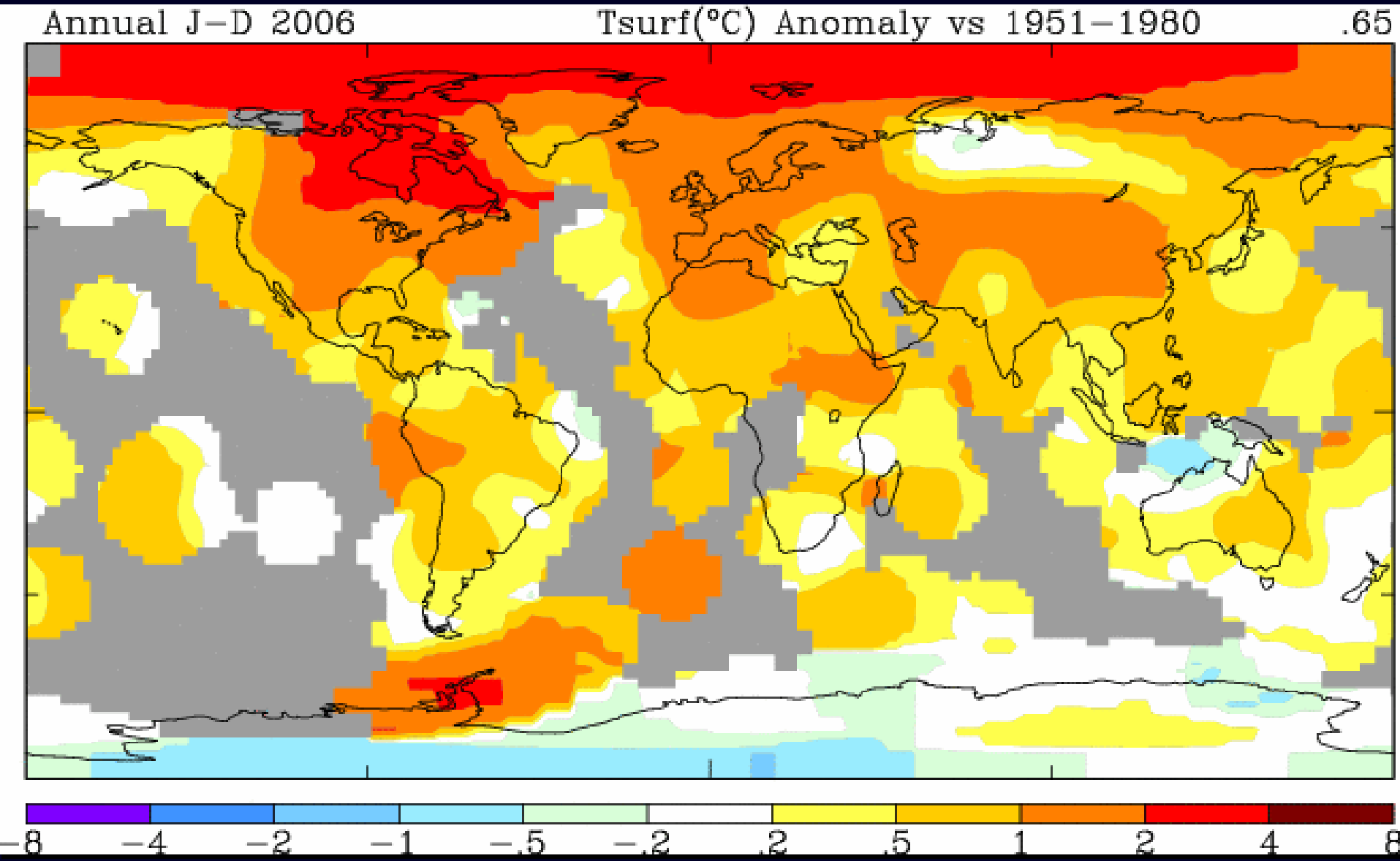
#7 (of 8): Aquatic / Wetland Species at Risk



#8 (of 8): Ag Runoff for Soil, Pesticides, and Nitrogen

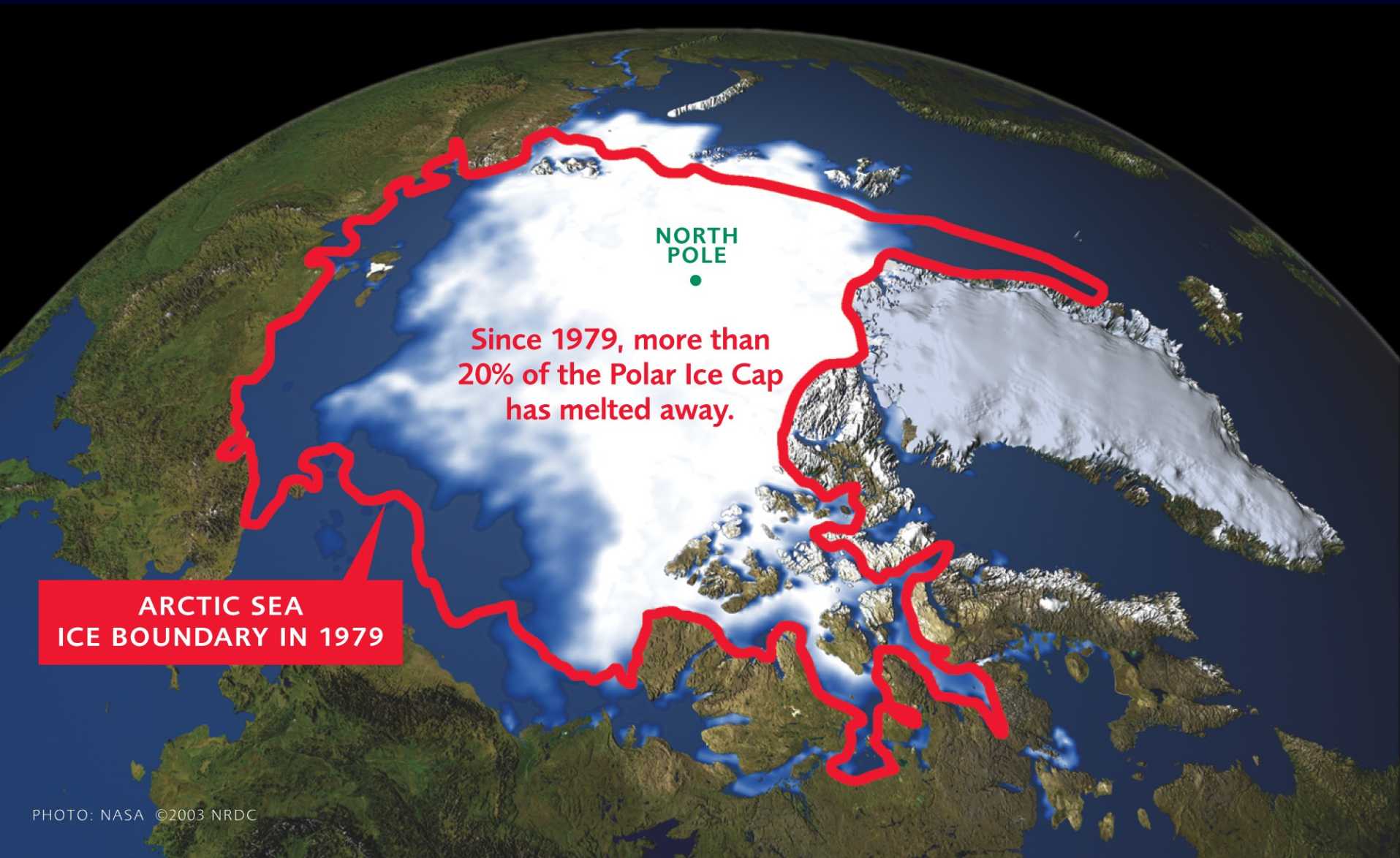


Indicators of Potential Impacts on Water and on Water Use



NASA GISS: Temperatures for 2006 relative to 1951-1980 mean based on surface air measurements at meteorological stations. (http://data.giss.nasa.gov/gistemp/)

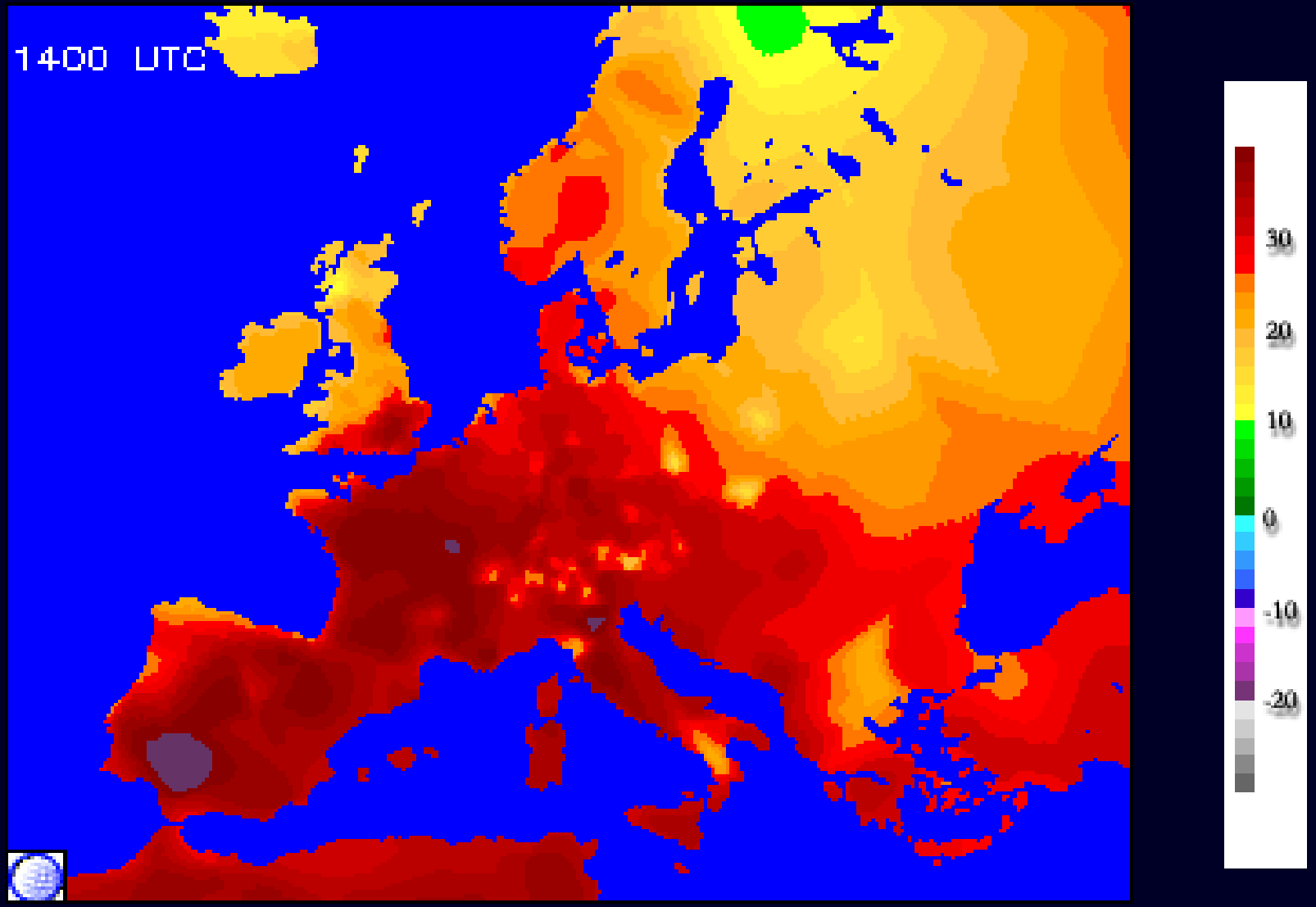
Polar Ice


NORTH POLE
Since 1979, more than 20% of the Polar Ice Cap has melted away.
ARCTIC SEA ICE BOUNDARY IN 1979
PHOTO: NASA ©2003 NRDC

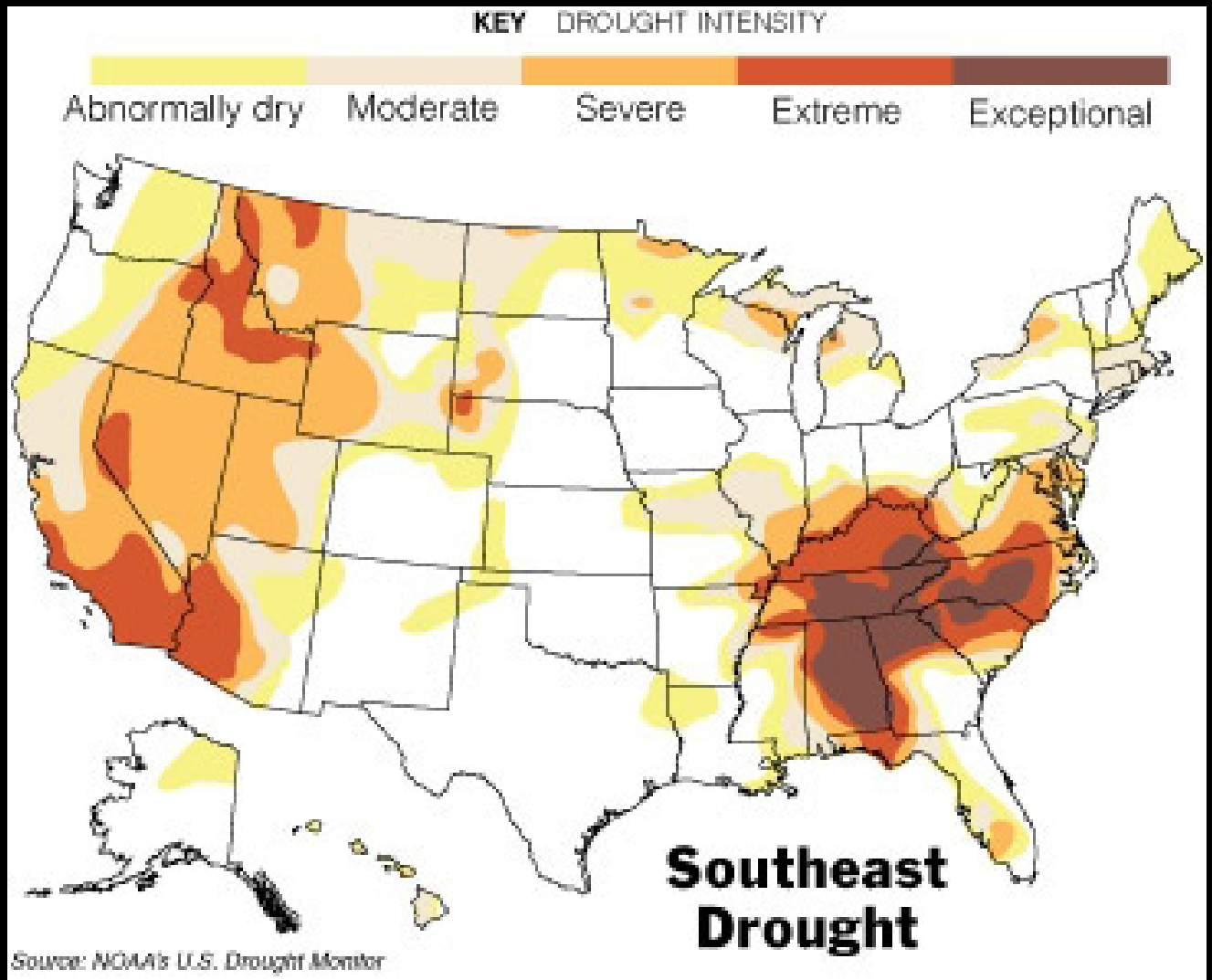
Glacier Retreat

Blomstrandbreen Glacier, Svalbard

Maximum Temperature August 10, 2003



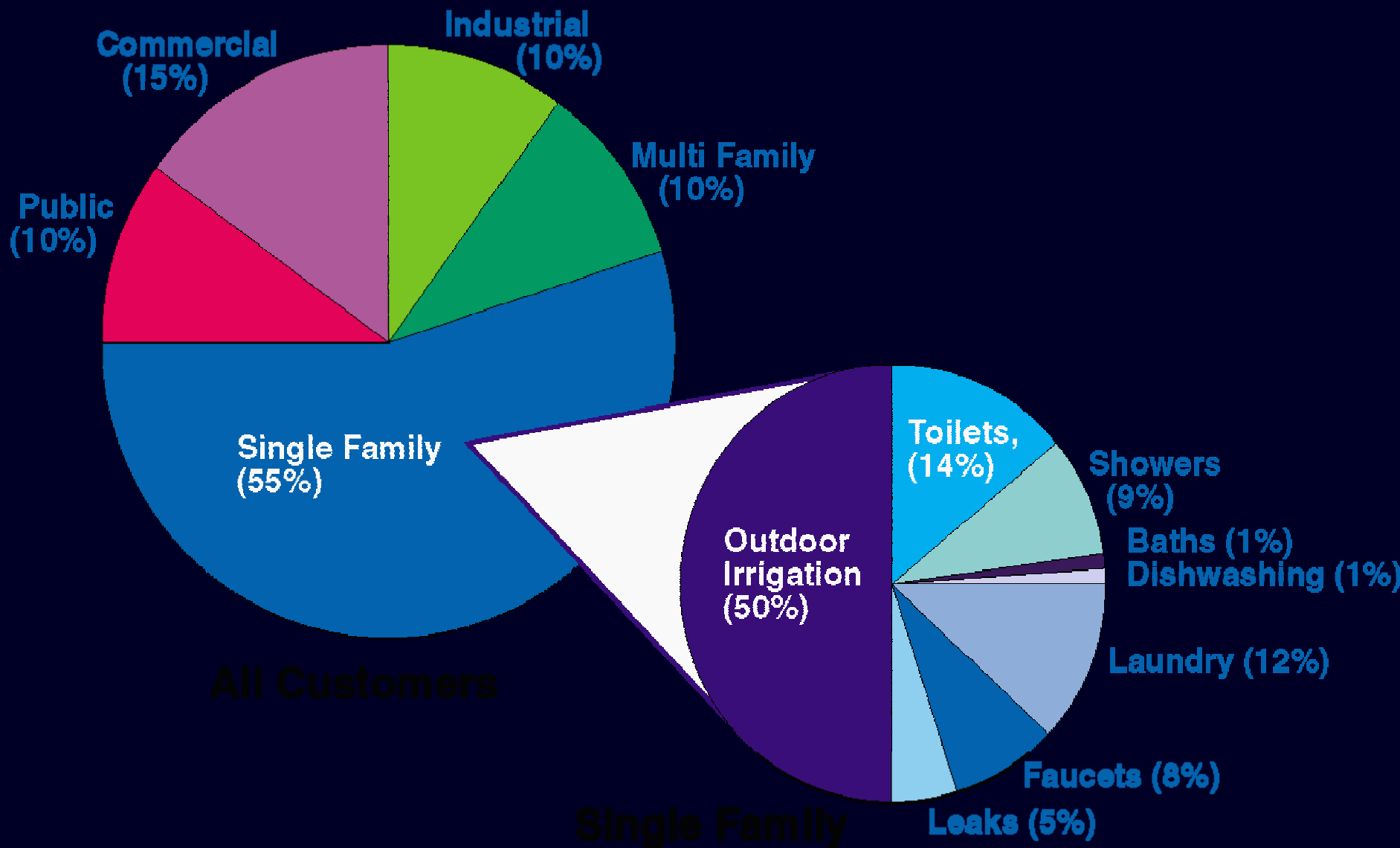
Drought (Fall 2007)



State Water Supply Sources

Lester Snow, California
Department of Water Resources

Urban Water Uses

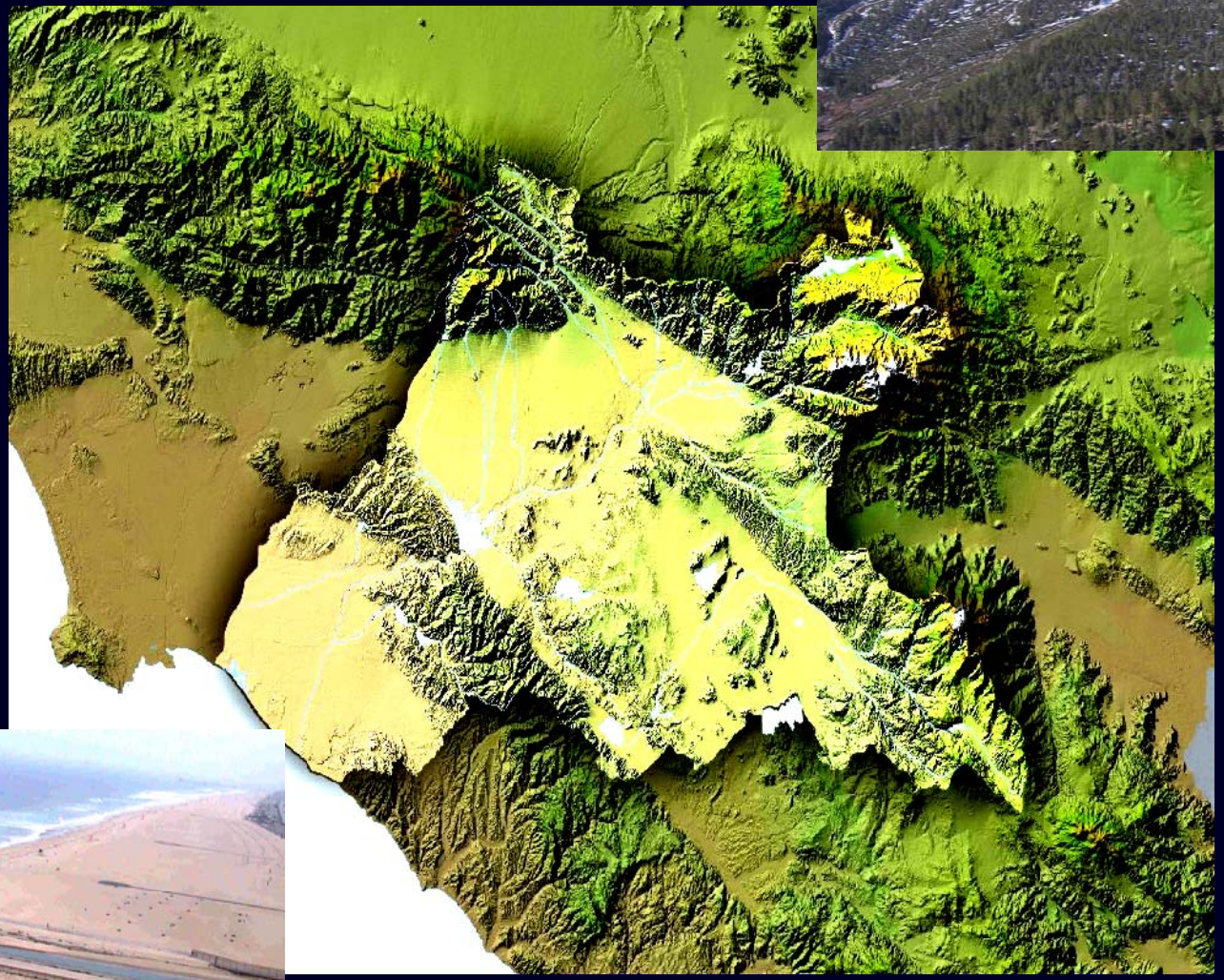


California Energy Use for Water

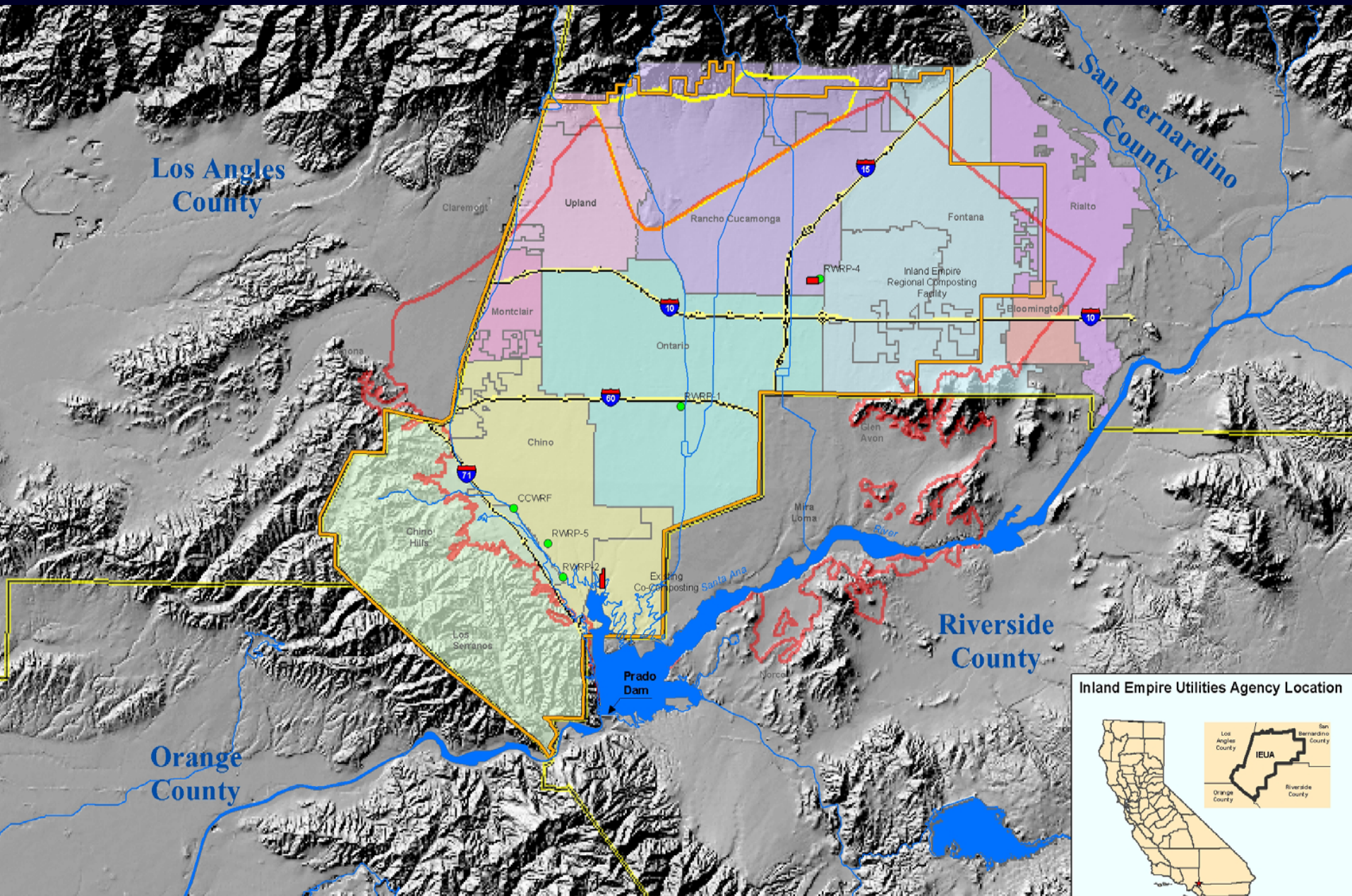
19% electricity

33% natural gas (non-power plant)

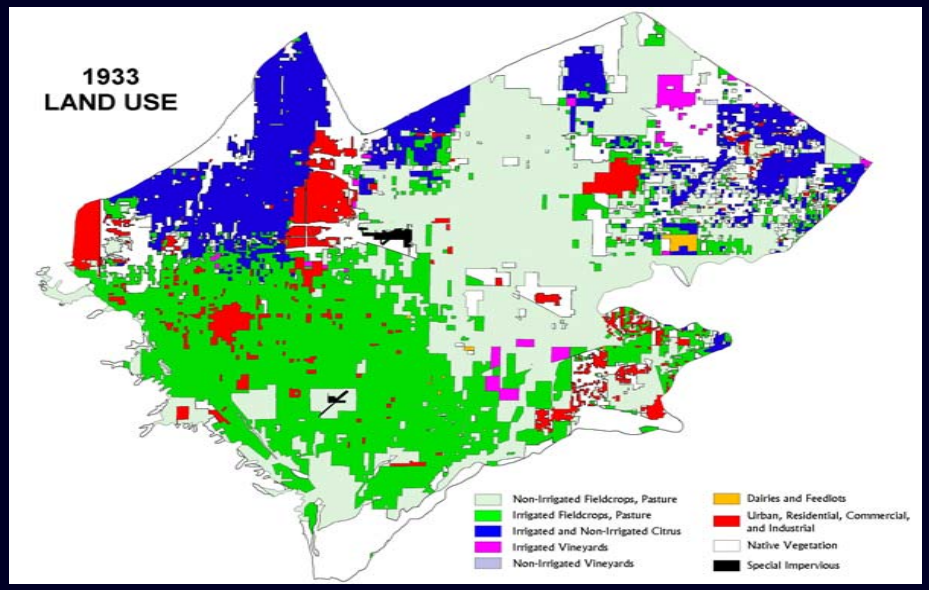
Santa Ana Watershed

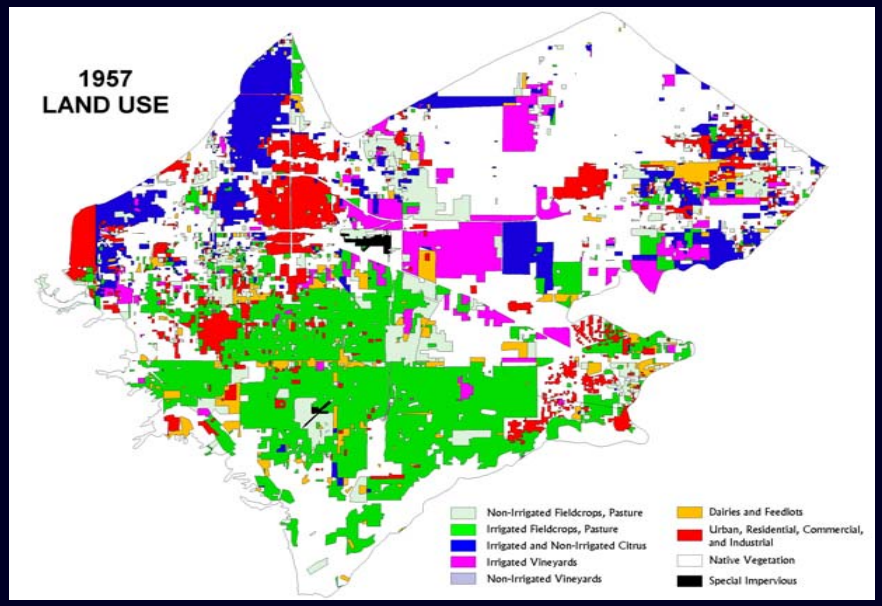


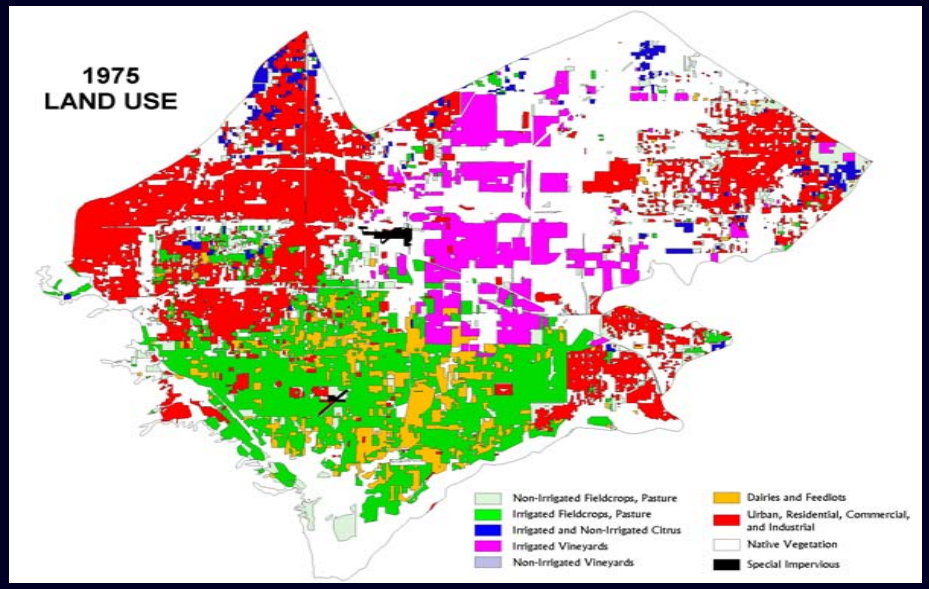
IEUA Service Area

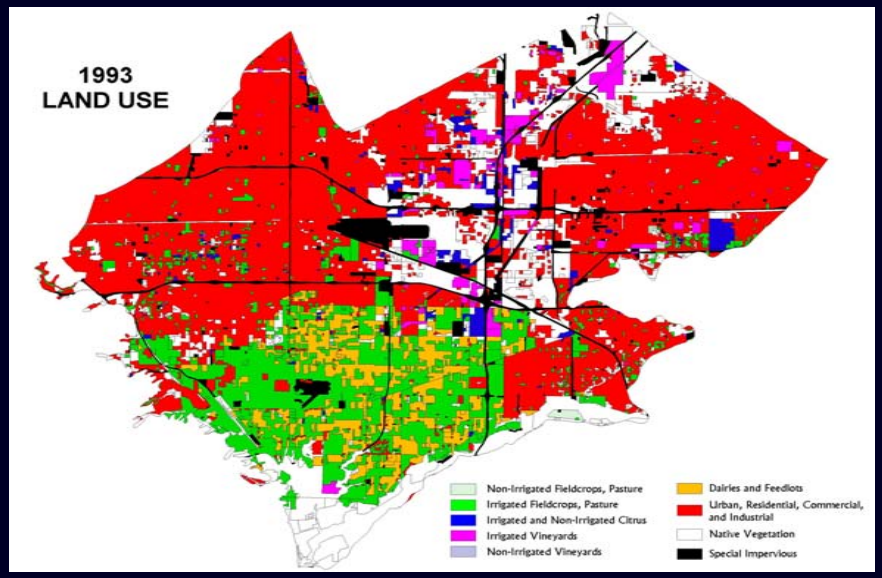


Land-Use in the Chino Basin









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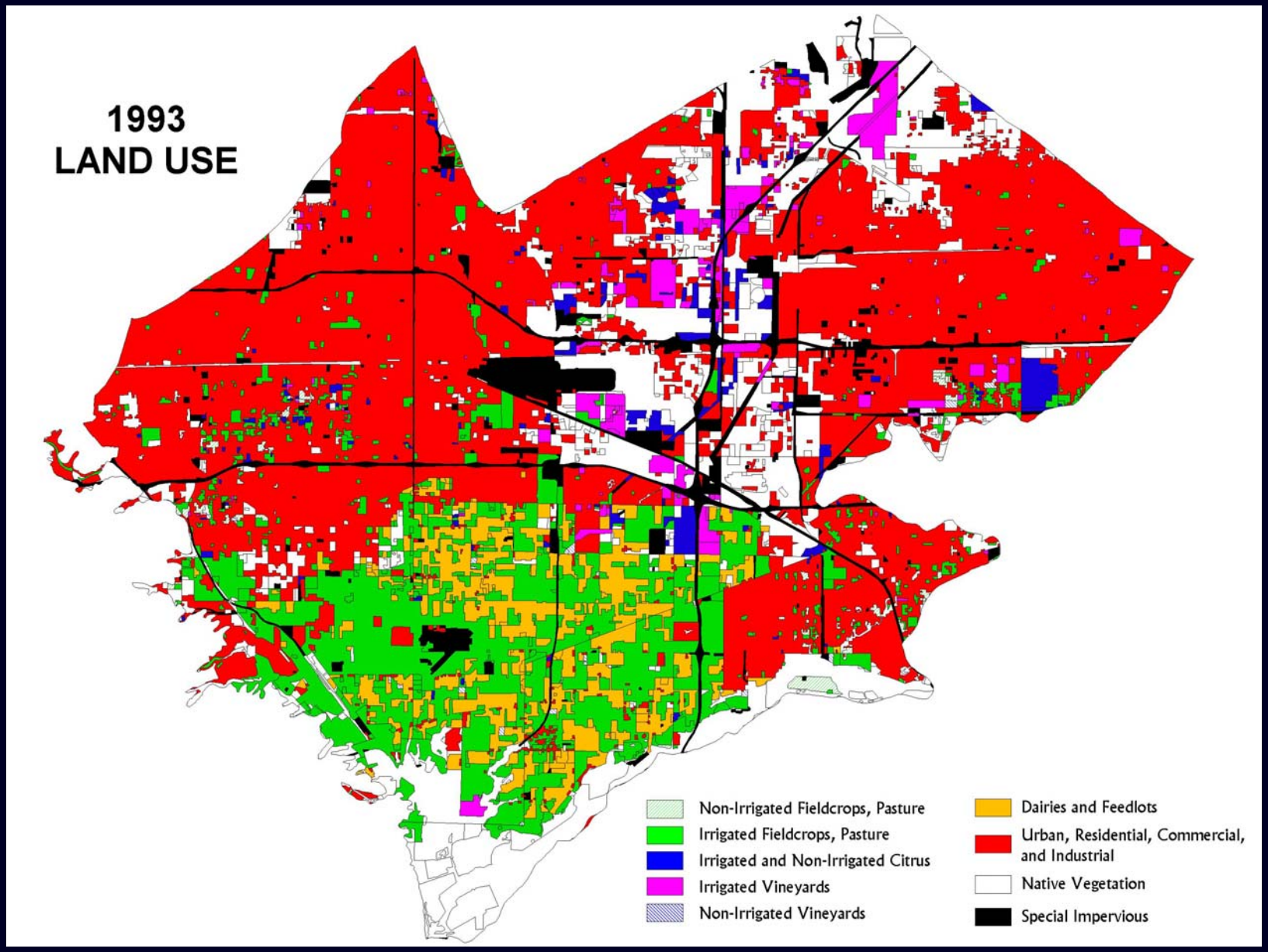
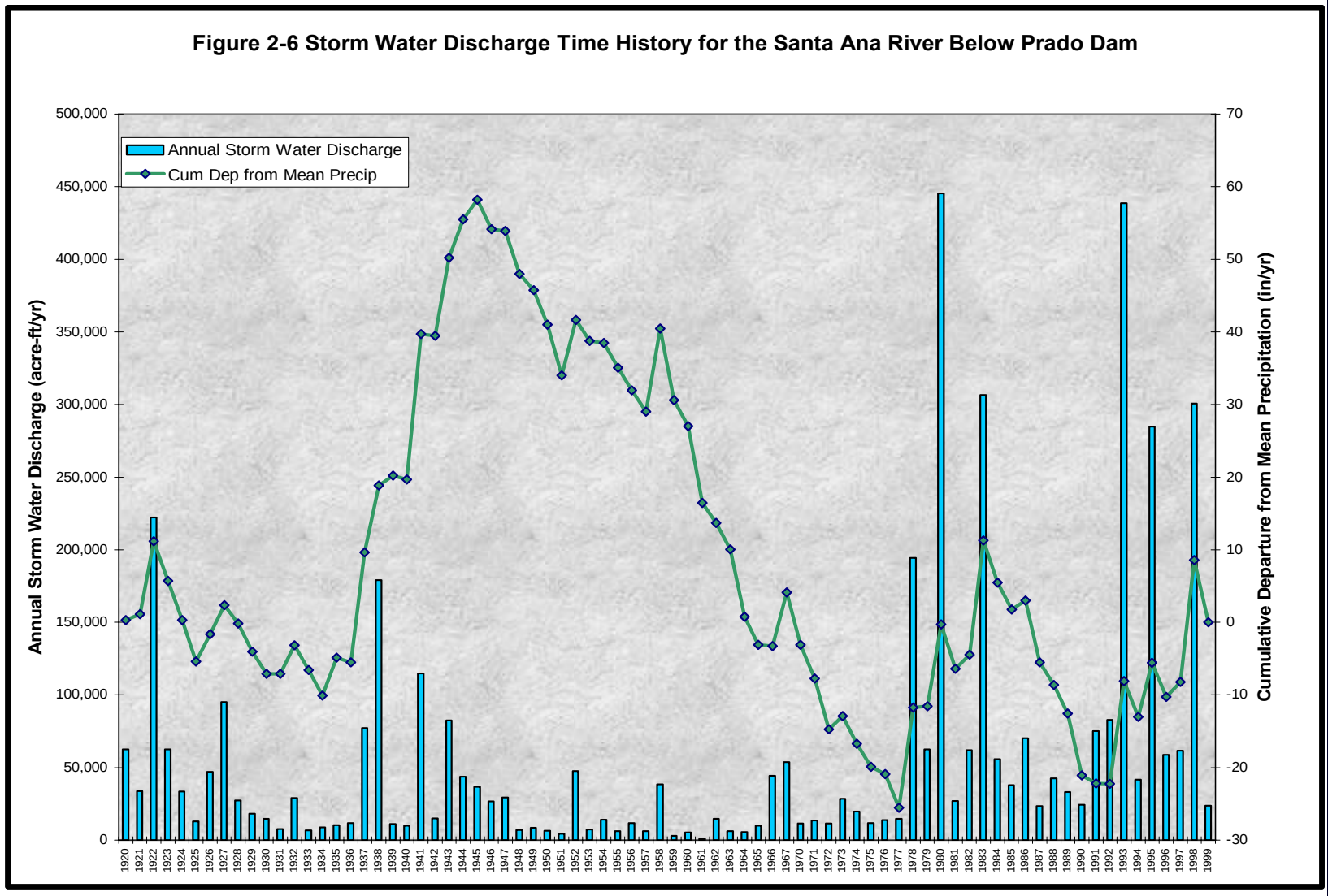


Stormwater Flows

Precipitation and Runoff



Source: Wildermuth Environmental and Black & Veatch, 2001. *Recharge Master Plan Phase II Report: Chino Optimum Basin Management Program*, Chino Basin Watermaster.

Water

Precipitation *patterns* can be as important as total amounts.

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