

Water and Climate Change: Managing Unavoidable Impacts; Avoiding Unmanageable Impacts



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Briefing to the U.S. Congress



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Research for People and the Planet

Conclusions

- Impacts of climate change on U.S. water systems are not only unavoidable, **they are already occurring.**
- **Both** mitigation and adaptation actions must be pursued.
- Recommendations for water managers and planners have been available for two decades, but
- Actual progress toward implementing these recommendations has been slow.

Conclusions

- In many cases and locations, there is compelling scientific evidence that climate changes will pose serious challenges to water systems.
- National water policy must be re-evaluated and updated to meet 21st century challenges, including the risks of climate change for the nation's water.
- I will provide 8 broad recommendations for Congress.



Public Health



Water



Forestry



Energy



**Climate Impact
Challenges**



Agriculture



Environment



Increased
air temperature

Climate Change Effects on Water Resources

Total precipitation may increase or decrease



More precipitation as rain than snow
due to higher temperatures

Less snowpack

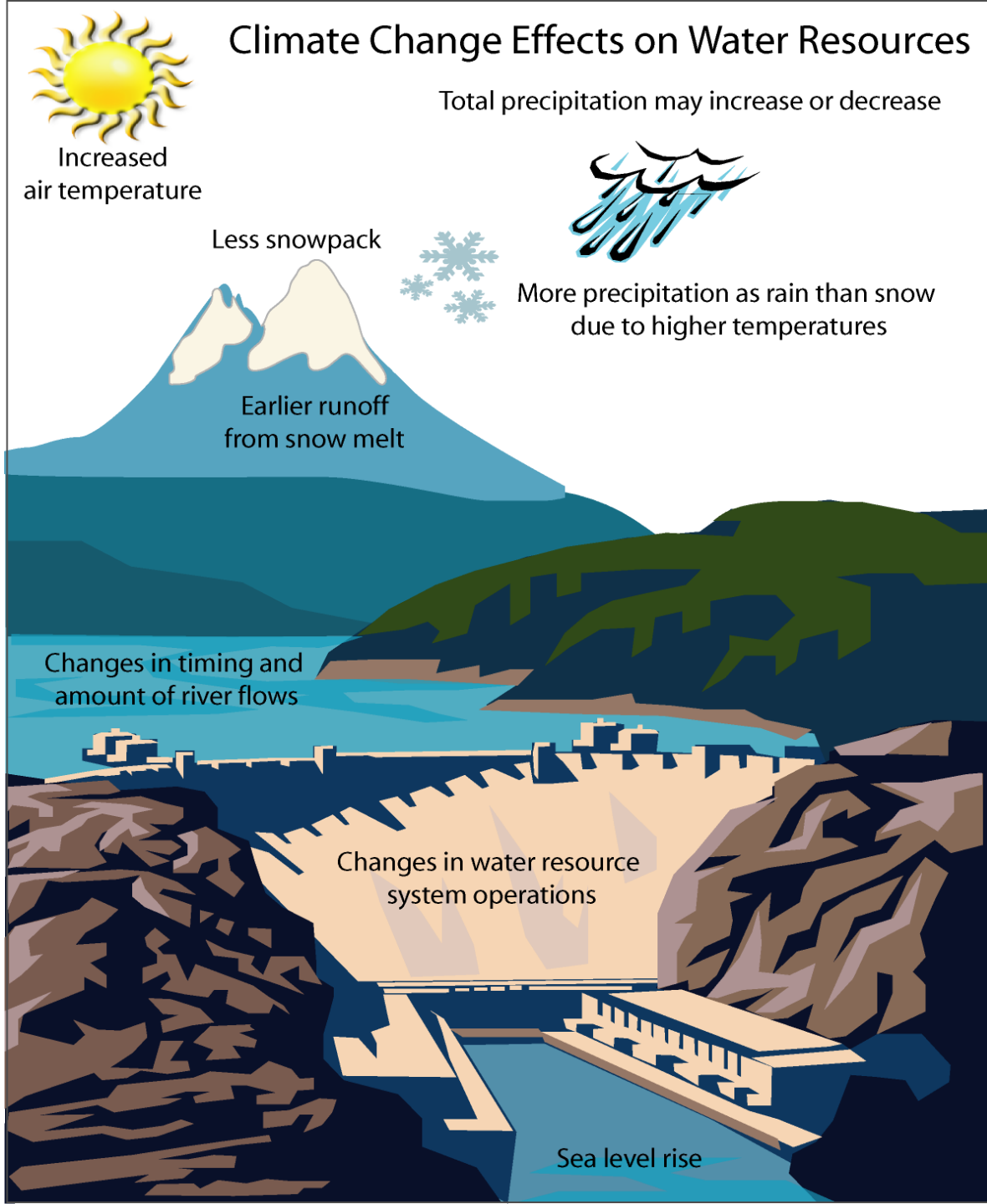


Earlier runoff
from snow melt

Changes in timing and
amount of river flows

Changes in water resource
system operations

Sea level rise



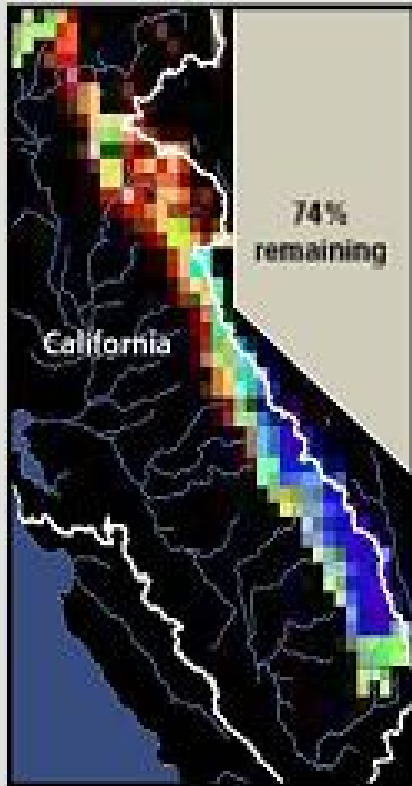
Climate changes threaten water availability and quality in the U.S.

- A hotter world means more demand for water.
- Changes in the amount and extremes of precipitation means changes in availability.
- Dramatic changes in snowfall and snowmelt dynamics and runoff *timing* will affect management.
- Rising sea-level will alter groundwater quality and ecosystems health.
- Uncertain impacts on extreme events, though both floods and droughts may be more of a problem.

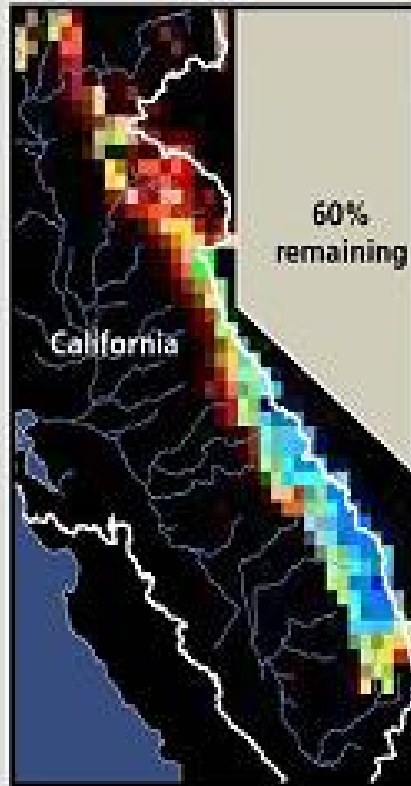
The western U.S. will lose most of its snowpack by the end of the century

2020–2049

Lower Emissions

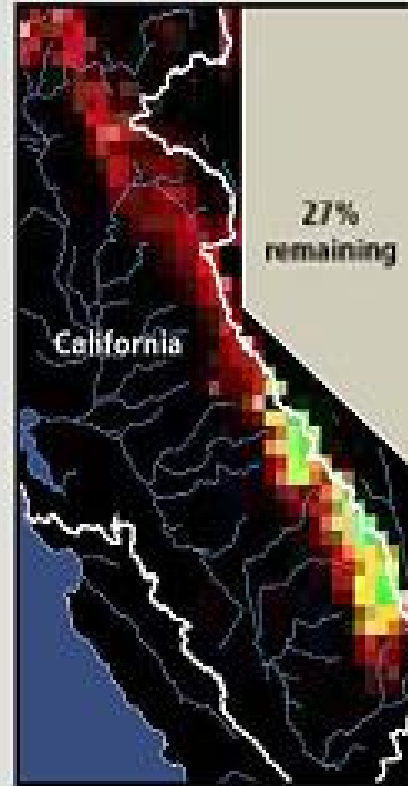


Higher Emissions

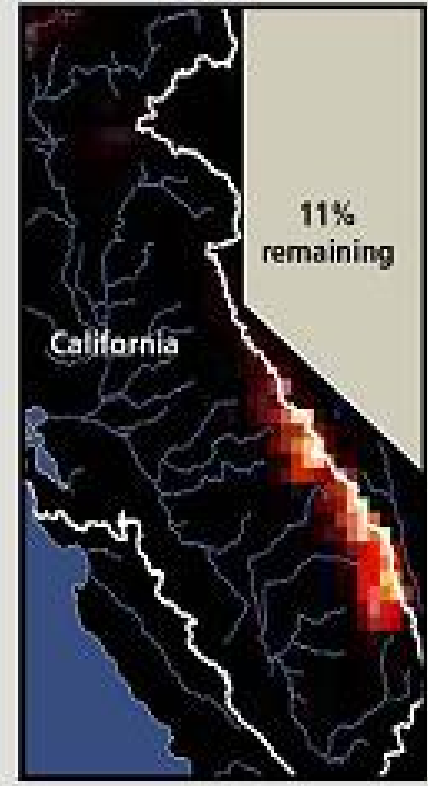


2070–2099

Lower Emissions



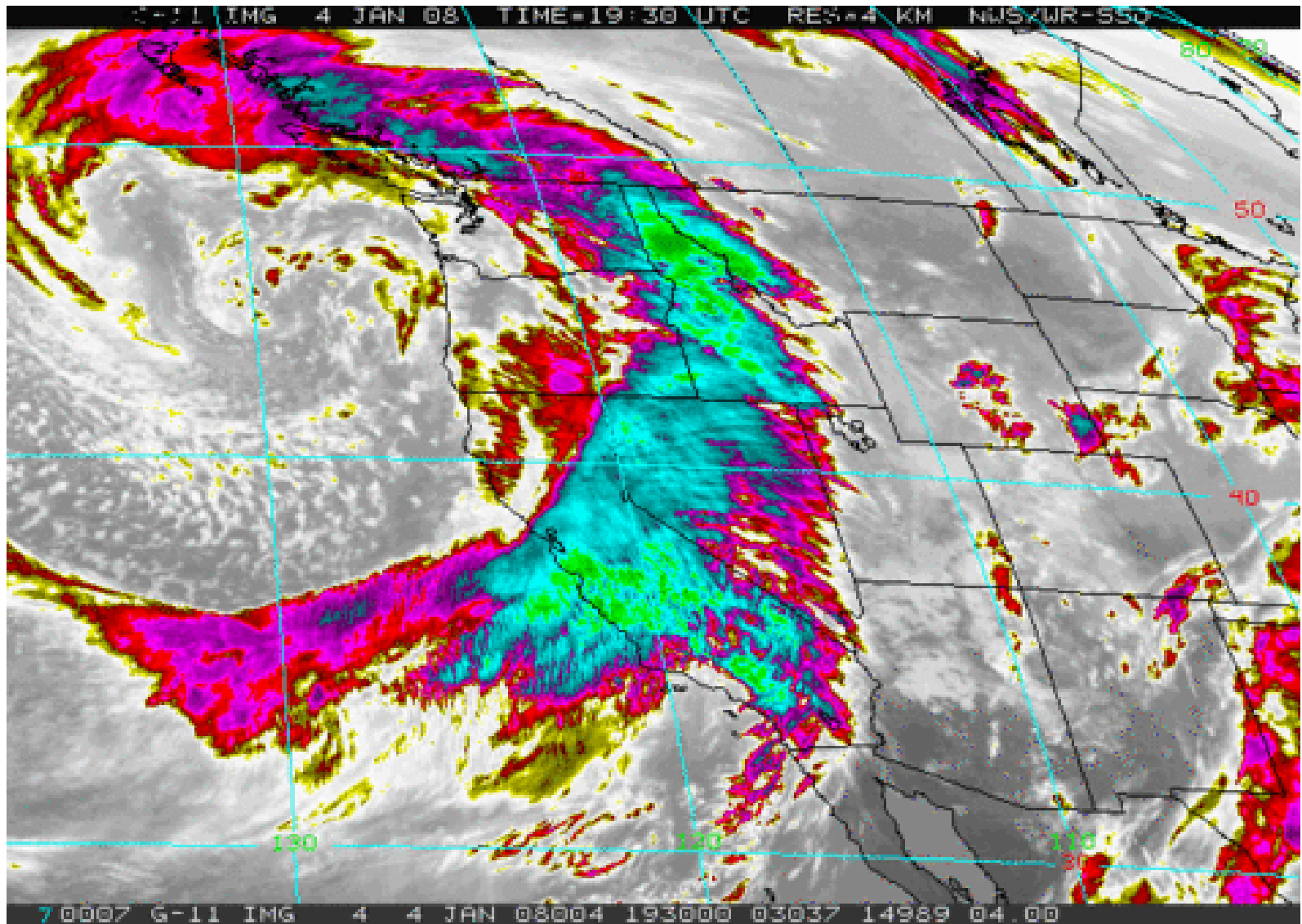
Higher Emissions



Remaining Snowpack (%)



Changes in extreme events are critical uncertainties



The need for adaptation Isn't "new" news....

- In 1997, the American Water Works Association recommended that water managers integrate climate change into operations:

“water agencies should re-examine water system designs and operating rules under a wider range of climatic conditions than traditionally used.”

Nor is the conclusion that climate changes are *already* affecting U.S. water resources

“The evidence that humans are changing the water cycle of the United States is increasingly compelling.”

(National Assessment Water Report, 2000)

Recommendations to Congress

- Constitute a new national, bipartisan Water Commission to develop new water policy recommendations.
- Update the national Clean Water Act and the Safe Drinking Water Act.
- Reorganize and streamline the diverse and uncoordinated federal water responsibilities.

Recommendations to Congress

- Expand investment in our drinking water and wastewater treatment system, especially for small communities.
- Establish federal incentives for improving water efficiency and reducing wasteful use of water, using the Farm Bill, trade laws, plumbing codes, and tax code revisions.

Recommendations to Congress

- Spotlight national security issues related to water (and climate).
- Update the 2000 National Assessment on the impacts of climate change on U.S. water resources.
- Integrate climate change into all federal water decisions and policies.



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Selected Federal Water Budget Recommendations

Department of the Interior: U.S. Geological Survey

- Expand National Water Quality Assessment Program (\$30 million initial; annual increase)
- Create National Water Use Assessment Program (\$5 million initial)
- Expand national advanced streamflow gage program (\$10 million per year; steady funding)
- National Assessment of Climate and Water (2 yr program; \$1 million/yr)

Selected Federal Water Budget Recommendations

Department of the Interior: Bureau of Reclamation

- National reservoir reoperation climate change studies in conjunction with USACoE, TVA, Bonneville (split) (\$7 million annually for three years)

Department of the Interior: Fish and Wildlife

- Environmental science program; to work with states on implementation of instream environmental flows: (\$10 million initial)

Selected Federal Water Budget Recommendations

Department of Agriculture

- Expand water conservation/efficiency grants: “Environmental Quality Incentives Program (EQIP):” (+\$285 million to bring to level of Farm Bill request)

Environmental Protection Agency

- State Clean Water and Drinking Water Revolving Loan Funds (\$500 million additional to return program back to 2007 levels)
- Water Sense/Efficiency Program (+\$10 million initial; to \$15 million by 2012)

Selected Federal Water Budget Recommendations

Department of Defense: US Army Corps of Engineers

- National levee, seawall, coastal infrastructure assessment (\$10 million each year for three-year program)
- Implementation of Mississippi River flood recommendations from Galloway Report (\$250 million first year for “shovel-ready” levee removal; wetland restoration; land use modifications; 10% annual increases.)

Selected Federal Water Budget Recommendations

Department of Defense

- Water-related security workshops, and in house expertise on water (reallocation; no new funds)

State Department

- Fully fund “Paul Simon Water for the Poor Act” (+\$200 million for small water systems)

Department of Energy

- Integrated water-energy regional assessments (reallocation; no new funds)