

MANAGING DROUGHT: A ROADMAP FOR CHANGE IN THE UNITED STATES

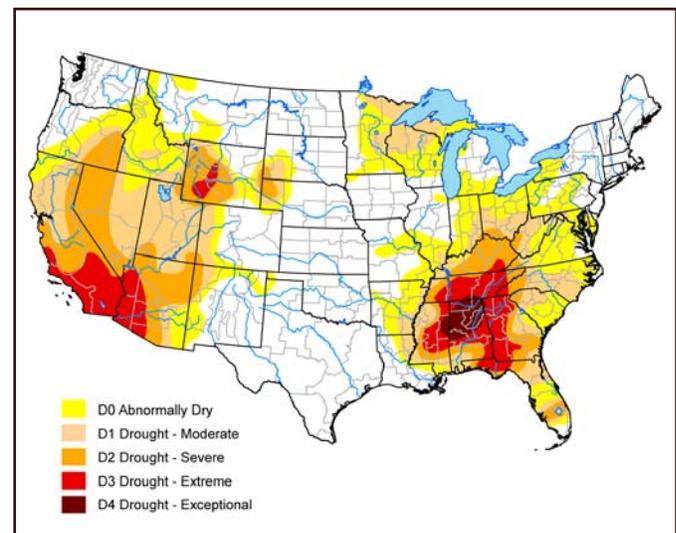
URGENT ACTION NEEDED ON DROUGHT

Economic, environmental, and societal impacts of drought are severe and extremely costly. For 1988 alone, the Climate Prediction Center calculated that drought cost the US\$39 billion (in 1988 dollars). Vulnerability to drought—a routinely occurring part of the natural hydrologic cycle—is increasing in all parts of the United States due to: population growth and population shifts, especially in the water-short western states and in the Southeast; land use changes; global climate change; and increased water resource demands. The U.S. population has increased by about 50% since 1970 to more than 300 million, much of that occurring in water-scarce western regions. Land-use changes due to development and other activities reduce water storage and degrade water quality. Global climate change directly and indirectly impacts the hydrologic cycle, reducing water availability and increasing vulnerability to drought in many regions of the United States. Increased water demand comes from all sectors—agriculture, municipal uses, industry, energy, ecosystem habitat maintenance, and recreation. Considered together, all of these factors call for development of collaborative, science-based, and risk-informed water resource assessments in pursuit of effective drought management and mitigation in the United States.

Background

The findings presented here are the product of a participatory conference sponsored by the Geological Society of America (GSA) in cooperation with 20 other scientific and technical organizations. The conference report, *Managing Drought: A Roadmap for Change in the United States*, is online at <http://www.geosociety.org/meetings/06drought/roadmap.pdf>. Conference attendees collaborated in identifying promising science and water policy solutions to managing and mitigating the impacts of drought. Physical scientists, life scientists, social scientists, Native Americans, policy-makers, water managers, water users, and students found that enhanced data and analyses are needed to improve: the fundamental understanding of the causes of droughts; the prediction of droughts; and drought mitigation and management. To be useful to decision-makers, drought analysis reports must be timely and at appropriate spatial scales. Including measures of confidence or uncertainty helps decision-makers assess the credibility and usefulness of the information. Participants shared key observations about present-day drought and vulnerability to future drought in the U.S.:

1. Multiple severe droughts since 1996 have had substantial economic, social, and environment impacts in many regions of the country. No part of the country is immune to the impact of drought. In 2007, vast areas of the nation are experiencing severe to exceptional drought, and the extent of drought will likely increase as water demand increases in the summer months.
2. Global climate change is expected to increase the frequency, intensity, and duration of droughts in the United States. Already, snowpacks have disappeared earlier, and reduced stream flow, lower reservoir levels, higher temperatures, and greater precipitation variability have been observed.
3. Government is poorly prepared for drought. The drought management plans that do exist are often ineffective and tend to reinforce the status quo. To improve the situation, federal, state, local, and tribal governments need to collaborate



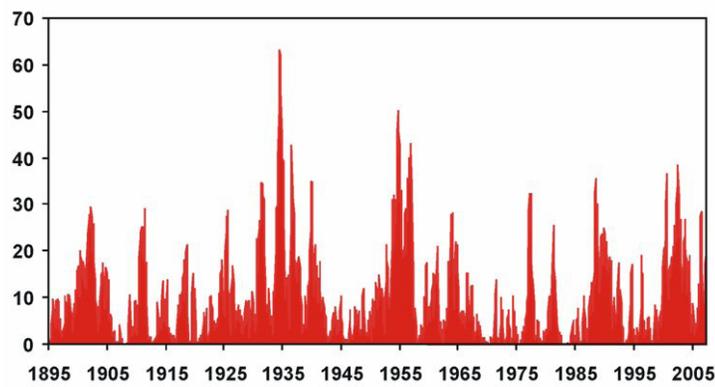
*Drought in the conterminous United States, June 26, 2007.
Courtesy of National Drought Mitigation Center.*

with water managers and water users in a shift from crisis-based, reactive drought management to risk-based, proactive drought management, with greater emphasis on drought monitoring and early warning, prediction, mitigation, and preparedness planning.

Science and Water Management Policy Recommendations

Despite repeated calls for action to move the nation toward a more proactive, risk-based management approach for drought, little progress has been made. Participants at this national conference urge federal, state, local, and tribal governments to move forward immediately in implementing the ten recommendations identified below, thereby fostering a new paradigm for drought management.

1. Implement drought mitigation planning at the local, state, federal and regional (hydrologic basin) levels, as called for in the Report of the National Drought Policy Commission in 2000. Drought policies that foster a high level of cooperation and coordination at all levels of government can lead to greater social and economic security for the United States.
2. Include in drought risk mitigation planning potential impacts from certain temperature rises due to global climate change.
3. Create a new “national water culture” that promotes sustainable water management practices to meet long-term societal needs. A broad educational initiative can foster partnership and collaboration among local, state, federal, and tribal governments, educational and research institutions, energy and industrial users, and the public. Increased public education may be the single most effective enabling element of long-term drought mitigation and water resources management.
4. Engage stakeholders within common hydrologic basins in both the development of water resource management plans and the implementation of drought mitigation plans.
5. Foster place-based science with community stakeholder involvement as a part of public education and outreach. Place-based science can result in better understanding of local climate conditions and variability and can provide information at space and time scales relevant to resource decision-makers.
6. Maintain and enhance hydrologic and meteorologic data collection capabilities and existing data sets, and develop new data sets needed to improve assessments. Automate data collection to the maximum practical extent, and collect data at the frequency and spatial scale needed to support model analyses and decision-making. Fully fund and implement the National Integrated Drought Information System (NIDIS) passed by Congress in 2006.
7. Encourage the use of risk-based approaches for assessment of multiple potential future climate and water management scenarios in support of decision-making.
8. Support research that improves fundamental scientific understanding of drought. Enhanced understanding through better data and improved representation of underlying physical, chemical, and biological processes will lead to more reliable and more useful drought assessment and management tools.
9. Value water at its full worth in the development of water resource management and drought mitigation plans. That valuation must include recognition of water resource services in economic, environmental, recreational, and public health contexts.
10. Harmonize roles and responsibilities of cooperating institutions and reduce conflicts in applicable policies in order to yield more useful data, more efficient analyses, and more effective decision-making.



*Percent of the U.S. in severe to extreme drought.
National Drought Mitigation Center analysis of
National Climate Data Center/NOAA data.*