

**COMMITTEE ON SCIENCE, SPACE, AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES**

HEARING CHARTER

Drought Forecasting, Monitoring, and Decision-Making: A Review of the National Integrated Drought Information System

Wednesday, July 25th, 2012
10:00 a.m. to 12:00 p.m.
2318 Rayburn House Office Building

PURPOSE

On Wednesday, July 25th, 2012, the Committee on Science, Space, and Technology will hold a legislative hearing to examine the state of drought forecasting, monitoring, and decision-making and the role the National Integrated Drought Information System (NIDIS) serves in drought planning. Additionally, the Committee will receive testimony on draft legislation entitled, “The National Integrated Drought Information System Reauthorization Act of 2012.” Witnesses have been asked to provide comments on, and suggestions to, this discussion draft.

WITNESSES

Dr. Roger S. Pulwarty, Director, National Integrated Drought Information System, National Oceanic and Atmospheric Administration (NOAA)

The Honorable Gregory A. Ballard, Mayor, City of Indianapolis

Mr. J.D. Strong, Executive Director, Oklahoma Water Resources Board

Dr. James S. Famiglietti, Professor and Director, Earth System Science, University of California, Irvine

Ms. Patricia Langenfelder, President, Maryland Farm Bureau

Background

The definition of drought, the conditions that lead to a drought, and the defining features of a drought can vary depending on geographic location or region; characteristics of a drought in one region may be different from those elsewhere. However, drought can be loosely defined as the absence of water and further identified as a “condition of moisture deficit to have an adverse

effect on vegetation, animals, and man over a sizeable area.”¹ Droughts are generally associated with periods of dry weather characterized by a shortage of precipitation (meteorological droughts). These conditions can cause hydrologic imbalances and lead to below average water levels in streams, reservoirs, and groundwater aquifers (hydrological droughts), and can adversely affect agriculture and livestock operations (agricultural droughts), negatively impact flora and fauna, and also strain water resources for affected municipalities and communities. The severity of droughts depends upon many factors, including the degree of moisture deficiency, duration of the conditions, and the size of the affected area. The variability of the definition, and the conditions that cause droughts, presents unique challenges in identifying the onset, severity, and duration of a drought. As no single operational definition works in all circumstances, planning for and recognizing droughts can be difficult².

Classifying Drought

Drought has afflicted portions of North America for thousands of years. Severe, long-lasting droughts may have been a factor in the disintegration of Pueblo society in the Southwest during the 13th century, and in the demise of central and lower Mississippi Valley societies in the 14th through 16th centuries. In the 20th century, droughts in the 1930s (Dust Bowl era) and 1950s were particularly severe and widespread. In 1934, 65% of the contiguous United States was affected by severe to extreme drought.³

The US Drought Monitor (see Figure 1 below) provides a summary of drought conditions across the country by combining a variety of drought indices and indicators into a single composite drought indicator, updated weekly⁴. The map classifies drought conditions based on four levels of intensity ranging from moderate to exceptional, similar to the scale used to communicate the intensity of tornados and hurricanes, and also includes a classification for conditions of abnormal dryness⁵. The map also identifies areas that are in a short or long term drought, based on whether they are hydrological or agricultural, respectively.

According to the July 17, 2012 US Drought Monitor data, over seventy percent of the country is currently classified as abnormally dry or worse. Additionally, over half of the continental US is experiencing moderate to extreme drought, and a third of the country is characterized as being in severe to extreme drought⁶ as determined by the Palmer Drought Severity Index⁷. This index classifies meteorological drought in terms of supply and demand of water by balancing needs versus precipitation.

¹ USGS Definitions of Drought, Accessible at: <http://md.water.usgs.gov/drought/define.html>.

² National Drought Mitigation Center, University of Nebraska, Lincoln. What is a Drought? Accessible at: <http://drought.unl.edu/DroughtBasics/WhatisDrought.aspx>.

³ Congressional Research Service. *Drought in the United States: Causes and Issues for Congress*. RL34580. June 12, 2012.

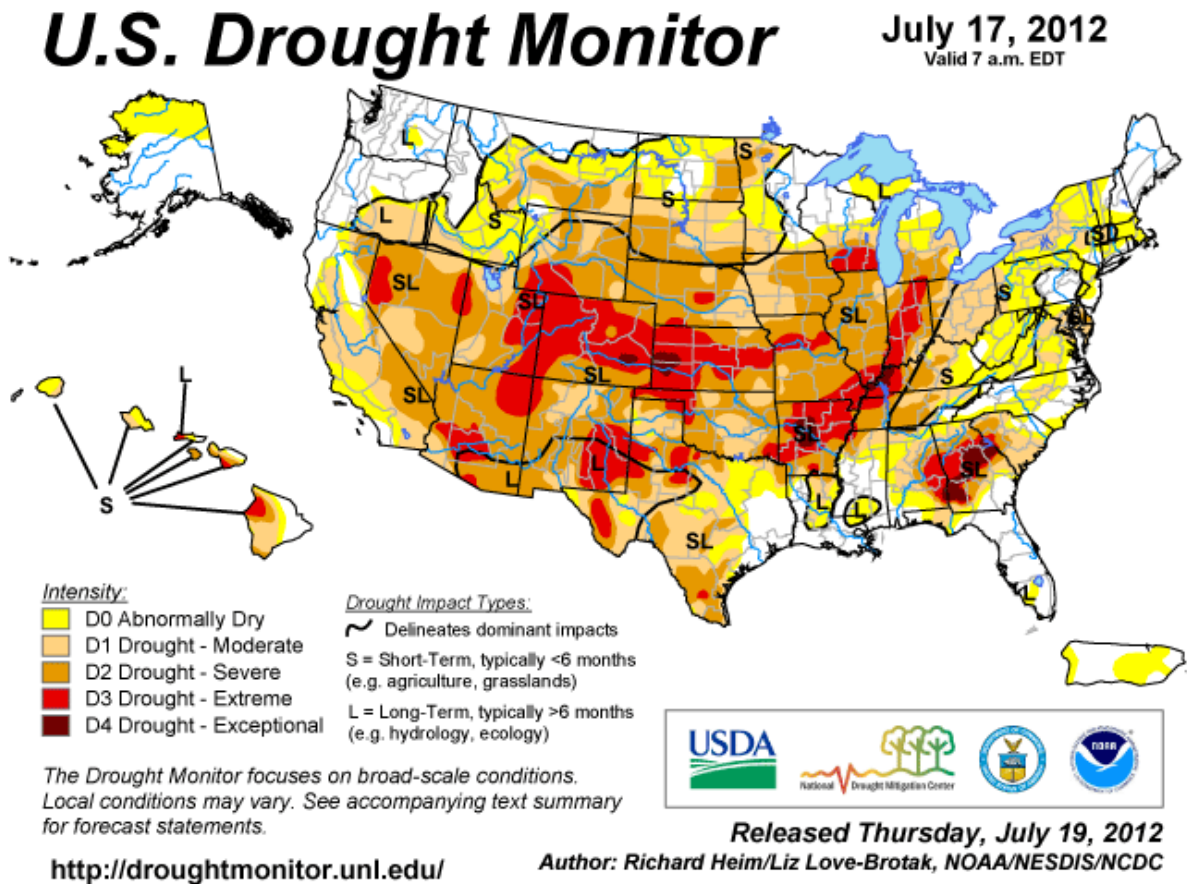
⁴ The US Drought Monitor was unveiled in August 1999 at a White House press conference, and was the culmination of experts' recognition of the need for a simple and accurate way to communicate drought conditions to decision makers and the public. Accessible at: <http://droughtmonitor.unl.edu/>.

⁵ D0=Abnormally Dry; D1=Moderate; D2=Severe; D3=Severe; D4=Exceptional

⁶ Data accessible at http://droughtmonitor.unl.edu/DM_tables.htm?conus.

⁷ http://www.drought.gov/portal/server.pt/gateway/PTARGS_0_2_693_208_0_43/http%3B/drought.unl.edu/Planning/Monitoring/ComparisonofIndicesIntro/PDSI.aspx

Figure 1. U.S. Drought Monitor⁸



According to the Department of Agriculture (USDA), the current widespread drought conditions are having an impact on the Nation’s corn and soybean crops; as of July 17, 2012, 88 percent of the country’s corn and 87 percent of the country’s soybeans are in drought-stricken areas⁹. As shown in Figure 2, Secretary of Agriculture Tom Vilsack has designated 1,055 counties across the country as disaster areas¹⁰ due to drought conditions. A drought disaster is declared if 30 percent of the commodities in the county have been damaged due to drought conditions. On July 11, 2012, USDA streamlined its rules for disaster determinations, declaring that any county experiencing D2 (see intensity scale in Figure 1) or greater for eight weeks shall be granted a disaster designation.¹¹

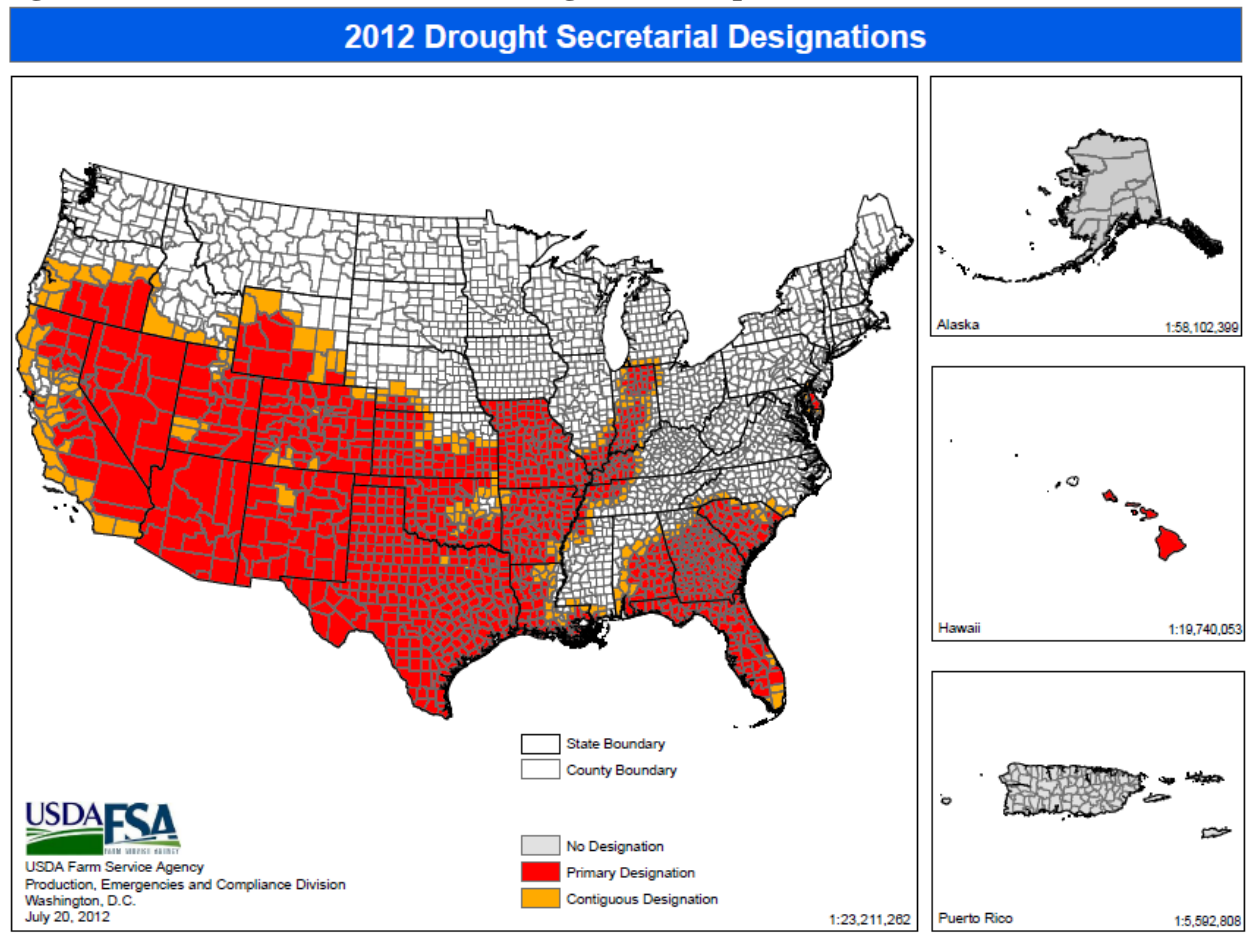
⁸ NIDIS Drought Portal, U.S. Drought Monitor. Accessible at www.drought.gov.

⁹ Weekly Column: The Means to Help Producers Impacted by Drought, July 20, 2012. Accessible at <http://content.govdelivery.com/bulletins/gd/USDAOOC-4a7395>.

¹⁰ *Ibid.*

¹¹ Brown, Tanya. USDA Farm Services Administration Fence Post, *New Designation Process Fast-Tracks Thousands of Counties into Disaster Status*, July 11, 2012. Accessible at: <http://fsa.blogs.govdelivery.com/2012/07/11/new-designation-process-fast-tracks-thousands-of-counties-into-disaster-status/>.

Figure 2. USDA Secretarial Disaster Designations Map¹²



History of the National Integrated Drought Information System

In 1998, Congress passed the National Drought Policy Act¹³, establishing the National Drought Policy Commission to provide advice and recommendations on the creation of an integrated, coordinated Federal policy designed to prepare for, and respond to, serious drought emergencies. The Commission submitted the report, *Preparing for Drought in the 21st Century*, to Congress in 2000.¹⁴ The recommendations in this report included a policy shift from drought relief to drought preparedness, and urged coordination in delivering federal drought-related services and data. The report called for improved collaboration to enhance the effectiveness of observation networks, monitoring, prediction, information delivery, and applied research and specifically advocated a comprehensive information gateway for drought-related data. This report inspired the Western

¹² Accessible at http://www.fsa.usda.gov/Internet/FSA_File/drought_secretarial_desig_12.pdf.

¹³ Public Law 105-199; 105th Congress, H.R. 3035, National Drought Policy Act. Accessible at: <http://www.gpo.gov/fdsys/pkg/BILLS-105hr3035enr/pdf/BILLS-105hr3035enr.pdf>.

¹⁴ Report of the National Drought Policy Commission. *Preparing for Drought in the 21st Century*. Accessible at: <http://govinfo.library.unt.edu/drought/finalreport/fullreport/pdf/reportfull.pdf>.

Governors Association 2004 report, “Creating a Drought Early Warning System for the 21st Century,” which conceptualized the NIDIS program.¹⁵

These reports ultimately led to H.R. 5136¹⁶, the National Integrated Drought Information Act of 2006, introduced by Congressmen Ralph Hall and Mark Udall in April of 2006 and subsequently referred to the Committee on Science. On May 4, 2006, the Environment, Technology and Standards Subcommittee held a legislative hearing on the proposed bill and the state of drought forecasting, drought information needs. The bill was later considered by the full Committee on June 7, 2006 and passed both the House and the Senate unanimously on September 26, 2006 and on December 6, 2006, respectively. On December 20, 2006, President George W. Bush signed the bill into law (Public Law 109-460).

The NIDIS Act defined drought as “a deficiency in precipitation that leads to a deficiency in surface or subsurface water supplies and causes or may cause substantial economic or social impacts or substantial physical damage or injury to individuals, property, or the environment.” The law established a NIDIS program (the “Program”) at the National Oceanic and Atmospheric Administration (NOAA), and tasked the Program with providing an effective early warning system, coordinating and integrating Federal research in support of the early warning system, and building upon existing forecasting and assessment programs and partnerships. NOAA was also required by the law to consult with relevant Federal, regional, State, tribal, and local government agencies, research institutions, and the private sector in developing the Program.

Implementation

The Program is housed in the Climate Program Office within the Office of Oceanic and Atmospheric Research at NOAA. The goal of NIDIS is to “improve the nation’s capacity to proactively manage drought-related risks, by providing those affected with the best available information and tools to assess the potential impacts of drought, and to better prepare for and mitigate the effects of drought.”¹⁷ In support of these goals, NOAA conducted workshops with federal, state, and local agencies, academic researchers, and other stakeholders to solicit input on how to develop a path forward. This culminated in the 2007 NIDIS Implementation Plan, which outlined the governance structure, priorities, and operational requirements needed to meet the Program’s objectives. These objectives were identified as:¹⁸

- Develop the leadership and partnerships to ensure successful implementation of an integrated national drought monitoring system at federal, state, and local levels
- Foster and support a research environment that focuses on risk assessment, forecasting, and management

¹⁵ Western Governors Association, *Creating a Drought Early Warning System for the 21st Century: The National Integrated Drought Information Act*, June 2004. Accessible at: <http://www.westgov.org/wga/publicat/nidis.pdf>.

¹⁶ Public Law 109-430; 109th Congress, H.R. 5136, The National Integrated Drought Information Act of 2006. Accessible at: <http://www.gpo.gov/fdsys/pkg/PLAW-109publ430/pdf/PLAW-109publ430.pdf>.

¹⁷ The National Integrated Drought Information System Implementation Plan: A Pathway for National Resilience,” June 2007. Accessible at: <http://www.drought.gov/pdf/NIDIS-IPFinal-June07.pdf>.

¹⁸ *Ibid.*

- Create a drought early warning system capable of providing accurate, timely, and integrated information on drought conditions and associated risks at relevant spatial scales to facilitate proactive decisions
- Provide interactive delivery systems, including an internet portal, as part of the early warning information system, for easily comprehensible and standardized products; and
- Provide a framework for increasing public awareness and educating those affected by drought on how and why droughts occur, and how they impact human and natural systems.

The implementation plan also included a list of program milestones that reflect key objectives in support of the Program, and projected dates for meeting these objectives.

Table 1. NIDIS Implementation Milestones (FY 2007-2012, by year)¹⁹

Activity	Milestone	07	08	09	10	11	12	13
1	Initial portal operational capability at drought.gov	■	■					
1	Advanced portal mapping capability with GIS tools		■	■				
1	Populate drought.gov website (portal, plans, reports, agency links)		■	■	■			
1	Operational portal communities and collaborations		■	■	■	■		
1	Enhance data management and distribution		■	■	■	■	■	
1	Portal extension to hemispheric and global domains		■	■	■	■	■	
2	Drought forecast regionalization studies		■	■	■	■	■	
2	Enhance soil moisture and temperature measurements		■	■	■	■	■	■
2	Forecast verification and calibration to measurements					■	■	■
3	Coordinate with CPO Program Managers/agencies on interdisciplinary research goals	■						
3	Inventory drought-related service (federal/state/private)	■	■	■				
3	Assess national status of drought early warning	■	■	■				
3	Inventory drought-related research (federal/state/private)		■	■				
3	Coordinate drought preparedness plans		■	■				
3	Planning for adaptation			■	■	■		
3	Institutionalize "Drought Coordinator" network			■	■	■	■	
3	Enhanced regional impacts research					■	■	■
3	Implement adaptive management strategies						■	■
4	Pilot study scoping and selection	■	■					
4	NPIT workshops: Define criteria and assess partner interest and capacity for pilots		■	■				
4	First Workshop: Assessment of Drought Early Warning System Status in the United States			■	■			
4	Pilot study implementation			■	■			
4	Initial early warning prototypes				■	■		
4	Pilot study assessment and follow-on work				■	■	■	
5	Establish NIDIS Program Office, governance structure, and final Program Implementation Team	■						
5	Establish regional sub-team leads within NPIT	■						
5	Establish initial agency/state rotational assignment to NIDIS Program	■						
5	Establish NIDIS Interdisciplinary Research Coordination Board	■						
5	Extend NIDIS to National Governors' Association and Inter-basin Watershed Commission	■	■					
5	Operational workshops to assess national drought monitoring and forecasting gaps	■	■	■	■	■	■	

Current Activity

In support of the overall program goals, the NIDIS Program is engaged in the collection, consolidation, and dissemination of drought-related data and information on an ongoing basis. The Program develops “a suite of usable drought decision support tools focused on critical management indicators, thresholds and triggers, and engages and enables proactive planning by

¹⁹ Ibid.

those affected by drought...” as part of their mission²⁰. In this function, NIDIS acts as a data clearinghouse, and also works to develop and actively support a collaborative framework between researchers and managers. The Program also conducts knowledge assessments to “determine where major drought-information gaps occur and where research improvements are needed” as well as to “coordinate capabilities among those conducting research and research activities.”²¹

The NIDIS Program developed and currently operates the U.S. Drought Portal, a website that features a range of services related to drought, including historical data on past droughts, current data from climate observations, early warnings about emerging and potential droughts, decision support services for managing droughts, and a forum for stakeholders to discuss drought-related issues.²² Further, the Program developed and operates four regional drought early warning system pilot projects, which encompass the upper Colorado basin, California, the Four Corners Region of the Southwest, and the Apalachicola-Chattahoochee-Flint River Basin in the Southeast. A scoping workshop has also been scheduled for July 31-August 1, 2012 to discuss a drought early warning system pilot project for the Carolinas that will focus on coastal ecosystems.²³

In its FY 2013 budget request²⁴, NOAA requested \$13.6 million for NIDIS, a \$1.5 million increase and 0 FTEs above the FY2012 level. This increase would focus on development of additional Regional Drought Early Warning Information Systems and enable NIDIS to extend products, tools, and knowledge to areas outside of the NIDIS Pilot areas.

Table 2. NIDIS Funding, FY 2007-2012

Fiscal Year	Authorized Amount	Amount in NOAA Spend Plan
2007	\$11.0 million	\$4.0 million
2008	\$12.0 million	\$8.4 million
2009	\$13.0 million	\$10.4 million
2010	\$14.0 million	\$12.9 million
2011	\$15.0 million	\$13.7 million
2012	\$16.0 million	\$12.2 million
Total, FY 2007-2012	\$81.0 million	\$61.5 million

²⁰ Pulwarty, Roger, Fall 2011 NIDIS Drought Research Special Issue, “Coping with Drought: Research in Support of NIDIS” Volume 2, Issue 2. Accessible at:

http://drought.gov/imageserver/NIDIS/newsletter/Fall_2011_Research_Special_Issue.pdf

²¹ Ibid.

²² NOAA Climate Program Office, National Integrated Drought Information System. Accessible at:

http://www.cpo.noaa.gov/cpo_pa/nidis/pdf/NIDIS_Feb17.pdf

²³ Project Announcement, NIDIS Pilot Project in the Carolinas. Accessible at:

http://www.drought.gov/imageserver/NIDIS/workshops/carolinas_drought_early_warning_scoping_workshop_2012/docs/NIDIS-Carolinas_Pilot_Project_Announcement.pdf

²⁴ NOAA FY 2013 Budget Request Summary. Accessible at:

http://www.corporateservices.noaa.gov/nbo/fy13_bluebook/noaaBlueBook_2013_Web_Full.pdf

Section-by-Section Analysis

Purpose: To reauthorize the National Integrated Drought Information System.

Section 1: Short Title

The National Integrated Drought Information System Reauthorization Act of 2012

Section 2: NIDIS Program Amendments

Section 2 modifies Section 3 of the 2006 Act. Section 2(1) modifies the “In General” clause by adding the purpose of the NIDIS program “to better inform and provide for more timely decision making to reduce drought related impacts and costs.”

Section 2(2) modifies existing language by reorganizing in order to distinguish between the function of the NIDIS program in general and the early warning system specifically. The functions are largely the same as those in existing law, reorganized to reflect the distinction. The only additional function added is to allow NIDIS to “continue ongoing research activities related to drought.”

Section 2(3) also adds a new subsection (e) which requires the Undersecretary of Commerce to provide the Committee with a report 18 months after enactment. This report should (i) include an analysis of the implementation of NIDIS, including how the information, forecasts, and assessments are utilized in drought planning policy and response activities; (ii) describe specific plans, including future milestones, for continued development of such programs; and (iii) identify research, monitoring, and forecasting needs to enhance the predictive capability of drought early warnings, the length and severity of droughts, and the contribution of weather events to reducing or ending drought conditions. In developing this report, the Undersecretary is also required to consult with relevant Federal, regional, State, tribal, and local government agencies, research institutions, and the private sector.

Section 3: Authorization of Appropriations

Section 3 amends Section 4 of the 2006 Act to authorize appropriations for each of fiscal years 2013 through 2017. The discussion draft does not propose a specific funding level, but does propose flat funding for the included fiscal years.