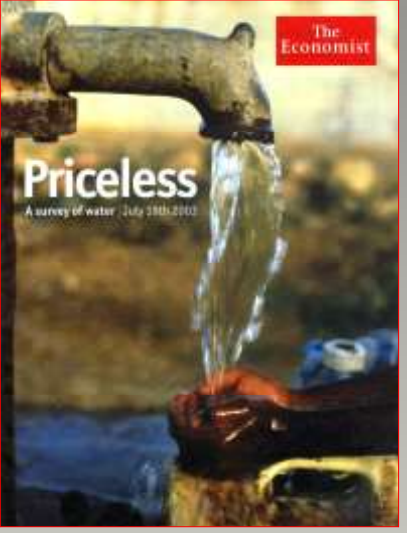
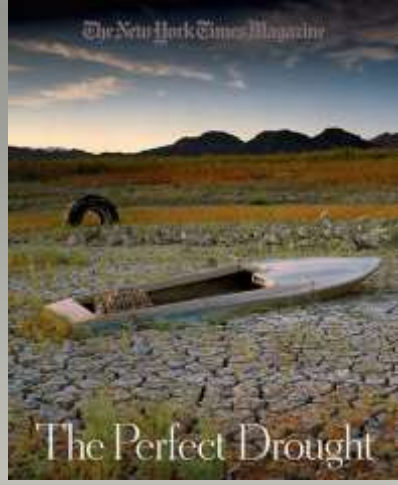


NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM



National Integrated Drought Information System (NIDIS)

Robert S. Webb
NOAA Earth System Research Laboratory
Physical Sciences Division

Roger S. Pulwarty
NOAA Climate Program Office
Climate and Societal Interactions Division

Drought Spans Weather to Climate-

Both a continuum and a cumulative deficit

Heat Waves

Storm Track Variations

Madden-Julian Oscillation

El Niño-Southern Oscillation + ?????

Decadal Variability

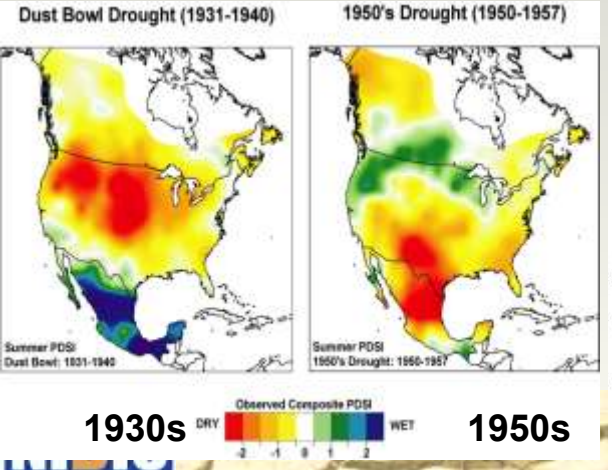
Solar Variability

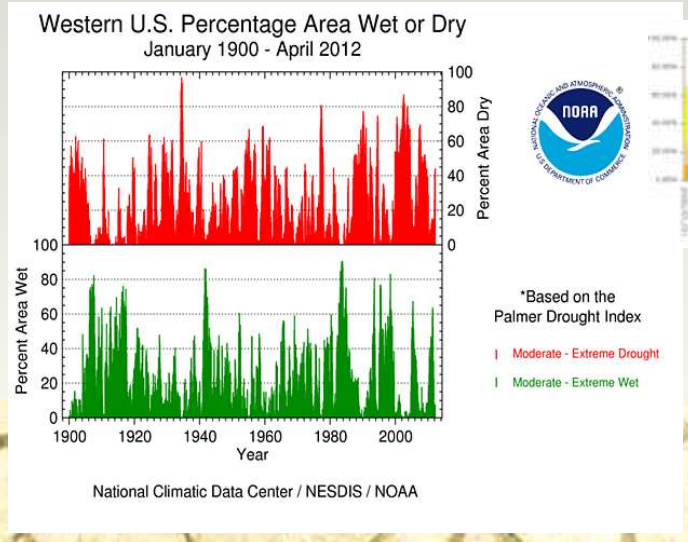
Deep Ocean Circulation

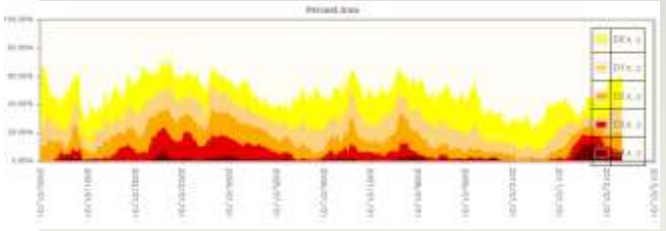
Greenhouse Gases

30 DAYS | 1 SEASON | 3 YEARS | 10 YEARS | 30 YEARS | 100 YEARS

SHORT-TERM **INTERANNUAL** **DECADE-TO-CENTURY**





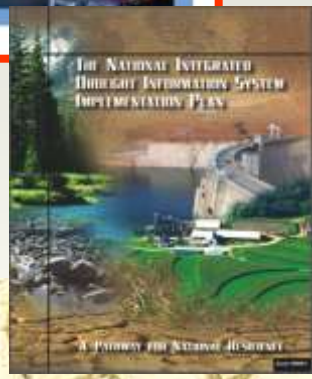


National Integrated Drought Information System

"No systematic collection and analysis of social, environmental, and economic data focused on the impacts of drought within the United States exists today"
Western Governors Association 2004

Public Law 109-430 (The NIDIS Act 2006)

"Enable the Nation to move from a reactive to a more proactive approach to managing drought risks and impacts"



"better informed and more timely drought-related decisions leading to reduced impacts and costs"

(www.drought.gov)

NIDIS

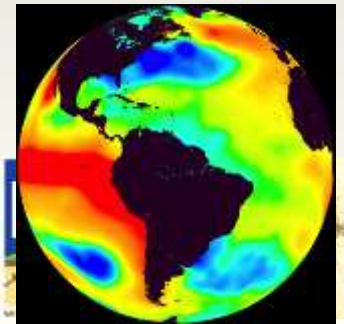
Three tasks under the NIDIS Act (PL 109-430)

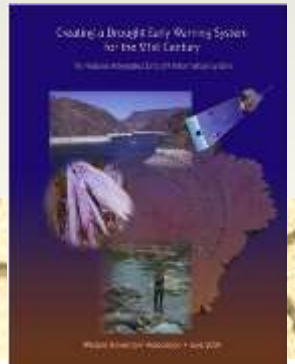
(I) **Provide an effective drought early warning system:**

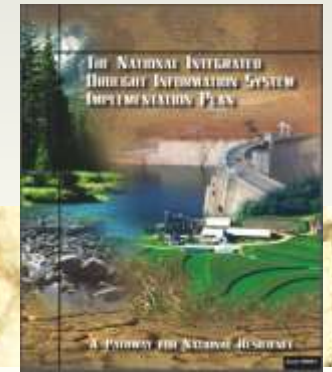
(a) collect and integrate key indicators of drought severity and impacts; and
(b) produce timely information that reflect local, regional, and State differences;

(II) **Coordinate and integrate as practicable, Federal research in support of a drought early warning system**

(III) **Build upon existing forecasting and assessment programs and partnerships**







NIDIS
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

NIDIS Components

- NIDIS Program Office
- U.S. Drought Portal
- Climate Test Beds
- Drought Task Force
- Integrating data and forecasts
- Coping with Drought
  - Applications and Decision support
  - Research (RISAs, SARP, MAPP..)
- NIDIS Early Warning
  - Information Systems
  - Design, Prototyping,
  - Implementation(multi-agency, multi-state)

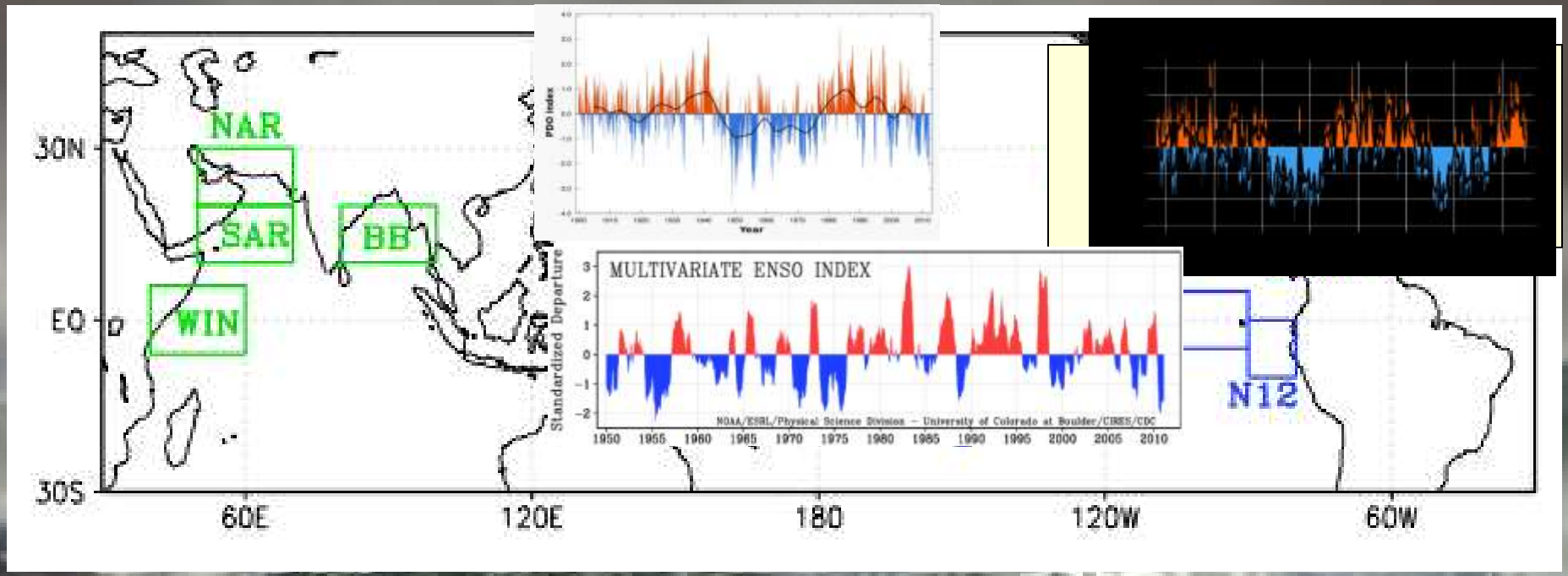
Actionable Information

- How did we get here? Status and antecedent conditions
- Is this drought like others?
- Why has it been dry/drier than normal?
- What are the impacts and where did they occur?
- What information is being provided and by whom?
- How bad might it get and how long will it last?
- Are information needs being met?
- How are we planning for this year and for longer-term risks and opportunities?

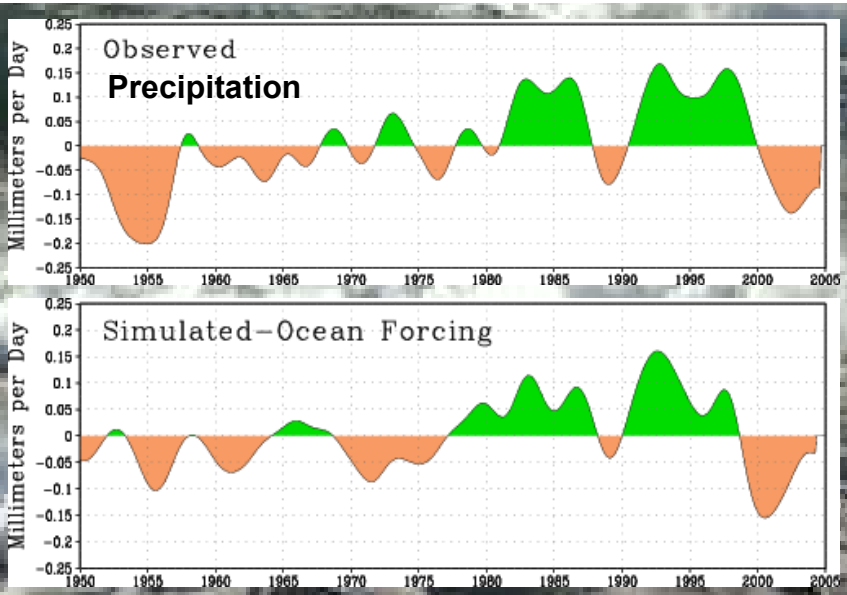
Monitoring Drought

- Sustain and enhance **observations of remote ocean surface conditions**
- Sustain and enhance ***in situ* snow and streamflow** observations
- Improved **satellite estimates of snow** amount (e.g., SWE)
- Improved sate**llite estimates and *in situ* measurements of soil moisture** (SMAP)
- Improved **real-time precipitation observations**
- Improved **estimates of evaporated losses** (evapotranspiration, sublimation)
- Estimates of **ground water/surface water interactions**

Drought Early Warning-
Useful monitoring regions for the US Southwest



Improved monitoring and projections of the ocean will be critical for the future predictions of drought in the semi-arid West.



NIDIS

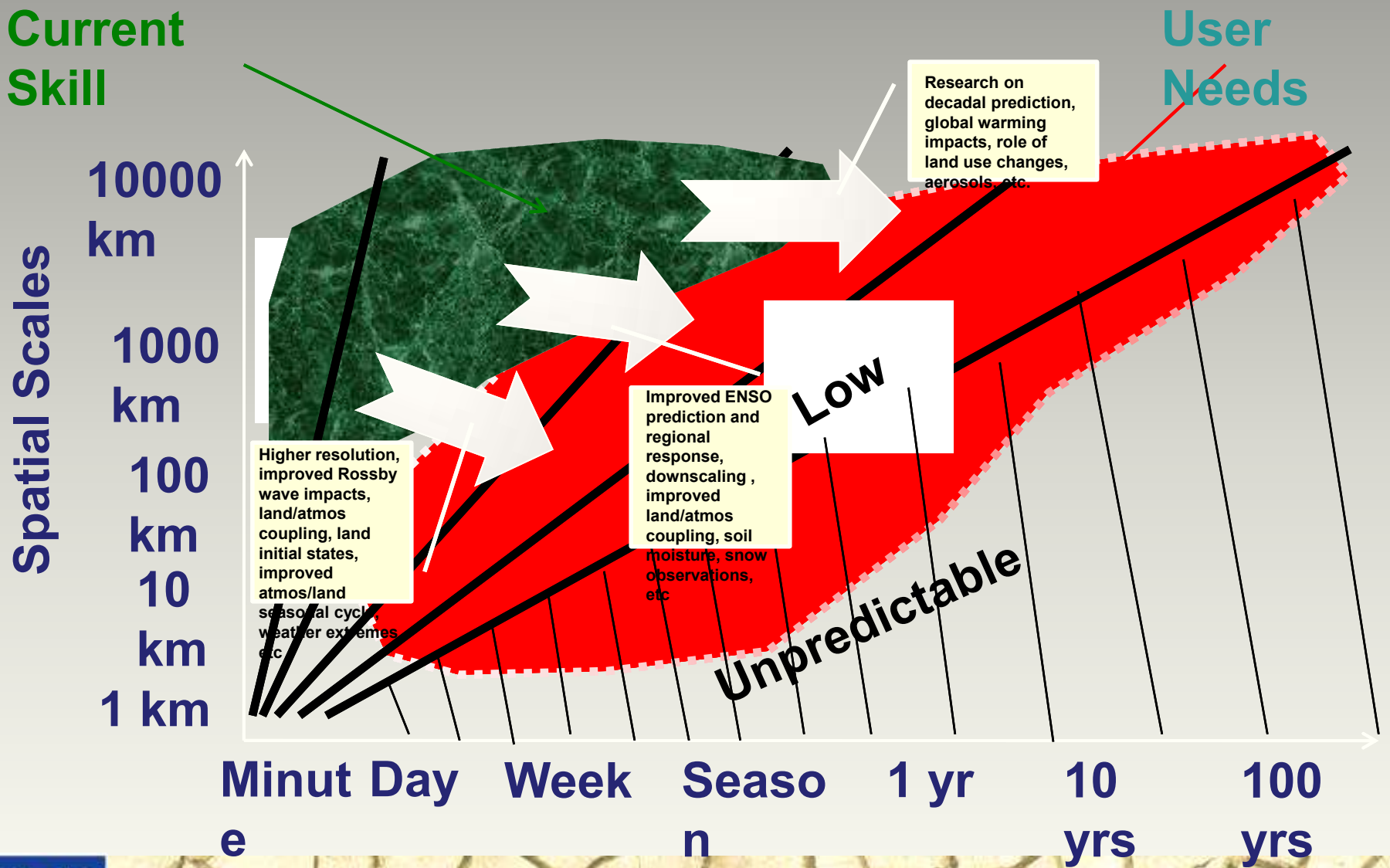
Understanding Drought

- **Role of the SST** in the various ocean basins
  - strength and nature of the connections between SST and hydrology
  - how do the impacts of SSTs in the various ocean basins interact to enhance/reduce predictability on regional scales?
- Improved understanding of the **impact of decadal variability and warming** on (will impact) droughts world-wide
- Improved understanding of the **role of land surface conditions**
- Comprehensive **assessment of the underlying predictability** of surface temperature, precipitation, soil moisture, and stream flow on monthly to decadal time scales, and comparisons with forecast skill
- **Near real-time explanations of drought** (What happened? Why did it happen? What is the likelihood continuing or recurring?)
- **Analysis of significant past events**

Drought Prediction

- Improved **prediction capabilities** drawing on expertise at national laboratories and centers and key academic partners
- Improved satellite estimates of snow amount for initialization (e.g., SWE)
- Improved **satellite estimates of soil moisture** for initialization (expect that from SMAP)
- Improved **predictions of temperature, precipitation, and other hydroclimate variables as well as extremes**
- Increased **climate model ensemble size and higher resolution** for better estimates of extremes (changes in the tails of the PDF)
- Understand the **role of extreme weather events** (drought busters and persistence of large scale circulation patterns) and climate variability

Predictability (DTF, NIDIS)



Schubert 2013

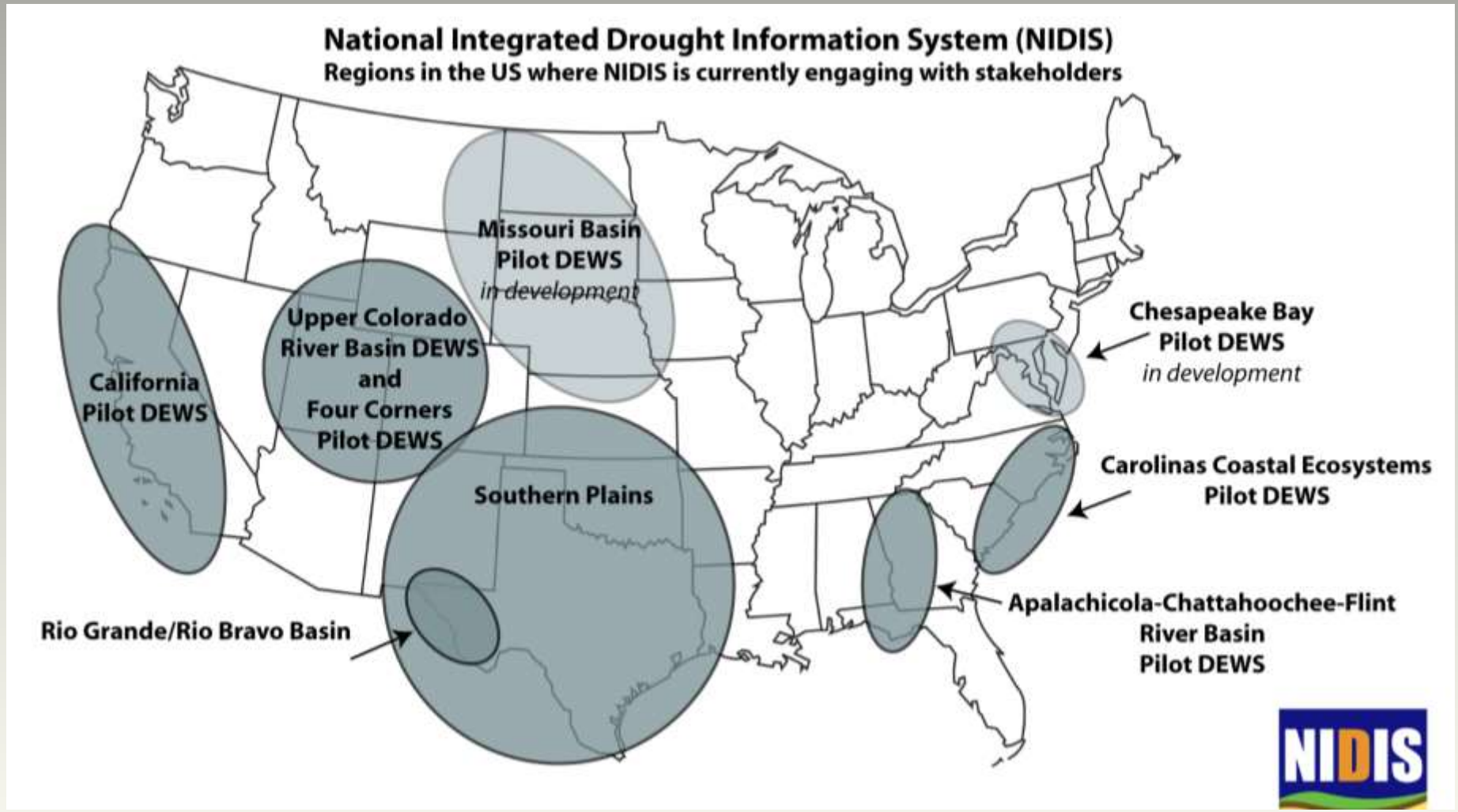
Modeling

- Improvements in the simulation of **atmosphere-land coupling**
  - Daily large-scale (not point measurements) estimates of soil moisture, evaporation, precipitation and net radiation at the surface
  - Improvements in the simulation of SSTs (Atlantic and Indian Oceans) on seasonal to interannual time scales
- Improvements in the simulation of **warm season climatology** including the stationary (planetary) waves and precipitation over land (problematic: US Great Plains moisture and diurnal cycle)
- Improved simulation of the **key modes of variability** impacting US precipitation on monthly to seasonal time scales including stationary Rossby waves (summertime), the MJO, the NAO, PNA, and ENSO

Forecasting Drought

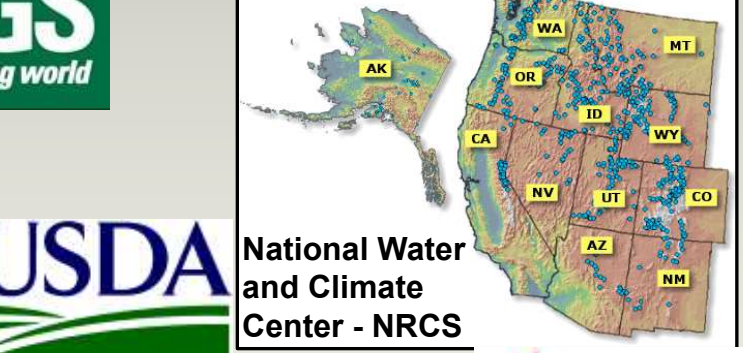
- Improve **reliability and skill of forecasts** including characterization uncertainty and opportunities for conditional skill *(conditioned on interannual and decadal variability)*
- Improve **forecasts of onset and termination** (dominant sources of skill and reliability from persistence of conditions and knowledge of antecedent conditions – *thus the critical role for monitoring*)
- **Objective and reproducible** NOAA Drought Outlook (*National MultiModel Ensemble, NMME*)
- Improved **identification and use of analog year information**
- Advances in **Land-Data Assimilation Systems** (LDAS)
- Enhanced **ENSO Plume Model Forecasts**
- Updated **Optimal Climate Normals** (Temperature & Precipitation)
- Experimental **Climate Divisions** and **Regional Forecasts**

Regional Challenges/Regional Answers



Actionable Information: Missouri River Basin

Inter-Agency Proposal for an Expanded Plains Snow and Basin Conditions Network

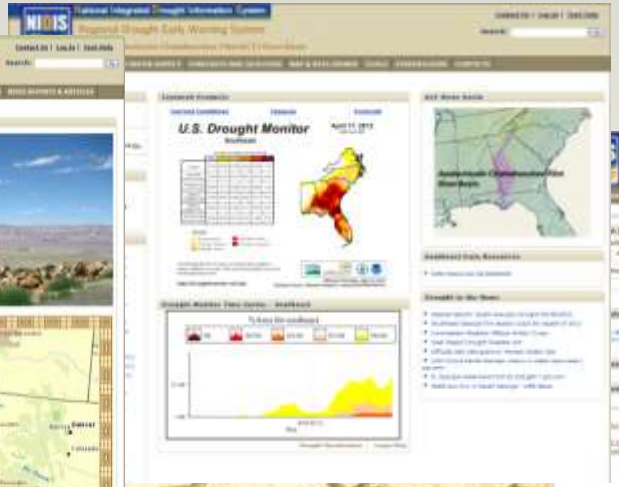


National Water and Climate Center - NRCS

Recognized State Climate Office

Thanks to Kevin Grose (USACE) for these slides

Drought Portal Regional Pages



NIDIS EVALUATION SURVEY

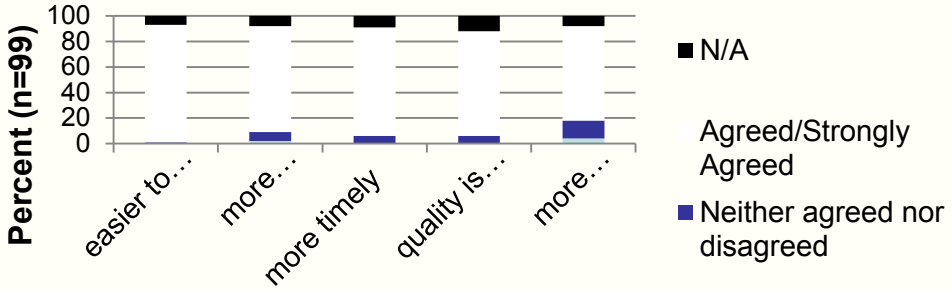
Executive Summary

Drought-Ready Communities

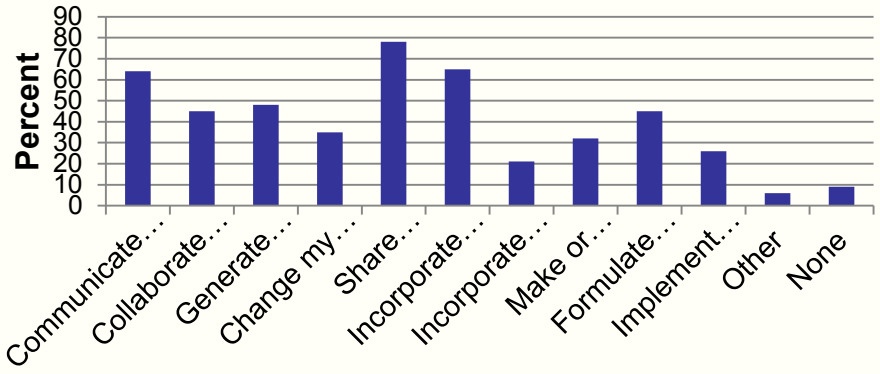
A Guide to Community Drought Preparedness

ulate outside of NIDIS
gation Center. Comments,
Tonya Haigh, NDMC,

Compare your readiness for drought before 2002 with now, information is...



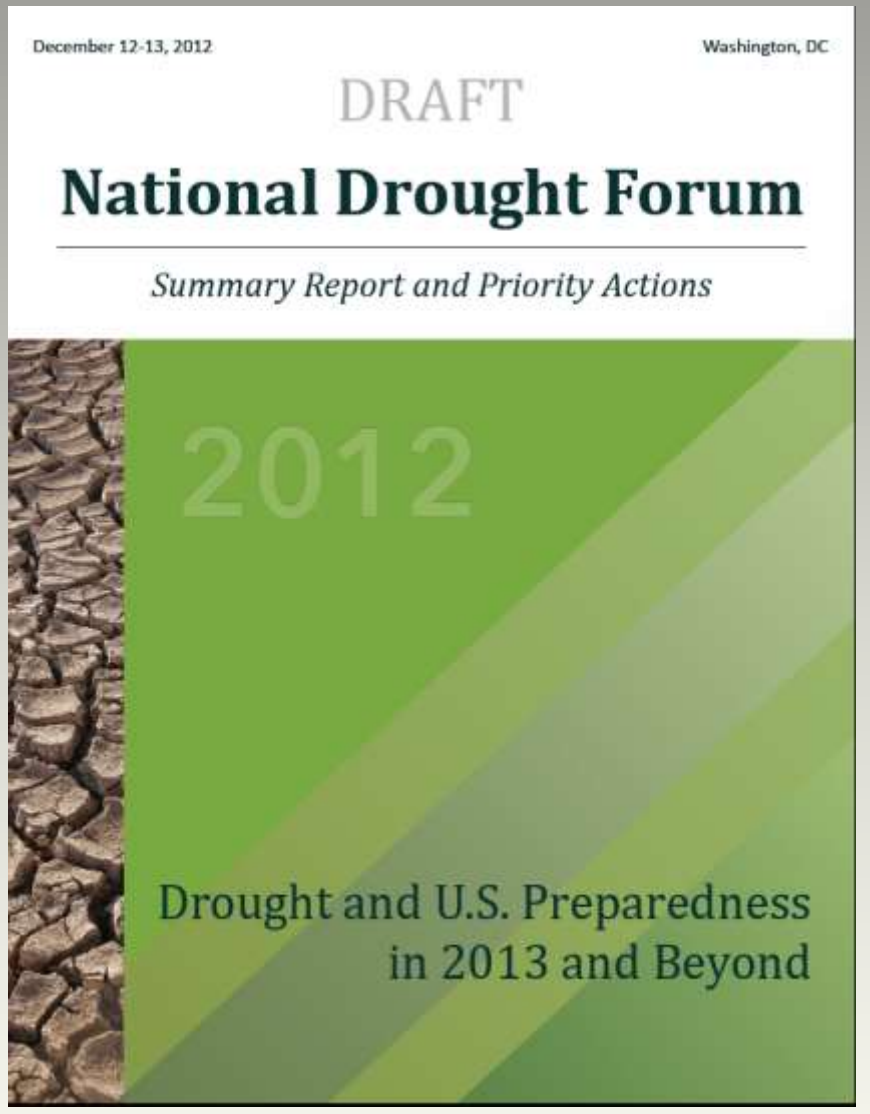
Actions Taken as a Result of NIDIS



National Drought Forum Goals

"To understand the extent of 2012 drought impacts and response in 2012, and help provide new information and coordination for improving the nations' drought readiness for 2013 and in the future"

- **Increase public awareness of current drought and potential impacts for next year**
- **Technical assistance**
- **Ensure sustained support for monitoring - stream gages and other data**
- **Outreach with impacted communities**
- **Conservation plans**



National Drought Forum:
The 2012 Drought and U.S. Preparedness in 2013 and Beyond
December 12-13, 2012
Hall of the States
Washington, DC

DRAFT PRIORITY ACTIONS

- **Drought Preparedness Planning & Plan Implementation** – Existing drought plans (and related resource management plans) should be reviewed and revised as appropriate, and implemented in order to proactively reduce and mitigate the impacts from drought. Where drought preparedness plans do not yet exist, federal agencies, states, tribes, communities, utilities, and others should develop and implement planning processes utilizing incentives, model drought plans and technical guidance.
- **National Drought Early Warning Outlook & Communications** – Hold a series of National Drought Early Warning Outlooks, beginning in early 2013, to review ongoing forecasts for drought evolution and options for improving preparedness. In addition, provide regular, real-time coordination and information sharing with the public and among all stakeholders on the status, impacts, and prospects for drought throughout 2013 and beyond.
- **National Integrated Drought Information System (NIDIS)** – Accelerate efforts to build a nation-wide integrated drought information system across Federal, state, and tribal agencies through NIDIS, in order to complete a national "early warning information system" for drought that provides accurate, timely, and integrated information and provides a framework for public awareness and education about droughts.
- **Drought Monitoring** –Improve the observations, monitoring and forecasts related to drought in order to: 1) characterize physical drought conditions; and 2) assess socio-economic and environmental impacts across a range of time and spatial scales.

National Drought Forum:
The 2012 Drought and U.S. Preparedness in 2013 and Beyond
December 12-13, 2012
Hall of the States
Washington, DC

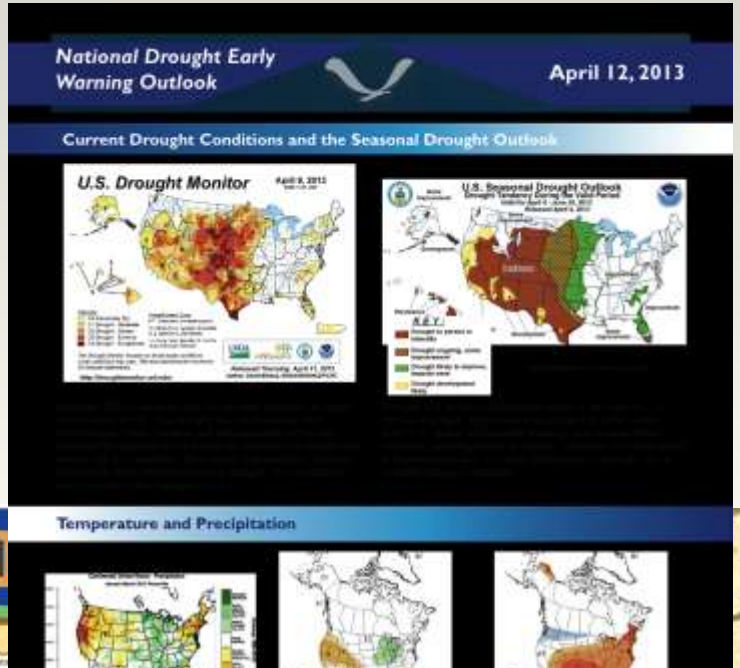
DRAFT PRIORITY ACTIONS

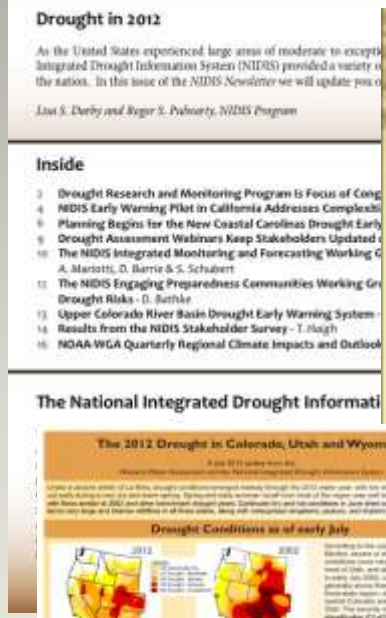
- **Congressional Authorizations** –
  - **Reclamation States Emergency Drought Relief Act of 1991**– Reauthorize the Reclamation States Emergency Drought Relief Act of 1991 in order to improve preparedness capabilities and assist affected populations and sectors. Current authorizations for this Act expired on September 30, 2012.
  - **Farm Bill** – A new Farm Bill should include key provisions and programs relevant to drought.
  - **NIDIS** – Reauthorization of the National Integrated Drought Information System Act (NIDIS) will allow for continued progress toward a national drought early warning system. Current authorizations for NIDIS expired December 31, 2012.
  - **Secure Water Act** – Reauthorization of the Secure Water Act should strengthen key provisions relevant to drought
- **National Drought Policy** – Pursue a multi-stakeholder, intergovernmental process to develop recommendations with local and private sector input for a coordinated national drought policy framework, drawing on the 2000 National Drought Policy Commission report, "Preparing for Drought in the 21st Century."

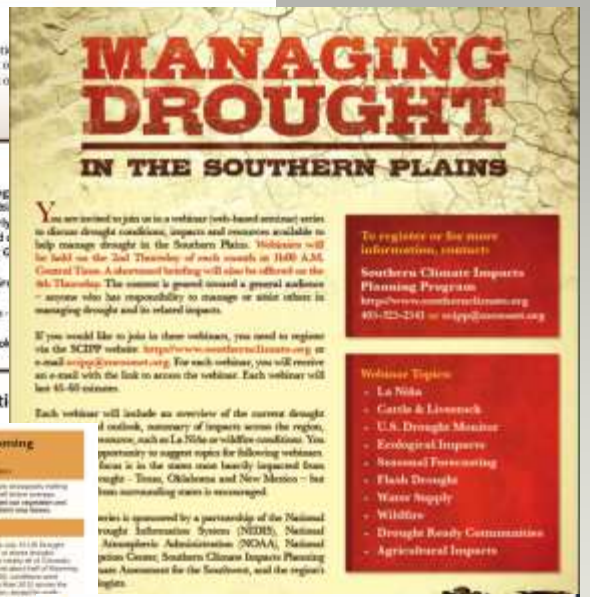
Experimental Information and Outreach

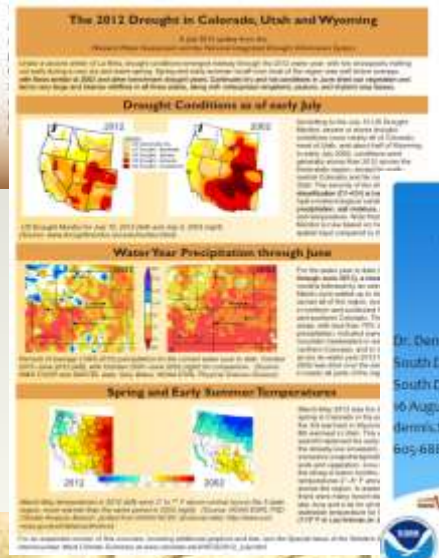
Quarterly Drought and Climate Outlooks

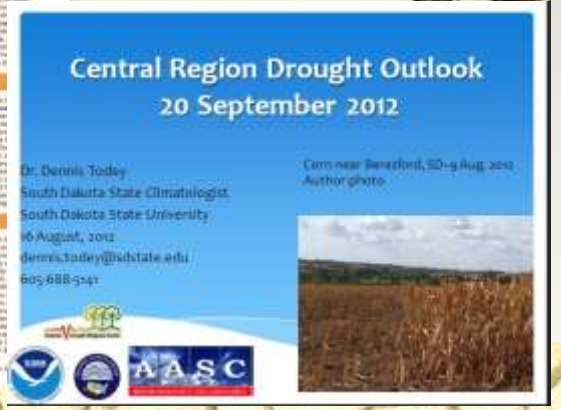
Sec. Vilsak at the National Governors Meeting



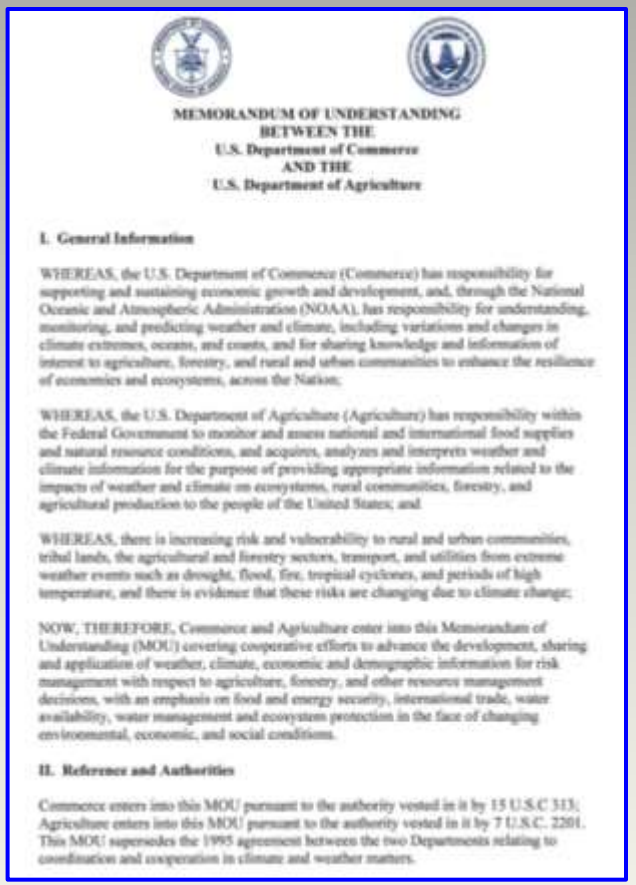








Partnerships and Agreements



MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. Department of Commerce
AND THE
U.S. Department of Agriculture

I. General Information

WHEREAS, the U.S. Department of Commerce (Commerce) has responsibility for supporting and sustaining economic growth and development, and, through the National Oceanic and Atmospheric Administration (NOAA), has responsibility for understanding, monitoring, and predicting weather and climate, including variations and changes in climate extremes, oceans, and coasts, and for sharing knowledge and information of interest to agriculture, forestry, and rural and urban communities to enhance the resilience of economies and ecosystems, across the Nation;

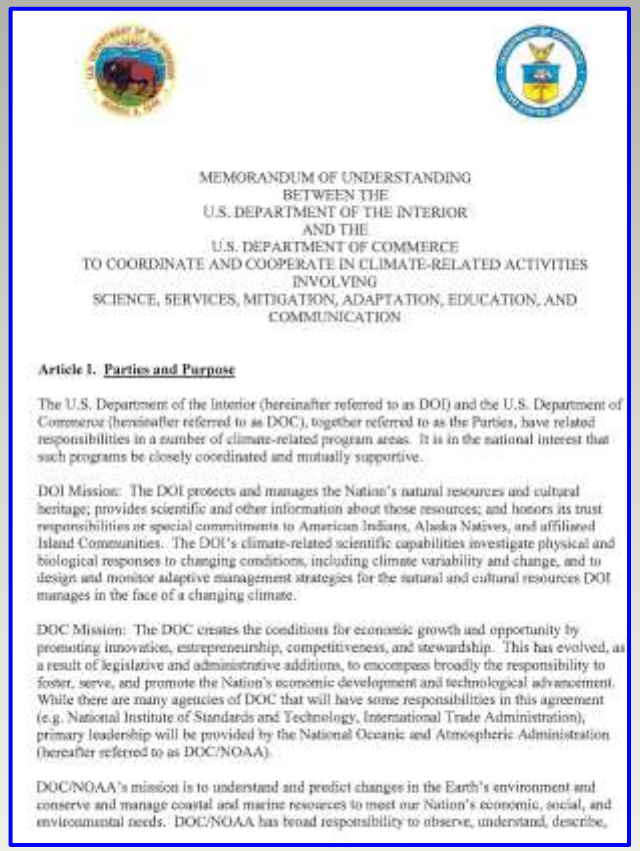
WHEREAS, the U.S. Department of Agriculture (Agriculture) has responsibility within the Federal Government to monitor and assess national and international food supplies and natural resource conditions, and acquires, analyzes and interprets weather and climate information for the purpose of providing appropriate information related to the impacts of weather and climate on ecosystems, rural communities, forestry, and agricultural production to the people of the United States; and

WHEREAS, there is increasing risk and vulnerability to rural and urban communities, tribal lands, the agricultural and forestry sectors, transport, and utilities from extreme weather events such as drought, flood, fire, tropical cyclones, and periods of high temperature, and there is evidence that these risks are changing due to climate change;

NOW, THEREFORE, Commerce and Agriculture enter into this Memorandum of Understanding (MOU) covering cooperative efforts to advance the development, sharing and application of weather, climate, economic and demographic information for risk management with respect to agriculture, forestry, and other resource management decisions, with an emphasis on food and energy security, international trade, water availability, water management and ecosystem protection in the face of changing environmental, economic, and social conditions.

II. Reference and Authorities

Commerce enters into this MOU pursuant to the authority vested in it by 15 U.S.C 313; Agriculture enters into this MOU pursuant to the authority vested in it by 7 U.S.C. 2201. This MOU supersedes the 1995 agreement between the two Departments relating to coordination and cooperation in climate and weather matters.



MEMORANDUM OF UNDERSTANDING
BETWEEN THE
U.S. DEPARTMENT OF THE INTERIOR
AND THE
U.S. DEPARTMENT OF COMMERCE
TO COORDINATE AND COOPERATE IN CLIMATE-RELATED ACTIVITIES
INVOLVING
SCIENCE, SERVICES, MITIGATION, ADAPTATION, EDUCATION, AND
COMMUNICATION

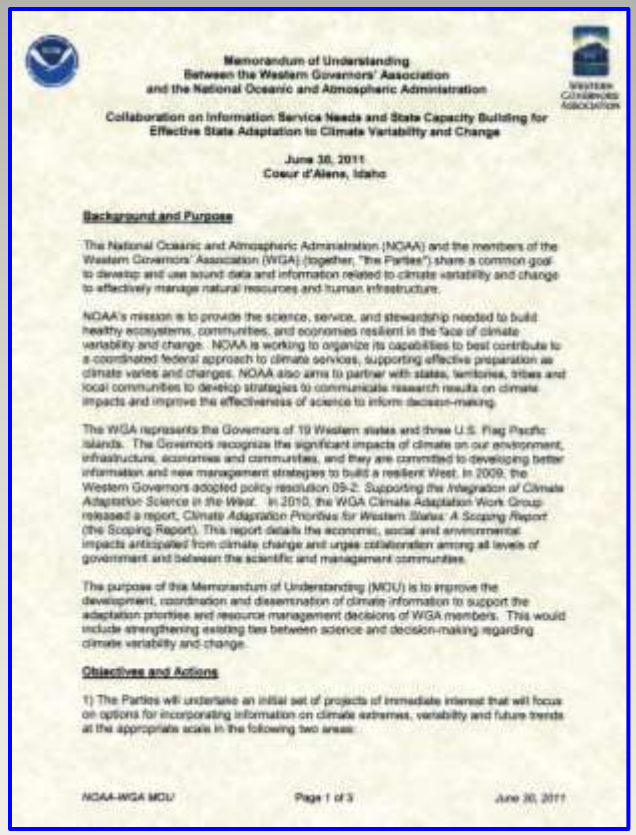
Article I. Parties and Purpose

The U.S. Department of the Interior (hereinafter referred to as DOI) and the U.S. Department of Commerce (hereinafter referred to as DOC), together referred to as the Parties, have related responsibilities in a number of climate-related program areas. It is in the national interest that such programs be closely coordinated and mutually supportive.

DOI Mission: The DOI protects and manages the Nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its trust responsibilities or special commitments to American Indians, Alaska Natives, and affiliated Island Communities. The DOI's climate-related scientific capabilities investigate physical and biological responses to changing conditions, including climate variability and change, and to design and monitor adaptive management strategies for the natural and cultural resources DOI manages in the face of a changing climate.

DOC Mission: The DOC creates the conditions for economic growth and opportunity by promoting innovation, entrepreneurship, competitiveness, and stewardship. This has evolved, as a result of legislative and administrative additions, to encompass broadly the responsibility to foster, serve, and promote the Nation's economic development and technological advancement. While there are many agencies of DOC that will have some responsibilities in this agreement (e.g. National Institute of Standards and Technology, International Trade Administration), primary leadership will be provided by the National Oceanic and Atmospheric Administration (hereafter referred to as DOC/NOAA).

DOC/NOAA's mission is to understand and predict changes in the Earth's environment and conserve and manage coastal and marine resources to meet our Nation's economic, social, and environmental needs. DOC/NOAA has broad responsibility to observe, understand, describe,



Memorandum of Understanding
Between the Western Governors' Association
and the National Oceanic and Atmospheric Administration

Collaboration on Information Service Needs and State Capacity Building for Effective State Adaptation to Climate Variability and Change

June 30, 2011
Coeur d'Alene, Idaho

Background and Purpose

The National Oceanic and Atmospheric Administration (NOAA) and the members of the Western Governors' Association (WGA) (together, "the Parties") share a common goal to develop and use sound data and information related to climate variability and change to effectively manage natural resources and human infrastructure.

NOAA's mission is to provide the science, service, and stewardship needed to build healthy ecosystems, communities, and economies resilient in the face of climate variability and change. NOAA is working to organize its capabilities to best contribute to a coordinated federal approach to climate services, supporting effective preparation as climate varies and changes. NOAA also aims to partner with states, territories, tribes and local communities to develop strategies to communicate research results on climate impacts and improve the effectiveness of science to inform decision-making.

The WGA represents the Governors of 19 Western states and three U.S. Flag Pacific Islands. The Governors recognize the significant impacts of climate on our environment, infrastructure, economies and communities, and they are committed to developing better information and new management strategies to build a resilient West. In 2009, the Western Governors adopted policy resolution 09-2, *Supporting the Integration of Climate Adaptation Science in the West*. In 2010, the WGA Climate Adaptation Work Group released a report, *Climate Adaptation Priorities for Western States: A Scoping Report* (the Scoping Report). This report details the economic, social and environmental impacts anticipated from climate change and urges collaboration among all levels of government and between the scientific and management communities.

The purpose of this Memorandum of Understanding (MOU) is to improve the development, coordination and dissemination of climate information to support the adaptation priorities and resource management decisions of WGA members. This would include strengthening existing ties between science and decision-making regarding climate variability and change.

Objectives and Actions

1) The Parties will undertake an initial set of projects of immediate interest that will focus on options for incorporating information on climate extremes, variability and future trends at the appropriate scale in the following two areas:

NOAA-WGA MOU Page 1 of 3 June 30, 2011

NIDIS

S. 376 : Drought Information Act of 2013

INTRODUCED

Feb 25, 2013 (113*th* Congress, 2013–2015)

SPONSOR

Senator Mark Pryor [D-AR]

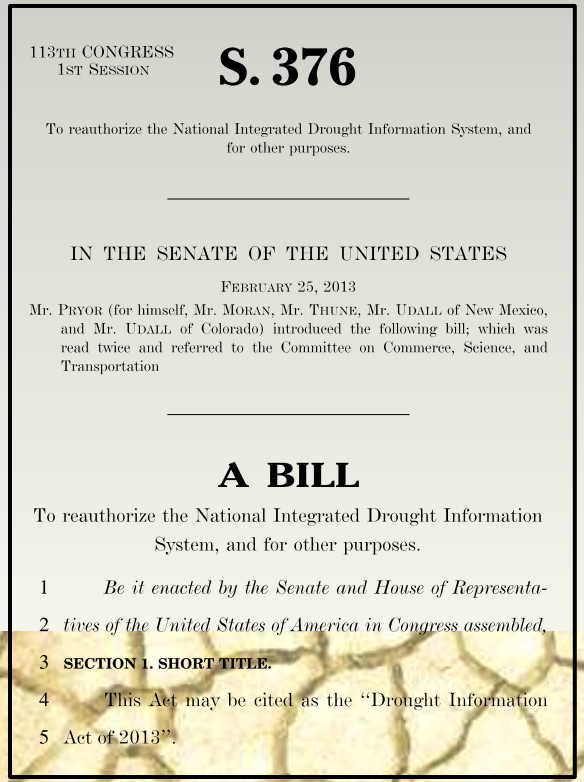
STATUS

This bill was assigned to a congressional committee on February 25, 2013, which will consider it before possibly sending it on to the House or Senate as a whole.

PROGRESS

Introduced	Feb 25, 2013
Referred to Committee	Feb 25, 2013

H.R. 6489: National Integrated Drought Information System Reauthorization Act of 2012
Introduced:
Sep 21, 2012 (112*th* Congress, 2011–2013)
Sponsor:
Representative Ralph Hall [R-TX4]
Status:
Died (Referred to Committee) ☹



113TH CONGRESS
1ST SESSION

S. 376

To reauthorize the National Integrated Drought Information System, and for other purposes.

IN THE SENATE OF THE UNITED STATES

FEBRUARY 25, 2013

Mr. PRYOR (for himself, Mr. MORAN, Mr. THUNE, Mr. UDALL of New Mexico, and Mr. UDALL of Colorado) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

A BILL

To reauthorize the National Integrated Drought Information System, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

SECTION 1. SHORT TITLE.

This Act may be cited as the "Drought Information Act of 2013".

Bill language explicitly includes "*the role of extreme weather events and climate variability in drought*" ☺

Recent Congressional Engagement

Senate Committee on Agriculture Nutrition & Forestry

Home > Hearings

Drought, Fire and Freeze: The Economics of Disasters for America's Agricultural Producers

Date: Thursday, February 14, 2013
Time: 09:30 AM
Location: 328A Russell Senate Office Building

From the devastation of the Dust Bowl in the '30s to the historic droughts that parched much of the country last year, weather disasters have played a significant role in the story of American agriculture – as well as the nation's economic security. This hearing examined the toll weather disasters have taken on American agriculture – which employs 16 million Americans – and what steps can be taken to safeguard the economy from future catastrophes. Witnesses included **Dr. Joe Glauber**, Chief Economist at the U. S. Department of Agriculture, and **Dr. Roger Pulwarty**, Director of the National Integrated Drought Information System at the National Oceanic and Atmospheric Administration, as well as farmers and ranchers from across the country.

Open in New Window

Senate Committee on on Energy & Natural Resource

Apr 25 2013

FULL COMMITTEE HEARING: Exploring the Effects of Drought on Energy and Water Management

SD-366 Senate Dirksen Building 09:55 AM

The purpose of this hearing is to explore drought and the effects on energy and water manager decisions.

The hearing will be webcast live on the committee's website, and an archived video will be availa shortly after the hearing is complete. Witness testimony will be available on the website at the s of the hearing.

Archived Webcast