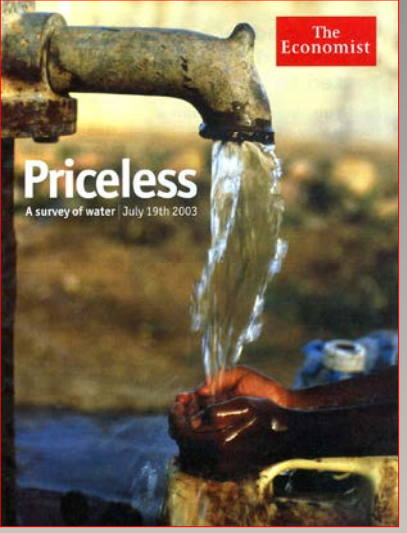
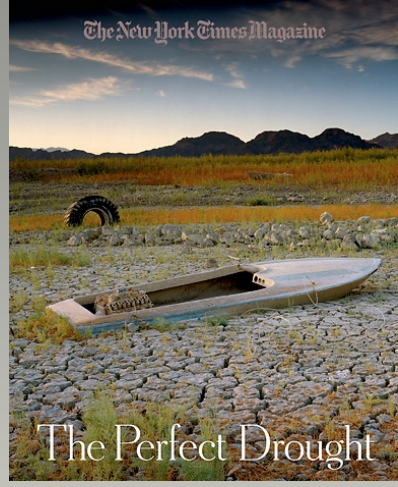


NIDIS
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM



National Integrated Drought Information System (NIDIS) Activities and Reauthorization

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

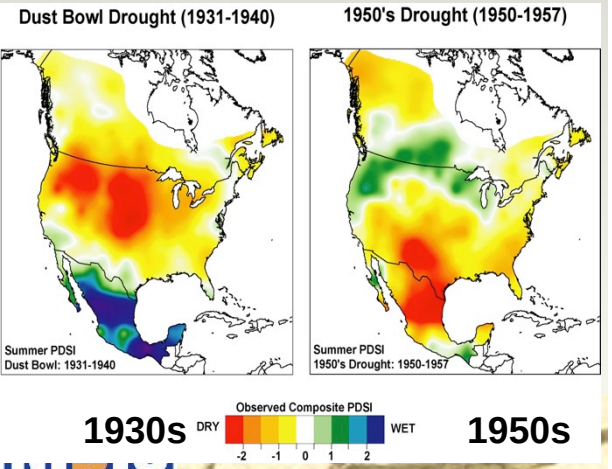
Solar Variability

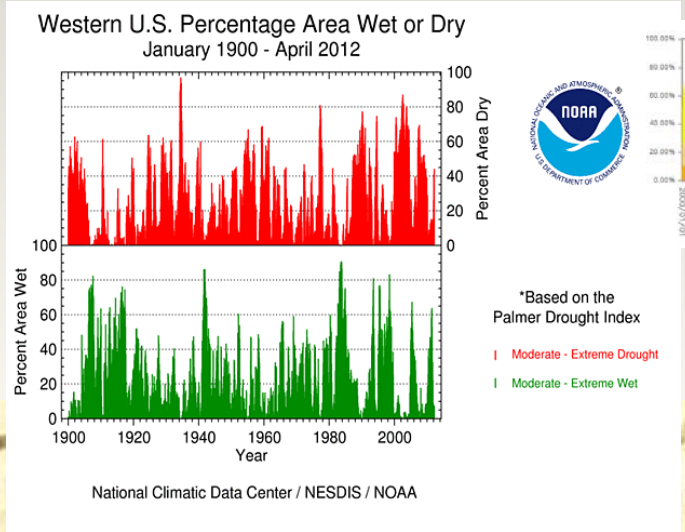
Deep Ocean Circulation

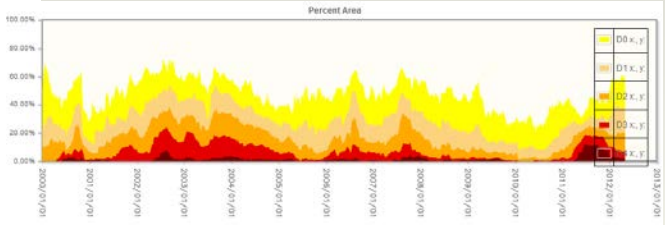
Greenhouse Gases

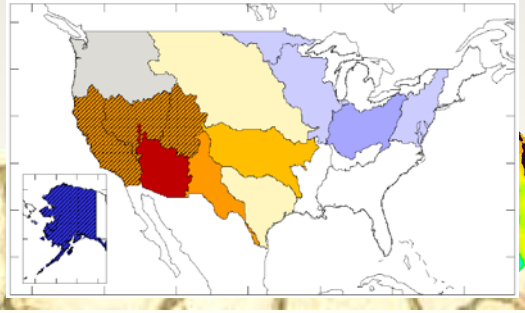
30 DAYS | 1 SEASON | 3 YEARS | 10 YEARS | 30 YEARS | 100 YEARS

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
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

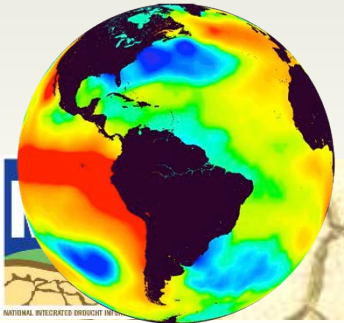
Three tasks under the NIDIS Act (PL 109-430)

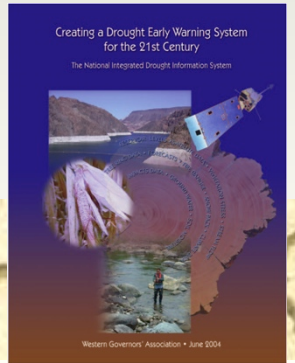
(I) **Provide an effective drought early warning system:**

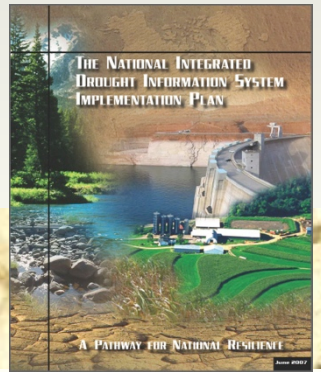
(a) collect and integrate key indicators of drought severity and impacts;
(b) produce timely information that reflect local, regional, and state differences

(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 Answers

- 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**

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 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

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

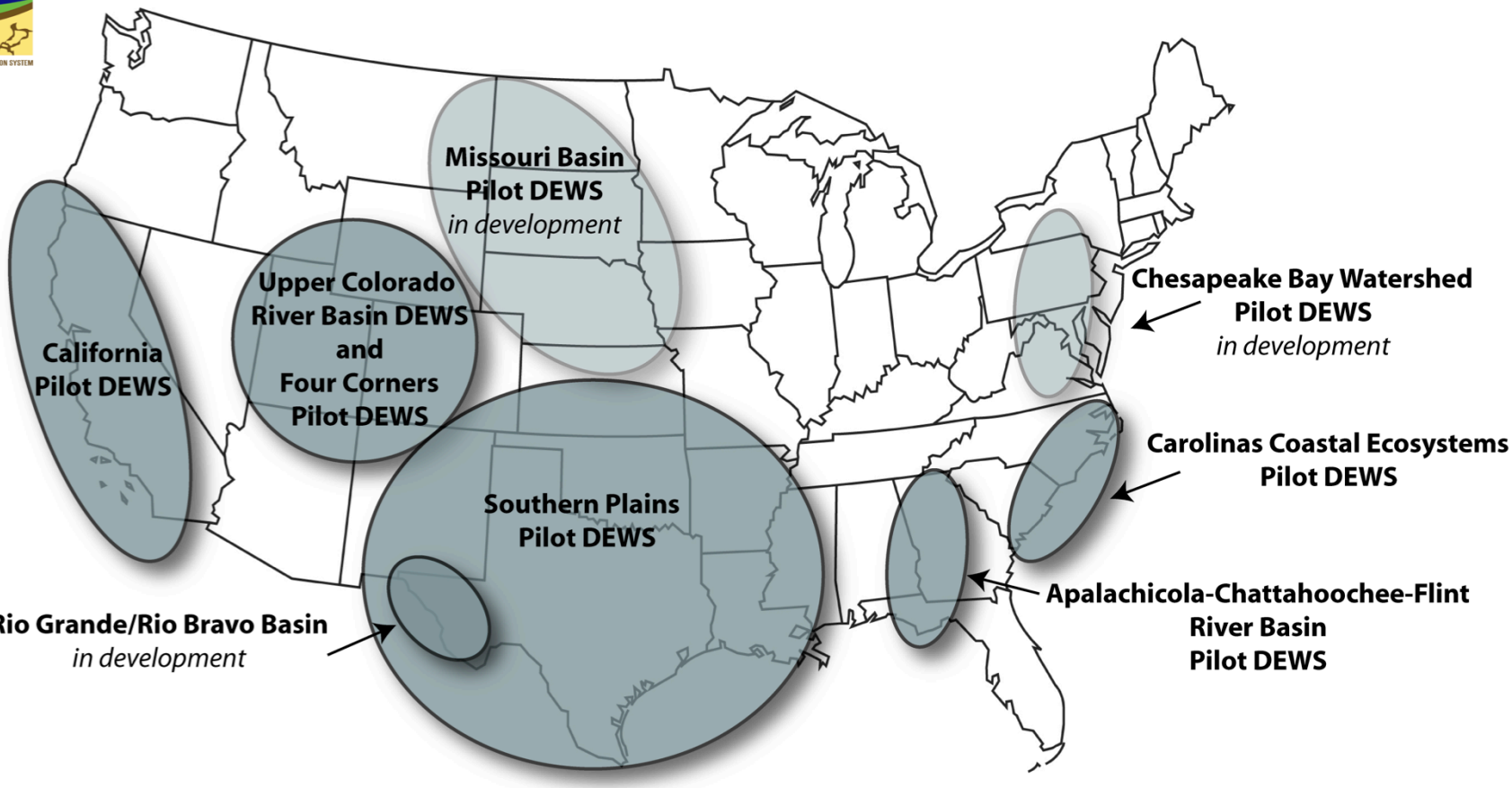
Forecasting Drought

- 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 Solutions

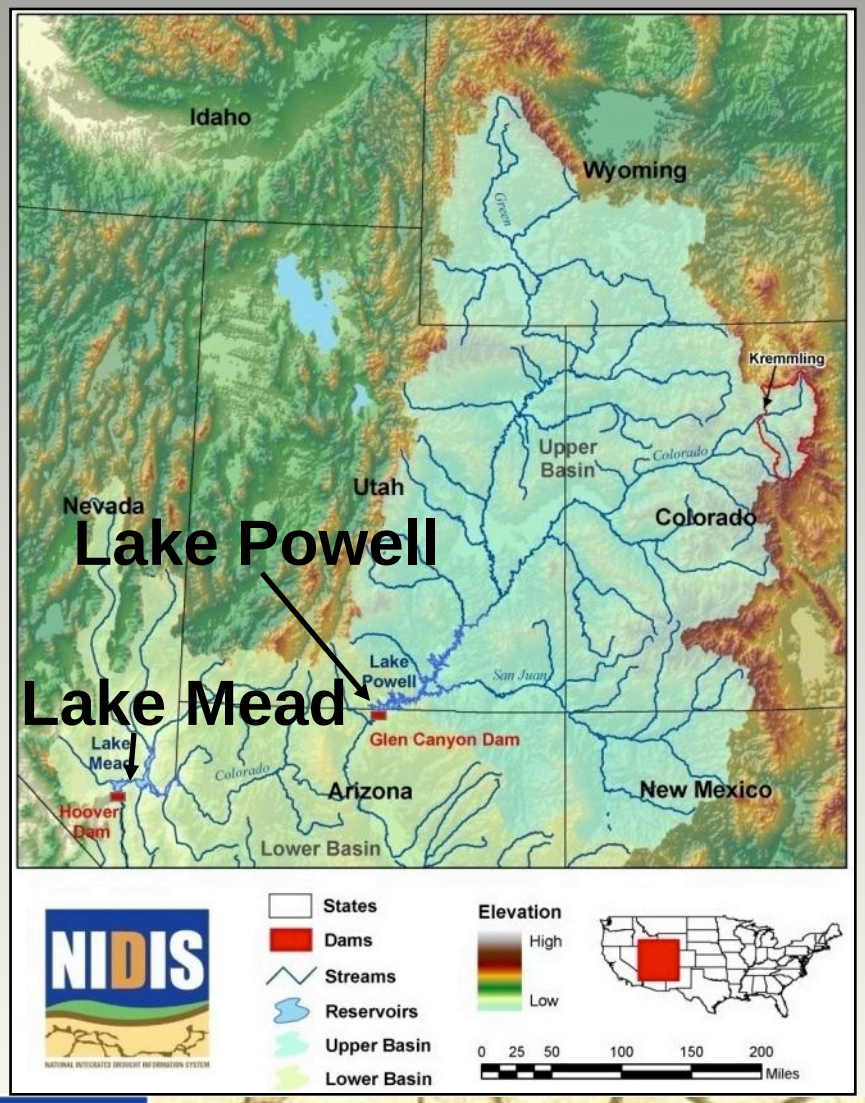
National Integrated Drought Information System (NIDIS)

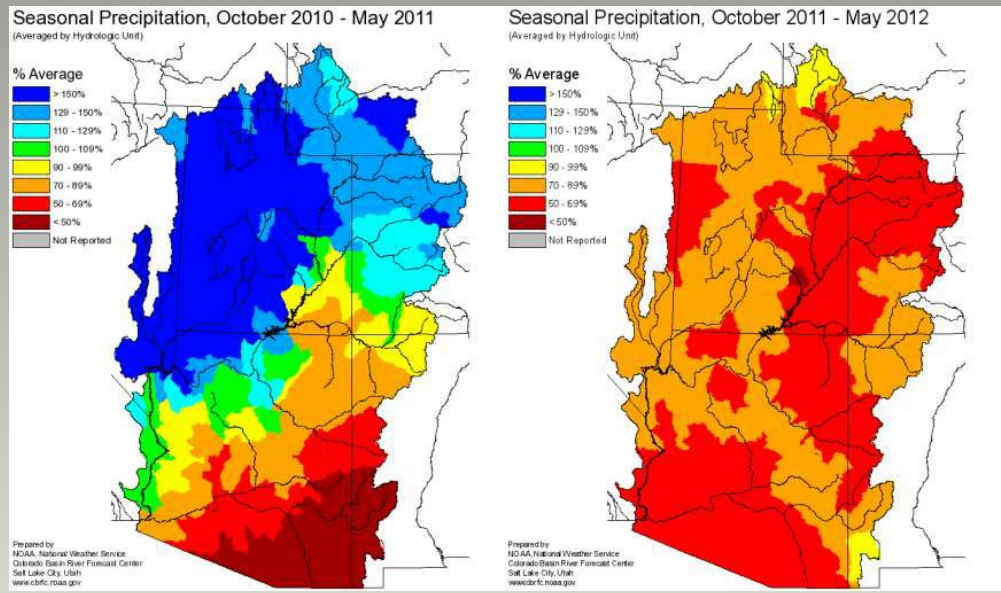
Regions in the US where NIDIS is currently developing drought early warning information systems

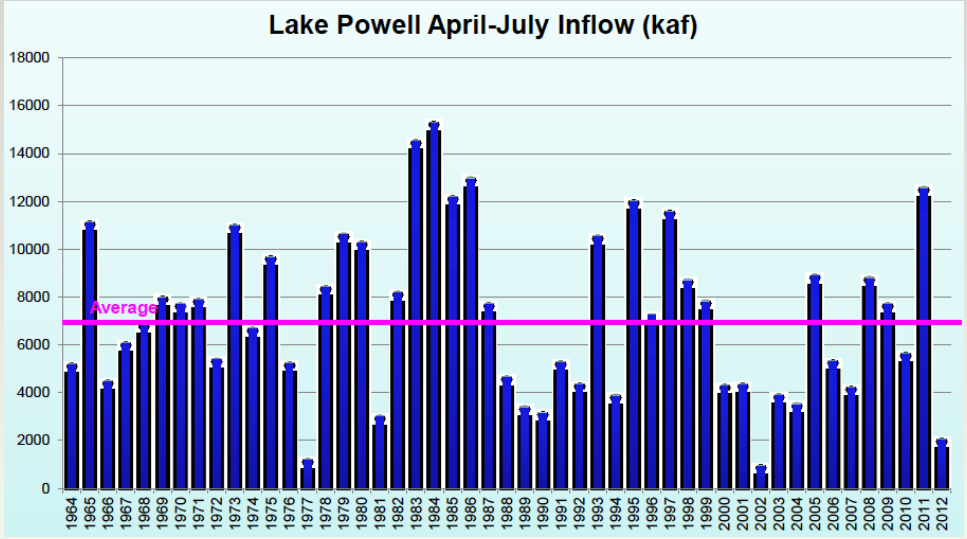


NIDIS is working toward a fully national drought information system through national, tribal and state partnerships
NIDIS-supported research and monitoring is conducted across the nation
For monitoring, forecasting, data products, research activities and information on NIDIS webinars and meetings, visit the drought portal - www.drought.gov

Upper Colorado River Pilot



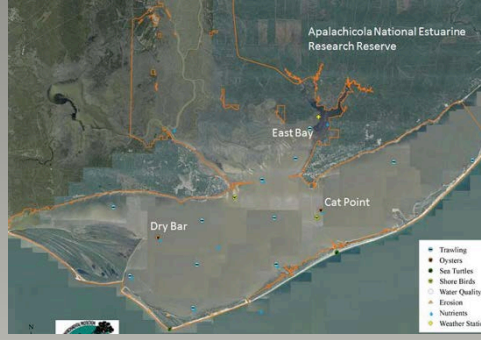


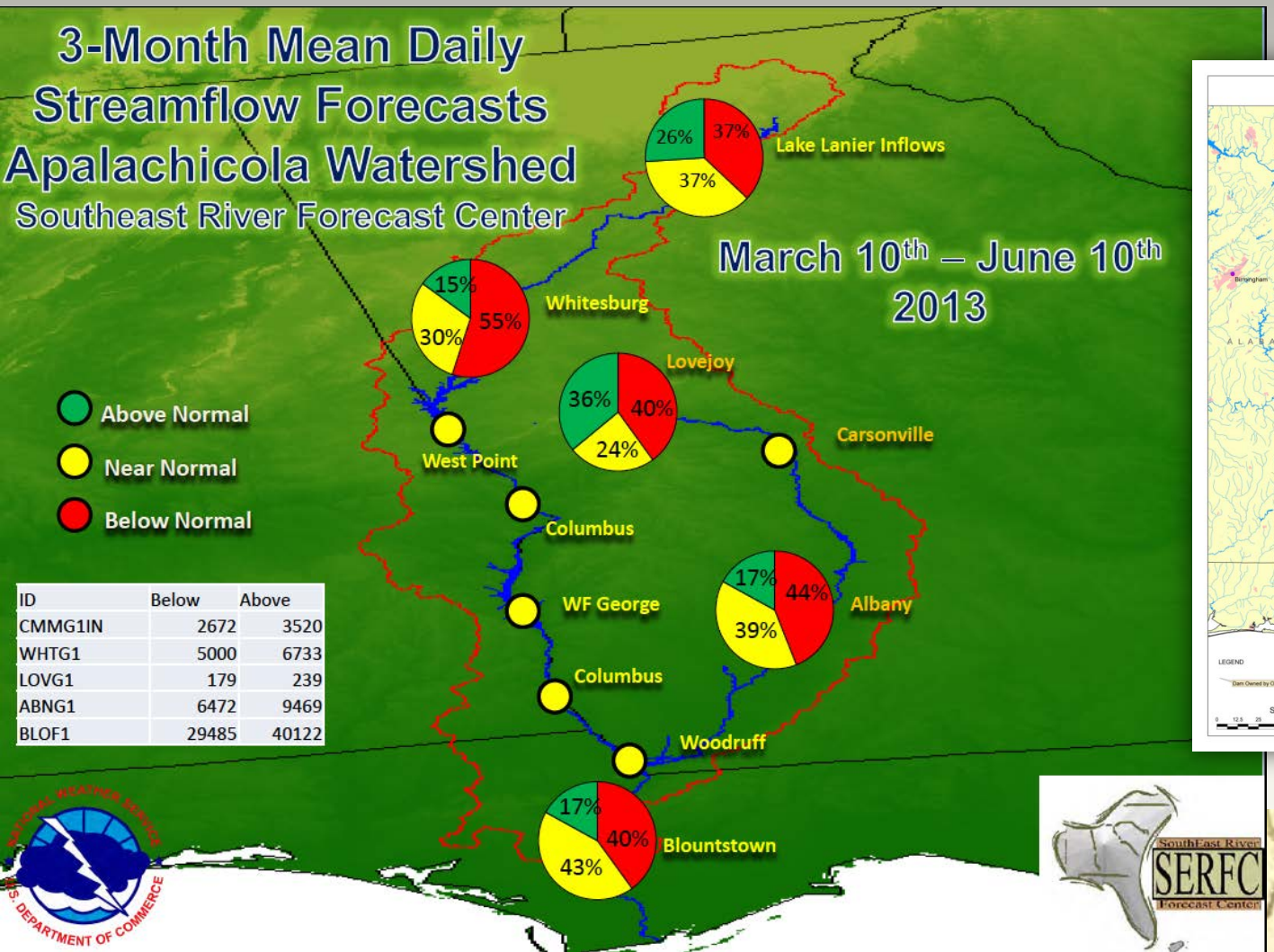


NIDIS
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

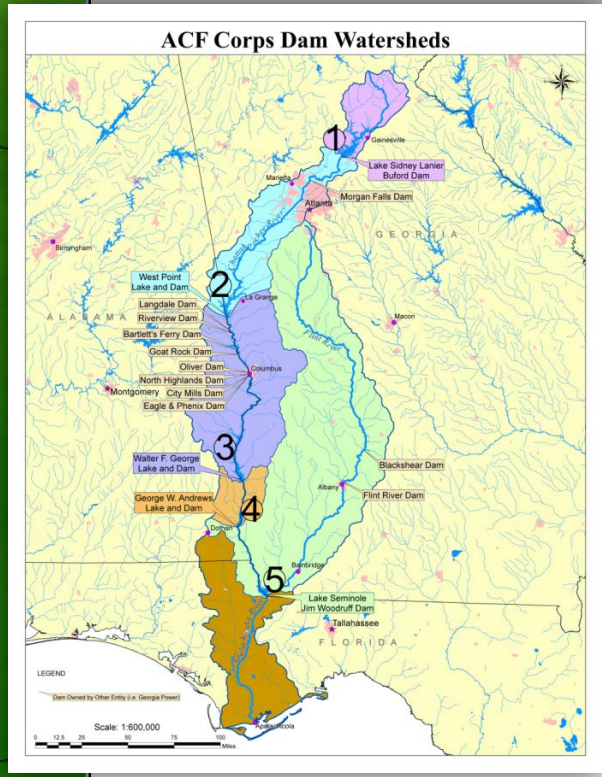
ACF River Basin

- 5 Corps-operated dams
- 11 Dams owned and operated by power companies
- Litigation regarding allocation of water in the basin and the three sub-basins





ID	Below	Above
CMMG1IN	2672	3520
WHTG1	5000	6733
LOVG1	179	239
ABNG1	6472	9469
BLOF1	29485	40122

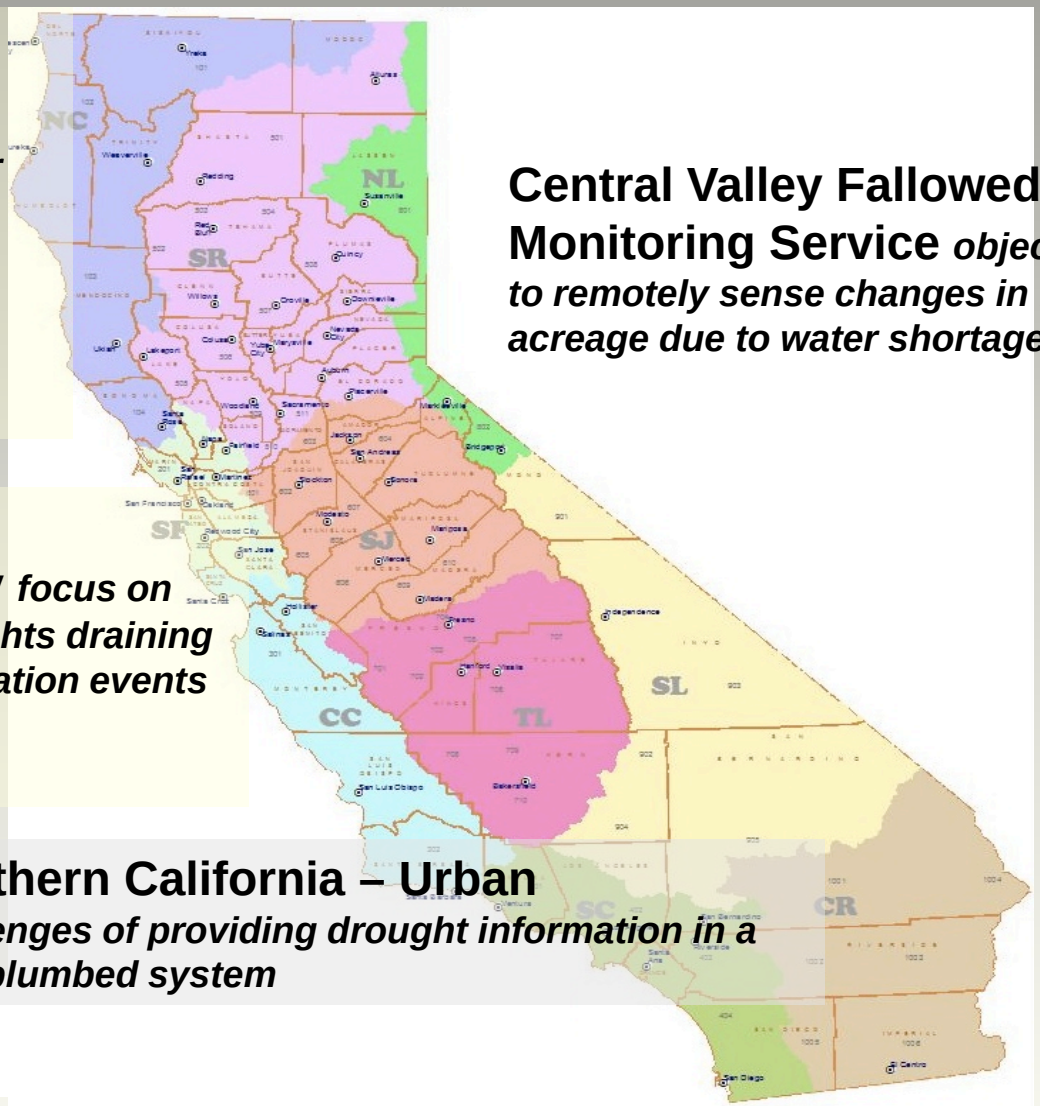


California Activities

Klamath River Basin-wide Hydroclimate Information System ***Regional Climate Center integrated information system to provide access to River Forecast Center hydroclimate data***

Central Valley Fallowed Land Monitoring Service ***objective method to remotely sense changes in fallowed acreage due to water shortage***

North Bay Counties and Russian River Valley ***focus on hydrologic extremes with droughts draining reservoirs and extreme precipitation events filling reservoirs***

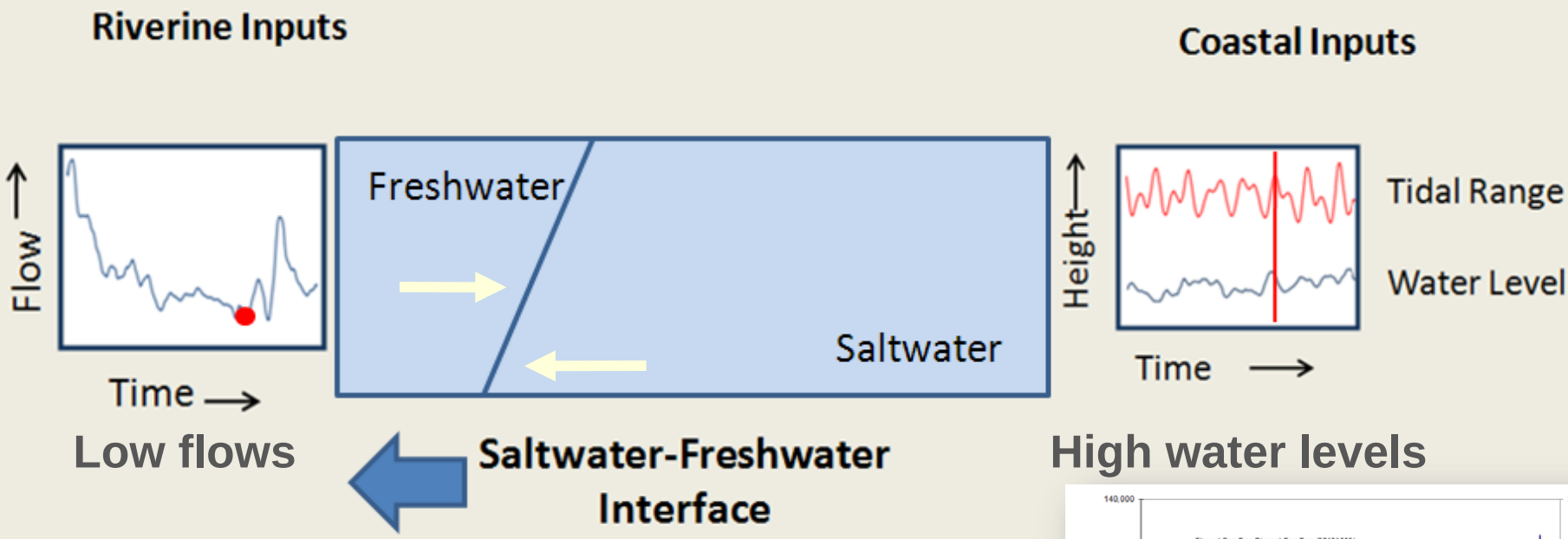


Southern California – Urban
challenges of providing drought information in a well-plumbed system

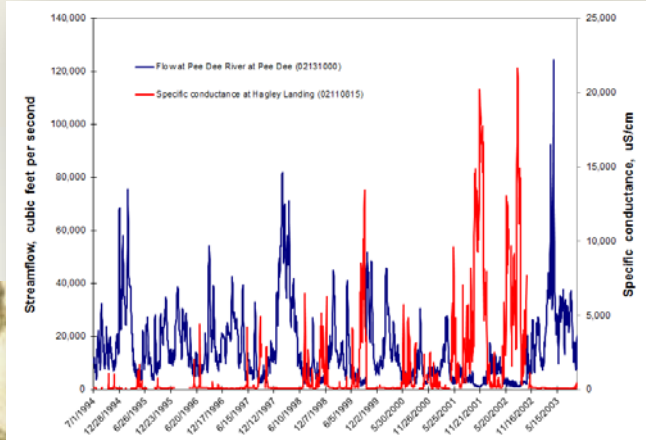
Carolinas Coastal Ecosystems

Saltwater-Freshwater Interface

- ***Determine appropriate drought indicators***
- ***Prototype drought index based on real time salinity data (Paul Conrads USGS)***

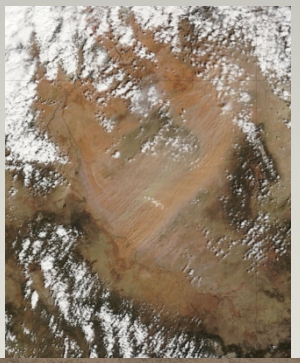


Tidal Marshes
Critter Communities



Four-Corners
Landscape changes-
Tribal Lands (USGS, NIDIS)

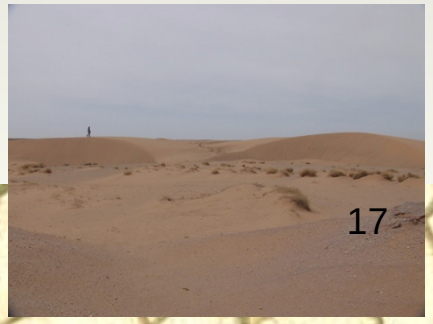
Sand Dune Mobility = W/(P/PE)



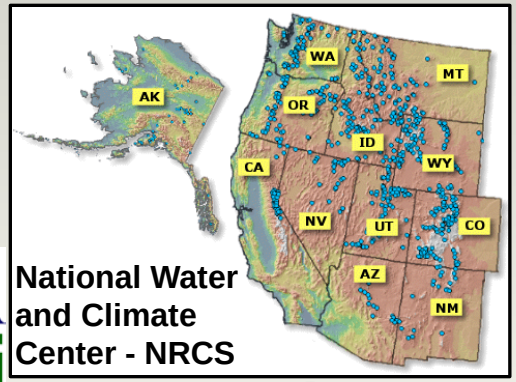
Stable Sand Dunes
= P/PE > 0.31 →

Partly Active Dunes →

Fully Active Dunes
= P/PE< 0.125 →



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

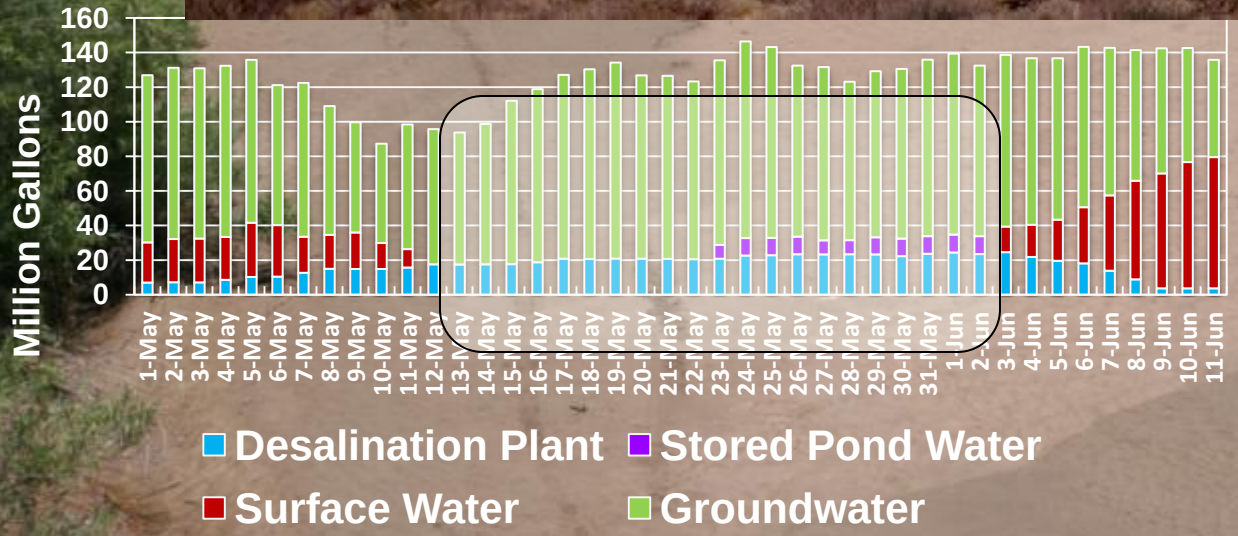


National Water and Climate Center - NRCS

Recognized State Climate Office

Thanks to all [illegible]

Rio Grande Runs Dry

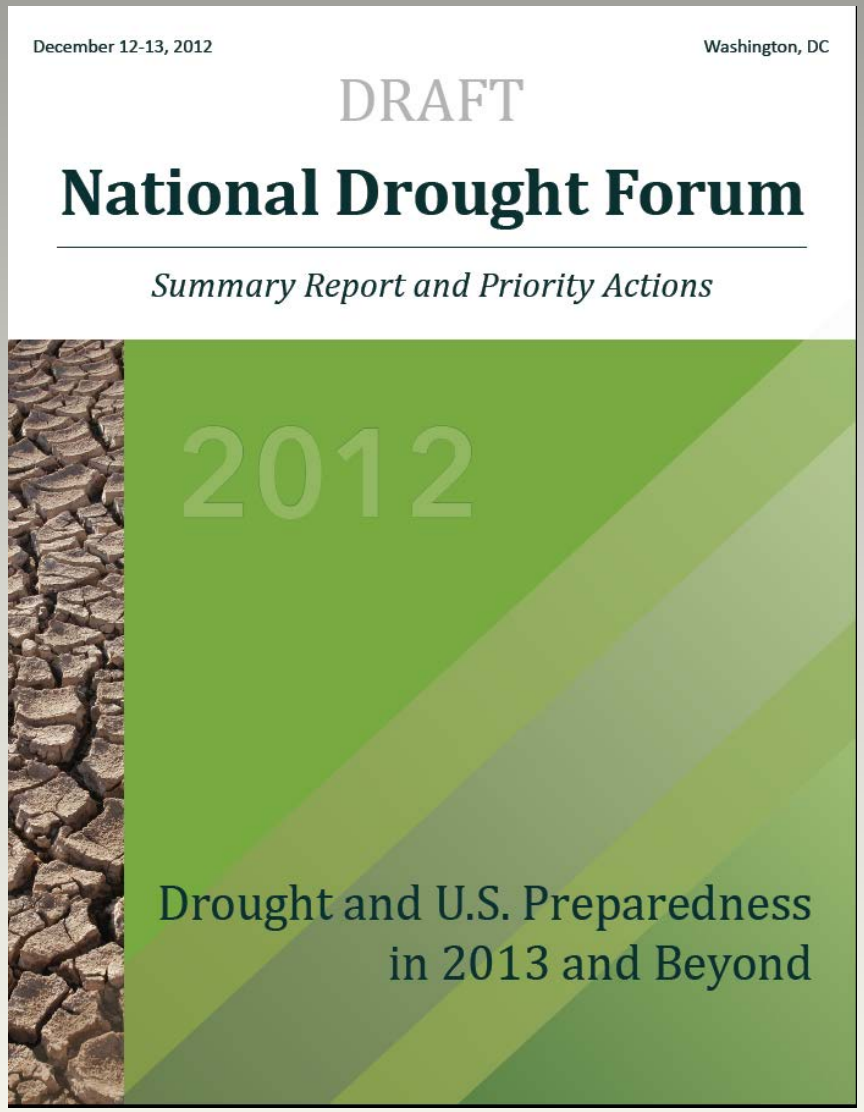


El Paso Water Utilities Board

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**



Experimental Information and Outreach

Quarterly Drought and Climate Outlooks

Sec. Vilsak at the National Governors Meeting

Drought in 2012

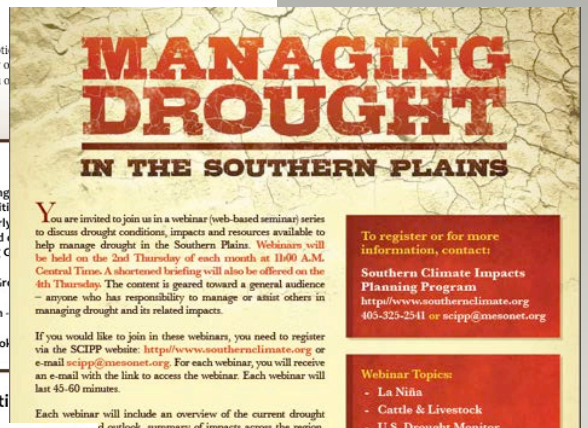
As the United States experienced large areas of moderate to excepti
Integrated Drought Information System (NIDIS) provided a variety o
the nation. In this issue of the *NIDIS Newsletter* we will update you o

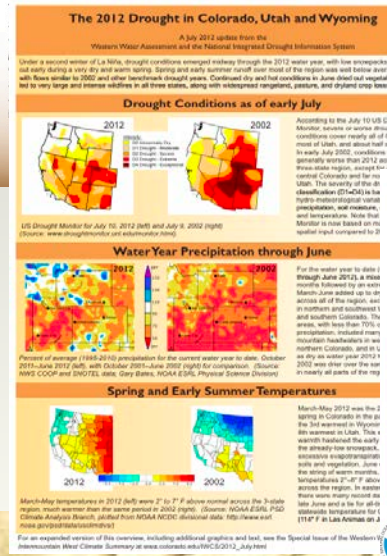
Lisa S. Darby and Roger S. Pulwarty, NIDIS Program

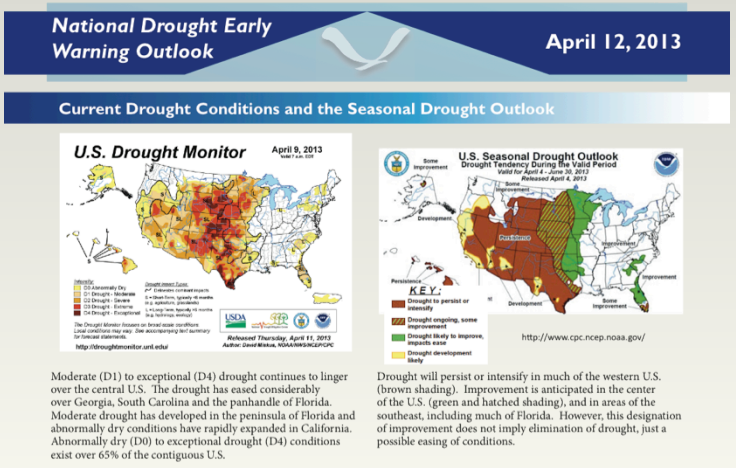
Inside

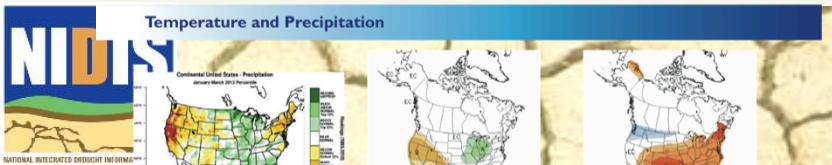
2 Drought Research and Monitoring Program Is Focus of Cong
4 NIDIS Early Warning Pilot in California Addresses Complexiti
6 Planning Begins for the New Coastal Carolinas Drought Early
9 Drought Assessment Webinars Keep Stakeholders Updated
10 The NIDIS Integrated Monitoring and Forecasting Working C
A. Mariotti, D. Barrie & S. Schubert
12 The NIDIS Engaging Preparedness Communities Working Gr
Drought Risks - D. Bathke
13 Upper Colorado River Basin Drought Early Warning System
14 Results from the NIDIS Stakeholder Survey - T. Haigh
16 NOAA-WGA Quarterly Regional Climate Impacts and Outlook

The National Integrated Drought Informati









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*" ☺