NIDIS Research and Implementation: Developing Early Warning Information Systems Across Climatic Timescales

National Integrated Drought Information System (NIDIS) - A Pathway for National Resilience

"No systematic assessment of drought impacts exists in the US" (Western Governors Association, 2004)

Public Law (109-430, 2006) articulates the need for "…better informed and more timely drought-related decisions leading to reduced impacts and costs…"

Natural variability together with near- and longer-term projections for a warmer climate make early warning information critical for supporting adaptation

Under Public Law 109-430, NIDIS will…

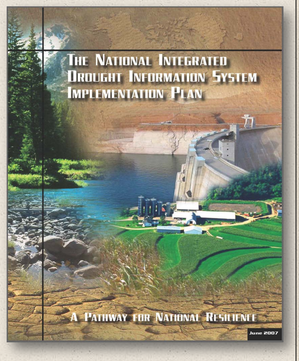
(I) Provide an effective drought early warning system

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

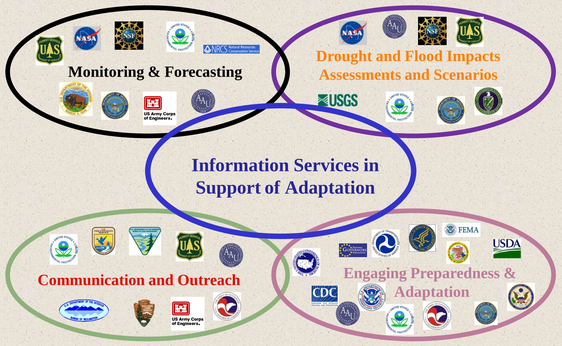
(III) Build upon existing forecasting and assessment programs and partnerships

NIDIS Components

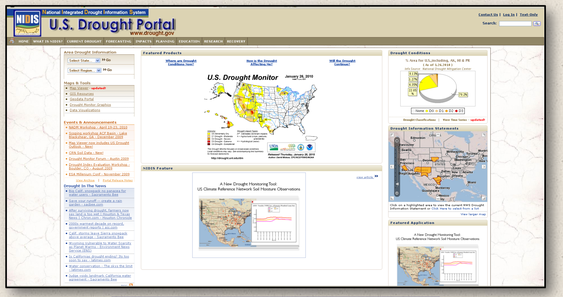
1. NIDIS Program Office
2. U.S. Drought Portal
3. Climate Test Beds
   - Integrating data and forecasts
4. Coping with Drought
   - Impacts assessments and applied research
5. NIDIS Early Warning Information System Pilots
   - Design, Implementation and evaluation



Drought and Water Resources Federal Partnerships



NIDIS U.S. Drought Portal (www.drought.gov)



Key Clearinghouse Functions: Credible, Accessible, Timely Information

Where are drought conditions now?
Does this event look like other events?
How is the drought affecting me?
Will the drought continue?
Where can I go for help?

NIDIS INFORMATION SERVICE MODEL

Coordinating federal, state, and local drought-related activities (*e.g.,* within watersheds and states)

Monitoring ↔ Prediction ↔ Applications Research

Integrating Tools: e.g. Drought Portal

Identifying and diffusing innovative strategies for drought risk assessment, communication and preparedness

Proactive Planning → Impact Mitigation → Improved Adaptation

The key to implementing this service model is through the pilot drought early warning systems. The first three pilots are currently under development for the **Colorado River Basin**, the **Southeast United States** and **California**.

Upper Colorado River Basin (UCRB) Early Warning System (EWS)

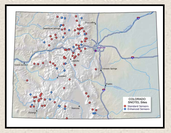
The pilot area extends from the Upper Colorado River Basin down to Lake Mead and across the Continental Divide to the Front Range of Colorado.

Priorities:

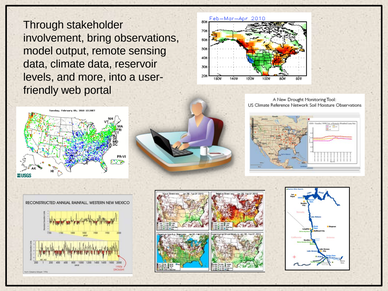
- **Monitoring gaps assessment**
- **Analyses of water demand**
- **Basin-specific drought monitor**
- **Drought scenarios across timescales**
- **Develop EWS discussion fora at key points during the water year**

UCRB EWS – Outcomes

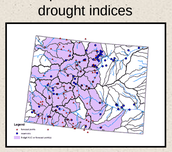
Enhanced in-situ measurements



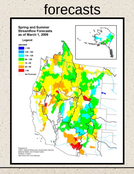
Through stakeholder involvement, bring observations, model output, remote sensing data, climate data, reservoir levels, and more, into a user-friendly web portal



Improvements in drought indices



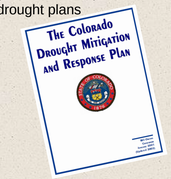
Improved streamflow forecasts



Better understanding of water demand

Figure courtesy of Olga Wilhelmi and Kevin Sampson, NCAR

Help states develop drought plans



Drought conditions on tribal lands Lower Colorado River Basin EWS Pilot

Cornfield on Hopi reservation, Summer 2009

Dry stock tank on Hopi reservation, Summer 2009

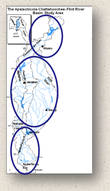
Encroaching sand dunes in Kayenta, AZ, 2004

Southeast US Pilot

Focus on the following river basins as identified by stakeholders:

(1) Apalachicola-Chattahoochee-Flint (ACF)
(2) Catawba-Wateree
(3) Yadkin-Pee Dee

Apalachicola-Chattahoochee-Flint (Georgia, Florida, Alabama)

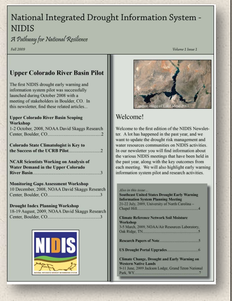


Catawba-Wateree (N & S Carolina)

Yadkin-Pee Dee (N Carolina)

Knowledge Assessment Workshops (selected)

- **Drought, Climate Change and Early Warning on Western Native Lands, June '09**
- **Status of Drought Early Warning Systems across the US, June '08**
- **Assessing Satellite-Based Estimates of Soil Moisture, Feb '08**
- **Climate Change and Water Resources: Federal Perspectives (USGS Report 1331), 2009**



NIDIS Newsletter released in Sep 2009 and circulated across disaster management communities, agencies and states (available on www.drought.gov).

NIDIS Priorities

- **Initiate the California EWS (Sacramento-San Joaquin Basin, Klamath)**
- **Initiate transboundary drought and adaptation plan (US, Canada, Mexico)**
- **Assess economic impacts of drought**
- **Assess drought impacts on ecosystem services**

Evaluation

- **Co-convene workshops with the Western Governors Association**
- **Convene NIDIS Executive Council Meeting**