The National Integrated Drought Information System

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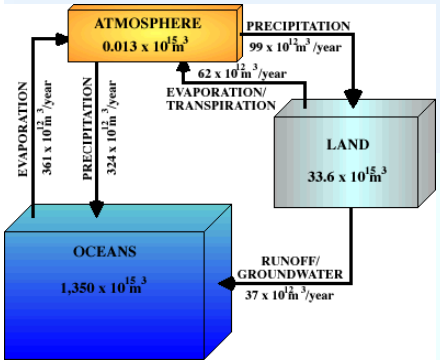
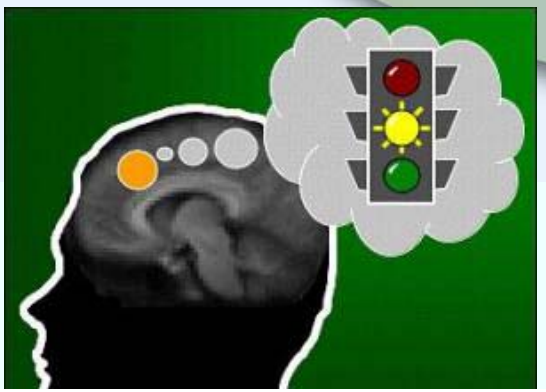
The NIDIS Implementation Team
www.drought.gov

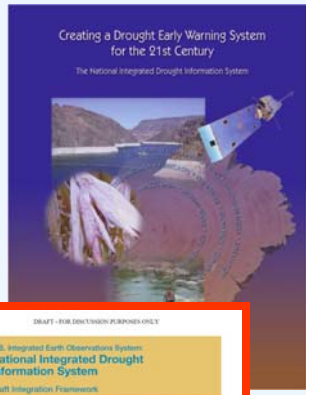




NIDIS
NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM

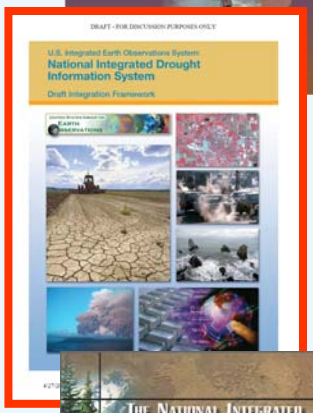
National Integrated Drought Information System

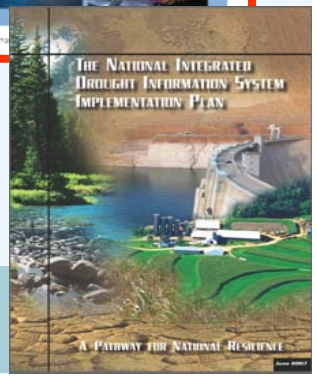
"No systematic collection and analysis of social, environmental, and economic data focused on the impacts of drought within the United States exists today" Western Governors Association 2004



The NIDIS Act of 2006 (Public Law 109-430)

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





NIDIS
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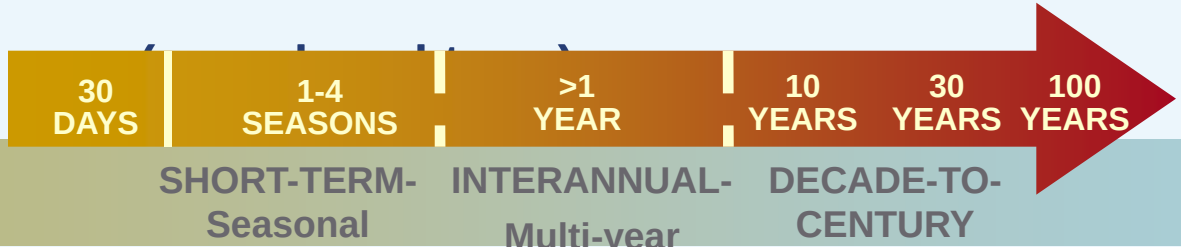


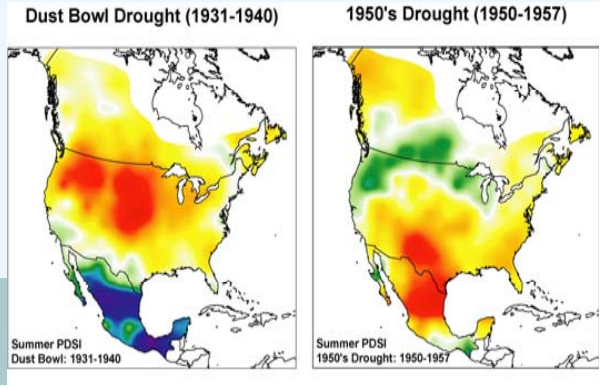
NIDIS has three general tasks under Public Law 109-430, 2006

(I) Provide an effective drought early warning system that: (a) collects and integrates key indicators of drought and the severity of drought conditions and impacts; and (b) produces timely information that reflect local, regional, and State differences in drought conditions;

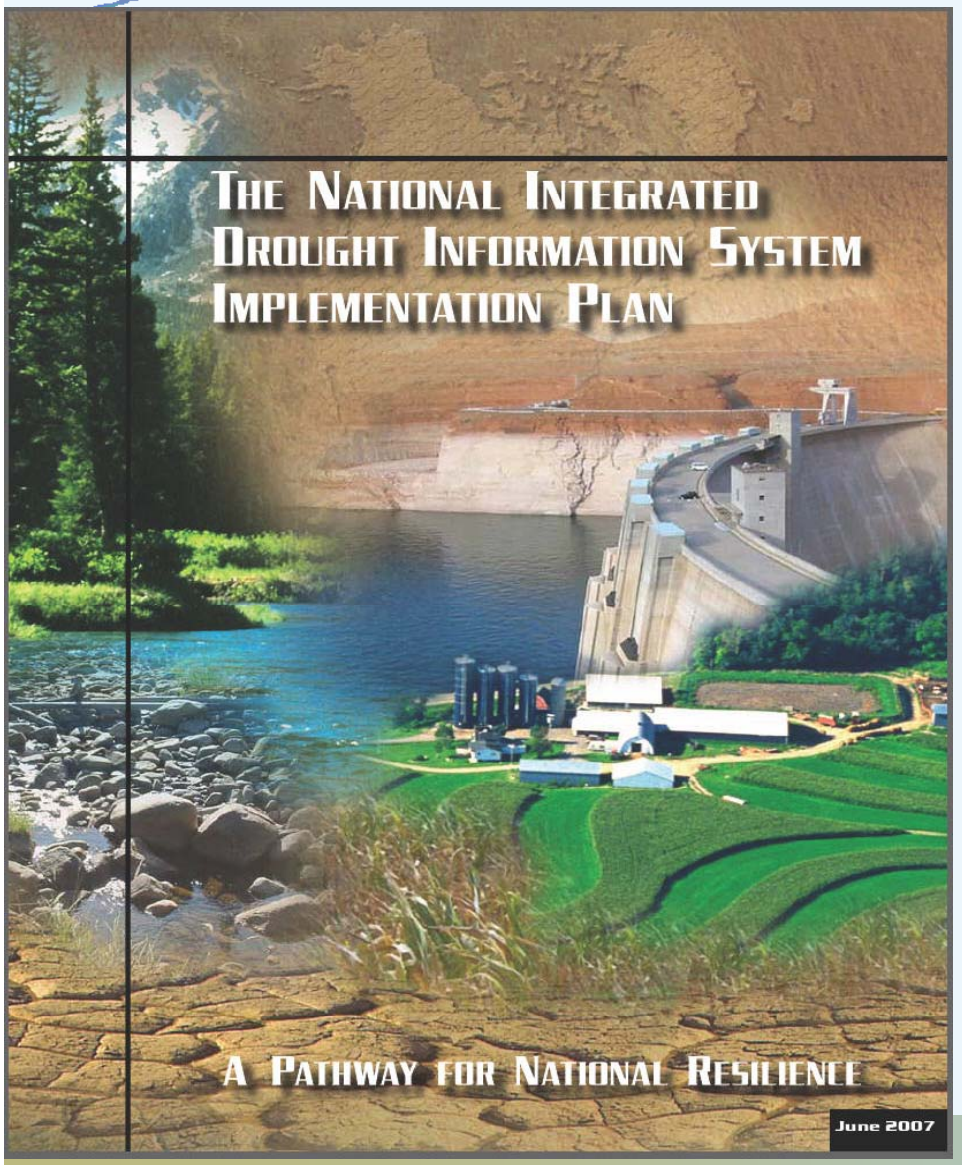
(II) Coordinate and integrate as practicable, Federal research in support of a drought early warning system;

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

NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM



NIDIS Components



1. NIDIS Office

2. U.S. Drought Portal
3. Climate Test Beds/Drought
   - Integrating data and forecasts
4. Coping with Drought-Grants-Impacts assessment and decision support research (RISAs, Universities, NGO)

5. NIDIS Early Warning Information Systems
   - Design, Prototyping, Implementation

   (multi-agency, multi-state, RCCs, State Climatologists

Drought and Water Resources: Federal Partnerships

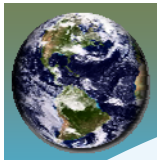
Monitoring & Forecasting

Drought and Flood Impacts Assessments and Scenarios

NIDIS-Early Warning Information in support of Adaptation

Communication and Outreach

Engaging Preparedness & Adaptation

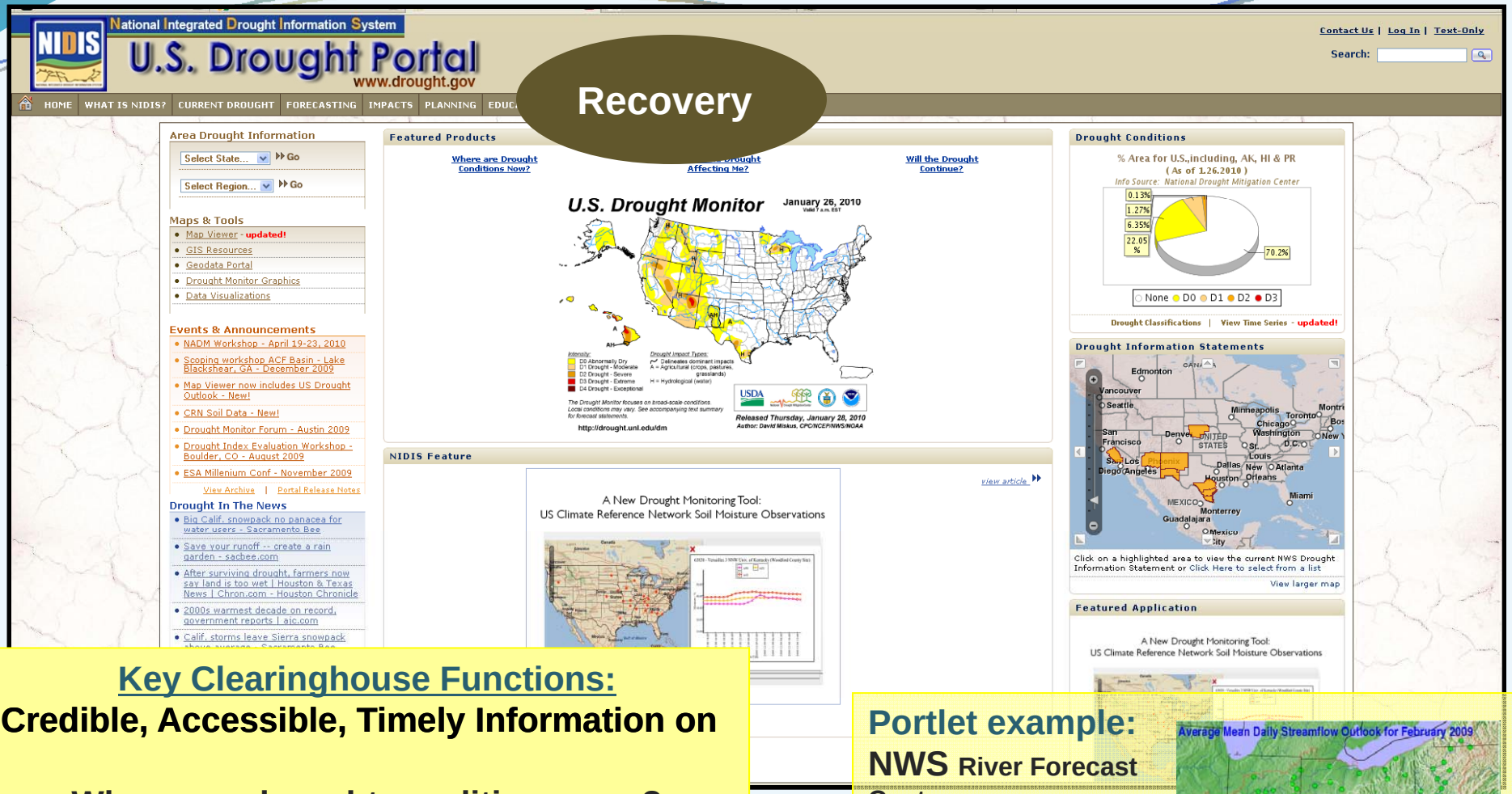


NIDIS Implementation Team: Over 50 Federal, state, tribal and private sector representatives

- Integrated Monitoring and Forecasting
- Interdisciplinary Research and Applications
- U.S. Drought Portal
- Public Awareness And Education
- Engaging Preparedness Communities

→ Regional Drought Early Warning Information Systems

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



Key Clearinghouse Functions:

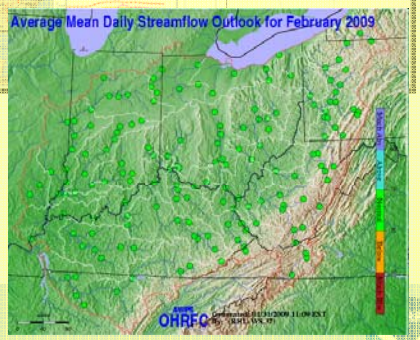
Credible, Accessible, Timely Information on

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?

Portlet example:

NWS River Forecast Center

Ohio River Water Resources Outlook-
Ecosystem recovery



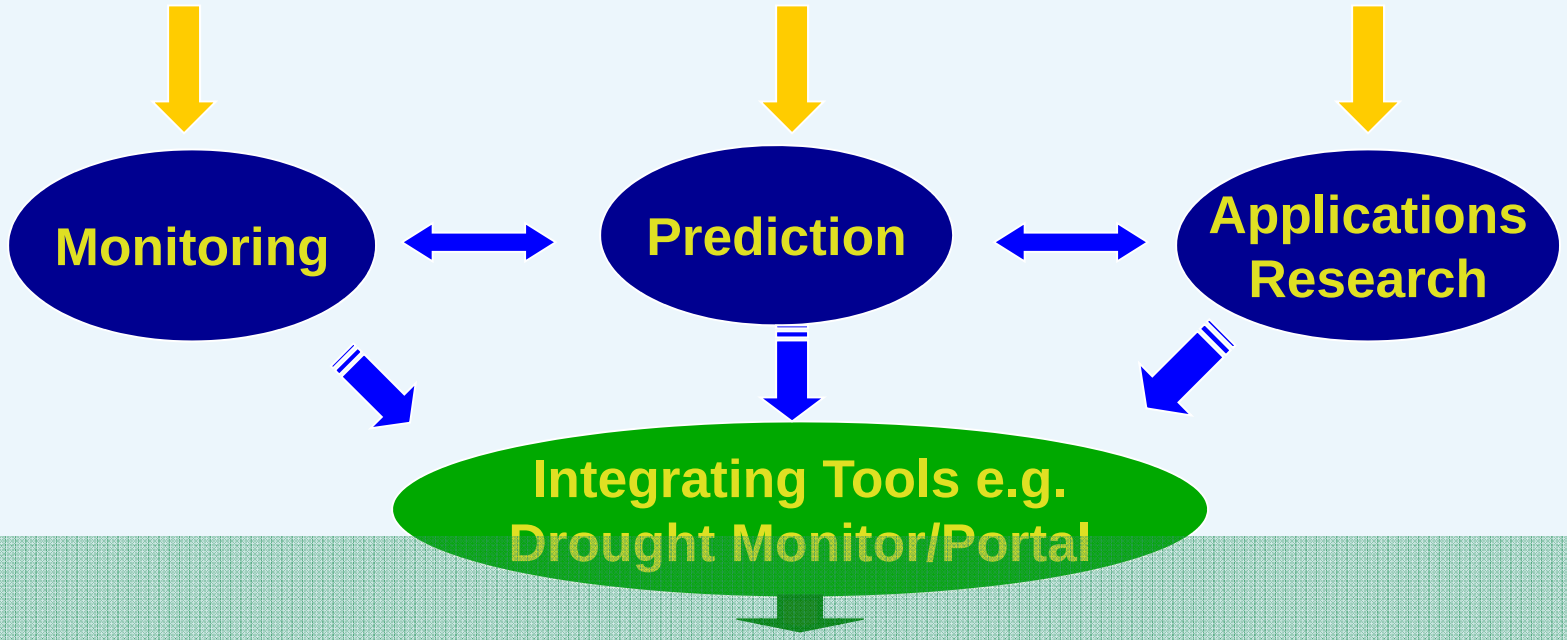
National Level

NIDIS Knowledge Assessments (selected)

- **Remote Sensing Contributions to Drought Monitoring, February, 2008, Boulder-** NOAA, USGS, NASA, USDA, universities, state climatologists, state-local drought officials
- **National Status of Drought Early Warning Systems, June 2008, Kansas** City-NOAA, USGS, USAID, USDA, USACE, NASA, tribes, universities, state government, water managers
- **Drought, Climate change and Early Warning on Western Tribal Lands June 2009-** Columbia, Colorado, Rio Grande, Missouri Basin tribes
  - 2010 Four Corners regions
- **WGA/WSWC Workshops on developing constituencies for NIDIS (Oct 2009, April 2010, September 2010-Washington DC**

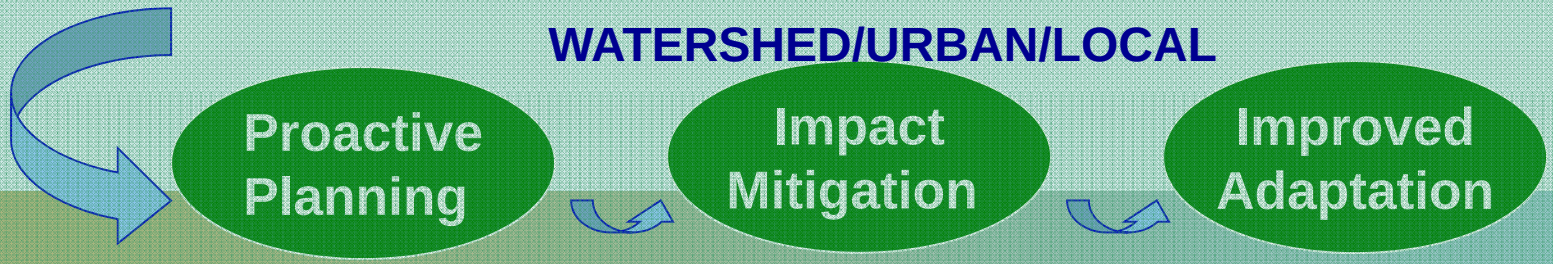
NIDIS REGIONAL INFORMATION MANAGEMENT MODEL

Coordinating existing federal, state, and local drought-related data and decision support activities (e.g., within watersheds and states)



Identifying and transferring indicators, decision support tools and innovative strategies for drought risk assessment, communication and preparedness

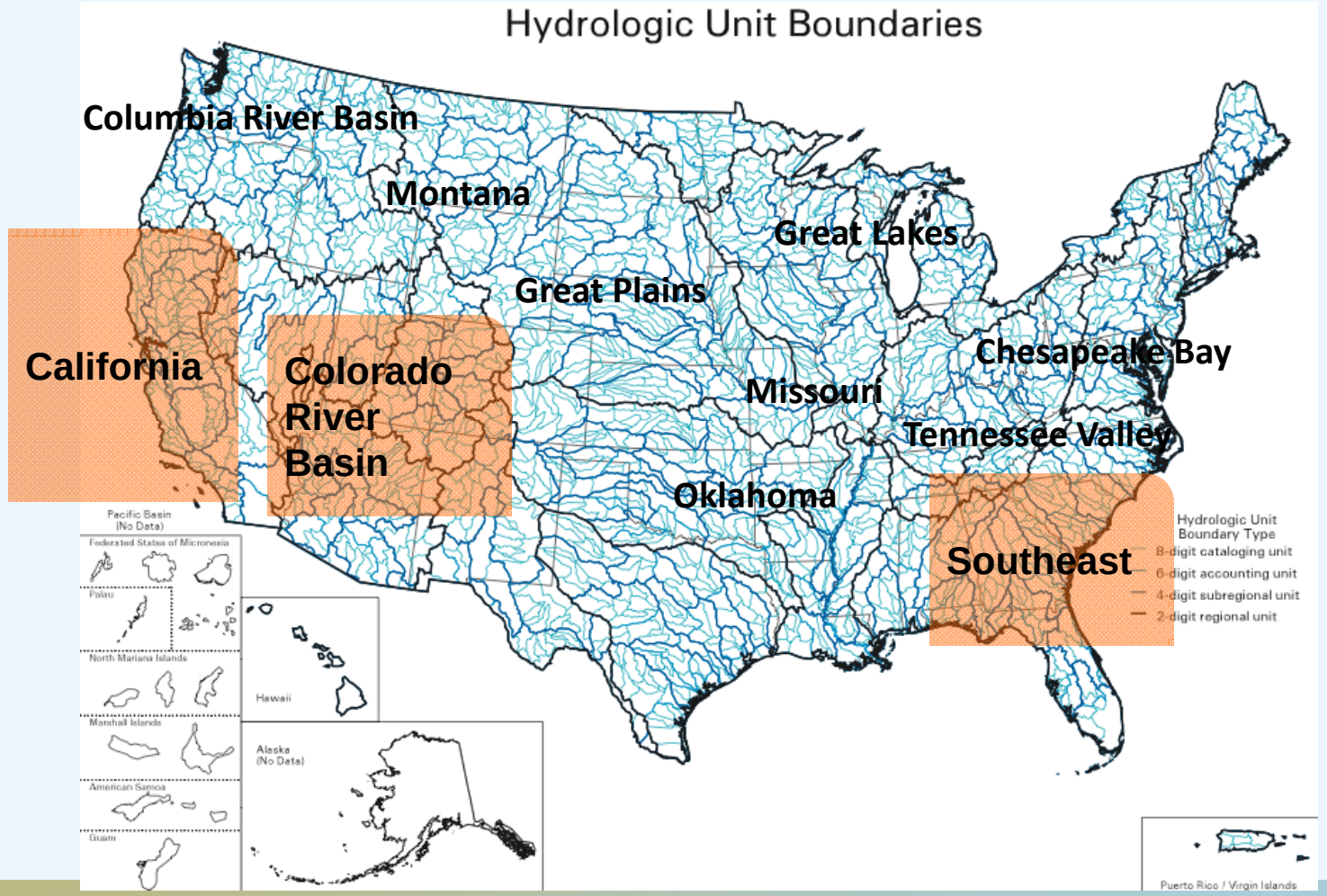
WATERSHED/URBAN/LOCAL



NIDIS

Regional Drought Early Warning Systems

Highlighted-first round prototypes;
Non-highlighted-second round Regional DEWS



Regional DEWS Implementation: Upper Colorado River Basin

Categories of drought information users & analysis

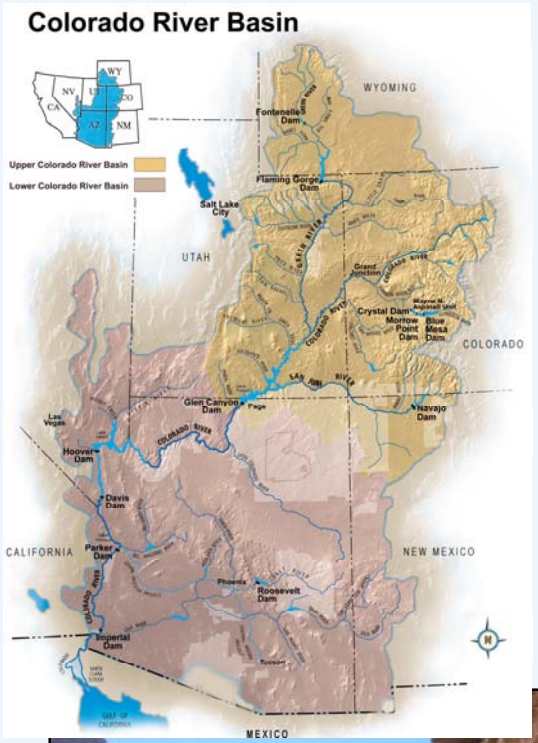
Upper Basin down to Lake Mead

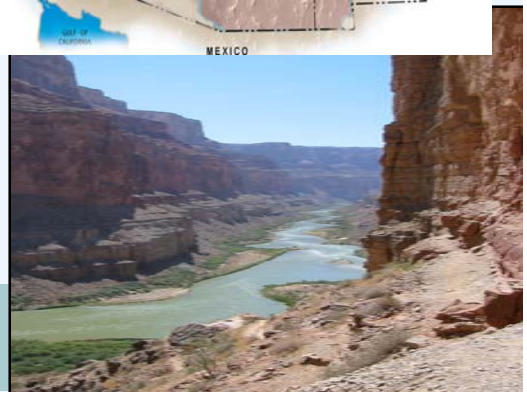
•Coordinated reservoir operations: Low flow shortage triggering criteria (Powell/Mead)

Sub-basin

•Inter- and Intra-basin transfers; Front range urban-agriculture-Changing water demand during drought

•Ecosystem health/services including recreation and tourism impacts





Regional and Watershed Levels

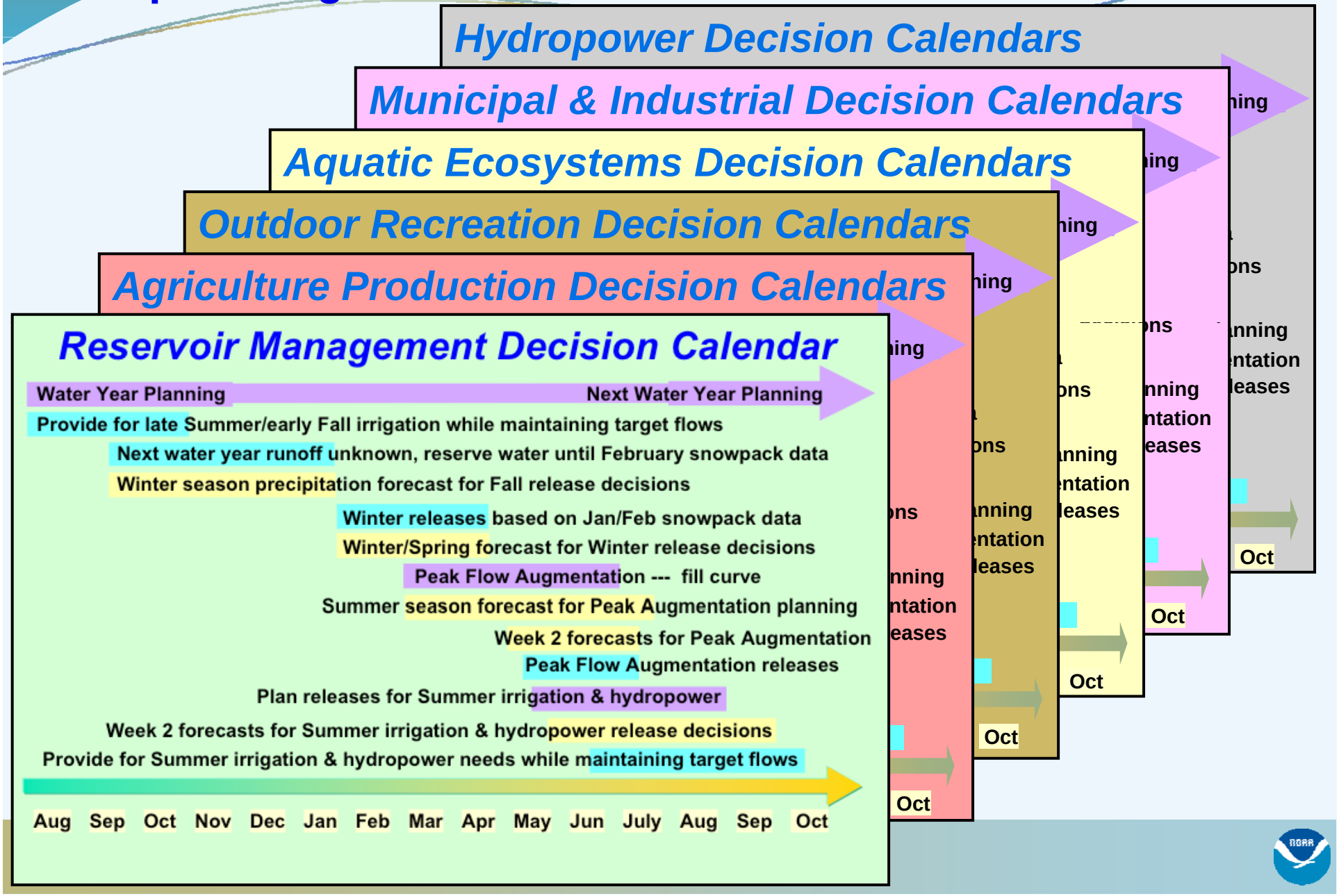
Applications and Decision Support Research in support of NIDIS

- Adaptation Policies For Urban Water Resource Management-Short-Term Drought Responses And Long-Term Planning

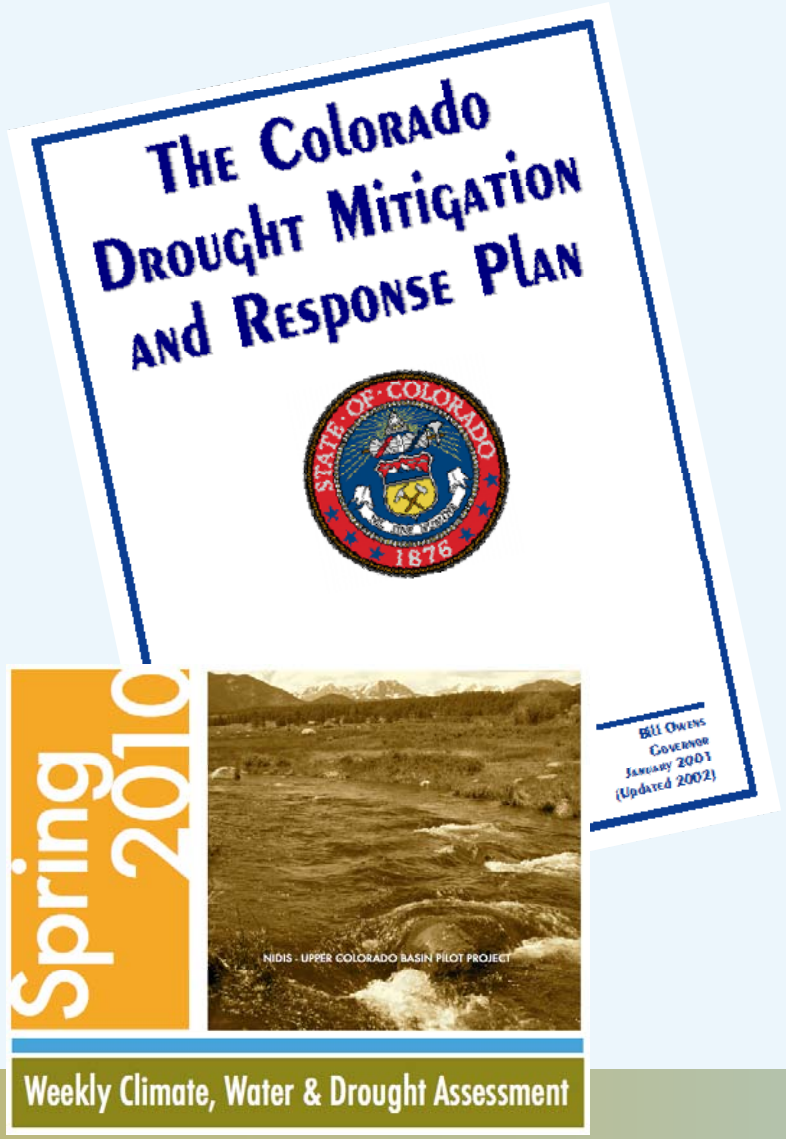
- Socioeconomic Assessments to Build Community Resilience in Mitigating Drought
- Climate Information System to Enhance Drought Preparedness by Underserved Farmers

- Ensemble Hydrologic Forecasts
- Drought Index Evaluation and Implementation in a Geospatial Framework Linked to Hydrologic Data Web Services

Drought information and Resource Management: optimizing risk reduction



Coordination with State Water Conservation Board



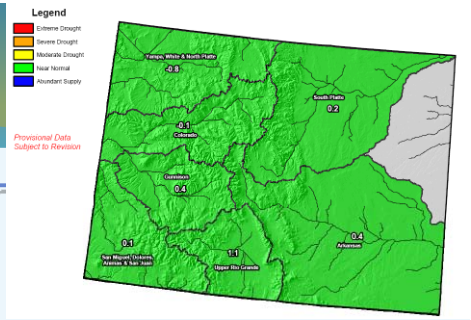
Revision of the Plans to meet drought requirements of the State Natural Hazard Mitigation Plan, as well as FEMA and EMAP

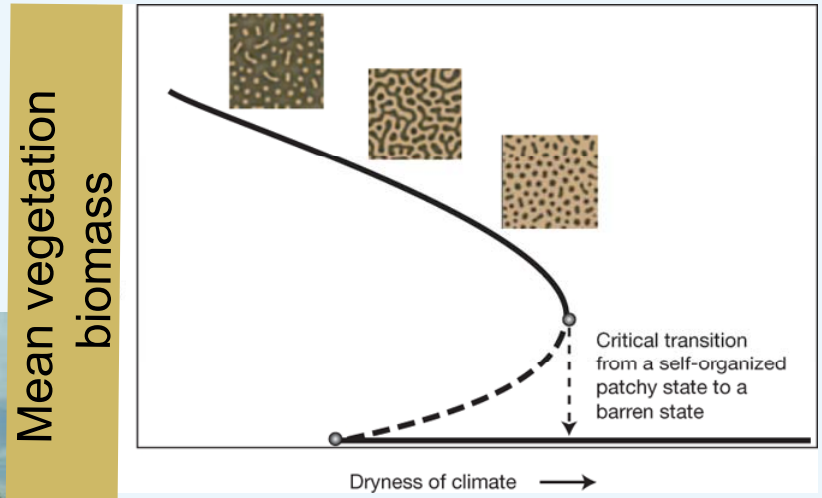
NIDIS

- **Development of indices that incorporate current surface water conditions and a forecast component**
- **Evaluate trigger points and the responses that they activate**

Weekly Early warning Webinars

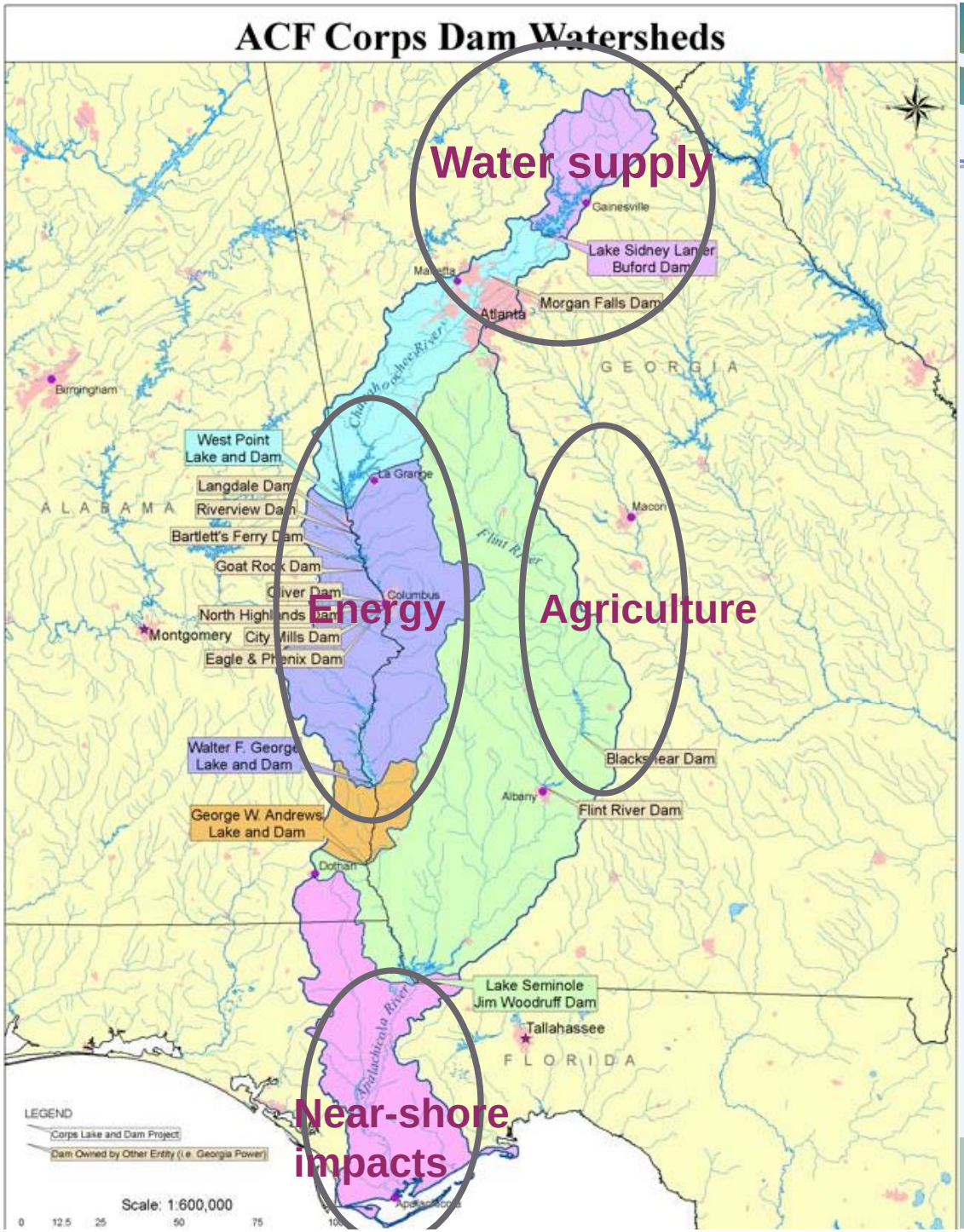
Landscape changes- Drought Early Warning System on Native American Lands in the Four-Corners Region





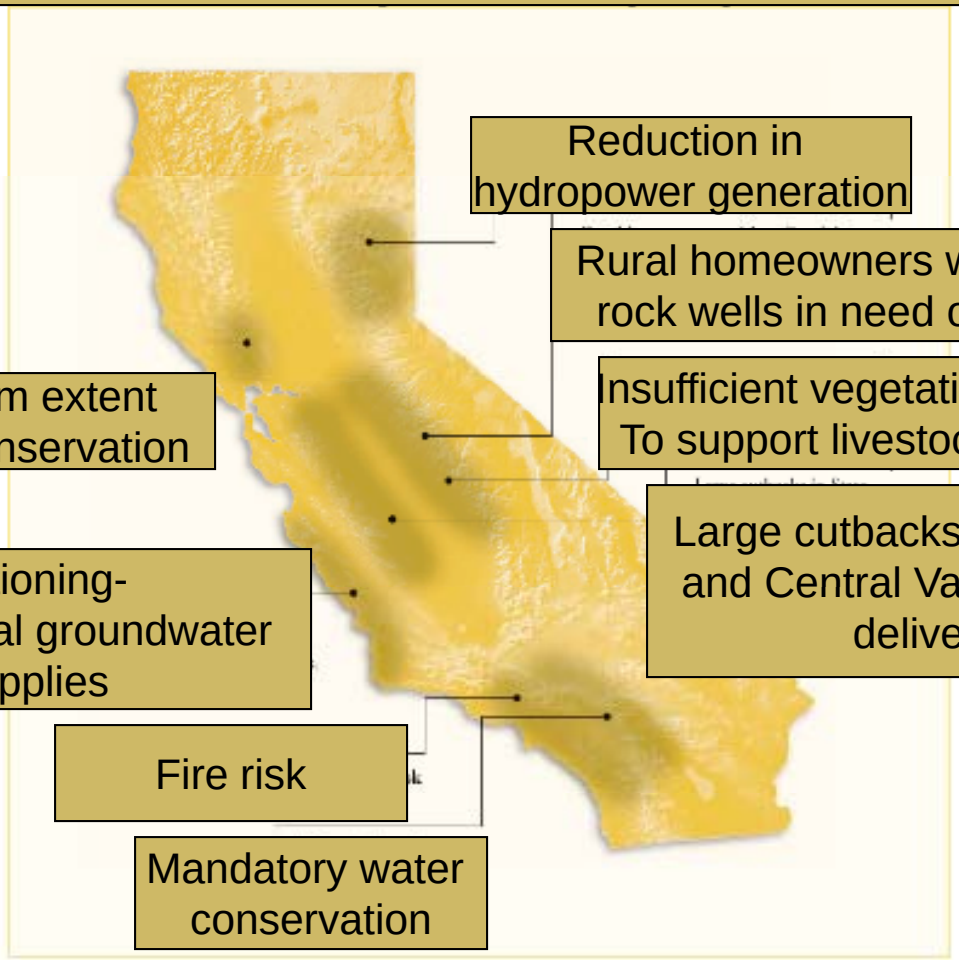
Dryness of climate

(Nature, 2009)



Apalachicola-Chattahoochee-Flint Basin

California-Potential Impacts of continued drought



Reduction in hydropower generation

Rural homeowners with fractured rock wells in need of deepening

Maximum extent Water conservation

Insufficient vegetation To support livestock

Large cutbacks-State Water and Central Valley Projects deliveries

Rationing- small coastal groundwater supplies

Fire risk

Mandatory water conservation

North American Drought Monitor

May 31, 2010

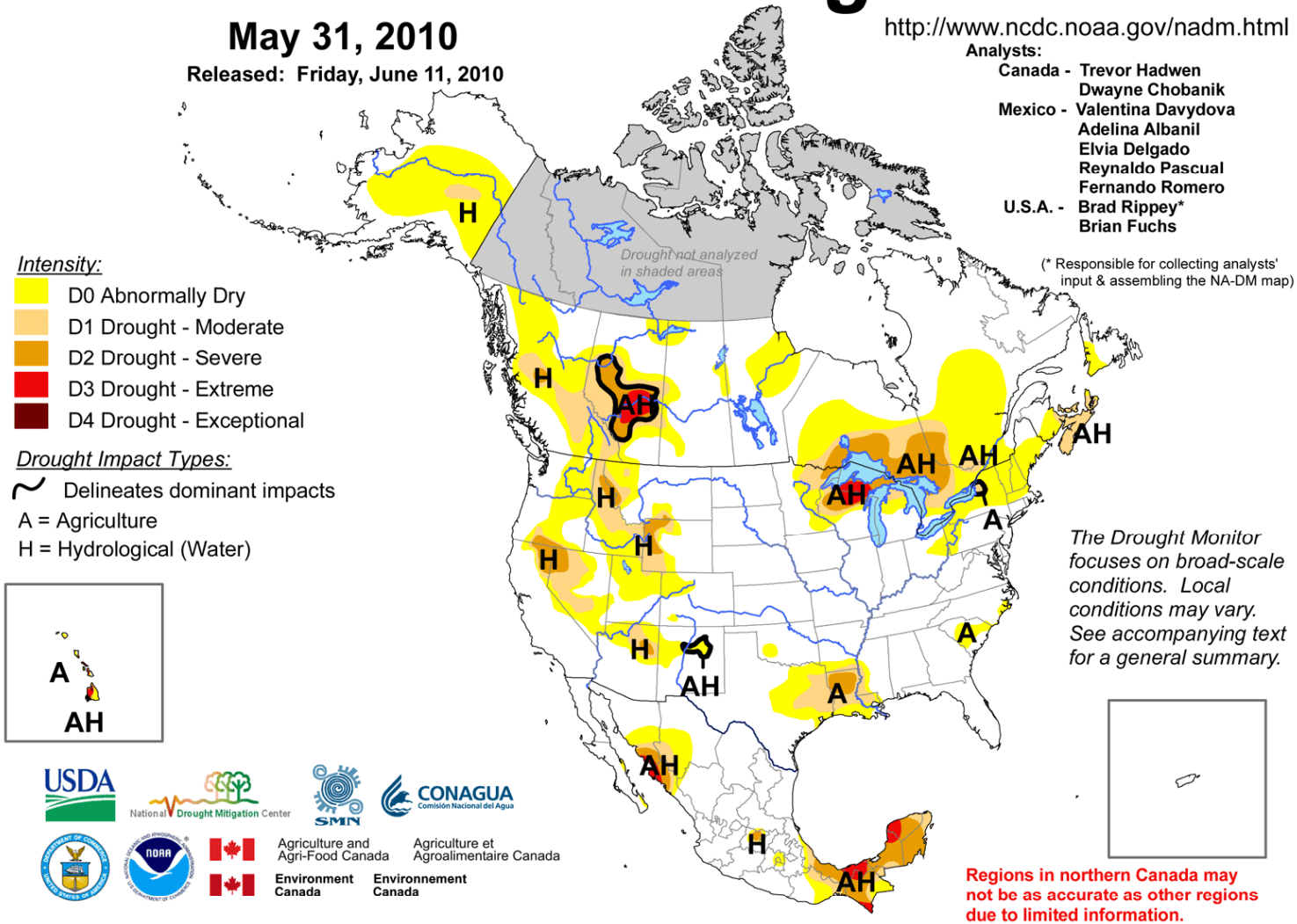
Released: Friday, June 11, 2010

http://www.ncdc.noaa.gov/nadm.html

Analysts:

Canada - Trevor Hadwen
Dwayne Chobanik
Mexico - Valentina Davydova
Adelina Albanil
Elvia Delgado
Reynaldo Pascual
Fernando Romero
U.S.A. - Brad Rippey*
Brian Fuchs

(* Responsible for collecting analysts' input & assembling the NA-DM map)



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

Drought Impact Types:

Delineates dominant impacts
A = Agriculture
H = Hydrological (Water)

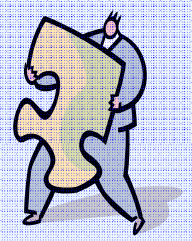
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text for a general summary.

Regions in northern Canada may not be as accurate as other regions due to limited information.

USDA | National Drought Mitigation Center | SMN | CONAGUA Comisión Nacional del Agua | NOAA | Agriculture and Agri-Food Canada / Agriculture et Agroalimentaire Canada | Environment Canada / Environnement Canada

Drought and water resources:
Engaging communities, resources managers in a changing climate

(RISAs, RCCs, State Climatologists Climate Forecasting Test-Beds, → ….NIDIS)



Integrated Climate, Ecosystems, Hydrology:Technical Info & Data

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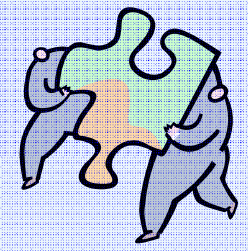

Watershed, state, tribal, local: Experience & Knowledge

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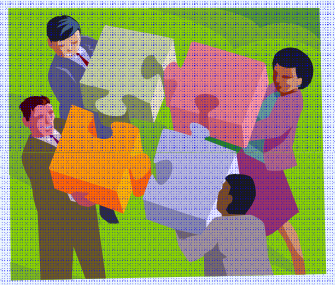
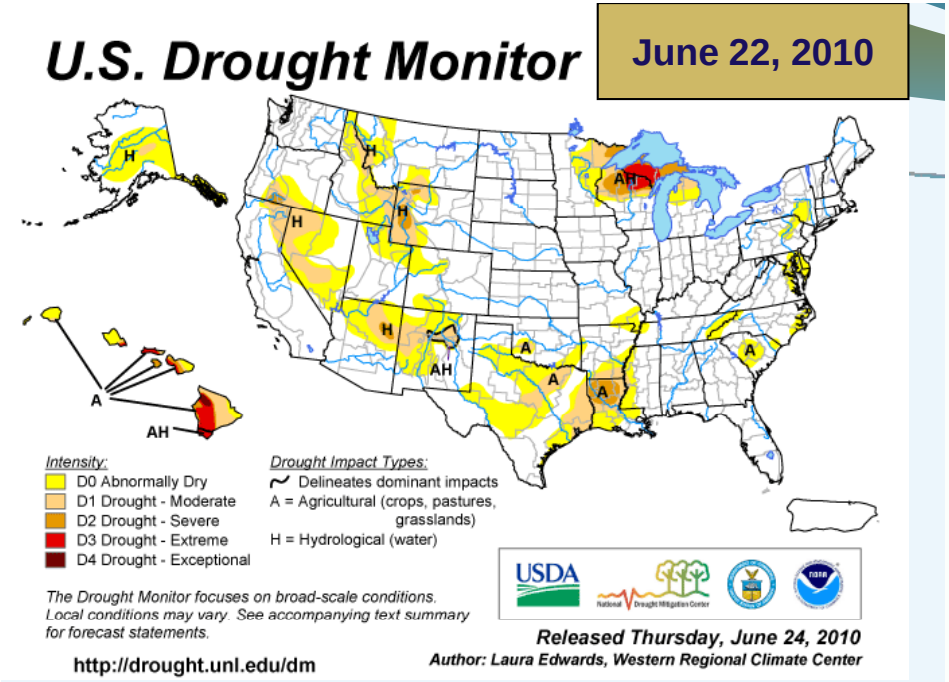
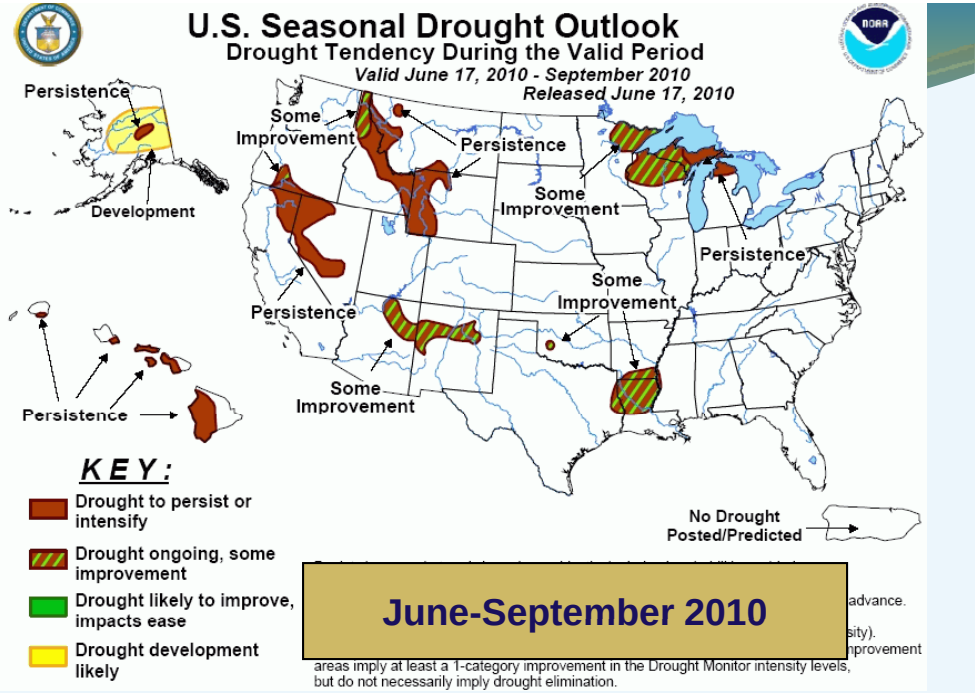


Decision Support

Climate information needs and usability:
Entry points for proactive Planning-triggers and indicators

Enabling adaptation:
Best available drought risk & water supply information Input to drought planning, preparedness and adaptation





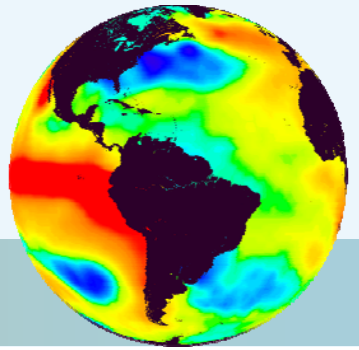
Seven drought declarations as of June 17, 2010

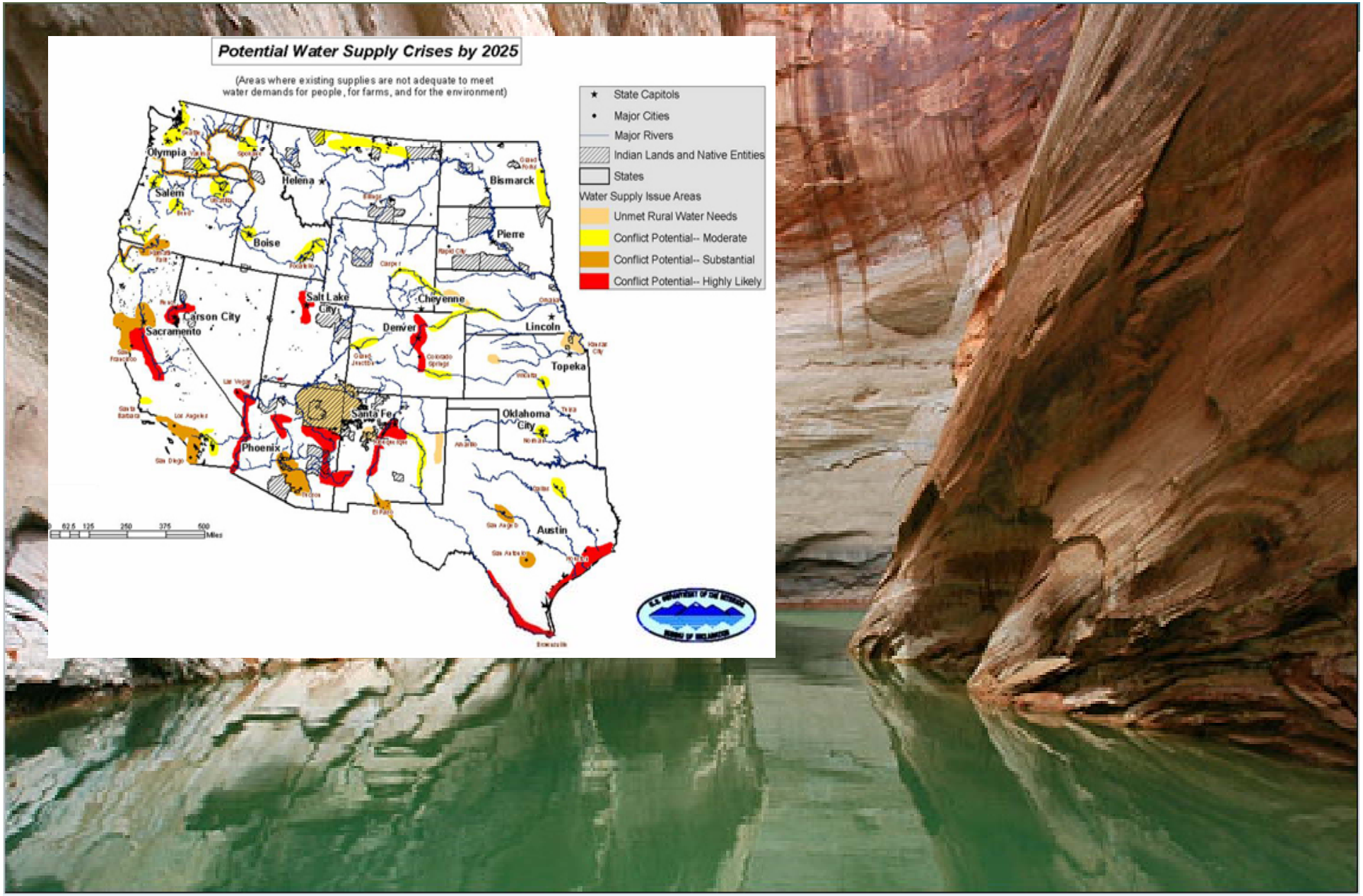
Northeast	-	reduction in extent of dry conditions
Southern Plains/Gulf	-	DFW-driest May-June since 1899, heat
Upper Midwest	-	Severe to no-drought gradient, fire potential
Mississippi River Valley	-	heat, dry along the AK-MI border
Mid-Atlantic	-	developing in Baltimore-DC area
The West	-	**Lake Powell-65% capacity, early runoff, PNW/CA fire potential,SW-Four corners drought continues**
Hawaii	-	Persistent drought, water quality issues
Alaska	-	Fire risk

Conditions are favorable for a transition to La Niña conditions during June – August 2010

"We would cite the National Integrated Drought Information System (NIDIS) as one example of how federal agencies can work together and with states ……NIDIS is not perfect yet– but it demonstrates key elements of how….to deliver actionable information to end users and decisionmakers"

Western Governors letter to CEQ-Response to CEQ Adaptation Interim Report May 21, 2010




Potential Water Supply Crises by 2025
(Areas where existing supplies are not adequate to meet water demands for people, for farms, and for the environment)
State Capitols
Major Cities
Major Rivers
Indian Lands and Native Entities
States
Water Supply Issue Areas
Unmet Rural Water Needs
Conflict Potential-- Moderate
Conflict Potential-- Substantial
Conflict Potential-- Highly Likely
Olympia
Salem
Helena
Bismarck
Boise
Pierre
Salt Lake City
Cheyenne
Carson City
Sacramento
Denver
Lincoln
Topeka
Santa Fe
Oklahoma City
Phoenix
Austin
62.5 125 250 375 500
Miles

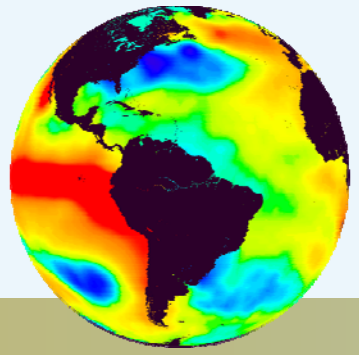
THANK YOU

BACKUP SLIDES

NIDIS as prototype: Informing climate services development

“If we don’t get NIDIS right, we can’t get a national climate service right”

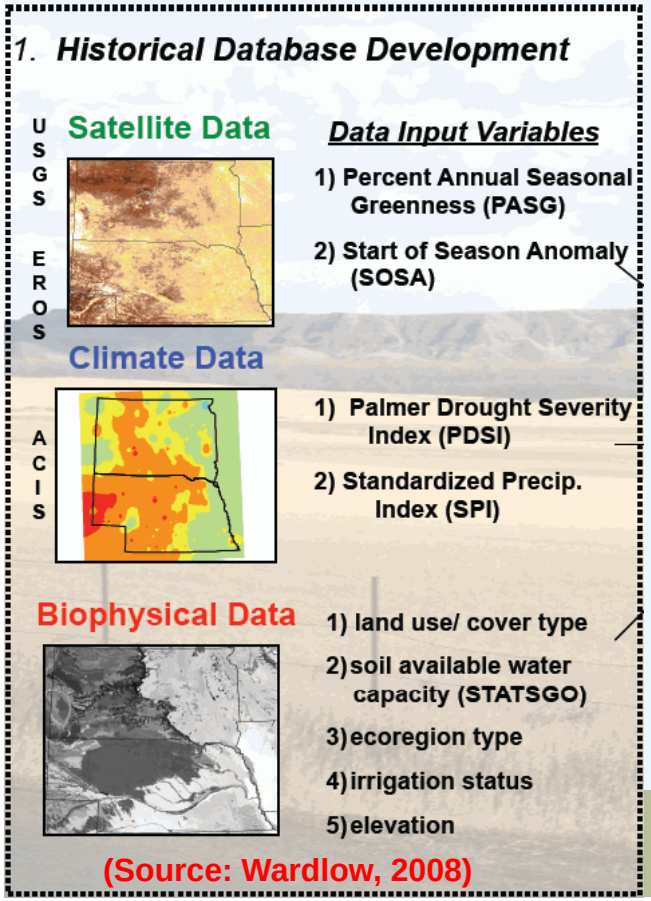
Kelly Redmond, Western Regional Climate Center



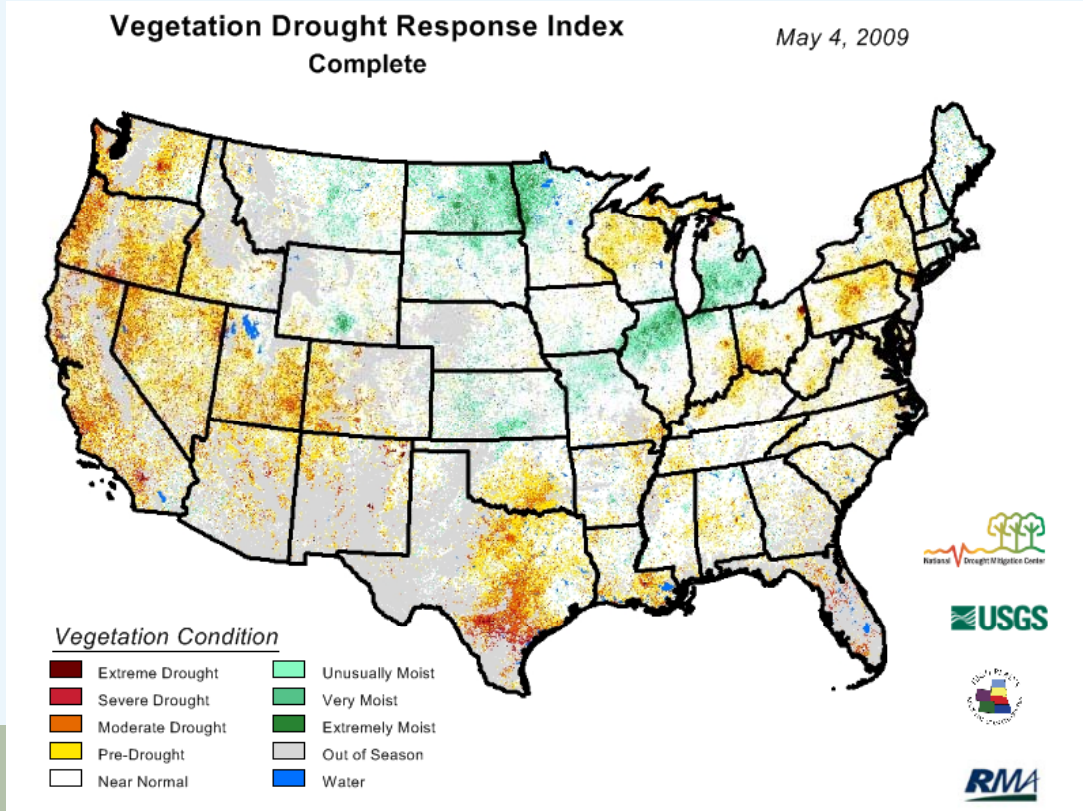
6th Drought Monitor Forum
Austin, Tx Oct. 7-8, 2009

Vegetation Drought Response Index (VegDRI)

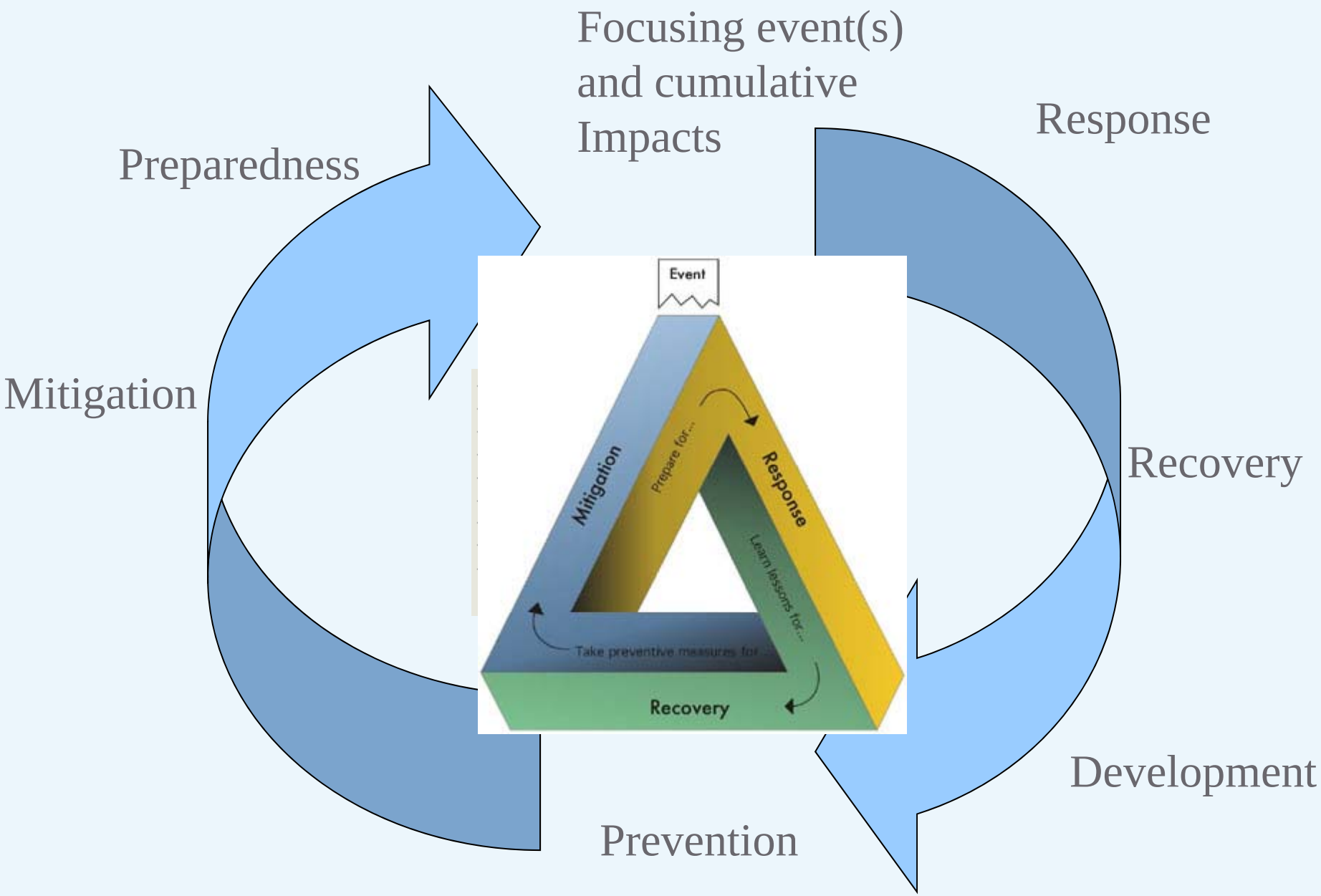
- ✓ Hybrid Drought Index that Integrates:
  - Satellite-based observations of vegetation conditions
  - Climate-based drought index data
  - Biophysical characteristics of the environment



http://drought.unl.edu/vegdri/VegDRI_Main.htm



Event to event..Hyogo Framework..issue attention cycle



Implementation

Upper Colorado River Basin:

Existing mandates, decision cycles, and organizational capacities to guide implementation of the pilot

- Colorado Division of Water Resources (CDWR)
- Colorado State Climatologist
- Colorado River Water Conservation District (CRWCD)
- Colorado Water Conservation Board (CWCB)
- CU – Western Water Assessment, CIRES, and CADSWES
- Denver Water Board
- Northern Colorado Water Conservancy District (NCWCD)
- Wyoming State Engineer
- Wyoming State Climatologist
- Utah State Climatologist
- Desert Research Institute/WRCC
- National Center for Atmospheric Research (NCAR)
- National Drought Mitigation Center (NDMC)
- USDA: Natural Resources Conservation Service
- USFS: Region 2
- USBR: Eastern Colorado Area Office, Great Plains Region, Office of Policy and Programs, Research and Development
- USGS: Colorado Water Science Center, Central Region, Grand Canyon Monitoring and Research Center
- NOAA: Earth System Research Laboratory, National Centers for Environmental Prediction, National Climatic Data Center, National Weather Service

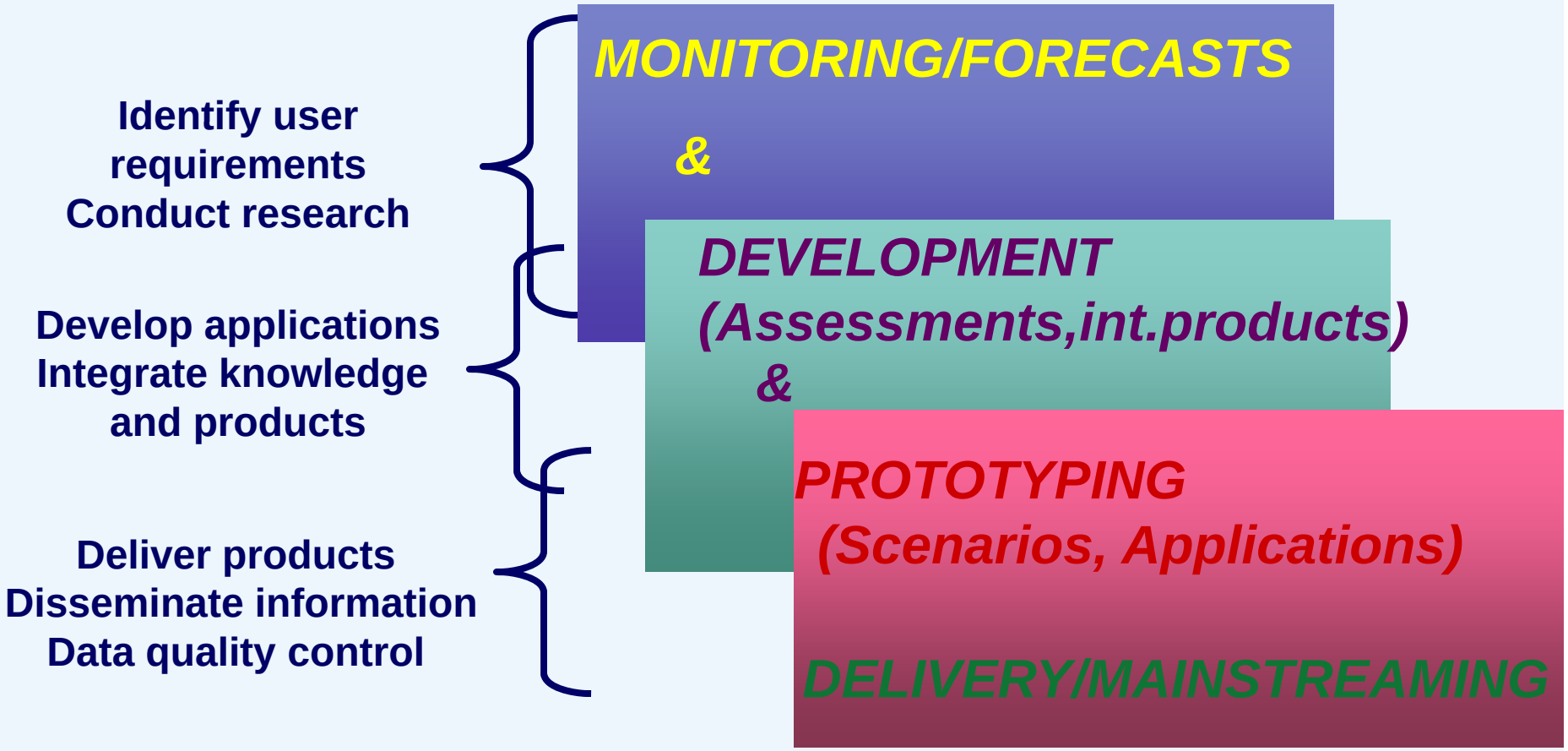
Drought and Water Resources Services

Mission: Implement a dynamic, accessible, authoritative drought information system

NOAA Produces:	With Our Partners:	Used By:
Monitoring and Forecasting		
U.S. Drought Monitor	USDA, National Drought Mitigation Center	USDA, state and local governments
U.S. Soil Moisture Monitoring	DOE, USDA (NRCS)	USDA, agricultural producers
Normalized Difference Vegetation Index	USGS, NASA	USAID (FEWS NET)
Crop Moisture Index	USDA	USDA, agricultural producers
Ensemble Water Supply Forecasts	USDA	USBR, USACE, state water management agencies, local district water managers
Soil Moisture Anomaly Forecast	USDA (NRCS)	USDA, agricultural producers

NOAA Produces	With Our Partners:	Used By:
Products Informing Risk Assessment and Management		
Reconciling projections of future Colorado River stream flow in a changing climate	USBR, USGS, University of Washington, University of Colorado, University of Arizona, University of California-San Diego	USBR, state and local water providers, reservoir managers, Water Conservancy Districts
USGS Circular 1331: Climate Change and Water Resources Management: A Federal Perspective	USGS, USBR, USACE	USBR, USACE, Water Utilities
Climate Change in Colorado: A Synthesis to Support Water Resources Management and Adaptation	Colorado Water Conservation Board, University of Colorado, Western Water Assessment RISA	Colorado water planners, State Climatologists
Managing Threatened and Endangered Salmon in Low Water Conditions	USBR, CA Department of Fish and Game, CA Department of Water Resources, University of California Davis, Humboldt State University	NMFS, CA Department of Fish and Game, CA Department of Water Resources, Pacific Fisheries Management Council
Assessing Drought Indicators and Triggers	USGS, USDA (NRCS), Colorado Water Conservation Board, Colorado State University, Utah State University, University of Wyoming	USGS, USDA, USBR, water planners/providers, reservoir managers, State Climatologists

The "Services" Challenge



Relative status of information

STATIC.....EMERGENT/DYNAMIC

Regional Drought Early Warning System
Upper Colorado River Basin

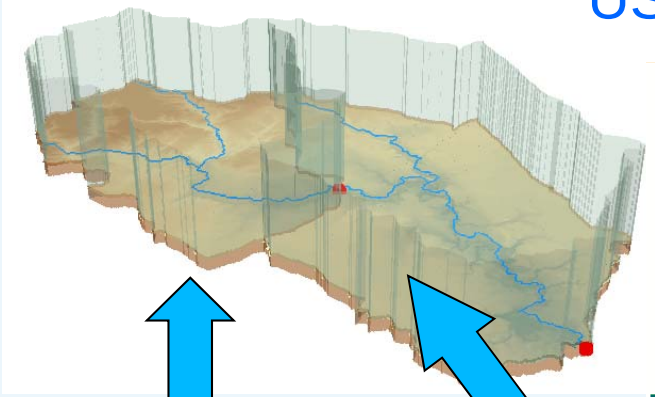
Given better data and information coordination, would responses have been improved for past events? Assess:

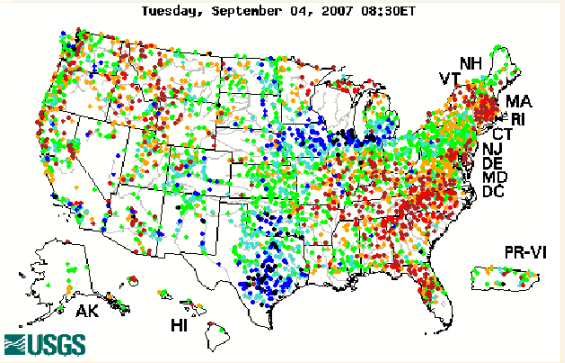
1. Value of improved information using past conditions
2. Responses for projections/ scenarios(decadal, climate change)
3. Feedback on priorities (e.g. data gaps) to Interagency Executive Council

Connecting geospatial and temporal water resources data

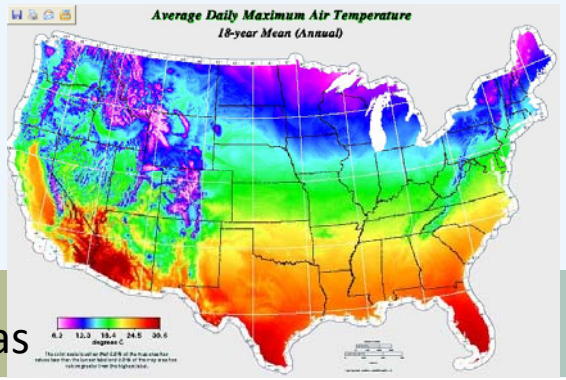
Digital Watershed

USGS NWIS Streamflow



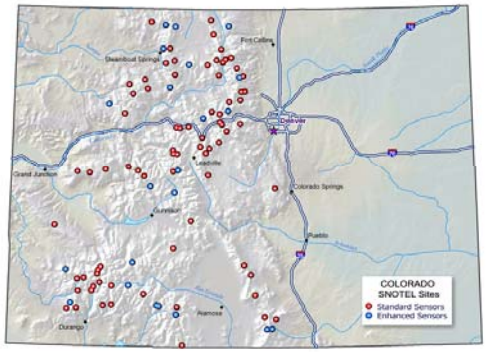


NHDPlus

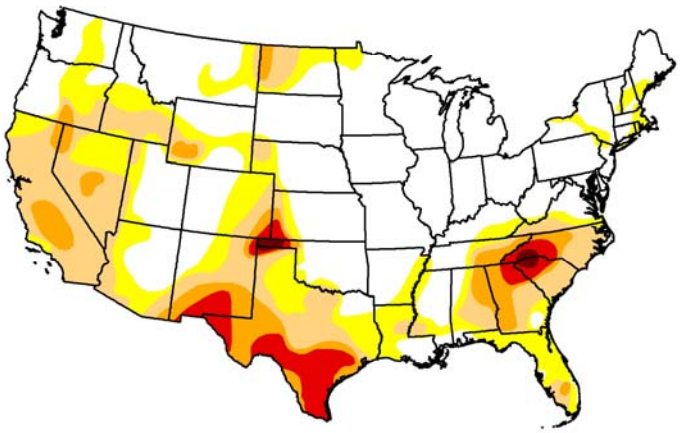


NOAA NCDC and ASOS

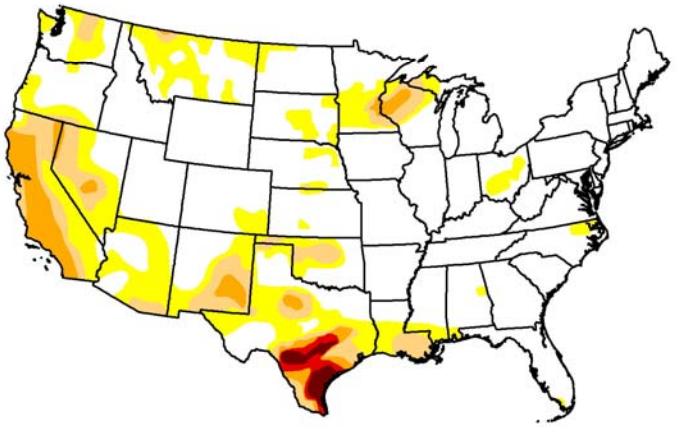
NRCS Snotel



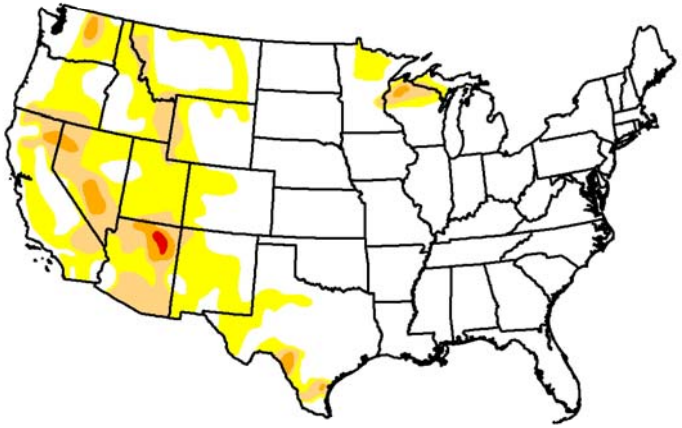
David Maidment, U Texas



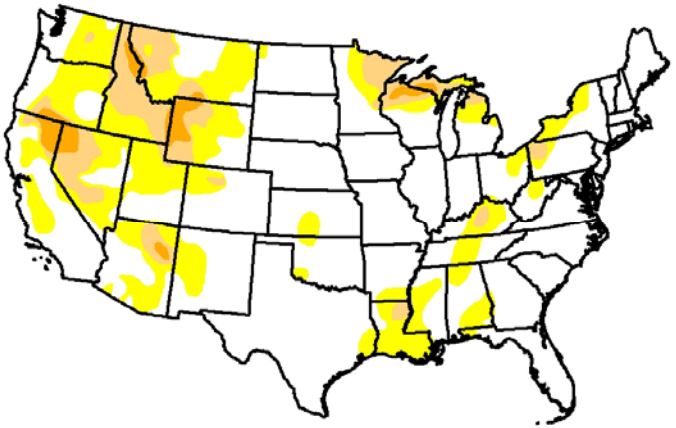
June 24, 2008



June 23, 2009



January 25, 2010



20 April 20, 2010

NIDIS Governance: Executive Council

NIDIS Program Office

NIDIS Implementation Team: Over 50 Federal, state, tribal and private sector representatives

REGIONAL
NIDIS Technical Working Groups

Public Awareness And Education

Engaging Preparedness Communities

Integrated Monitoring and Forecasting

Interdisciplinary Research and Applications

U.S. Drought Portal

Integrated Drought Information Systems

Drought Early Warning System Design-Information clearinghouse, Pilots, and Implementation