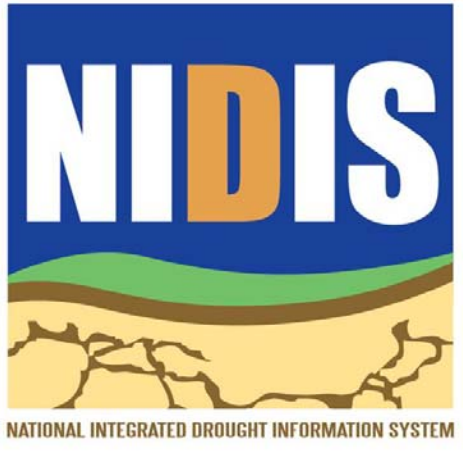
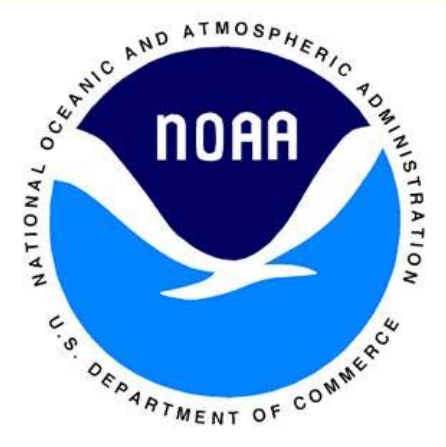


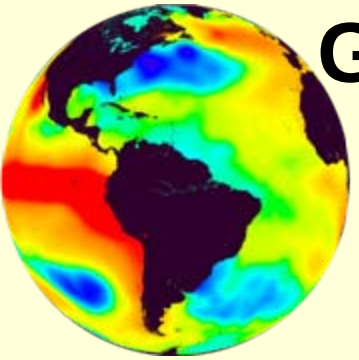


National Integrated Drought Information System (NIDIS)

Robert S. Webb

NOAA ESRL

Boulder, Colorado



Global Climatic-Drought Contributors: A continuum

— SCALES OF DROUGHT —

Heat Waves

Storm Track Variations

Madden-Julian Oscillation

El Niño-Southern Oscillation

Decadal Variability

Solar Variability

Deep Ocean Circulation

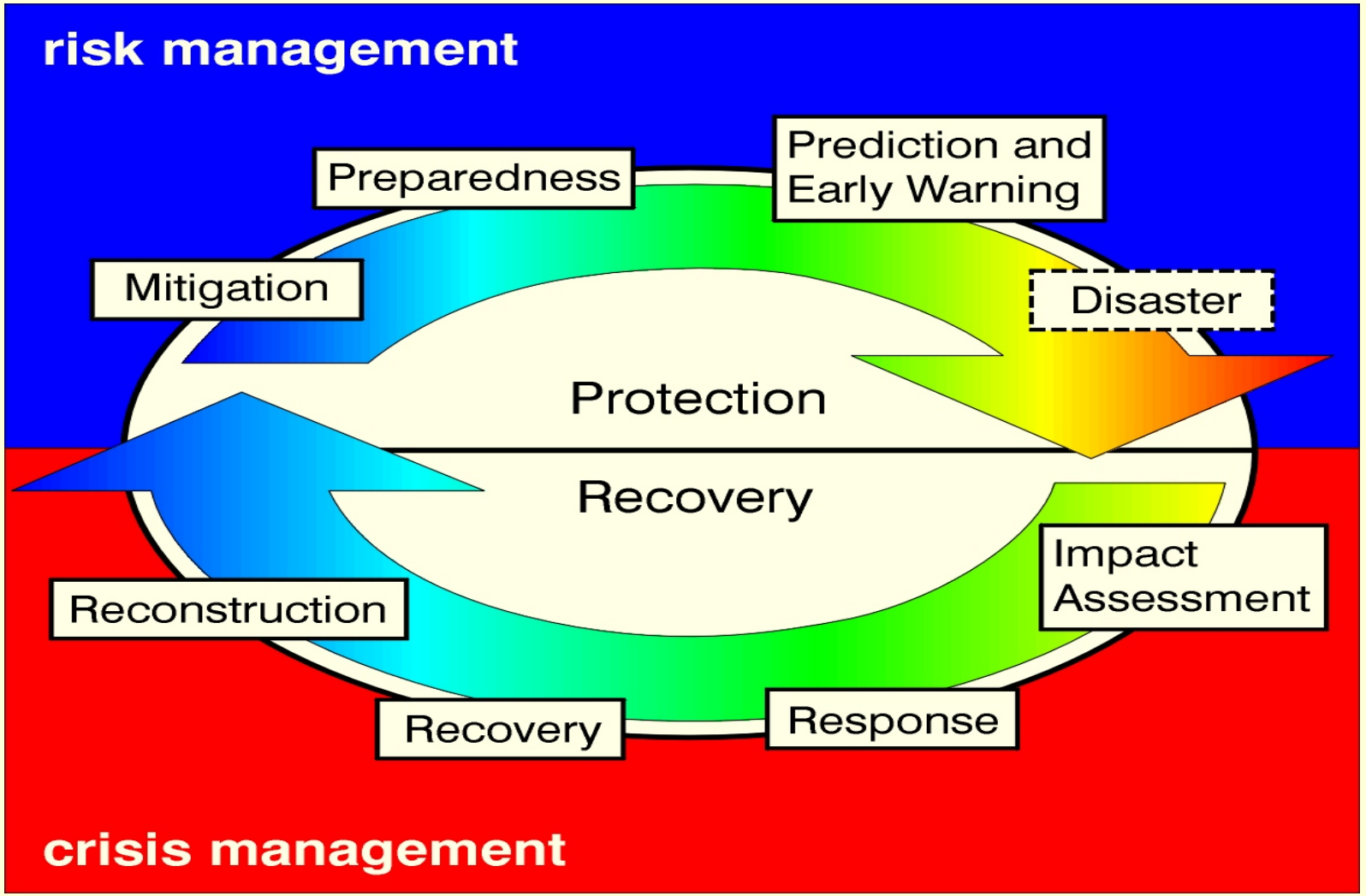
Greenhouse Gases

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

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

Droughts span a large range of temporal and spatial scales

The Cycle of Disaster Management

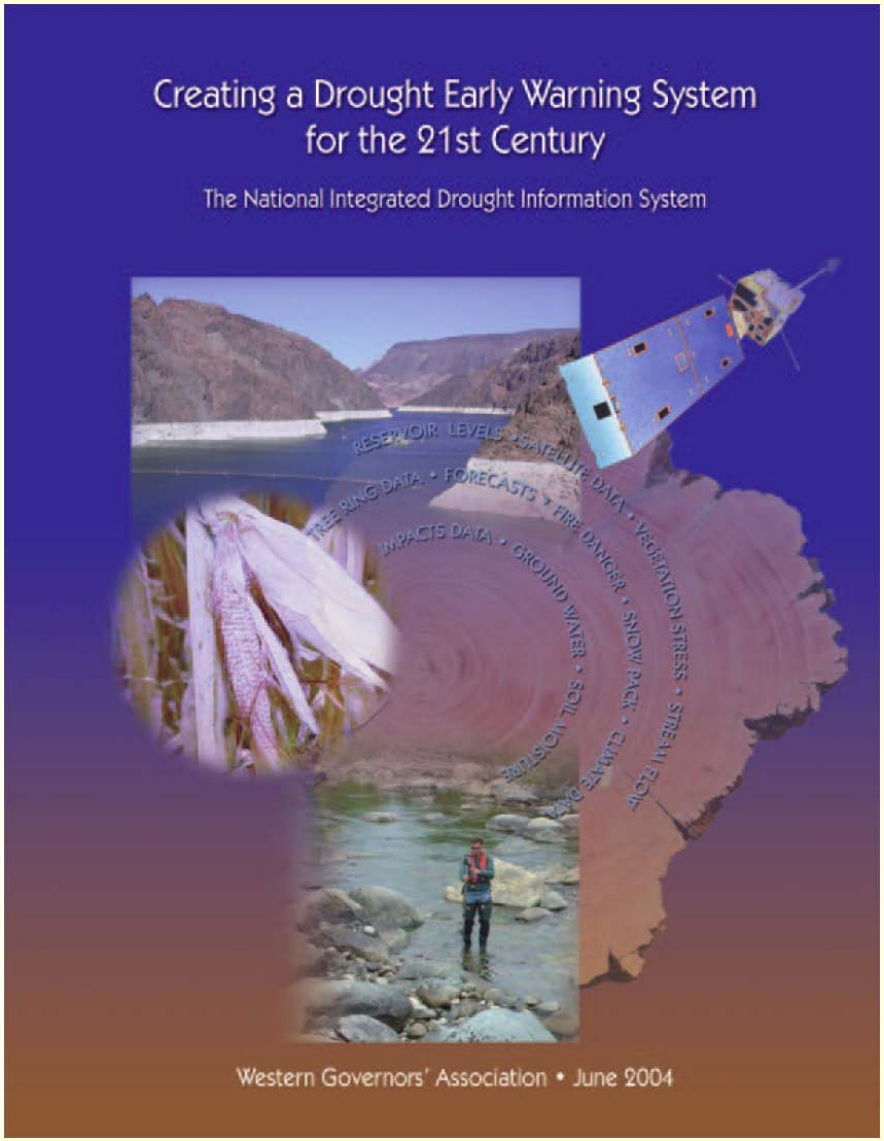


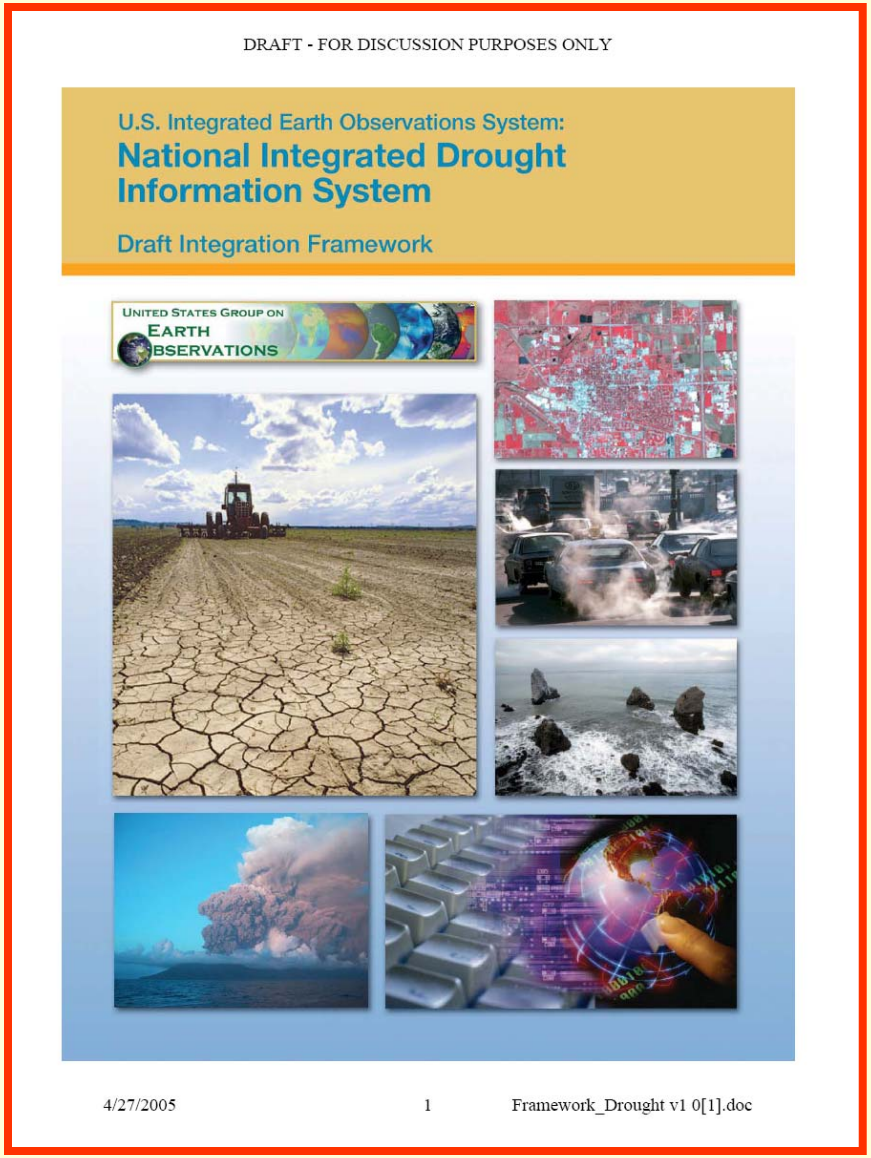
NDMC and others

Basis for Assessing Risk for Early Warning

Risk (likely degree of impact) = f(Hazard, Vulnerability)

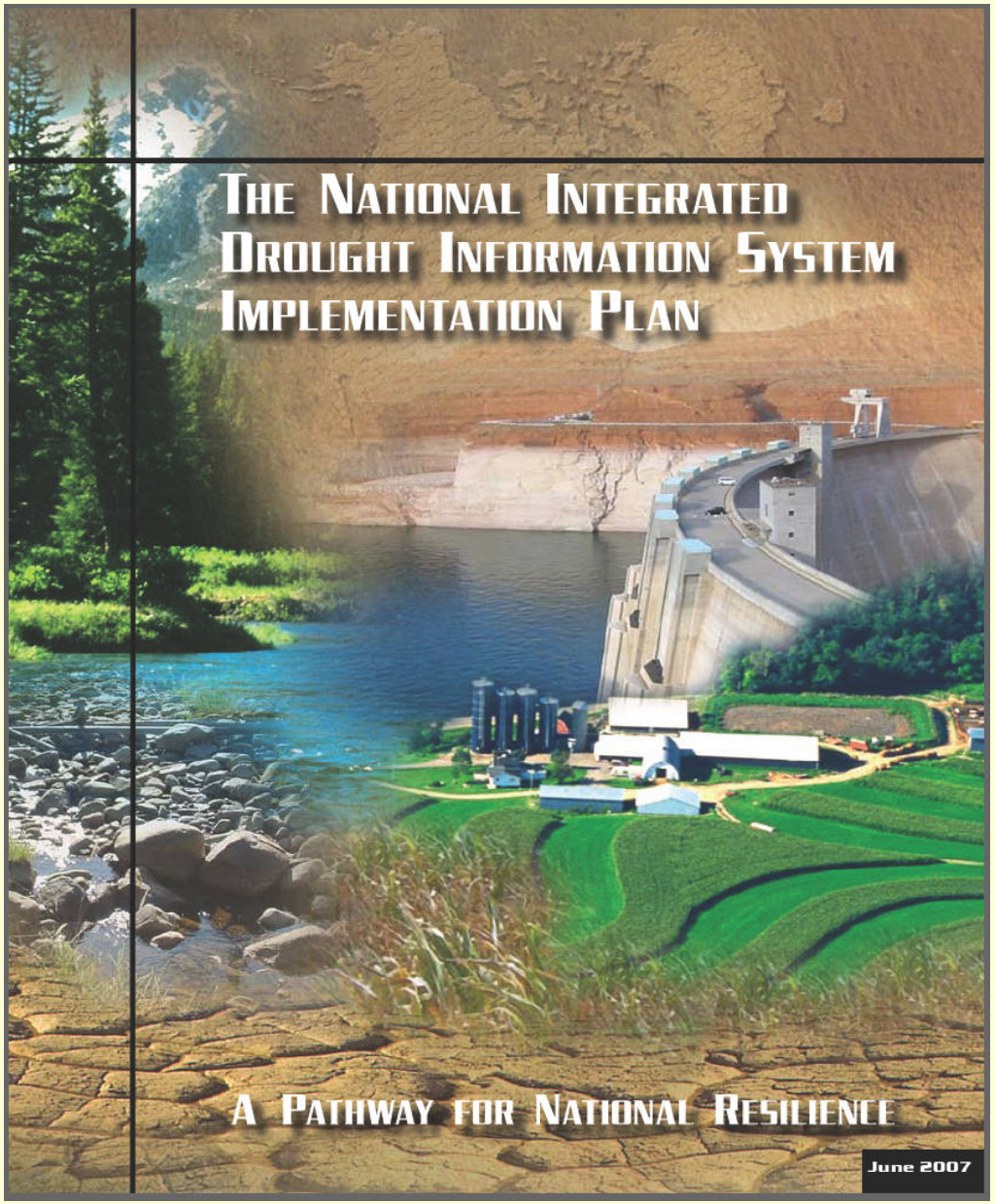
- **The combination of the inherent uncertainty of natural variability, plus projections for a warmer climate in the 21st century, make *early warning* and *adaptation* more important than ever**
- **NIDIS offers a framework for integration of vulnerability and hazard information for planners and decision makers**


Creating a Drought Early Warning System
for the 21st Century
The National Integrated Drought Information System
RESERVOIR LEVELS • SATELLITE DATA • VEGETATION STRESS • STREAM FLOW
TREE RING DATA • FORECASTS • FIRE DANGER • SNOW PACK • CLIMATE DATA
IMPACTS DATA • GROUND WATER • SOIL MOISTURE
Western Governors' Association • June 2004


DRAFT - FOR DISCUSSION PURPOSES ONLY
U.S. Integrated Earth Observations System:
National Integrated Drought Information System
Draft Integration Framework
UNITED STATES GROUP ON EARTH OBSERVATIONS
4/27/2005
1
Framework_Drought v1 0[1].doc

The National Integrated Drought Information System (NIDIS)

- ***An information system for drought early warning and adaptation***
- Public Law 109-430 authorizing NIDIS signed by President in December 2006
- Led by NOAA, a multi-agency partnership of Federal, State, and Local cooperators
- A clearinghouse for drought mitigation and response innovations
- Coordination of drought plans among states and communities with common river basin
- Strengthening monitoring networks



Elements

- 1. U.S. Drought Portal:
  - Development and tailoring
- 2. Climate Test Beds:
  - Integrating data and forecasts
- 3. Coping with Drought
  - Integrated Research and applications
  - Engaging preparedness communities
  - Education and awareness
- 4. NIDIS EWS Pilots:
  - Early Warning System Design and Implementation
- 5. NIDIS Program Office

NIDIS Knowledge Assessment Workshops

- “Reconciling Projections of Future Colorado River Stream Flow”, Sept 2007/November 2008
- “Remote Sensing Contributions to Drought Monitoring”, February 6-7, 2008, Boulder
- “NIDIS Southeast Drought Workshop” – April 29-30, 2008, Peachtree City, Georgia
- “Drought Early Warning – National Status of of Drought Early Warning Systems”, June 17-19, 2008, Kansas City

NIDIS SOUTHEAST US DROUGHT WORKSHOP
Peachtree City, Georgia - April 29th-30th, 2008

Key Issues

Water supply & low flow

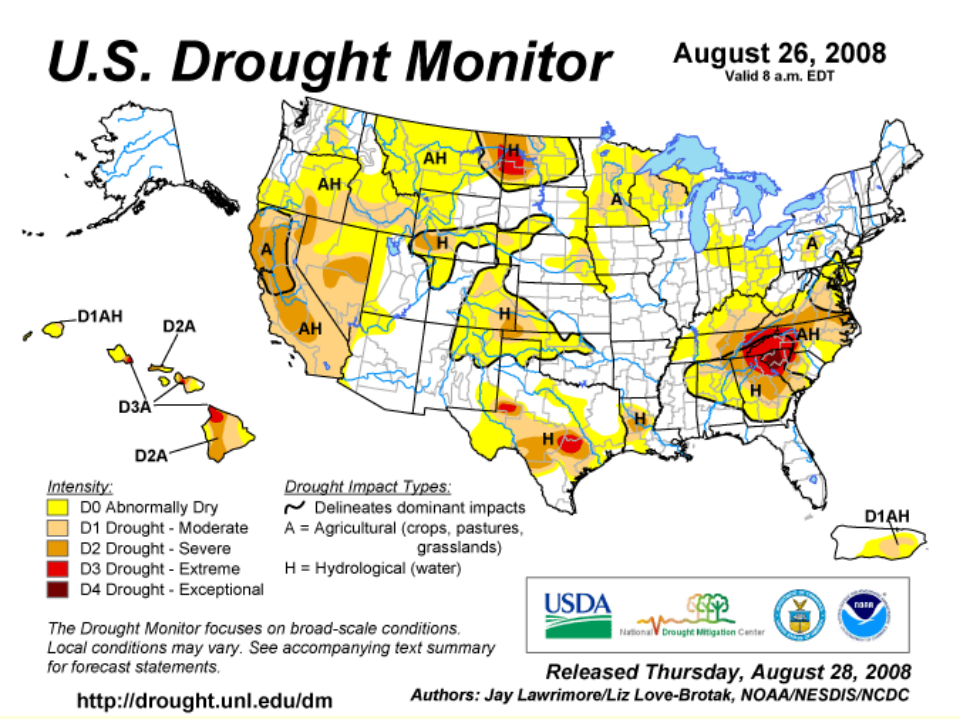
Navigation

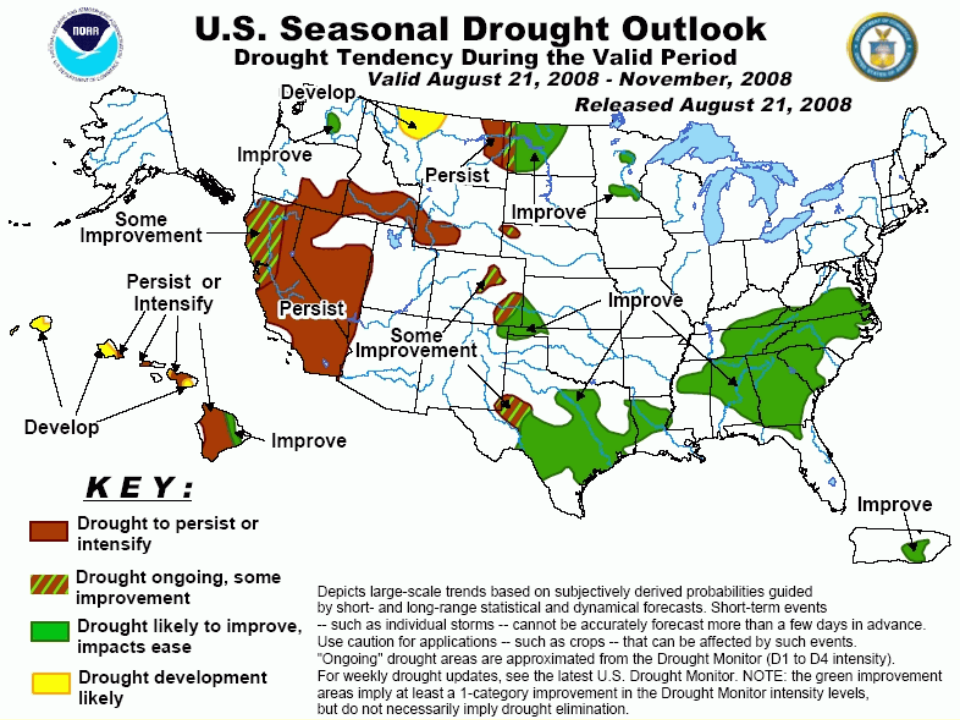
Energy

Urban and agricultural

Coastal- Nearshore impacts

- **Overview of Federal Drought Products**
- **Overview of State Drought Plans and Triggers Used: What Works and What is Needed**
- **Coastal and Estuarine Issues and Drought**
- **Current Long Range Forecast from NOAA**

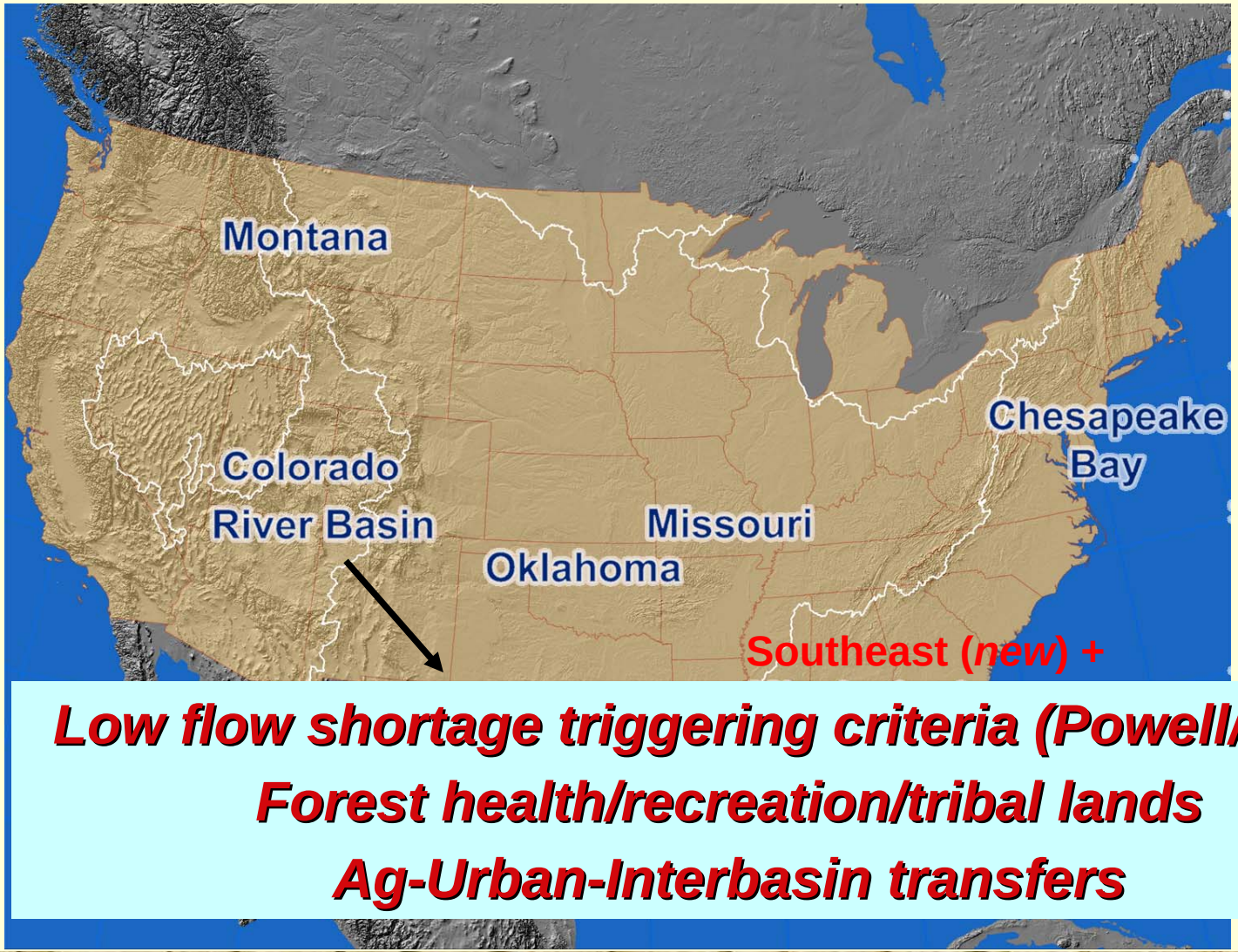




Tailoring and interpretation of national products needed for regional, watershed and local detail and usability

NIDIS Pilots – Drought-type and analysis units
FY09 tailoring the drought portal to key regions

NIDIS Pilots – Drought-type and analysis units
FY09 tailoring the drought portal to key regions



Low flow shortage triggering criteria (Powell/Mead)

Forest health/recreation/tribal lands

Ag-Urban-Interbasin transfers

Upper Colorado River Pilot

Pilot Scoping Workshop (May 28, 2008)

Drought early warning client organizations convened from three categories:

- **Water managers from Reclamation and State governments of Utah, Wyoming, and Colorado**
- **Urban/local water supply managers (like Denver, Salt Lake City, Northern Colorado Water Conservancy District)**
- **Ecosystems/environmental/recreational resource managers (Forest Service, EPA, States, NPS, USGS/BRD, NGOs)**
- **Explore existing mandates, decision cycles, and organizational capacities to determine a team to implement the pilot**

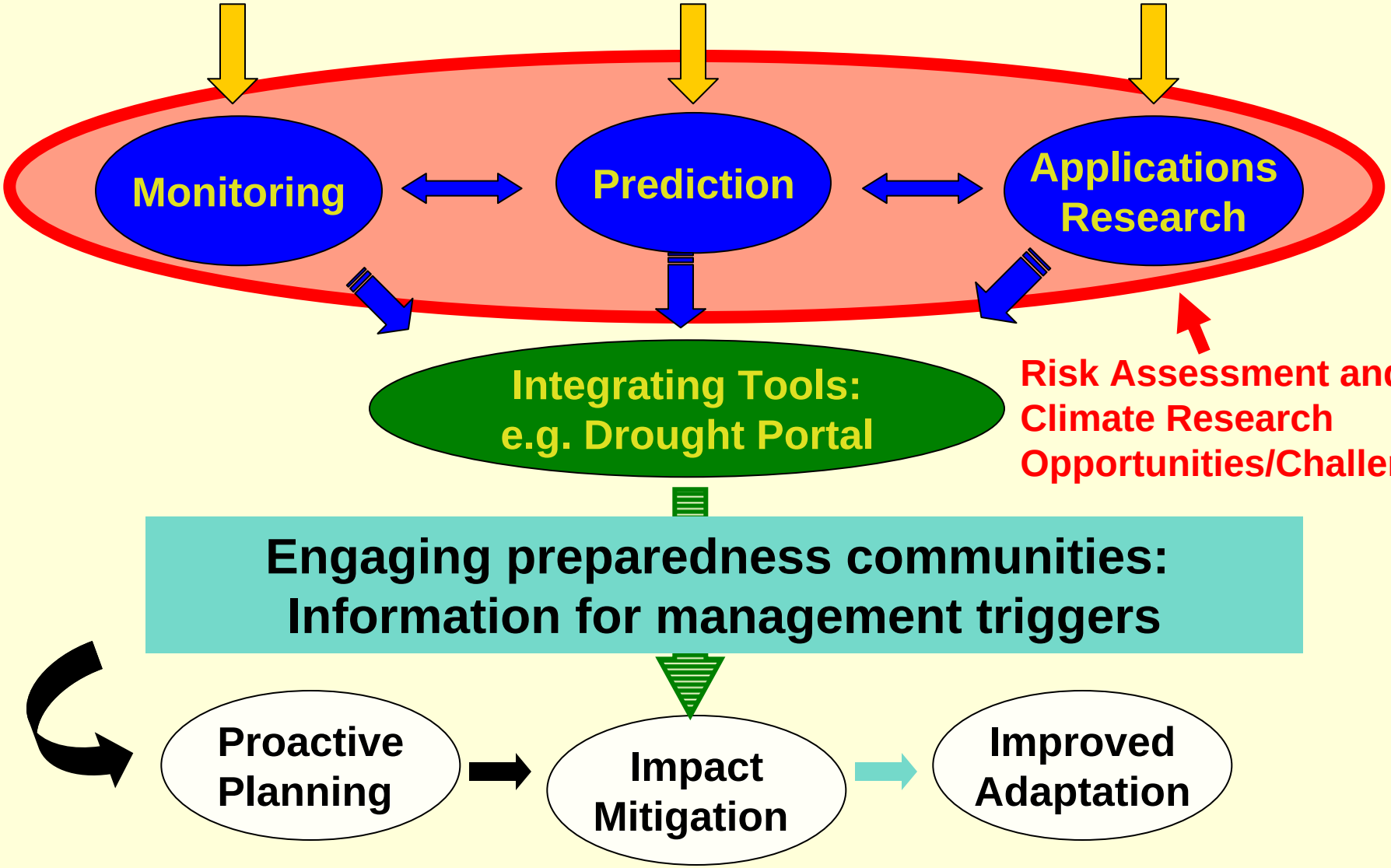
Upper Colorado River Pilot Meeting Boulder, CO, October 1 & 2, 2008

Assessment study of gaps in monitoring, in process understanding, and in prediction

- **Gather and synthesize information from observation network operators, researchers, and forecasts/projection producers**
- **Identify unmet needs for drought early warning**
- **Provide the basis for initiatives to strengthen and enhance monitoring, understanding and prediction in support of drought early warning**

NIDIS Implementation

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



Potential Research Opportunities/Challenges

Risk Assessments	**vulnerabilities, triggers, decision making process, adaptive capacity, mitigation pathways, building/engaging network of users/partners**
Monitoring	**current and past temperature, precipitation, snowpack, soil moisture, runoff and evapotranspiration, and vegetation health trends/variations -- at all elevations**
Process Understanding	**critical thresholds, elevation dependency of climate change, closing the hydrologic budget, role of aerosols, role of sublimation, soil moisture sources and sinks, impacts of land use changes**
Modeling, Forecasts, Projections	**Improved atmospheric/ hydrology coupling, extension of reliable predictions beyond 10 days better seasonal outlooks + 2 to 5 year timescale, hydrologic demand predictions, downscaled projections to relevant elevation & spatial scales**