



# The State of the NIDIS

## NIDIS Project Implementation Team

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and Earth Systems Research Lab.





## Sub-Committee on Natural Disasters Grand Challenges: National Drought Preparedness:

*#1: Develop a National Drought Information system*

*#2: Enhance Hazard Understanding*

*#3: Develop Mitigation Technologies and Strategies*

*#4: Protect Critical Infrastructure Systems*

*#5: Assess Disaster Resilience*

*#6: Promote "Risk-Wise" Behavior*



# NIDIS VISION and GOALS



***“A dynamic and accessible drought information system that provides users with the ability to determine the potential impacts of drought and the associated risks they bring, and the decision support tools needed to better prepare for and mitigate the effects of drought.”***

## **Implementation requires:**

- **Building a national drought monitoring and forecasting system**
- **Creating a drought early warning system**
- **Providing an interactive drought information delivery system for products and services—including an internet portal and standardized products (databases, forecasts, Geographic Information Systems (GIS), maps, etc)**
- **Designing mechanisms for improved interaction with public (education materials, forums, etc)**



# WGA (2004), NIDIS Bill (2006), USGEO (2006)

Preceded by: Western States Water Policy Commission (1998), NDMC, National Drought Bill efforts (2000)

Creating a Drought Early Warning System for the 21st Century

The National Integrated Drought Information System

RESERVOIR LEVELS • SATELLITE DATA  
 STREAMING DATA • FORECASTS  
 IMPACTS DATA • FIRE DANGER • PRECIPITATION STRESS  
 SNOWPACK • GROUNDWATER • SOIL MOISTURE  
 AIR QUALITY • RIVER FLOW • WIND SPEED  
 WAVE HEIGHT • TIDE GAUGES

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

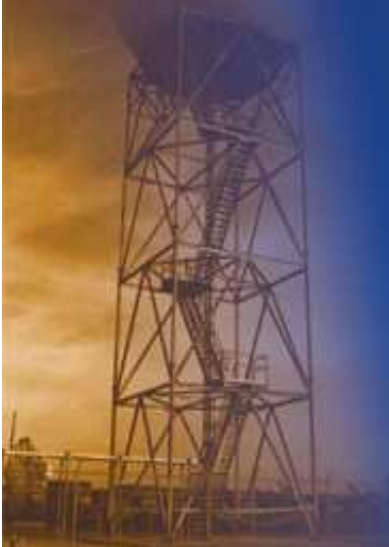
## Federal, State, Local, Tribal, Regional



# Making NIDIS “Operational”



- Established the NOAA **NIDIS Coordination Office**
- Established **NIDIS Implementation Team**
- **USGEO role** -- Coordination of monitoring to leverage existing cross agency, state, local and private sector observations and information delivery
- **Coordinate** inter-agency program and sponsored activities





# NIDIS Governance and Management



- **NOAA:** Roles and Responsibilities
- **Steering Body** Roles and Responsibilities
- Executive Council (NOAA, USGS (DoI), Others: Western States Water Council)
- **Project Manager** Roles and Responsibilities
- **Project Implementation Team** Roles and Responsibilities
- **Sub-teams** for pilot implementation and evaluation



## Past Meetings/Future Directions

- May 11 Washington DC
- June 1,2 Lincoln NE
- May 31-Jun 3 Santa Fe NM
- Sept 21-22 Longmont CO
- Nov 14-15 USDA Headquarters
- NIDIS Bill 06
- March-April 07 Implementation Plan

**2007:** NOAA Integrated Water Resource Services Portal prototype

Workshops for team development in pilot locations

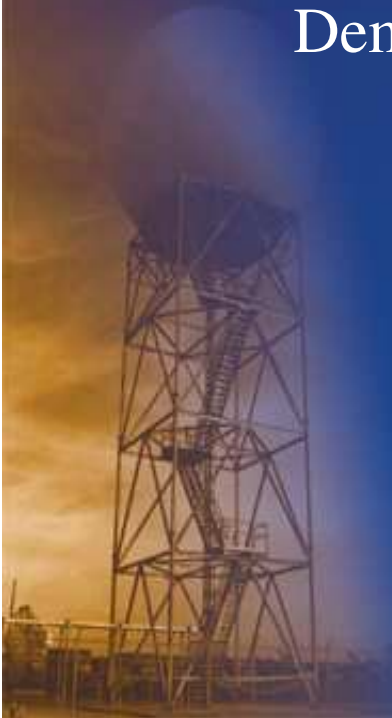
Early 2008: National Workshop on the status of drought early warning indicators and triggers,



## Policy types

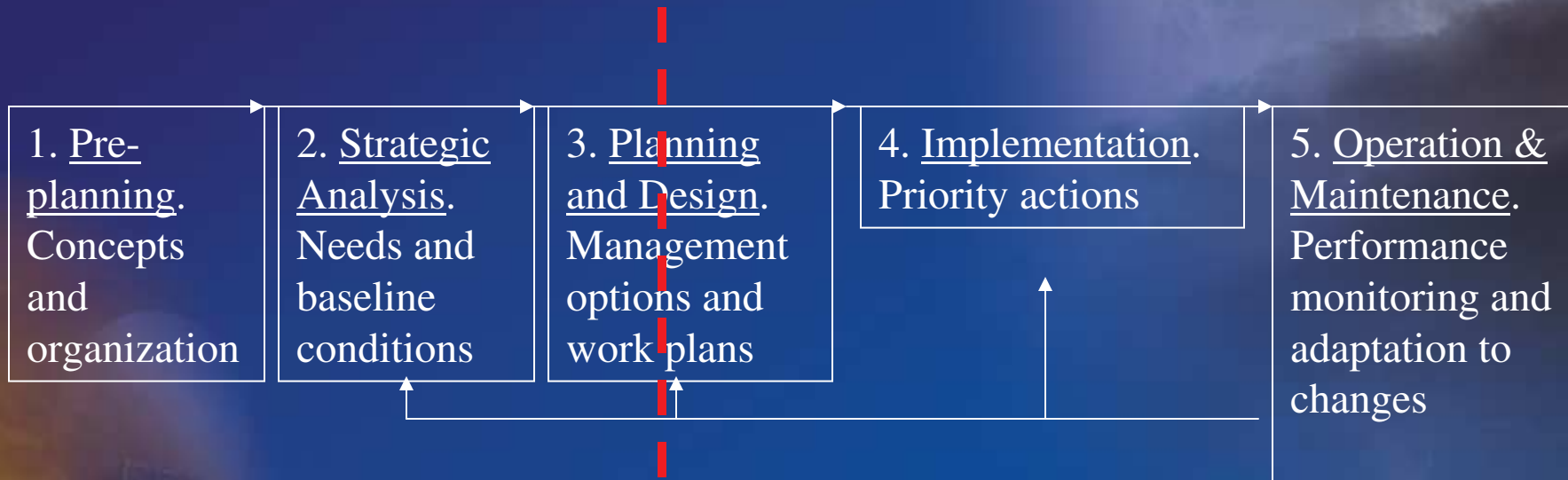
- Ordinary
- Constitutive

Is the drought problem an information Supply vs. Demand transaction?





## Crafting climate services (CS): Where are we?



Strong analysis and planning is evident in CS but....

Weak implementation and monitoring experience to date



Think Big!

*But, don't start off by trying to  
implement as big as you can think it!*



# National Integrated Drought Information System

*What are the "pieces"? Where are the gaps?*



- *Drought Observations: Improvements in the frequency & timeliness of data from stations we already have & greater density of key soil moisture observations*
- *U.S. Drought Portal: Internet portal to provide a drought early warning system from U.S. county to national scale*
- *NIDIS Operations:*
  - Network Performance Monitoring
  - Ongoing analysis and recommendations related cross agency Observing System optimization for:
    - *maintenance and communication*
    - *integrated data flow*
    - *configuration*
  - Leverage non-federal observing systems
  - Identify Non-Fed partnerships
  - Coordinate drought educational outreach
  - Track NIDIS progress



# Challenge: Diverse Time Scale

## TIME SCALES OF CLIMATE VARIABILITY

### Droughts

- Heat waves, droughts
- Floods
- Storm track variations
- Madden-Julian Oscillation

- El Niño-Southern Oscillation
- Other climate modes

- Decadal variability
- Solar variability
- Deep ocean circulation
- Greenhouse gases



Droughts span an enormous range of time scales, from short-term “flash droughts” that can have major agricultural impacts to multi-year or even decadal droughts (1930s, 1950s, etc.) Paleoclimate evidence suggests that in the last 1000 years parts of the U.S. have experienced “mega-droughts” that persisted for decades.



# NOAA Service Requirement across scales



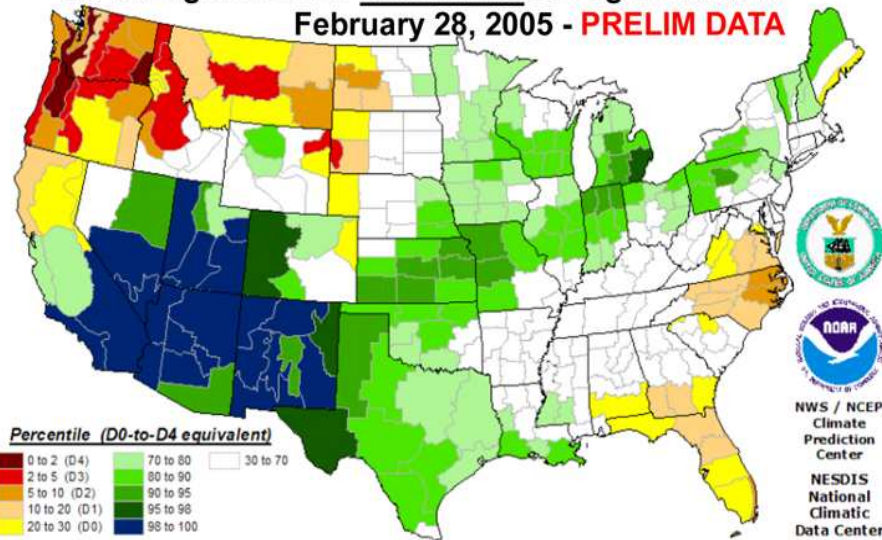


# NIDIS Operations: Improved Monitoring



- Drought indicators based on available preliminary data differ greatly from final data in some areas.

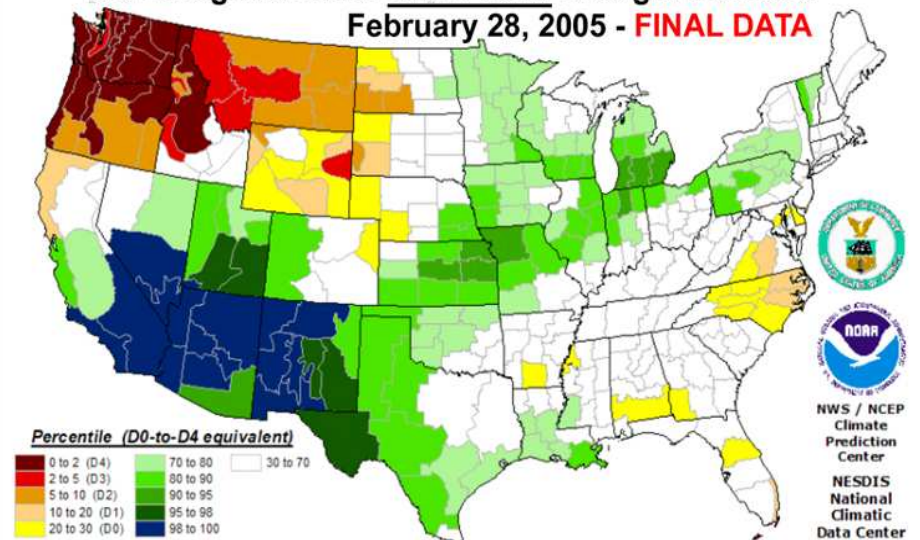
US Drought Monitor *Short-Term* Drought Indicator  
February 28, 2005 - **PRELIM DATA**



**Inputs (as percentiles):**  
 35% Palmer Z-Index  
 25% 3-Month Precipitation  
 20% 1-Month Precipitation  
 13% CPC Soil Moisture Model  
 7% Palmer Drought Index

This map approximates impacts that respond to precipitation over several days to a few months, such as agriculture, topsoil moisture, unregulated streamflows, and most aspects of wildfire danger. The relationship between indicators and impacts can vary significantly with location and season. Do not interpret this map too literally.

US Drought Monitor *Short-Term* Drought Indicator  
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## U.S. Drought Portal (USDP)



FY 2008:

Establish, operate, and maintain (update/improve) U.S. Drought Portal (USDP)

Mapping capabilities incorporated

Advanced communities of users capability established

- FY 2009 and beyond:

Steady increase in volume of data and information delivered through the USDP

- FY 2008

USDP – initial operational capability established

Access to other web sites and use of drought information

- FY 2009 and beyond

Provide seamless links to drought community

Increase Number of Users and Accesses

Increase Number of Products Developed and available

On-line User feedback to measure success and make improvements

Applied Climate Information System (ACIS) -DP Integration

National Water Information System (NWIS) -DP Integration

Integrate Climate Forecasts with DP Products

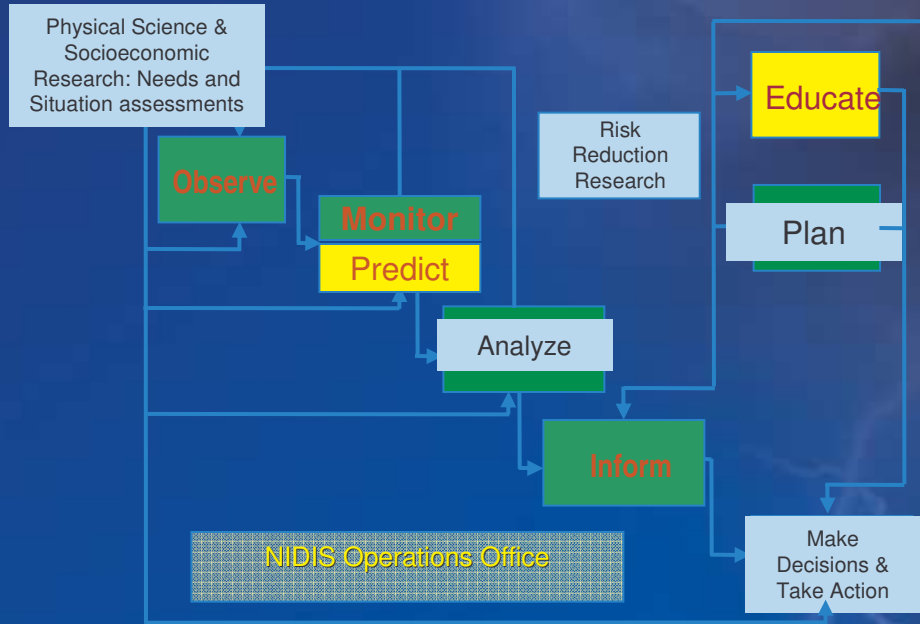


# NIDIS Business Model

NIDIS NTO Planned Functions  
 Emerging Opportunities

## Goals & Objectives -

Develop and Implement an integrated national drought early warning system

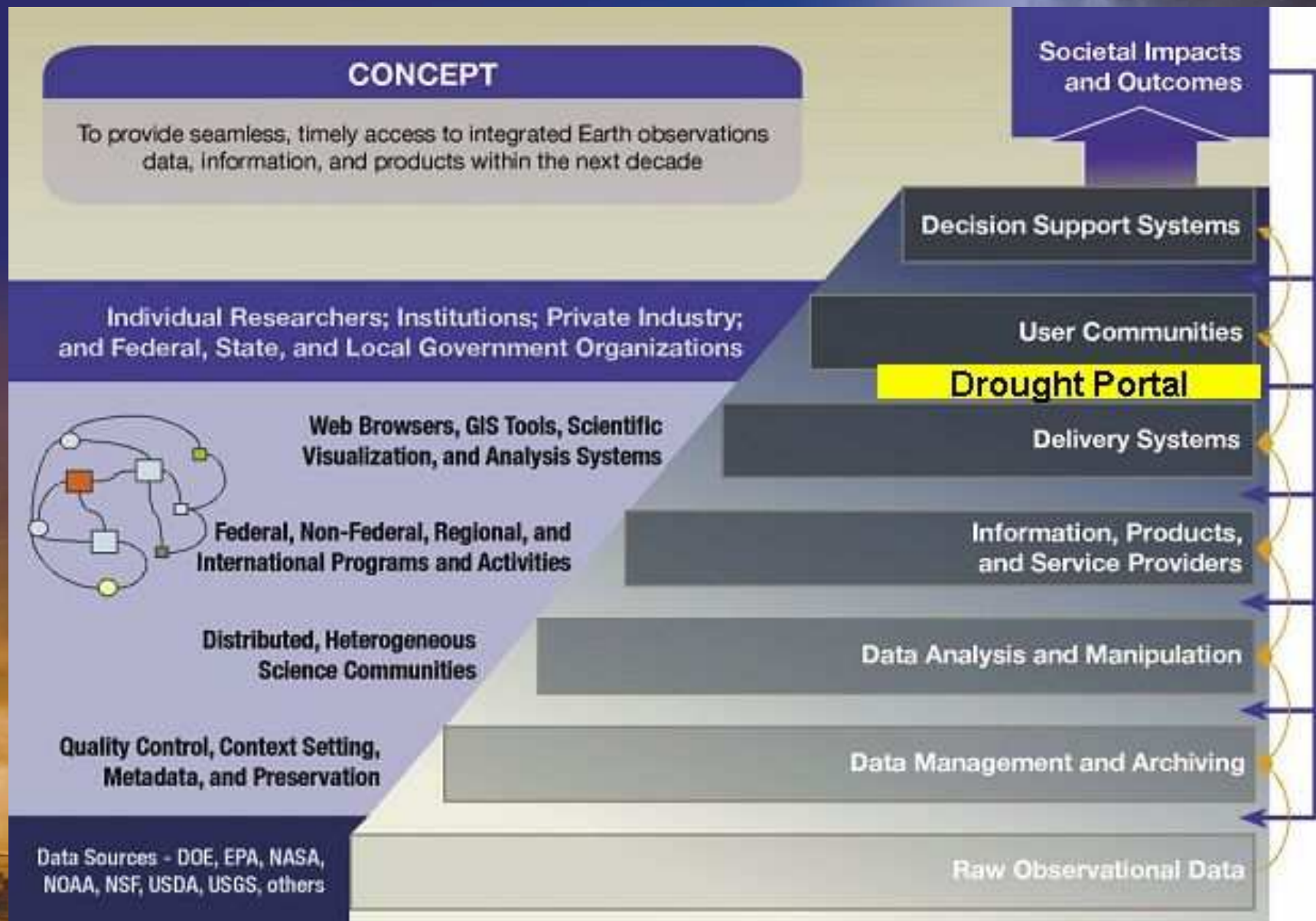


*Is this an adequate model?*

*NIDIS Business Process Requirements*



# NIDIS Data assimilation and provision model





# Making NIDIS Operational



- The **NIDIS Project Office**: Structure, implementation teams and governance (incl. Exec. Council)
- **National**
  - *Engaging the preparedness communities*
  - *Monitoring and forecasting: gaps and capacity*
  - *Education and Outreach*
  - *Integrated research for generating drought risk scenarios*
  - *The Drought Portal*
- **Regional/State DEWS Pilots**: Goals, Design, Implementation, Evaluation, Transferability
- **Partnerships**: Federal, State, Tribal, Local



# Designing 'Early Warning' (Sub)Systems

*What do we need to learn from pilots?*



- **Public awareness of drought risk:**
- **Monitoring and forecasting subsystem**  
National, regional and local levels gap analyses and product tailoring, benefits of additional (soil moisture, *etc.*) sensors
- **Risk assessment sub-system**  
Enable resource and other management authorities to generate risk and impact scenarios (e.g., indicators, triggers, risk analysis in particular settings for EWS)





# Designing 'Early Warning' (Sub)Systems

## Conceptual Model: *What do we need to learn from pilots?*



- **Preparedness sub-system**

Outline and inform actions required to reduce the loss and damage expected from an impending hazard event

- **Communication sub-system**

Delivery of timely information on impending events, potential risk scenarios and preparedness strategies

- **Evaluation and feedback sub-system**





# Implementation Plan Considerations



- Who is doing what? (and how well is it working?)

*Established or emerging federal, state, and local innovations  
(e.g., Drought Monitor, South Carolina, etc.)*

- Section outlines (identification potential additional illustrative cases/approaches, *etc.*)
- The NIDIS Program: Governance and management
- Criteria for Pilot selection: Choice, design and implementation
- Pilot Project review by NIDIS Implementation team
- Priorities for the near-term: What's needed?





# Project Team DEWS Pilot Design Recommendations



## Types of drought and management units:

- Large watershed, several WGA-relevant basins: e.g. Colorado,
- Individual States: 2-3 of Montana, South Dakota, Missouri, Oklahoma, down to county level
- Eastern Watershed: Multi-state flash drought: Chesapeake
- Underserved or as yet under-represented testing transferability: Mississippi or other
- Other
- Support from other regions through 'Coping with Drought'
- Small supporting grant within pilots



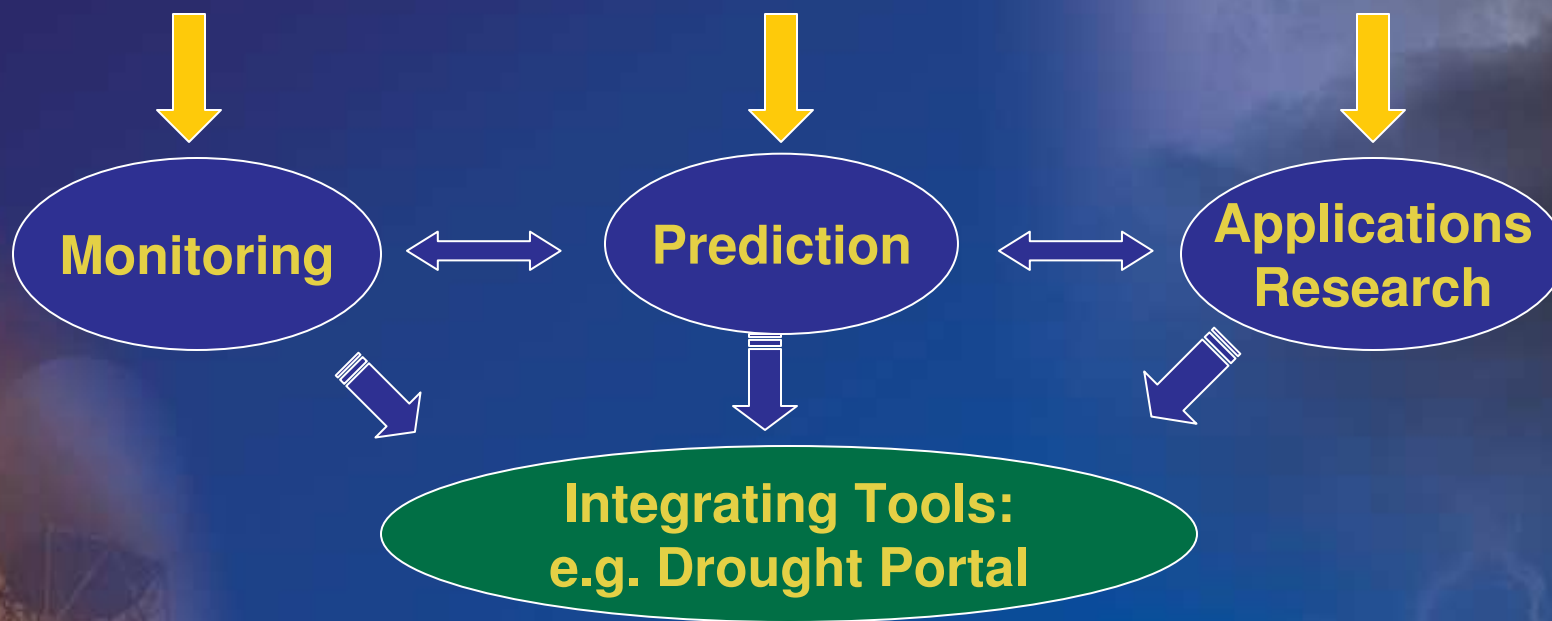
## NIDIS Pilots (Project implementation Team)



**Timeline? Funding? Transferability?**

# NIDIS Process Model: Implementing NIDIS Pilots

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



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

**Proactive  
Planning**

**Impact  
Mitigation**

**Improved  
Adaptation**



# Core Requirements



- Scope
- Work breakdown
- Risk management
- Illustrative cases
- Stakeholders
- Resources: Procurement Funding
- Quality assurance





# Research Priorities



Selected “Research needs” in NIDIS:

- “Developing methodologies to **integrate data and forecasting** on climate, hydrology, water: short-term vs. long term drought
- Identifying **regional differences in drought impacts** and related information needs and delivery systems  
Develop regionally specific drought monitoring and forecasts



## Where are we?

- *NIDIS Implementation Plan*
- *USGS detail to the NIDIS Program office (others?)*
- *MoA with California Department of Water Resources (others?)*
- *Western States Water Council*
- *Climate Test-Bed*
- *Presentations to various stakeholder and other communities by Project Team members*
- *Workshops to initiate pilot team and design: Cross-agency and cross-state coordination*
- *National Workshop: Status of Drought Early Warning in the U.S.*
- *USGEO*



## *Understanding the players: Identifying existing and needed information networks for managing climate-related risks*

### *(1) Service provision as a set of activities:*

- Collecting, quality control, management and archiving data
- Maintaining continuous watch on short-term climate fluctuations , decadal-scale variations , diagnosis and prediction
- Applied research to support climate information services

### *(2) Service as an administrative network: Institutional structure and Program management*

- Scope of operational domain
- Structure and processes of interactions
- Driving mandates behind roles
- Resource dependencies and shared tasks
- Outreach activities
- Mission, culture and incentive structure for interdisciplinary and service activities.
- Cost effectiveness vs. need for overlap



# A Prototype Pathway for Regional Climate Information Services

Regional Oversight and Evaluation

OTHER NON-NOAA PARTNERS

**RESEARCH**

&

RISAs, universities, and labs

**DEVELOPMENT**

&

Integrating knowledge and products (CDC, ETL, RCCs, RFCs, SCs)

**PROTOTYPING**

&

Operational (RCCs, NCDC, CPC, WFOs, SCs, other private sector)

**SERVICES**

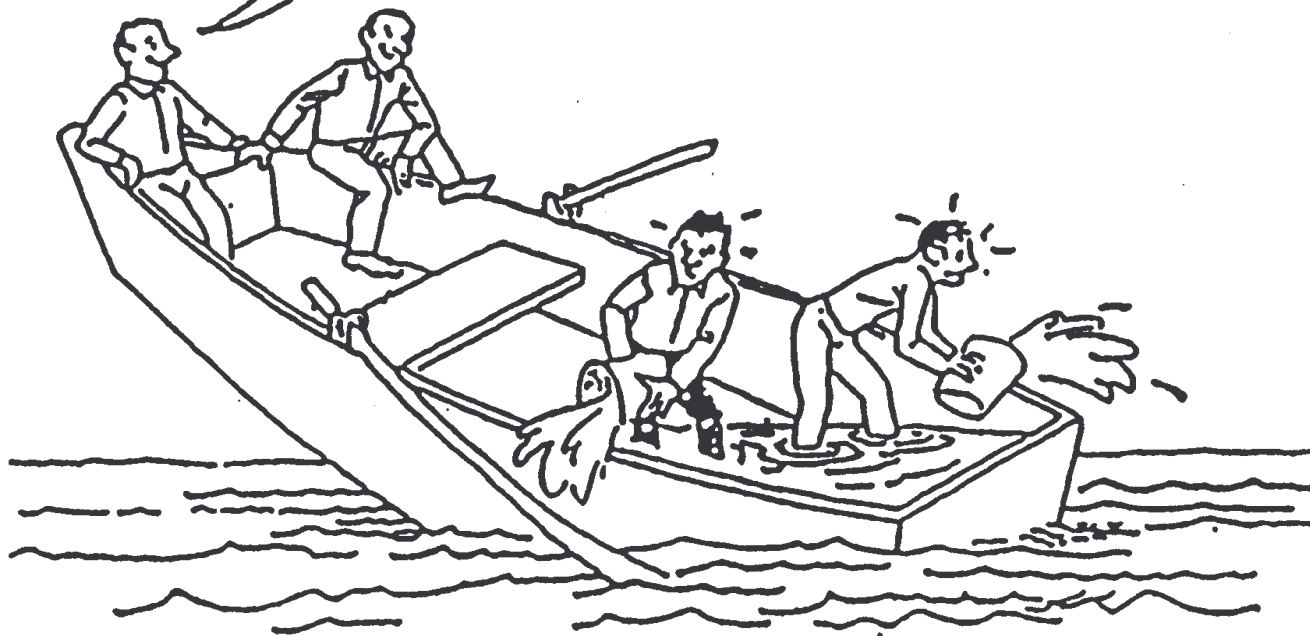
*new or enhanced regional products*

*information delivery technology*

*sustained & systematic communication and feedback*



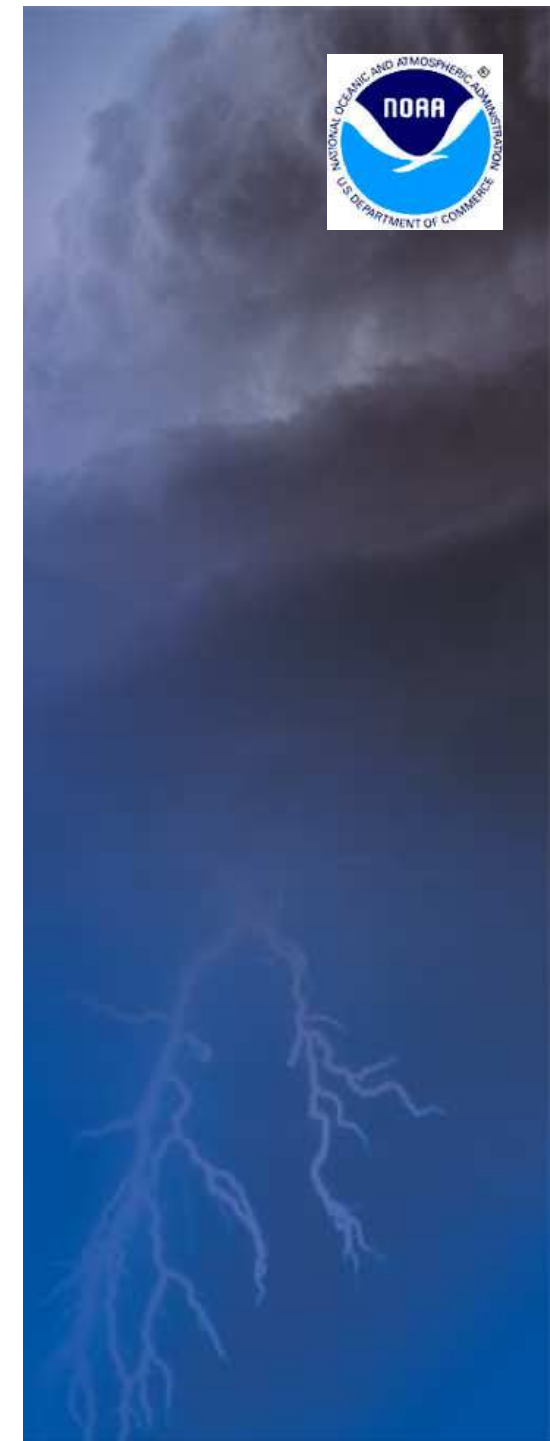
*I'm sure glad the hole isn't in our end . . .*



<b>Vulnerable Sector or Activity</b>	<b>Criteria for Key Vulnerability</b>					
	<b>Magnitude</b>	<b>Rates of Change</b>	<b>Persistence and reversibility</b>	<b>Likelihood and confidence</b>	<b>Potential for Adaptation</b>	<b>Distribution</b>
<b>Bounded ecosystems such as coastal, mountain and already stressed</b>	State magnitudes of vulnerability for different magnitudes of change, especially thresholds, relative to temperature, precipitation or the other critical parameters that create the vulnerability	State any critical rates of change that affect vulnerability	Provide information on the likelihood that the vulnerable sector will be affected by an irreversible impact and whether it is likely to persist.	Overall confidence and likelihood, but state confidence also with any specific figures or points.	State capacity for adaptation. Is adaptive capacity sufficient to delay or prevent adverse impacts and at what cost.	Provide information on the distribution of impacts – both physically and socially within countries (not in a simple developed/developing dichotomy).

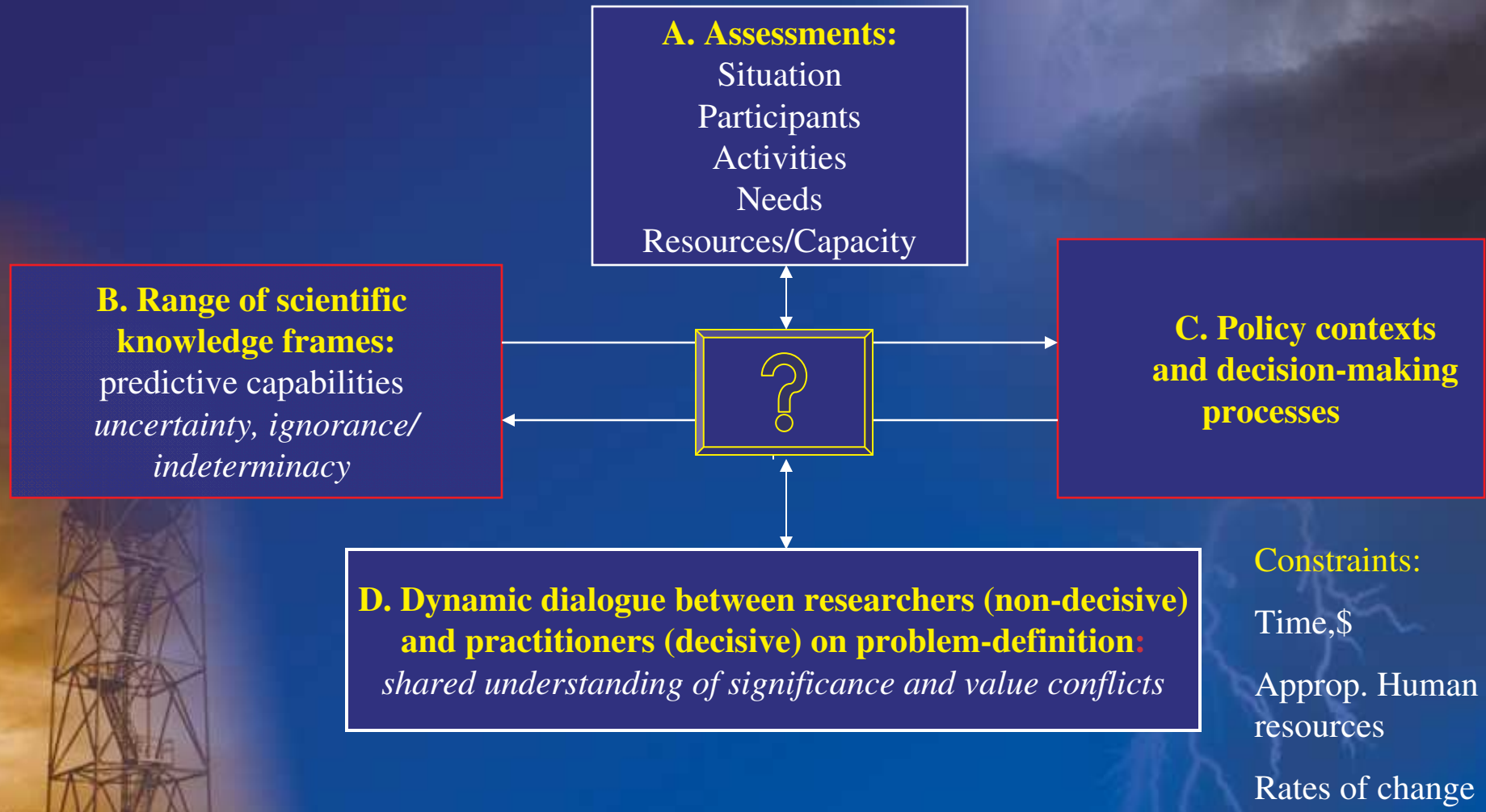


	CORE REQUIREMENTS
<b>Scope</b>	<p>Policy objective and context</p> <p>Governance arrangements setting out internal and external accountability mechanisms</p> <p>A summary of the major work that will be undertaken to achieve the policy objective and associated assumptions, constraints and exclusions</p> <p>Success criteria against which implementation and progress towards objectives can be monitored and assessed</p> <p>Benefits statement identifying the intended beneficiaries and expected benefits to be evaluated</p>
<b>Work breakdown</b>	<p>Work breakdown structure, covering phases and related activities, start and end dates, allocation of management responsibility</p> <p>Implementation schedule by financial year</p>
<b>Funding</b>	<p>Funding (table) showing estimated roll-out of deliverables and costs by financial year for the relevant forward estimates period</p>
<b>Risk management</b>	<p>A risk management plan. Identify key risks, their likelihood and potential impact as well as mitigation strategies and accountability</p> <p>A summary of the agencies risk monitoring arrangements</p>
<b>Stakeholders</b>	<p>List of key stakeholders for each major phase/activity</p> <p>Strategy for consultation with major stakeholders, including an outline of the purpose and timeframes for consultation</p>
<b>Resources</b>	<p>List of critical resources</p> <p>Strategy to acquire or manage each critical resource</p>
<b>Contracting &amp; procurement</b>	<p>Procurement plan summarising the items and/or services (ie outputs) for which external providers will be sought, including anticipated cost and internal accountability</p> <p>Strategy for securing and managing important agreements necessary for implementing the policy</p>
<b>Quality assurance</b>	<p>Monitoring and evaluation strategy</p> <p>Quality assurance strategy</p>





# Participatory Assessments: action-research orientation





# NIDIS Pilots Program Adjustment: not for citation



<b>(FY\$M):</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>
<b>Current Program</b>	<b>6.9</b>	<b>9.9</b>	<b>10.9</b>	<b>12.4</b>	<b>12.4</b>	<b>12.4</b>
Program Adjustment	<b>0.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>	<b>2.0</b>
<b>Proposed Program</b>	<b>6.9</b>	<b>11.9</b>	<b>12.9</b>	<b>14.4</b>	<b>14.4</b>	<b>14.4</b>
<b>CAPABILITY: RDS- Research</b>						
<b>QUANTITY:</b>						
<b>Input Capacity Change</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>
FTE (#/year)	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
Regional tailored product development (#grants)	<b>0</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>
Training, education, developing user-defined triggers, scenarios, and indicators) (#grants)	<b>0</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>
<b>Output Capacity Change</b>	<b>FY08</b>	<b>FY09</b>	<b>FY10</b>	<b>FY11</b>	<b>FY12</b>	<b>FY13</b>
Drought information and early warning system design prototypes (triggers, scenarios, processes) developed for transfer to other regions (#/year)	<b>0</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>
Development of education and outreach materials and workshops (#/year)	<b>0</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>
Real-time data streams, monitoring, forecasts and gap analysis at federal, state, & local level. Tailor drought portal monitor. (#/year)	<b>0</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>4</b>



# CLASS



NOAA Satellite and Information Service  
National Environmental Satellite, Data, and Information Service (NESDIS)

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Comprehensive Large  
Array-data Stewardship System

## CLASS Links

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The Comprehensive Large Array-data Stewardship System (CLASS) is an electronic library of NOAA environmental data. This web site provides capabilities for finding and obtaining those data.

CLASS is NOAA's premiere on-line facility for the distribution of NOAA and US Department of Defense (DoD) Polar-orbiting Operational Environmental Satellite (POES) data, NOAA's Geostationary Operational Environmental Satellite (GOES) data, and derived data.



### NEWS:

- **Media**: CLASS now has the capability to accept orders for data on media such as CD-ROM, DVD-ROM, and IBM LTO Tapes.
- **GOES data available**: All data from the Geostationary Operational Environmental Satellites (GOES) from late 1994 to the present. CLASS's next goal is to complete ingesting the older GOES data from GOES-7 on back to 1979. The estimated date of completion is the early part of 2007.
- **SBUV data available**: The original data from the Solar Backscatter Ultraviolet Spectral Radiometer (SBUV/2), flown on the NOAA Polar-orbiting Operational Environmental Satellites (POES), are now available online for the entire period of record: 1984 to the present. For more information on the instrument and the dataset description, please go to the [NOAA KLM User's Guide - section 3.8](#).