



# Commerce Information Technology Review Board

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## **NOAA**

### **National Integrated Drought Information System (NIDIS):**

### **U.S. Drought Portal**

### **FY 2008 IT Budget Request**

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# AGENDA

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- Introduction
- Basis for Investment
- Project Management
- Risk Management
- IT Security
- Architectural Compliance
- Administration/Department Goals and Initiatives



# INTRODUCTION

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- FY 2008 IT Budget Increase:
  - Establish the US Drought Portal (USDP) to provide user-friendly access to historical and real-time data and products from the National Integrated Drought Information System (NIDIS) partners
  - \$1.4M
    - Hardware: \$425K
    - Software: \$600K
    - IT Security: \$75K
    - NIDIS Helpdesk: \$300K



# INTRODUCTION

<b>(FY\$M):</b>	<b>FY 07</b>	<b>FY 08</b>	<b>FY 09</b>	<b>FY 10</b>	<b>FY 11</b>	<b>FY 12</b>
<b><i>CAPABILITY:</i></b>						
Current Program	0.00	0.00	0.00	0.00	0.00	0.00
Current IT Resources	0.00	0.00	0.00	0.00	0.00	0.00
Program Adjustment	0.00	1.80	1.80	1.80	1.80	1.80
IT Program Adjustment	0.00	1.40	1.40	1.40	1.40	1.40
<b>Program Total</b>	<b>0.00</b>	<b>1.80</b>	<b>1.80</b>	<b>1.80</b>	<b>1.80</b>	<b>1.80</b>
<b>Proposed IT Total</b>	<b>0.00</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>
<b><i>IT COMPONENTS:</i></b>	<b>FY 07</b>	<b>FY 08</b>	<b>FY 09</b>	<b>FY 10</b>	<b>FY 11</b>	<b>FY 12</b>
Hardware	0.00	0.43	0.43	0.43	0.43	0.43
COTS Software	0.00	0.00	0.00	0.00	0.00	0.00
Support Services (ex. Software & Maint.)	0.00	0.60	0.60	0.60	0.60	0.60
Telecommunications	0.00	0.00	0.00	0.00	0.00	0.00
IT Security	0.00	0.08	0.08	0.08	0.08	0.08
IT Training	0.00	0.00	0.00	0.00	0.00	0.00
Common Services (ex. Help Desk)	0.00	0.30	0.30	0.30	0.30	0.30
<b>IT Component Total</b>	<b>0.00</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>	<b>1.40</b>



# INTRODUCTION

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- For FY 2008, NOAA requests \$1,400,000 (total of \$7,000,000 in FY08-12) in IT support to:
  - Establish, operate, and maintain a U.S. Drought Portal (USDP)
- For FY 2008, NOAA requests \$400,000 (total of \$2,000,000 in FY08-12) in non-IT:
  - Install, operate, and maintain @ at cost of \$400K/year soil moisture and temperature sensors at each of the 114 U.S. Climate Reference Network (USCRN) stations operational across the 48 contiguous states.

# INTRODUCTION

## *Fire*



## *Water Supply*



## *Agriculture*



**More than 7 years of Drought in the Western United States:**

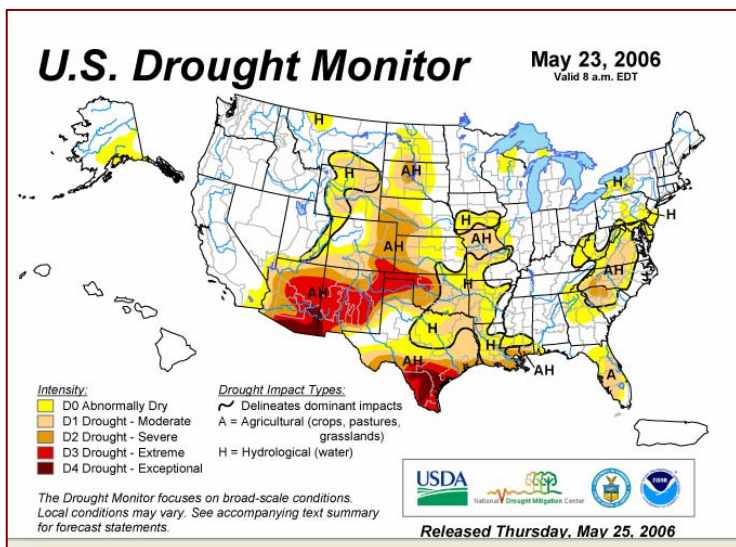
- Current drought began in **1998-99**.
- Some areas have seen **record** drought conditions.



# INTRODUCTION

**NIDIS:** An integrated, interagency national drought monitoring and forecasting system that provides:

- An **early warning system** for drought.
- Drought impact and causation **education**.
- Resources for drought **mitigation**.
- An interactive, web-based **drought portal**.
- Improved **observational** capabilities.



**Existing Drought Product:  
NIDIS will Provide Major Improvements**





# BASIS FOR INVESTMENT

- **Economic Basis for Drought monitoring and response:**
  - **Annual drought losses to the US are \$6-8 billion (FEMA)**
  - **Agribusiness:**
    - In 1999, drought led to farm income losses of **\$1.35 billion** (62% in the Northeast U.S.)
    - The costliest U.S. drought occurred in 1988 resulting in **\$56 billion** in economic losses and **5,000 heat-related deaths**.
  - **Fire:**
    - In 2000, prolonged drought in the Western U.S. caused severe fires resulting in **\$2 billion** in damages and **7 million acres burned**.

Source: *NOAA Economic Statistics*

*An effective drought portal as planned in NIDIS would result in mitigation of these economic and human losses through better preparation and planning for drought as well as education on drought impacts and why they occur.*





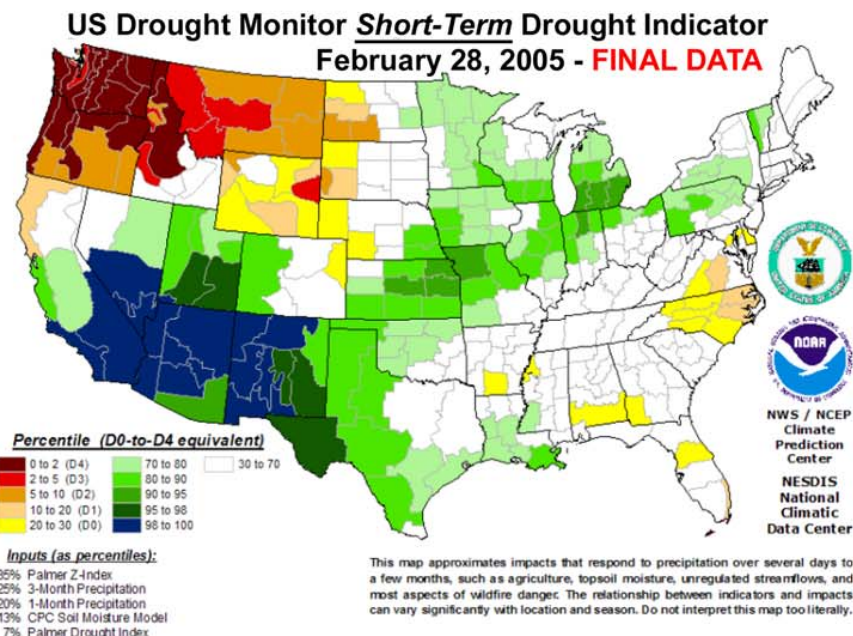
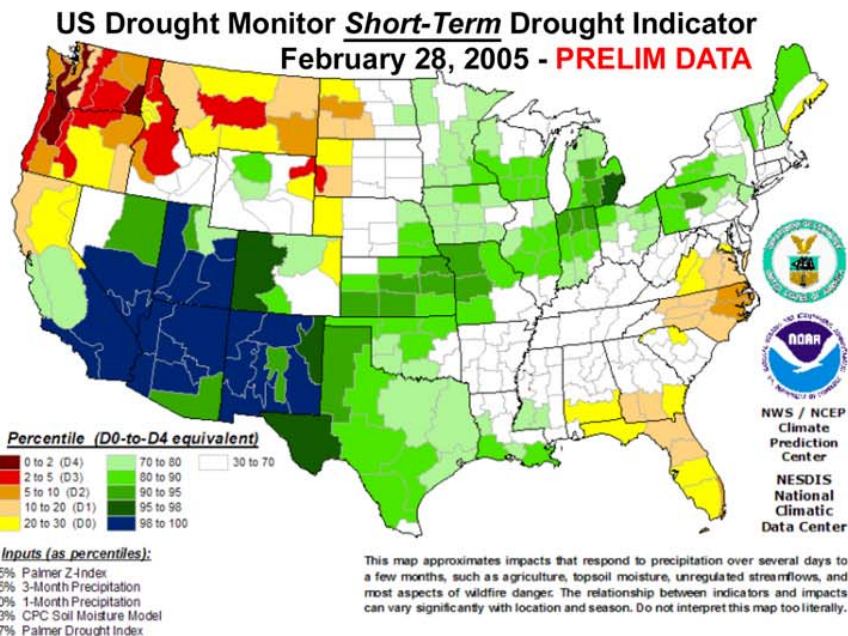
# BASIS FOR INVESTMENT



- **Gaps in Observations**

- **Drought severity** can be significantly under-estimated or over-estimated due to **inadequate** drought observations.
- Poor estimation affects the Nation's ability to **Plan, Predict, Mitigate, and Respond**.

## *Example Map Analysis Differences Due to Late Station Reporting*



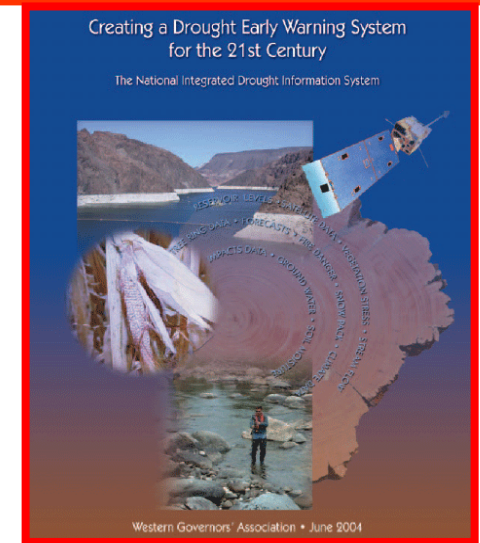


# BASIS FOR INVESTMENT



## Western Governor's Association

- **1996:** Recommendation for national preparation for and response to drought.
- **2000:** Creation of National Drought Policy Commission.
- **2003:** Partnership with NOAA to improve drought monitoring and forecasting.
- **2004:** Formal document published recommending NIDIS.



## Grand Challenges for Disaster Reduction

National Science and Technology Council  
Committee on Environment and Natural Resources



A Report of the  
Subcommittee on Disaster Reduction

June 2005



## U.S. Congress

- The 109th Congress introduced a bill (H.R. 1386/S. 802) to improve national drought preparedness, mitigation, and response efforts, etc.

## Subcommittee on Disaster Reduction (President's National Science and Technology Council)

- Highlighted drought as one of the grand challenges for disaster reduction in 2005.
- Proposed actions calls for developing an implementation plan for NIDIS.

## U.S. Integrated Earth Observing System

- NIDIS is one of six near term opportunities identified by U.S. GEO.



# BASIS FOR INVESTMENT

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- US Drought Portal (USDP) Goals
  - Support the ability to graph relevant data and products spatially and temporally, and interactively compose maps
  - Allow users to arrange and save selected products for a specific geographic area for easy return visits
  - Support links to specific support systems



# BASIS FOR INVESTMENT

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- USDP will:
  - Provide user-friendly, internet navigation for national to county levels
  - Populate with historical and real-time drought data and products from a variety of partners
  - Support easy to understand interpretations of relevant drought products



# BASIS FOR INVESTMENT

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- USDP product examples:
  - Observe elements at multiple time and spatial scales, both station and gridded data sets: precipitation, snow pack, stream flows, reservoir levels, ground water, crop moisture, soil moisture, temperature, anomalies, and drought impacts
  - Derive products and indexes: US Drought Monitor, Palmer Drought Severity Index (PDSI), Standardized Precipitation Index (SPI), Objective Blends, Surface Water Supply Index (SWSI), Vegetation Drought Response Index (VegDRI), Keetch-Bryam Fire Index





# BASIS FOR INVESTMENT

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- USDP Products:
  - Forecast products: Water supply, stream flow, climate, snow pack, US drought outlook



# BASIS FOR INVESTMENT

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- USDP Information Technology in FY 2008
  - Hardware and software to establish and mature the portal capability and capacity
  - Maximize use of existing and emerging software products and techniques in applied service oriented architecture environment
  - Seamless and convenient access between existing websites
  - Common look and flow of data, information, and products via the USDP





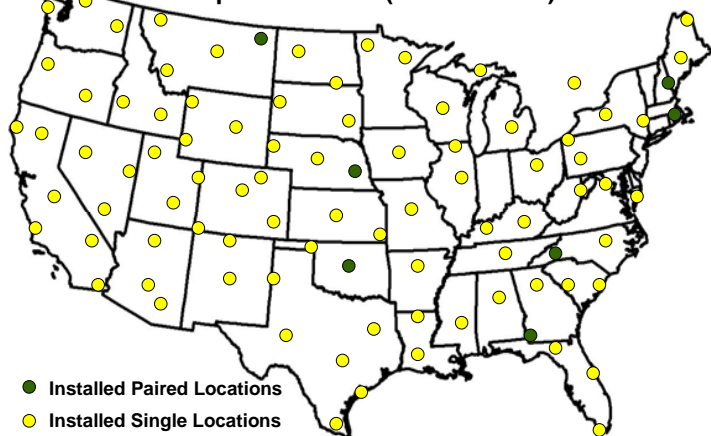
# BASIS FOR INVESTMENT



## Soil Moisture Sensors

## Drought Portal Concept

Location of 100-station USCRN in CONUS  
September 2005 (100\* stations)



**Climate Reference Network** \* Includes 2 in Alaska

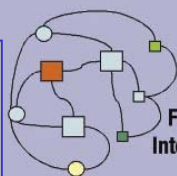
A critical observation for understanding the state of drought throughout the country.

Install reference quality soil moisture sensors at all 114 U.S. Climate Reference Network stations across the contiguous 48 states.

Bridge gap to user communities consistent with U.S. GEO strategy with seamless and timely access to integrated Drought observations.

Internet Portal to provide a drought early warning system from U.S. county to national scale.

Individual Researchers; Institutions; Private Industry; and Federal, State, and Local Government Organizations



Web Browsers, GIS Tools, Scientific Visualization, and Analysis Systems

Federal, Non-Federal, Regional, and International Programs and Activities

Distributed, Heterogeneous Science Communities

Quality Control, Context Setting, Metadata, and Preservation

Data Sources - DOE, EPA, NASA, NOAA, NSF, USDA, USGS, others

Societal Impacts and Outcomes

Decision Support Systems

User Communities

**U.S. Drought Portal**

Delivery Systems

Information, Products, and Service Providers

Data Analysis and Manipulation

Data Management and Archiving

Raw Observational Data

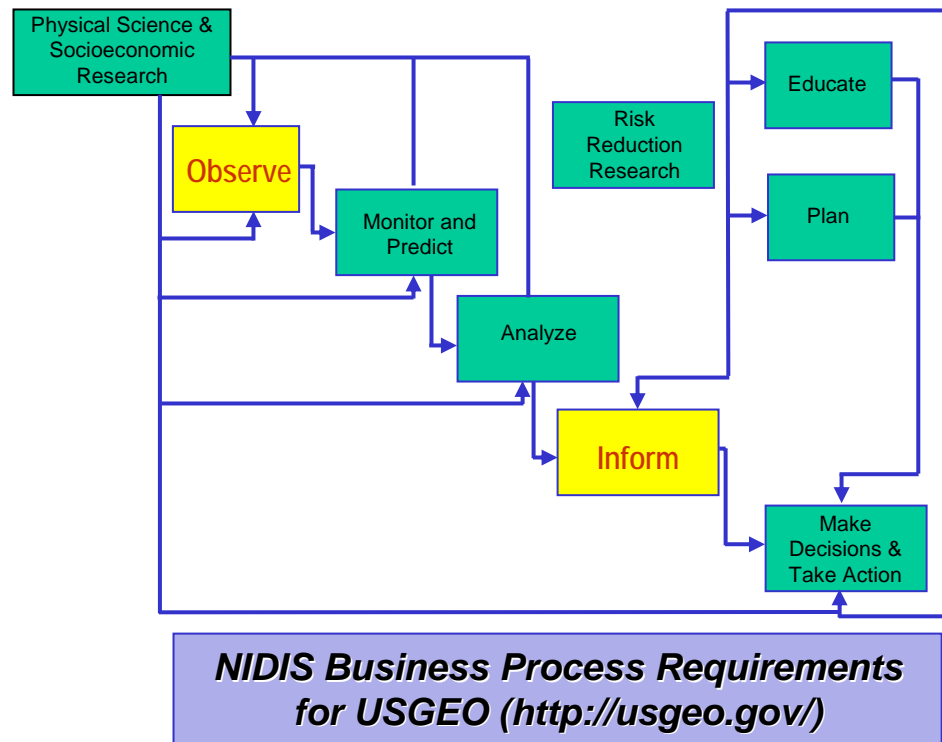


# PROJECT MANAGEMENT



- Coordination between NOAA's **NESDIS** and **OAR** line offices and **Climate** and **Weather and Water Goals**.
- Provide **cross-agency observing** system optimization.
- Ensure **agreements** with both Federal and other partners.
- Coordinate drought **education**.
- Track NIDIS progress in achieving **milestones**.
- Enable team **communication** and provide **outreach** to user communities to improve NIDIS and refresh requirements.

## NIDIS Operations Office





# PROJECT MANAGEMENT



- Earned Value Management (EVM)
  - Full acquisition project in the capital planning and investment control (CPIC) process.
  - Work breakdown structure (WBS) for managing and tracking performance, utilizing Microsoft Project 2000 and Excel tools.
  - Performance-based management, using EVMS, applied to ongoing development projects to ensure rigorous management controls to:
    - Direct systems and component developers, control costs, meet deadlines, and ensure successful project execution and completion.
    - Provide the basis for holding the Agency, project managers, and contractors accountable through development of enhancements and applications.
    - Project management of IT a subset of Program Office function.
  - Quarterly (e.g. EVM) reports on NIDIS (including IT investment) will be given to Assistant Administrators for the Office of Atmospheric Research (OAR) and the National Environmental Satellite, Data, and Information Service (NESDIS)



# PROJECT MANAGEMENT



Deliverables / Milestones	Performance Measures
<b>U.S. Drought Portal (USDP)</b>	
Establish, operate, and maintain (update/improve) U.S. Drought Portal (USDP)	<ul style="list-style-type: none"> <li>- Increase access to and use of drought information</li> <li>- Increase Number of Users and Accesses</li> <li>- Increase Number of Products Developed and available</li> <li>- Initial roll-out in FY 09</li> <li>- On-line User feedback to measure success and make improvements</li> </ul>
<b>Soil Moisture Sensors</b>	
Install soil moisture and soil temperature sensors at 114 CRN sites	- Number of soil moisture measurement reporting nationally in real time FY 08-12 Targets: 23 stations/FY
<b>Other Components of NIDIS</b>	
Applied Climate Information System (ACIS) -IDP Integration	<ul style="list-style-type: none"> <li>- Number of climate stations in ACIS</li> <li>- Number of climate products related to drought</li> <li>- Capability for gridded climate product generation</li> </ul>
National Water Information System (NWIS) -IDP Integration	- Number of stream flow and ground water stations in NWIS
Integrate Climate Forecasts with IDP Products	- Specific product integration to meet user needs.
Integrate Remotely Sensed data with in-situ data	- Data in areas not covered by terrestrial network.



# RISK MANAGEMENT



IT Risk	Description	Strategies for Mitigation
Strategic (Level of Risk: High)	Failure to get community agreement among NIDIS partners (all Federal, State agencies)	Initial project planning workshops will be conducted to ensure partnership ownership/buy-in is achieved early on in project
Organizational Change Management (Level of Risk: Medium)	Integrated observations and data management system as proposed by NIDIS is a challenge, especially across agencies	NOAA senior management and the oversight bodies put in place (councils, Goals, etc) will ensure NIDIS is achieved
Data/ Information (Level of Risk: Medium)	Uniqueness of data/information across agencies results in inability to develop data management functional capabilities and interoperability	Develop scalable architecture and infrastructure plans to upgrade NOAA facilities in conjunction with GEO IDE initiative. Use market driven technologies
Technical Obsolescence (Level of Risk: Medium)	Incompatibility of architectural elements among existing data management systems due to age of legacy systems	Manage the coordination among different organizations' planned architectural changes
Security (Level of Risk: Basic)	Unauthorized users may corrupt the data, algorithms and processes throughout NOAA's data management systems. (These are all critical NOAA assets that support the fundamental mission of the agency.)	(1) Develop Security implementation plan in early stages of project, (2) Identify and position appropriate security barriers (firewalls, Owl devices, etc.) (3) Development of an backup infrastructure
Privacy (Level of Risk: Basic)	Unauthorized person(s) could access systems and uncover personal data	No personal data stored in system. Conduct Periodic system-wide review for any added requirements
Data/Info (Level of Risk: Basic)	Data Loss potential as well as lack of cross-system integration	Plan for extensive back-ups; IT information under NESDIS control



# IT SECURITY

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- System ID: NOAA5009
  - National Climatic Data Center (NCDC) Local Area Network, Asheville, NC
- Security Plan Date: April 3, 2006
- C&A Date: June 8, 2006



# IT SECURITY

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**Interoperability** among existing Federal drought system observation networks will be assured, particularly between NESDIS and OAR line offices.

**Certification and Accreditation (C&A)** documentation suites will interface with existing frameworks, OMB policy and NIST guidance.

Data systems will meet all **security** requirements, both individually and collectively.

- Security Testing Integration/System Testing with each **increment** added to Operations.
- IT Security will be a critical priority for interoperability, based on existing NCDC LAN **Security Plan**.

Confidentiality, integrity and availability of information, including **management, operational** and **technical** controls.

Contingency Plans will leverage NOAA's data processing **backup** capabilities.

**Documentation** will be based on NOAA's Continuity of Operations (COOP) and Business Recovery Plans (BRP).





# ARCHITECTURAL COMPLIANCE

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## **Convergence/Integration** with DOC and Government-wide systems

- Portal to provide seamless access among many existing web sites
- Portal to provide a common look and flow of data, information, and products.
- Web development completed in close coordination with the NOAA Web Committee.

## **Reuse** of Existing Assets

- Employs application software & previously developed government software, including GOES-based Climate Reference Network for communications.
- Integration of existing NOAA education web components on what data is used in specific products.
- Design will maximize use of commodity software & hardware.
- A partial list of candidate Federal and State websites to be integrated via drought portal:

National Drought Mitigation Center (NDMC), Applied Climate Information Systems (ACIS),  
National Water Information System (NWIS), Joint Agricultural Weather Facility (JAWF),  
National Climatic Data Center (NCDC), Climate Prediction Center (CPC),  
National Water and Climate Center (NWCC), NWS – Hydrology

## Usage of **Standards**

- Design will be based on government standards used by the NOAA Observing System Architecture (NOSA) and GEO-IDE.



# ADMINISTRATION/DEPARTMENTAL GOALS AND INITIATIVES

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**U.S. Global Earth Observation (USGEO) System of Systems (NOAA, NASA, OSTP chairs)**

**Integrated Surface Observing System (ISOS/IOS):** Commitment to national/international reporting and partnership obligations; leveraging opportunities.

**President's Management Agenda** by expanding e-Government via a U.S. Drought Portal

**DoC's Strategic Goal 3:** "Observe and Manage the Earth's Environment to Promote Sustainable Growth"

- Enhance Conservation of the Natural Environment
- Improve Understanding and Prediction of the Natural Environment

**NOAA Climate and Weather and Water Goals**