

# DOI Climate Change Response



*“Addressing climate change impacts will require a monumental effort by DOI”*

*“The data piece is probably the most important component of all of this”*

*David Hayes, Deputy Secretary of the Interior*

## **Key Points from DOI Data Management/Integration Subcommittee:**

- Data and information sharing and integration are the key to collaboration among DOI bureaus and their many partners in addressing the significant climate change challenges.
- We need a significant DOI response to develop effective and efficient means of finding, retrieving, using, and sharing the best available data and information. This will require both a top-down and bottom-up approach to addressing Department-wide data management issues.
- The key to data sharing and integration is modernization of data systems using reusable and sharable building blocks (“web services”) based on DOI and industry standards to allow data exchange across multiple data systems.

# Challenges for Data Sharing, Integration, Dissemination to Address Climate Change



## Major Challenge #1:

- Need to discover, share, have access to large holdings of data and information to address rapid climate change
  - e. g., geospatial data, imagery, water quantity & quality, soils, vegetation, invasive species, land cover and use, status and trends of plant and animal populations, to name a few
  - Multiple scientific and resource management disciplines
  - Multiple scales, multiple agencies
- Data are stored at thousands of locations in a variety of formats; many methods needed to access them

# Department of the Interior Offices in the 50 United States and Caribbean



# Challenges for Data Sharing, Integration, Dissemination



## Major Challenge #2:

**Most** of the data and information we need exists or will exist in databases and sources outside of the DOI.

e.g., NOAA, NASA, EPA, Forest Service, universities, NEON, State agencies, NatureServe, NGOs, Data.gov



# Key User Communities have different needs



- Land managers
- Planners
- Resource professionals “ologists”
- LCC scientists, data managers
- Researchers from CESUs, USGS, academia, NOAA, NEON, USDA
- Educators (interpreters, teachers)
- Partner/constituency groups staff
- General public
- Data.gov

**Stakeholder** →



# Examples of Data and Information Products that Need to be Shared

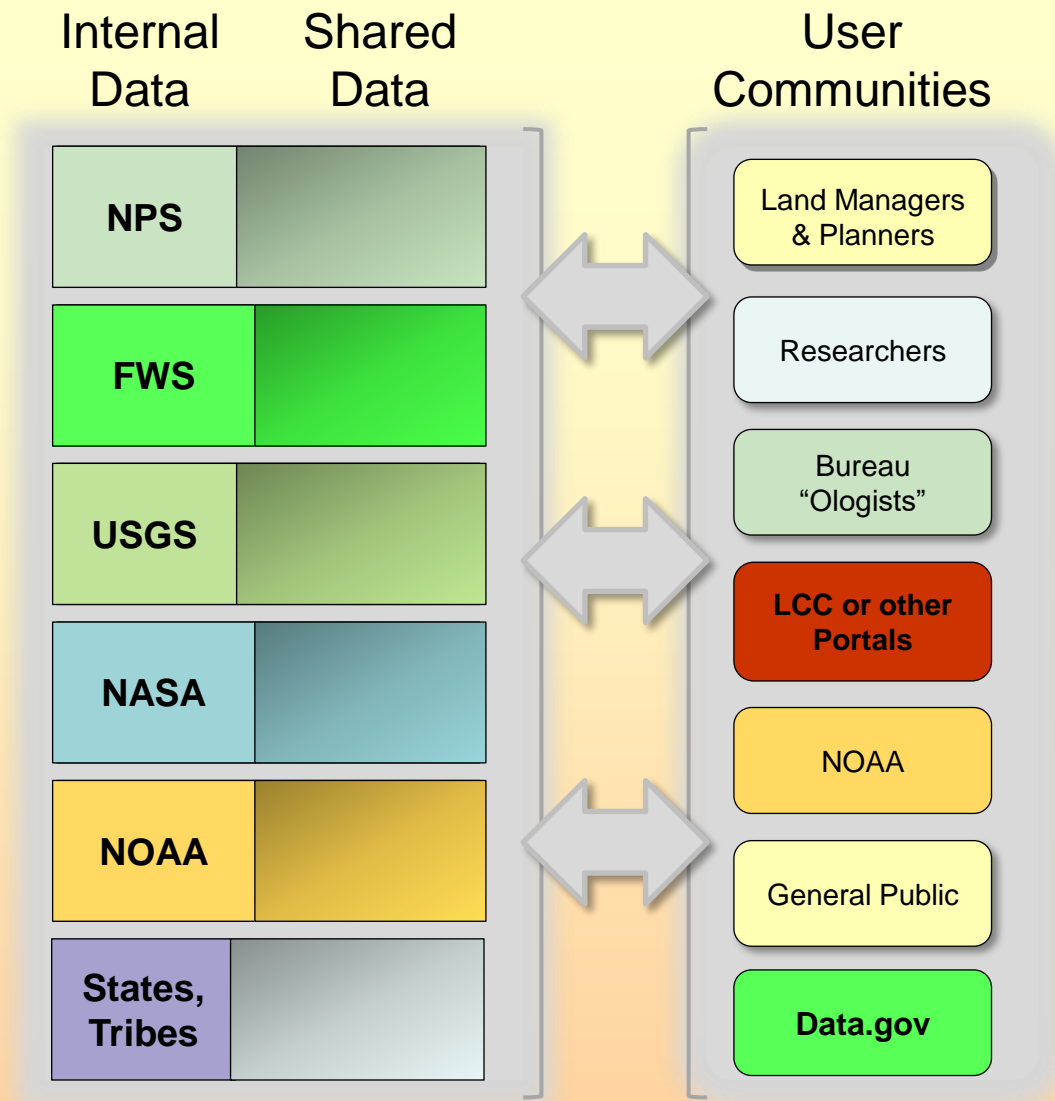


- Briefing statements for busy managers and the technologically disinclined
- Metadata catalog to allow discovery and access to DOI data sets
- Data sets - tables, spreadsheets, relational databases in various formats
- GIS products (maps, vector and raster data)
- Aerial Photography and Satellite Imagery
- Technical reports (e.g., "gray literature")
- Journal publications that can be shared without violating copyright restrictions
- Data synthesis reports - statistical and geospatial analyses
- Resource Assessments (involve simplification and translation of complex data)
- Environmental Assessments (EA) and Environmental Impact Assessments (EIAs)
- Management plans
- Trend reports
- Standards – standard operating procedures, protocols, and content standards
- Tools – models, scripts and templates
- Downscaled (fine-scaled) climate models
- Environmental models (e.g., hydrologic models, ecosystem models)
- Training materials
- Graphics – suitable for inclusion in presentations or reports
- Multimedia
- Data.gov

# But there is hope . . .

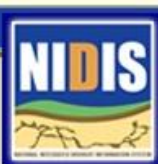


- Technology and standards are available that make it possible to integrate and share data amongst legacy data systems and new systems yet to be built through a loosely-coupled, distributed system based on web services and segment architecture.
- The approach is flexible and modular and is phased in over time. We don't have to figure it all out in advance, or get all of the funding and people in place in advance.
- The approach is based on industry standards. Microsoft, Oracle, Java, Google, IBM, etc. do the heavy lifting. Approach is widely used in the online travel, shopping, banking industries.
- The approach is also OMB and DOI's standard. This is what they're promoting for all federal agencies; re-usable, sharable components. <http://www.fsam.gov>



**Conceptual approach showing a few agencies: Each agency maintains their data systems, yet make portions of their data available for sharing by using a common set of standards and processes.**





# U.S. Drought Portal

[www.drought.gov](http://www.drought.gov)
Search: 

HOME

[WHAT IS NIDIS?](#)[CURRENT DROUGHT](#)[FORECASTING](#)[IMPACTS](#)[PLANNING](#)[EDUCATION](#)[RESEARCH](#)[RECOVERY](#)

## Area Drought Information

Select State... Select Region... 

## Maps & Tools

- [Map Viewer - updated!](#)
- [GIS Resources](#)
- [Geodata Portal](#)
- [Drought Monitor Graphics](#)
- [Data Visualizations](#)

## Events & Announcements

- [NADM Workshop - April 20-23, 2010](#)
- [Scoping workshop ACF Basin - Lake Blackshear, GA - December 2009](#)
- [Map Viewer now includes US Drought Outlook - New!](#)
- [CRN Soil Data - New!](#)
- [Drought Monitor Forum - Austin 2009](#)
- [Drought Index Evaluation Workshop - Boulder, CO - August 2009](#)
- [ESA Millenium Conf - November 2009](#)

[View Archive](#) | [Portal Release Notes](#)

## Drought In The News

- [Big Island areas reach intense-drought classification - Hawaii News - Starbulletin.com](#)
- [Water forecast heightens Wash. drought concerns | Seattle Times Newspaper](#)
- [Governor seeks Klamath drought declaration - Sacramento Bee](#)
- [USDA to provide 10 million to California farmers - Sacramento Bee](#)
- [Web winter leaves Sierra snowpack](#)

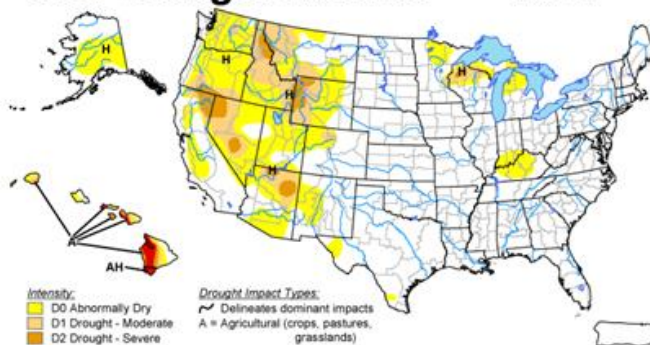
## Featured Products

[Where are Drought Conditions Now?](#)
[How is the Drought Affecting Me?](#)
[Will the Drought Continue?](#)

## U.S. Drought Monitor

March 16, 2010

Valid 7 a.m. EST



Intensity:

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

Drought Impact Types:

A = Agricultural (crops, pastures, grasslands)  
H = Hydrological (water)

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

<http://drought.unl.edu/dm>

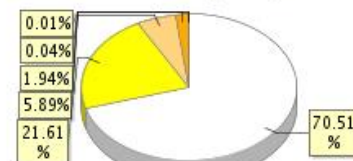

Released Thursday, March 18, 2010

Author: Matthew Rosencrans, NOAA/NWS/NCEP/CPC

## Drought Conditions

% Area for U.S., including, AK, HI & PR  
(As of 3.16.2010)

Info Source: National Drought Mitigation Center


☐ None ☐ D0 ☐ D1 ☐ D2 ☐ D3 ☐ D4

[Drought Classifications](#) | [View Time Series - updated!](#)

## Drought Information Statements



Click on a highlighted area to view the current NWS Drought Information Statement or Click Here to select from a list

[View larger map](#)

## Featured Application

## NIDIS Feature

## Energy and Water Programs within the United States Department of Agriculture

### Journal of Contemporary Water Research & Education

Issue 143  
December 2009





# IRMA



## The NPS is Doing its Part:

- Integration of Resource Management Applications
- Service-oriented Architecture (SOA): build once, use many times services that can be re-used by many applications
- Using DOI and industry standards to allow data exchange and integration among data systems
- DOI award for "Best Agency SOA Application"

# DOI Climate Change Response



**“The Department of Interior has committed to a unified monitoring and data management effort that will promote state of the art data integration procedures to facilitate data sharing.”**

*- Interior’s Plan for a Coordinated, Science-based Response to Climate Change Impacts on our Land, Water, and Wildlife Resources*

- The technology exists
- We know how to do this – several DOI efforts already underway
- Lots of other agencies, universities, NGOs, industry contributing
- Congress and OMB want to eliminate redundancy and see true interagency collaboration ... the DOI could be a national leader if we got our data integration act together

# What it will take to make this happen



## **Top-down Responsibilities of DOI:**

- Establish roles, policies, and accountabilities (i.e., governance)
- Promote interagency coordination and provide leadership, incentives, and funding for segment architecture modernization by each bureau.
- Provide strong leadership and incentives to accelerate agreement on metadata and data exchange standards.
- Support funding initiatives to implement DOI data integration efforts

## **Bottom-up Responsibilities of each Bureau and Partner:**

- Define bureau business and user requirements.
- Develop and modernize data systems using federal segment architecture.
- Implement recommended metadata, data exchange, and taxonomic standards that come out of the Framework and Blueprint activities.
- Provide training and enforce use of data and metadata standards.
- Develop budget initiatives to implement the above.

# What the NPS and others are doing now



- IRMA system has already integrated 6 separate applications; eventually will integrate 19 applications; serious about data integr.
- Natural Resource Database Template
  - ✓ Consistent core data structure in MS Access
  - ✓ Hundreds of successful NRDT databases nationwide
  - ✓ Long-term datasets will be available through IRMA or data.gov – can be discovered and accessed by others
- FWS I&M Program co-locating with us in Fort Collins
  - ✓ We have offered to share same contractor company and give them our modules and code if they want to “join at the hip”
- USGS – talking about 7-10 regional data centers where researchers would submit their data; working on web services and metadata and data structure standards.
- States – Western Governor’s Assn. 17 states serious about this