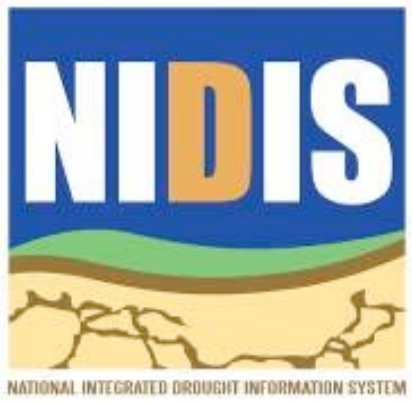
ESIP Federation Meeting, Santa Barbara, CA
July 7th, 2009



Leveraging Web Services in a Portal Environment

Jason Symonds

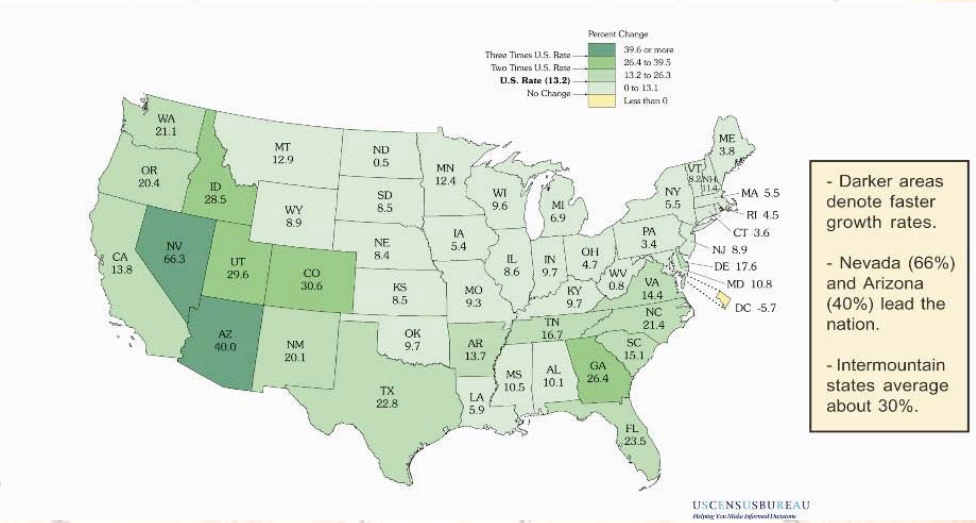
Contents

- NIDIS Background
- NIDIS USDP Requirements and technical evaluations
- USDP infrastructure web services
- Content aggregation through web services
- Data Visualizations using web services
- Summary

Societal Challenges and Climate

Increased vulnerability

- Society is changing - increasing urbanization, aging populations, overdevelopment in coastal regions, and regions with limited water supply

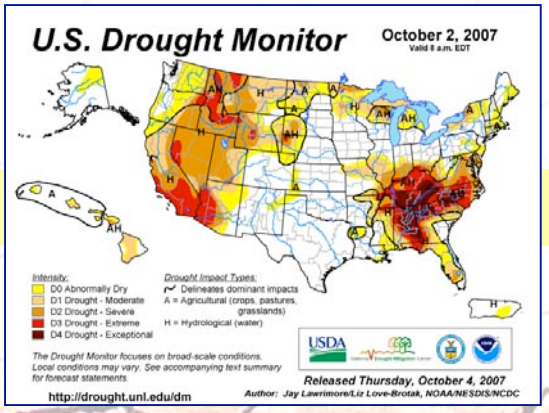


What is NIDIS?

National Integrated Drought Information System: An integrated, interagency national drought monitoring and forecasting system that provides:

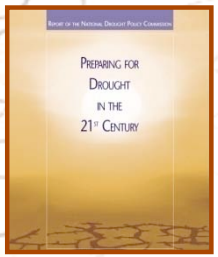
- An **early warning & forecast system** for drought.
- Drought impact and causation **education.**
- Information for drought **mitigation**.
- An interactive, web-based **drought portal**.
- Improved **observational** capabilities.

NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM



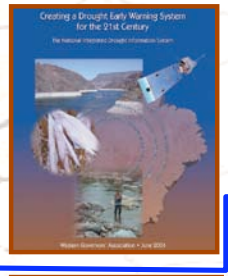
NIDIS Builds Upon Collaborative Successes!

NIDIS Authority



"(We) contend that we can reduce this nation's vulnerability to the impacts of drought by making **preparedness**— especially drought planning, plan implementation, and proactive mitigation— the cornerstone of national drought policy.."

— National Drought Policy Commission Report, May 2000



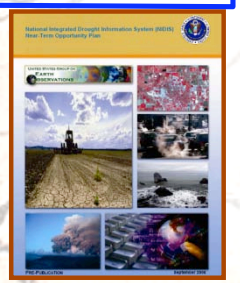
"NIDIS should improve and expand the compilation of **reliable data** on the various indicators of droughts, and it should integrate and interpret that data with easily **accessible and understandable tools**, which provide timely and useful information to decision-makers and the general public. Western Governors believe **NOAA should be designated as the federal lead** for NIDIS.

— Western Governor's Association Report, June 2004

"Characteristics of disaster-resilient communities:

- ❑ Relevant hazards are **recognized and understood**.
- ❑ Communities at risk know when a hazard event is imminent.
- ❑ Individuals at risk are safe from hazards in their homes and places of work.
- ❑ Communities experience **minimum disruption** … after a hazard event has passed."

— National Science and Technology Council, June 2005



"Near-term opportunities identify observing systems or **integration of components** that meet **high priority societal needs**, and make improvements to inadequate existing systems that can be completed within 5 years and have tangible, measurable results.

- ❑ Improved Observations for Disaster Warnings
- ❑ Global Land Observation System
- ❑ Sea Level Observation System
- ❑ **National Integrated Drought Information System**
- ❑ Air Quality Assessment and Forecast System
- ❑ Architecture and Data Management."

— U.S. Group on Earth Observations, September 2006

Timeline

2004 Western Governors' Association Recommendations for NIDIS

2006 Legislation requiring NIDIS

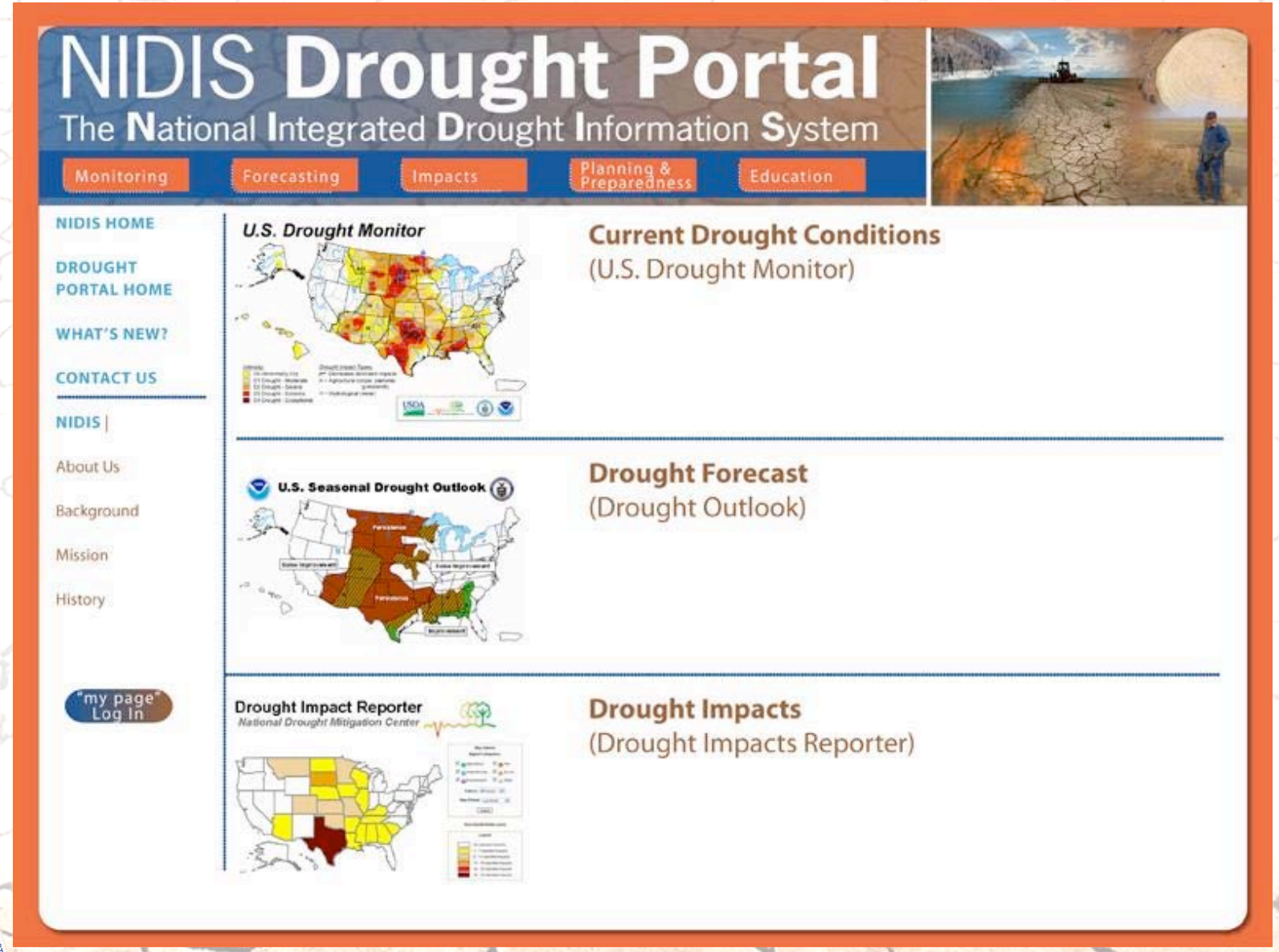
2007 USGEO Near-term opportunity

2007 Initial Portal accessible

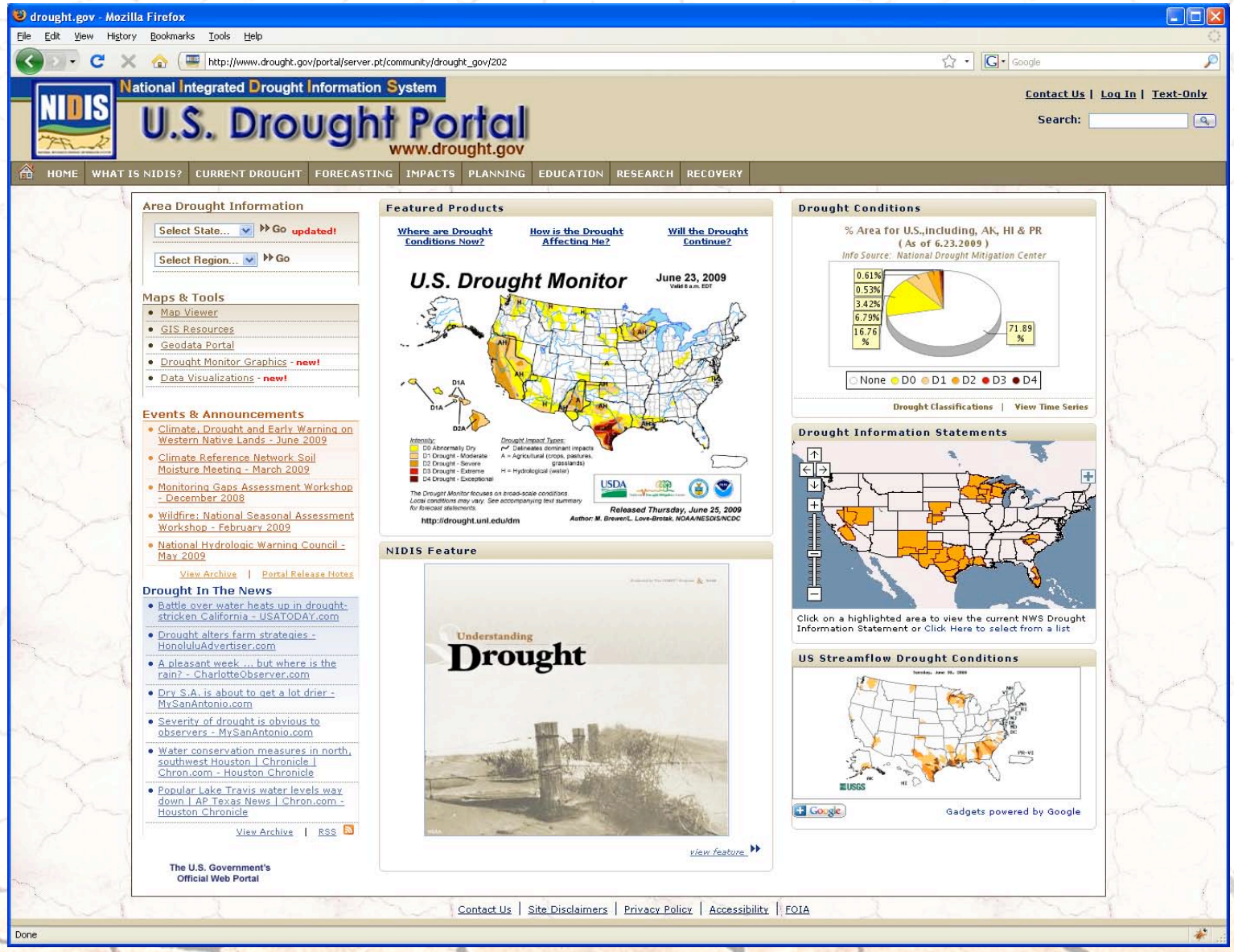
2008 Third incarnation

2009 Regional & International focus

First Incarnation of USDP



U.S. Drought Portal - Today



NIDIS US Drought Portal Requirements

- Provide one-stop shop for up-to-date drought information

- Establish clearinghouse for drought data from multiple agencies and partners

- Facilitate NIDIS Pilots:
    - Create on-line communities for various stakeholder groups
    - Establish collaborative workspace to enhance research and creation of new data sets and tools

- Develop and enhance GIS resources in support of NIDIS mission

- NIDIS Technical team evaluated a number of solutions
    - Liferay, Oracle Portal, BEA Aqualogic

Oracle's Web Center Interaction

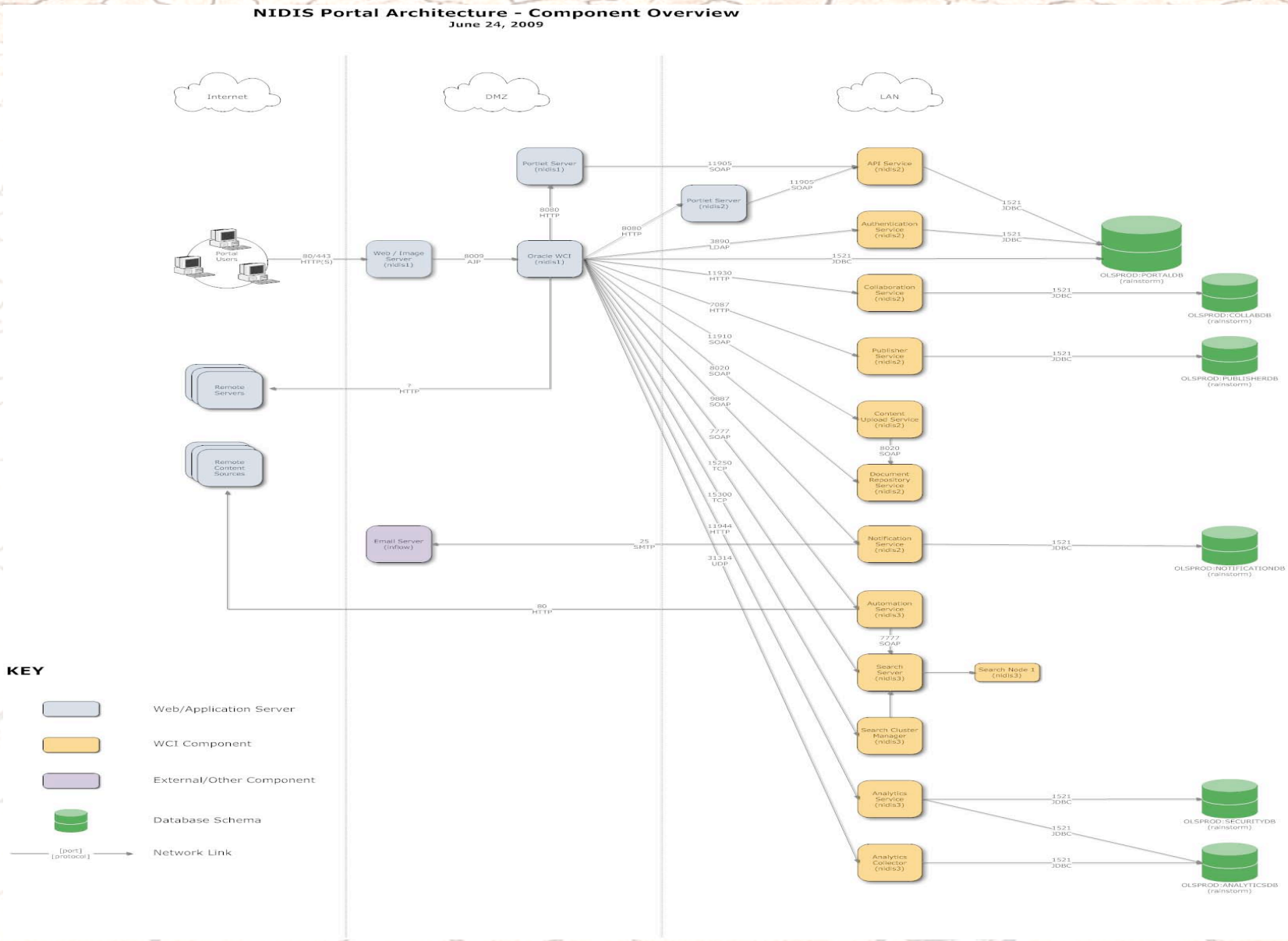
- Commercial Off-The-Shelf software package – formerly BEA's Aqualogic

- Follows SOA model

- Able to render anything that responds to an HTTP request in a portlet

- Offers value added services:
  - Collaboration
  - Notification (Email, RSS, etc)
  - Web crawling
  - Search
  - API Service

- Components communicate via SOAP web services


NIDIS Portal Architecture - Component Overview
June 24, 2009
Internet
DMZ
LAN
Portal Users
80/443 HTTP(S)
Web / Image Server (nidls1)
8009 AJP
Oracle WCI (nidls1)
Portlet Server (nidls1)
8080 HTTP
Portlet Server (nidls2)
11905 SOAP
8080 HTTP
3890 LDAP
11930 HTTP
7087 HTTP
11910 SOAP
8020 SOAP
9887 SOAP
7777 SOAP
15250 TCP
15300 TCP
11944 HTTP
31314 UDP
7 HTTP
Remote Servers
Remote Content Sources
Email Server (inflow)
25 SMTP
80 HTTP
API Service (nidls2)
Authentication Service (nidls2)
Collaboration Service (nidls2)
Publisher Service (nidls2)
Content Upload Service (nidls2)
Document Repository Service (nidls2)
Notification Service (nidls2)
Automation Service (nidls3)
Search Server (nidls3)
Search Node 1 (nidls3)
Search Cluster Manager (nidls3)
Analytics Service (nidls3)
Analytics Collector (nidls3)
1521 JDBC
OLSPROD:PORTALDB (rainstorm)
OLSPROD:COLLABDB (rainstorm)
OLSPROD:PUBLISHERDB (rainstorm)
OLSPROD:NOTIFICATIONDB (rainstorm)
OLSPROD:SECURITYDB (rainstorm)
OLSPROD:ANALYTICSDB (rainstorm)
KEY
Web/Application Server
WCI Component
External/Other Component
Database Schema
[port] [protocol]
Network Link

Oracle's WCI – Web Service for Remote Portlet

- Select Remote Server or Remote Host

- Define page/content/application endpoint

- Configure web service options:
  - Gateway concept
    - In-line refresh
    - Transform javascript/css
    - Hosted display mode
    - Apply Security settings
    - Preferences
    - Caching

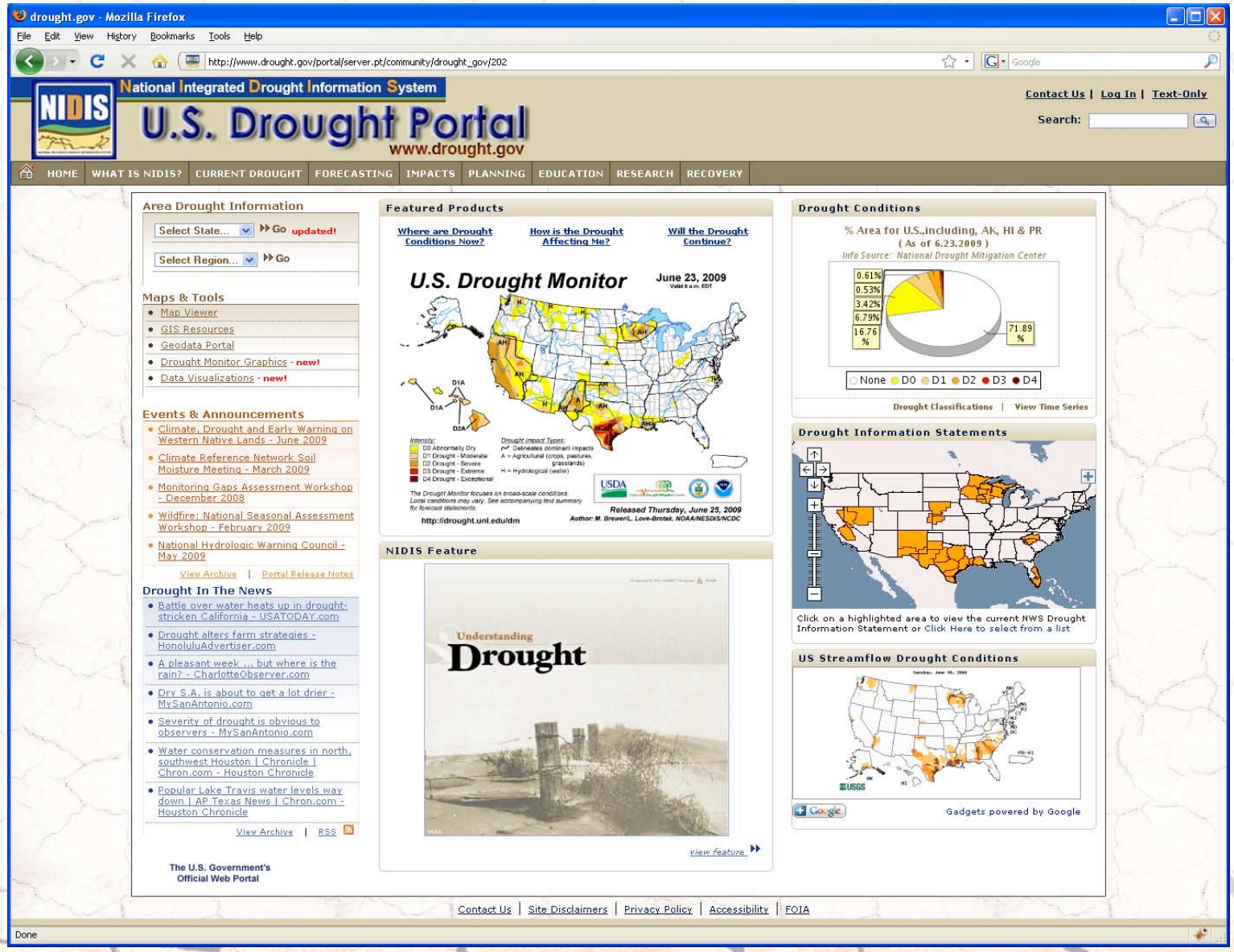
USDP - Content Aggregation

- USDP leverages a number of different technologies

- JSR standards for portals
  - Not mature enough
  - Scope is at the portlet level, not page or page group

- Future Trends point toward Gadgets and RESTful Web Services to produce Mash Ups

U.S. Drought Portal - Today



USDP Web Services examples

- Drought Monitor Graphics:

  - RESTful Web Service that exposes Drought Monitor Data Archive

  - Used to serve up images in several different contexts throughout the portal (img src references REST endpoint)

  - Can be used to produce presentation style graphics on demand

  - More recently developed user interface for the service

USDP Web Service examples – cont.

- NWS Drought Information Statements:

  - Exposing data source only available on a NWS web page – and NCDC archive

  - Setup an ArcGIS REST web service to facilitate an Interactive Mapping application

NWS Drought Information Statements

USDP Web Service examples – cont.

- GIS - Mapping and Visualizations:

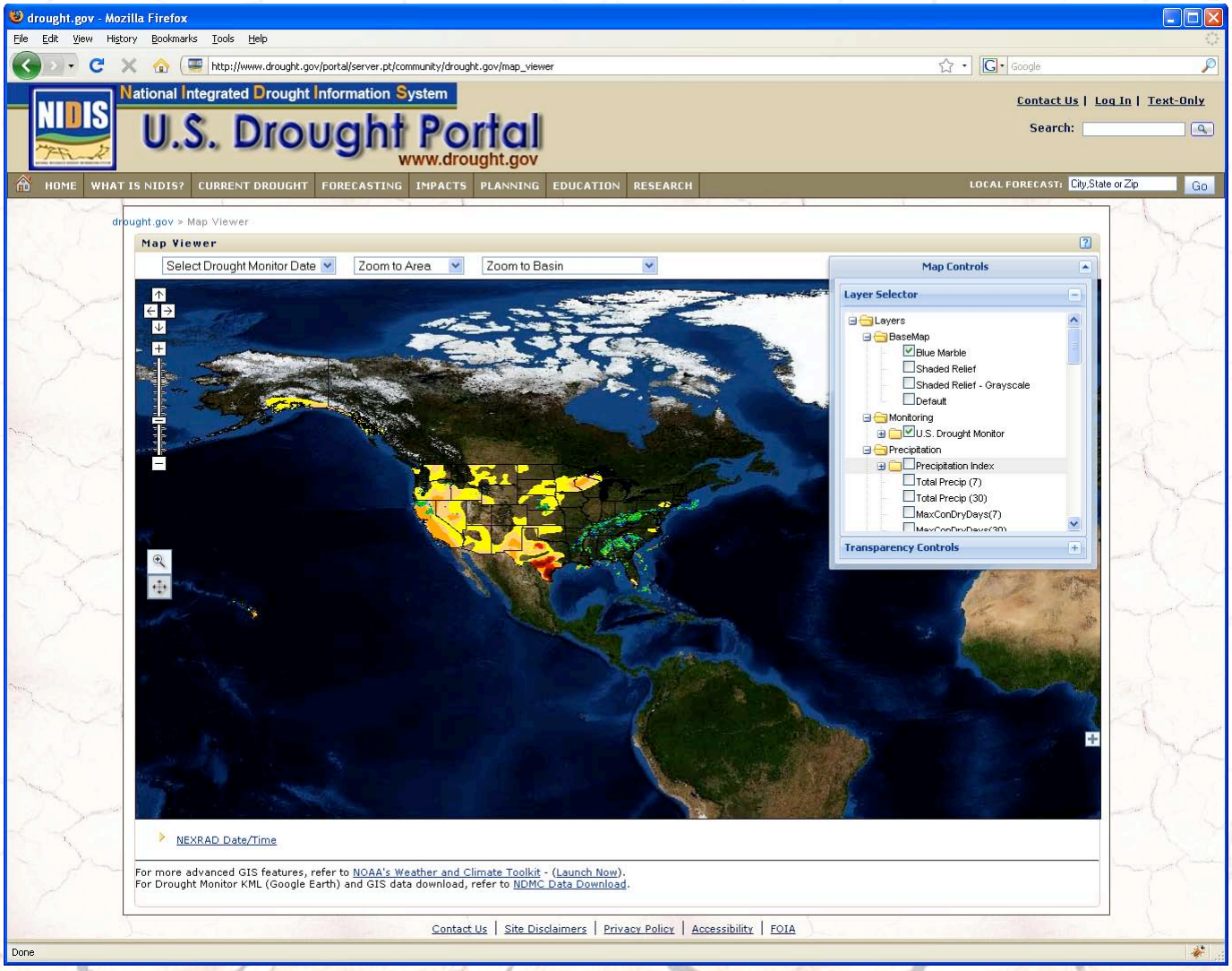
  - Data from disparate sources, but useful for a scientist to pull into a tool together to visualize or perform simple analysis on data

  - Supports/utilizes OGC Services

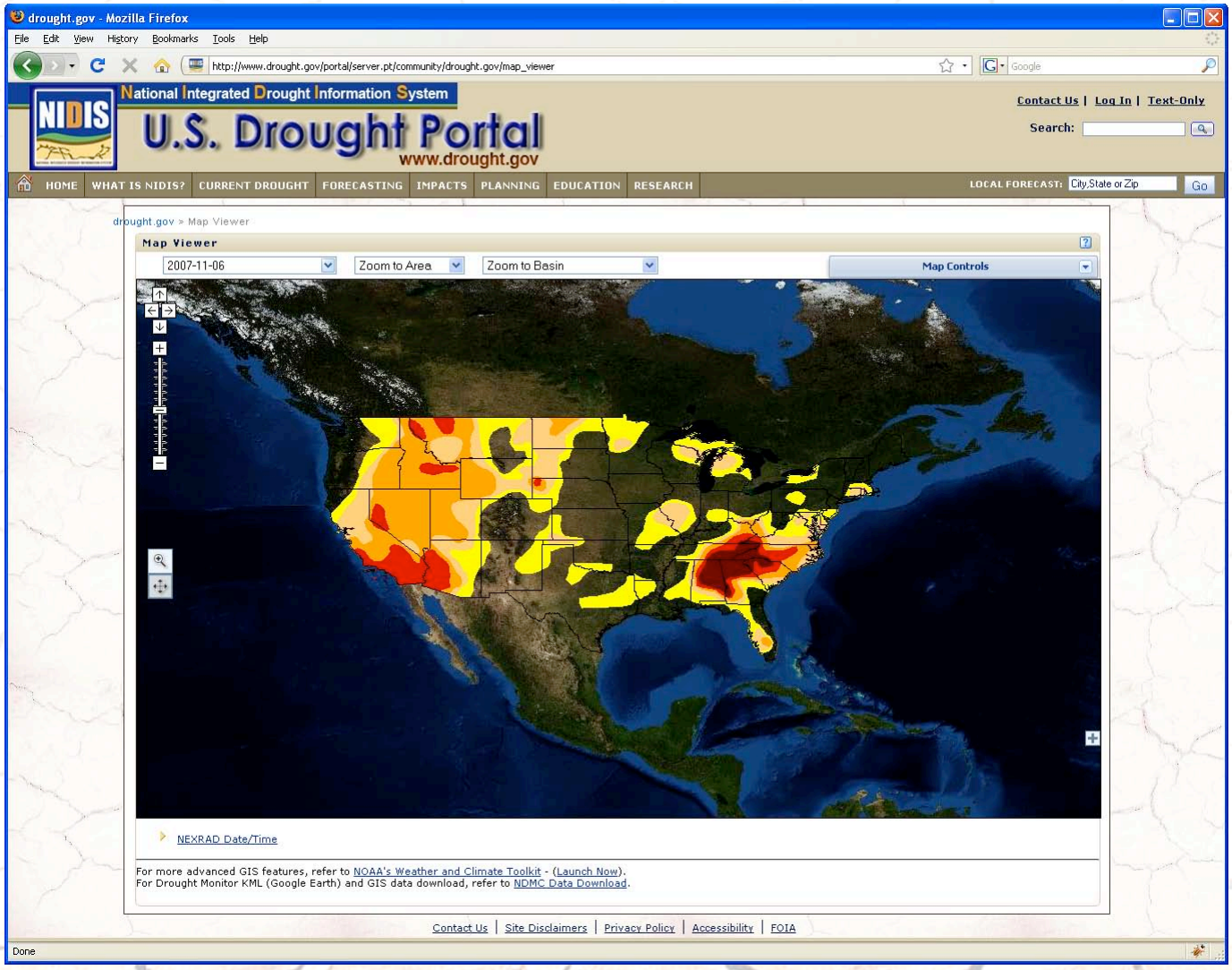
  - ESRI ArcGIS REST implementation

  - Services created to expose and/or format data from:
    - Relational Databases
    - HTTP/FTP – Web Servers
    - ASCII – tab delimited data

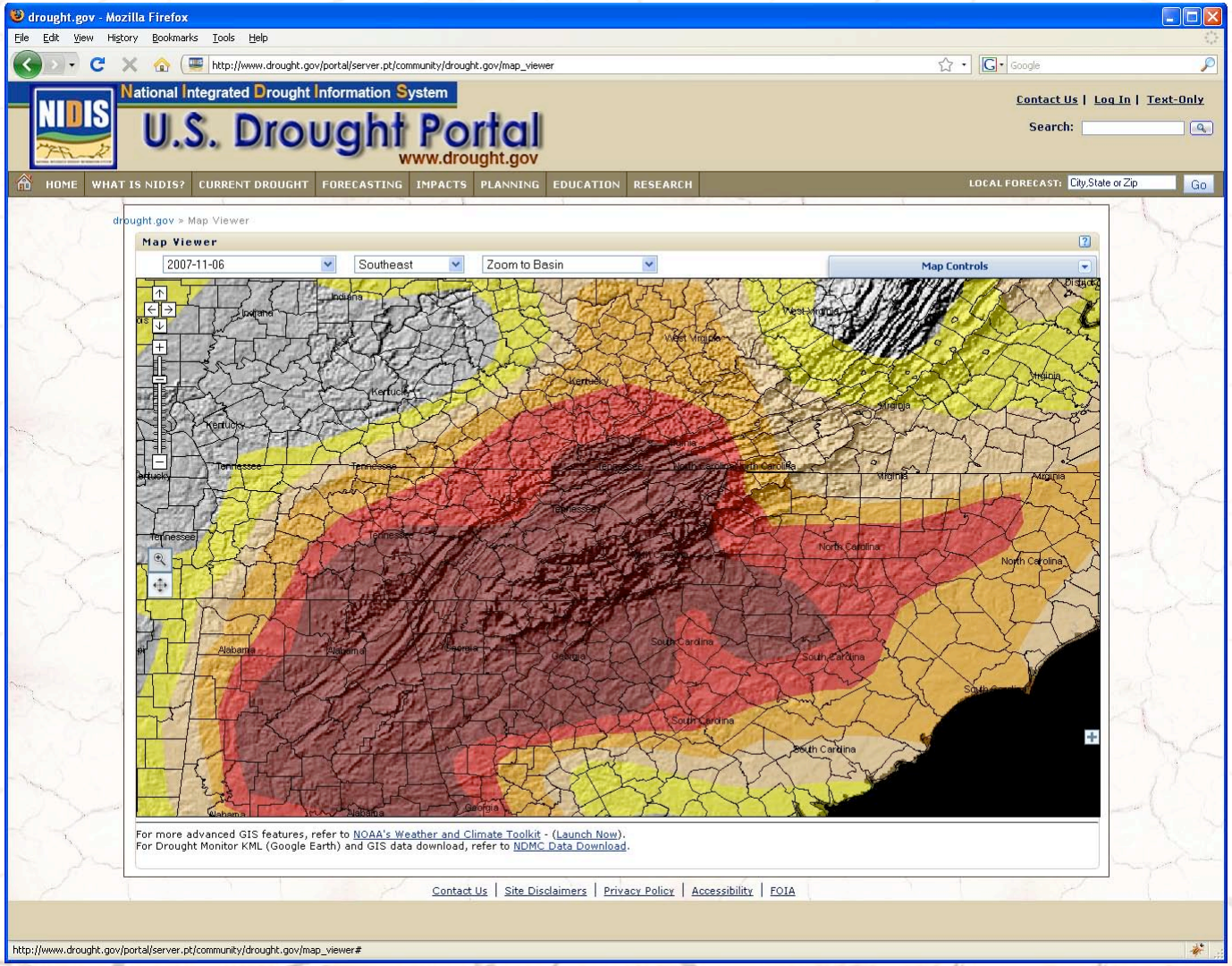
USDP Map Viewer



Drought Monitor from Fall 2007

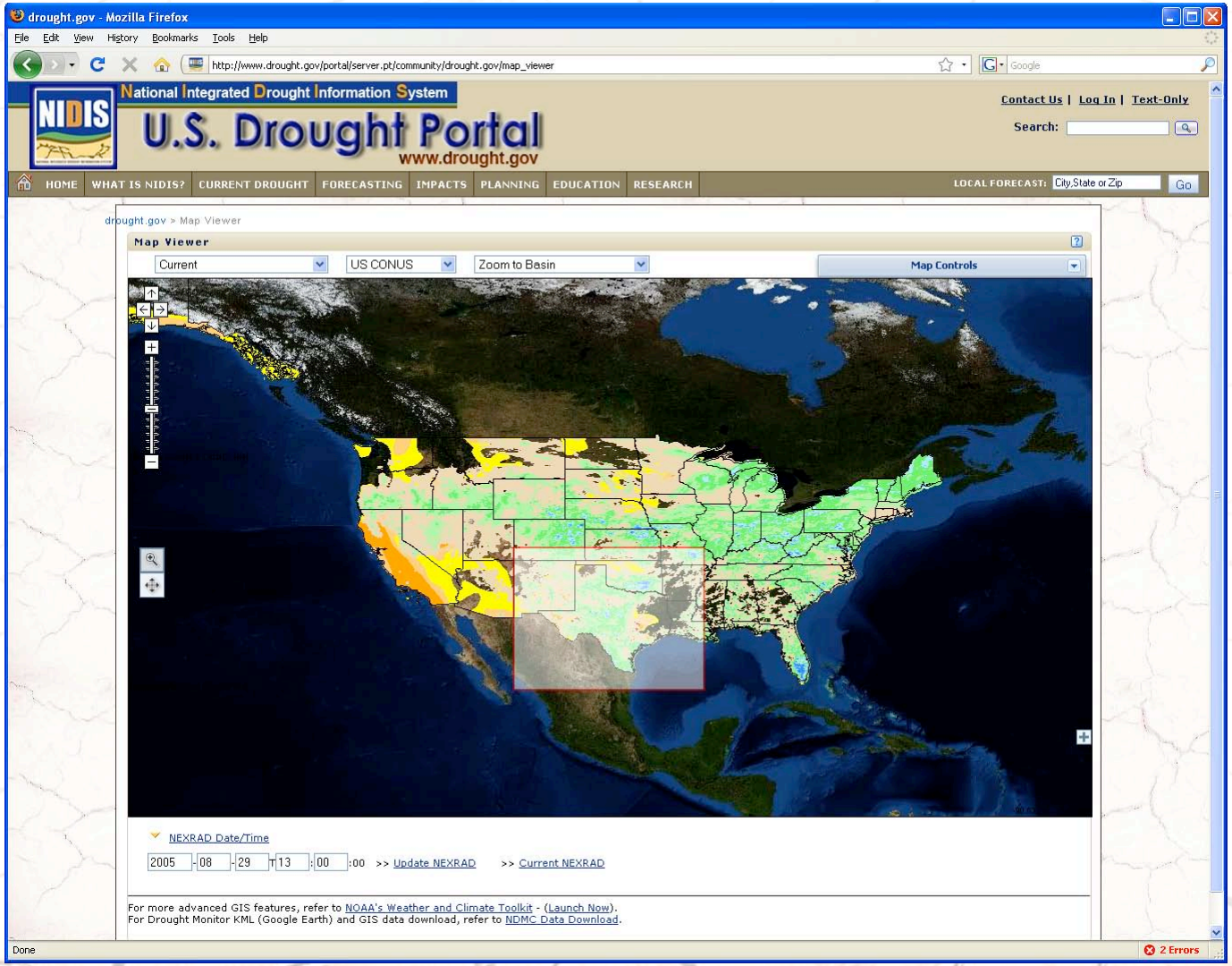


Carolinas, Fall 2007

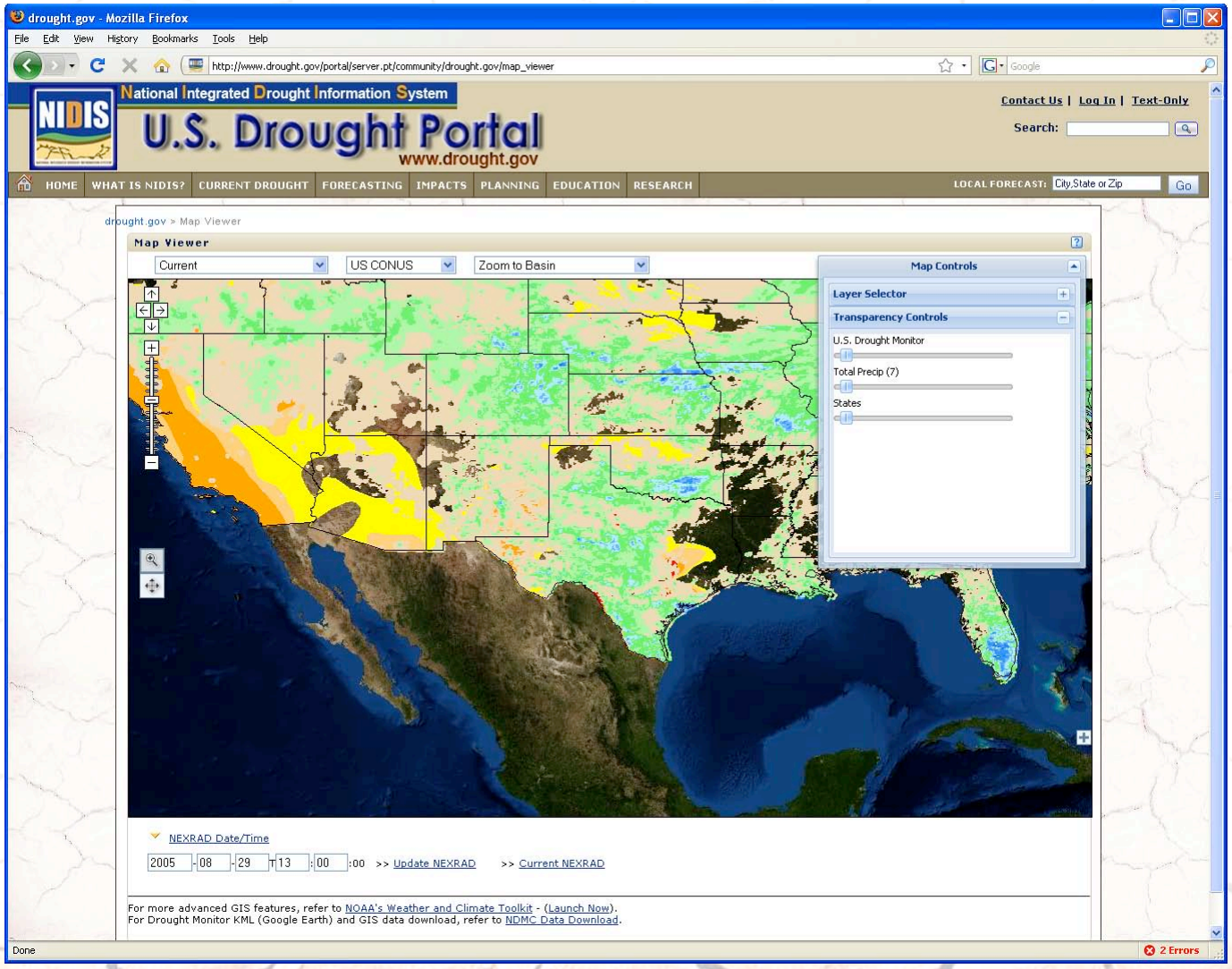


Map Controls – Layer Selector

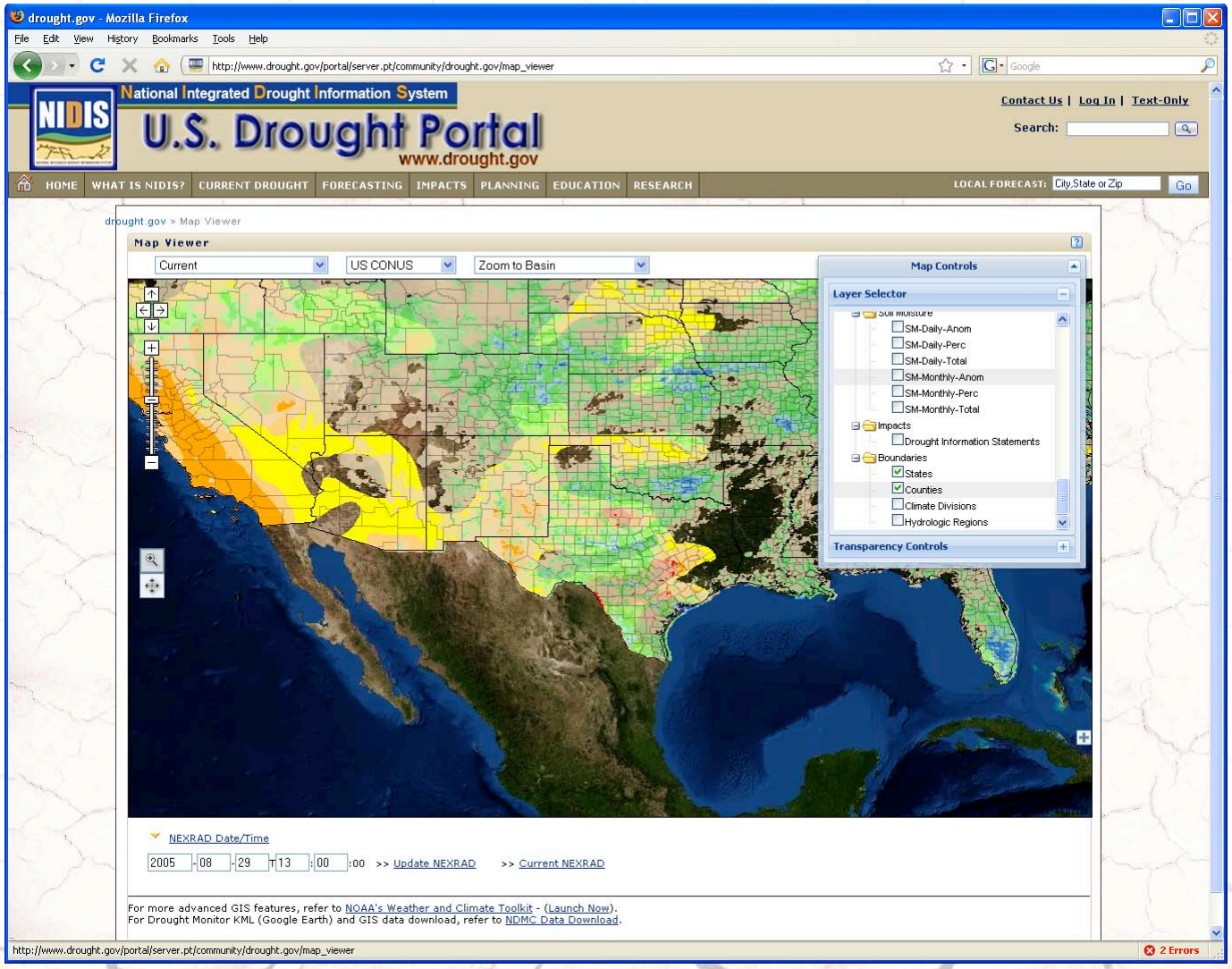
Zoom In and PanTools



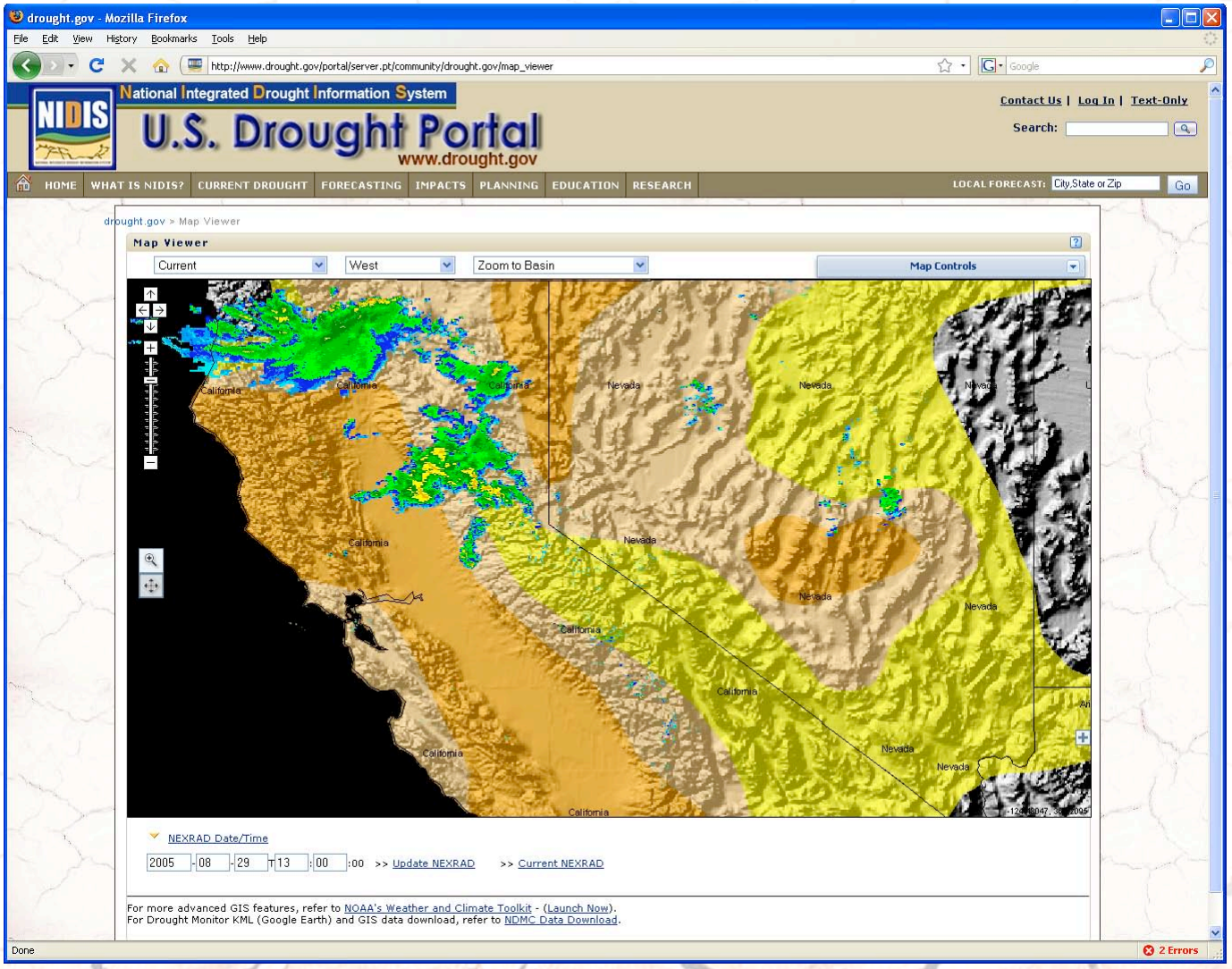
Map Controls – Transparency



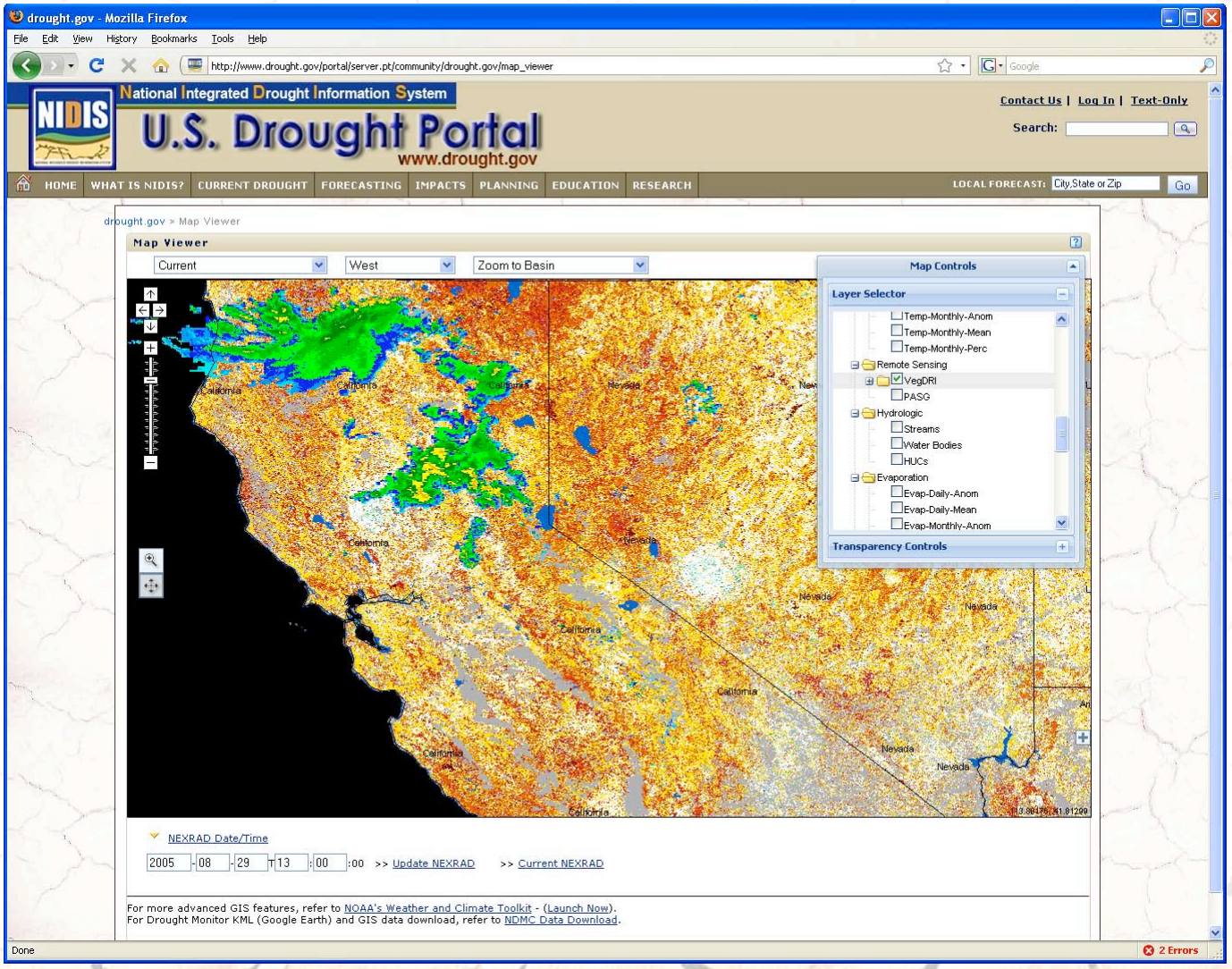
Zoom in, add map layers



Zoom to West

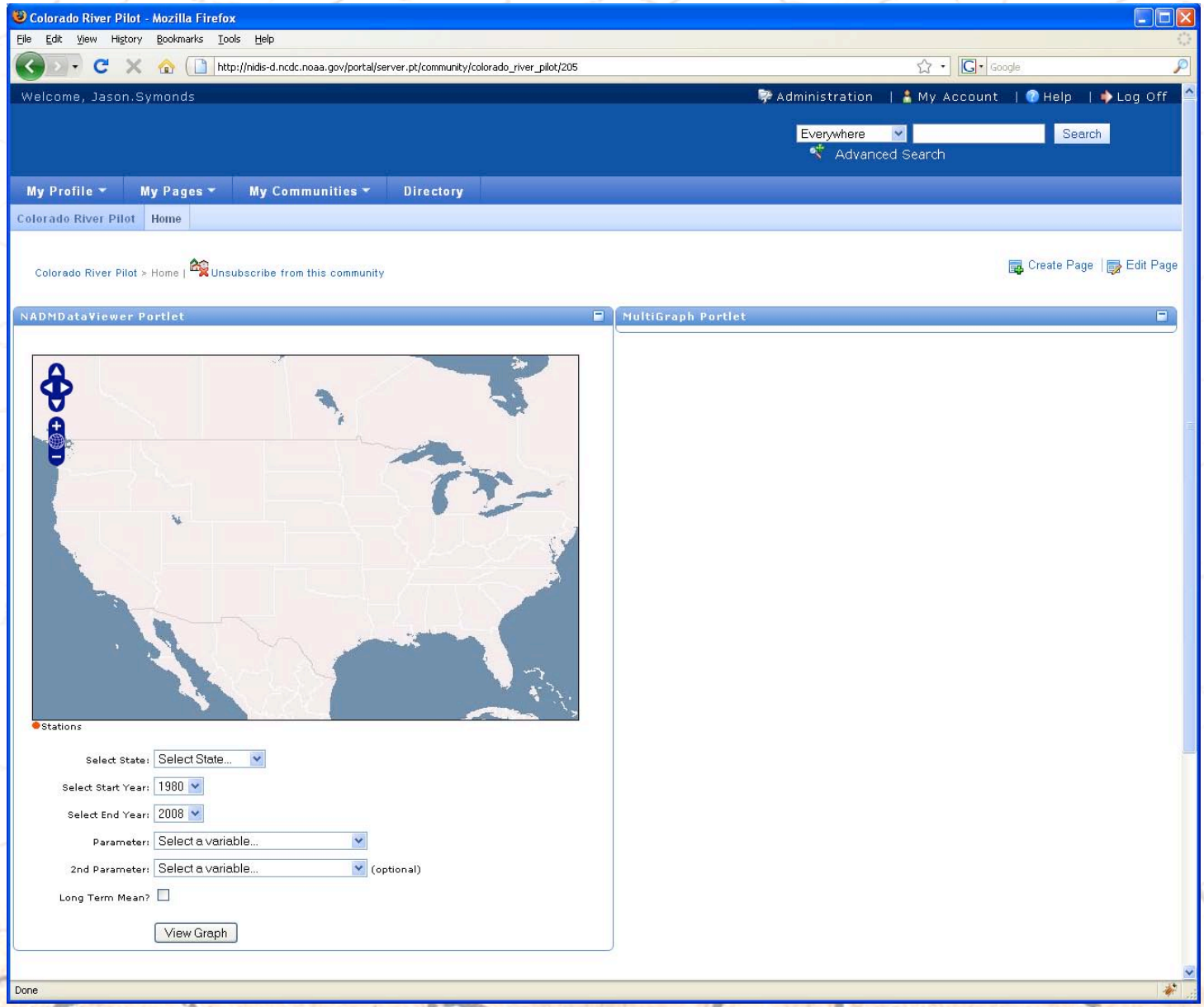

drought.gov - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://www.drought.gov/portal/server.pt/community/drought.gov/map_viewer
National Integrated Drought Information System
U.S. Drought Portal
www.drought.gov
Contact Us | Log In | Text-Only
Search:
HOME WHAT IS NIDIS? CURRENT DROUGHT FORECASTING IMPACTS PLANNING EDUCATION RESEARCH
LOCAL FORECAST: City,State or Zip Go
drought.gov > Map Viewer
Map Viewer
Current West Zoom to Basin Map Controls
California
Nevada
NEXRAD Date/Time
2005 - 08 - 29 T 13 : 00 :00 >> Update NEXRAD >> Current NEXRAD
For more advanced GIS features, refer to NOAA's Weather and Climate Toolkit - (Launch Now).
For Drought Monitor KML (Google Earth) and GIS data download, refer to NDMC Data Download.
Done
2 Errors

View VegDRI – remote sensing product

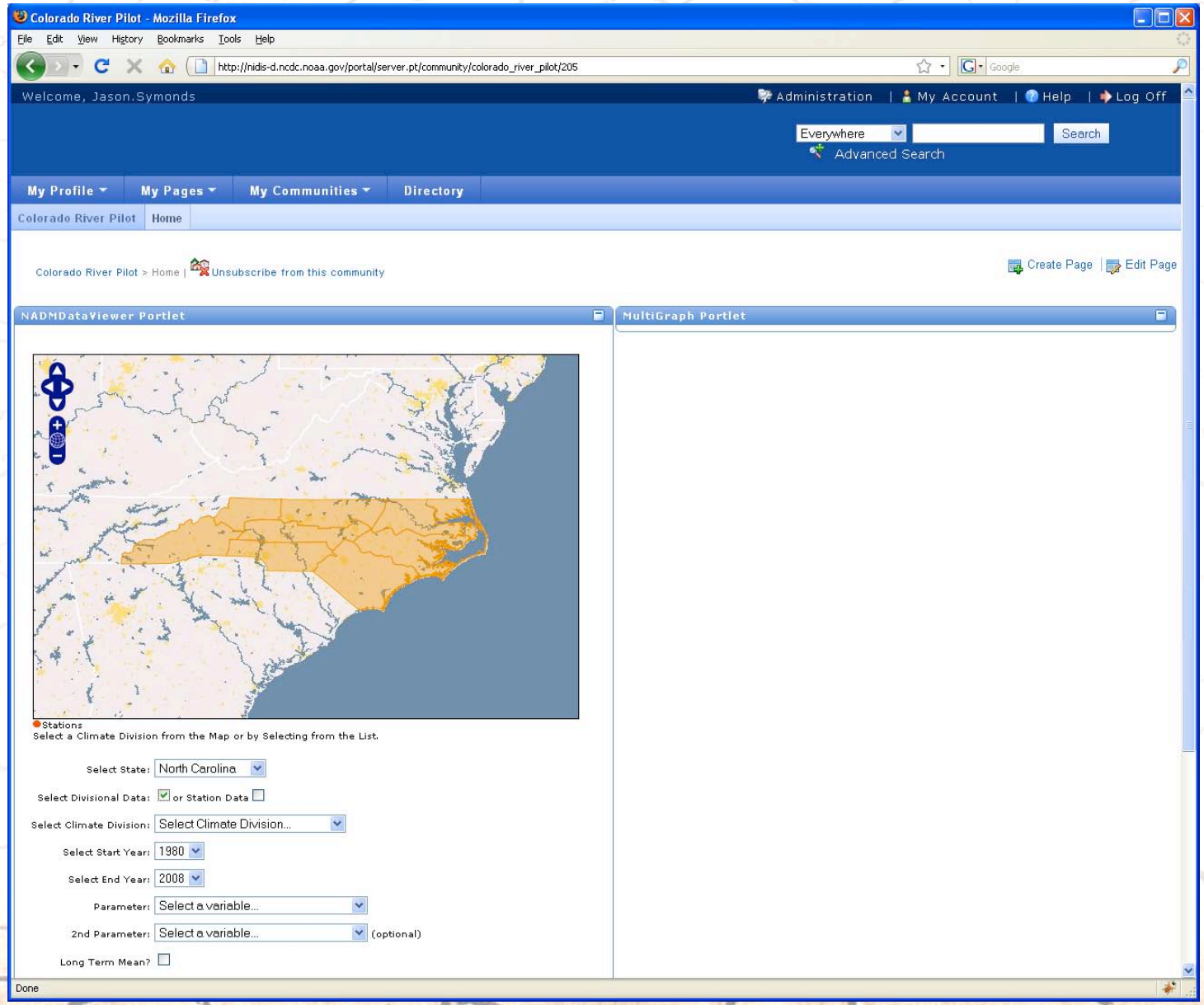


ArcGIS REST Web Mapping Services

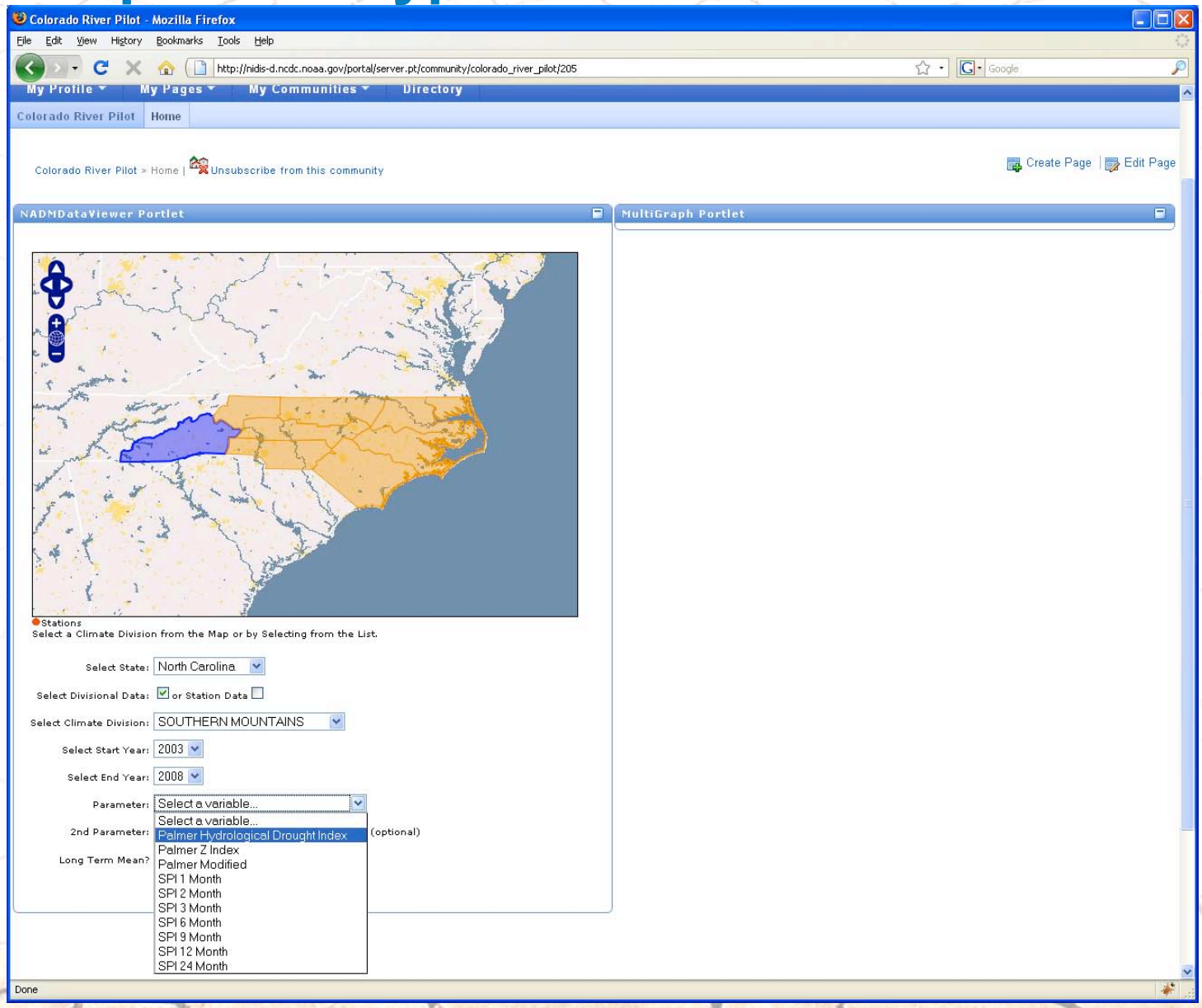
Multi Graph Prototype



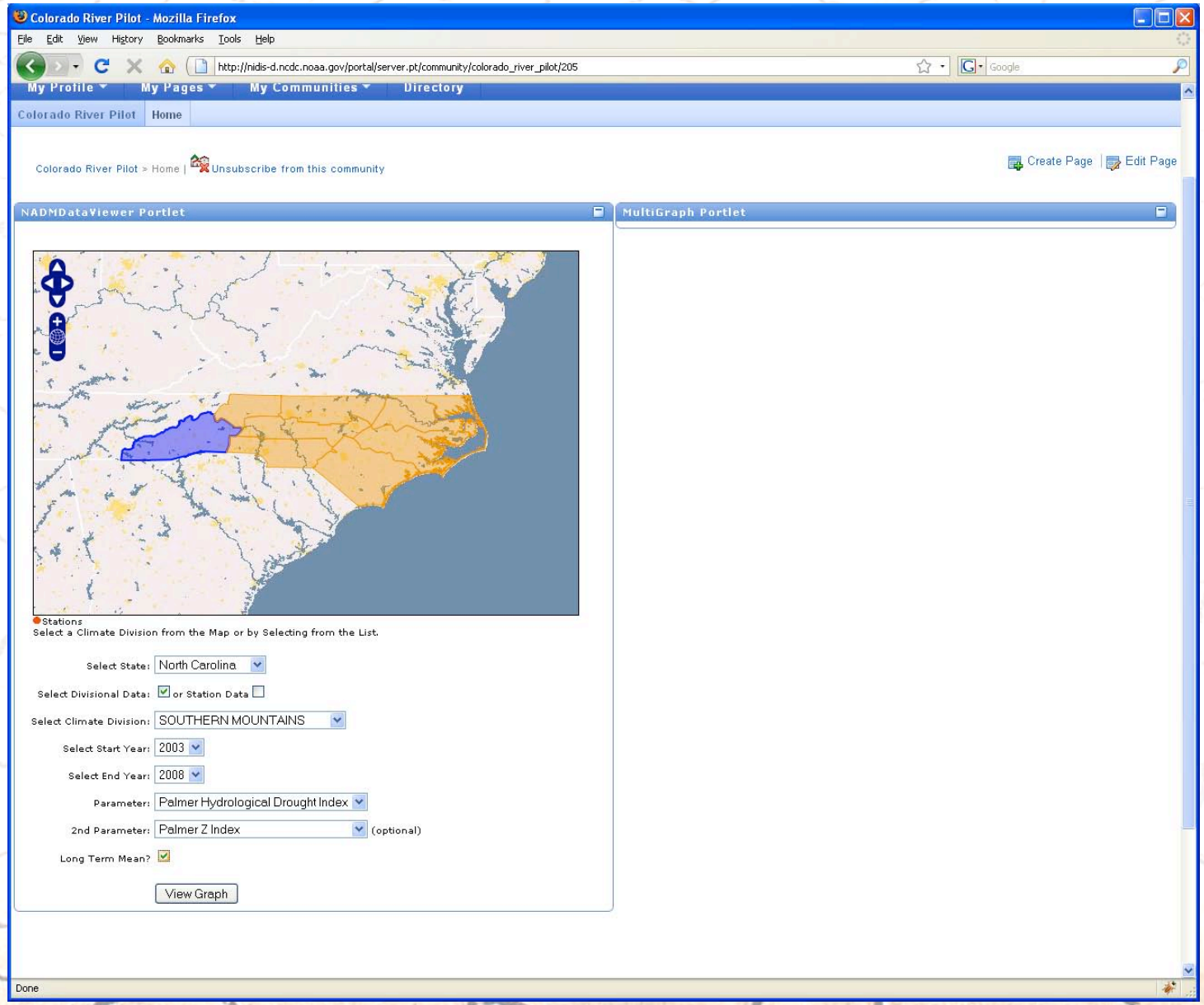
Multi Graph Prototype



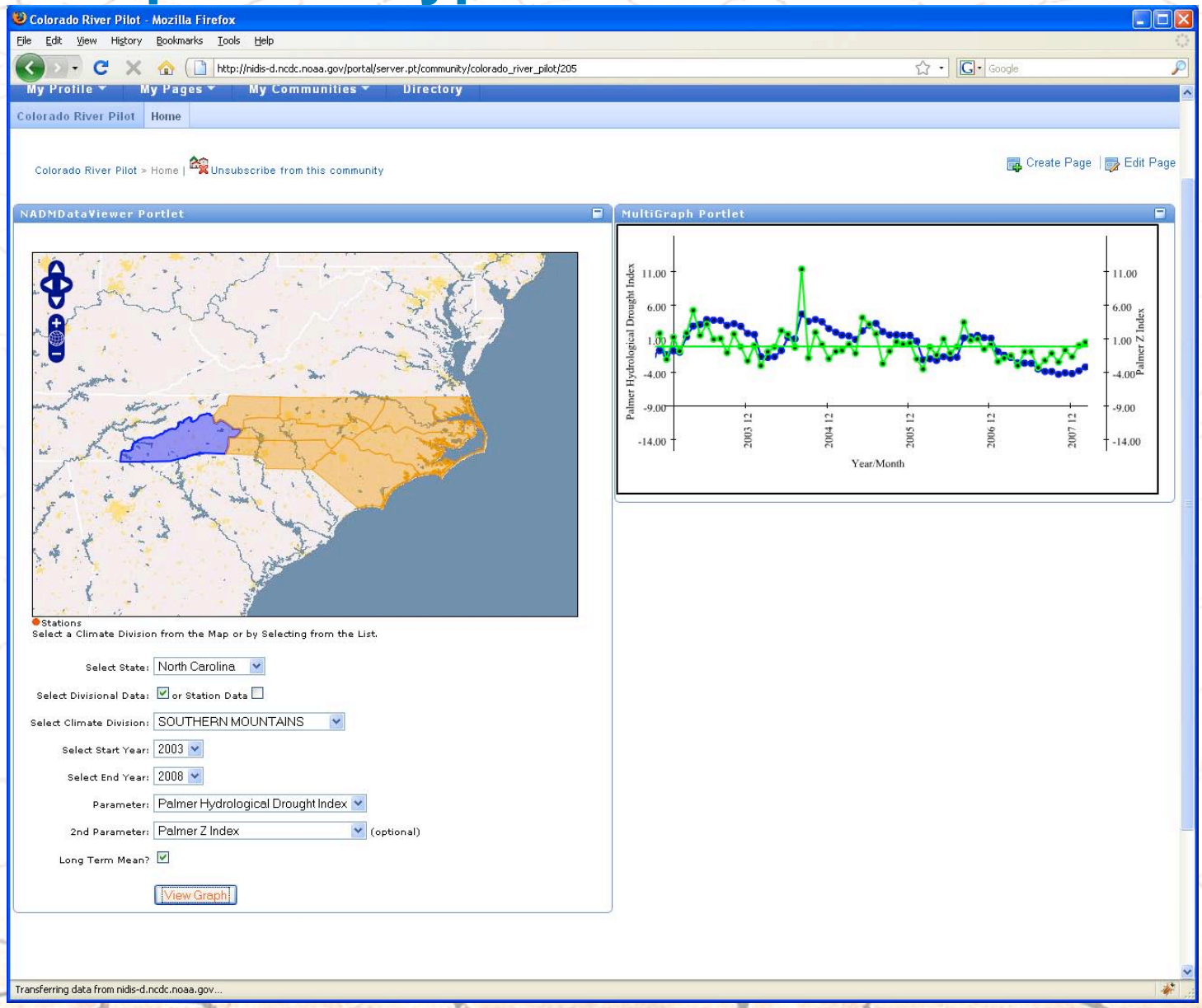
Multi Graph Prototype



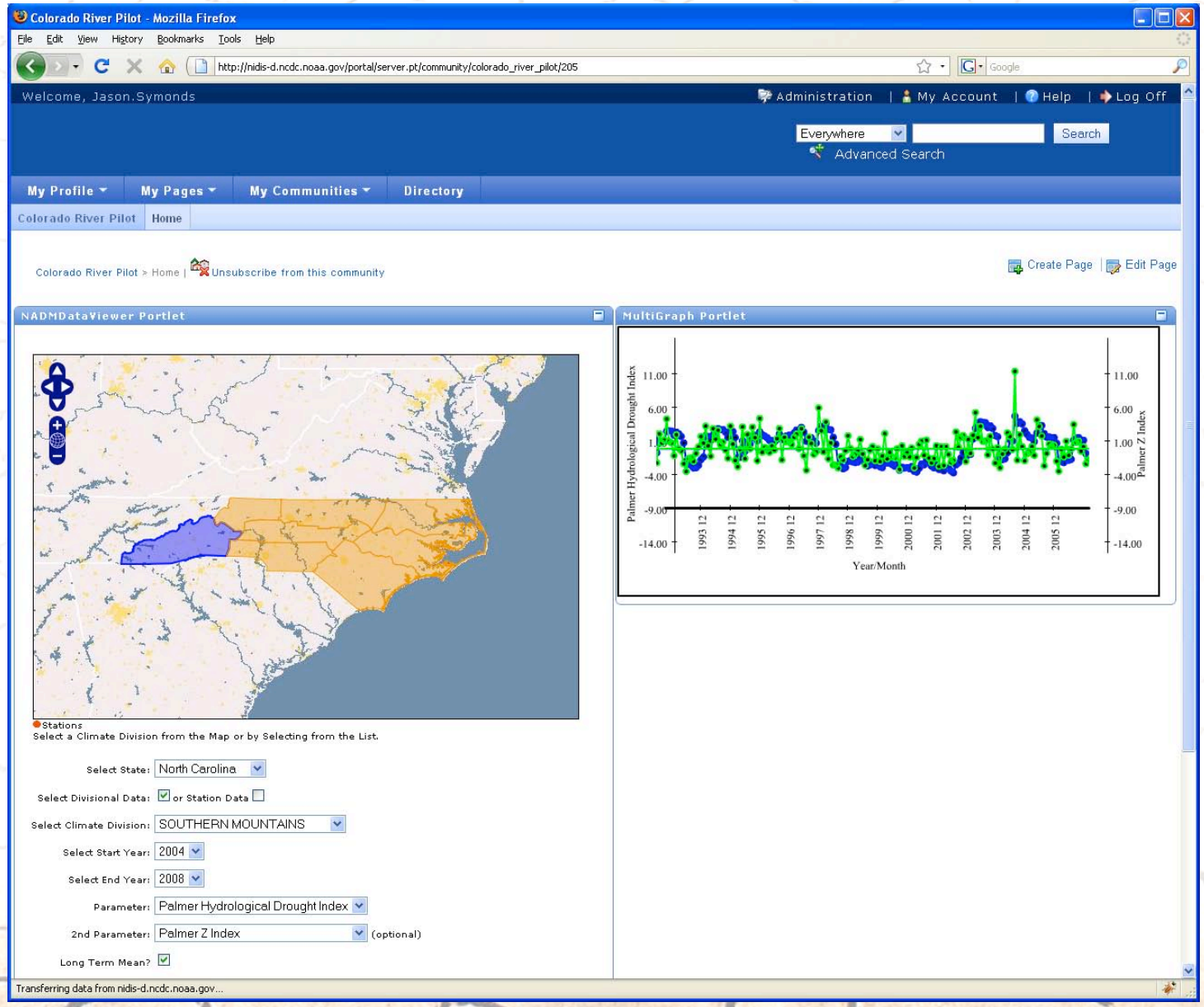
Multi Graph Prototype



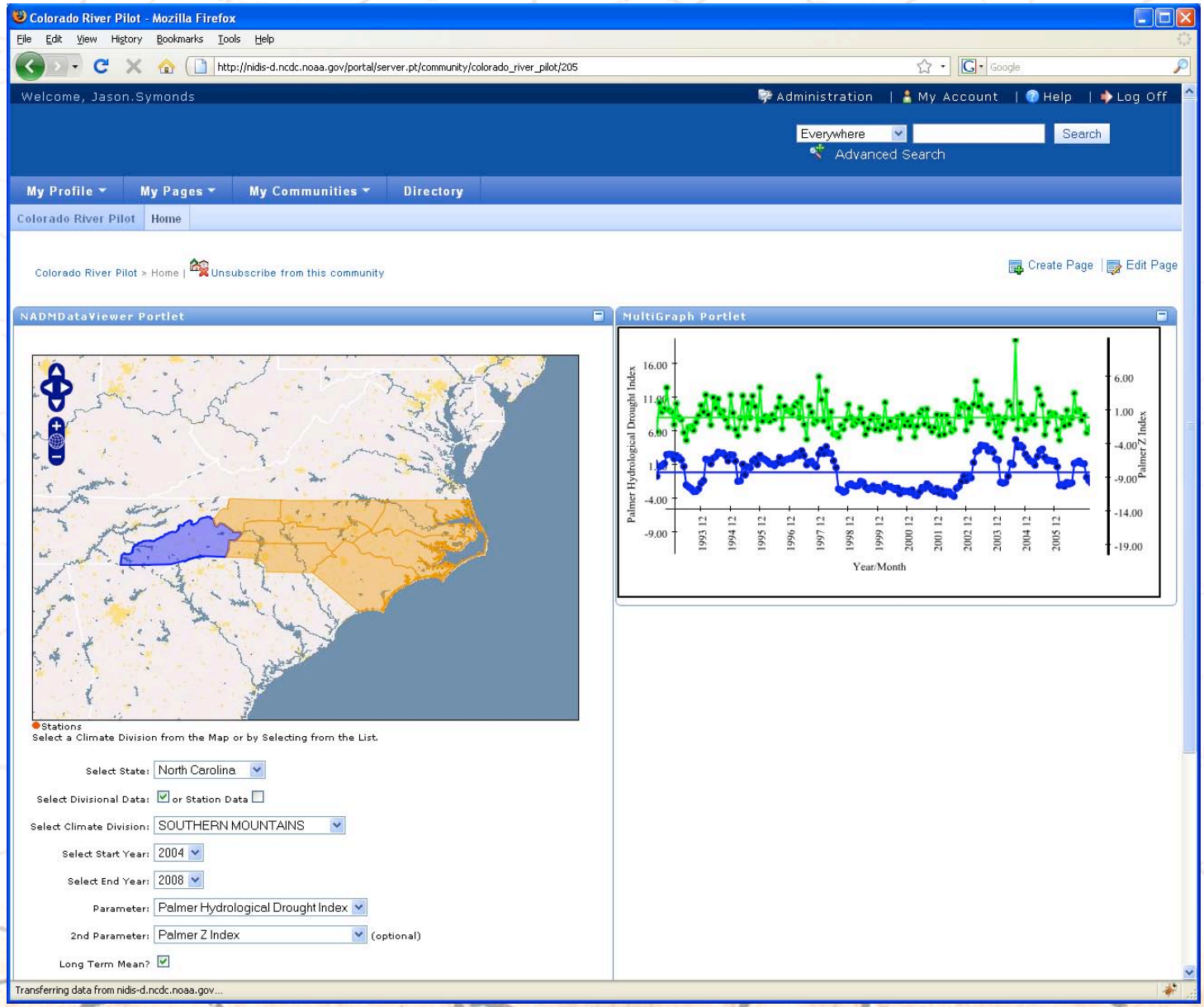
Multi Graph Prototype



Multi Graph Prototype



Multi Graph Prototype



Summary

- NIDIS identified the need for leveraging web services early on

- It was reflected in the COTS solution acquired

- NIDIS utilizes existing web services to access relevant data

- NIDIS continues to develop web services in support of ongoing content and data integration

- NIDIS will be working with other upcoming projects to help them leverage work done and lessons learned – i.e. NCS