2.4 THE NATIONAL INTEGRATED DROUGHT INFORMATION SYSTEM (NIDIS): U.S. DROUGHT PORTAL STATUS AND PLANS

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1. INTRODUCTION

Water availability is emerging as a critical concern in the 21st Century. Lack of water leading to drought is among the most dangerous and least understood of all natural hazards. Many state and federal agencies are beginning to recognize the need to move forward with a more proactive, risk-based drought management approach. The NIDIS Act of 2006 put in motion the implementation of an interagency activity to improve drought monitoring, forecasting, and early warning that will improve the nation's capacity to proactively manage drought-related risks. This will be accomplished by providing those affected with the best available information and tools to assess the potential impacts of drought and to better prepare for and mitigate the impacts of drought. Led by NOAA, NIDIS focuses on the consolidation of physical, hydrological and socio-economic impacts data; integrated observing networks; development of a suite of drought decision support and simulation tools; and interactive delivery of standardized products through an internet portal. The vision for NIDIS is a dynamic and accessible drought risk information system that informs user decisions in preparing for and mitigating the effects of drought.

The U.S. Drought Portal (USDP, http://www.drought.gov) has been developed as a national resource for data, models, risk information and impacts of drought and has the responsibility for integrating, archiving, and disseminating data via the internet. The public release of the USDP has proven especially helpful in assimilating drought-related information from multiple federal, state, and other agencies in support of drought early warning. The current status of the USDP and plans for the future are discussed below.

2. U.S. DROUGHT PORTAL CURRENT STATUS

Development of the U.S. Drought Portal began in mid 2007 and an initial release was provided via the internet in November 2007. The infrastructure for the USDP was determined based upon requirements and recommendations from the software vendor and was integrated into the infrastructure of the National Climatic Data Center (NCDC). Since 2007, a major revision of the USDP has taken place to better serve decision maker requirements based upon feedback received through the USDP (see figure 1). In late 2008, a major software update was implemented necessitating some restructuring of the material on the USDP and the way the information was displayed as described in section 3 below.

Information in the USDP focuses around answering three main questions: what are the drought conditions right now, what will the drought conditions be in the future, and how are these drought conditions impacting me? These questions are answered through groups of information from NIDIS partners into the broad categories of Current Drought, Forecasting, Impacts, Planning, Education, and Research. Participating partners providing information, products, and services include the National Oceanic and Atmospheric Administration, the U.S. Geological Survey, the U.S. Department of Agriculture, the Department of Interior, the Army Corps of Engineers, as well as other agencies, universities, and research partners.

3. USDP RECENT ENHANCEMENTS

Following the most recent software update for the USDP, two paths were available for providing content - either patch existing products and services to work with the new software or address additional feedback received since the last USDP update and improve usability. The later route was chosen and a minor redesign of the USDP was implemented. This new design allows faster and more readily apparent access to data, products, and services, as well as incorporates new products and services into the USDP. One such example is the National Weather Service's Drought Information Statements (DGTs). Each NWS Weather Forecast Office currently in severe drought (D2 according to the U.S. Drought Monitor) or worse provides a summary of the drought conditions and the impacts those conditions are having on the local area. Previously these statements were only available through the USDP as a web link. Recently, USDP personnel developed an Open Geospatial Consortium (OGC) compliant web mapping service (WMS) to show these products, using the NWS DGT repository. This new map service provides a quick national look at the distribution of DGTs on a county basis and provides one-click access to the impact statements.

In addition to the WMS for the DGTs, new WMS layers have been added to the USDP map viewer. The initial release of the map viewer contained 15 WMS layers displaying drought products and eight layers of boundaries and background maps. The new instance of the map viewer contains 13 layer and background maps as well as 43 layers with drought information from various sources (see figure 2). The map viewer is augmented by a link to

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the NCDC Weather and Climate Toolkit. This free software allows access to an even greater assortment of geographic information including NEXRAD data. It also allows users to save the information they are viewing as an ESRI shapefile for further geographic analysis.

Also implemented in the new USDP release is a simplified navigation scheme. Persistent navigation is used in the USDP header and drop-down navigation was removed, allowing prime web real estate to be used for products and services available via the USDP. This simplified navigation has proven to be more intuitive than the system it replaced and as a result, users are examining more information each time they visit the USDP, resulting in more informed users.

Figure 1. The second US Drought Portal homepage. This page emphasizes the importance of drought observations, impacts, and forecasting.

4. ENHANCED COLLABORATION THROUGH COMMUNITIES

The USDP allows the establishment of "communities" with enhanced services. These communities can be organized around a location or a theme and can take advantage of collaboration tools, document and information sharing, and archiving of projects and services created within the community. Communities currently exist only through secure log-in to the USDP and are available to a limited number of people involved in specific NIDIS activities. Initial communities were developed for administration of the USDP and to vet content offered for inclusion in the USDP.

Recently, communities have been developed for facilitating tasks. A community was implemented for the authors of the U.S. Drought Monitor which represents an attempt to provide a single, national depiction of drought. A standard set of tools was provided for developing the weekly product and document sharing and other collaboration were enabled, as well as an archive function to track tasks passed from one author to another in successive weeks.

An additional community is being implemented for the Upper Colorado River Basin NIDIS Pilot Project (for more information on pilot projects see section 5). This community will be available to those within the pilot to facilitate discussion and idea sharing. It will also keep track of tasks and allow sharing of information with the pilot group that a particular contributor does not wish to distribute to the entire internet. Once the pilot project is sufficiently mature, a public instance for the basin will be developed and implemented, providing a more detailed regional look at drought than is available via the existing USDP. Pilot projects will serve as prototypes for regional information available through the USDP, allowing other regions to tap into pertinent products and services while allowing region-specific tailoring of products and services.

5. INTERNATIONAL DROUGHT MONITORING

In addition to the emphasis of moving from national to regional scales, the USDP will also begin providing information on the continental and global scales. This will be done under the context of a local drought initiative, working with the Group on Earth Observations (GEO) and the NIDIS Implementation Team. Initial efforts at continental-scale assessments, such as the North American Drought Monitor, will be highlighted. Additional activities such as a GEO effort for monitoring drought in the Pacific may also be undertaken as initial steps. Success and depth of the project will depend upon participation from GEO partner countries.

6. ESTABLISHMENT OF PILOT PROJECTS

The aim of developing pilot projects under the auspices of NIDIS is to provide a mechanism for prototyping approaches to drought early warning for proactive drought impact reduction. Specifically, these interagency, collaborative pilot projects will

- Support the capability to provide data and information required for local, national, and regional decisions on drought and other sectoral issues;
- Act as a data integrator to complement and support sector-based issues (*e.g.*, drought, water quality, carbon cycle, *etc.*);
- Promote data standards (*e.g.*, Service-Oriented Architecture) for linkage of agency data to user inputs; and
- Contribute to enhanced data visualization tools that allow integration and interrogation of agency-provided and user-input spatial data.

Each pilot project must: include elements of education and public awareness, integrate monitoring and forecasting, develop risk assessment systems, engage preparedness systems, communicate with decision makers, and evaluate feedback. Elements of the pilots proven successful can then be examined for implementation in other regions or nationally. Transferability is a prime consideration for activities conducted in the pilot projects.

7. CONCLUSION

The U.S. Drought Portal is a living web service that is constantly changing in response to user requirements. Through an emphasis on both regional and international scale activities, enhanced information will be available to decision makers for mitigating the impacts of and adapting to drought.

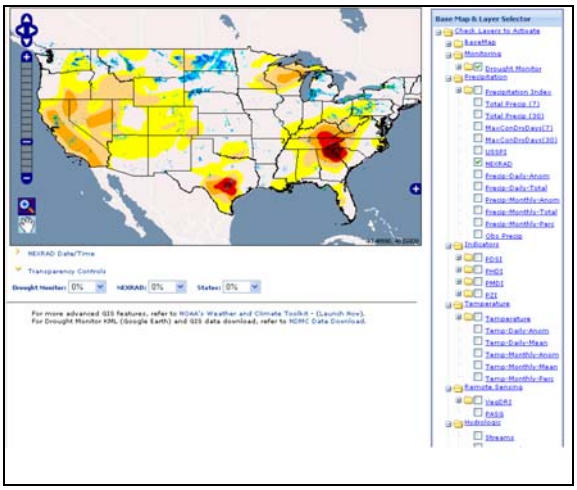

Figure 2. Mapping capabilities available in the U.S. Drought Portal. Through advanced geographic information systems capabilities, the USDP will allow users to view and couple drought-related map information for customized purposes. In this example, areas of radar-observed precipitation are overlaid upon the U.S. Drought Monitor depiction and a sample of the available layers is shown in the sidebar.