



United States Department of the Interior

U.S. GEOLOGICAL SURVEY
Reston, Virginia 20192

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MEMORANDUM

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Subject: Implementation of the National Spatial Data Infrastructure in the U.S. Geological Survey

On June 23, 1998, Acting Director, Thomas Casadevall, provided guidance to reaffirm the importance of the National Spatial Data Infrastructure (NSDI) as a critical element of the long-term U.S. Geological Survey (USGS) Strategic Plan and foundation upon which we can become a "Gateway to the Earth." Over the past several months the Geological Survey Geospatial Data Committee (GSGDC) has been reviewing the bureau implementation strategy, and the divisions have been pursuing implementation actions. Much is being done, we are making progress that is vital to the USGS leadership role in the NSDI.

The action plan for 1998 was initiated at the start of the fiscal year and modified to incorporate additional action items deemed necessary for the GSGDC and the divisions. The goals of the action plan are to 1) increase the understanding and awareness of the NSDI; 2) develop common solutions for access, discovery, and use of geospatial data; 3) use community-based approaches to develop and maintain common collections of geospatial data for sound decisionmaking; and 4) build relationships among organizations to support the continuing development of the NSDI.

There have been many actions that have taken place within the USGS this past fiscal year to implement the NSDI. Many of these are continuation of actions already underway, and others are new initiatives or activities. To highlight the most important aspects of this effort, we are providing a summary of key items of the GSGDC completed during the fiscal year and a summary of key items for each of the NSDI goals by division (Attachment 1). Attachment 2 provides a brief summary of FY 1999 planned NSDI activities.

2 Attachments

Summary of FY 98 Accomplishments of the GSGDC

1. **Gateway to the Earth.** In response to the request of the Directors Office, GSGDC prepared a concept paper in March 1998 that outlines a possible approach to GTE. This was transmitted to the Directors Office. The concept paper begins the process of developing a FY 2001 budget initiative called for in the July 1998 Directors memorandum. As a first step in that direction, a workshop on this topic is being arranged.

2. **Technology Development.** As a step toward building partnerships and providing technologies that meet the needs of a variety of users, USGS collaborated with other agencies to further develop GIS software for general application, such as LANDVIEW III.

3. **Metadata.** In response to the Director, each division has prepared concepts for increasing the production of metadata by its personnel. The concepts will be organized into a set of recommendations for application throughout the USGS.

4. **IGDC.** At the request of the DAS Water and Science, a WWW application was carried out and is now operational. The application provides for the public dissemination of bureau NSDI accomplishments, activities of the subcommittees, and a communications mechanism for joint development of plans to further the NSDI operations of IGDC.

5. **IGDC/Base Mapping Working Group.** As an ongoing activity of all the bureaus of DOI, spatial data requirements continue to be identified, prioritized, and put into production annually. This activity supports the Federal component of the FY 2000 C/FIP initiative, in that it is creating the foundation of the Federal GIS spatial data structures that can support external users as well.

6. **Information Infrastructure.** "Gateway to the Earth" and the "Digital Earth" initiative workshops suggest that there be renewed emphasis on customer "one-stop shopping" as well as data packaging for ease of use. All divisions have been working on these efforts. There are numerous working groups looking at all facets of issues brought out through the Workshops and it is not clear, at this time, what the impacts on activities supported by the GSGDC will be. The GSGDC is closely monitoring these two initiatives and will provide assistance as necessary.

7. **Digital Earth.** The USGS has been in partnership with NASA, has been leading the interagency effort to plan for and implement the Vice President's vision for the digital earth.

USGS Division Accomplishments for FY 1998

Goal 1: Increase the awareness and understanding of the vision, concepts, and benefits of the NSDI through outreach and education.

BRD

Personnel from the Office of Biological Informatics and Outreach (OBIO) and the Center for Biological Informatics (CBI) provided briefings and overview to internal and external customers concerning the National Biological Information Infrastructure (NBII). It is through the NBII that BRD facilitates accomplishment of the National Spatial Data Infrastructure (NSDI).

GD

GD staff across the field centers and headquarters attend National, Regional, and State Mapping and GIS conferences where they participate in the presentation of papers and panel discussions regarding the strategic future directions of the Geologic Division as they relate to the development of NSDI. Division personnel are also involved in FGDC- sponsored workshops such as the FGDC Clearinghouse Implementors workshop.

GD has strengthened its relationships with organizations such as the Association of American State Geologists (AASG) and is currently working with AASG on various projects designed to promote the NSDI by developing a data content standard for geologic map data.

The GD continues to develop and present metadata workshops. Training has been systematic; workshops have been convened in each of the three regional centers, and shorter follow-up workshops have been begun, now including representatives from other DoI bureaus (NPS, BLM, BuRec)

NMD

Staff members were extensively involved in national, regional, and state mapping and GIS conferences and grant programs in regard to NSDI topics and participated in several FGDC- sponsored workshops. NMD liaisons were placed in strategically located field offices to better understand community-based geospatial data requirements. The Division strengthened its relationship with key organizations, such as the National States Geographic Information Council and the National Association of Counties, by increasing participation in state and local spatial data coordination and development efforts. The USGS participated as a downlink site in a national satellite videoconference for 2000 individuals on: *A Practical Guide to Metadata Implementation for GIS Professionals*. Sustained outreach and education efforts of this nature are planned for fiscal year 1999.

WRD

In response to the request of the Directors Office, GSGDC prepared a concept paper in March

1998 that outlined a possible approach to Gateway to the Earth. This was transmitted to the Directors Office. The concept paper began the process of developing a FY 2001 budget initiative called for in the July 1998 Directors memorandum. As a first step in that direction, a workshop on this topic was held on Oct. 14-15 to define the elements of the initiative.

Goal 2: Develop common solutions for discovery, access, and use of geospatial data in response to the needs of diverse communities.

BRD

OBIO with the Environmental Management and Technology Center (EMTC) has set up an NBII Clearinghouse node compliant with NSDI protocols which might be referred to as a "Biologically Enhanced" NSDI node. The National Wetlands Research Center (NWRC), although not yet NSDI compliant, is serving spatial data and metadata to our customer base.

BRD, with the assistance of OBIO, continues to create metadata for its internal data holdings as well as providing assistance to partners. OBIO has an Interagency Agreement (IAG) with NASA to assist BRD in the capabilities to create metadata for current and on-going projects especially legacy data sets. This activity is tied to NASA's Global Change Master Directory (GCMD) and has provided for more than 60 BRD metadata sets as well as 175 additional datasets of biological interest from the (GCMD).

GD

GD continues to operate and enhance a registered NSDI Clearinghouse node that holds dataset-level and component-level metadata for 30 major geospatial data products of the Division. GD datasets serve as a testbed for metadata extensions owing to their inherent diversity.

Software tools developed by Geologic Division continue to be the principal means by which metadata are created, validated, and formatted for presentation in the Clearinghouse.

Developments of note during FY 1998 include

- Introduction of the metadata editor Tkme for Windows 95 and NT and Unix,
- Full support for the 1998 revision of the metadata standard,
- Metadata in Plain Language, a web site which recasts the metadata standard as a series of questions of increasing specificity, leading to detailed instructions for filling out a metadata record for any data set. This helps people review metadata as well as create it.

NMD

NMD initiated a pilot project for delivering geospatial data in near real-time to a consortium of academic institutions in Ohio, called OhioView, which has a mission to promote public distribution and wide application of satellite-derived land images and other geospatial data. This consortium was also selected to participate in the NSDI Cooperative Agreements Program based

on its proposal to establish a regional clearinghouse for geospatial data. As the lead organization for developing and maintaining the Spatial Data Transfer Standard (SDTS) and supporting data profiles, which will enable users to handle multiple-format data as well as provide a consistent method for data documentation, NMD worked closely with the national standards community. In June of 1998, the American National Standards Institute formally adopted SDTS. In 1998, NMD also established a registered, FGDC-compliant, NSDI Clearinghouse node that holds dataset series metadata for five major cartographic-related products.

WRD

In response to the Director, the division has prepared concepts for increasing the production of metadata by its personnel. Incentives that were identified include (1) directives from the division chief; (2) enhancement of guidance and tracking via web pages; (3) providing increased training, metadata tools, and user assistance; (4) increased recognition of professional accomplishment and use of the awards process. The concepts from all divisions will be organized into a set of recommendations for uniform application throughout the USGS.

Goal 3: Use community-based approaches to develop and maintain common collections of geospatial data for sound decision making.

BRD

OBIO and CBI personnel working with Federal Geographic data Committee (FGDC) developed a biological profile of the FGDC Content Standard for Geospatial Metadata. The standard has been approved by the FGDC and will support increased access to, sharing and use of biological and spatial data and information among users on both a national and international basis.

OBIO with the University of California, San Diego, Super Computer Center has installed four interactive ecological models for use by BRD and its partners. The models use both biological and spatial data for analysis.

GD

In cooperation with other Federal and State partners and private contractors, GD is the national leader in producing digital geologic map data, digital mineral resource occurrence and commodity data, digital earthquake hazard assessment and earthquake location data, digital geophysical data, digital marine geologic and geophysical data, digital geomagnetic monitoring data, and other digital geoscience data.

GD is working with the Association of American State Geologists and all 50 States to develop a national geologic map database which will provide basic geologic map data in a common format that anyone can use and to which anyone can contribute. The data is designed to be enhanced by those closest to the data. It is expected that states and localities will add more detailed data to allow for specific geological studies and add value to the original data by linking the results of the studies to the common data and making that data available to the wider community.

GD, as chair of the FGDC Subcommittee on Geologic Data, has supported the development,

implementation, and promotion of the National Geologic Map Database standards. These standards include: (1) use of the FGDC Content Standard for Digital Geospatial Metadata, (2) development of a digital geologic map data model (content standard for geologic maps). GD is also staffing, through direct involvement in software development and user support, the development and maintenance of the Content Standard for Digital Geospatial Metadata. In FY98, GD approved new internal guidelines for the preparation of publications, including those containing digital data. These guidelines require metadata to accompany those publications, and be fully compliant with the FGDC Content Standard for Digital Geospatial Metadata.

NMD

In cooperation with Federal and State partners, NMD is the national leader in producing digital orthoimage and elevation data, reaching 98% completion in 1998 of the first national elevation database and 37% completion of a national orthoimagery database. NMD earmarked \$8 million under the Bureau Framework Initiative to explore new technologies, business practices, and data requirements to further NSDI development. In consultation with appropriate State agencies, NMD initiated two- to five-year maintenance plans for USGS geospatial databases (orthoimagery, elevation, hydrography). As chair of the FGDC subcommittee on Base Cartographic Data, NMD supported the development, promotion, and implementation of NSDI standards, including those on spatial data accuracy, digital orthoimagery, and digital gridded land elevation data. NMD also leads or participates in numerous national and international standards bodies.

WRD

In cooperation with other Federal agencies and in response to the Secretary's Watershed Initiative, the WWW application "Science in Your Watershed" was developed to assist watershed associations with the use of scientific information in their own planning processes. The application is designed to complement parallel efforts of EPA ("Surf Your Watershed") and the Conservation Technology Information Center ("Know Your Watershed"). This application continues to be developed, and has been evaluated by a number of the watershed customers for whom it is designed. The application is a technology that will be used to support the Gateway to the Earth effort and has also been committed as an early USGS contribution to the American Heritage Rivers initiative.

Goal 4: Build relationships among organizations to support the continuing development of the NSDI.

BRD

OBIO has established a partnership with the Inter-American Geospatial Data Network (IGDN) at the EROS Data Center. Through a grant with US Agency for International Development (AID) to IGDN, OBIO participated in a two week workshop to train Latin American data managers in the use of the automated tool.

BRD continues to provide funding support through competitive bid for selected State project that

further the goals for developing and implementing NBII and has formed a new FGDC sub-working group to address Biological standards and issues.

GD

A significant objective of GD's Information Resources Group is to influence data partnerships that build on the principles of NSDI. GD is developing its data policies and standards to provide more flexibility in establishing long-term data partnerships and in turn support the development and maintenance of the NSDI.

GD actively supports NSDI-related activities encouraged by the National States Geographic Information Council (e.g. development of metadata, technical discussions among data-processing professionals). In addition, the Division participates in meetings within regions, such as regional Geological Society of America conferences, to understand broad interests and trends.

GD is continuing its successful in-house data production approaches which ensure high-quality, coherent information flow carefully targeted at the proper audiences, while working closely with carefully-selected outside organizations to produce data cooperatively. A successful model is the Global Seismic Network.

NMD

NMD's Coordination and Requirements personnel group has an ongoing, nationwide objective to influence data partnerships that build on the principles of the NSDI. As indicated in several examples above, NMD developed data policies and standards in 1998 to provide more flexibility in establishing long-term NSDI-related data partnerships. In 1998, the Division continued to move away from traditional in-house data production approaches toward increased leveraging of data produced by other mapping organizations. In addition, NMD's participation in the DOI High Priority Digital Data Base Program served as a business model for leveraging and consolidating multiple agency requirements to stretch data development and maintenance resources. Plans for 1999 and beyond call for increasing and strengthening NSDI partnerships.

WRD

As an ongoing activity of USGS divisions and DOI bureaus, spatial data requirements continue to be identified, prioritized, and put into production annually under the High-Priority Digital Base

Data Program . This activity leverages funding among bureaus as much as 6:1. It supports the Federal component of the FY 2000 Community/Federal Infrastructure Partnership, in that it is creating the foundation of the Federal GIS spatial data structures that can support both internal and external users.

GSGDC FY 1999 NSDI Planned Activities

With the sponsorship of GSGDC, a workshop on GIS is planned for April 1999. The workshop provides a platform for facilitating the goals of NSDI throughout the USGS, and will also be a way of gaining input from GIS practitioners about emerging issues.

Interagency efforts will continue toward development of a memorandum of understanding with the Natural Resources Conservation Service and other agencies, that will coordinate delineation and digitizing of watershed boundaries for smaller areas. The small watersheds are needed for mission purposes by Federal, State, and local government partners, as well as by watershed associations.

Support of the "Gateway to the Earth" and "Digital Earth" initiatives will continue. This will take the form of changes in how information is presented using the WWW, for example by expansion of the Science in Your Watershed web application. Work will be carried out in partnership with all USGS divisions.

Production of metadata will be increased by developing a set of methods for uniform application throughout the USGS.

The High-Priority Digital Base Data Program will be carried out to identify spatial requirements of the divisions and DOI bureaus, to prioritize these requirements, and to place them into production.

