

FY 2012 FINAL TECHNICAL REPORT
NATIONAL GEOLOGICAL AND GEOPHYSICAL
DATA PRESERVATION PROGRAM

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Virginia Geologic Information Catalog

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ABSTRACT

The Department of Mines, Minerals and Energy - Division of Geology and Mineral Resources (DGMR) serves as Virginia's geological survey. The primary mission of the Division is to gather and disseminate geologic and mineral resources information that supports sustainable development and a more productive economy. Since the early 1900's, DGMR (and its predecessors in name) has maintained and added to collections of geologic materials including reference rock specimens and associated thin sections, core samples, well cuttings, and fossils that are presently stored in warehouse facilities in Charlottesville. The Division also maintains collections of geologic maps, historical photographs, aerial photographs, geophysical and geochemical datasets, manuscripts and publications, and mineral locality information.

Recognizing the need to both preserve these valuable collections and improve the ability of staff and customers to search for, cross-reference, and access key information, DGMR implemented a long range data preservation plan. With support from the U.S. Geological Survey (USGS) National Geological and Geophysical Data Preservation Program (NGGDPP), the Division began standardizing and consolidating key data collections into the Virginia Geologic Information Catalog (VGIC). The VGIC database system features a map-based web browser interface to serve internal and external customers alike. The VGIC has also provided the optimal means for creating feature-specific metadata in the format that serves the priority needs of the USGS ScienceBase Catalog.

For the grant year starting September 1, 2012 and ending August 31, 2013, DGMR added five data collections to the VGIC. The VGIC enables DGMR staff and customers to conduct searches based on keywords and geographic coordinates. In achieving the NGGDPP grant deliverable commitment, DGMR uploaded 11,975 feature-specific metadata records for the five Virginia data collections to the ScienceBase Catalog using the USGS web site:

<https://www.sciencebase.gov/catalog/>

In addition to uploading metadata records, DGMR also continued the physical inventory of a large historic collection of rock, mineral, and fossil specimens acquired from the University of Virginia in 2008. Project staff also continued digital scanning of unpublished historical paper documents collectively known as the DGMR Economic Geology Mineral Resource Files collection.

INTRODUCTION

The Department of Mines, Minerals and Energy's (DMME's) Division of Geology and Mineral Resources (DGMR) collects, maintains, and distributes information related to the geology, mineral and energy resources, and geologic hazards of Virginia. The Division's customers include the general public, schools and educational programs, mineral and energy production industries, construction industries, land use planning authorities, and local, state, and federal government agencies.

DGMR seeks to improve our customers' ability to locate and wisely develop or conserve rock, mineral, water, and energy resources. A key strategy to achieve this objective is to enhance the organization and accessibility of the geologic information contained in the DGMR archives. The archives comprise a variety of collections of geologic materials and data that vary in format, size, and complexity. The format of our published and unpublished map products that depict geologic, geophysical, geochemical, mineral and energy resources data includes hard copy media (paper, mylar, sepia, etc) and digital data. The collections also include historic photographs, rock thin sections, results of petrographic and microscopic analyses, geochemical laboratory results, reports on groundwater and mineral spring characteristics, historic and out-of-print publications, well logs, well cuttings, drill cores, and extensive collections of rock, mineral, and fossil specimens. These collections continue to grow as DGMR gathers new data.

Supported by a FY 2007 Phase 1 grant from the U.S. Geological Survey (USGS) National Geological and Geophysical Data Preservation Program (NGGDPP), DGMR identified and characterized existing inventories of physical materials, maps and other key data sets. Starting in FY 2008, and supported by NGGDPP grant funds, DGMR began standardizing and consolidating its data collections into a centralized system called the Virginia Geologic Information Catalog (VGIC). Enhancements including on-line access to this catalog have significantly improved the ability to search for and access geologic information using web-based search tools. In the five year period from FY 2008 to FY 2012, DGMR added 21 prioritized data collections to the VGIC. Feature-specific metadata records describing these collections were uploaded to the ScienceBase Catalog at the close of each respective grant year.

PURPOSE AND JUSTIFICATION

DGMR customers with an interest in geologic information are currently able to browse the *DMME Web Store*, an on-line electronic commerce site at the URL: <https://www.dmme.virginia.gov/commerce/>, and purchase hard copy products, or alternatively download scanned versions for free in PDF format. The *DMME Web Store* provides a full listing of the titles of reports and maps that have been published as part of DGMR's publication series, and includes a comprehensive index and list of keywords. An extensive amount of unpublished information, also part of the DGMR archives, has recently become available from the on-line Virginia Geologic Information Catalog.

To better manage the archival of geologic materials and information in the VGIC, and ensure that these resources are readily accessible to customers, DGMR developed a long range data preservation plan. This plan includes best management practices for archival methods, converting key information from non-digital format to digital, developing metadata, enabling web-based access, and participating in the effort to build the National Digital Catalog (now ScienceBase Catalog). Since most geologic information is tied to a geographic location on the earth, DGMR has established the goal of delivering and enabling searches using the VGIC based on key spatial information. A web-based mapping interface enables searches using geographic

coordinates, allowing direct access to the information by clicking on points, polygons, and polylines that represent available data. The VGIC also delivers site-specific metadata for each data set. For many commonly requested data sets, DGMR is able to provide scanned digital versions in PDF format. Examples include core logs, seismic lines, sample descriptions, and results of chemical analyses.

The VGIC serves as a database management system for the organization, management, preservation, and distribution of data. Among the many benefits of this system, the following are expected for the specified customer groups:

General Public, Education, and Business:

- Direct and timely (24hr x 7d) access to a wide range of geologic information in a downloadable format;
- Eliminates costs of travel to DMME offices, data copying, shipping, etc;
- Ability to search for geologic information based on specified geographic locations;
- Access to unpublished and out-of-print data.

Land Use Planners:

- Direct and timely (24hr x 7d) access to GIS data for incorporating into comprehensive land use and transportation infrastructure plans.

State and Federal Government:

- Enables internal DMME staff and other government agencies to quickly search for available geologic information to serve their needs;
- Reduces the response times to customer requests;
- Reduces the costs of data handling, copying, and shipping.

STRATEGY FOR LONG-TERM DATA PRESERVATION

The work accomplished to date has effectively advanced DGMR's long range data preservation goals, which are:

1. Data collections will be preserved for future generations;
2. Data collections will be organized and stored in a secure and accessible manner;
3. Data collections will be incorporated into the Virginia Geologic Information Catalog;
4. Data collections will be standardized, consolidated, and normalized;
5. The Virginia Geologic Information Catalog will be accessible on-line.

This project ensures that all of DGMR's geologic information is preserved, standardized, and accessible to its customers in a secure, robust relational database that is readily queried using keywords and geographic coordinates.

FY 2012 GOALS

For FY 2012 (September 1, 2012 to August 31, 2013) DGMR proposed to expand the VGIC by adding five prioritized data collections, and continuing the inventory of other collections. The prioritized collections were to be integrated into a comprehensive Microsoft SQL-Server relational database, which serves as the VGIC database management system. Site-specific metadata were to be developed for each data collection. All metadata developed for this project was to comply with the USGS National Catalog Metadata Products requirements. Building upon

the work accomplished as part of the NGGDPP-supported programs in FY 2007 through FY 2011, the activities for work proposed for FY 2012 included the tasks listed below:

NGGDPP Objective – Create Metadata

- a. Review native format, scan and digitally convert, edit data records for accuracy and completeness.
- b. Define database fields, table structure, relationships, indices, and queries based on key attributes identified for five selected DGMR Collections.
- c. Program user interfaces for data entry, querying, viewing, and reporting.
- d. Develop feature-specific metadata (meeting National Digital Catalog Metadata standards) for each collection. Upload metadata records to the ScienceBase Catalog using the established procedure.

Final Technical Report

- a. Complete and deliver Final Technical Report that summarizes all activities and accomplishments for FY 2012.

FY 2012 RESULTS

NGGDPP Objective – Create Metadata

Five collections were targeted for preservation and metadata creation in FY 2012 including:

1. Rock Thin Sections Collection – 4,525 records uploaded;
2. Silica Sample Analyses – 51 records uploaded;
3. Clay Sample Analyses – 870 records uploaded;
4. UVA Rock, Mineral and Fossil Collection – 6,273 records uploaded; inventory of Virginia reference rock and fossil specimens is on-going;
5. Economic Geology Mineral Resource Files – 256 records uploaded; estimated 5,130 files scanned and awaiting processing.

Digital scanning, data entry, and georeferencing were followed by an extensive quality control review. The collections were migrated to the VGIC geodatabase platform. Feature-specific metadata records were then created using the specified attribute fields and guidelines provided in the USGS document *Metadata Profile for the National Digital Catalog*. The metadata records were submitted to the USGS in the CSV file format at the close of the FY 2012 grant year. A total of 11,975 feature-specific metadata records were uploaded to the ScienceBase Catalog using the USGS web site: <https://www.sciencebase.gov/catalog/>.

Table 1 shows the current status of Virginia’s data collections in the USGS ScienceBase Catalog and indicates the number of uploaded records for each of the prioritized collections.

TABLE 1 DGMR Data Collections Currently Available in USGS Science Base Catalog				
<i>NGGDPP Collection ID</i>	<i>Collection Name</i>	<i>Number of metadata records uploaded- Science Base Catalog</i>	<i>Year uploaded</i>	<i>Progress Summary</i>
P0826	Fossil repository	1,141	FY 2010	Inventory completed in FY 2007; access from VGIC in FY 2012.
P1233	Well cuttings	7,376	FY 2010	Inventory completed in FY 2007; access from VGIC in FY 2012.
P1246	Historic uranium exploration information	1,320	FY 2010	Inventory completed in FY 2007; access from VGIC in FY 2012.
P0637	Rock cores	447	FY 2008	Inventory completed in FY 2007; access from VGIC in FY 2010.
P1229	Rock (specimen) repository	7,712	FY 2008	Inventory completed in FY 2007; access from VGIC in FY 2010.
P1231	Historic topographic maps	313	FY 2011	Inventory completed in FY 2007; access from VGIC and DMME Web Store in FY 2011.
P1232	Historic photographs	9,180	FY 2011	Inventory completed in FY 2007; access to metadata records from VGIC in FY 2011.
P1111	DGMR Publications Index	5,237	FY 2008	Inventory completed in FY 2007; access from VGIC in FY 2010.
P0830	Rock thin sections	4,525	FY 2012	Inventory completed in FY 2007; access from VGIC expected in FY 2014.
P0835	Carbonate geochemical database	6,193	FY 2009	Inventory completed in FY 2007; access from VGIC in FY 2010.
P0836	Aerial photographs	7,622	FY 2011	Inventory completed in FY 2007; access to metadata records from VGIC in FY 2011.
P0838	Silica sample analyses	51	FY 2012	Inventory completed in FY 2007; access from VGIC expected in FY 2014.
P0839	Clay sample analyses	870	FY 2012	Inventory completed in FY 2007; access from VGIC expected in FY 2014.
P0840	Geophysical data	1,734	FY 2009	Inventory completed in FY 2007; access from VGIC in FY 2012.
P0841	Borehole database	6,721	FY 2009	Inventory completed in FY 2007; access from VGIC in FY 2012.
P0843	Sinkhole maps	336	FY 2010	Inventory completed in FY 2007; access from VGIC in FY 2012.
P1362	Mineral resources inventory (MRV)	10,442	FY 2009	Inventory completed in FY 2007; access from VGIC in FY 2012.
P1442	Unpublished geologic maps	670	FY 2008	Inventory completed in FY 2007; access from VGIC in FY 2010.
P1653	Coal quality database	401	FY 2009	Inventory completed in FY 2007; access from VGIC in FY 2010.
	UVA Mineral and Rock Collection	6,273	FY 2012	Inventory of Virginia mineral portion of collection completed in FY 2010; metadata (partial) uploaded in FY 2011, FY 2012.
	Economic Geology Mineral Resources Files	256	FY 2012	Inventory (partial) completed in FY 2011; ongoing document scanning and digital conversion.
TOTAL		78,820		

In addition to the specific grant deliverables described above, DGMR continued programming development of the Virginia Geologic Information Catalog (VGIC) during the year, with additional datasets added to the Microsoft SQL-Server database application by DMME support staff. Table structure, relationships, and other design criteria were established, together with user interface screens to allow data entry, querying, and reporting. The database is hosted on a DMME server currently located in the DMME Big Stone Gap office. Access to the VGIC is available from the portal: <http://www.dmme.virginia.gov/DGMR/MapsPubs.shtml>

FY 2013 WORK PLAN

Due to the inability to gain funding support in FY 2013 from the USGS NGGDPP, activities supporting the VGIC and submission of metadata records to the USGS ScienceBase Catalog have been suspended.