

**Final Technical Report for FY2009  
National Geological and Geophysical Data Preservation Program**

**Prepared for:  
The United States Geological Survey (USGS)**

**Prepared by:  
The New Hampshire Geological Survey (NHGS)**

**Kristen Svendsen, Hydrogeologist  
kristen.svendsen@des.nh.gov  
603-271-4087**

**and**

**Tara Johnson, Environmental Technician  
tara.johnson@des.nh.gov  
603-271-0587**

**29 Hazen Drive  
Concord, NH 03302  
Fax: 603-271-3305**

**Award Number: 09HQPA0009  
Award Period: 7/1/2009 through 6/30/2010  
Date: September 16, 2010**



## Table of Contents

1.0 .....	Abstract
2.0 .....	Project Summary
3.0 .....	Progress
4.0 .....	Goals
5.0 .....	Conclusion

### Tables

Table 1.....	DPAC Members and Affiliations
--------------	-------------------------------

### 1.0 Abstract

The New Hampshire Geological Survey (NHGS) completed requirements set by the National Geological and Geophysical Data Preservation Program (NGGDPP) for FY2009. The primary priorities of this grant period were to perform individual-level inventories on two collections entered into the NGGDPP on-line inventory in FY2008, and to continue with data preservation goals outlined in the NHGS Long-Range Data Preservation Plan. This Final Technical Report describes FY2009 project details and includes NHGS' objectives for the FY2010 grant period. In fulfillment of the grant requirements, this final technical report will be submitted to the USGS by September 30, 2010.

### 2.0 Project Summary

For NGGDPP FY2009, NHGS received funding in the amount of \$16,021 to focus on specific priorities as recommended by the NGGDPP proposal review panel which include: (1) digital preservation and creation of metadata for well completion reports in the New Hampshire Seacoast Region and (2) preservation and creation of metadata for field maps used to produce the Bedrock Geologic Map of New Hampshire (Lyons and others, 1997). In addition, NHGS continued to make progress on long-range data preservation program goals. NHGS entered two new paper collections into the USGS online inventory, researched a potential core collection, and created a Data Preservation Advisory Committee (DPAC).

NHGS' first priority for FY2009 was to scan well reports and logs from the New Hampshire Seacoast Region, and preserve associated cuttings. The original collection, relinquished by the University of New Hampshire (UNH) in FY2008, did not have sufficient provenance information to create the metadata required for upload to the National Digital Catalog (NDC). Cuttings associated with these well logs were not properly labeled and did not contain accurate location information. Therefore, NHGS began an individual inventory on New Hampshire Well Completion Reports (Collection ID# P1611) with program approval. The primary focus of this project was to create digital infrastructure (including metadata) for the well completion reports of wells located in the Seacoast Region. The reports were digitally converted from a paper document to a PDF file through high resolution scanning. In addition, metadata was created in CSV format and uploaded to the NDC.

This effort is a program priority since NHGS is the data steward of the New Hampshire Water Well Inventory Database and associated well completion reports. NHGS' Data Preservation Program will ensure the preservation of this important database. Well completion reports contain information on well construction including well location, total well depth, depth to bedrock, and water yield. Some reports also contain general lithologic descriptions. These reports have a multitude of users and uses. Information about average well depths and yields in a specific neighborhood is helpful to drillers and their prospective customers when a new well is to be drilled or a pump replaced. Real estate agents and lending institutions commonly use the well data during the course of property transactions. NHGS uses the data extensively in the process of mapping surficial and bedrock geology. The data also are a key component of both ground water quantity and ground water quality assessments, and aquifer mapping. Private sector hydrogeologic consultants find the data to be invaluable when siting new public drinking water supply wells, and geotechnical engineers use the data when planning new construction projects. Ultimately, the data support a range of water resources and infrastructure planning activities and the development of public policy.

NHGS receives several well report data requests per week, which often necessitate perusal of, and access to, existing archived information. Limited data on the well completion reports are currently available on-line through the NHDES website, although much of the additional, valuable information contained in the paper reports is not web accessible. The well reports scanned in FY2009 will be made web accessible in FY2010 through the New Hampshire Department of Environmental Services (NHDES) website. The New Hampshire Water Well Inventory Database currently contains over 117,000 well records with associated well completion reports. NHGS began well report preservation efforts on the Seacoast Region of New Hampshire during FY2009. This region is one of the most stressed areas of ground-water use in the state due to population growth and land development, and its proximity to the ocean. In addition, some Seacoast Region ground water has naturally occurring arsenic contamination. In some areas, one-third of all private wells exceed the 10 microgram EPA MCL for arsenic. This focus on the Seacoast Region was supported by the NGGDPP review panels in FY2009 and FY2010. Currently, there are over 25,000 wells in the New Hampshire Water Well Inventory Database for the Seacoast Region. A total of 1,273 georeferenced well completion reports were scanned and metadata uploaded to the NDC by June 30, 2010 under the FY2009 grant priorities. Digital conversion of the paper well reports (which currently exist only in paper media), creation of metadata, and expanded web accessibility will continue to be a program priority for future grant years.

NHGS' second priority for this grant period was to preserve and create metadata for original field maps utilized to produce the Bedrock Geologic Map of New Hampshire (Lyons and Others, 1997). Dr. Wally Bothner, a UNH professor and a primary contributor to the Bedrock Geologic Map of New Hampshire (Lyons and Others, 1997), released to NHGS, manuscript field maps which were used during creation of the Lyon's Map. This field map collection was entered into the on-line inventory for the NGGDPP (Collection ID# P1652), and the field maps were inventoried at the individual level in order to fulfill a program priority for FY2009. The maps were digitally scanned and associated metadata was uploaded to the NDC by June 30, 2010.

In addition to completing individual inventories and long range program goals, NHGS utilized FY2009 funding to attend the Geoscience Data Preservation Techniques Workshop hosted by the Indiana Geological Survey at Indiana University, and co-sponsored by the American Association of State Geologists (AASG) and the USGS, in July 2009. Critical information and preservation techniques acquired as a result this workshop helped NHGS data preservation program development and improved current data preservation practices.

### 3.0 Progress

Grant goals which were set by NHGS for NNGDPP FY2009 were met. In addition, NHGS made progress on data preservation goals in accordance with the NHGS Long-Range Data Preservation Plan implemented in FY2008. Most of these goals are on-going and include: (1) continuous entering of new collections into the USGS Inventory of Geologic and Geophysical Collections, (2) creating digital infrastructure, such as generating metadata for current collections for upload to the NDC and converting paper records (well completion reports) to digital format, (3) making digital collections available to the public through the NHDES/NHGS website, (4) contacting other agencies to locate geological and geophysical data for preservation, and (5) creating a data preservation advisory committee.

#### Long-Range Plan Accomplishments - FY2009:

1(a). Two paper collections were cataloged, inventoried, and entered into the collection-level inventory in FY2009. The first collection consists of 61 individual field maps used to create the Bedrock Geologic Map of New Hampshire (Lyons and Others, 1997). A previously entered collection, New Hampshire Highway Maps (Collection ID# P1517) was amended to reflect updated information regarding the collection. The second paper collection (Collection ID# P1655) consists for 9 monitoring well completion reports and well logs associated with rock cuttings (Collection ID #P1538) for the New Hampshire Ground water network

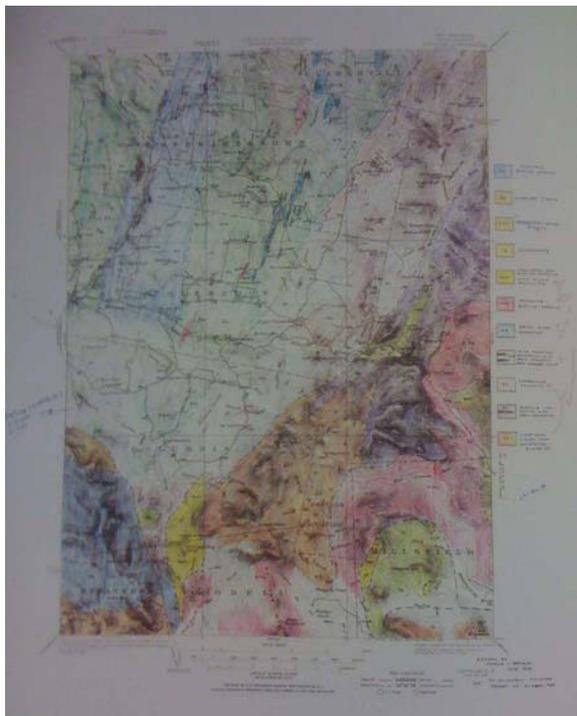


Photo 1. Manuscript Maps (Collection ID # 1652)

1(b). One physical collection was entered into the on-line inventory during the FY2009 grant period. This collection consists of 195 rock cuttings collected during construction of monitoring wells, which have been added to the New Hampshire ground water network project. These cuttings correspond to Collection ID# 1655 (well completion reports and logs). These cuttings will be preserved in clear plastic vials and be made available to the public during FY2010.

2) NHGS converted paper reports to a digital format, as well as created metadata for approximately 1300 well completion reports for wells in five New Hampshire Seacoast Region towns: Stratham, Greenland, New Castle, Newfields, and Seabrook (Photo 2). Associated metadata was uploaded to the NDC in CSV format. NHGS will continue to create and upload metadata to the NDC for newly constructed, georeferenced wells in New Hampshire's Seacoast towns on a regular basis.



Photo 2. Well Completion Reports (Collection ID #s 1611 and 1655)

3) For FY2009, NHGS researched the feasibility of making preserved digital collections available to the public through the NHDES/NHGS website. In August 2009, NHGS began tracking water well database website traffic using website management software. A total of 12,887 well record page views were reported between August 31, 2009 and March 30, 2010, making the water well database one of the top five visited web pages on NHDES website. This number indicates that the water well records in the New Hampshire Water Well Inventory Database are a relevant and useful tool for the general public. Although some of the data on the well completion reports is currently available on-line through the NHDES website data search engine (referred to as ONESTOP), much of the information on the paper reports is not web accessible. Therefore, NHGS approached the NHDES web board regarding inclusion of a link which will connect the well data returned in a database search to a PDF scan of the original well report. NHGS had anticipated implementing this web feature in future grant years. However, due to a restructuring of NHDES online data search engine (ONESTOP) in FY2010, NHGS approached the NHDES ONESTOP design team with this request in FY2009. NHGS was successful in securing the ONESTOP design team's support for implementing this new feature during the FY2010 grant year. This added function will provide additional, valuable information regarding well completion reports through the NHDES website. This new ONESTOP design and links to PDF scans of well reports for two towns should be publicly available by the end of August 2010, which is considerably earlier than originally projected.

4) During FY2009, NHGS focused on establishing new contacts for geoscience data acquisitions, as well as securing diverse, relevant collections for future collection inventories. This spring NHGS staff met with the Berlin, New Hampshire Historical Society Vice-President, Walter Nadeau, regarding a well-preserved core collection (Photo 3) stored in a warehouse owned by the Town of Berlin in Coos County. The core collection's provenance is currently being researched at the Coos County Registry of Deeds. These cores contain assay labels and are stored in six foot wooden core boxes (some with locking mechanisms) on historical society property. They will be added to the NHGS data repository if the provenance information justifies their inclusion into our physical collection. NHGS personnel will then relocate the cores to the NHGS off-site storage building.



Photo 3. Potential future physical collection: Cores from the Town of Berlin.

5) In November 2009, NHGS met with members of the New Hampshire Geologic Advisory Committee (NHGRAC) to discuss forming a Data Preservation Advisory Committee (DPAC) subcommittee. NGGDPP Grant Co-Primary Investigator, Kristen Svendsen, gave an informative, comprehensive presentation describing the NHGS Data Preservation Program, including program accomplishments and goals with background information on the NGGDPP. The committee unanimously supported our data preservation program goals and several members of NHGRAC agreed to sit on the DPAC subcommittee (Table 1). DPAC met in July 2010 to the acquisition of future collections, current program priorities, the Long-Range Data Preservation Plan, and future program objectives

**Table 1. DPAC Members and Affiliations:**

<b>Committee Member Name</b>	<b>Title</b>	<b>Organization</b>	<b>Contact Information</b>
Brian Fowler	President/CEO	Fowler Management Resources	<a href="mailto:B2FMR@metrocast.net">B2FMR@metrocast.net</a>
Wally Bothner	Professor	UNH-Department of Earth Sciences	<a href="mailto:Wally.bothner@unh.edu">Wally.bothner@unh.edu</a>
Gary Johnson	Professor	Dartmouth College - Department of Earth Sciences	<a href="mailto:Gary.d.johnson@dartmouth.edu">Gary.d.johnson@dartmouth.edu</a>
Thompson Davis	Professor	Bentley University - Dept. of Natural and Applied Science	<a href="mailto:pdavis@bentley.edu">pdavis@bentley.edu</a>
Krystle Pelham	Engineering Geologist	Department of Transportation – Bureau of Materials and Research	<a href="mailto:kpelham@dot.state.nh.us">kpelham@dot.state.nh.us</a>

## **4.0 Goals**

Funding through the NGGDPP has been critical in supporting NHGS geologic data preservation goals during the past three grant years. Program priorities set by NHGS for FY 2009 were met. However, NHGS is aware that goals, such as metadata creation for individual samples, established for FY 2009 are ongoing.

For NGGDPP FY2010 grant year, NHGS is focusing on three program priorities: (1) Inventory collections of geological and geophysical data, (2) Create metadata for individual items in those data collections, and (3) Create or update digital infrastructure. The goals include individual inventories of the cores, well borehole videos, and strategic mineral maps, and completion of the on-line survey after investigation and characterization of the collections have been made. Metadata will be created for the 195 well cuttings and select well completion reports, and then submitted to the USGS NDC in CSV format according to the NGGDPP guidelines. In addition, the NHGS will continue to convert well records from paper to digital format for wells in the Seacoast Region. Metadata for these records will also be created and submitted as described above. A technical report summarizing NHGS' efforts will be submitted within 90 days of completion of the grant period.

Additional goals for FY2010 include the continuous entering of new collections into the USGS Inventory of Geologic and Geophysical Collections, increasing public access to our geoscience data collections (including making digitally preserved items web accessible), working with DPAC to improve program implementation and enhance geologic data acquisition, and securing appropriate long-term storage for physical collections. These goals have been outlined in the NHGS Long-Range Data Preservation Plan and will continue to be ongoing efforts in future grant years.

## **5.0 Conclusion**

Requirements set by USGS for NHGS FY2009 Data Preservation Grant were fulfilled. The NHGS currently has thousands of individual items entered as 6 separate collections in the USGS Inventory of Geologic and Geophysical Collections. Moving forward with data preservation efforts, NHGS will continue to focus on program priorities, such as creating digital infrastructure for these collections at an individual level, and meeting the objectives in our long-range data preservation plan.

## **References**

Lyons, J.B, Bothner, W.A., Moench, R.H, and Thompson, J.B., 1997, Bedrock Geologic Map of New Hampshire, U.S. Geological Survey, Reston, VA, 2 sheets, scale 1:250,000.