National Geological and Geophysical Data Preservation Program
Fiscal Year 2010

Final Technical Report
for

Inventory, Metadata, and Preliminary Digital Infrastructure Development for Selected Ohio Division of Geological Survey Sample and Paper Collections

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Abstract

The Energy Policy Act of 2005 mandates the U.S. Geological Survey to implement a National Geological and Geophysical Data Preservation Program to inventory, archive, and preserve geologic and geophysical data collected over the past 150 years. With financial assistance from U.S. Geological Survey Grant G10AP00118 proposal 2010-0016, the Ohio Department of Natural Resources (ODNR), Division of Geological Survey (or Ohio Geological Survey) completed comprehensive inventories for two major collections currently housed at its H. R. Collins Laboratory (HRCL). The completed collection inventories include the Dr. Thomas Lewis Collection (TLC) of Lake Erie bottom sediments and onshore samples and the Ohio Geological Survey collection of Environmental Impact Statements (EIS), including lithology logs for Ohio River boring record collection. For the Ohio River boring collection, site-specific metadata for 414 borings has been uploaded to the National Catalog. Collection metadata and ACCESS databases were provided for the 6,932 samples and paper records of the TLC and the Ohio Geological Survey-EIS collection.

The Ohio Geological Survey was unable to capture site-specific metadata for these collections because paper records containing this information were initially lost and only recently found. Also, limited funding did not allow extensive searches of existing hard-copy records to find location data for some TLC samples. Finally, the inventory of the EIS collection revealed that new geologic information was very limited and often lacked the necessary location maps or coordinate data. The Ohio Geological Survey is continuing to capture the location data for the records in the TLC and EIS collection lacking this information.

Introduction

In the mid 1980s, the Ohio Geological Survey began work to include all paper inventories and records from physical sample, derived geoscience collections, and indirect geoscience collections into a digital catalog of databases and user-friendly web-based maps. Since June 2005, a major effort has been underway to inventory and develop ACCESS databases for the 15 major geoscience collections housed at the HRCL. Cooperative efforts with the USGS and funding provided by USGS Grant 07HQGR0145, proposal 0024 (2007); Grant 08HQGR0106-0007 (2008); and Grant 09AP00094-0006 (2009) have assisted the Ohio Geological Survey in completing inventories and ACCESS databases for 13 of the 15 collections. The USGS Grant G10AP00118-2010, proposal 0016 provided funds to assist the Ohio Geological Survey in completing inventories for the TLC and the Ohio Geological Survey-EIS collection, including lithology logs from Ohio River borings (table 1).

Goals Accomplished

The Ohio Geological Survey completed comprehensive inventories, ACCESS databases, and metadata for the TLC and the Ohio Geological Survey-EIS collection. A total of 7,599 records were entered into three ACCESS databases, which have been reviewed and edited to ensure that reliable information was entered. Copies of the databases and limited site-specific metadata were provided to the USGS to be incorporated into the National Digital Catalog.

The first phase of the Ohio Geological Survey Long-Range Data-Preservation Plan is now complete with the production of inventories of the TLC and EIS collection (table 2).

Dr. Thomas Lewis Collection (TLC)

The TLC is a large collection consisting of 6,932 shoreline, beach ridge, and lake/harbor bottom samples collected from surface exposures and core. Dr. Lewis taught geology at Cleveland State University and had a life-long interest in Lake Erie geology and processes.

Grain size and heavy- and light-mineral composition analyses were conducted for the samples, and grain mounts were produced for select samples. The current inventory of the TLC provides information that includes storage box number, sample numbers, sample descriptions, sample size, geographical location data for each sample (state, county, and/or topographic sheet), and miscellaneous notes. Hard-copy location maps and location data tables are reported to exist, but to date these records have not been found in the extensive records of the Lake Erie Data Center.

Over 200 beach and dune samples from the shorelines of Lake Erie are included in the TLC. Forty six beach ridge samples are available, as are 150 sand samples, from Ohio waters between Mouse Island and Locust Point. Additional samples include over 60 bottom-sediment samples collected off Fairport Harbor, Ohio, and 100 splits from vibratory core collected in Lake Erie waters of Ohio and off Erie, Pennsylvania.

The TLC corresponds to areas of particular interest to the Ohio Geological Survey, including areas of wind turbine development, beach nourishment, urban development, and beach contamination issues. Bottom sediment samples and information are critical in our understanding of Lake Erie's substrate and help to verify data obtained by sidescan sonar and other geophysical-data collection methods.

Ohio Geological Survey - Environmental Impact Statement (EIS) Collection

Included in the Ohio Geological Survey-EIS collection is a collection of paper charts of the Ohio River and adjacent floodplains prepared by the U.S. Army-Corps of Engineers under the supervision of the Ohio River Board of Engineers. The charts were produced between 1911 and 1914 and based on detailed surveys of the Ohio River from Pittsburgh to junction with the Mississippi River. The charts were published in 1914 and 1915 and then revised in 1930. Each chart shows the location of locks and dams, Ohio River bathymetry, topographic elevations, cultural and navigational features, land use, property owners, lithologic composition of river bank and bar sediments, and subsurface lithologic data, and in some cases, bedrock elevations. Many charts contain the location of river bank and river bottom borings and lithology logs for each boring. All borings are numbered from the Ohio River left bank to the right bank and occur in a line perpendicular to river flow direction. Boring top and bottom elevations were determined from the low-water slope of the Ohio River Surveys of 1896–1906. Latitude and longitude coordinates, referred to the North American datum, were derived by connecting with primary triangulation stations established by other government bureaus.

A total of 503 boring logs were inventoried from 74 charts located in the states of Ohio, West Virginia, and Kentucky. Eighty-nine boring logs were inventoried as part of USGS Grant 09AP00094-0006 (2009), and the remaining 414 boring logs were inventoried as part of USGS Grant G10AP00118-2010, proposal 0016.

The Ohio Geological Survey assigned each boring a unique number consisting of the chart number, range numbers provided on each sheet, and the boring number. Each chart was scanned using an 800:1 ratio in a black-and-white spectrum. Using a Digital Raster Graphic (DRG) topographic map as a base map, each chart was matched to the same projection and minute marks of the base map using ESRI ArcMap software. Each chart was georeferenced to the base map by referencing each intersection of the latitude and longitude lines with the estimated average accuracy of plus or minus 6 feet. Once each chart was georeferenced, the coordinates of each boring were determined and entered into the inventory database. Data captured from each lithology log includes: low-water elevation determined by the Ohio River Survey of 1896–1906; elevation of boring top and bottom; elevation of the bedrock, if present; unconsolidated sediment lithology; and bedrock lithologies.

The remainder of the Ohio Geological Survey-EIS collection consists of 253 folders of paper records of EIS reviewed by the Ohio Geological Survey staff between 1960 and 1989. The inventory of these folders focused on what, if any, geologic data is available for digital capture. The majority of the geologic data available consisted of geologic summaries of the existing data pertaining to the site; preexisting published geologic maps, cross sections, and core and measured sections descriptions and logs; and limited new data obtained through drilling or geological/geophysical investigations of a site.

The Ohio Geological Survey plans to reorganize this collection to capture the very limited amount of new geologic data in ACCESS databases and capture coordinate data for these boring lithology logs. And future plans include scanning this information and making these images available to the public.

Web Site Update

During Federal Fiscal Year 2010, minor revisions were completed to the Horace R. Collins Laboratory group of web pages. Ongoing deep budget cuts resulted in a change in Ohio Geological Survey policy from providing free services to Laboratory users to charging for many services provided for users of the Sample Repository. A “Compensation for Services” table was added to our web site outlining these charges. (Go to: http://www.ohiodnr.com/OhioGeologicalSurvey/HoraceRCollinsLaboratory/tabid/7943/Default.aspx for a summary.) Likewise, ongoing deep budget cuts have limited available funding to activate links to some 15 collections inventoried as part of USGS Grants ranging from 2005 to 2010. The Ohio Geological Survey is hopeful that additional funding sources will be found that will allow a limited number of inventories to be available for public use.

Advisory Committee

On August 24, 2010, the Ohio Geological Survey hosted the third meeting of the HRCL advisory committee. The committee reviewed and provided insight to improve our 2010 NGGDPP Grant proposal (USGS Grant G10AP00118-0016) and provided guidance for future grant proposals. Other topics discussed included plans for two core workshops that were held on April 20 and 25, 2011, and additional sources of funding to help offset reduced funding because of ongoing budget reductions.

Goals to be Accomplished

As previously stated, the Ohio Geological Survey recently located paper location maps for some of the samples of the Thomas Lewis Collection. Efforts are underway to capture the coordinates for these samples and as many samples as possible from this collection. Once the ACCESS database is populated with coordinate data, the Ohio Geological Survey will upload the revised database to the National Digital Catalog.

The Ohio Geological Survey plans to reorganize the Environmental Impact Statement collection by removing the records that contain new geologic information from the existing collection and then alphabetizing these folders. Attempts will be made to capture the coordinate data for the records. If successful, the resulting metadata will be uploaded to the National Digital Catalog.

TABLE 1.—*Collections housed at the Ohio Geological Survey H. R. Collins Laboratory (HRCL) and a summary of the collection inventories and metadata completed as part of the National Geological and Geophysical Data Preservation Program*

FY 2007 Grant 07HQGR0145-0024 (completed)

5,000-well sample suite that includes 1,175 duplicate well sample suites
845 rock core totaling over 300,000 feet
600 well sample strip logs

FY 2008 Grant 08HQGR0106-0007

54,009 USGS and USDA aerial photographs flown from 1949 through 1979
8,650 samples of unconsolidated Cenozoic-age sediments
6,205 seismogram tracings recording earthquake events
3,428 lithology strip logs of cores, oil and gas wells, and measured sections
2,627 geochemical analysis records for economic carbonate deposits and coal beds
353 thin sections
241 sidewall core or core plugs
199 oil samples from Ohio's producing horizons

FY 2009 Grant 09AP00094-0006

<u>Lake Erie soft-sediment core and grab samples</u>

37 Lake Erie vibracores
736 Coastal Engineering Research Center core samples
1,318 miscellaneous soft-sediment core and grab samples from 1974 through 2005

<u>Lake Erie Data Center paper records and maps</u>

2,778 Lake Erie bottom-sediment records entered in database

<u>Sand-and-gravel resource investigations</u>

68 county sand-and-gravel data file inventories
186 reports detailing sand-and-gravel samples geology and quality
270 pebble count analyses for samples collected from 10 Ohio counties
629 sieve analyses for samples collected from 12 Ohio counties

Environmental impact statements
89 Ohio River boring records from engineering reports dating from 1911 through 1914

FY 2010 Grant G10AP00118-0016

Lake Erie Data Center
6,932 samples inventoried from the Dr. Thomas Lewis collection
Tom Lewis collection location data capture from paper records and maps (in progress)
No scanned paper records because budget cuts negated purchase of HRCL scanner
Environmental impact statements
414 Ohio River boring records from engineering reports dating from 1911 through 1914, in addition to the 89 records inventoried during grant 09PA00094-0006
253 folders, only 21 folders contain boring logs or data

TABLE 2.—*The Ohio Geological Survey Long-Range Data-Preservation Plan, status*

Phase 1: Collection inventory and core box preservation - **Complete**

Goal 1 – **Completed July 2008.** Replacement of oversized and/or deteriorating core boxes with 2,966 new cardboard core boxes. The reboxing project resulted in the long-term preservation of 7,395 meters (m; 24,265 feet [ft]) of core. Also, this effort opened additional shelf space for the storage of 1,158 m (3,800 ft) of core in space that was previously being wasted by storing small-diameter core in oversized core boxes.

Goal 2 – **Completed June 2011.** Digital inventories, ACCESS databases, and metadata compatible to the National Digital Catalog of Archived Materials for some major collections housed at the Horace R. Collins Laboratory. Collections include:

Well samples
Rock cores
Well sample strip logs
Aerial photographs flown from 1950 through 1979
Unconsolidated Cenozoic-age sediments
Seismogram tracings recording earthquake events
Lithology strip logs of cores, oil and gas wells, and measured sections
Geochemical analysis records for economic carbonate and coal samples
Thin sections
Sidewall core or core plugs
Oil samples from Ohio's producing horizons
Lake Erie soft-sediment core and grab samples
Lake Erie Data Center of paper records and maps
Sand-and-gravel resource investigations
Environmental impact statements

Phase 2: Digital conversion of paper collections to digital formats

Goal 3 – Scan paper documents in digital format and make available to public utilizing Ohio Geological Survey website. Collections to be scanned:

Geochemical analysis records
Selected Lake Erie Data Center paper records
Lithology strip logs
Seismogram tracings
Aerial photographs

Phase 3: Repository and staff expansion

Goal 4 – Convert existing Ohio Geological Survey drilling support warehouse into additional core and sample collection storage space with the purchase of new shelving.

Goal 5 – Purchase a climate control system for improved moisture control in collection storage areas.

Goal 6 – Hire one full-time geologist to assist repository coordinator with repository operations and maintenance, geologic research, and public outreach.