

National Geological and Geophysical Data Preservation Program
Final Technical Report for FY 2013

Inventory and Digital Infrastructure of Historic Louisiana Geological Map Data

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Abstract

During the FY 2013 phase of the National Geological and Geophysical Preservation Program (NGGDPP), the Louisiana Geological Survey (LGS) directly addressed two of the program priorities: creating an inventory of the LGS historic geologic map collection and improving upon the state and national digital map infrastructure.

Thousands of published and unpublished geologic maps, cross-sections, sample site maps, and other geo-data dating back over a century exist in LGS cartographic storage rooms. This un-indexed material consists of lithographic prints, working drafts, historic reference maps, and many original manuscripts on linen, vellum, positive and negative film, contact prints, and even some metal plates.

The LGS inventory team continued an effort to systematically conduct a proper inventory, assess the quantity, condition, and importance of the material, and catalog retained items into a relational database. A catalog record for each document was prepared and the on-line inventory completed on the Data Preservation website.

The LGS digital infrastructure team handled the maps, cross-sections, and geologic diagrams selected by the inventory team as candidates for digitization. Items were scanned at high resolution, post-processed in Photoshop, and metadata records were prepared and uploaded to the National Digital Catalog portal.

Introduction

The Louisiana Geological Survey (LGS) has completed requirements set by the National Geological and Geophysical Data Preservation Program (NGGDPP) for FY2013. The primary priorities of this grant were to create a cataloged inventory of the LGS historic map collection and to enhance the national digital infrastructure by digitizing maps and other geologic documents. This Final

Technical Report describes FY 2013 project details and includes LGS objectives for the FY 2014 grant period.

Background: The Louisiana Geological Survey (LGS) has been in existence since 1934 and predecessor agencies go back to the 1860's. Published and unpublished maps dating back to the 1870's exist in LGS cartographic storage rooms and much data has been retained by generations of cartographers. A wealth of geologic and topographic data exists in this material which consists of lithographic publications, working drafts, historic reference maps, and many original manuscripts on linen, vellum, positive and negative film, contact prints, and even some metal plates. Much of this data is from publications long out of print and some are unpublished manuscripts unknown to the research community.

Unfortunately, while much of this data has been fastidiously preserved and kept in climate controlled storage, over 100 years of agency changes and at least five major moves to different buildings on campus since 1934 have resulted in a collection that is almost unusable due to an inadequate inventory and proper cataloging of the material. Most of it exists in many hundreds of un-indexed tubes and dozens of flat and vertical filing cabinets.

In FY 2010 the LGS completed a NGGDPP project to begin the inventory and digital infrastructure acquisition of this archival material. Year one saw the assessment of material stored in map tubes and map racks. The items from the Collection Inventory effort were assessed for geologic importance, potential for use, and physical condition. Approximately 175 items were reference maps or other proprietary, copyrighted material that was deemed inappropriate for LGS to scan and make available. 190 were deemed to be unsuitable for scanning, such as color separates and a few extremely fragile items. 175 others were deemed to be of subject matter unlikely to be widely used. 39 were maps from other agencies that were already available online. 2,500 items were assessed, 1,000 superfluous, damaged, or otherwise unusable items were discarded, and accounting for 900 duplicates, 579 items were cataloged in the database. 103 map and cross-section documents were scanned, processed, and digitally archived.

This effort was continued in FY 2011 with a project to inventory and scan the material stored in large fireproof vertical files. Approximately 2,300 total items were assessed. After discarding 1,000 superfluous, damaged, or otherwise unusable items, and accounting for 804 duplicates, 496 items were cataloged in the database. 178 were deemed to be unsuitable for scanning, such as color separates and a few extremely fragile items. 150 others were deemed to be of subject matter unlikely to be widely used. 249 map and cross-section documents were scanned, processed, and digitally archived.

Objective: The objective of the FY 2013 effort was to continue to systematically inventory, catalog, and archive this valuable map data in order to make it searchable and accessible to the public. We believed this effort to be compatible with the FY2013 Program Priorities in the categories: 1—Collection Inventories and 3—Digital Infrastructure. All tube-storage items were dealt with in Year 1. The Year 2 effort was to inventory and scan the material in large fireproof vertical files. This FY 2013 effort was to continue the project by inventorying and assessing map material stored in flat map filing cabinets.

Since it is difficult to predict the quantity, condition, and importance of the data until it was inventoried, the principle endeavor was to conduct a proper inventory and catalog it to National Digital Catalog standards. Far less than 100% of the data was suitable for digital capture and metadata production, but an effort to continue that process on the most fragile and valuable maps was included.

Team: The LGS staff team involved in this effort was John Snead, Patrick O’Neill, Reed Bourgeois, and student assistant Carl Salo.

Key tasks

In September 2013, LGS received funding under NCGDPP Award G13AP00091 to continue the inventory of the historic geological map collection and enhance the digital infrastructure of state geological maps. The existing collection is stored in many hundreds of un-indexed tubes and dozens of flat drawer cabinets and vertical map filing cabinets. Both surface and subsurface geologic maps are included, many cross-sections and profiles, oil and gas maps, mineral resource maps, water resource maps, sample locations, and other geologic data including hand-drawn foraminifera and other fossil illustrations. This material meets the objectives of the NCGDPP: (1) Archive geologic, geophysical, and engineering data, maps, well logs, and samples; and (2) Provide a national catalog of such archival material.

Collection Inventory Methodology

A five-task process was performed on each record selected for the collection inventory effort:

- 1. Carefully examined each folder** in the non-inventoried collection. Many contained multiple documents and some contained fragile documents. Each document was assessed initially for condition and technical significance for retention in the LGS Geological Map Archives.
- 2. Discarded items that did not meet the criteria for retention.** Some fragile, old documents have crumbled, deteriorated, darkened, or faded completely and are past conserving. They have been disposed of or set aside for conservation if valuable. Duplicate documents and documents not appropriate to the LGS Geological Map Archives have been noted and will be offered to other archives and map libraries.
- 3. Assigned an inventory control number** to each retained document. A small sticker with an ICN was affixed to each document.
- 4. Created a catalog record** for each retained document, gathering title, author, date, publisher, scale, storage unit, condition, media type, document type, size, and other data will be determined from the map keys and title blocks or from labels attached to their original storage tubes and folders. A short description was created for untitled documents and keywords for each document were entered based on assessment of the item. These records were created in a Filemaker Pro relational database.

5. Selected maps and diagrams for digitization. Certain maps were deemed candidates for inclusion in the digital infrastructure effort and were set aside to be scanned and processed.

Digital Infrastructure Methodology

A five-task process was performed on each document selected for digital conversion:

1. Assessed the candidate document for geologic importance, potential for use, and physical condition using the information from the inventory and cataloging effort. The items were prioritized based on this information with emphasis given to first preserving the most fragile items.

2. Prepared the physical documents for scanning by carefully removing them from their drawers and folders. Items that have been folded for sometimes needed several days of flattening on large tables to flatten the ridge in the media before scanning. The most fragile items were scanned on the large flatbed scanner and digitally merged when needed.

3. Scanned the original document using the 54" or 56" roller-fed scanners or the 18 x 24" flatbed scanner as was most appropriate, scanning at the maximum resolution at 100% size for archival copies. Returned the original to its designated new storage medium.

4. Post-processed the scanned image digitally to enhance the contrast, brightness, sharpness, levels, and color balance; rotated and cropped as is appropriate, and removed digital artifacts from the image. Saved the image both as a lossless TIFF file and as a compressed JPEG file in the archive.

5. Prepared a metadata record using the inventory catalog information and information from the digital conversion effort. Used the template provided by the NCGDPP to produce the file format that will import into the National Digital Catalog portal. Saved a metadata file to accompany the data files in the archive.

Results

Collection Inventory effort

The collection inventory effort successfully assessed and inventoried the entire map archives that were stored in folders within flat drawers in map cabinets. Approximately 240 drawers in over 40 map cabinets examined.

One of the surprises of the effort was the sheer number of items discovered in many individual folders. Some folders held as many as 60 items. Approximately 2,400 total items were assessed. Another roughly 1000 items consisting of multiple duplicate copies of published publications were inventoried but not assessed for inclusion into the index.

Many of the items cataloged in this years effort were hand-drawn manuscripts consisting of india ink drawings on linen, vellum, and mylar film; hand-scribed negative engraving on coated mylar film; “stick-up” type and artwork on film; and hand-colored drafts on bond and vellum.

There were a large number of items that were discarded due to deterioration or otherwise not appropriate for indexing, approximately 1,650. Many of these were a large number of superseded drafts, authors’ worksheets, rough notes, field sketches, un-cited drawings, and other work-up material unsuitable for archiving. These were also discarded or returned to their authors, if still living. Many discards were very old blue-line and van-dyke positives and negatives (many in duplicate) that had faded or darkened to the point of uselessness. Fortunately, most of these were duplicates of a manuscript original or a film positive or negative that was retained and was suitable for inventory. Many other hand-drawn drafts were found to be of good quality and of geologic or historical interest and were retained but not included in the index database due to the lack of provenance for much of this material.

After assessing the 1,750 selected items, discarding 820 superfluous, damaged, or otherwise unusable items, and accounting for a retained 497 draft manuscripts, 383 significant items were cataloged into the database.

Among the records were:

- 330** manuscripts
- 46** photographic positive and negative film reproductions
- 3** multicolored lithographs
- 3** Diazo prints
- 1** monochrome lithograph

Among the types noted were:

- 202** geologic diagrams, columns, sections and other geologic illustrations
- 109** subsurface structure maps
- 43** large geologic cross-sections
- 14** base maps
- 6** salt dome maps
- 5** index maps
- 4** surface geologic maps

Digital Infrastructure effort

The digital infrastructure effort successfully scanned maps and sections and created metadata records of the inventoried items deemed relevant and useful for digitization.

The 383 items from the Collection Inventory effort were assessed for geologic importance, potential for use, and physical condition. 17 were deemed to be unsuitable for scanning, such as color

separates, fragility or material unlikely to be graphically useful. 366 map and cross-section documents were scanned, processed, and digitally archived.

Metadata records for these documents were developed by processing the Collection Inventory relational database records. A subset database of the Digital Infrastructure documents was created with the following fields as required by the NCGDPP: *collectionID*, *title*, *abstract*, *dataType*, *supplementalInformation*, *coordinates*, and *datasetReferenceDate*. After a 2012 discussion with Richard Brown of USGS – Core Science Systems, we added an optional field, *alternateGeometry*, in which to indicate that the scan files of the 366 digital documents were not georeferenced.

Coordinates were left with null values, because the document scans were not georeferenced. In the future, as each image is georeferenced the associated NDC record will be updated to indicate the coordinates. *CollectionID* was left with null values at Richard Brown’s suggestion that the appropriate collection identification would be automatically generated during the uploading process. A generalized referral to the LGS website was entered for all records in the *supplementalInformation* field. All other fields were populated within the subset database by either copying a field originating from the Collection Inventory database or concatenating a number of fields. A sample metadata record follows.

collectionID: <Null>

title: DOCUMENT ID: LGS-IDB-1222 TITLE: Northeast Louisiana and Southeast Arkansas Showing Successive Course of the Arkansas River (Plate 2) from Geological Bulletin No. 25 The Geology of Desoto and Red River Parishes DATE: 1952

abstract: DOCUMENT TITLE: Northeast Louisiana and Southeast Arkansas Showing Successive Course of the Arkansas River DATE: 1952 AUTHOR/S: Wang, K. K. SCALE: 1 = 10 Miles Publisher: US Geological Survey

dataType: manuscript

supplementalInformation: Map Repository managed by the Cartographic Section of the Louisiana Geological Survey. Contact information can be found at <http://www.lgs.lsu.edu/>

coordinates: <Null>

datasetReferenceDate: 2013-07

alternateGeometry: Not georeferenced

After final review, the Digital Inventory Database metadata records were translated into comma separated value (csv) format and emailed on October 15, 2014 to Natalie Latysh and Tamar Norkin to be uploaded into the National Digital Catalog.

Summary and objectives for future work

This year's project successfully assessed and inventoried all of the LGS map archival material that was stored in map drawers and flat map cabinets. A database of selected document records was created. A further selection of documents was scanned and digitally archived with metadata file uploaded to USGS.

Earlier NGGDPP projects prepared by the LGS involved cataloging core and well logs in the LGS core repository. The FY 2010 project was the first to catalog historic geologic map data in the cartographic section map repository. A new collection was added to the LGS on-line inventory form at the Data Preservation website, collection ID P1276. Seven question pages were completed during the revision. The new collection information added:

Type of = Historic Louisiana geologic map collection

Category = maps

Current media = physical

Units of measure = items

Amount = 2900

This information was updated as appropriate for the current project.

Remaining to be inventoried and digitally archived are several hundred LGS textual geologic publications dating back to 1905, some long out of print. A 2014 NGGDPP proposal for the collection inventory and digital infrastructure of these books, booklets, and brochures, and was submitted and accepted.

Also remaining to be assessed and inventoried is the LGS map archival material stored in various map racks and map cabinets outside of the Cartographic Section collection. The existence and the quantity of this material came to light during the initial NGGDPP inventories. Many of these are older project material that has been retained in storage rooms, the core log facility, various laboratories, and research offices. A rough assessment of the quantity and scope of this material is being conducted for possible future NGGDPP consideration.

Data preservation

Project data management and preservation: The digital inventory created by this project is in the form of a Filemaker Pro database. Currently this data is offline, but a new website is being prepared for the LGS and plans are being made to incorporate this data into the new site's data retrieval component.

The scanned documents and metadata files were saved in TIFF format, full scale at 400 DPI. Currently this data is also offline, but will be a part of the new website.

The database, digital files, and metadata files prepared by this project are stored on two external hard disk drives with additional copies on two LGS servers. Standard LGS protocols for backup and

security are in place. In time the data will also reside on the university's planned Institutional Repository and enjoy full web access with NSF-compatible, professional data management and preservation protocols.

Long-term strategy for data preservation: The project addressed the initial data preservation plans that the Louisiana Geological Survey and Louisiana State University (LSU) seeks to implement. These goals, for the map repository, are to inventory, assess, catalog, conserve, and archive both physical and digital geologic map data. The initial milestone was to complete an inventory of the collection to assess the remaining effort in terms of the quantity of items, physical condition of the items, value of certain historic prints, and the importance of the geologic data. The second milestone was the acquisition of digital copies of all appropriate items.

The long-term strategy is the integration of LGS digital map documents into a preservation scheme compatible with that of the University. LSU's scheme is undergoing evaluation to comply with the National Science Foundation's (NSF) data management mandate. The LSU Center for Computation and Technology has established a web-based Institutional Repository that is considered the best way to meet the goals of campus libraries and research institutes and to satisfy requirements for data management and preservation. When fully implemented, the LGS digital data will become part of the LSU Institutional Repository.