RESOURCE ASSESSMENT SERVICE
MARYLAND GEOLOGICAL SURVEY
Jeffrey P. Halka, Acting Director

COASTAL AND ESTUARINE GEOLOGY
FILE REPORT NO. 09-04

Inventory of Geological Data and Collections at the Maryland Geological Survey

by

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Partial funding for this study was provided by a grant from the U.S. Geological Survey, National Geological and Geophysical Data Preservation Program (NGGDPP)
Award Number: 08HQGR0117
Award Period: September 1, 2008 – August 31, 2009

September 2009

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ACKNOWLEDGMENTS

We the authors wish to thank, first and foremost, the scientific and technical staff at MGS who, despite mutterings to the contrary, willingly recorded the collection-related information stored in their heads. The project would have been impossible without their cooperation. We also appreciate Director Jeff Halka's enthusiasm for the project and his willingness to lend the (as it turned out, unneeded) strong arm of his support. At NGGDPP, Frances Pierce, on more than one occasion, lent a sympathetic ear to our problems and helped us to work through them more effectively.

ABSTRACT

The Maryland Geological Survey (MGS) shares the concerns of other agencies and organizations engaged in geological research – that geoscience collections and data are valuable in their own right, beyond the lifetime of the projects during which they are collected or acquired, and that special efforts are required to preserve them.

In its initial efforts to systematize the preservation of its geological holdings, MGS (1) apprised its scientific and technical staff of the need and reasons for data preservation, the status of data preservation at the Survey, and the role of MGS vis-à-vis the national data preservation efforts, (2) identified and broadly described the geoscience collections and data currently in its possession and (3) entered information about the nature, size, condition, and accessibility of its 26 permanent collections into both a newly developed internal database and the NGGDPP's Collections Inventory of the National Catalog.

Over the course of the past year, MGS evaluated repository infrastructure and collection storage, condition, access and usage. In the process the Survey managed to match its collections to NGGDPP's collection categories, fully justified the need for an internal data preservation database, and began to understand some of the challenges posed by systematic data preservation. In short, MGS has completed the first steps in building what it hopes will become a first-rate repository that effectively serves the larger geoscience community in Maryland and beyond.

INTRODUCTION

The Maryland Geological Survey (MGS) shares the concerns of other agencies and organizations engaged in geological research – that geoscience collections and data are valuable in their own right, beyond the lifetime of the projects during which they are collected or acquired, and that special efforts are required to preserve them.

Over the course of one year, beginning in September 2008, MGS, in compliance with the terms of a grant awarded by the National Geological and Geophysical Data Preservation Program (NGGDPP), (1) identified and broadly described the geoscience collections and data currently in its possession and (2) entered information about the nature, size, condition, and accessibility of those collections and data deemed "permanent" into the Collections Inventory of the National Catalog. Independently of those activities, MGS also developed a long-range data preservation plan for its physical collections. Although the plan was not among the funded products of this year's NGGDPP grant, some of the findings and lessons learned presented below were informed by the writing of the plan.

BACKGROUND

Maryland is a relatively small, densely-populated state, with a land area of 9,844 square miles, a water area of 623 square miles, and an estimated population of 5.6 million people

(MGS, 2007; U.S. Census Bureau, 2006). The state straddles six geologically diverse physiographic provinces, from the Appalachian Plateau to the Atlantic Continental Shelf, and contains an extensive network of tidal streams and bays, most notably northern Chesapeake Bay. The Atlantic Ocean forms its eastern border.

The state geological survey has been in existence since 1896. The types of geoscience collections held by MGS reflect its mission, as it has changed over the past 113 years. Current research is focused on the geological underpinnings and groundwater resources of the State. However, MGS has retained several collections from the past, when the interests of its staff and the needs of Maryland's citizenry were different than they are today. For instance, although the Survey is no longer actively engaged in paleontological research, MGS has a macrofossil collection that numbers in the hundreds of specimens. As a consequence of its longevity and diverse activities, MGS possesses a wide array of holdings in a variety of formats.

MGS is in the early stages of grappling with the long-term preservation of its data and collections in a formalized, systematic way. Typically, MGS researchers work with other government agencies or academic institutions on projects that are tied to funding sources and are designed to meet particular objectives. Usually, the principal investigator (PI) of a project is responsible for maintaining the physical and derived or indirect data collected as part of that project. When several PIs from one of the Survey's programs collect similar kinds of data (e.g., well logs, bay bottom sediment cores), the program may establish a repository and perhaps a paper or digital catalog to facilitate access. But, in general, there are no Survey-wide provisions to preserve data. At the start of this study, the Survey's catalog of collections resided mainly in the minds of its staff members.

OBJECTIVES

Designed to stimulate MGS's progress in data preservation, the six objectives of the 2008 NGGDPP project, as outlined in the proposal, were as follows:

1. Convene a meeting to apprise the scientific staff at MGS of the importance of data preservation, the objectives of the proposed project, and the role of staff members in meeting those objectives.
2. Through questionnaires and/or personal interviews with Survey staff, primarily the program chiefs of the Hydrogeology & Hydrology and the Coastal & Environmental Geology Programs, identify the nature (e.g., physical specimens, paper reports or maps, digital data) and whereabouts of geologic data and collections held by MGS.
3. Inventory MGS's collections to determine their size, condition, and accessibility.
4. Develop an internal database that mirrors the National Catalog but contains additional information (e.g., the location of the collection/data within MGS; the program and person(s) responsible for its maintenance) for both permanent and semi-permanent collections.

5. For each of the permanent collections, submit collection records to the Collections Inventory of the National Catalog.
6. Submit a final report to the NGGDPP.

METHODS

Because of the variety and number of collections and data sets held by the Survey, the authors felt that the simplest approach to cataloguing would be to (a) distribute questionnaires to the individuals who know the most about each collection or data set and then (b) meet with each group separately to review their responses and to discover where items in the collection are kept. When necessary, the authors then counted or otherwise measured the items in each collection.

MGS followed these steps in the process, in approximately chronological order:

- The authors distributed an initial list of holdings, included as an appendix in the MGS proposal, to the two program chiefs and asked them designate the staff members who would be responsible for answering questions about each collection or data set. For collections and data sets with two or more "owners," one person was named as group leader. For some of the collections, like maps, reports, and photos, individual researchers hold many of the items that comprise the collections. For those, each program chief was responsible for polling his own staff as to the numbers and types of individually-held items that would eventually become part of an MGS collection. (The latter exercise provided an indication of the need for protocols for the formal transfer of items collected, created, or acquired by individual staff members to permanent MGS collections.)
- The authors developed a questionnaire (Microsoft Word format) based on the fields included in the National Catalog, with a few additional fields for MGS's use (e.g., the names of people most knowledgeable about a collection; the current location within MGS of items comprising a collection, the names of people outside of MGS who might be familiar enough with the collection to be included on a Data Preservation Advisory Panel) (see Appendix 1).
- The authors held a Survey-wide meeting, announced and introduced by the Director, to discuss the need for data preservation, the terms of the grant, and the role of staff members in the process. (The PowerPoint presentation created for the meeting is available upon request.) At the end of that meeting, the authors distributed the assignment list and one questionnaire per collection/data set to the appropriate individual or group lead. For collections with which one or two people were familiar, a two-week deadline was set for completion of the questionnaires. In the case of larger groups, the authors suggested that the group leader convene a meeting with other members of the group to complete either a single or multiple questionnaires. For collections scattered throughout MGS, like reports and photographs, a four-week deadline for questionnaire completion was set. (At the end of this meeting, one of the Survey geologists asked the presenter, half jokingly, "So, how does it feel to be the most hated person at MGS?")

- Within two-four weeks of the meeting, MGS staff had completed most of the questionnaires. The authors entered information about each collection into a newly created internal Microsoft Access database, DataPreservation.mdb. (See Appendix 2 for a description of the structure of the database.) Because the number of permanent collections was small, MGS entered information about each of them into the National Catalog by hand, as opposed to supplying the NGGDPP with a digital file.

FINDINGS

THE MGS REPOSITORY - INFRASTRUCTURE

Current Infrastructure

MGS currently stores its data and collections in two separate places – its main office in Baltimore, Md., and a warehouse 40 miles away at a Maryland Department of Natural Resources facility in Matapeake, Md. (Fig. 1).

Baltimore

MGS's main office is located in a renovated, climate-controlled, stone edifice built in 1888 as a college gymnasium. The four-story building, 33,000 ft^2 in size, consists of two wings – the main building and the annex – connected by a bridge that spans the alleyway separating them. Its function as a repository for most of MGS's data and collections is secondary to its use as office space. It contains staff offices, conference rooms, a publication sales office, libraries, laboratories, and storage areas. One small room, in which original MGS publications are stored, is protected by a fire suppression system.

(a) (b)

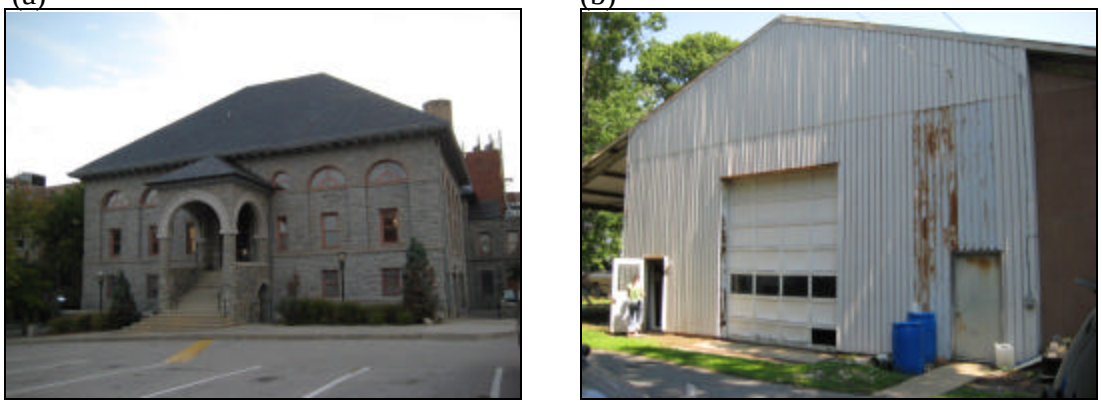

Figure 1: MGS's geoscience holdings are stored in (a) its main office building in Baltimore, Md., and (b) a storage building in Matapeake, Md.

A variety of data and collections is scattered throughout the building – in individuals' offices, in a number common rooms (e.g., library, lobby, storage rooms), and on stairway landings. Data and collections stored in common rooms may share space with field

equipment, extra copies of reports (i.e., the Publications Office inventory), obsolete computer equipment, cleaning supplies, etc. (Fig. 2).

(a) (b)

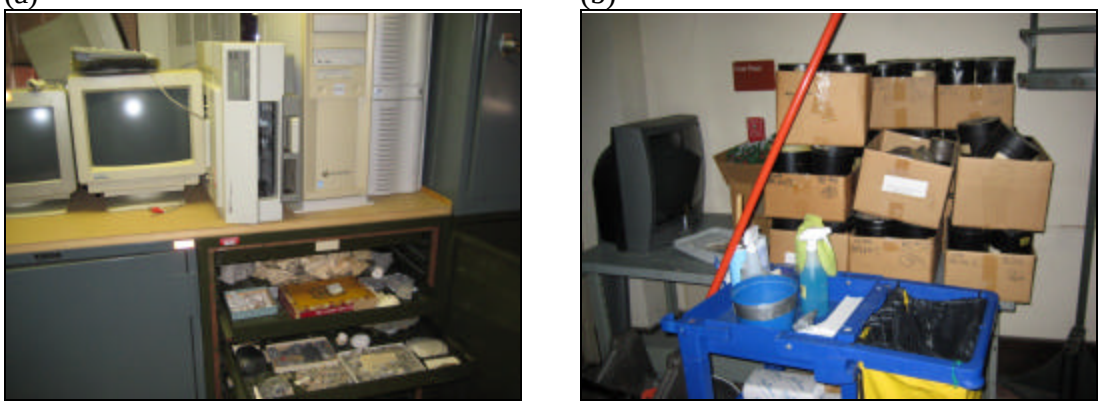

Figure 2: At the main office building, MGS's collections commonly share space with (a) obsolete computer equipment and (b) cleaning supplies.

Matapeake

MGS's storage facility at Matapeake consists of a single room, 1,100 ft^2 in area, partitioned from the interior of a larger, corrugated metal building. Entry is through either a single house door or a garage door, both located on one side of the building. The building is insulated and wired for electric lights, but temperature and humidity cannot be regulated, except by opening or closing the doors.

The collections housed at Matapeake consist almost entirely of marine and estuarine sediment cores, sediment grab samples, and sand splits remaining from the analysis of sediment grain size. Many of the items in these collections have been in storage at Matapeake for over 30 years. MGS does not advertise their existence, and they are seldom accessed.

As is the case at the main office, the facility at Matapeake is used to store both collections and field equipment (Fig. 3). The site is conveniently located for field work on Maryland's Eastern Shore. So, it is a handy place to store equipment, particularly the Survey's 17-foot Boston Whaler. However, joint storage of field equipment and physical collections has been a problem. Several years ago, a driver, backing the boat into the "garage" at Matapeake, accidentally hit a rack of storage shelves and ruined a number of the samples kept there.

Existing Issues with Current Infrastructure

Baltimore

- For the most part, the main office building is well maintained, secure, and regularly cleaned. Temperature and humidity are controlled. The primary

Figure 3: At the Matapeake facility, MGS's collections (sediment grab samples stored in glass jars inside labeled cardboard boxes) share space with field equipment.

structural deficit is a tendency for the basement to flood during heavy rainstorms and external water main breaks (Fig. 4).

- The dispersal of data and collections throughout the building complicates their management.
- At present, no area except the library is designated specifically for the examination of certain collections (i.e., reports, maps, and aerial photos) by outside users.

Matapeake

- Inadequate storm drainage around the Matapeake facility sometimes leads to severe flooding inside the building; water stands several inches deep after heavy rainstorms. The resulting dampness has encouraged the growth of mold in the insulation and on interior walls.
- The warehouse itself is poorly maintained. The exterior siding near the single door is coming unscrewed. Many of the overhead lights work erratically, flickering off and on, or not at all. A bottom panel is missing from the garage door. The opening allows entry to local cats. The storage room smells of urine, and animal feces are drying on the floor.
- The place is in dire need of cleaning. A light bulb lies shattered on the floor. A trashcan is overflowing. Field equipment is disorganized.
- Over time, variability in temperature and humidity has weakened the integrity of the cardboard boxes in which many of the collected items are stored.
- Given the amount of space allotted for the boat and its trailer, there is little or no additional storage space at Matapeake.

Figure 4: In Baltimore, building engineer Keith Andrews vacuums water from basement storage area (Room 009) following a heavy rainfall.

Infrastructure Needs

Building improvements, including diverting or otherwise controlling local drainage, and routine maintenance, especially at Matapeake, are the primary infrastructure needs.

At present, MGS has adequate storage space for its data and collections. In general, though, collections are increasing in size (albeit in an unpredictable way, a consequence of the erratic funding of projects). Although the Survey has not been compelled to optimize the available storage space, based on the situation at many other repositories, MGS would be unwise to disregard the issue of space.

THE MGS REPOSITORY – COLLECTIONS

During the course of this project, MGS identified 31 collections, 26 of which are to be held permanently. Of the 26, seven are physical collections, and 19 are derived or indirect data collections. The distribution of the Survey's permanent collections among the NGGDPP collection categories is summarized in Table 1 and elaborated upon in Appendix 3.

Table 1: Permanent collections held by MGS, by NGGDPP collection category.	
Collection category	**Permanent collections (N)**
Physical Collections	
1. Auger samples	
2. Fluid samples	
3. Geochemical samples	
4. Hand samples	1
5. Ice cores	
6. Paleontological samples	1
7. Rock cores	1
8. Rock cuttings	1
9. Sediment cores	3
10. Sidewall cores	
11. Thin sections and polished sections	
12. Type stratigraphic sections	
Subtotal	**7**
Derived/Indirect Data	
13. Drilling/completion reports	1
14. Drill stem and other tests	1
15. Field notes	1
16. Geochemical data	1
17. Geophysical data	
18. Lithology logs	1
19. Maps	
20. Paleomagnetic resistivity	
21. Paper reports	2
22. Petrophysical data	
23. Photographs	3
24. Potential fields	
25. Production history	
26. Routine analysis data	2
27. Scout tickets	
28. Seismic data	1
29. Source rock maturity analysis	
30. Special analysis data	
31. Stratigraphic horizons	
32. Surface and airborne data	3
33. 2-D and 3-D seismic reflection	1
34. Vertical seismic profiles	
35. Well logs	2
Subtotal	**19**
Total	**26**

Collection Storage

The several collections and data sets held by MGS are scattered throughout the main office building or are stored at the Matapeake facility. The exact storage situation varies depending on the collection, as illustrated by two examples: macrofossils and groundwater-level measurements. In public areas of the main office building, macrofossils are labeled and displayed in glass display cabinets (Fig. 5-a). Elsewhere, fossils are kept in labeled cigar boxes in cabinets located in a locked basement office subject to flooding (Fig. 5-b). Individual researchers also have collections of their own, which may or not become part of MGS's permanent collection. These are stored according to the collectors' whims. No catalog, paper or digital, exists, listing MGS's fossil holdings.

An explanation of the whereabouts of the items that comprise a temporarily-held collection, synoptic and intermittent groundwater-level measurements, serves as another example:

> Assorted water-level data are stored in County files on the 2nd floor bridge (MGS main office). Other data may be scattered throughout files in Room 009, in files of individual Hydrogeology Program staff offices, and in the Annapolis Field Office. These water levels were likely made by MGS or USGS personnel, but may also include measurements made by other governmental agencies, drillers, and consultants. Hydrographs for the Statewide Observation-Well Network (~pre-1981) are filed in black, loose-leaf binders on the 2nd floor bridge. In addition, water-level data from aquifer tests or other short-term monitoring may be stored in digital files by Hydrogeology Program staff. A portion of all water-level records stored at MGS (paper and digital) is also likely stored in the U.S. Geological Survey's NWIS computer database.

(a) (b)

Figure 5: Storage of MGS's fossil collection in (a) display cabinets in public areas and (b) cigar boxes in cabinet drawers.

For other collections, storage containers are the issue. Not all collection items are stored in containers appropriate or adequate for their preservation. For example, lithologic logs, measuring 40"x3", are rolled and wrapped in paper instead of being stored flat in a metal cabinet. Some of the longer-held sediment cores collected from the Maryland Coastal Plain are stored in poorly labeled boxes in various states of disrepair. Repackaging of cores and relabeling of boxes are needed.

Some of the collections are so poorly documented and were collected so long ago that no one at the Survey has the requisite knowledge to provide the needed metadata. Many of the more recent collections are in need of a catalog that pinpoints the physical location of items in collections, listing the whereabouts of specific labeled containers on shelves, in drawers, etc. The rock cores are a case in point. The entire collection was recently relocated from a now defunct storage facility and has yet to be arranged in an orderly fashion in the core repository. Nor is a catalog available to indicate where particular core boxes are located.

In summary, then, many of the collections are disorganized and in need of an archival management plan. Constituent items need to be retrieved from various locations within the Survey, repackaged if necessary, organized in a logical fashion for ease of access, catalogued, documented, and properly archived, preferably in a central location.

Collection Condition

Staff members describe the condition of most of MGS's collections as "Satisfactory." The condition of only two collections, the rock/mineral and fossil exhibits, is considered "Excellent." And five collections are "Marginal."

Some of the specific issues related to the current condition of collections are:

- Paper-based collections:
  - Some items are deteriorating. The paper is brittle and/or tearing from repeated handling and folding/unfolding; notes written in pencil are fading with age.
  - Lithologic logs stored as blue-line prints on over-sized material are difficult to reproduce because of their size.
  - Some collections should be converted to digital format. Conversion, however, is occurring slowly and inconsistently. Depending on the collection, it is (a) not planned, (b) occurring sporadically as particular digital files are required for research, or (c) occurring in a piecemeal fashion (i.e., some, but not all, related materials are being digitized).

- Digital collections:
  - Some are stored on obsolete storage media (tape, floppy disk) and/or in outdated formats; these should be updated.
  - MGS is in dire need of integrated back-up and digital data archive solutions.

- Workforce and workflow
  - Until this year, MGS has given little consideration to the need for data preservation or the steps that must be taken to ensure it. The Survey must develop collection-specific archival management plans that address (a) organization and documentation of collection-worthy items at the conclusion of a project and/or at the time an employee leaves the Survey, (b) criteria for deciding how long data are to be kept, and (c) protocols for logging collections into both the internal database and the National Catalog. Once individual collection plans are developed, they must be implemented, that is, incorporated into the Survey's workflow.
  - In terms of training, MGS needs staff schooled in computer programming and database construction.
  - MGS needs to establish working relationships with a number of outside experts to fully document some of its collections. For instance, although MGS has a large macrofossil collection, there is no longer a paleontologist on staff. To make the collection fully usable, the fossils should be examined by an expert and re-identified as needed. If possible, the Survey should also attempt to obtain additional information about the fossils' collection.

Collection Access and Usage

Few of the MGS collections are advertised or actively marketed as being available to the larger geoscience community. Most are available only upon request from an outside user, and that user must generally visit the Survey to access the collection on-site. Not surprisingly then, the collections are seldom used by others.

Similarly, few of the collections are web-accessible. Those that are, however, are heavily utilized. The most striking example is the collection of bathymetric surveys, including downloadable maps of a number of reservoirs popular with fishermen. In general, fewer than a dozen outside users per year access any of the Survey's other collections; in contrast, about 12,000 users visit the bathymetric survey website. Clearly, the more information that MGS is able to post to its website, the greater the likelihood of (non-destructive) usage of its collections.

LESSONS LEARNED

MGS'S COLLECTIONS AND THE NGGDPP COLLECTION CATEGORIES

For a geological survey just beginning to systematically preserve its collections, two questions immediately arose: Which of our holdings should be deemed permanent collections? And, how should our collections be fitted into the categories imposed by NGGDPP? For example, as a geological survey located in a coastal (and Coastal Plain) state, MGS possesses an abundance of (a) sediment cores and cuttings drilled on land and (b) sediment cores, surficial (grab) samples, and subsamples (processed and unprocessed) collected from Maryland's ponds, rivers, bays, and the Atlantic Ocean. NGGDPP makes a distinction between rock cores and rock cuttings, but no such distinction between sediment cores and sediment cuttings.

MGS decided to categorize cuttings from boreholes drilled in unconsolidated Coastal Plain sediments as "rock cuttings," along with drill cuttings from all other rock types, the operative word being "cuttings." With regard to bottom sediments extracted from any of a number of water bodies in the state, the Survey's quandary was whether to consider sediment grab samples as "hand samples" or "sediment cores." MGS opted for the latter, the thinking being that a grab sample might reasonably be regarded as a broad, short (e.g., 10-20 cm long) core collected from the top of the sediment column. Conversely, MGS does not distinguish between sidewall and other cores. In the end, MGS developed the following guidelines for assigning rock and sediment cores and cuttings to the NGGDPP categories:

- Auger samples: Samples (usually, soil or soft, surface sediments) collected by hand auger only
- Rock cores: Hard rock cores, collected by any method
- Rock cuttings: Drill cuttings from any rock type, including unconsolidated sediments
- Sediment cores:
  - Land-based sediment cores: Generally, unconsolidated sediment cores (portions of which may be cemented by iron or calcite, for example) and the subsamples extracted directly from them (except **not** sediment drill cuttings, which are included with rock cuttings); includes sidewall cores taken from sedimentary rocks
  - Water-based sediment cores: Sediment cores and surficial (grab) samples collected from the bottoms of bays, lakes, etc. Archived sediment cores may be (a) whole, (b) split in half vertically, with one half intact, (c) subsamples of cores, or (d) grab or surficial sediment samples. Subsamples of cores (c) and grab samples (d) may be unprocessed or processed (e.g., the sand fraction remaining from grain size analysis of a small section of sediment core).

The MGS library and Survey publications available for purchase posed another dilemma. Should these be included as collections of reports and maps or not? Most of the Survey's maps have already been entered into the National Geologic Map Database. And most of the publications in the library are the work of authors affiliated with other institutions. Because other collections in MGS's possession are in greater need of attention, the Survey elected to exclude the publications in its library and in its Publication Sales Office from the National Catalog.

In both of these cases, contacting the NGGDPP about the problem was very helpful. The NGGDPP acted as a sounding board, providing concrete examples of how other states had handled similar situations. For example, the NGGDPP explained that its interest lay, not in itemizing entire libraries, which might already be catalogued elsewhere, but in documenting and preserving reports and maps directly related to physical collections. (By bringing state curators together at the Data Preservation Techniques Workshop, held in July 2009 at Indiana University, the NGGDPP facilitated future contacts among the state geological surveys. Now, in addition to contacting the NGGDPP, a state curator can directly poll curators at other geological surveys to resolve problems.)

A related problem was coming to grips with the idea of separating the highly integrated products collected during the course of a particular project into separate collections. For example, it is not unusual for the Coastal & Environmental Geosciences Program to collect a sub-bottom seismic profile and, from that seismic information, to determine core sampling locations. Once a core is collected, it is typically x-rayed, split longitudinally, photographed, described lithologically, and subsampled for textural and geochemical analyses. So, the physical core is associated with a whole suite of derived products: seismic runs, x-rays, photos, and analytical results. The PI is accustomed to keeping all of the derived products associated with a project, in this case, a set of sediment cores, together. Separating them into collections of seismic data, photographs (both x-rays and photos), lithology logs, and routine analysis data, introduces a sense of disorder – dispersing a group of products that logically belong together – and, consequently, requires that some provision be made for establishing a connection among all of a project's physical and derived products. MGS plans to meet that need via its internal database.

Finally, one geologist raised the issue of keeping track of geoscience materials that reside in the hands of other agencies. This particular researcher was in touch with someone who knew the whereabouts of a series of vibracores drilled by the U.S. Army Corps of Engineers at a known location in Maryland. However, unless information about this non-MGS collection is recorded somewhere (e.g., in an internal database), when that staff member leaves the Survey, no one else here may know that those cores exist, much less where they are. At this point, MGS has no plans to keep track of materials in the hands of other agencies. But the need exists.

INTERNAL DATABASE

Because of the duplication of effort, the authors had misgivings about creating an internal database that mirrors the National Catalog but includes additional fields. However, onerous as it may be to maintain similar data in two places, the internal database is essential. First, it allows for the storage of information about temporary collections or about permanent collections that the Survey is not yet ready to enter into the National Catalog. Second, it can be expanded to allow tracking of the use of collections, which will enable MGS to better justify funding requests for their preservation. Third, the database can be readily queried, for example, to create a list of prospective members of the Survey's Data Preservation Advisory Panel or to update the *Long-Range Data Preservation Plan*.

FUNDING AND STAFFING

Funding has been and will continue to be a chronic problem for the Survey. Maintenance of the repository will require more than a one-time infusion of funds. For example, a federal agency, the Minerals Management Service, provided partial funding for the initial collection of many of the marine sediment cores stored at Matapeake, as well as for their preservation (i.e., shelf construction, core packaging, cataloguing). Since then, no

additional funding for the facility has been forthcoming, and the storage situation has deteriorated as a consequence.

At a minimum, the repository is in need of a curator, and the curator is in need of a salary. His or her

> "job functions will include (a) overseeing implementation and (annual) revision of the long-range plan, (b) keeping abreast of and adhering to national preservation standards, (c) tracking funding opportunities, including NGGDPP's spending priorities, and applying for funding to support data preservation activities, (d) working closely with MGS staff members to identify and conserve items that belong in permanent collections, (e) convening meetings of the Advisory Panel as needed, (f) updating the internal database and the National Catalog as needed, (g) serving as a contact for accessing collections in MGS's repository, (h) arranging for training in the use of permanent collections, as needed, and (i) engaging in active outreach as time allows. In grants requiring a 1:1 match, the curator's salary may serve as the MGS match." (Hennessee, 2009).

Currently, one of the authors has been diverted from other research activities to serve in that capacity, but given Maryland's dire fiscal straits, she might easily be reassigned, or laid off.

At the Data Preservation Workshop, representatives of several mid-Atlantic state surveys agreed that, given the funding and staffing problems each faced, it seemed inefficient for each survey to designate a curator, develop preservation strategies, and maintain separate repositories. There might be economies of scale in cooperating in a regional repository. Such a repository might also serve the needs of other state agencies and private companies that collect geologic materials.

HOUSEKEEPING

Developing an in-house version of the Geological Collection Inventory Form allowed MGS to add questions useful internally for improving the repository. For example, in response to Question 21 (What else would you like us to know about this collection?), MGS encouraged participants to elaborate; responses will help determine preservation priorities. Likewise, MGS requested bibliographic references for any reports associated with a collection, the idea being that these probably contain much of the metadata for items comprising the collection. To develop an initial contact list for the Data Preservation Advisory Panel, Question 25 asked respondents to list the names and contact information of people outside of MGS who might be familiar enough with the collection to serve on such a committee.

Having the Director of the Survey, as opposed to the authors, announce the kick-off meeting well in advance of the meeting date and issue a reminder a few days beforehand

were effective in ensuring participation in the inventory, as were his introductory remarks at the kick-off meeting.

Initially, the authors decided to divide responsibility for completing the inventory between those who knew the most about each collection and those who counted the items in a collection, thinking that the knowers would not want to count, and that the counters would not know the answers to many of the questions. In reality, though, staff members who completed inventories were usually able to quantify the collections themselves, without resorting to counters.

It is important to define which NGGDPP categories include which collections BEFORE an inventory is requested. Otherwise, the curator risks confusion among the staff and may antagonize them by creating a "redo" situation.

GENERAL OBSERVATIONS

At the Data Preservation Workshop, it was apparent that, in terms of data preservation, state geological surveys can be divided into the experienced and the inexperienced. The former are already well along the path to establishing respected geoscience repositories. The latter are just beginning the process. As one of the inexperienced, MGS has benefited enormously from the work of the NGGDPP and its predecessors. The existing literature provides a useful framework for thinking about the many aspects of data preservation, particularly for the uninitiated. The NGGDPP has set up a logical, implementable series of initial steps for preserving geological data, which MGS has been following: broadly describe the collections, decide which are to be held permanently, create a catalog of permanent collections, enter information (metadata) about each constituent item into a (national) database, and develop a preservation plan for each collection. In short, MGS has been able to leap forward largely because these resources are available.

CONCLUSIONS

MGS is beginning to understand some of the challenges posed by systematic data preservation. Building a fully functioning repository will require attention to virtually every aspect of data preservation, some of which will require changes in the way the Survey currently operates: (a) fostering a preservation mentality among staff, (b) forming an external advisory panel and establishing decision-making criteria for preserving or discarding geoscience materials, (c) developing collection-specific preservation strategies, (d) capturing metadata at the time of collection, (e) developing protocols for the transfer of items from collectors to the repository, (f) maintaining an up-to-date catalog of holdings, both internally and at the National Catalog level, (g) developing user-friendly policies that promote public access to the collections, including Internet access, (h) tracking usage of the collections, (i) establishing partnerships with other agencies committed to preservation, and (j) applying for funding for repository growth and maintenance.

During the past year, MGS has successfully completed the first steps in building what it hopes will become a first-rate repository that effectively serves the larger geoscience community in Maryland and beyond. Having completed the Collections Inventory, MGS now has a better understanding of the nature, size, and condition of its collections. Once the collection-level information entered into the National Catalog becomes publicly accessible, the Survey will have a better idea of the interest that those collections might generate. The Survey is in the process of forming an external Data Preservation Advisory Panel. It has developed a long-range data preservation plan, which it intends to revise annually, and has named a curator to carry the initial work forward. The next step is to begin the process of documenting each of the collections, preparing them for long-term preservation, and adding the associated item-specific metadata to the National Catalog.

REFERENCES

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U.S. Census Bureau, 2006, 2006 population estimates, United States – states; and Puerto Rico, http://factfinder.census.gov/, [3/31/2008].

APPENDIX 1
MGS'S *GEOLOGICAL COLLECTION INVENTORY FORM*

MGS created a *Geological Collection Inventory Form* based in part on the information required by the Collections Inventory of the National Catalog. These items comprise Questions 7-22 of the Survey's *Inventory Form*. The other questions (1-6 and 23-25) were added solely for the benefit of MGS.

MGS Collection ID: _____ USGS Collection Key:_____

MARYLAND GEOLOGICAL SURVEY
GEOLOGICAL COLLECTION INVENTORY FORM

SECTION A

1. Date: _____

2. Form completed by: _____
(names of everyone who participated in completing form; indicate group leader if more than one person participated)

3. Collection Name:_____

4. Physical Location(s) of Collection at MGS *(i.e., room number(s) at main office, Matapeake)*: _____

5. Your Association with Collection (*e.g., PI, collector, manager, user, etc.*)**:**
_____

6. Permanence of Collection:
IN YOUR OPINION, should the collection be:
(*Select one.*)
_____ Permanently retained
_____ Temporarily retained, until _____ (*date or length of time*)
_____ Not retained
_____ Undecided

7. Collection Type:
_____ Physical Geoscience (*comprised of items that originated naturally, like rocks, minerals, or fossils*)
_____ Derived and Indirect Geoscience Data (*produced from some other medium, like a paper log, a digital file, or a photograph*)

8. Collection Category:
(*Select one only from the appropriate collection type.*)
PHYSICAL
_____ Augur samples
_____ Fluid samples
_____ Geochemical samples
_____ Hand samples
_____ Ice cores
_____ Paleontological samples
_____ Rock cores
_____ Rock cuttings
_____ Sediment cores
_____ Sidewall cores
_____ Thin sections & polished sections
_____ Type stratigraphic sections
_____ Other
(*Specify*:_____)

DERIVED/INDIRECT
_____ Drilling/completion reports
_____ Drill stem & other tests
_____ Field notes
_____ Geochemical data
_____ Geophysical data
_____ Lithology logs
_____ Maps
_____ Paleomagnetic resistivity
_____ Paper reports
_____ Petrophysical data
_____ Photographs
_____ Potential fields
_____ Production history
_____ Routine analysis data
_____ Scout tickets
_____ Seismic data
_____ Source-rock maturity analysis
_____ Special analysis data
_____ Stratigraphic horizons
_____ Surface & airborne data
_____ 2-D & 3-D seismic reflection
_____ Vertical seismic profiles
_____ Well logs
_____ Other
(*Specify*:_____)

9. Current Media
(*Select all that apply.*)
_____ Digital
_____ Paper (*includes film, microfiche, Mylar, etc.)*
_____ Physical

YOU MAY LEAVE QUESTIONS 10 & 11 FOR DALE & LAMERE TO COMPLETE

10. Amount or Quantity (*Number of units or "Quantity Unknown"*):_____

11. Collection Units (*Units of measure*)
_____ Cubic feet
_____ Items
_____ Volumes
_____ Megabytes
_____ Other
_____ None
_____ Unknown amount or quantity

SECTION B

1. Briefly describe this collection (*250 words max*).

2. Is this collection increasing in size?

_____ Yes
_____ No
_____ Don't know

3. If so, is it increasing in a predictable way? (*Please explain.***)**

4. Has a survey or assessment of the general condition of the collection been completed?

_____ Yes
_____ No
_____ Don't know

5. What estimated percentage of the collection is stored in areas and conditions considered to be adequate for the current scope and use?

_____%

6. For the percentage deemed inadequate, what improvements are needed? (*Please specify.*)

7. What is the overall condition of the collection?

8. What are the significant uses of the collection?
(*Select all that apply.*)
_____ Research
_____ Teaching
_____ Reference
_____ Land Management
_____ Hazard Mitigation
_____ Mineral Exploration
_____ Oil & Gas Exploration
_____ Engineering
_____ Other *(Specify:_____)*

9. What is the geographic scope of the collection?

10. Who are the outside users of the collection?
(*Select all that apply.*)
_____ K-12
_____ Universities
_____ Professional Researchers
_____ Regulatory Agencies
_____ Other Government Agencies
_____ General Public
_____ Private Sector
_____ Others *(Specify:_____)*
_____ None

11. How does the user community access the collection?

12. Approximately how many <u>times per year</u> is the collection accessed by external users?

13. What is the expected long-term trend (number and type) in <u>usage</u> of the collection? (*Please specify or "Don't know."*)
Number of expected users: _____
Types of expected users: _____

14. Is the collection affiliated with another agency or organization?
_____ Yes, (*Please specify.*)_____
_____ No
_____ Don't know

15. Does this collection include materials donated by Federal agencies?
_____ Yes
_____ No
_____ Don't know

16. What estimated percentage of the collection is catalogued?

_____%

17. What estimated percentage of the collection is documented (metadata)? (*Please specify metadata format(s).*)

_____%

18. What estimated percentage of the collection is accessible through an electronic database?

_____%

19. Is this database available via the Web?
_____ Yes
_____ No
_____ Don't know

(a) If "Yes," is it available to
(*Check all that apply*.)
_____ Public sector
_____ Private sector
_____ Internal users only

(b) Database
URL:_____

(c) How is web access for this database implemented? (*e.g., web page client, Z39.50, web service, OGC catalog, other standard service…*)

20. What is the current staffing (Full Time Equivalent) associated with this collection in these categories?
Full Time - _____ FTE
Part Time - _____ FTE
Volunteer - _____ FTE
Contractor - _____ FTE
Student - _____ FTE

21. What else would you like us to know about this collection (e.g., improvements, additions, etc.)? (*Please elaborate. Responses to this question will help establish preservation priorities and guide the next grant proposal.*)

22. How long (in hours) has it taken you to complete the inventory to this point?

Name	Hours

23. <u>FOR DERIVED/INDIRECT DATA SETS ONLY</u>, attach an example of a typical item in the data set, if appropriate (e.g., well completion report).

24. Please list bibliographic references for any reports associated with the collection.

25. Please list the names and/or titles of people <u>outside of MGS</u> who might be familiar enough with the items in this collection or data set to be included on a Data Preservation Advisory Panel. The Panel will advise the Survey on the disposition of its collections. Include the agency or organization with which each person is affiliated, as well as other contact information.

THANK YOU FOR YOUR PARTICIPATION

PLEASE RETURN THE COMPLETED FORM TO
LAMERE HENNESSEE BY 1/21/2009

APPENDIX 2
MGS'S INTERNAL DATA PRESERVATION DATABASE

MGS developed an internal Microsoft Access database, DataPreservation.mdb, that mirrors the National Catalog but contains additional information for both its permanent and temporary collections. This appendix documents the content and structure of the tables in the database, as well as the relationships between tables.

The database contains two types of tables, "data" tables and correlation tables; the latter are many-to-many tables that link the rows in two data tables using key field entries. The names of all database tables are preceded by the prefix "tbl." Correlation tables are named after both of the data tables they link, with a "/" separating those names. Thus, the correlation table "tblCollection/Collection Use" links tblCollection and tblCollectionUse. Table 2-1 briefly describes all of the tables in the database. The structure and content of all "data" tables are described in subsequent tables in the appendix. Within those tables, an asterisk (*) following a field name indicates a unique key field, generally assigned automatically by Access.

Table 2-1: Tables in MGS's internal collections database, DataPreservation.mdb

Table name	Table description
"Data" tables	
tblCollection	Titles and general descriptions of MGS's permanent and temporary geoscience data and collections, consistent with NGGDPP National Catalog fields and requirements
tblCollectionCategory	Collection types (i.e., Physical, Derived And Indirect Geoscience Data), categories (e.g., Rock cuttings, Sediment cores), and examples, from Appendix 2 of "Implementation Plan for the National Geological and Geophysical Data Preservation Program" (USGS, 2006)
tblCollectionUse	Domain of significant USES of a collection or data set, identical to NGGDPP National Catalog choices
tblCollectionUser	Domain of outside USERS of a collection or dataset, identical to NGGDPP National Catalog choices
tblWebAccess	Domain of outside users with web access to a collection or dataset, identical to NGGDPP National Catalog choices
tblCollectionEvent	Dates of certain events associated with a collection (e.g., the date on which a collection was entered into the National Catalog)
tblPerson	Names and contact information of people associated with MGS's collections, including (prospective) members of the Data Preservation Advisory Panel
tblAffiliation	Names and addresses of agencies or organizations with which the people listed in tblPerson are affiliated
tblPublication	Bibliographic citations of publications associated with

	MGS's data and collections
tblProject	Projects associated with particular collections, that is, projects that led to the initial collection or acquisition of items in the collections.
Correlation tables	
tblCollection/CollectionUse	Correlation table linking tblCollection (field MGSCollectionID) and tblCollectionUse (field UseID)
tblCollection/CollectionUser	Correlation table linking tblCollection (field MGSCollectionID) and tblCollectionUser (field UserID)
tblCollection/Person	Correlation table linking tblCollection and tblPerson, also including the person's association with the collection (e.g., PI, internal user, prospective Data Preservation Advisory Panel member)
tblCollection/Project	Correlation table linking tblCollection (field MGSCollectionID) and tblProject (field ProjectID), to facilitate identifying the sources of items comprising a collection and determining interconnections between collections (e.g., an x-ray or seismic profile associated with a particular sediment core)
tblCollection/Publication	Correlation table linking tbl Collection (field MGSCollectionID)and tblPublication (field PublicationID)
tblCollection/WebAccess	Correlation table linking tblCollection (field MGSCollectionID) and tblWebAccess (field WebAccessID)

tblCollection

The table tblCollection is the heart of the database. It contains all of the fields required by the National Catalog, as well as certain fields useful to MGS. Unlike the National Catalog, it contains information about temporarily retained collections and data sets, including the date on which they are to be discarded. It contains specific information about the geographic location represented by the collection, for instance, the area in Maryland from which "local" data were retrieved. And, finally, it contains information about the physical locations of datasets and collections at MGS.

Table 2-2: Structure and content of tblCollection in MGS's internal collections database, DataPreservation.mdb

Field name (Caption)	Data type	Field size	Description
MGSCollectionID* (MGS ID)	AutoNumber	Long integer (increment new values)	MGS collection or data set identification number, assigned automatically

Table 2-2: Structure and content of tblCollection in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
USGSCollectionID (USGS ID)	Text	50	USGS collection or data set identification number ("Collection Unique Key" - Field B in Excel spreadsheet, "State Survey Collection Fields in Excel format.xls"); assigned by National Catalog; linked by NGGDPP to StateID
StateID (USGS State ID)	Text	6	USGS state survey identification number ("ID" - Field C in Excel spreadsheet, "State Survey Collection Fields in Excel format.xls"); constant number for MGS = 435934
InventoryDate (Date of inventory)	Date/Time	Short date (e.g., 6/2/2009)	A-1. Date on which Collection Inventory Form completed
CollectionName (Name)	Text	200	A-3. Name of collection or data set
CollectionLocation (Location)	Text	250	A-4. Physical location of collection at MGS (i.e., room number(s) at main office, Matapeake)
Retained (same)	Text	50	A-6. In your opinion, should collection be retained "Permanently","Temporarily"," Discarded", "Undecided"?
DiscardDate (Discard date)	Date/Time	Short date	A-6a. If collection is to be held temporarily, specify date on which it is to be discarded.
CollectionCategoryID (Category ID)	Number	Long integer	A-7&8. Collection category identification number; link to tblCollectionCategory
CurrentMedia (Media)	Text	15	A-9. Current media (i.e., "Digital" or "Paper" or "Physical" or "Digital & Paper" or "Digital & Physical" or "Paper & Physical" or "Digital, Paper, & Physical")
NumberUnits (# units)	Number	Long integer	A-10. Number of units (if unknown, enter -99)

Table 2-2: Structure and content of tblCollection in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
CollectionUnits (Units)	Text	25	A-11. Collection units (i.e., "Cubic Feet" or "Items" or "Volumes" or "Megabytes" or "Other" or "None")
BriefDescription (Description)	Memo		B-1. Briefly describe this collection (250 words max.)
IncreasingSize? (Size increasing?)	Text	50	B-2. Is this collection increasing in size? (i.e., "Yes" or "No" or "Unknown")
PredictableWay? (Increasing predictably?)	Text	50	3. If so, is it increasing in a predictable way? (i.e., "Yes" or "No" or "Unknown")
PredictableWayDetails (Explain predictable increase)	Memo		3a. If Q3=Yes, explain how the collection is increasing predictably.
GeneralCondition (Survey of condition?)	Text	50	4. Has a survey or assessment of the general condition of the collection been completed? (i.e., "Yes" or "No" or "Yes, but is not current" or "Yes, but only a portion of the collection" or "No, but is planned")
PercentAdequate (% adequately stored)	Number	Integer	5. What estimated percentage of the collection is stored in areas and conditions considered to be adequate for the current scope and use? (if unknown, enter -99)
Improvements (Improvements needed)	Memo		6. For the percentage deemed inadequate, what improvements are needed?
OverallCondition (Overall condition)	Memo		7. What is the overall condition of the collection? (i.e., "Excellent" or "Satisfactory" or "Marginal" or "Very Questionable" or "Needs Immediate Attention")
GeographicScope (Geographic scope)	Text	10	9. What is the geographic scope of the collection? (i.e., "Global" or "National" or "Regional" or "State" or

Table 2-2: Structure and content of tblCollection in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
			"Local" or "Other"
GeographicDetails (Geographic details)	Memo		9a. Provide details about the geographic scope of the collection.
Accessibility (same)	Memo		11. How does the user community access the collection?
NumberUsers (# users)	Number	Integer	12. Approximately how many time per year is the collection accessed by external users? (if unknown, enter -99)
UsageTrend (Usage trend)	Memo		13. What is the expected long-term trend (number and type) in usage of the collection?
Affiliated? (Other affiliation?)	Text	10	14. Is the collection affiliated with another agency or organization? (i.e., "Yes" or "No" or "Unknown")
AffiliationSpecified (Agency(s))	Text	250	14a. If Q14=Yes, specify affiliated agency(s).
FedAgencyMaterial (Federal donations?)	Text	10	15. Does this collection include materials donated by Federal agencies? (i.e., "Yes" or "No")
PercentCatalogued (% catalogued)	Number	Integer	16. What estimated percentage of the collection is catalogued? (if unknown, enter -99)
PercentDocumented (% documented)	Number	Integer	17. What estimated percentage of the collection is documented (metadata)? (if unknown, enter -99)
MetadataFormat (Metadata format(s))	Text	250	17a. If Q17>0, specify metadata format(s)
PercentAccessible (% accessible electronically)	Number	Integer	18. What estimated percentage of the collection is accessible through an electronic database? (if unknown, enter -99)
WebAvailability (Available via web)	Text	10	19. Is this database available via the Web? (i.e., "Yes" or "No" or "Don't know")
WebDatabaseURL	Text	250	19b. If Q19 = Yes, specify the

Table 2-2: Structure and content of tblCollection in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
(URL)			database URL.
WebImplementation (Web implementation)	Text	250	19c. If Q19=Yes, specify how web access for database is implemented (e.g., web page client, Z39.50, web service, OGC catalog, other standard service...)
CollectionStaffFullTime (Full-time FTE)	Number	Single (Decimal places – Auto)	20a. What is the current staffing (FTE) associated with collection, full time?
CollectionStaffPartTime (Part-time FTE)	Number	Single (Decimal places – Auto)	20b. What is the current staffing (FTE) associated with collection, part time?
CollectionStaffVolunteer (Volunteer FTE)	Number	Single (Decimal places – Auto)	20c. What is the current staffing (FTE) associated with collection, volunteer?
CollectionStaffContractor (Contractor FTE)	Number	Single (Decimal places – Auto)	20d. What is the current staffing (FTE) associated with collection, contractor?
CollectionStaffStudent (Student FTE)	Number	Single (Decimal places – Auto)	20e. What is the current staffing (FTE) associated with collection, student?
Elaboration (same)	Memo		21. What else would you like us to know about this collection (e.g., improvements, additions, etc.)?
Hours (same)	Number	Single (Decimal places – Auto)	22. How long (in hours) has it taken you to complete the inventory to this point? (total hours for all persons involved)
Example? (same)	Yes/No		23. Is an example of a typical item in the (derived/indirect) data set attached?

tblCollectionCategory

The table tblCollectionCategory contains collection types (i.e., Physical, Derived And Indirect Geoscience Data), categories (e.g., Rock cuttings, Sediment cores), and examples, from Appendix 2 of "Implementation Plan for the National Geological and Geophysical Data Preservation Program" (USGS, 2006). The tables tblCollection and tblCollectionCategory are linked through the field, CollectionCategoryID, in the former table and key field, CategoryID, in the latter.

Table 2-3: Structure and content of tblCollectionCategory in MGS's internal collections database, DataPreservation.mdb

Field name (Caption)	Data type	Field size	Description
CategoryID* (Category ID)	AutoNumber	Long integer (increment new values)	Collection or derived/indirect data category identification number, assigned automatically
CollectionType (Type)	Text	50	Type of collection or data set (i.e., "Physical Geoscience" or "Derived and Indirect Geoscience Data"
CollectionCategory (Category)	Text	50	Collection category; depends on collection type
Examples (same)	Memo		Examples of items in collection category

tblCollectionUse

The table tblCollectionUse contains the NGGDPP-specified domain of possible "significant uses of the collection," (e.g., Research, Teaching, Engineering). Instances of the key field, UseID, are matched to specific collections in the correlation table, tblCollection/CollectionUse.

Table 2-4: Structure and content of tblCollectionUse in MGS's internal collections database, DataPreservation.mdb

Field name (Caption)	Data type	Field size	Description
UseID* (Use ID)	AutoNumber	Long integer (increment new values)	Collection use identification number, assigned automatically
Use (same)	Text	50	Specific use of collection

tblCollectionUser

The table tblCollectionUser contains the NGGDPP-specified domain of possible "outsider users of the collection," (e.g., K-12, Universities, Private Sector). Instances of the key field, UserID, are matched to specific collections in the correlation table,

tblCollection/CollectionUser.

Table 2-5: Structure and content of tblCollectionUser in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
UserID* (User ID)	AutoNumber	Long integer (increment new values)	Collection user identification number, assigned automatically
User (same)	Text	50	Outsider user of collection

tblCollectionEvent

The table tblCollectionEvent tracks the dates of certain events associated with a collection (e.g., date of collection inventory, date on which a collection was entered into the National Catalog). The tables tblCollection and tblCollectionEvent are linked through the field, CollectionID.

Table 2-6: Structure and content of tblCollectionEvent in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
EventID* (Event ID)	AutoNumber	Long integer (increment new values)	Event identification number, assigned automatically
CollectionID (Collection ID)	Number	Long integer	Collection identification number; link to tblCollection
EventDate (Date)	Date/Time	Short date	Date of event
Event (same)	Text	250	Nature of event

tblPerson

The table tblPerson contains the names and contact information of people associated with MGS's collections, including (prospective) members of the Data Preservation Advisory Panel. Instances of the key field, PersonID, are matched to specific collections in the correlation table, tblCollection/Person. The tables tblPerson and tblAffiliation are linked through the field, AffiliationID.

Table 2-7: Structure and content of tblPerson in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
PersonID*	AutoNumber	Long integer	Person identification number,

Table 2-7: Structure and content of tblPerson in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
(Person ID)		(increment new values)	assigned automatically
LastName (Last name)	Text	30	Last name of person
FirstName (First name)	Text	30	First name of person
MiddleInitial (Middle initial)	Text	1	Middle initial of person (single character in length)
Affiliation (same)	Number	Long integer	Agency or organization with which person is affiliated; link to tblAffiliation
Phone (same)	Text	12	Person's area code & phone number (i.e., xxx-yyy-zzzz)
FAX (same)	Text	12	Person's area code & FAX number (i.e., xxx-yyy-zzzz)
EMail (E-mail address)	Text	50	Person's e-mail address
MGSEmployee (MGS?)	Yes/No		Is (or was) the person an employee of the Maryland Geological Survey?
AdvisoryPanel (Advisory panel?)	Yes/No		Is the person a member of the Data Preservation Advisory Panel?

tblAffiliation

The table tblAffiliation contains the names and addresses of agencies or organizations with which the people listed in tblPerson are affiliated. The tables tblPerson and tblAffiliation are linked through the field, AffiliationID.

Table 2-8: Structure and content of tblAffiliation in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
AffiliationID* (Affiliation ID)	AutoNumber	Long integer (increment new values)	Affiliation identification number, assigned automatically
AgencyName (Agency name)	Text	50	Name of agency, organization, or institution
AgencyDept (Department)	Text	100	Name of department within larger agency, etc.
StreetAddress1	Text	50	First line of agency's street

Table 2-8: Structure and content of tblAffiliation in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
(Address)			address
StreetAddress2 (Address)	Text	50	Optional second line of agency's street address
City (same)	Text	50	City in which agency is located
State (same)	Text	2	Two-character code of state in which agency is located (e.g., MD, DE, PA)
ZipCode (Zip code)	Text	10	Zip code in which agency is located (5 digits or 5-4 digits)

tblPublication

The table tblPublication contains bibliographic citations of publications associated with MGS's data and collections Instances of the key field, PublicationID, are matched to specific collections in the correlation table, tblCollection/Publication.

Table 2-9: Structure and content of tblPublication in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
PublicationID* (Publication ID)	AutoNumber	Long integer (increment new values)	Publication identification number, assigned automatically
Citation (same)	Memo		Bibliographic information about publication

tblProject

The table tblProject contains the names of projects associated with particular collections, that is, projects that led to the initial collection or acquisition of items in the collections. Instances of the key field, ProjectID, are matched to specific collections in the correlation table, tblCollection/Publication.

Table 2-10: Structure and content of tblProject in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
ProjectID* (Project ID)	AutoNumber	Long integer (increment new values)	Project identification number, assigned automatically
ProjectName	Text	100	Name of project

Table 2-10: Structure and content of tblProject in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
(Name)			
ProjectAcronym (Abbreviation)	Text	10	Project acronym or abbreviation
ProjectStart (Start date)	Date/Time	Short date	Start date of project (e.g., 6/1/2000)
ProjectEnd (End date)	Date/Time	Short date	End date of project (e.g., 6/1/2000)
ProjectDescription (Description)	Memo	Unlimited	Project description

tblWebAccess

The table tblWebAccess contains the NGGDPP-specified domain of the possible "sectors" permitted to access the collection via the Internet (i.e., Public sector, Private sector, Internal users only). Instances of the key field, WebAccessID, are matched to specific collections in the correlation table, tblCollection/WebAccess.

Table 2-11: Structure and content of tblWebAccess in MGS's internal collections database, DataPreservation.mdb			
Field name (Caption)	**Data type**	**Field size**	**Description**
WebAccessID* (Web access ID)	AutoNumber	Long integer (increment new values)	Web access identification number, assigned automatically
WebUser (Web user)	Text	50	Prospective users of data housed on MGS website

APPENDIX 3
PERMANENT COLLECTIONS HELD BY MGS AND ENTERED INTO THE NATIONAL CATALOG

Collection category	MGS ID	National Catalog ID (State ID = 435934)	Collection name	Comments
PHYSICAL COLLECTIONS				
Augur Samples (samples collected by hand auger only; usually soil or soft surface sediments)	---	---		held temporarily only
Fluid Samples	---	---		none
Geochemical Samples	---	---		none
Hand Samples	MGS-5	P1510	Hand Samples: Rock and Mineral Exhibits	A collection of various rocks and minerals from Maryland on display in glass cabinets located in MGS's main building, as well as several larger specimens displayed on cabinet tops and benches. A metal specimen cabinet also contains approximately 100 samples of Maryland rocks and minerals used as reference examples.
Ice Cores	---	---		none
Paleontological Samples	MGS-6	P1518	Paleontological Samples: Fossil Exhibits	A collection of about 75 macrofossils from Maryland on display in glass cabinets in the MGS Library.
Rock Cores	MGS-21	P1531	Rock Cores	For now, all rock cores are included in the same

Collection category	MGS ID	National Catalog ID (State ID = 435934)	Collection name	Comments
(hard rock cores, collected by any method; excludes Coastal Plain sediment cores)				collection, regardless of where, why, or how they were collected (e.g., no distinction is made between cores of basement rock underlying the Coastal Plain and rock cores obtained from other physiographic provinces in MD; may include sidewall cores)
Rock Cuttings (drill cuttings from any rock type, including unconsolidated sediments; the key word is "cuttings")	MGS-22	P1532	Rock Cuttings	For now, all rock cuttings, including unconsolidated Coastal Plain sediments, are included in the same collection, regardless of where, why, or how they were collected.
Sediment Cores (land-based: generally unconsolidated sediment cores, portions of which may be cemented by iron or calcite, for example, and the subsamples extracted directly from them (except **not** sediment drill cuttings, which are included with rock cuttings); includes sidewall cores taken from sedimentary rocks water-based: sediment cores and grab (surficial) samples	MGS-1	P993	Sediment Cores, Maryland Continental Shelf	Continuous, intact vibracores, in 1-m or 5-m sections, collected between 1984-1997, on the Maryland continental shelf by MGS or the U.S. Army Corps of Engineers (USACOE) for the purpose of assessing sediment suitability for beach nourishment.
	MGS-2	P1507	Sediment Cores, Maryland Coastal Plain	About 5,000 linear ft of sediment cores from 272 wells or test holes drilled on the Maryland Coastal Plain, collected as part of hydrogeologic or stratigraphic mapping studies dating back to the 1950s.
	MGS-7	P1519	Sediment Cores: Heavy Minerals, Maryland Continental Shelf	Glass vials containing heavy minerals from the sand-size fraction of approximately 250 samples of surface materials on the continental shelf.

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collected from the bottoms of ponds, lakes, and tidal bodies of water. Sediment cores may be (a) whole, (b) split in half vertically, with one half intact, (c) subsamples of cores, or (d) grab or surficial sediment samples. Subsamples of cores and grab samples may be unprocessed or processed (e.g., the sand fraction remaining from grain size analysis of a small section of sediment core).				
Sidewall Cores	---	---		included in "Rock Cores" or "Sediment Cores"
Thin Sections & Polished Sections	---	---		
Type Stratigraphic Sections	---	---		
DERIVED/INDIRECT COLLECTIONS				
Drilling/ Completion Reports	MGS-16	P1526	Well Permits and Well Completion Reports, Maryland	Approximately 500,000 paper copies of well permits and well completion reports for the State of Maryland, beginning with the origin of the permit system in 1945 to current year, are filed

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				by county and permit number. Some include location maps, pump test data, sand analyses, geophysical logs, chemical analyses and other analyses performed on the hole or well.
Drill Stem & Other Tests	MGS-9	P1521	Aquifer (Pump) Tests, Maryland Coastal Plain	For 262 water well locations, digital (Excel) files describing each aquifer test, containing raw data, plots, and calculations of hydraulic properties, as well as a list of references associated with the collection.
Field Notes	MGS-10	P1522	Geology Field Notebooks, Maryland	Approximately 70 field notebooks from (a) geologic mapping, (b) the Chesapeake Bay Earth Science Study (CBESS), and (c) the Hart-Miller Island Monitoring Study.
Geochemical Data	MGS-20	P1530	Maryland Groundwater Quality Data	Collection consists of paper and electronic files of data from individual wells and springs that have been tested for water quality as part of an ongoing statewide assessment of ground-water quality. Data from the collection is documented in publications and annual administrative reports. Much of the data is in USGS WATSTORE database; some exists only in paper and spreadsheet format at MGS.
Geophysical Data	---	---		
Lithology Logs	MGS-17	P1527	Geological (Lithological) Descriptions of Coastal Plain Cores and Well	31 lithologic logs in nine Maryland Coastal Plain counties plus one from the Virginia Coastal Plain consisting of paper strip with depth, sample

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			Cuttings, Maryland and Virginia	description and cuttings glued to strip (Logs) Approximately 20 Washington Gas Light Company lithologic logs (also includes geophysical logs) for a gas storage project in Prince George's County. (WGL)
Maps				Undecided about how to handle (e.g., National Geologic Map Database)
Paleomagnetic Resistivity	---	---		none
Paper Reports	MGS-11	P1523	Doctoral Dissertations on Maryland Geology	28 dissertations that relate to some aspect of the geology of Maryland
	MGS-25	P1553	Unpublished Reports of the Maryland Geological Survey	~300 unpublished reports, usually associated with a specific project involving MGS staff. Generally, these are file reports or open-file reports that meet the terms of a grant or contract but are not otherwise distributed or included in the MGS List of Publications. They are commonly, but not necessarily, associated with a particular collection(s).
Petrophysical Data	---	---		none
Photographs	MGS-28	P1603	Historical Aerial Photographs	~25,000 black & white aerial photos (most 9"x9", 1:20,000-scale) from 1938, 1952, 1964, 1970-71, mid-1980s, early 1990s, flown or otherwise acquired by U.S. Department of Agriculture, U.S. Geological Survey, or Air Photographics.

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	MGS-23	P1565	Tidewater Shorelines, Maryland	~20,000 photographs, negatives, or slides taken in the 1960s and 1970s to document shoreline conditions and shoreline protection structures along the Chesapeake Bay in Maryland. Most are shots taken from shore; some are oblique aerials of the shore taken from low-flying aircraft.
	MGS-27	P1589	X-rays & Xeroradiographs of Marine & Estuarine Sediment Cores, Maryland	~300 x-rays or xeroradiographs, taken prior to core extrusion; cores, generally obtained using gravity or box coring equipment, are usually 1-2 m long
Potential Fields	---	---		none
Production History	---	---		none
Routine Analysis Data	MGS-12	P1524	Paleontological and Palynological Data Derived from Maryland Water Wells	Paleontological or palynological reports and correspondence from various researchers describing or referring to approximately 200 wells, most located within Maryland's Coastal Plain.
	MGS-30	P1612	Marine & Estuarine Beach & Bottom Sediment Data	Paper & digital (generally, Excel spreadsheet) tables containing the results of laboratory analyses of sediments (e.g., grain size composition, carbon/sulfur/nitrogen content, trace metal content), for over 50 projects involving marine & estuarine beach or bottom sediments in tidewater Maryland (along with a few freshwater ponds & reservoirs)

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Scout Tickets	---	---		none
Seismic Data	MGS-26	P1554	Marine and Estuarine Seismic Profile Prints	240 rolls of seismic profiles obtained from the Atlantic Ocean and Chesapeake Bay as part of projects funded by the U.S. Minerals Management Service (MMS) and the U.S. Environmental Protection Agency (EPA), respectively. Rolls are either original thermal printer paper or photographic copies.
Source-Rock Maturity Analysis	---	---		none
Special Analysis Data	---	---		none
Stratigraphic Horizons	---	---		none
Surface & Airborne Data	MGS-19	P1529	Elevation Surveys of Arnold, Broad Creek, & Crofton Meadows Well Fields, Anne Arundel County, Maryland	15 volumes
	MGS-24	P1547	Bathymetric Surveys, Maryland Water Bodies	Raw and processed bathymetric data, including water level measurements at time of collection. Processed files ultimately render 3-D (x, y, z) discrete points, which are then mapped as planar surfaces. Data and maps available for the MD and VA Coastal Bays and the following MD lakes/reservoirs: Liberty, Loch Raven, Prettyboy, Rocky Gap (Lake Habib), Rocky Gorge, and

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				Tridelphia
	MGS-31	P1613	Beach Profiles, Coastal Maryland	Beach profiles collected periodically, primarily along the Atlantic coast of Maryland, but also along Chesapeake Bay & tributary shorelines
2-D & 3-D Seismic Reflection	MGS-8	P1520	2-D Seismic Reflection Profiles, Maryland Coastal Plain	Seismic reflection profiles delineating basement structure and structural features extending into overlying sediments, Eastern and Western Shore Coastal Plain counties in Maryland
Vertical Seismic Profiles	---	---		none
Well Logs	MGS-15	P1525	Well Logs, Maryland and Neighboring States	Approximately 2,000 paper copies (original logs and duplicated copies) of geophysical logs (gamma, resistivity, caliper, sonic, etc.) of wells in Maryland's 23 counties, Baltimore City, Delaware, Virginia, New Jersey, Pennsylvania, and Washington, D.C. Approximately 1,000 wells have logs in digital format.
	MGS-18	P1528	Geophysical Logs, Western Maryland Deep Wells	~150 geophysical logs (gamma, density, electric, etc.) for wells drilled mainly for natural gas in Garrett and Allegany Counties, Maryland.