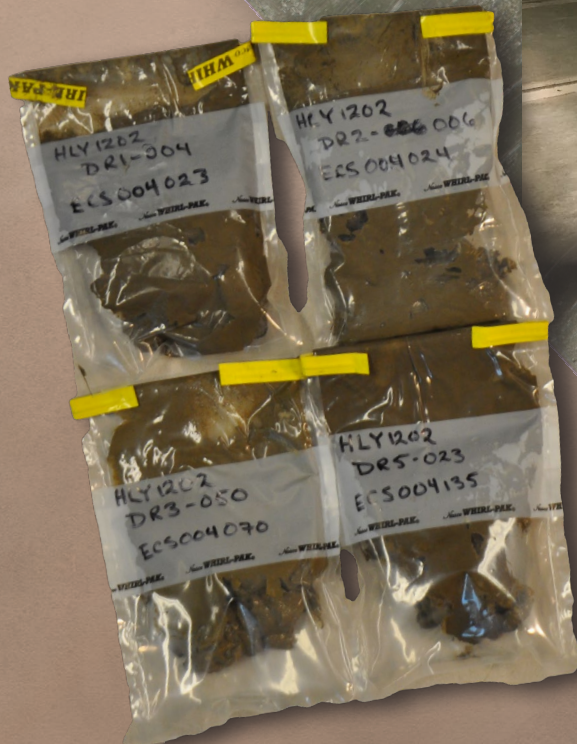
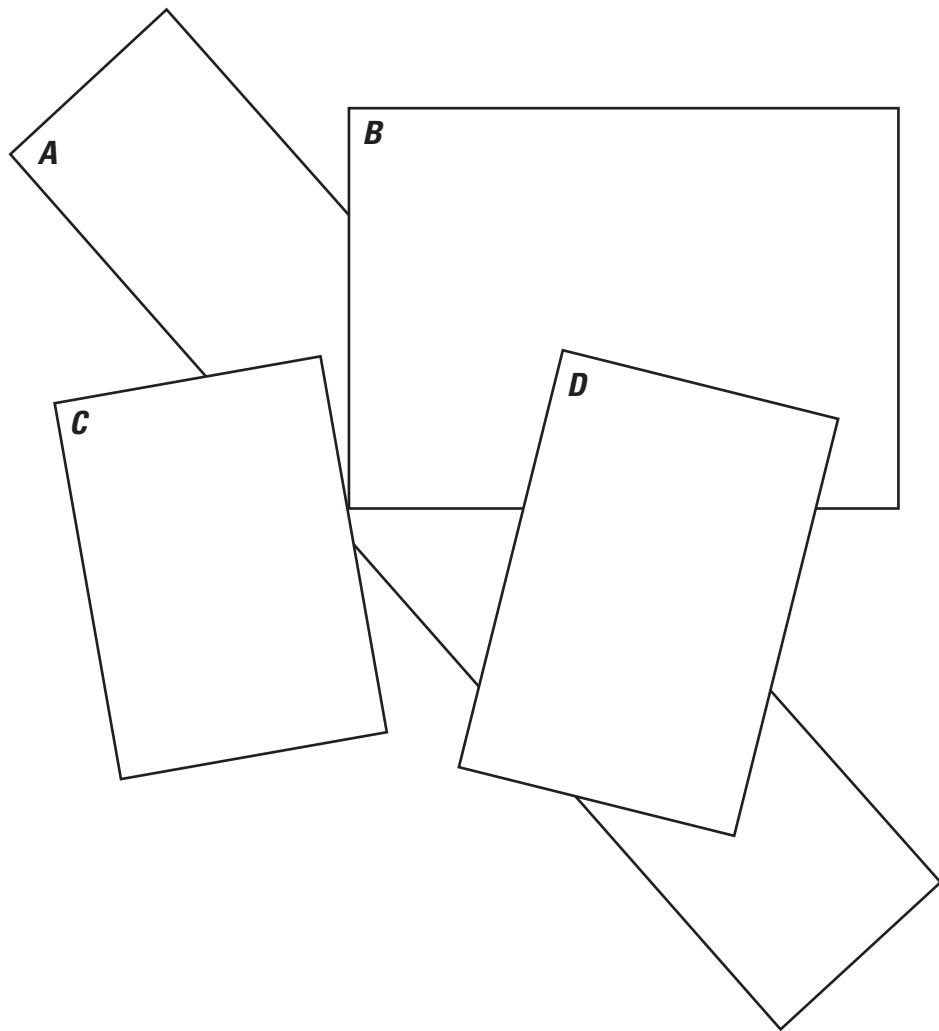


Collections Management Plan for the U.S. Geological Survey Woods Hole Coastal and Marine Science Center Samples Repository



Scientific Investigations Report 2022–5106
Supersedes USGS Open-File Reports 2006–1187 and 2018–1100



Cover. A. Split core 2TC from field activity 2010–018–FA; image collected using a USGS multisensor core logger in Menlo Park, California. B. View of core storage racks inside the walk-in refrigerator at the K.O. Emery Geotechnical Wing of the U.S. Geological Survey (USGS) Coastal and Marine Science Center in Woods Hole, Massachusetts. C. Bagged mud samples from USGS field activity 2012–038–FA. D. Sample DR2–006 from USGS field activity 16AOA01. All images are by the USGS.

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**U.S. Department of the Interior
U.S. Geological Survey**

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Supersedes OFR 2006-1187; OFR 2018-1100

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Preface

The U.S. Geological Survey Woods Hole Coastal and Marine Science Center Samples Repository was formed in late 2002 as a dedicated effort to catalog and organize scientific samples collected by researchers at the Woods Hole Science Center, as it was then known. The “Archival Policies and Collections Database for the Woods Hole Science Center’s Marine Sediment Samples” was released as U.S. Geological Survey (USGS) Open-File Report 2006–1187 in 2007. This report documented the collections management policies and procedures initially developed for the samples repository and provided a collections inventory that represented the samples that were available through the samples repository at that point in time.

The samples repository has since grown because research efforts and field work have continued, with new facilities built to house the sample collections, improved collections management procedures developed, and new acquisitions accepted into the collections. An overview of the Woods Hole Coastal and Marine Science Center Samples Repository facilities was originally published as USGS Open-File Report 2018–1100 and described the types of samples preserved and managed; that document is being updated with this document to include up-to-date collections management procedures that are directed by policy and implementation guidance provided to USGS researchers and managers at the Bureau level. These policy requirements have been implemented locally by the samples repository to ensure the preservation and usefulness of these samples for future research as well as to comply with management standards required for scientific collections across the USGS. This report, as well as the companion data release, “Collections Inventory for the U.S. Geological Survey Woods Hole Coastal and Marine Science Center Samples Repository,” supersede the information and inventory provided by USGS Open-File Reports 2006–1187 and 2018–1100.

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Conversion Factors

U.S. customary units to International System of Units

Multiply	By	To obtain
square foot (ft ²)	0.09290	square meter (m ²)

Temperature in degrees Celsius (°C) may be converted to degrees Fahrenheit (°F) as follows:
°F = (1.8 × °C) + 32.

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:
°C = (°F – 32) / 1.8.

Abbreviations

CMGDS	Coastal and Marine Geoscience Data System
CMHRP	Coastal and Marine Hazards and Resources Program
CSC	Collections Steering Committee
FAN	field activity number
GCMS	Geologic Collections Management System
NGGDPP	National Geological and Geophysical Data Preservation Program
NMNH	National Museum of Natural History
USGS	U.S. Geological Survey
WHCMSC	Woods Hole Coastal and Marine Science Center
WHOI	Woods Hole Oceanographic Institution

Collections Management Plan for the U.S. Geological Survey Woods Hole Coastal and Marine Science Center Samples Repository

By Brian J. Buczkowski

Abstract

Since 2002, the Woods Hole Coastal and Marine Science Center Samples Repository has been supporting U.S. Geological Survey research by providing secure storage for geological, geochemical, and biological samples, organizing and actively inventorying these sample collections, and providing researchers access to these scientific collections for study and reuse. Over the years, storage facilities have changed, and new collections management strategies have been adapted as sample collections have grown and as research programs and focuses have shifted. The commitment of the samples repository to preserve and provide physical samples for future research, however, has remained the same. This report documents the collections management plan developed and implemented by the Woods Hole Coastal and Marine Science Center Samples Repository to manage the center's scientific collections.

Introduction to the Woods Hole Coastal and Marine Science Center Samples Repository

The U.S. Geological Survey (USGS) Coastal and Marine Science Center (CMSC) in Woods Hole, Massachusetts, has been a member of the Woods Hole scientific community since 1962. From the beginning, samples collected by USGS scientists in this office have provided invaluable insight into the nature and character of coastal, estuarine, and nearshore marine environments, as well as the sea floor, a region that remains to this day one of the least explored places on the Earth. Many of these samples are unique and irreplaceable because of either the great difficulty and expense in their collection or the changing nature of these locations.

Early in its history, the Woods Hole CMSC, then known as the Branch of Atlantic Marine Geology, established an agreement with the Woods Hole Oceanographic Institution (WHOI) to co-locate USGS collections of marine cores, dredged rocks, and surface sediments within the WHOI Core Lab repository. This was done to preserve these samples for further investigations and ensure that the scientific legacy of USGS research endured.

The cooperative agreement between the two institutions continues to this day; D-tubes containing split cores, subsamples of dredges, and sediment grab samples (grabs) collected by USGS scientists are still housed in the WHOI repository. In addition to the protected storage provided by WHOI, the USGS acquired a number of outdoor climate-controlled vans to store grab samples, subsamples, split and whole cores, and small sample collections (descriptions of these sample types are detailed in the “Types of Samples Preserved and Maintained in the Samples Repository” section of this report) in refrigerated, freezing, and ambient temperatures ([fig. 1](#)). These outdoor vans became collectively known as the “Freezer Farm.” Upon acquiring these storage units, the USGS took steps to create and maintain order among the vans and the samples housed within them.

The Woods Hole Coastal and Marine Science Center (WHCMSC) Samples Repository was officially established in 2002 to formally catalog and organize these geological, geochemical, and biological scientific collections. Policies and procedures developed for their preservation and access have been previously released in Buczkowski and Kelsey (2007) and Buczkowski (2018). Since its inception, the samples repository has seen continued developments in collections management strategies, as well as the construction in 2007 of the K.O. Emery Geotechnical Wing, which currently [2022] houses the samples repository ([fig. 2](#)). This report supersedes previously released collections management plans and includes up-to-date guidance for the samples repository.



Figure 1. Photograph of storage vans, referred to as the “Freezer Farm,” outside the U.S. Geological Survey offices in Woods Hole, Massachusetts, in 2004. Photograph by Brian Buczkowski, U.S. Geological Survey.

Mission Statement

The mission of the samples repository is to:

- serve as the USGS repository for geological, geochemical, and biological samples collected through field research sponsored by the WHCMSC,
- provide long-term storage of these samples collected by WHCMSC scientists and affiliated researchers under controlled conditions to ensure optimum preservation, and
- maintain an inventory of sample collections stored in the samples repository and promote the secondary usage of the sample material in its care by the scientific community.

The samples repository provides secure storage, processing, and resampling services to USGS scientists and researchers from government and academic institutions investigating the history, nature, and properties of geological, geochemical, and biological materials collected from coastal, marine, and nearshore environments. Collections in the samples repository continue to be a resource for research and scientific investigation as a result of preservation efforts and access to the samples through the collections inventory (Buczkowski and others, 2018).

Samples Repository Facilities

The samples repository is co-located on WHOI’s Quissett Campus in Woods Hole. The K.O. Emery Geotechnical Wing of the USGS facility in Woods Hole serves as the primary storage for all geological, geochemical, and biological samples



Figure 2. Photograph of the K.O. Emery Geotechnical Wing of the U.S. Geological Survey facility in Woods Hole, Massachusetts, in 2018. Photograph by Brian Buczkowski, U.S. Geological Survey.

either collected through research sponsored by WHCMSC or in the permanent custody of the USGS. Storage facilities within the Geotechnical Wing consist of walk-in refrigerated and frozen cold rooms, ambient storage space for dry samples, and an analysis and sampling facility.

The refrigerated cold room measures 774.5 square feet (ft²) and maintains a storage temperature of 39 degrees Fahrenheit (°F; 4 degrees Celsius [°C]). The freezer, measuring 420 ft², maintains a storage temperature of −4 °F (−20 °C). These temperature-controlled and monitored facilities have been partially built into a hillside to maximize insulation and efficiency. They are designed to exclude the ambient environment, because fluctuations in air temperature and humidity can degrade the viability of the samples for scientific research and promote the growth of mold on and in the samples. Both rooms are equipped with rolling storage racks, which maximize available space for sediment and subsample storage and allow for future expansion as collections grow (fig. 3). Core racks and mobile storage carts are also available to organize and store samples in these rooms.

Doors to the walk-in refrigerator and freezer are locked, and access is only permitted with the use of a proximity pass system administered by security and facilities personnel at the WHCMSC. Key pass swipes are monitored and recorded to track personnel going into and out of these spaces. Refrigerator and freezer doors are operable from the inside with a proximity pass scanner and a “push to exit” button, which is designed to prevent anyone from being locked in. Panic buttons are in each of the cold rooms in the event of injury or emergency. These panic buttons sound an alarm in the lobby in the adjacent WHCMSC Gundersen Wing. Users of the facilities are instructed to press and hold the panic button until help arrives; the alarm will only sound while the button is pushed. Administrative personnel working in the lobby have access to the cold rooms and have been trained to respond to the panic button alarm. Additionally, instructions for responding to the alarm are posted in the lobby.

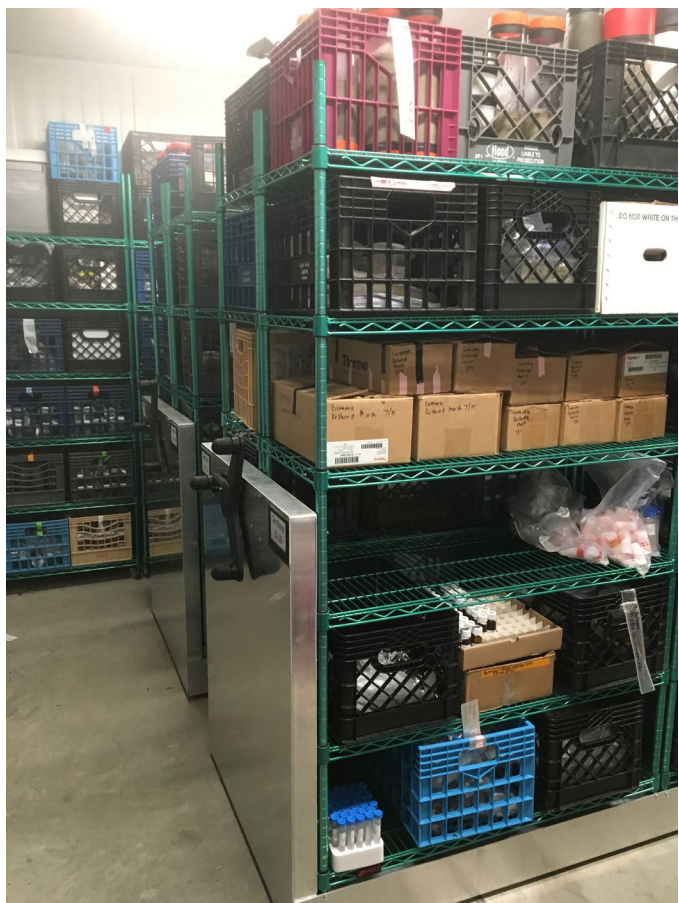


Figure 3. Photograph of rolling storage racks installed in the U.S. Geological Survey Woods Hole Coastal and Marine Science Center samples repository walk-in freezer. Photograph by Brian Buczkowski, U.S. Geological Survey.

Protective gear worn in the freezers is necessary for any activity exceeding 2 minutes. Steel-toed thermal boots, thermal union suits, glove liners, gloves, facemasks, and several types of hats and hoods are available to project staff accessing and working in these facilities. Detailed safety information and updated job hazard analysis reports for facilities and equipment in the samples repository are available through local WHCMSC safety officers.

Types of Samples Preserved and Maintained in the Samples Repository

There are six categories of samples: cores, grabs, dredges, slides, subsamples, and other samples. The bulk of these sample collections consist of marine sediment cores, grab samples, and dredged rock samples. Categories defined by the devices with which samples were collected are corers, grab samplers, and dredges (descriptions for many of these devices are detailed in Hopkins [1964]). The slides

and subsamples categories are derivative products from the cores, grabs, and dredges. The samples repository maintains small collections of other sample types, such as corals, water samples, and peel samples, which are also accounted for in the collections inventory.

Cores

Cores are cylindrical samples of rock or unconsolidated sediment collected vertically through the surface and into the substrate beneath. A core, when collected perpendicular to the stratigraphic layers below the surface, provides a cross-section of the depositional history at the specific location of collection. Most of the cores in the samples repository were collected from marine, coastal, and estuarine environments and are used to construct geologic histories, to characterize subsurface depositional features, and to confirm stratigraphic data resulting from geophysical surveys.

Most cores are split in half longitudinally by researchers to view the sediment and character of the core for descriptions and to provide access for sampling. These split halves are stored in D-tubes horizontally in the samples repository (fig. 4). In most cases, an archived half is retained as an untouched record of the original core, and a working half is used for sampling and analysis.

Grabs

Grab samples consist of the unconsolidated substrate found on the surface of the sea floor. These samples usually consist of loose sediment, as well as any seashells, shell fragments, or other components of the sea floor captured by the grab device. Grab samples of loose sediment and shell material are bagged after collection and housed in refrigerated storage or they are dried and stored in ambient temperature and humidity conditions in the samples repository.

Dredges

Dredge samples are rocks and debris raked and plucked from the seabed by dredges towed behind research vessels. These samples are boxed and stored in ambient environmental conditions either in the samples repository core laboratory or in long-term storage at WHCMSC's Marine Operations Facility.

Slides

The samples repository maintains a collection of slides created for microscopic analyses. This slide collection consists of foraminifera and diatom tests picked by paleontologists and exploration geologists from marine and terrestrial sediment cores, thin sections of geological sample material, and smear slides of unconsolidated marine sediment.



Figure 4. Photograph showing sediment core storage containers (known as D-tubes) containing split cores labeled and archived in the U.S. Geological Survey Woods Hole Coastal and Marine Science Center samples repository walk-in refrigerator. Photograph by Brian Buczkowski, U.S. Geological Survey.

Subsamples

Subsamples are samples taken from cores, grabs, and dredges that were previously described and analyzed. These subsamples may often be used again for further research and investigation. Subsamples are retained by the samples repository and stored according to their long-term preservation needs. These samples are also available for further study upon request.

Other Samples

WHCMSC personnel may occasionally collect other sample types and materials during the course of research. These samples are also preserved and inventoried in the samples repository. They include dried biological specimens (predominantly coral skeletons), bottled water samples, and dried peel samples and are available for research upon request.

Acquisition of Samples

Samples submitted for inclusion in the samples repository are acquired through collection in the field or through the discovery of sample collections that were used for past research. The majority of the samples and scientific collections preserved and maintained by the samples repository come from field activities sponsored by the WHCMSC. Field activities originating from all three USGS Coastal and Marine Hazards and Resources Program science centers (Woods Hole; St. Petersburg, Florida; and Santa Cruz, California) and from activities with participation from program personnel are assigned field activity numbers (FANs) using the field activity management and data tracking tool Compass—a specifically created software and user interface developed and maintained in-house by Coastal and Marine Hazards and Resources

Program programmers and data managers (Frances Lightsom, USGS, written commun., October 28, 2016). FAN registration includes documentation of all participating personnel, scientific objectives, equipment for acquiring data and samples, dates, and location of operation. Every sample collected in the field is associated with a FAN, and FANs are used to identify key pieces of information required to catalog and organize the samples (see the “Evaluating and Accepting Samples Submitted to the Samples Repository” section in this report). Compass is only accessible to USGS personnel in the Coastal and Marine Hazards and Resources Program; however, field activity information is publicly available through the USGS Coastal and Marine Geoscience Data System (CMGDS; U.S. Geological Survey, 2022a).

Often legacy collections assembled by program researchers no longer with the USGS or as part of past research projects are discovered stored in offices and other locations outside the samples repository. Information related to their acquisition in the field can be traced; and information pertaining to collection and research history can be gathered by researching the available information in Compass, in the CMGDS, and from available data libraries (List and others, 2015). This information can be used to incorporate these legacy collections into the working collections managed by the samples repository.

Upon discovery, legacy collections may be determined to be in poor condition. Samples that have deteriorated or been damaged beyond any useful value for further scientific study or are lacking essential collection information to identify their condition and origin will not be accepted into the samples repository (see the “Evaluating and Accepting Samples Submitted to the Samples Repository” section of this report).

Samples in a legacy collection that do not have an associated FAN but which are donated into the permanent custody of the WHCMSC and are accompanied by sufficient information for identification and their collection history may be considered for inclusion into the samples repository. If these samples are accepted for inclusion, a new FAN is registered by using available information; these donated collections are evaluated in the same manner as legacy collections.

Planning for Collection and Reserving Storage Space

It is the responsibility of project scientists to ensure there is storage space and resources available to accommodate the incoming samples originating from field activities sponsored by the WHCMSC before starting any sample collection field activity. The principal investigator or collecting scientist contacts the samples repository curator of geologic collections and provides preliminary information about all sample collection activities. The principal investigator or collecting scientist lists for the curator an approximate number of samples to be recovered, the type of samples to be collected, and storage required (ambient, refrigerated, or frozen) to preserve them. This information is used to complete a collection plan required by USGS

policy in USGS Instructional Memorandum CSS 2019–01 (U.S. Geological Survey, 2019b) to be created as part of all USGS project work plans describing the need for, proper care, and planned disposition of all new working collections. A collection plan template is available for USGS researchers and collections managers from U.S. Geological Survey (2020). This plan is completed and archived locally and updated as needed. Completed collection plans are used by the curator to update the samples repository holdings recorded in the USGS Registry of Scientific Collections (U.S. Geological Survey, 2022b).

Upon receipt of this information, the curator plans the storage of incoming samples. During this documentation and planning period, the curator locates and reserves space for the new samples and notifies the project scientist where the samples will be stored.

Evaluating and Accepting Samples Submitted to the Samples Repository

The K.O. Emery Geotechnical Wing provides secure storage for working collections: suites of samples actively used for scientific research that may be subject to consumptive analysis and are not initially intended for long-term preservation due to their expendable nature, as well as collections that have been evaluated and determined to have further scientific value to the USGS and should be preserved to ensure their scientific integrity and availability for future scientific research. Samples and collections actively being used for research may be stored in the samples repository facility for the duration of the project but may not necessarily be accepted into the samples repository until they have been evaluated as appropriate for inclusion.

Scientific collections are evaluated and periodically re-evaluated for their research potential, possible reclassification, appropriateness for acceptance and retention in the samples repository, and inclusion into the collections inventory. Those samples and collections with metadata insufficient to identify them and their collection history and those that are not deemed appropriate for continued retention on the basis of their iconic, historic, or further scientific value (based on conversations with CMHRP scientists that may have related scientific interests or in-depth knowledge of the collecting program the samples came from) will not be formally accepted into the samples repository nor included in the collections inventory.

Essential information that identifies samples and scientific collections for evaluation was defined in the USGS Geologic Collections Management System (GCMS; Geologic Materials Repository Working Group, 2015) and further developed by the USGS Collections Steering Committee to become the five-point minimum standard information needed to evaluate samples and collections for acceptance into the samples repository (U.S. Geological Survey, 2019a). In order

to be considered for acceptance into the samples repository, samples must have accompanying metadata that address the five necessary components of the five-point standard:

- a sample name or some other identifier that is unique to that sample in the context of the field activity or greater collection to which it belongs (this may be assigned in the field or by the curator upon discovery in a legacy collection);
- information about the specific location of collection, preferably as geographic coordinates (however, site names and geographic features can be used to approximate collection site locations) in order to adequately display the collection location on a map for the samples managed in the samples repository [in the case of samples collected at sea (which describes the bulk of the samples repository materials), water depths recorded at the time of collection are also required];
- any available information relating to the field activity, cruise, or expedition the sample came from (at the most basic level, the samples repository requires the name of the principal investigator or collecting scientist);
- the date of collection for each sample; and
- information pertaining to the equipment and techniques used to collect the sample, along with information or guidance on the best way to preserve the sample for the intended purpose (also, in the case of legacy collections, information on storage history that may shed light on the sample's condition and potential use for further research).

For samples without an associated FAN, these five pieces of information can be used to initiate a FAN request (fig. 5). This newly assigned FAN is used to link samples in the collections inventory to all available information about them provided through CMGDS.

Samples in the samples repository are periodically re-evaluated to ensure their continued preservation and usefulness for ongoing and future research. Re-evaluation takes into consideration storage availability and limitations, as well as the physical condition of the samples, and is used to determine the appropriate disposition of the materials and minimize the loss or destruction of otherwise valuable samples.

The recommended method to submit collections metadata to the samples repository is to electronically send all information directly to the curator. To organize and document this information, the WHCMSC has made available a Microsoft Excel template (U.S. Geological Survey, undated a). These metadata are then formatted into a collections inventory database, which provides search access to the samples repository's holdings through the samples repository inventory search page (Buczowski and others, 2018).

6 Collections Management Plan for the Woods Hole Coastal and Marine Science Center Samples Repository

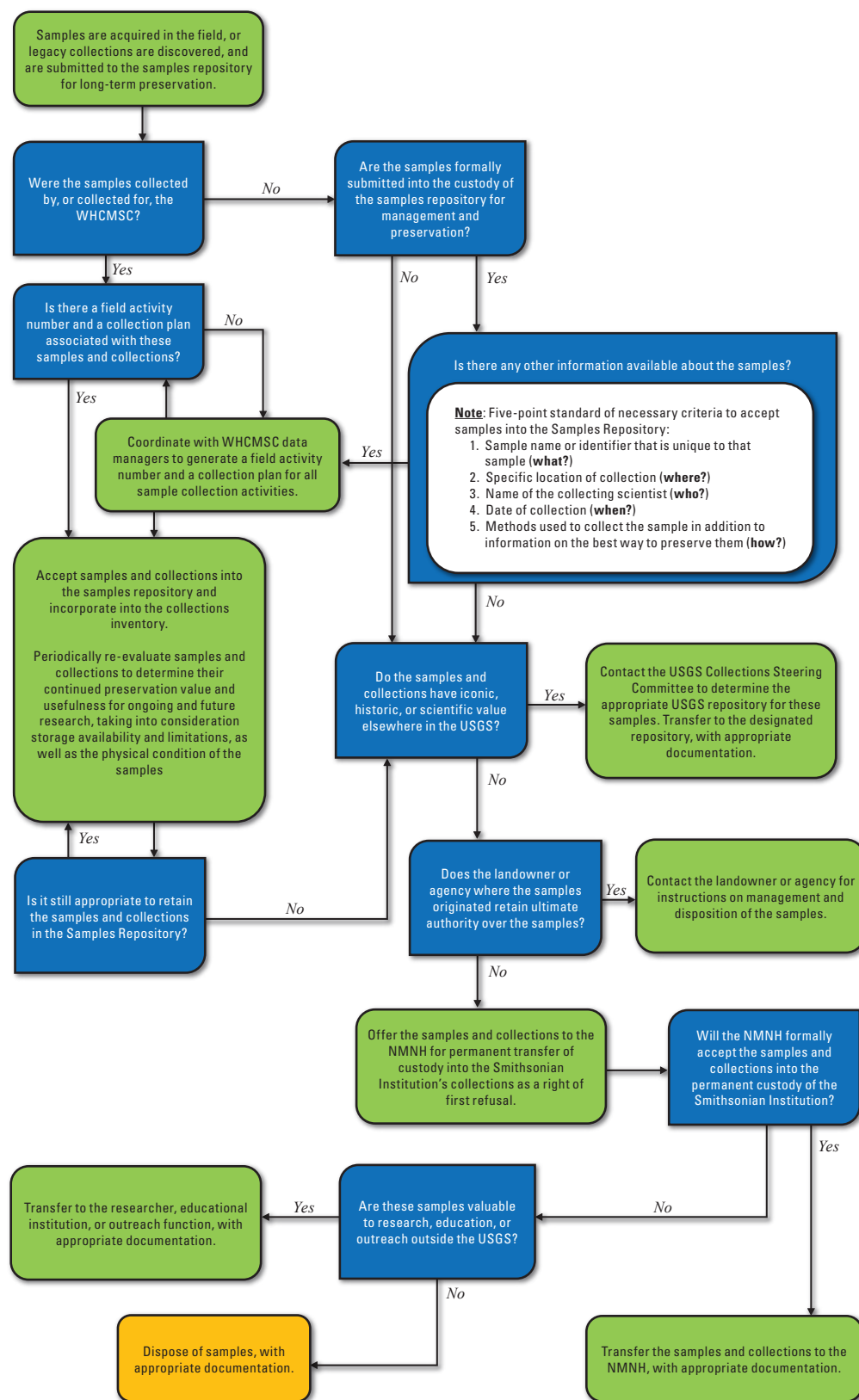


Figure 5. Decision tree used to evaluate scientific collections considered for inclusion in the U.S. Geological Survey (USGS) Woods Hole Coastal and Marine Science Center (WHCMSC) samples repository, modified from Geologic Materials Repository Working Group (2015, fig. 3) and List and others (2015, fig. 1). Blue boxes note questions related to evaluation and acceptance of samples and collections into the samples repository, green boxes represent outcomes and steps along the process, and the yellow box indicates the final stage in the evaluation process where samples are disposed of with proper documentation. NMNH, [Smithsonian Institution] National Museum of Natural History.

Health and Safety

Samples or suites of samples from environmental studies may contain preservatives, such as formalin or sodium azide, or trace amounts of heavy metals, such as mercury, that may be harmful to humans. Any samples submitted to the samples repository that may contain any concentration of toxic preservatives, heavy metal content, asbestos, radioactivity, or any other suspected hazard must be explicitly identified as such before the materials are accepted. The curator consults with local safety officers on the appropriateness of retaining these materials onsite or, if needed, determines if these sample collections would be better kept elsewhere to prevent possible harm through exposure to toxic elements.

Sample Storage and Organization

Available storage in the samples repository is divided into six locations. Each location has been assigned an identifying code (table 1).

Specific storage within each space in the K.O. Emery Geotechnical Wing (RE01, FR01, and LAB) is further broken down to specify the precise location of sample collections, facilitating retrieval. Individual shelving units on the rolling storage racks, as well as stationary shelves, core racks, and mobile storage carts, have been assigned section numbers. Each shelf is also numbered, starting at 01 on the top shelf and continuing downward. These three components (storage location, section number, and shelf number [where available]) are combined into a single storage identification number,

Table 1. Available storage locations in the U.S. Geological Survey Woods Hole Coastal and Marine Science Center samples repository and the identifying codes used to identify these locations.

[WHCMSC, Woods Hole Coastal and Marine Science Center; USGS, U.S. Geological Survey; WHOI, Woods Hole Oceanographic Institution]

Location code	Storage location
CURATOR	Storage space in the USGS office of the curator of geologic collections
FR01	Frozen storage space in the WHCMSC K.O. Emery Geotechnical Wing
LAB	Short-term dry storage space in the WHCMSC K.O. Emery Geotechnical Wing
MOF	Long-term dry storage space at the WHCMSC Marine Operations Facility
RE01	Refrigerated storage space in the WHCMSC K.O. Emery Geotechnical Wing
WHOI	Long-term dry storage space at the WHOI Core Lab repository

which is assigned to each inventoried sample in the samples repository. As an example, samples stored in refrigerated space, in section 02, on the third shelf from the top, would be given the location identifier RE01.02.03. Updated information on the current [2022] layout and storage schematics of the K.O. Emery Geotechnical Wing can be found on the samples repository facilities page (U.S. Geological Survey, undated b).

The samples repository uses barcode labels to identify samples, coordinate storage, and aid in retrieving samples. Barcodes are affixed to various containers in the samples repository and are related to individual entries in the collections inventory. Some containers may hold only one sample. For example, D-tubes may contain only one split half of a core. Other containers, such as milk crates and boxes, may contain numerous samples. The curator can use barcodes in the collections inventory to track the physical locations of individual samples in the samples repository as well as those on loan.

The Collections Inventory

The collections inventory database for the samples repository is published in Buczkowski and others (2018). Sample collections in the samples repository can be queried and selected through a web-based interface. This collections inventory database consists of individual tables for each sample type (see the “Types of Samples Preserved and Maintained in the Samples Repository” section of this report) and is built in PostgreSQL (Buczkowski and others, 2018). These tables contain information related to the geospatial location the sample originated from, information related to processing and documentation of the sample once it was brought back for research, as well as the sample’s location in the samples repository. The collections inventory database pulls information relevant to sample collection activities from CMGDS and incorporates it into the inventory search results to provide users with detailed and consistent information.

Accessing Samples and Scientific Collections

The responsibility of the samples repository is to provide samples and scientific collections for research and reuse and to oversee their preservation and security. Collections of samples can be searched by using the user interface of the inventory (fig. 6) from Buczkowski and others (2018).

The user interface of the inventory allows for search and selection either through a geographic information system (GIS) display or through a web-based form for known criteria (table 2). Both options query and export selected portions of the collections inventory. Search results are downloaded as comma-separated value (CSV) files and come with customized metadata. The entire inventory and associated metadata may also be downloaded as a CSV file.

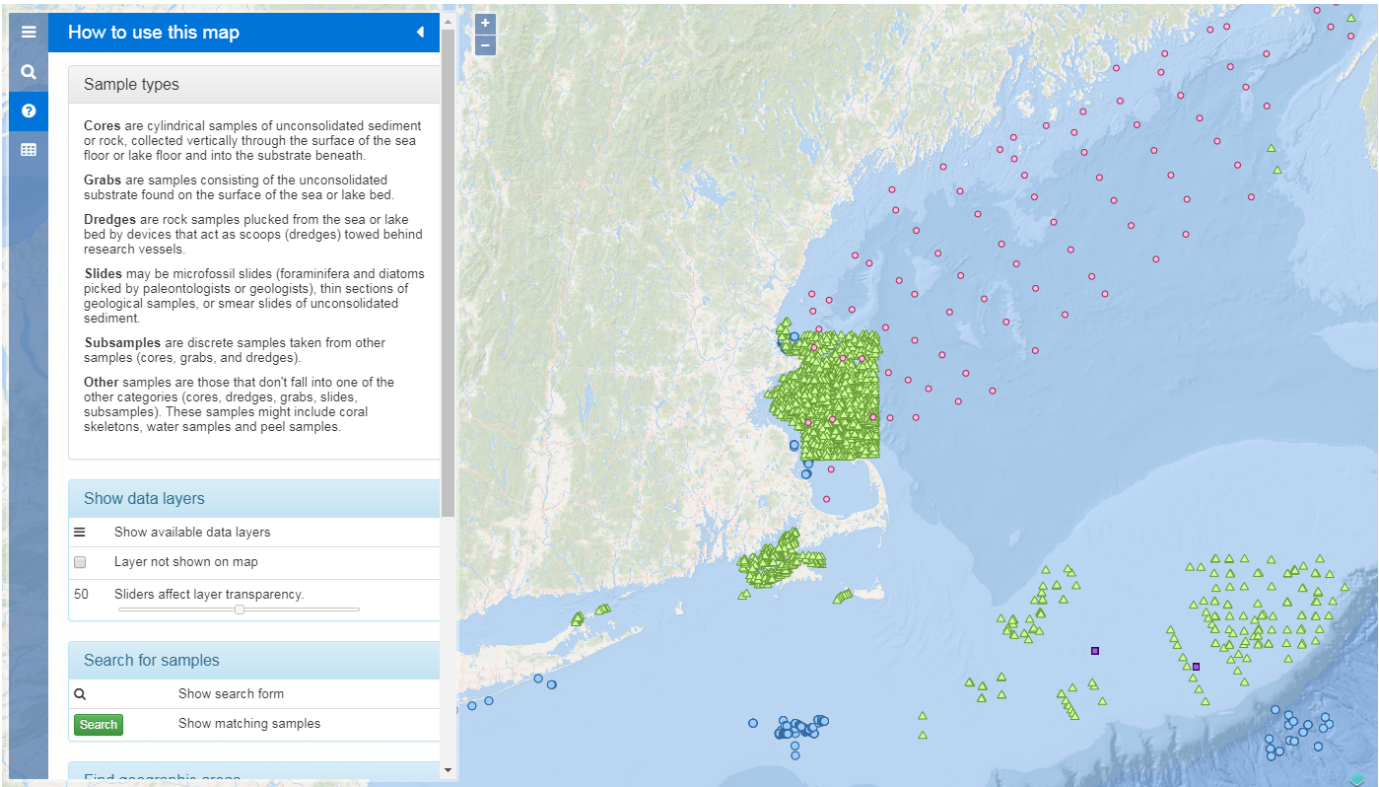


Figure 6. Screen capture showing the user interface of the geographic information system used to search the collections inventory for the U.S. Geological Survey Woods Hole Coastal and Marine Science Center samples repository (Buczowski and others, 2018). Cores are represented by blue circles; grabs are represented by green triangles; dredges are represented by brown diamonds (none shown in example); slides are represented by purple squares; subsamples are represented by pink circles; and samples classified as “other” are represented by white triangles (none shown in example).

Table 2. Search fields and definitions in the U.S. Geological Survey Woods Hole Coastal and Marine Science Center samples repository.

Search field	Explanation
Platform	Search by platform name or vessel used to collect the samples
Scientist	Search by the name, or partial name, of the principal investigator or collecting scientist
Activity	Search by the field activity number assigned to the cruise
Sample type	Select from a list of sample types available
Device	Select from a list of collection devices
Date collected	Select dates by using the calendar picker

Requesting Samples

Samples needed for research can be requested through request forms (U.S. Geological Survey, undated c); request forms include information about the samples repository’s policies on loan requests, resampling, and data return. The samples repository makes every effort to fulfill sample requests and aid in research whenever possible. Onsite resampling visits are initiated through these sample request forms; access to the samples repository facilities is coordinated through the curator.

The samples repository maintains that principal investigators, collecting scientists, and project researchers have exclusive use of all samples and scientific collections for the tenure of the original project for which they were collected. For this reason, sample requests are evaluated on a case-by-case basis by the curator in consultation with project principal investigators, if they are available, to determine the status of their research and the availability of associated samples.

Notification of Request Status

All sample requests are addressed upon receipt, and the individual initiating the request is notified by email regarding the status of their request and the availability of the samples. Once the request has been approved, the curator completes and distributes a sample loan agreement form, which the requesting individual signs and returns to the samples repository before any sample material is made available.

Conditions of an Approved Loan

By signing the sample loan agreement form, the requesting individual acknowledges the conditions outlined in this section and assures that the conditions will be met during the duration of the loan. The curator returns a copy of the sample loan agreement form to the individual making the request after the sample request has been approved.

Term of Loan

All samples loaned out for research, along with copies of datasets derived from analysis and citations for any publications that have used data derived from the analysis of these samples, are returned to the samples repository at the borrower's expense, no later than the agreed upon date stated at the top of the sample loan agreement form or within 1 week if an earlier return is requested by the curator. According to the terms of the loan, datasets containing data derived from WHCMSC samples are to link to the collecting field activity information provided online through CMGDS. Samples approved for consumptive analyses as described in the loan request will not be assigned a term.

Use of Samples and Scientific Collections

Samples on loan are for the sole use of the person or persons stated on the sample loan agreement form. The borrower will not loan, deliver, lease, or transfer the samples to any other group or entity. When displaying the samples or publishing the results of any resulting research, the borrower should clearly state that these samples belong to the USGS and give proper credit to the source of the sample. If samples are under the ultimate authority of the landowner or agency managing the location where the samples were collected (such as the National Park Service, Bureau of Land Management, or Tribal authorities), the curator contacts the proper authority to request authorization to loan samples for a requester and for terms to be included in the loan on behalf of the landowner or agency.

Alteration of Samples

In the sample request form or email correspondence, the requester should clearly explain all proposed tests and anticipated alterations planned for the samples while they are in the borrower's care. Requests may be negotiated or denied if there is not enough sample material available for the intended analyses based on the proposed analytical methods. Samples on loan should be used only for the research and data extraction purposes stated on the sample loan agreement form. The curator must be contacted if further analyses are needed.

Loss or Damage

The samples repository recognizes that many analytical methods are destructive in nature. However, unless it is agreed that the sample or any part of it will not be returned to the samples repository after analysis, the borrower is responsible for reporting any damage or loss of material to the curator upon return of the samples.

Commitment to Long-Term Preservation

Samples and scientific collections fulfilling the five-point standard that are formally accepted and inventoried into the samples repository are the responsibility of the principal investigator or collecting scientist in cooperation with the curator. These samples and scientific collections will be cared for and available for reuse as a long-term resource. Should storage conditions change or space considerations arise, it is the duty of the WHCMSC center director and the curator, in consultation with the principal investigator or collecting scientist, if available, to locate alternate storage or disposition solutions for the samples. Alternate storage locations may be at another USGS facility or in an appropriate repository outside the USGS. Final authorization for any transfer of custody of scientific collections to repositories outside the Bureau must come from USGS associate directors or officials representing the landowner or agency managing the location where the samples were collected.

Transfer of Custody to the National Museum of Natural History

The Sundry Civil Act of March 3, 1879 (20 USC §59), as amended, directs that:

“All collections of rocks, minerals, soils, fossils, and objects of natural history, archaeology, and ethnology, made by the National Ocean Survey, the United States Geological Survey, or by any other parties for the Government of the United States, when no longer needed for investigations in progress shall be deposited in the National Museum.”

In the absence of legal authority applicable to samples collected on lands or waters managed by other Federal agencies, the Smithsonian Institution's National Museum of Natural History (NMNH) is designated as the ultimate repository for all scientific samples and scientific collections collected by the USGS and other Federal agencies that are deemed appropriate for permanent retention. If samples that have already been accepted into the samples repository are evaluated and decisions are made to remove samples from the custody of the USGS due to storage limitations, duplication of sample material, or if samples are determined to no longer meet the scientific mission of the USGS, the curator is bound to offer these samples to the NMNH for permanent transfer into the Smithsonian Institution's collections as a right of first refusal.

Options for Disposition

If the NMNH declines the offer to accept the samples into their custody, the WHCMSC center director and curator, in consultation with principal investigators, collecting scientists, and appointed WHCMSC advisors, will give due diligence to locating alternate storage and determine the final disposition for these samples by following the decision tree diagram in [figure 5](#). Options for disposition include transferring custody of the samples to research, educational, or outreach opportunities outside the USGS with appropriate documentation to track the transfer and justify disposition decisions. These opportunities are identified using knowledge of known research collaborators related to the samples as well as querying local and regional educational and outreach programs that may benefit from the use of these samples in their activities.

If all avenues for transfer have been exhausted, the curator, in consultation with the WHCMSC center director, may proceed with disposal and destruction of these samples in accordance with Federal, State, and local regulations. Disposal and destruction actions will be documented to account for these samples and to justify disposal decisions.

Collections Management Across the U.S. Geological Survey

The USGS has been collecting samples for research and analysis since its formation in 1879. These samples and scientific collections represent the scientific legacy of the USGS and are an invaluable resource for further study and investigations. It is the responsibility of USGS scientists and managers to preserve the scientific integrity of these samples and collections to meet the USGS scientific mission (U.S. Geological Survey, 2019b).

The USGS National Geological and Geophysical Data Preservation Program was established in accordance with the National Geological and Geophysical Data Preservation Program Act of 2005 (42 U.S.C. §15908), to develop a uniform way to manage collections of geological and

geophysical data, ensure their preservation, and ensure access (accomplished by forming the Geologic Materials Repository Working Group, an assembly of researchers and collections managers charged with formulating a comprehensive and adaptable collections management plan to accommodate the varied types of collections throughout the USGS. The working group published "The U.S. Geological Survey Geologic Collections Management System (GCMS)—A Master Catalog and Collections Management Plan for the USGS Geologic Samples Collections" (Geologic Materials Repository Working Group, 2015), which proposes a set of collections management policies and procedures that can be applied to all USGS scientific collections.

The USGS established a national governing body to advise USGS leadership and management on establishing scientific policies and protocols for the management of USGS scientific working collections as well as interfacing with local USGS science centers, researchers, and curators to facilitate the implementation of these policies. To coordinate management and stewardship of USGS scientific collections, the USGS Collections Steering Committee (CSC) was chartered under USGS Survey Manual chapter 308.76 (U.S. Geological Survey, 2015).

In 2019, the USGS presented its policy on scientific working collections, released as Instructional Memorandum CSS 2019–01 (U.S. Geological Survey, 2019b). This policy was developed by the CSC and is accompanied by the "Guide to Planning for and Managing Scientific Working Collections in the U.S. Geological Survey" (U.S. Geological Survey, 2019a), an online resource that provides USGS researchers and managers guidance for implementing the policies in CSS 2019–01. The collections management plan documented in this report was developed in compliance with USGS policy and the guidance provided by the CSC.

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Glossary

accept To formally receive a sample or collection into the custody of the Woods Hole Coastal and Marine Science Center Samples Repository and incorporate it into the inventory.

barcode A code in the form of numbers, which can be human- and machine-readable, and a pattern of parallel lines of varying width which can be read by an optical laser scanner. Barcodes are affixed to samples and sample containers to identify their contents.

catalog The act of classifying objects into categories and documenting them with descriptive detail and identifying or descriptive unique numbers.

collection plan A document required by USGS survey manual instructional memorandum CSS 2019–01, describing the need for, proper care, and planned disposition of all new working collections. This document is established during the project work plan process for new U.S. Geological Survey (USGS) research and is approved by the science center director that documents, at a high level, the planning for, management and expected disposition of the working collection. This plan is a living document and may be amended over the lifespan of the collection.

collecting scientist The researcher who was present for the sample collection in the field and who is responsible for recording any pertinent details, such as the location from which the sample was taken. This researcher may be the principal investigator but is not always the same person (see principal investigator).

collection Assets gathered together during the course of field work or study and assembled according to a rational scheme, such as a common research project, principal investigator, or sample type (see scientific collection and working collection).

collections management The ongoing process of acquiring and maintaining a collection. It involves defining the policies and procedures that govern sample handling, labeling, storage, cataloging, conservation, and access.

curator The individual who is responsible for the organization, preservation, and maintenance of sample collections and inventories.

D-tube A tube-shaped container, usually some sort of plastic, used to store sediment cores that have been split longitudinally. This container is usually semicircular to accommodate the split cylinder of the core and resembles the capital letter “D” in shape.

data library A facility that provides access to and retrieval of data and data-derived products.

disposition The outcome of the collection evaluation process that determines if a collection, or portion thereof, is to be transferred or disposed of in accordance with applicable Bureau requirements.

field activity Any activity sponsored by and tracked by the USGS Coastal and Marine Geology Program for the purpose of collecting data and making observations in the field.

field activity number A unique identifying number assigned by data managers in the USGS Coastal and Marine Geology Program to track a field activity and link it to any samples, data, and derived records to which it is associated.

five-point standard The minimum standard information needed to evaluate samples and collections for acceptance into the samples repository: sample number assigned in the field (what), geographic location of field station (where), collector (who), date collected (when), and collection methods and requirements for preservation (how).

geographic information system A system designed to capture, store, manipulate, analyze, manage, and present all types of spatial or geographical data.

iconic value Important or special worth for historical or institutional reasons (for example, a former director’s field collections or collections from the earliest surveys of the WHCMSC).

inventory A complete list of samples and scientific resources available from a repository.

legacy collection A suite of samples collected by a research scientist who is no longer with the USGS or were collected as part of past research projects, which may or may not require additional investigation to determine the minimum standard information needed to evaluate these samples and collections and accept them into the samples repository (see scientific collection).

metadata Documentation about a sample or collection that describes pertinent background information, including field information (original geographic location, collector, date, sample identification number), the nature of the material, and any associated descriptive characteristics.

peel sample A sample derived from a split sediment core. Peel samples are generated by applying an adhesive to the cut surface of a split core and backing that adhesive with a flexible screen or other suitable material. Once the adhesive has dried, the backing is peeled back, removing the adhesive as well as the surface of the split core that was in contact with the adhesive.

policy A guiding principle designed to influence and determine decisions and actions.

preservation Various steps necessary to care for geoscientific data and collections, including data acquisition, organization, and maintenance; promoting user awareness of samples and data; ensuring data accessibility; and assurance that the data are useful and of sufficient quality.

principal investigator The researcher responsible for the collection of the samples and the research performed on them.

procedure An established action or method for implementing policy.

repository A controlled facility that assumes responsibility for the long-term management of scientific collections and ensures that they are safely stored, discoverable, and accessible.

sample Any material collected for research purposes as a representative example of the field location.

sample name Alphanumeric identification number (ID) assigned to an individual sample to differentiate it from other samples in its collection group. Different IDs may accrue to the same sample as a result of processing performed by various analytical labs.

sample type A categorization of samples based on the general method used to collect or obtain them. Samples collected in the field are divided into the categories of “cores,” “grabs,” “dredges,” and “other.” The samples repository also maintains collections of derived samples, categorized as “subsamples” and “slides.”

scientific collection Collections that are created for the purpose of supporting science and serving as assets to research, rather than for their market value as collectibles or their historical, artistic, or cultural significance (see working collection).

working collection A suite of samples being used actively for scientific research. Samples in working collections are subject to consumptive analysis and not initially intended for long-term preservation due to their expendable nature. Working collections that may have long-term scientific value to USGS research beyond their original purpose will be evaluated, and periodically re-evaluated, to determine if all or a portion of the collection continue to possess scientific integrity and remain essential to the USGS research mission (see scientific collection).

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U.S. Geological Survey Scientific Collections <https://www.usgs.gov/products/scientific-collections>
Woods Hole Coastal and Marine Science Center Samples Repository
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