Data and Information Sharing Plan Guidance and Resources

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All full proposals submitted in response to NOAA Ocean Exploration's Ocean Exploration Fiscal Year 2025 Funding Opportunity must include a data and information sharing plan (DISP). A DISP describes how data and information sharing requirements specified in the funding opportunity announcement will be met. Below is information describing the content of a DISP, an example of a DISP, and additional guidance on data and information sharing. The intent of this document is to provide helpful information to those applying for this funding opportunity. Requirements for the DISP can be found in Section IV.B.3.b. of the funding opportunity announcement.

DISP Checklist

The checklist below serves as a helpful guide of all elements included within the DISP. A complete DISP should include and/or describe the following:

- Principal investigators and co-principal investigators' ORCID IDs (https://orcid.org/).
- Descriptions of all the types of environmental data, information, and products expected to be collected or created during a project (with instruments and collection platforms if applicable), including those that may lead to publication.
- Expected open-access, machine-readable data formats for all data types (e.g., .csv, ASCII, .shp, .mp4, .jpg, etc.).
- Expected metadata standard to be used (ISO 19139) and/or additional data descriptors that will be compiled to accompany archived data.
- Anticipated archive location(s) for each data type (At a minimum, awardees are expected to submit all applicable raw data to NOAA's National Centers for Environmental Information (NCEI)).
- Method(s) to be used for providing access to data archived outside of NCEI (if applicable).
- Tentative date by which all data will be shared.
- Approximate total volume of data to be collected or produced (volume of each data type with totals preferred).
- Prior experience making similar environmental data accessible and discoverable (preferably with links to access the data).
- Acknowledgement that documents and pre-publication scholarly manuscripts will be submitted to the NOAA Central Library's Institutional Repository (and that manuscripts submitted to closed-access journals will be made Section 508 compliant[1,2]).
- Plans to collect restricted data on maritime heritage sites whose locations may not be suitable for public access, if applicable.

Example Data and Information Sharing Plan

The following is a general example of a DISP addressing all elements described in the funding opportunity announcement (see Section IV.B.3.b). This example was developed based on DISPs submitted with proposals for NOAA Ocean Exploration funding in previous years.

Data Information and Sharing Plan

In the initial stages of fieldwork, ship-based bathymetry surveys will be conducted and analyzed to identify key areas of interest. Areas selected will be explored and documented using an ROV with a suite of instrumentation to collect navigation and oceanographic data. Sampling will also be performed at these areas and will include invertebrate samples, focusing on sponges and corals; geological samples, and eDNA. A detailed list of data types anticipated to be collected or produced from this project are summarized in **Table 1**.

Table 1: Data types, formats, instruments, estimated volume in GB, and repository

Data Type	Format	Instrument	Est. Volume (GB)	Repository
Multibeam: raw, processed, products	.kmall, .gsf, .xyz	Kongsberg EM304 MKII multibeam sonar	35	NCEI
CTD, dissolved oxygen	.csv	SeaBird SBE-911 Plus CTD; DO sensor	< 1	NCEI
ROV navigation	.csv	Unknown	< 1	NCEI
ROV video (4K & 1080p)	.mp4 or .mov	Insite Pacific Zeus Plus camera	5,600	NCEI, USF
ROV video annotations	.csv	Excel	< 1	NCEI
ROV images	.jpg, .CR3	Canon EOS R3 camera	15	NCEI
ROV CTD	.csv	SeaBird SBE-911 Plus CTD	2-3	NCEI
Biological samples & information	.csv	Excel	< 1	NMNH, NCEI
Geological samples & information	.csv	Excel	< 1	WHCMSC, NCEI
eDNA samples & information	.csv	Excel	< 1	NMNH, NCEI
Genetic sequences (inverts & eDNA)	FASTA	n/a	5	NCBI
Sample images	.jpg	GoPro HERO 8	5	NCEI, NMNH

Cruise and data-type level metadata will be generated and archived along with the data and will ensure they are independently understandable to the end user. This will include descriptions of cruise activities, data collection methods and instruments, processing methods, data QA/QC and explanations of file names and organization. All applicable raw data will be submitted to NOAA's National Centers of Environmental Information (NCEI) along with any processed data and/or data products. Project data will also be hosted at project investigators' home institutions. Biological and eDNA samples will be sent to the Smithsonian National Museum of Natural History (NMNH) for curation and will be available to the public upon request. Geological samples will be sent to the U.S. Geological Survey's Woods Hole Coastal and Marine Science Center's Samples Repository (WHCMSC).

Data in Table 1 will be archived in at least one open-access, machine readable format and are expected to be archived no later than the publication of a peer-reviewed article based on the data, two years after the data are collected, or two years after the original end date of the award, whichever is soonest, unless a delay has been authorized by NOAA Ocean Exploration. After acceptance and archiving, NCEI will provide public access to the data. There is no plan to restrict any of the data from public access. Principal investigators will provide NOAA Ocean Exploration with any data links outside of NOAA to make public. It is estimated that this project will create or produce less than 7TB of data.

Data collected during this project will be used by two funded graduate students for their capstone projects. Significant discoveries will be presented at the Ocean Sciences Meeting and through the NOAA Central Library Seminar Program. A minimum of two peer-reviewed papers will be developed from this research targeting open-access journals such as *Deep Sea Research* and will cite NOAA Ocean Exploration and the award number as the funding source. Project documents and final pre-publication article manuscripts will be submitted to the NOAA Institutional Repository. Assigned DOIs or links and citations will be shared with NOAA Ocean Exploration. All documents sent to the NOAA Institutional Repository will be Section 508 compliant. The project team has reviewed NOAA's PARR compliance guidelines and NOAA Ocean Exploration's data guidance and is prepared to fulfill all requirements. The costs of data preparation, data management, and making data publicly accessible have been accounted for in the budget for this project. The PI and Co-PI have ample experience working with NOAA's NCEI to archive similar, government-funded environmental data and make them available and discoverable to the public (e.g., https://doi.org/10.25921/c2hq-s940, https://www.ncei.noaa.gov/waf/okeanos-rov-cruises/ex2201/).

Additional Information and Guidance

NOAA Ocean Exploration is subject to NOAA's Public Access to Research Results (PARR)[3] policy and the implementing guidance in the NOAA Environmental Data Management Committee's procedural directives.[4] The PARR policy is NOAA's response to the White House Office of Science and Technology Policy's memorandum of February 22, 2013: Increasing Access to the Results of Federally Funded Scientific Research.[5]

The Data and Publication Sharing Directive for NOAA Grants, Cooperative Agreements, and Contracts is the procedural directive specific to competitive awards.[6] This procedural directive requires NOAA Ocean Exploration to 1) provide guidance for applicants to use in developing a data management plan, 2) confirm data management plans ensure public accessibility and long-term preservation of NOAA-funded data, and 3) track and enforce conditions imposed on awardees.

Proposal Stage

Proposals submitted in response to the Ocean Exploration Fiscal Year 2025 Funding Opportunity must include a data and information sharing plan (DISP) of no more than two pages describing how NOAA Ocean Exploration's requirements for environmental data and information will be satisfied. A DISP should be aligned with the data management guidance provided by NOAA in the funding notice and in this document. The content of a DISP (or absence thereof) and past compliance with such plans will be considered as part of the proposal review.

The costs of data preparation, data management, and making data publicly accessible are necessary to meet the requirements of the data sharing procedural directive,[6] and applicants can include these costs in their proposal budget. For example, if more than 50GB of data are expected to be produced, an awardee will be asked to provide their data to NOAA on a hard drive that will be returned to them once their data are archived.

Post-Award Stage

Environmental data and information collected or created under NOAA grants and cooperative agreements must be:

- Made available in at least one machine-readable format, preferably a widely used or open-standard format, and be accompanied by machine-readable documentation (metadata), preferably based on widely used or international standards (i.e., ISO 19139).

- Archived (long term) and made discoverable by and accessible to the general public in a timely fashion, preferably within one year, but no later than the following, whichever is soonest, unless a delay has been authorized by NOAA Ocean Exploration:
    - Publication of a peer-reviewed article based on the data,
    - Two years after the data are collected and verified, or
    - Two years after the original end date of an award.
- Free of charge or at a cost no greater than the cost of reproduction, except where limited by law, regulation, security requirements, or policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information).[7]

At a minimum, awardees are expected to submit all applicable raw data to NOAA's National Centers for Environmental Information (NCEI), which will provide public access, discoverability, and long-term archiving.[8,9] Accepted submission of properly formatted data to the NCEI archive is one way to satisfy NOAA Ocean Exploration's data sharing and archiving requirements. However, NCEI is not obligated to accept all data and may charge a fee, particularly for large or unusual datasets, which, if applicable, should be included in proposal budgets.

At NOAA's discretion, NOAA may make an awardee's DISP publicly available. NOAA may also use information from an awardee's DISP to produce a formal metadata record and include that metadata record in an online catalog to indicate the pending availability of new data.

Awardees must submit scholarly publications and reports (e.g., fieldwork reports, final project reports) on work partially or fully funded by NOAA to the NOAA Institutional Repository. Final pre-publication manuscripts of articles should be submitted to the repository after acceptance by the journal and no later than the date of publication. Awardees must provide NOAA Ocean Exploration with a citation and link to the publication. Closed-journal manuscripts will be made publicly available by the NOAA Institutional Repository after an embargo period previously arranged with the journal. Pre-publication manuscripts for articles in closed-access journals must be compliant with Section 508, an amendment to the United States Workforce Rehabilitation Act of 1973.[1,2] Awardees are encouraged to publish in open-access journals, where appropriate. Publications produced via funding under this notice of funding opportunity should cite NOAA Ocean Exploration and the award number as the funding source.

Additionally, NOAA Ocean Exploration asks awardees to send a full file manifest to NCEI to aid in project archiving and data tracking.

PARR Compliance

NOAA Ocean Exploration will consult with awardees on DISPs to help them fully comply with PARR requirements. Responsibility for meeting these requirements may rest solely with an

awardee or be shared between an awardee and NOAA, depending on the terms of their final DISP. For reference, NOAA Ocean Exploration requires the following from awardees for full compliance with PARR:

- Datasets (at least raw data) from every instrument/sensor (including ship-based and submersible-based data) are provided in archive-ready, machine-readable, open-source, nonproprietary formats at a minimum to NCEI, if applicable.
- Datasets of scientific logging and first-hand scientific observations are preserved and converted into archive-ready formats.
- All datasets used to support the conclusions of a peer-reviewed publication are made available in a form that permits verification and reproducibility of the results.
- Datasets are accompanied by ISO metadata with all mandatory elements completed, including any additional information, such as data quality, acquisition software settings, etc., necessary for an end user to completely understand the dataset and be able to use it.
- Post-processed datasets, data products, and reports generated by the awardee are made discoverable and accessible to the public (preferably through NCEI) and documented with metadata, including descriptions of processing steps and quality assurance methods.
- The full complement of data is archived (long-term), stewarded, and made discoverable by and accessible to the public (preferably through NCEI).
- Final pre-publication manuscripts of scholarly articles (or their DOIs if open access) are submitted to the NOAA Institutional Repository after acceptance by the journal and no later than the date of publication. Pre-publication manuscripts for articles in closed-access journals are Section 508 compliant.

Geospatial Data Guidance

If applicable, awardees should provide geospatial information for data collection locations to improve data visualization, data discovery, and data access via NCEI-NOAA Ocean Exploration map viewers and data access portals. More information is provided in the ArcGIS guidance materials.[10]

- Provide ship tracks to accompany expedition-level data access (preferably shapefiles).
- Provide remotely operated vehicle/autonomous underwater vehicle dive tracks (or in-water coordinates) to accompany dive-level data visualization (preferably shapefiles for dive tracks).
- Provide coordinates of stationary data collection stations.

- Provide a geographic coordinate system and/or projected coordinate system for submitted geospatial information to ensure accurate representation of data collection sites.

Restricted Data

NOAA Ocean Exploration works with the ocean science communities across all sectors to locate, explore, and characterize maritime heritage sites and resources in U.S. waters and around the world. NOAA Ocean Exploration adheres to a number of laws, regulations, and executive orders that apply to the archaeological activities of federal agencies as well as those that are federally financed, licensed, or permitted. For maritime heritage projects, this often includes the collection of sensitive data not meant for public access, including location information related to sensitive places where harm is possible to the site if its location is released.

Thus, NOAA Ocean Exploration has developed its own Restricted Data Management Standard Operating Procedures that guide the NCEI data submission process for restricted data. Under leadership by NOAA Ocean Exploration's marine archaeologist and beginning at the expedition planning stage, awardees are expected to help NOAA Ocean Exploration and NCEI pursue the appropriate data protections for associated restricted data. These protections may fall under the Sunken Military Craft Act (SMCA, 10 U.S.C. 113 *et seq*.) or the National Historic Preservation Act of 1966 (NHPA, 54 U.S.C. 300101 *et seq*.) and/or may align with the Rules Concerning Activities Directed at Underwater Cultural Heritage, an annex to UNESCO's Convention on the Protection of the Underwater Cultural Heritage.

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[1] NOAA Central Library. Section 508 Compliance.
[2] U.S. Access Board. Information and Communication Technology: Revised 508 Standards and 255 Guidelines.
[3] NOAA Research Council. (2015). NOAA Plan for Increasing Public Access to Research Results.
[4] NOAA Observing Systems Council. NOAA Procedural Directives.
[5] Office of Science and Technology Policy. (2013). Increasing Access to the Results of Federally Funded Scientific Research. White House.
[6] NOAA. NOAA Data and Publication Sharing Directive for Grants and Contracts, v3.0.
[7] NOAA Office of Chief Administrative Officer. Administrative Issuances.
[8] NCEI. Archive.
[9] NCEI. (2019). Archive Collecting Policy.
[10] NCEI. (2021). Guidance for Data Inclusion in NOAA Ocean Exploration ArcGIS Online Geospatial Services.