

## **Bridging the Education Gap Between Data Acquisition and Sharing**

*Integrating collaborative planning and data sharing practices into marine technology curriculum*

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Alaska Geosummit - Anchorage, Alaska

# Project Background

- **Partners:** NOAA's IOCM, NCEI and Northwestern Michigan College (NMC).
- **Focus:** NMC's Marine Technology Capstone Course.
- **Goals:**
  - Teach mapping coordination and data stewardship practices to the future marine science workforce.
  - Contribute multibeam data to Lakebed 2030 via NCEI's Bathymetry Archive.



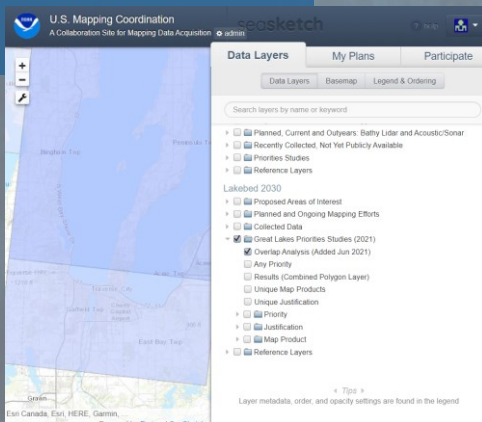
*[U.S. Bathymetry Gap Analysis \(2023\)](#)*



*[Marine Inspection Technologies & Applications Course \(NMC\)](#)*

## Seasketch: U.S. Mapping Coordination Site

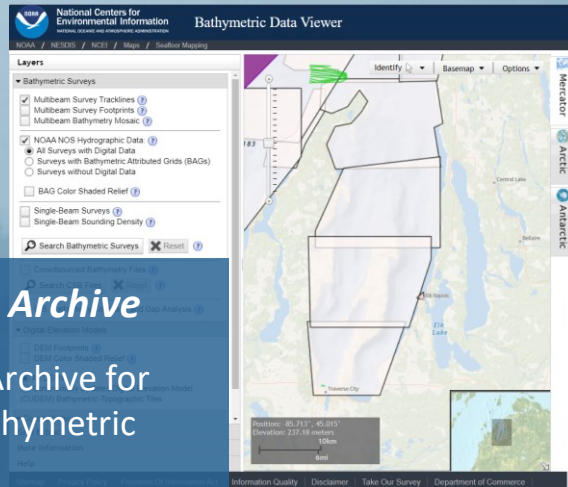
- Planning & Coordination
  - What kind of data? All-bathy, topo, etc.
- Spatial Priorities
  - IOCM Studies
  - Regional Studies
  - IWG-OEC Priorities



## What Do We Do?

### NCEI MB Data Archive

- U.S. National Archive for multibeam bathymetric data.
- Hosts the International Hydrographic Organization Data Centre for Digital Bathymetry (IHO DCDB).
- Currently holds 69 TB of data from over 3700 multibeam surveys.

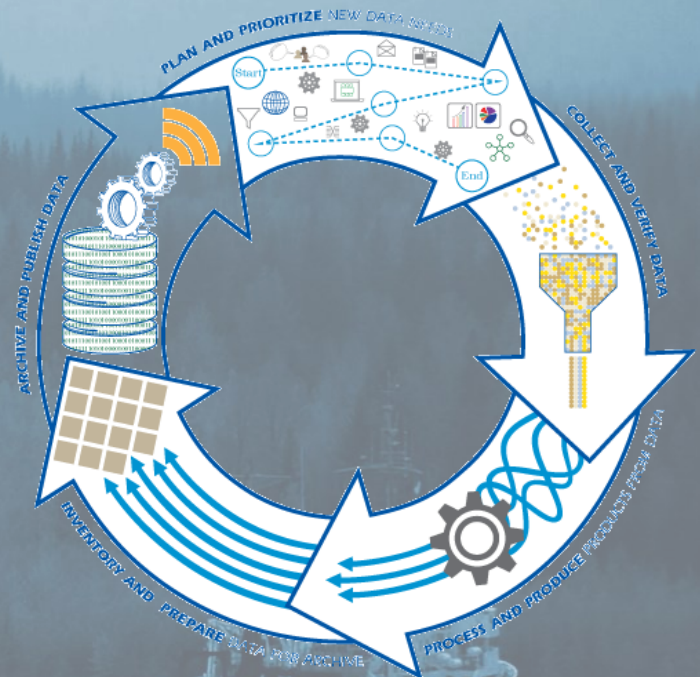




# Data Stewardship - Map Once, Use Many Times!

*"Environmental data will be visible, accessible and independently understandable to users in a timely manner..."* - [NOAA Data Sharing Policy](#)

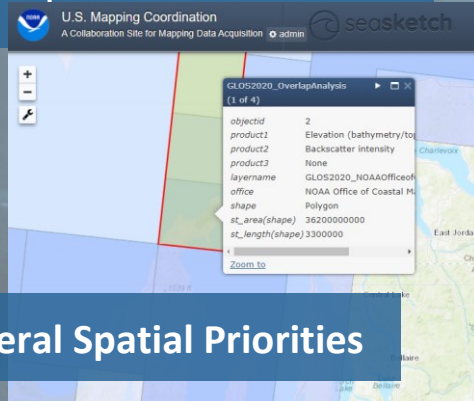
- “Independently understandable” is achieved through informative metadata. NCEI uses the ISO 19115-2 Standard. Good metadata = more useful data.
- Archived data is preserved for long-term use and can serve a purpose beyond the original project.
- Data stewardship practices keep the data life cycle circular.



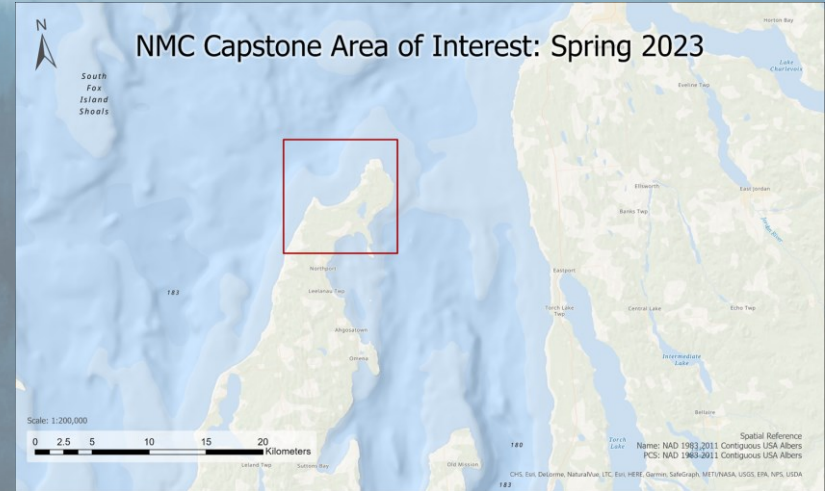
# Area Delineation and Coordination

Who needs what, where?

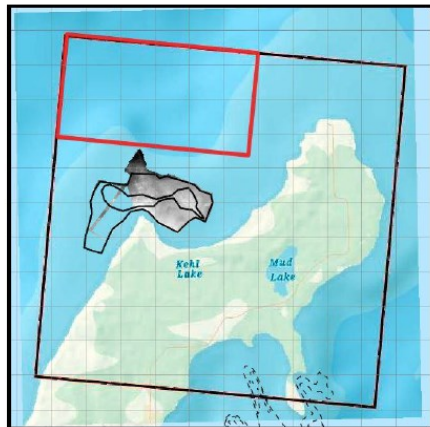
Looking for: the greatest amount of overlapping interest proximal to NMC operations radius



Regional & Federal Spatial Priorities



# Planning Collection



**Project Name:**

Northwestern Michigan College Data Collection of North Leelanau  
Peninsula, Lake Michigan

Authors: Jackson Hollocker, Sam Brooks, Ben Meyers, Chris Groleau, Max Streeter, Alec Rice

Date: 04/27/23

- Meeting with stakeholders
  - Office for Coastal Management (OCM)
    - Looking for areas with no existing bathymetric data
  - U.S. Geological Survey (USGS), MI Department of Natural Resources (DNR), The Nature Conservancy (TNC)
    - Reef mapping project in Lake Michigan
      - Overlapping interests
        - Bathymetry, ground truthing, data normalization
- Limitations
  - Time-frame
  - Personnel
  - Vessel Capabilities
- Guiding Documents
  - NOAA HSD
    - Hydrographic Survey Specifications and Deliverables Field Manual
    - Field Procedures Manual
  - Standard Ocean Mapping Procedure (SOMP)
  - IHO Guidelines
    - International Hydrographic Organization Standards for Hydrographic Surveys, S-44 Edition 6.1.0





# Collection

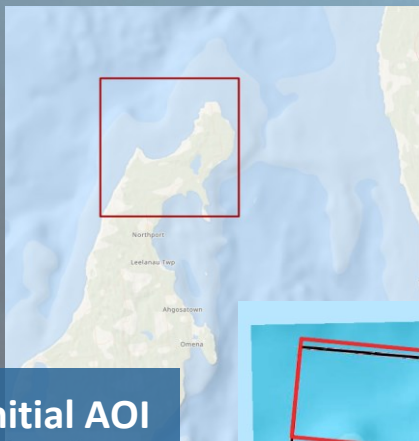
- May 15-19, 2023
- Northport Marina
- R/V Northwestern
- Kongsberg EM2040
- Multibeam EchoSounder
- 33.5 LNM collected
  - 61.783 KM



*RV NORTHWESTERN*



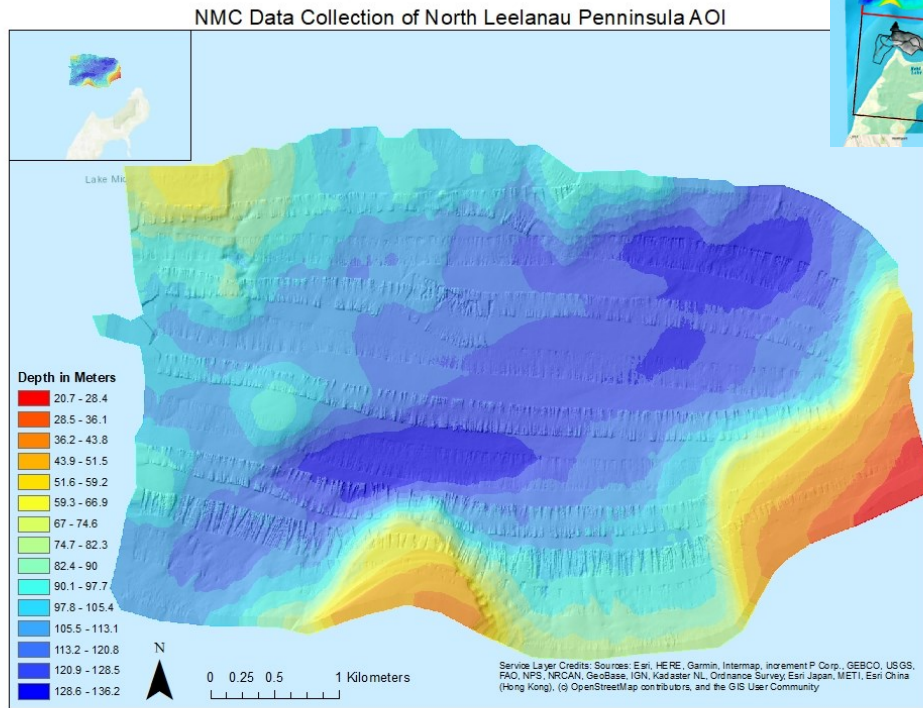
# Collected Data



Initial AOI



Planned Collection

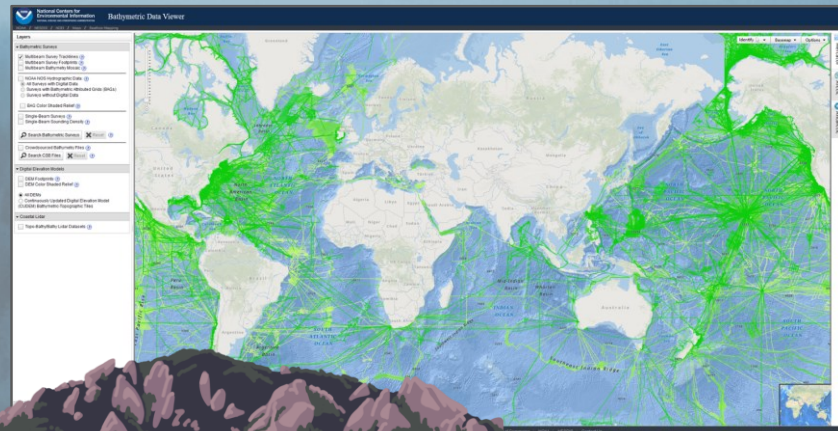


Collected Data





# From Ships to Servers: Submitting Marine Sonar Data to NCEI



NOAA Office in Boulder, Colorado



# From Ships to Servers: Submitting Marine Sonar Data to NCEI

- Data Provider Responsibilities:
  - Data Processing (optional)
  - Data Packaging
  - Metadata Creation
  - File Transfer Protocol (FTP) to NCEI
- NCEI Responsibilities:
  - Confirm successful submission
  - Archive and publish data to the [NCEI Bathymetric Data Viewer](#) and the [IHO DCDB Viewer](#) within 90 days of submission
  - Publish an ISO Metadata Record for each dataset

## Submitting Marine Geophysical Data to the NOAA National Centers for Environmental Information & the co-located IHO Data Center for Digital Bathymetry

### Introduction

This document describes current procedures to prepare various marine geophysical data sets (multibeam bathymetry, sidescan profile, water column sonar, singlebeam bathymetry, side-scan sonar and supplemental data) for submission to [NOAA National Centers for Environmental Information \(NCEI\)](#) & the co-located [IHO Data Center for Digital Bathymetry \(DCDB\)](#)

### File Formats

#### 1. Multibeam Bathymetry

##### General Information:

The multibeam bathymetry database at NCEI/IHO DCDB primarily maintains raw (as collected) data files in the instrument's vendor specific format (e.g., .all, .s7k, .ase). However, other supplemental data (sound speed profiles, tides, vessel offsets, cruise reports, etc.) and/or processed versions or products of the multibeam data are also accepted. In all submissions, the data files and cruise/survey should be well documented using metadata.

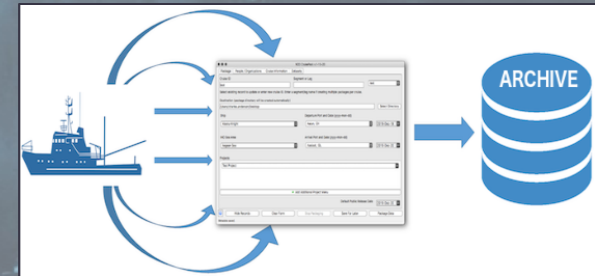
##### MB Data File Formats:

NCEI can accept bathymetric data from most of the commercial multibeam sonars and acquisition systems. The multibeam bathymetry data management pipeline at NCEI relies heavily on the open source software suite, [MB-System](#). Data formats supported by the software are listed on their [website](#). Data submitted in unsupported formats will still be accepted but will not be discoverable through the web services provided at NCEI ([Bathymetric Data Viewer](#)). These data can only be accessed from the archive upon request to [mb.info@noaa.gov](mailto:mb.info@noaa.gov).

Processed data (if submitted) need to be delivered in an MB-System processed format or other non-proprietary format. The majority of processed data in the multibeam bathymetry database are processed MB-System, XYZ, or GSF format.

If your data are not in one of the supported formats or you would like to contribute bathymetric data products, email [mb.info@noaa.gov](mailto:mb.info@noaa.gov) to discuss the options available at NCEI for your data.

### [Submitting Marine Sonar Data to NCEI](#)



### [CruisePack Data Packaging Tool](#)

# Outcomes in the Great Lakes

- NMC2023 is the **first** multibeam bathymetric survey in the Great Lakes to be archived at NCEI.
- This data will be used in widely-distributed publications and bathymetric products such as:
  - NOAA Nautical Chart Products
  - NOMECE Progress Report
  - U.S. Bathymetric Gap Analysis
  - NOAA Office of Coast Survey Press Release
- New marine technology professionals with experience in mapping coordination & data sharing, and connections to NOAA's seafloor mapping resources.

## Bathy-Gap Analysis

## NCEI Bathymetry Viewer

JUNE 14, 2023 BY NOAA COAST SURVEY

### NOAA helps develop undergraduate course in lakebed mapping

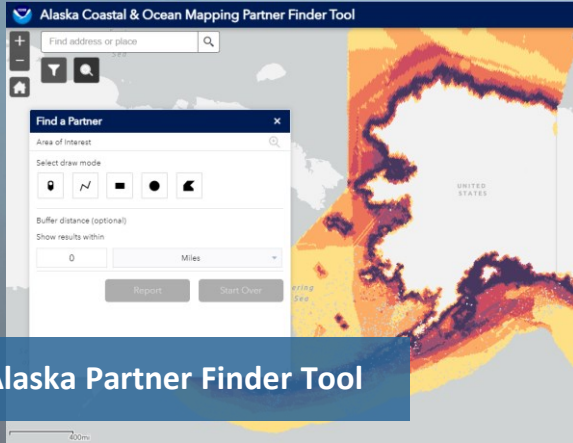
As the [New Blue Economy](#) grows along with demands for a [climate-ready workforce](#), NOAA is connecting the dots between climate resilience and the need for a workforce skilled in science and technology supporting ocean and coastal mapping. Exposure to key disciplines, from geodesy, oceanography, and science data management to modeling, hydrography and GIS-based cartography, is critical to building robust interest, opportunities and expertise in the government and industry geospatial careers supporting climate resilience. NOAA works with a variety of partners to advance workforce development in these foundational geospatial areas. In particular, hydrography – measuring water depths, locating hazards, and describing the seafloor – is a challenging but exciting field dependent on skilled technicians, surveyors, and scientists to acquire mapping data using state-of-the-art technologies. With only 50% of U.S. coastal, ocean and Great Lakes mapped, there is a lot of work to do! Read on to learn about a

OCS Blog Post

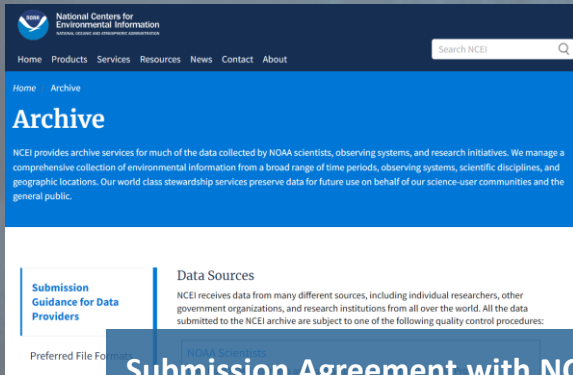




# Bring this project to Alaska!



Alaska Partner Finder Tool



Submission Agreement with NCEI

Boat!



# Get Involved in other ways

The screenshot shows the NOAA U.S. Mapping Coordination website. At the top, it says "U.S. Mapping Coordination" and "A Collaboration Site for Mapping Data Acquisition". There are navigation tabs for "Data Layers", "My Plans", and "Participate". The "Participate" tab is active, showing a "Share Your Mapping Plans" section. A map on the left shows a coastal area with a blue-shaded region. The text explains that coordinated mapping is critical and lists three ways to contribute: uploading shapefiles, providing a service URL, and drawing plans. There is a "Submit Your Plans" button and social media share options for Facebook and Twitter.

U.S. Mapping Coordination  
A Collaboration Site for Mapping Data Acquisition

Participate

Surveys / Submit Plans to U.S. Mapping Coordination

### Share Your Mapping Plans

Coordinated mapping and survey planning is a critical element of integrated ocean and coastal mapping best practices, in order to eliminate redundant efforts and acquire more data that everyone can use. Thank you for joining our efforts. To contribute, you may provide your data in three ways:

- Upload Shapefiles
- Provide a service URL
- Draw your plans

Submit Your Plans

Share Tweet

Submit plans to U.S. Mapping Coordination site!

The screenshot shows the NCEI website. The header includes the NOAA logo and "National Centers for Environmental Information". There is a search bar and navigation links for Home, Products, Services, Resources, News, About, and Contact. The main heading is "Contributing Marine Geological and Geophysical Data". Below this, there is a paragraph about NCEI's archive services. A "Related Products" section lists "Seafloor Mapping", "Bathymetry", and "Marine Geology and Geophysics". There are also sections for "Contact Us" and "Data Submission Guidelines".

National Centers for Environmental Information  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Home Products Services Resources News About Contact

Search NCEI

Home Products Contributing Marine Geological and Geophysical Data

## Contributing Marine Geological and Geophysical Data

NCEI provides archive services for much of the data collected by NOAA scientists, observing systems, and research initiatives. We manage a comprehensive collection of data and environmental information from a broad range of time periods, observing systems, scientific disciplines, and geographic locations. Our world class data stewardship services preserve data for future use on behalf of our science-user communities and the public.

### Related Products

Seafloor Mapping Bathymetry Marine Geology and Geophysics

### Contact Us

New data providers should contact us before submitting data. Send your data type and formats, expected data volume, and other details or questions to:

- Marine Geology: [geology.info@noaa.gov](mailto:geology.info@noaa.gov)

### Data Submission Guidelines

NCEI accepts a wide variety of data types in marine geology and geophysics. We accept well-documented data in almost any format, although we prefer open-source or non-proprietary data types. Please contact us before sending your data.

### Resources

[How To Package and Submit Data](#) describes preparation techniques for a variety of marine geology and geophysics data types.

Share your data with the NCEI archive!



# Questions?

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