

Data Documentation

Dataset Information: NCCOS-GLBM-GL2401

Dataset Title: NCCOS Mapping: Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin – Collection locations of GL-24-01 cruise benthic imagery and sediment samples in the Wisconsin Shipwreck Coast National Marine Sanctuary (WSCNMS) Lake Michigan, 2024-04-30 to 2024-10-16)
(<https://www.ncei.noaa.gov/archive/accession/NCCOS-GLBM-GL2401>)

Description:

This dataset includes collection locations associated with sites sampled throughout the Wisconsin Shipwreck Coast National Marine Sanctuary (WSCNMS). Site information data was collected by a series of sampling platforms including, a Drop Camera, a Remotely Operated Vehicle (ROV), an Autonomous Operated Vehicle (AUV) and a Ponar sediment sampler. The benthic imagery was collected in 2024 in southwestern Lake Michigan throughout the Wisconsin Shipwreck Coast National Marine Sanctuary (WSCNMS) to characterize the lakebed and provide ground-truthing observation data for predictive substrate and biological community models. This dataset includes supplementary data used in planning the collection, including the planned sampling sites and environmental covariates used in sampling site allocation; including, but not limited to, latitude and longitude coordinates at each sample site, maximum sampling depth in meters and duration time of bottom sample.

The dataset includes collection locations to be referenced in a cruise report.

Purpose:

These data were created to support management decisions intended to address multiple littoral issues including increases in coastal erosion and sedimentation, degradation of native fish habitat, coastal development, water quality changes, harmful algal blooms, and species invasions. The intended users of these maps are lake managers and scientists working on restoring the Great Lakes. These data were developed with funding from the Great Lakes Restoration Initiative, and support restoration of the Great Lakes.

This dataset was the product of a partnership among the National Centers for Coastal Ocean Science, the Office for Coastal Management, the Office of National Marine Sanctuaries, the Great Lakes Environmental Research Laboratory, and the National Park Service.

Methods:

Collection methods for benthic and sediment sample imagery is described in Cruise Report: Great Lakes Benthic Characterization Cruise GL-24-01, May 2024-October 2024 (DOI TBD). All data were gathered in the field at the time of collection using the ArcGIS Survey 123 application. The entirety of benthic videos collected by drop cameras were sent to and processed in TATOR, an online cloud-based video management and annotation system developed by CVision AI., Inc. For benthic images collected by the USGS IVER AUV, only images within 10 m of planned sites were sent to TATOR for further processing. Videos were synchronized to positional data

Data Documentation
Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin

collected by an ultrashort baseline system so that each video frame could receive an underwater spatial coordinate. Then, individual video frames were selected every 10 m for annotation. Each selected frame was annotated by a benthic mapping matter expert. Annotations included the percent cover of substrates and biological cover, benthic organism abundance, and geomorphological characteristics. Lakebed measurements and benthic characterization labels were classified according to the Coastal and Marine Ecological Classification Standard (CMECS; FGDC 2012).

Instruments:

- Drop Camera
- Remotely Operated Vehicle (ROV)
- Autonomously Operated Vehicle (AUV)
- Ponar sediment sampler

People & Projects

Dataset Authors:

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Collaborators:

- Dennis Donahue – Great Lakes Environmental Research Laboratory
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- Phil Wernette – Michigan State University
- Hayden Henderson and Jamey Anderson – Michigan Tech University
- Jay Glase -National Park Service
- Sam Pecorano – US Fish and Wildlife Service

Partners:

- NOAA's Office for Coastal Management along with the Office for Coast Survey
- NOAA's Office of National Marine Sanctuaries
- US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)
- National Center for Coastal and Ocean Science (NCCOS)
- Great Lakes Environmental Research Laboratory
- Michigan Technological University (MTU)
- United States Geological Survey (USGS)
- United States Fish and Wildlife Service (USFWS)
- National Park Service (NPS)

Data Documentation
Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin

- Great Lakes Restoration Initiative (GLRI)

Funding:

- US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS) (ROR-<https://ror.org/05ba43f71>)
- Great Lakes Restoration Initiative, Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes project

Extents

Start Date: 2024-04-30

End Date: 2024-10-16

Northern Boundary: 44.33146

Southern Boundary: 43.17227

Western Boundary: -87.9034

Eastern Boundary: -87.3648

Citations

Cited Publications:

- Mabrouk, A., C. Menza, and W. Sautter. 2022. Best Practices for Ground-Truthing and Accuracy Assessment of Lakebed Maps in the Great Lakes: A case study offshore the Bayfield Peninsula in Lake Superior. NOAA Technical Memorandum NOS NCCOS 295 Silver Spring, MD. 25 pp.
<https://doi.org/10.25923/f1tn-0694>
- Menza, C., Mabrouk, A., Hoevet, T., Taylor, C., Donahue, D., Foley, O., Braymer, B., Anderson, J., and Henderson, H. (2024). Cruise Report: Great Lakes Benthic Mapping Cruise GL-23-01, June 20–August 4, 2023. NOAA, National Ocean Service, National Centers for Coastal Ocean Science.
<https://doi.org/10.25923/s52d-0876>
- Mabrouk, Ayman; Menza, Charles; Hoevet, Tonya; Goetsch, Chandra; Dar, Rabiya; Taylor, Chris; Donahue, Dennis; Foley, Ossian; Anderson, Jamey; Henderson, Hayden. Cruise Report: Great Lakes Benthic Mapping Cruise GL-23-02, August 21–September 15, 2023. National Centers for Coastal Ocean Science (U.S.); Great Lakes Environmental Research Laboratory; CSS, Inc.; Michigan Technological University, Great Lakes Research Center. 2024. DOI :
<https://doi.org/10.25923/bmy4-fg64>
- Foley, O., Anderson, J., Bawks, S., Borg, C., Dar, R., Donahue, D., Edwards, K., Goetsch, C., Henderson, H., Hunter, B., Johnson, K., Kline, L., Mabrouk, A., Menza, C., Taylor, C., Weber, M., Wernette, P., Wilson, J., Wright, C. Cruise Report: Great Lakes Benthic Mapping Cruise GL-24-01, April 30–October 16, 2024. NOAA, National Ocean Service, National Centers for Coastal Ocean Science. <https://doi.org/TBD>

Data Sources:

- [Bulleted list of full citations (including DOIs) of all source datasets, if any.]

Associated Datasets:

- [placeholder for all Collection of Accession urls once created]

Associated Online Resources:

- Great Lakes Restoration Initiative Project, Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin, <https://www.noaa.gov/regional-collaboration-network/regions-great-lakes/glri/about-glri/glri-focus-area-4-habitat/collaborative-benthic-habitat-mapping-in-nearshore-waters-of-great-lakes-basin>
- NCCOS Project, Benthic Mapping, Ground-Truthing, and Habitat Modeling to Support Great Lakes Restoration, <https://coastalscience.noaa.gov/project/benthic-mapping-ground-truthing-and-habitat-modeling-to-support-great-lakes-restoration/>
- NCCOS Project, Collaborative Lakebed Mapping Off Apostle Islands to Support Great Lakes Restoration, <https://coastalscience.noaa.gov/project/collaborative-lakebed-mapping-off-apostle-islands-to-support-great-lakes-restoration/>
- Wisconsin – Lake Superior Biomapper [online publicly accessible site to view videos and maps]. <https://maps.coastalscience.noaa.gov/biomapper/biomapper.html?id=apis>

Keywords

Sea Areas, Water Bodies, Marine Protected Areas:

- Great Lakes
- Lake Michigan
- Wisconsin Shipwreck Coast National Marine Sanctuary (WSCNMS)

NOAA Ships, Other Ships, Platforms:

- R3105

Discovery Theme Keywords

- Coastal Change: Vulnerability, Mitigation, and Restoration
- Great Lakes
- Field Observation
- Geospatial
- Lakebed characterization
- Benthic videos
- Sediment Samples
- Cruise ID: GL2401

NCCOS Keywords:

- NCCOS Research Priority > Marine Spatial Ecology
- NCCOS Research Topic > Habitat Mapping
- NCCOS Research Location > Region > Great Lakes
- NCCOS Research Location > U.S. States and Territories > Wisconsin
- NCCOS Research Data Type > Field Observation
- NCCOS Research Data Type > Geospatial

Project Keywords:

- Collaborative Benthic Habitat Mapping in the nearshore waters of the Great Lakes basin

Data Documentation
Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin

File Information

Total File Size: 6.39 MB total, 9 files in 3 folders (zipped)

Data File Format(s):

comma-separated value files (.CSV)
 Adobe PDF files
 jpeg file

Data File Compression: n/a

Data File Resolution: n/a

GIS Projection: NAD 1983 UTM Zone 15N

Data Files:

- CSV files:
 - NCCOS_GLBM_GL2401_AUV_Data01
 - NCCOS_GLBM_GL2401_DropCamera_Data02
 - NCCOS_GLBM_GL2401_Ponar_Data03
 - NCCOS_GLBM_GL2401_ROV_Data04
- Documentation Files:
 - NCCOS_GLBM_GL2401_BrowseGraphic.jpg
 - NCCOS_GLBM_GL2401_DataDocumentation.PDF
 - DropCamera_SOP_v1.2.PDF
 - Sediment_Sampling_SOP_v1.4.PDF
 - ROV_SOP_v1.4.PDF

Table 1: NCCOS_MAPPING_GLBM_WCSNMS_2024_AUV_Data01

Column	Variable	Label	Definition	Units	Range
1	numeric	Deploy ID	Sequential series of AUV drops	n/a	GL2401_A0001 to GL2401_A0050
2	date	Launch Date	The calendar date of the sample	MM/DD/YR	08-12-2024 to 10-16-2024
3	time	Launch Time	The time of sample in local UTC	UTC	13:34 to 23:52
4	numeric	Target Site ID	The assigned site identification number	n/a	569-2575
5	numeric	Latitude	x coordinates	Decimal Degrees	-87.8803 to -87.3684
6	numeric	Longitude	y coordinates	Decimal Degrees	43.26653 to 44.27872
7	numeric	Depth	Maximum depth of dive at AUV sample site	meters	3-81
8	time	Bottom Time	Duration of bottom of the AUV dive at the sample site	minutes	0:11-1:54

Table 2: NCCOS_MAPPING_GLBM_WCSNMS_2024_DropCamera_Data02

Column	Variable	Label	Definition	Units	Range
1	numeric	Deploy ID	The number indicating the cycle of AUV drops	Text + integer	GL2401_D0001 to GL2401_D0853

Data Documentation
Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin

Column	Variable	Label	Definition	Units	Range
2	date	Launch Date	The calendar date of the sample	MM/DD/YR	4/30/2024 to 10/9/2024
3	time	Launch Time	The time of sample in local UTC	UTC	14:11 to 22:41
4	numeric	Target Site ID	The assigned site identification number	integer	0 to 2499
5	numeric	Latitude	x coordinates	Decimal Degrees	-87.9034 to -87.3665
6	numeric	Longitude	y coordinates	Decimal Degrees	43.17227 to 44.33146
7	numeric	Depth	Depth of the Drop Camera at the sample site	meters	1.7 - 84
8	time	Bottom Time	Total duration of bottom of the Drop Camera dive	minutes	0:02 to 0:13

Table 3: NCCOS_MAPPING_GLBM_WCSNMS_2024_Ponar_Data03

Column	Variable	Label	Definition	Units	Range
1	Text + numeric	Deploy ID	The number indicating the cycle of AUV drops	Text + integer	GL2401_P0026 to GL2401_P0165
2	date	Launch Date	The calendar date of the sample	MM/DD/YR	7/11/2024 to 10/7/2024
3	time	Launch Time	The time of sample in local UTC	UTC	14:40 to 21:11
4	numeric	Target Site ID	The assigned site identification number	integer	68 to 2483
5	numeric	Latitude	x coordinates	Decimal Degrees	-87.8671 to -87.3664
6	numeric	Longitude	y coordinates	Decimal Degrees	43.177748 to 44.320632
7	numeric	Depth	Depth at point of sediment sample	meters	2.7 to 85.0

Table 4: NCCOS_MAPPING_GLBM_WCSNMS_2024_ROV_Data04

Column	Variable	Label	Definition	Units	Range
1	numeric	Deploy ID	The number indicating the cycle of AUV drops	Text + numeric	GL2401_R0001 to GL2401_R0114
2	date	Launch Date	The calendar date of the sample	MM/DD/YR	5/30/2024 to 9/13/2024
3	time	Launch Time	The time of sample in local UTC	UTC	0:16 to 23:39
4	numeric	Target Site ID	The assigned site identification number		645 to 2575
5	numeric	Latitude	x coordinates	Decimal Degrees	-87.8813 to -87.3648

Data Documentation
Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin

Column	Variable	Label	Definition	Units	Range
6	numeric	Longitude	y coordinates	Decimal Degrees	-87.8813 to -87.3648
7	numeric	Depth	Deepest depth of the AUV dive at the site	meters	4.68 to 83.7
8	time	Bottom Time	Total duration of bottom of the ROV dive	minutes	0:08 to 16:43

Data Types (Parameter Information)

List of major parameters included in this accession:

Parameter Description:

Parameters: cruise data collection locations
Property Type: GPS coordinates
Units: latitude, longitude
Observation Category: in situ
Sampling Instrument: AUV, drop camera, ponar dredge, ROV
Sampling and Analyzing Method:

Benthic imagery and/or sediment samples were collected with an AUV, ROV, drop camera, and ponar dredge. The locations of AUV, ROV, drop camera and ponar data collections were determined using GPS systems. Cruise data were collected at each location using standard operating procedures developed for each equipment type, see the following SOPs for each sampling platform in the data documentation included in this accession:

- Drop_Camera_SOP_v1.2.PDF,
- Sediment_Sampling_SOP_v1.4.PDF,
- ROV_Sampling_SOP_v1.4.PDF

Data Quality Method:

Data was reviewed immediately after collection by field crew and again after the cruise was completed by analysts for accuracy and completeness. Enter details and add AUV SOP

Parameter Description:

Parameters: Cruise data collection times
Property Type: Sampling time
Units: launch time in UTC, bottom time duration in total minutes
Observation Category: in situ
Sampling Instrument: AUV, drop camera, ROV, ponar dredge
Sampling and Analyzing Method:

Launch times and bottom times were recorded using GPS times in UTC.

Data Quality Method:

Data was reviewed immediately after collection by field crew and again after the cruise was completed by analysts for accuracy and completeness.

Parameter Description:

Parameters: Cruise data collection depths
Property Type: Maximum water depth

Data Documentation
Collaborative Benthic Habitat Mapping in the Nearshore Waters of the Great Lakes Basin

Units: meters
Observation Category: in situ
Sampling Instrument: AUV, drop camera, ROV, ponar dredge
Sampling and Analyzing Method:

The maximum depth of data collections from the AUV, drop camera, ROV, ponar dredge. Depths were determined by intersecting data collection coordinates with the highest-resolution bathymetric data available at the collection.

Data Quality Method:

Data was reviewed immediately after collection by field crew and again after the cruise was completed by analysts for accuracy and completeness.

Document Information

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Resource Provider: NCCOS Data Manager, nccos.data@noaa.gov, US DOC; NOAA; NOS; National Centers for Coastal Ocean Science (NCCOS)
Comment: This data documentation describes data files archived as a NOAA NCEI data accession, and is intended to provide dataset-level metadata for the purposes of discovery, use, and understanding.
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Appendix: NCCOS Discovery Keywords

Research Priorities

- Marine Spatial Ecology
- Stressor Impacts and Mitigation
- Coastal Change: Vulnerability, Mitigation, and Restoration
- Social Science

Research Topics

- Acoustic Sonar
- Aquaculture
- Aquatic Invasive Species
- Bioeffects/Toxicity
- Chemical Contaminants
- Climate Impacts
- Coral Reefs
- Ecological/Biological Characterization
- Ecosystem Valuation
- Eutrophication
- Forecasting
- Habitat Mapping
- Harmful Algal Blooms (HAB)
- Hypoxia
- Monitoring
- Natural Infrastructure
- Ocean Acidification
- Oil Spill Response/Recovery
- Pathogens
- Predictive/Spatial Modeling
- Remote Sensing
- Restoration
- Salt Marshes
- Seagrasses

Research Locations

- Regions
 - Atlantic Ocean
 - Bering Sea
 - Caribbean Sea
 - Great Lakes
 - Gulf of Mexico
 - U.S. Caribbean
 - Pacific Ocean
 - International
- U.S. States and Territories
 - [list all applicable]
- Geographic Areas
 - Deep Sea
 - Coastal Ocean
 - Continental Shelf
 - Coral Reefs
 - Estuaries
- Marine Protected Areas
 - National Estuarine Research Reserves
 - National Marine Sanctuaries
 - National Marine Monuments
 - National Parks

Research Data Types

- Field Observation
- Long-term Monitoring
- Geospatial
- Derived Data Product
- Model
- Field Experiment
- Laboratory Experiment
- Mesocosm Experiment
- Photographs
- Video