Please provide the following information, and submit to the NOAA DM Plan Repository.

Reference to Master DM Plan (if applicable)

As stated in Section IV, Requirement 1.3, DM Plans may be hierarchical. If this DM Plan inherits provisions from a higher-level DM Plan already submitted to the Repository, then this more-specific Plan only needs to provide information that differs from what was provided in the Master DM Plan.

URL of higher-level DM Plan (if any) as submitted to DM Plan Repository:

1. General Description of Data to be Managed

1.1. Name of the Data, data collection Project, or data-producing Program:

2012 USACE NCMP Topobathy Lidar: Lake Michigan (IL,IN,MI,WI)

1.2. Summary description of the data:

Original Data:

These files contain classified topographic and bathymetric lidar data as unclassified valid topographic data (1), valid topographic data classified as ground (2), invalid topographic data classified as low points (7), water (9), points that fall in topographic areas that were acquired with the bathymetric sensor (21), valid bathymetric data (29). Classes 1,2,7,9 are defined in accordance with the American Society for Photogrammetry and Remote Sensing (ASPRS) classification standards, while classes 21 and 29 are classes specific to the data collection. These data were collected with a RIEGL VQ-480 and a Coastal Zone Mapping and Imaging Lidar (CZMIL) airborne lidar system along the Lake Michigan shoreline. The VQ-480 sensor has a pulse repetition rate of 150 kHz at near infrared laser wavelength. CZMIL integrates a lidar sensor with topographic and bathymetric capabilities, a digital camera and a hyperspectral imager on a single remote sensing platform for use in coastal mapping and charting activities.

Data coverage generally extends along the shoreline from the waterline to 500 meters onshore. Native lidar data are not generally in a format accessible to most Geographical Information Systems (GIS). Specialized in-house and commercial software packages are used to process the native lidar data into 3-dimensional positions that can be exported to standard formats and imported into GIS software for visualization and further analysis. Horizontal positions, provided in UTM Zone 16N coordinates in meters, are referenced to the NAD83 (2011) Epoch 2010 datum. Vertical elevations in meters are also referenced to this datum (GRS80 ellipsoidal height). The 3-D position data are sub-divided into a series of LAS files, each derived from a single flightline. The National Geodetic Survey's (NGS) GEOID03 model is used to transform the vertical positions from ellipsoid to orthometric heights referenced to the North American Vertical Datum of 1988 (NAVD88). Once converted to orthometric heights, the data are then converted to the International Great Lakes Datum of 1985 (IGLD85) using the VDatum program from NOAA (National Oceanic and Atmospheric Administration). The 3-D position data are

sub-divided into a series of LAS files, each covering approximately 5 kilometers of shoreline. The format of the file is LAS version 1.2.

In addition to the lidar point data, the topobathy bare earth Digital Elevation Models (DEMs) at a 1 meter grid spacing, created from the lidar point data, are also available from the NOAA Digital Coast Data Access Viewer (DAV). A link to the bare earth 1 meter DEM data is provided in the URL section of this metadata record. DEMs at a 1 meter grid spacing, created from all classifications, are available by request at coastal.info@noaa.gov.

1.3. Is this a one-time data collection, or an ongoing series of measurements?
One-time data collection

1.4. Actual or planned temporal coverage of the data:
2012-09-02, 2012-09-03, 2012-09-07, 2012-09-08, 2012-09-09, 2012-09-10, 2012-09-12, 2012-09-13, 2012-09-14, 2012-09-23, 2012-09-25, 2012-09-26, 2012-09-27, 2012-09-28, 2012-09-29, 2012-10-01, 2012-10-02, 2012-10-03, 2012-10-06, 2012-10-15, 2012-10-16, 2012-10-17, 2012-10-18, 2012-10-19, 2013-11-05, 2013-11-06, 2013-11-11, 2013-11-18, 2013-11-26

1.5. Actual or planned geographic coverage of the data:
W: -87.9458693, E: -84.6843231741, N: 46.1156698822, S: 41.5996674

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Model (digital)

1.7. Data collection method(s):
(e.g., satellite, airplane, unmanned aerial system, radar, weather station, moored buoy, research vessel, autonomous underwater vehicle, animal tagging, manual surveys, enforcement activities, numerical model, etc.)

1.8. If data are from a NOAA Observing System of Record, indicate name of system:

1.8.1. If data are from another observing system, please specify:

2. Point of Contact for this Data Management Plan (author or maintainer)

2.1. Name:
NOAA Office for Coastal Management (NOAA/OCM)

2.2. Title:
Metadata Contact

2.3. Affiliation or facility:
NOAA Office for Coastal Management (NOAA/OCM)

2.4. E-mail address:

coastal.info@noaa.gov

2.5. Phone number:
(843) 740-1202

3. Responsible Party for Data Management
Program Managers, or their designee, shall be responsible for assuring the proper management of the data produced by their Program. Please indicate the responsible party below.

3.1. Name:

3.2. Title:
Data Steward

4. Resources
Programs must identify resources within their own budget for managing the data they produce.

4.1. Have resources for management of these data been identified?

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):

5. Data Lineage and Quality
NOAA has issued Information Quality Guidelines for ensuring and maximizing the quality, objectivity, utility, and integrity of information which it disseminates.

5.1. Processing workflow of the data from collection or acquisition to making it publicly accessible
(describe or provide URL of description):
Lineage Statement:
The NOAA Office for Coastal Management (OCM) received the data from the USACE Joint Airborne Lidar Bathymetry Technical Center of Expertise (JALBTCX). NOAA OCM processed the data to the NOAA Digital Coast Data Access Viewer (DAV) to make the data publicly available for bulk and custom downloads.

Process Steps:
- VQ-480 These data were collected using the RIEGL VQ-480 lidar system, operated by Fugro Pelagos through contract. The system collects topographic lidar data at maximum pulse rate of 150 kHz in a wavelength near infrared. Aircraft position, velocity and acceleration information are collected a POS AV 510 equipment. All logged raw data were transferred to the office and processed in RiPROCESS software. Aircraft position data are processed using POSPac software and the results combined with the lidar data to produce 3-D positions for each lidar shot. Upon processing and export to LAS format, QA/QC is performed with Fledermaus and FPI Workbench tools. Data are classified as 0 (valid topographic data), 21 (

points that fall in topographic areas that were acquired with the bathymetric sensor), 29 (valid bathymetric data). The data are then shifted vertically to the International Great Lakes Datum of 1985 (IGLD85) using the VDatum program from NOAA (National Oceanic and Atmospheric Administration). CZMIL These data were collected using the CZMIL system. It is owned and operated by the U.S. Army Corps of Engineers (USACE). The system collects lidar data at 20 kHz and RGB imagery at 2 Hz. A CASI-1500 hyperspectral line scanner is integrated with the system as well. Aircraft position, velocity and acceleration information are collected through a combination of Novatel and POS A/V 510 equipment. All raw data streams are transferred to the office for downloading and processing in CZMILs Hydro Fusion software. Aircraft position data are processed using POSPac software and the results are combined with the lidar data to produce 3-D positions for each lidar shot. Upon inspection and QA/QC in the software packages Fledermaus and PFM_ABE, anomalous data are flagged as invalid. NOAA's VDatum software then converts all valid data from ellipsoid to orthometric heights based on the NGS' GEOID12A model and exports valid lidar data as a series of unclassified LAS files. - VQ-480 The flightline LAS files are imported into GeoCue [V7.0.3.5], which is a geospatial workflow production and management software tool employed by JALBTCX to perform and monitor production of data products. Upon import into GeoCue, the flightline LAS files are divided into a series of boxes, each of which are 1500 meters in length and width. A customized classification macro, built upon the TerraScan [V11] module within Microstation V8i, classifies valid topographic data as ground points (2) and unclassified points (1). Upon completion the macro, the classification results undergo quality control and any misclassified points are manually edited. In areas of dense vegetation the bare earth ground points might be incorrectly classified due to the inability of the laser to penetrate the canopy and reach the bare ground. In these areas, JALBTCX defaults to the algorithm's ground surface instead of manually reclassifying those points. The final classification results are comprised of individual lidar points with classifications of ground (2) or unclassified (1). They are partitioned into a series of 5km delivery boxes, one Classified LAS file per box. The format of the file is LAS version [1.2]. Data are classified as 1 (valid non-ground topographic data), 2 (valid ground topographic data), 21 (points that fall in topographic areas that were acquired with the bathymetric sensor), 29 (valid bathymetric data). CZMIL LAS files are imported into GeoCue V2012.1.27.7, which is a geospatial workflow production and management software tool employed by JALBTCX to perform and monitor production of data products. Upon import into GeoCue, A customized classification macro, built upon the TerraScan V13 module within Microstation V8i, classifies valid topographic data as ground points (2), valid bathymetric data as bathy (29), and unclassified points (1). Upon completion the macro, the classification results undergo quality control and any misclassified points are manually edited. In areas of dense vegetation the bare earth ground points might be incorrectly classified due to the inability of the laser to penetrate the canopy and reach the bare ground. In these areas, JALBTCX defaults to the algorithms ground surface instead of manually

reclassifying those points. The final classification results are comprised of individual lidar points with classifications of ground (2) or unclassified (1). They are partitioned into a series of 5km or quarter quad delivery boxes, one Classified LAS file per box. The format of the file is LAS version 1.2. Data are classified as 1 (valid non-ground topographic data), 2 (valid ground topographic data), 29 (valid bathymetric data).
- 2024-08-23 00:00:00 - The NOAA Office for Coastal Management (OCM) received laz files from USACE JALBTCX for the Lake Michigan coastline. The lidar data had elevation and intensity measurements. The data were in geographic (NAD83 2011) coordinates and IGLD85 elevations in meters. The data were classified as: 1 - Unclassified, 2 - Ground, 7 - Noise, 9 - Water, 21 - points that fall in topographic areas that were acquired with the bathymetric sensor, 29 - Bathymetric Point. OCM processed all classifications of points to the Digital Coast Data Access Viewer (DAV). Classes available on the DAV are: 1, 2, 7, 9, 21, 29. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. An internal OCM script was run to check the number of points by classification and by flight ID and the gps and intensity ranges. 2. The LAZ files were converted from IGLD85 elevations to NAD83 (GRS80) ellipsoidal heights using the GEOID 03 model. 3. Internal OCM scripts were run on the laz files to assign the geokeys, to sort the data by gps time and zip the data to database and to AWS S3.

5.1.1. If data at different stages of the workflow, or products derived from these data, are subject to a separate data management plan, provide reference to other plan:

5.2. Quality control procedures employed (describe or provide URL of description):

6. Data Documentation

The EDMC Data Documentation Procedural Directive requires that NOAA data be well documented, specifies the use of ISO 19115 and related standards for documentation of new data, and provides links to resources and tools for metadata creation and validation.

6.1. Does metadata comply with EDMC Data Documentation directive?

No

6.1.1. If metadata are non-existent or non-compliant, please explain:

Missing/invalid information:
- 1.7. Data collection method(s)
- 3.1. Responsible Party for Data Management
- 4.1. Have resources for management of these data been identified?
- 4.2. Approximate percentage of the budget for these data devoted to data management
- 5.2. Quality control procedures employed
- 7.1. Do these data comply with the Data Access directive?

- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.1.2. If there are limitations to data access, describe how data are protected
- 7.4. Approximate delay between data collection and dissemination
- 8.1. Actual or planned long-term data archive location
- 8.3. Approximate delay between data collection and submission to an archive facility
- 8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?

6.2. Name of organization or facility providing metadata hosting:
NMFS Office of Science and Technology

6.2.1. If service is needed for metadata hosting, please indicate:

6.3. URL of metadata folder or data catalog, if known:
https://www.fisheries.noaa.gov/inport/item/73327

6.4. Process for producing and maintaining metadata
(describe or provide URL of description):
Metadata produced and maintained in accordance with the NOAA Data Documentation Procedural Directive: https://nosc.noaa.gov/EDMC/DAARWG/docs/EDMC_PD-Data_Documentation_v1.pdf

7. Data Access
NAO 212-15 states that access to environmental data may only be restricted when distribution is explicitly limited by law, regulation, policy (such as those applicable to personally identifiable information or protected critical infrastructure information or proprietary trade information) or by security requirements. The EDMC Data Access Procedural Directive contains specific guidance, recommends the use of open-standard, interoperable, non-proprietary web services, provides information about resources and tools to enable data access, and includes a Waiver to be submitted to justify any approach other than full, unrestricted public access.

7.1. Do these data comply with the Data Access directive?

7.1.1. If the data are not to be made available to the public at all, or with limitations, has a Waiver (Appendix A of Data Access directive) been filed?

7.1.2. If there are limitations to public data access, describe how data are protected from unauthorized access or disclosure:

7.2. Name of organization of facility providing data access:
NOAA Office for Coastal Management (NOAA/OCM)

7.2.1. If data hosting service is needed, please indicate:

7.2.2. URL of data access service, if known:
https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=10170/details/10170
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/10170/index.html

7.3. Data access methods or services offered:
Data is available for bulk and custom downloads.

7.4. Approximate delay between data collection and dissemination:

7.4.1. If delay is longer than latency of automated processing, indicate under what authority data access is delayed:

8. Data Preservation and Protection

The NOAA Procedure for Scientific Records Appraisal and Archive Approval describes how to identify, appraise and decide what scientific records are to be preserved in a NOAA archive.

8.1. Actual or planned long-term data archive location:
(Specify NCEI-MD, NCEI-CO, NCEI-NC, NCEI-MS, World Data Center (WDC) facility, Other, To Be Determined, Unable to Archive, or No Archiving Intended)

8.1.1. If World Data Center or Other, specify:

8.1.2. If To Be Determined, Unable to Archive or No Archiving Intended, explain:

8.2. Data storage facility prior to being sent to an archive facility (if any):
Office for Coastal Management - Charleston, SC

8.3. Approximate delay between data collection and submission to an archive facility:

8.4. How will the data be protected from accidental or malicious modification or deletion prior to receipt by the archive?
Discuss data back-up, disaster recovery/contingency planning, and off-site data storage relevant to the data collection

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.