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:

2018-2019 NOAA NGS Topobathy Lidar DEM: Trappe to Toddville, MD

1.2. Summary description of the data:

The NOAA Chesapeake Bay MD1804 Option 1 East 4 Topobathymetric lidar data were collected by NV5 Geospatial (NV5) using Riegl VQ-880-G, VQ-880-GII, and VQ-880-GH systems. The NOAA Chesapeake Bay MD1804 Option 1 East 4 acquisition spanned from 20181107-20190417 in 14 missions. The NOAA Chesapeake Bay MD1804 Option 1 East 4 dataset includes topobathymetric data in LAS format 1.4, point data record format 6, with the following classifications in accordance with project specifications and the American Society for Photogrammetry and Remote Sensing (ASPRS) classification standards:

1 - unclassified

2 - ground

7 - noise

40 - bathymetric bottom or submerged topography

43 - submerged feature

45 - water column

46 - overlap bathymetric bottom

71 - adjacent lift unclassified

72 - adjacent lift ground

85 - adjacent lift water column

1 Overlap - edge clip

This data set also includes lidar intensity values, number of returns, return number, time, and scan angle. The 100 meter buffered NOAA Chesapeake Bay MD1804 Option 1 East 4 project area covers approximately 563.829 square kilometers of an area

encompassing a portion of the Chesapeake Bay and the nearby census designated places of Taylors Island, Cambridge, Madison, Woolford, and Algonquin, Maryland. LAS files were compiled in 500 m x 500 m tiles. The final classified lidar data were then transformed from ellipsoid to geoidal height (Geoid12b) and used to create 36 - 5,000 m x 5,000 m topobathymetric DEMs in GeoTIFF format with 1m pixel resolution.

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:
2018-11-07 to 2019-04-17

1.5. Actual or planned geographic coverage of the data:
W: -76.379131, E: -76.034717, N: 38.659511, S: 38.309203

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?
Yes

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):
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):
Process Steps:
- 2020-12-17 00:00:00 - Data for the NOAA Chesapeake Bay MD1804 Option 1 East 4 Topobathymetric lidar project area was acquired by NV5 Geospatial (NV5) using Riegl VQ-880-G, VQ-880-GII, and VQ-880-GH Topobathymetric lidar systems. All derived DEM data is referenced to: Horizontal Datum-NAD83(2011) epoch: 2010. 00 Projection-UTM Zone 18N Horizontal Units-meters Vertical Datum-NAVD88 (Geoid12b) Vertical Units-meters The NOAA Chesapeake Bay MD1804 Option 1 East 4 dataset encompasses 36 5000m x 5000m tiles in an area encompassing a portion of the Chesapeake Bay and the nearby census designated places of Taylors Island, Cambridge, Madison, Woolford, and Algonquin, Maryland. Lidar data were acquired with VQ-880-G, VQ-880-GII, and VQ-880-GH Riegl sensors. The collected lidar data were immediately processed in the field by NV5 to a level that will allow QA\QC measures to determine if the sensor is functioning properly and assess the coverage of submerged topography. An initial SBET was created in POSPAC MMS 8.3 SP3 and loaded into RiProcess which applies pre-calibrated angular misalignment corrections of scanner position to extract the raw point cloud into geo-referenced LAS files. These files were inspected for sensor malfunctions and then passed through automated raster generation using LAStools to develop an initial assessment of bathymetric coverage. NV5 reviewed all acquired flight lines to ensure complete coverage and positional accuracy of the laser points. These rasters were also used to create an initial product in Quick Look Coverage Maps. These Quick Look files are not fully processed data or final products but provide rapid

assessment of approximate coverage and depth penetration. NV5 resolved kinematic corrections for aircraft position data using aircraft GNSS and Applanix's proprietary PP-RTX solution. When PP-RTX was not used NV5 conducted static Global Navigation Satellite System (GNSS) ground surveys (1 Hz recording frequency) using base stations over known monument locations during flights. After the airborne survey, static GPS data were triangulated with nearby Continuously Operating Reference Stations (CORS) using the Online Positioning User Service (OPUS) for precise positioning. Multiple independent sessions over the same base station were performed to confirm antenna height measurements and to refine position accuracy. This data was used to correct the continuous on board measurements of the aircraft position recorded throughout the flight. A final smoothed best estimate trajectory (SBET) was developed that blends post-processed aircraft position with attitude data. Using the SBETs, sensor head position and attitude were then calculated throughout the survey. Trimble Business Center v.3.90, Blue Marble Geographic Calculator 2019, and PosPac MMS 8.3 SP3 were used for these processes. Following final SBET creation, NV5 used RiProcess 1.8.5 to calculate laser point positioning by associating SBET positions to each laser point return time, scan angle, and intensity. Terra 19 and LasTools were used to classify water surface and create a water surface model. They are created for single swaths to ensure temporal differences and wave or water surface height variations between flight lines do not impact the refraction of the bathymetric data. These models are used in NV5's LasMonkey refraction tool to determine the accurate positioning of bathymetric points. All lidar data below water surface models were classified as water column to be refracted. Light travels at different speeds in air versus water and its direction of travel or angle is changed or refracted when entering the water column. The refraction tool corrects for this difference by adjusting the depth (distance traveled) and horizontal positioning (change of angle/ direction) of the lidar data. Using raster-based QC methods, the output data is verified to ensure the refraction tool functioned properly.
- 2020-12-17 00:00:00 - Once all data was refracted by flight line data was exported to LAS 1.4 format and combined into 500 m x 500 m tiles. Data were then further calibrated using TerraMatch. NV5 used custom algorithms in TerraScan to classify the initial ground/submerged topography surface points. Relative accuracy of overlapping swaths was compared and verified through the use Delta-Z (DZ) orthos created using NV5's Las Product Creator. Absolute vertical accuracy of the calibrated data was assessed using ground survey data and complete coverage was again verified. Post automated classification NV5 then performed manual editing to review all classification and improve the final Topobathymetric surface. NV5's LasMonkey was used to update LAS header information, including all projection and coordinate reference system information. The final lidar data are in LAS format 1.4 and point data record format 6. The final classification scheme is as follows: 1 - unclassified 2 - ground 7 - noise 40 - bathymetric bottom or submerged topography 43 - submerged feature 45 - water column 46 - overlap bathymetric bottom 71 - adjacent lift unclassified 72 - adjacent lift

ground 85 - adjacent lift water column 1 Overlap - edge clip
- 2020-12-17 00:00:00 - NV5 transformed the final lidar data from ellipsoid heights to orthometric heights referenced to NAVD88, Geoid 12b to create the final topobathymetric void clipped DEMs. The topobathymetric bare earth DEMs were output at 1 meter resolution in GeoTIFF format into 36 - 5,000 m x 5,000 m tiles. The NOAA Chesapeake Bay MD1804 Option 1 East 4 rasters are clipped to the extent of the project boundary and named according to project specifications. A bathymetric void shapefile was created to indicate areas where there was a lack of bathymetric returns. This shape was created by triangulating bathymetric bottom points with an edge length maximum of 4.56m to identify all areas greater then 9 square meters without bathymetric returns. This shapefile was used to clip and exclude interpolated elevation data from these areas in the bathymetric void clipped topobathymetric bare earth model.

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
- 5.2. Quality control procedures employed
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.4. Approximate delay between data collection and dissemination
- 8.3. Approximate delay between data collection and submission to an archive facility

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/64565

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?

Yes

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=9299
https://noaa-nos-coastal-lidar-pds.s3.us-east-1.amazonaws.com/dem/NGS_TrappeToToddville_MD_To

7.3. Data access methods or services offered:

Data is available online for bulk or 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)

NCEI_CO

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

Data is backed up to tape and to cloud storage.

9. Additional Line Office or Staff Office Questions
Line and Staff Offices may extend this template by inserting additional questions in this section.