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:
2013 Queen Annes County HD LiDAR & Hydro

1.2. Summary description of the data:
The County of Queen Anne Maryland requested delivery of three dimensional classified point cloud and hydro-flattened terrain data derived from LiDAR(Light Detection and Ranging) technology for the entirety of Queen Anne's County, MD. Remotely sensed, geographically referenced elevation measurements were collected by Axis Geospatial, LLC using airborne LiDAR sensors.

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:
2013-02-14, 2013-03-05, 2014-01-13, 2014-12-31

1.5. Actual or planned geographic coverage of the data:
W: -76.3776, E: -75.74641, N: 39.26307, S: 38.85122

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

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):
Process Steps:
- 2013-02-14 00:00:00 - Using a Trimble Harrier 68i High Definition LiDAR sensor on board a Cessna 206, 185 flight lines of high-density data were collected during 18 separate missions, flown as close together as the weather conditions permitted, to ensure consistent ground conditions across the project area, at a nominal pulse

spacing (NPS) of 0.46 m achieved a point density of 4.73 ppm2, were collected by Axis Geospatial, LLC covering Queen Annes County, MD (approximately 510 square miles). Data Acquisition Height = 2,034 feet Above Ground Level (AGL) - Aircraft Speed = 116 Knots. Multiple returns were recorded for each laser pulse along with an intensity value for each return. A total of 17 missions were flown from February 14th, 2013 to March 5th, 2013 with one additional collection on January 13th, 2014. The presence of a strong CORS (Continuously Operating Reference Station) configuration allowed for the LiDAR to be acquired with Global Navigation Satellite System (GNSS) techniques and procedures. 92 ground control points were surveyed through static methods. The GEOID used to reduce satellite-derived elevations to orthometric heights was GEOID12A. Data for the task order is referenced to the Maryland State Plane, North American Datum of 1983 (NAD83), and North American Vertical Datum of 1988 (NAVD88), in US Survey Feet. Airborne GPS data was differentially processed and integrated with the post-processed inertial measurement unit (IMU) data to derive a smoothed best estimate of trajectory (SBET). The SBET was used to reduce the lidar slant range measurements to a raw reflective surface for each flight line. The coverage was classified to extract a bare earth digital elevation model (DEM) and separate last returns.
- 2013-02-14 00:00:00 - During the project data acquisition by Axis Geospatial, LLC, East-West cross flights were flown over each of the 7 delivery block areas in order to tie the data together from multi-day North-South collections.
- 2013-02-14 00:00:00 - Once the data acquisition and GPS processing phases are complete, the lidar data were processed immediately by Axis Geospatial, LLC to verify the coverage had no voids. The GPS and IMU data were post-processed using ApplanixPOSPac v.6.1 software to derive a best estimate of trajectory. The quality of the solution was verified to be consistent with the accuracy requirements of the project.
- 2014-12-31 00:00:00 - The individual flight lines were inspected by Axis Geospatial, LLC to ensure the systematic and residual errors have been identified and removed. Then, the flight lines were compared to adjacent flight lines for any mismatches to obtain a homogenous coverage throughout the project area. Axis Geospatial, LLC compared LiDAR intensity values against known control point locations that were on defineable features such as the end of a paint line and measured the apparent offsets; these values were then averaged to come up with the X and Y values used for the horizontal correction. Additionally Axis Geospatial, LLC compared a TIN (Triangulated Irregular Network) of LiDAR points within 25 feet of each surveyed control point and measured the apparent vertical offsets; these values were then averaged to come up with the Z value used for the vertical correction. Next the point cloud underwent a classification process to determine bare-earth points and non-ground points utilizing TerraSolid, TerraScanLiDAR processing and modeling software. v. 014.013. This process determined Default (Class 1), Ground (Class 2), Noise (Class 7), and Water (Class 9) classifications. The bare-earth (Class 2 - Ground) lidar points underwent a manual QA/QC step to verify that artifacts have been removed from the bare-earth surface. The surveyed ground control points are used

to perform the accuracy checks and statistical analysis of the lidar dataset.
- 2014-12-31 00:00:00 - Axis Geospatial, LLC located a total of 43 check points for use in the analysis of the lidar data quality. The points were located on relatively flat terrain on surfaces that generally consisted of grass, gravel, or bare earth. Vertical RMSE for FVA (based on 12 points) was found to 0.104 feet; SVA Field (based on 25 points) was found to be 0.181 feet; and SVA Woods (based on 6 points) was found to be 0.373 feet. Applanix software (PosPAC MMS) was used in the post processing of the airborne GPS and inertial data, which are critical to the positioning and orientation of the sensor during all flights. POSPac MMS provides the smoothed best estimate of trajectory (SBET) that is necessary for the post processor to develop the point cloud from the lidar missions. The point cloud is the mathematical three-dimensional collection of all returns from all laser pulses as determined from the aerial mission. The GEOID used to reduce satellite derived elevations to orthometric heights was GEOID12A. Data for the task order is referenced to the Maryland State Plane, NAD83, and NAVD88, in US Survey Feet. At this point the data are ready for analysis, classification, and filtering to generate a bare-earth surface model in which the above ground features are removed from the data set. The point cloud was manipulated by the Optech or Leica software; GeoCue, TerraScan, and TerraModeler software were used for the automated data classification, manual cleanup, and bare-earth generation from the data. Project specific macros were used to classify the ground. All data were manually reviewed and any remaining artifacts removed using functionality provided by TerraScan and TerraModeler. All ground (ASPRS Class 2) lidar data inside of a Lake Pond and Double Line drain were classified to water (ASPRS Class 9) using digitized breaklines and TerraScan macro functionality. All Lake Pond and Double Line Island features were checked to ensure that the ground (ASPRS Class 2) were reclassified to the correct classification after the automated classification was completed. Data were then run through additional macros to ensure deliverable classification levels matching the ASPRS LAS Version 1.2 Classification structure. GeoCue functionality was then used to ensure correct LAS Versioning. In-house software was used as a final QA/QC check to provide LAS Analysis of the delivered tiles. QA/QC checks were performed on a per tile level to verify final classification metrics and full LAS header information.
- 2014-12-31 00:00:00 - Axis Geospatial, LLC used the bare-earth (Class 2 - Ground) lidar points and Hydro 3-D breaklines to generate Hydro-flattened Digital Elevation Models (DEMs) using Blue Marble Geographics Global Mapper v15.2.9 software. The DEMs were exported to an Erdas Imagine File (.img) format with 32-bit floating point samples and a 2-foot sample spacing (pixel size). The DEMs were tiled out into the same 565 MD State delivery tiles (6000 feet x 4000 feet) as the LiDAR delivery. Note that much of the hydro within the project area, specifically the Sea Shore features (Chesapeake Bay, Chester River, shores around Wye Island) are influenced by the tide. The LiDAR acquisition took place over the course of 18 different missions at varying tidal stages; because of this, there may be anomalies in the hydro-flattening between data from different missions as a result of the tide.
- 2018-03-07 00:00:00 - NOAA OCM downloaded the data from the Maryland iMAP (

imap.maryland.gov). Data were reprojected into geographic coordinates and transformed to ellipsoid heights (meters) vertically. The geoid12a model was used for the transform.

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/51889

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=8489
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/8489/index.html

7.3. Data access methods or services offered:

Data is available online for 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.