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:
2022 DC OCTO Lidar: Washington, DC

1.2. Summary description of the data:
These lidar data are processed classified LAS 1.4 files at USGS QL2 covering the District of Columbia. Some areas have limited data. The lidar dataset redaction was conducted under the guidance of the United States Secret Service. All data returns were removed from the dataset within the United States Secret Service redaction boundary except for classified ground points and classified water points.

This metadata record supports the data entry in the NOAA Digital Coast Data Access Viewer (DAV).

The NOAA Office for Coastal Management (OCM) downloaded laz point data files from the Open Data DC site.

The data were processed to the NOAA Digital Coast Data Access Viewer (DAV) to make the data available for bulk and custom downloads. In addition to these lidar point data, the bare earth Digital Elevation Models (DEM) created from the lidar point data are also available. These data are available for custom download at the link provided in the URL section of this metadata record.

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:
2022-01-24 to 2022-01-26

1.5. Actual or planned geographic coverage of the data:
W: -77.122373, E: -76.900716, N: 39.001746, S: 38.785481

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):

Lineage Statement:
Data were collected and processed by Fugro for the DC Office of the Chief Technology Officer (OCTO) and were made available on the Open Data DC site. The data were downloaded from the Open Data DC site by the NOAA Office for Coastal Management (OCM) where the data were processed to make it available for custom download from the NOAA Digital Coast Data Access Viewer (DAV) and for bulk download from AWS S3.

Process Steps:

- 2022-01-01 00:00:00 - The lidar data acquisition for DC OCTO was flown to support the creation of a 4 ppsm classified lidar point cloud data set, 1m resolution hydro-flattened bare earth DEM, DSM, nDSM, 1 meter resolution intensity images, and .6m contours over the full project area covering the District of Columbia. Due to security requirements in the area, Fugro received waivers to fly in the Flight Restricted Zone (FRZ) and P-56 areas. The lidar acquisition was flown in a single lift on January 24, 2022, and a short reflight on January 26, 2022, at an altitude of 7,950 feet above mean sea level and composed of 22 flight lines, 20 primary lines and two cross ties. All lidar data was collected with a Piper Navajo PA31-50, tail# N62912 and a Leica ALS80 lidar sensor, #130. Due to the known difficulties flying over DC, the ALS80 sensor was selected to take advantage of its flight altitude and speed, minimizing the number of lifts for the various flight restrictions. All lidar was collected in conjunction with airborne GPS.
- 2022-01-01 00:00:00 - Rice and Associates, under contract to Fugro USA Land, Inc., successfully established ground control for the DC OCTO project area. A total of 31 survey points were visited, 1 ground control point, 25 NVA checkpoints, and 5 VVA checkpoints. Of those 31 surveys, 18 were only visually observed to maintain control integrity and assure that construction had not altered the point. 13 surveys were done for this project to compile with previously surveyed ground control data. The new surveys used GPS to establish the control network. The ground control was delivered in Maryland State Plane (FIPS1900) meters, with the horizontal datum provided in both NAD1983 and NAD83(2011). The vertical datum was the North American Vertical Datum of 1988 (NAVD88) using GEOID12B. The table below shows which points were used as the control, which were used as NVA checkpoints, and which were VVA checkpoints: NVA - NVA-01 NEW SURVEY,NVA-02 NEW SURVEY,NVA-03,NVA-04-2,NVA-05 NEW SURVEY,NVA-06,NVA-07-2,NVA-08,NVA-09, NVA-10 NEW SURVEY,NVA-11,NVA-12-2 NEW SURVEY,NVA-13,NVA-14 NEW SURVEY,NVA-15,NVA-16,NVA-17,NVA-18,NVA-19 NEW SURVEY,NVA-20; VVA - VVA01 NEW SURVEY,VVA02 NEW SURVEY,VVA03 NEW SURVEY,VVA04 NEW SURVEY,VVA05 NEW SURVEY; GCP - GCP-01-2,GCP-02,GCP-03,GCP-04 NEW SURVEY, GCP-05-2,GCP-06-2. During initial processing, QC and accuracy assessments were run the data in NAD83(2011) datum which is the native coordinate system from the

sensor. Following boresight the data was re-projected to NAD83 for delivery per the contract specifications and cut to the delivery extent the control was re-run in the final deliverable projection.
- 2022-01-01 00:00:00 - Pre-Processing and Boresight All lidar data went through a preliminary field review to ensure that complete coverage was obtained and that there were no gaps between flight lines prior to leaving the project site. Once back in the office, the data went through a complete iteration of processing to ensure that it is complete, uncorrupted and that the entire project area was covered without gaps. There were three steps to processing: 1) GPS/IMU processing - airborne GPS and IMU data was processed using the airport GPS base station data; 2) raw lidar data processing - the raw data was processed to LAS format flight lines with full resolution output before performing QC. A starting configuration file is used in this process, which contains the latest calibration parameters for the sensor and outputs the flight line trajectories. 3) Verification of coverage and data quality - the trajectory files were checked to ensure completeness of acquisition for the flight lines, calibration lines and cross flight lines. Intensity images were generated for the entire lift and thoroughly reviewed for data gaps in project area. A sample TIN surface was generated to ensure no anomalies or turbulence were present in the data; if any adverse quality issues were discovered, the flight line was rejected and re-flown. The achieved post spacing confirmed against the project specification of 4 ppsm and checked for clustering in point distribution. The review showed that the lidar data exceeded the 2 ppsm post spacing. The lidar data was boresighted using the following steps: 1) The raw data was processed to LAS format flight lines using the final GPS/IMU solution. This LAS dataset was used as source data for boresighting. 2) Fugro proprietary and commercial software was used to calculate initial boresight adjustment angles based on sample areas within the lift. These areas cover calibration flight lines collected in the lift, cross tie and production flight lines. These areas are well distributed in the lift coverage and cover multiple terrain types that are necessary for boresight angle calculation. The results were analyzed and any additional adjustments were completed in the selected areas. 3) Once the boresight angle calculation was completed, the adjusted settings were applied to the flight lines of the lift and checked for consistency. The technicians utilized commercial and proprietary software packages to analyze the matching between flight line overlaps for the entire lift and adjusted as necessary. 4) Vertical misalignment of all flight lines was checked and corrected, as was the matching between data and ground truth. 5) A final vertical accuracy check of the boresighted flight lines against the surveyed ground control points was conducted. The boresighted lidar data achieved a vertical accuracy of 0.052m RMSE (0.102m at 95% confidence) against the 20 NVA checkpoint control locations.
- 2022-01-01 00:00:00 - Data Redaction Following the boresight completion, the lidar dataset redaction was conducted under the guidance of the United States Secret Service. All lidar data returns and collected data were removed from the dataset based on the redaction footprint shapefile agreed upon in 2022.
- 2022-01-01 00:00:00 - Classified Point Cloud The boresighted lidar data underwent

an automated classification filter to classify low noise, high noise, and ground points. To obtain optimum results, the parameters used by the automated classification filter are customized for each terrain type and project. Once the automated filtering was completed, the lidar files went through a visual inspection to ensure that an appropriate level of filtering was used. In cases where the filtering was too aggressive and important terrain may have been filtered out, the data is either run through a different filter within localized area or is corrected during the manual filtering process. A second automatic filter is run for the initial classification on buildings. Following the automatic filters, manual editing was completed in Terrascan software to correct any misclassification of the lidar dataset. All tiles then went through a peer review to ensure proper editing and consistency. When the peer review was completed two additional automatic filters were applied. The first filter was used to classify the vegetation - moving the unclassified points to either the low, medium, or high vegetation classes. The second filter was used to re-classify points inside water bodies to water class, and a 1*NPS buffer around water bodies to ignored ground class. Once the manual inspection, QC, and auto filter is complete for the lidar tiles, the LAS point cloud data was converted into the final deliverable format and the accuracy statistics were re-run to confirm the deliverable accuracy. The LAS was then cut to the final delivery layout and in LAS 1. 4 format for delivery. The point cloud was delivered with data in the following classifications: Class 1 - Processed but Unclassified; Class 2 - Bare Earth Ground; Class 3 - Low Vegetation; Class 4 - Medium Vegetation; Class 5 - High Vegetation, Class 6 - Buildings; Class 7 - Low Point (Noise); Class 9 - Water; Class 17 - Bridge Decks; Class 18 - High Noise; Class 20 - Ignored Ground.
- 2023-05-18 00:00:00 - The NOAA Office for Coastal Management (OCM) downloaded 328 las point data files from this Open Data DC site: https://opendata.dc.gov/datasets/2022-lidar-classified-las/explore The data were in Maryland State Plane (NAD83 2011), meters coordinates and NAVD88 (Geoid12b) elevations in meters. The data were classified as: 1 - Unclassified, 2 - Ground, 3- Low Vegetation, 4 - Medium Vegetation, 5 - High Vegetation, 6 - Buildings, 7 - Low Noise, 9 - Water, 17 - Bridge Decks, 18 - High Noise, 20 - Ignored Ground. OCM processed all classifications of points to the Digital Coast Data Access Viewer (DAV). Classes available on the DAV are: 1, 2, 3, 4, 5, 6, 7, 9, 17, 18, 20. Only ground classified points area available in these four areas: The U.S. Naval Observatory, the White House, the U.S. Capital Building/U.S. Supreme Court/ Library of Congress, and the Washington Navy Yard (few buildings). OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. Internal OCM scripts were run to check the number of points by classification and by flight ID and the gps, elevation, and intensity ranges. 2. Internal OCM scripts were run on the las files to: a. Convert from orthometric (NAVD88) elevations to NAD83 (2011) ellipsoid elevations using the Geoid12b model b. Convert the las files from Maryland State Plane (NAD83 2011), meters coordinates to geographic coordinates c. Assign the geokeys, sort the data by gps time and zip the data to database.

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/69938

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=9837/details/9837
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/9837/index.html

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.