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 FEMA Lidar: Region 3 (MD, VA, WV)

1.2. Summary description of the data:
Dewberry collected LiDAR for ~3,942 square miles in Virginia, West Virginia, and Maryland Counties. Those counties are:

Maryland - Allegany, Frederick, Washington

Virginia - Clarke, Fairfax, Fauquier, Frederick

West Virginia - Berkeley, Jefferson, Morgan

The acquisition was performed by Geodigital. The nominal pulse spacing for this project is 1.6 ft (0.5 meters). This project was collected with a sensor which collects intensity values for each discrete pulse extracted from the waveform. GPS Week Time, Intensity, Flightline and echo number attributes were provided for each LiDAR point. Dewberry used proprietary procedures to classify the LAS according to contract specifications: 1-Unclassified, 2-Ground, 7-Noise, 9-Water, 10-Ignored Ground due to breakline proximity, and 11-Withheld.

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:
2012-01-31 to 2012-03-27

1.5. Actual or planned geographic coverage of the data:
W: -78.383395, E: -77.442101, N: 39.723097, S: 39.327819

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

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:

- 2012-01-01 00:00:00 - - Establishment of survey points to support the LiDAR data collection. six existing published NGS stations (AI6312, AJ8025, DM6144, HV3503, JV4103, JV6141) were observed in a GPS control network and used to establish five new points for the primary control for this site. AI6312, AJ8025, DM6144, HV3503, JV4103, JV6141, 335DEW09, 335DEW10, 335DEW20, 335DEW21, 335DEW22 were observed and used to control all flight missions and static ground surveys. The following are the final coordinates of the control points used for this project: SurveyBlock, Station, Latitude(D M S Hem), Longitude(D M S Hem), H-Ell(m), H-MSL(m) 335_DEW_11, 335DEW09, 39 02 32.49529, -77 31 34.98309, 91.1625, 123.3164 335_DEW_11, 335DEW10, 38 45 06.58533, -77 44 53.11093, 105.8415, 138.0279 335_DEW_11, 335DEW20, 39 33 44.04655, -78 37 05.79616, 152.4477, 185.5792 335_DEW_11, 335DEW21, 39 24 00.80394, -78 04 35.85693, 204.8443, 238.8695 335_DEW_11, 335DEW22, 39 29 36.03322, -77 34 08.01429, 150.5777, 183.7722 335_DEW_11, AI6312, 39 41 43.29694, -78 47 16.08769, 182.8978, 215.3993 335_DEW_11, AJ8025, 39 17 34.38480, -77 18 53.40005, 146.1161, 178.2409 335_DEW_11, DM6144, 38 35 08.87989, -77 42 43.87127, 64.7557, 96.8580 335_DEW_11, HV3503, 38 58 29.39869, -77 41 26.89214, 109.6036, 141.9908 335_DEW_11, JV4103, 39 32 18.83476, -77 59 06.07081, 122.8047, 157.0112 335_DEW_11, JV6141, 39 04 51.93707, -77 33 30.18563, 81.9107, 114.2138
- 2012-01-01 00:00:00 - - Airborne acquisition of Lidar GeoDigital used two Optech ALTM 3100EA system to collect the data. The Optech System was configured in the following method: Aircraft Speed 150 knots Data Acquisition Height 950 m AGL Swath Width 680.00 m Distance between Flight Lines 470.00 m Overlap 30 % Scanner Field Of View 22 +/- degrees (+/-2 degrees flagged as withheld) Pulse Repetition Rate 70 KHz Scan Frequency 40 Hz Number of Returns per Pulse 4 Discrete returns Beam Divergence 0.3 mRad Flight Line Length shorter than 70km Base Station Distance shorter than 40km Resultant Raw Point Density ~1 pt/m2 with overlap Aircraft Speed 150 knots Data Acquisition Height 950 m AGL Swath Width 680.00 m Distance between Flight Lines 350.00 m Overlap 55 % Scanner Field Of View 22 +/- degrees (+/-2 degrees flagged as withheld) Pulse Repetition Rate 70 KHz Scan Frequency 40 Hz Number of Returns per Pulse 4 Discrete returns Beam Divergence 0.3 mRad Flight Line Length shorter than 70km Base Station Distance shorter than 40km Resultant Raw Point Density ~1 pt/m2 with overlap Aircraft platforms were used in the collection of this project: A Cessna 310 aircraft was used to conduct the aerial survey. The Cessna 310 is a fixed wing aircraft that have an endurance of approximately 5 hours. -GPS-IMU: High accuracy IMU (200Hz) and GPS information (1Hz) concerning the attitude and position of the sensor were acquired at the same time as the Laser data. Ground based GPS stations also acquired consecutive GPS information for the duration of the flights. A combination

of Sokkia GSR 2600 and NovAtel DL-4+ dual-frequency GPS receivers were used to support the airborne operations of this survey. - Flights and Flight Lines The area is covered by several missions, a mission is defined as the block of acquisition between aircraft take-off and landing flown under good meteorological and GPS conditions, and each mission includes multiple flightlines. List of Base Stations: JV6141 Number of Missions: 74 List Of Missions: o112031a, o112031b, o112034a, o112034a, o112034b, o112050b, o112051a, o112051b, o112053a, o112057a, o112057b, o112066a, o112070a, o112070b, o112071a, o112071b, 0112072a, o112072b, o112073a, o112073b, o112082a, o112083a, o112083b, o112086a, o112029a o112029b o112030a o112031a o112031b o112034a o112064b, o112070a o112070b o112071a o112071b o112072a o112072b o112073a o112082a o112083a o112083b o112086a o112090a o112092a o112093a o112093b o112093c o112094a o112094b o112094c o112094d o112095a o112095b o112096a o112096b o112096c o112097a o112097b o112098a o112100a o112101a o112103a o112103b o112104a o112104b o112104c o112105a o212094a o212095a o212096a o212096b o212097a o212097b o112046a o112046b o112048a o112048b
- 2012-03-01 00:00:00 - - Airborne GPS Kinematic processing Airborne GPS kinematic data was processed on-site using GrafNav kinematic On-The-Fly (OTF) software. Flights were flown with a minimum of 6 satellites in view (13 degrees above the horizon) and with a PDOP of better than 4. Distances from base station to aircraft were kept to a maximum of 40 km, to ensure a strong OTF (On-The-Fly) solution. For all flights, the GPS data can be classified as excellent, with GPS residuals of 3cm average but no larger than 10 cm being recorded. The Geoid09 geoid model, published by the NGS, was used to transform all ellipsoidal heights to orthometric.
- 2012-03-01 00:00:00 - - Generation and Calibration of laser points Laser data points are generated using Optech's software Dashmap. Those software combine the raw laser range and angle data file with the finalized GPS/IMU trajectory information. Each mission is evaluated in Terrasolid's Terramatch software to correct any residual roll pitch heading misalignments, if necessary those values are to the data. The resulting point cloud is projected into the desired coordinate system and created in LAS format. One file per swath, files bigger than 2Gb split in 2. On a project level, a coverage check is carried out to ensure no slivers are present.
- 2012-03-01 00:00:00 - - Mission to mission adjustments of Lidar data All missions are validated and adjusted against the adjoining missions for relative vertical biases and collected GPS static and kinematic ground truthing points for absolute vertical accuracy purposes.
- 2012-04-01 00:00:00 - - Deliverable Product Generation *Raw Calibrated LIDAR Point Cloud Raw LiDAR point cloud, was provided in the following formats/ parameters: - LAS V1.2, point record format 1, Adjusted GPS time, georeferencing information populated in header - The following fields are included in the LAS file: 1. Adjusted GPS time reported to the nearest microsecond 2. Flight line ID 3. Easting (reported to the nearest 0.01 m) 4. Northing (reported to the nearest 0.01 m) 5. Elevation (reported to the nearest 0.01 m) 6. intensity 7. Echo number 8. Classification 9. Scan angle 10. Edge of scan 11. Scan direction - Full swaths, all

collected points delivered (except discarded flightline) - The Withheld bit flags the last 2 degrees of the swath (Additional areas are classified with the withheld in areas where wind or vegetation affected the quality of the data long the edge of the flight line. The classification of the additional withheld areas does not affect the density of the data.) - 1 file per swath, 1 swath per file (except when swath had to be divided in section for size or calibration)
- 2012-06-01 00:00:00 - Dewberry utilizes a variety of software suites for inventory management, classification, and data processing. All LiDAR related processes begin by importing the data into the GeoCue task management software. GeoCue allows the data to retain its delivered tiling scheme (1500 m by 1500 m). The tiled data is then opened in Terrascan where Dewberry uses proprietary ground classification routines to remove any non-ground points and generate an accurate ground surface. The ground routine consists of three main parameters (building size, iteration angle, and iteration distance); by adjusting these parameters and running several iterations of this routine an initial ground surface is developed. The building size parameter sets a roaming window size. Each tile is loaded with neighboring points from adjacent tiles and the routine classifies the data section by section based on this roaming window size. The second most important parameter is the maximum terrain angle, which sets the highest allowed terrain angle within the model. Once the ground routine has been completed a manual quality control routine is done using hillshades, cross-sections, and profiles within the Terrasolid software suite. After this QC step, a peer review and supervisor manual inspection is completed on a percentage of the classified tiles based on the project size and variability of the terrain. After the ground classification corrections were completed, the dataset was processed through a water classification routine that utilizes breaklines compiled by Dewberry to automatically classify hydrographic features. The water classification routine selects ground points within the breakline polygons and automatically classifies them as class 9, water. During this water classification routine, points which are in close proximity (1 m) to the hydrographic features are moved to class 10, an ignored ground. In addition to classes 1, 2, 8, 9, and 10, the project allows for a Class 7, noise points. This class was only used if needed when points could manually be identified as low/high points. Dewberry also used Class 11 - Withheld points. The fully classified dataset is then processed through Dewberry's comprehensive quality control program. The data was classified as follows: Class 1 = Unclassified. This class includes vegetation, buildings, noise etc. Class 2 = Ground Class 7 = Noise Class 8 = Model Key Points Class 9 = Water Class 10 = Ignored Ground Class 11 = Withheld The LAS header information was verified to contain the following: Class (Integer) GPS Week Time (0. 0001 seconds) Easting (0.01 m) Northing (0.01 m) Elevation (0.01 m) Echo Number (Integer 1 to 4) Echo (Integer 1 to 4) Intensity (8 bit integer) Flight Line (Integer) Scan Angle (Integer degree)
- 2012-06-01 00:00:00 - Dewberry used GeoCue software to develop raster stereo models from the LiDAR intensity. The raster resolution was 1 meter.
- 2012-06-01 00:00:00 - LiDAR intensity stereopairs were viewed in 3-D stereo using

Socet Set for ArcGIS softcopy photogrammetric software. The breaklines are collected directly into an ArcGIS file geodatabase to ensure correct topology. The LiDARgrammetry was performed under the direct supervision of an ASPRS Certified Photogrammetrist. The breaklines were stereo-compiled in accordance with the Data Dictionary. The data dictionary defines Tidal Waters as the land and water interface at the time of LiDAR acquisition of tidally influenced bodies of water. There is no minimum area requirement. Tidal variations over the course of a collection or between different collections will result in discontinuities along shorelines. This is considered normal and these "anomalies" should be retained. Variations in water surface elevation resulting in tidal variations during a collection should NOT be removed or adjusted, as this would require either the removal of valid, measured ground points or the introduction of unmeasured ground into the DEM. The USGS priority is on the ground surface, and accepts there may be occasional, unavoidable irregularities in water surface. Breaklines must be captured at or just below the elevations of the immediately surrounding terain. Under no circumstances should a feature be elevated above the surrounding LiDAR points. If it can be reasonably determined where the edge of water most probably falls, beneath the dock or pier, then the edge of water will be collected at the elevation of the water where it can be directly measured. If there is a clearly-indicated headwall or bulkhead adjacent to the dock or pier and it is evident that the waterline is most probably adjacent to the headwall or bulkhead, then the water line will follow the headwall or bulkhead at the elevation of the water where it can be directly measured. If there is no clear indication of the location of the waters edge beneath the dock or pier, then the edge of water will follow the outer edge of the dock or pier as it is adjacent to the water, at the measured elevation of the water. Breaklines shall snap and merge seamlessly with linear hydrographic features.
- 2018-03-14 00:00:00 - NOAA OCM downloaded the point cloud data from the USGS . Data were in LAZ format, NAVD88(Geoid09) meters, and UTM 17 or 18N depending on county. Data were converted to geographic coordinates and transformed to ellipsoid heights. Data were then ingested in the Digital Coast Data Access Viewer for distribution.

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/52042

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=8496
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/8496/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.