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:
2014 USGS Lidar: Central Virginia Seismic (Louisa County)

1.2. Summary description of the data:
Laser Mapping Specialist, Inc (LMSI) collected 230 square miles in the Virginia counties of Fluvanna, Orange, Louisa, and Spotsylvania. The nominal pulse spacing for this project was no greater than 0.7 meters. Dewberry used proprietary procedures to classify the LAS into an initial ground surface. Dewberry used proprietary procedures to classify the LAS and then performed manual classifications according to project specifications: 1-Unclassified, 2-Ground, 7-Noise, 9-Water, and 10-Ignored Ground due to breakline proximity. The LiDAR data were processed to a bare-earth digital terrain model (DTM). Detailed breaklines and bare-earth Digital Elevation Models (DEMs) were produced for the project area. Deliverables were produced in both UTM and State Plane coordinates. The data was formatted according to tiles with each UTM tile covering an area of 1,500 meters by 1,500 meters and each State Plane tile covering an area of 5,000 feet by 5,000 feet. A total of 320 UTM tiles and 313 State Plane tiles were produced for the project encompassing an area of approximately 230 sq. miles.

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:
2014-05-06 to 2014-05-07

1.5. Actual or planned geographic coverage of the data:
W: -78.15526, E: -77.707851, N: 38.140154, S: 37.766376

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

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:

- 2014-05-01 00:00:00 - Data for the Central Virginia Seismic LiDAR project was acquired by PAR using a ALTM NAV Flight Plan Optech ALTM3100EA LiDAR system Piper Navajo Aircraft. LIDAR acquisition began on May 6, 2014 (julian day 126) and was completed on May 7, 2014 (julian day 127). A total of 2 survey missions were flown to complete the project. PAR utilized a Lecia ALS70-CM for the acquisition. The flight plan was flown as planned with no modifications. There were no unusual occurrences during the acquisition and the sensor performed within specifications. There were 186 flight lines required to complete the project. The calibrated data was processed to NAD83(2011) UTM 17, meters, NAVD88 (Geoid12A), meters. One base station was utilized VA_21. The base station coordinates are set forth below: VA_21 Latitude: 28 00 25.25513 Longitude: -77 58 24.21356 Ellipsoid Height: 112.461 Orthometric Height: 144.7978 4 kinematic cross sections and 11 static points were surveyed at various locations throughout the project to be utilized for quality control and adjustment of the LIDAR data. All airborne GPS trajectories were processed and checked on site. All trajectories were very high quality with forward/ reverse separation rms between 1cm-3cm. All equipment performed within specifications with no unusual occurrences or anomalies. All data was of a very high quality and the project was executed as planned. Overall the LiDAR data products collected for Dewberry and Davis meet or exceed the requirements set out in the Statement of Work for this project. The quality control requirements of PARs Quality management program were adhered to throughout the acquisition stage of this project to ensure product quality.
- 2014-07-01 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. The swath data is tiled according to project specifications (1,500 m x 1,500 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 that are within 1 meter of the hydrographic features are moved to class 10, an ignored ground due to breakline proximity. In addition to classes 1, 2, 9, and 10, there is a Class 7, noise points . This class was only used if needed when points could manually be identified as low/high 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 9 = Water Class 10=Ignored The LAS header information was verified to contain the following: Class (Integer) GPS Week Time (0.0001 seconds) Easting (0. 003 m) Northing (0.003 m) Elevation (0.003 m) Echo Number (Integer 1 to 4) Echo (Integer 1 to 4) Intensity (8 bit integer) Flight Line (Integer) Scan Angle (Integer degree)
- 2014-07-01 00:00:00 - Dewberry used GeoCue software to develop raster stereo models from the LiDAR intensity. The raster resolution was 0.3 meters.
- 2014-07-01 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. Inland Lakes and Ponds were collected according to specifications for the Central VA Seismic LiDAR Project. The data dictionary defines Inland Ponds and Lakes as a closed water body feature that is at a constant elevation. These polygon features should be collected at the land/water boundaries of constant elevation water bodies such as lakes, reservoirs, and ponds. Features shall be defined as closed polygons and contain an elevation value that reflects the best estimate of the water elevation at the time of data capture. Water body features will be captured for features 2 acres in size or greater. Donuts will exist where there are islands greater than 1/2 acre in size within a closed water body. Breaklines must be captured at or just below the elevations of the immediately surrounding terrain. Under no circumstances should a feature be elevated above surrounding LiDAR points. The compiler shall take care to ensure that the z-value remains consistent for all vertices placed on the water body. No Inland Streams, Rivers or Tidal Waters met the collection requirements within the project area.
- 2014-07-01 00:00:00 - Breaklines are reviewed against LiDAR intensity imagery to verify completeness of capture. All breaklines are then compared to ESRI terrains created from ground only points prior to water classification. The horizontal placement of breaklines is compared to terrain features and the breakline elevations are compared to LiDAR elevations to ensure all breaklines match the LiDAR within acceptable tolerances. Some deviation is expected between breakline and LiDAR elevations due to monotonicity, connectivity, and flattening rules that

are enforced on the breaklines. Once completeness, horizontal placement, and vertical variance is reviewed, all breaklines are reviewed for topological consistency and data integrity using a combination of ESRI Data Reviewer tools and proprietary tools. Corrections are performed within the QC workflow and re-validated.
- 2014-08-01 00:00:00 - Class 2, ground, LiDAR points are exported from the LAS files into an Arc Geodatabase (GDB) in multipoint format. The 3D breaklines, Inland Lakes and Ponds are imported into the same GDB. An ESRI Terrain is generated from these inputs. The surface type of each input is as follows: Ground Multipoint: Masspoints Inland Lakes and Ponds: Hard Replace
- 2014-08-01 00:00:00 - The ESRI Terrain is converted to rasters. The rasters are created to pre-defined extents so that multiple rasters are created over the project area. Creating multiple rasters rather than one large raster over a large project area makes the data more maneageable to work with. The rasters are created with 2 tiles of overlap. This allows us to ensure seamless coverage and edge-matching in the final tiled product. These rasters were created with a 1 meter cell size.
- 2014-08-01 00:00:00 - The DEMs that are created over large areas are reviewed in ArcGIS with hillshades and in Global Mapper. Hillshades allow the analyst to view the DEMs in 3D and to more efficiently locate and identify potential issues. The first review is done on the area DEMs as this increases the efficiency of any corrections that may be performed. Performing corrections on area DEMs allows the analyst to perform corrections on multiple tiles at once and helps prevent errors from occurring along individual tile seamlines. Analysts review the area DEMs for incorrect water elevations and artifacts that are introduced during the raster creation process.
- 2014-08-01 00:00:00 - The corrected and final area DEMs are clipped to individual tiles. Dewberry uses a proprietary tool that clips the area DEMs to each tile located within the final Tile Grid, names the clipped DEM to the Tile Grid Cell name, and verifies that final extents are correct. All individual tiles are loaded into Global Mapper for the last review. During this last review, an analsyt checks to ensure full, complete coverage, no issues along tile boundaries, tiles seamlessly edge-match, and that there are no remaining processing artifacts in the dataset.
- 2015-07-01 00:00:00 - The NOAA Office for Coastal Management (OCM) received the topographic/bathymetric files in LAS format from the University of William and Mary's Center for Geospatial Analysis. A number of LAS files were found to have corrupt GPS times and other unknown factors affecting header information. The files contained lidar easting, northing, elevation, intensity, return number, etc. The data was received in UTM coordinates, zone 18 North, referenced to the NAVD88 for vertical using the Geoid09 model. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. The LAS files were converted to geographic horizontal coordinates and ellipsoidal vertical coordinates. 2. The LAS files were cleared of error points and variable length records removed.

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/50136

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=4922
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/4922/index.html

7.3. Data access methods or services offered:

This data can be obtained on-line at the following URL:

https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=4922;

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.