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 South Carolina DNR Lidar DEM: Beaufort County

1.2. Summary description of the data:
LMSI provided high accuracy, calibrated multiple return LiDAR for roughly 785 square miles covering Beaufort County, South Carolina. The nominal point spacing for this project was at least 4 points per square meter. Dewberry used proprietary procedures to classify the LAS according to project specifications: 1-Unclassified, 2-Ground, 7-Noise, 8-Model Key Points, 9-Water, 10-Ignored Ground, 11-Withheld Points, 13-Bridges and Culverts. Dewberry produced 3D breaklines and combined these with the final LiDAR data to produce seamless hydro-enforced DEMs for the 982 tiles (5000 ft x 5000 ft) that cover the project area.

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:
2013-03-06 to 2013-04-20

1.5. Actual or planned geographic coverage of the data:
W: -81.019529, E: -80.401518, N: 32.707084, S: 32.072336

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

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:
- 2013-03-06 00:00:00 - Data for the South Carolina Dept of Natural Resources project

was acquired by Laser Mapping Specialist, Inc. (LMSI) The project area included approximately 785 contiguous square miles for Beaufort County, South Carolina. The data was delivered in the South Carolina State Plane (International Feet) coordinate system, horizontal datum NAD83 (NSRS 2007), vertical datum NAVD88, Geoid 09, Feet. Lidar ground points for each flightline generated by an automatic classification routine are used. LiDAR sensor data were collected with the Optech ALTM3100EA LiDAR system. No imagery was requested or delivered. Deliverables for the project included a raw (unclassified) calibrated LiDAR point cloud, survey control, and a final control report. Overall the LiDAR data products collected by LMSI meet or exceed the requirements set out in the Statement of Work. The quality control requirements of LMSIs quality management program were adhered to throughout the acquisition stage of this project to ensure product quality. LIDAR acquisition began on March 6, 2013 (julian day 065) and was completed on April 20, 2013 (julian day 079). A total of 16 survey missions were flown to complete the project. 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 203 flight lines required to complete the project. Project coverage was checked on site with no data gaps except for water features. Two base stations were utilized. The base station in the north west portion of the project was named G7_203. The base station on the central portion of the project was named GG. Thirty (30) static points were surveyed at various locations throughout the project to be utilized for quality control and adjustment of the LiDAR data. All airborne trajectories were very high quality with forward/reverse separation between 2cm-5cm. All equipment performed within specifications with no unusual occurances or anamolies. All data was of a very high quality and the project was executed as planned.
- 2013-07-01 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 (5000 ft x 5000 ft). 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. Before the actual ground routine is run points with scan angles greater than plus or minus 18 degrees are classified to class 11, withheld. Due to these higher scan angles these points have the potential to introduce issues into the ground and are therefore not used in the final 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 foot of the hydrographic features are moved to class 10, an ignored ground due to breakline proximity. 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 Class 11 = Withheld Points Class 13 = Bridges and Culverts The LAS header information was verified to contain the following: Class (Integer) Adjusted GPS Time (0.000001 seconds) Easting (0.001 ft) Northing (0.001 ft) Elevation (0.001 ft) Echo Number (Integer 1 to 4) Echo (Integer 1 to 4) Intensity (8 bit integer) Flight Line (Integer) Scan Angle (Integer degree)
- 2013-07-01 00:00:00 - Dewberry used GeoCue software to develop raster stereo models from the LiDAR intensity. The raster resolution was 1 foot.
- 2013-07-01 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. Single line drains, dual line drains, inland ponds and lakes, tidal waters, and edge of roads were collected according to specifications for the Beaufort County Project.
- 2013-08-01 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.
- 2013-08-01 00:00:00 - Class 2, ground, and class 8, model key points, LiDAR points are exported from the LAS files into an Arc Geodatabase (GDB) in multipoint format. The 3D breaklines (single line drains, dual line drains, connectors, inland ponds and lakes, and tidal waters) and the project boundary 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 Boundary: Soft Clip Connectors: Hard Line Single Line Drains: Hard Line Dual Line Drains: Hard Line Inland Lakes and Ponds: Hard Replace Tidal Water: Hard Line
- 2013-08-01 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 product. These rasters were created with a 5 foot cell size using floating point output cell values and natural neighbors interpolation.
- 2013-08-01 00:00:00 - The DEMs that are created over large areas are reviewed in ArcGIS with hillshades. 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.
- 2013-08-01 00:00:00 - The corrected and final area DEMs are clipped to not exceed maximum size criteria. DEMs are provided with a slight overlap to ensure complete coverage.
- The NOAA Office for Coastal Management (OCM) received the DEM files from the South Carolina Department of Natural Resources (SC DNR). The data were in SC State Plane (NAD83 2007) with horizontal units in international feet and NAVD88 (Geoid 09) elevations in U.S. Survey feet. The bare earth hydro-flattened raster files were at a 5 ft grid spacing. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. The DEMs were exported from proprietary ESRI File Geodatabase to 32-bit floating point GeoTIFF format using ArcGIS 2. Global Mapper was then used to create tiles from the single, county-wide DEMs 3. Gdal_translate was used to assign the correct EPSG codes to each tiled file 4. The raster files were copied to database and https for Digital Coast storage and provisioning purposes

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/57197

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=8821
https://noaa-nos-coastal-lidar-pds.s3.us-east-1.amazonaws.com/dem/SC_Beaufort_DEM_2013_8821/in

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.