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 U.S. Geological Survey Topographic Lidar: Northeast Atlantic Coast Post-Hurricane Sandy

1.2. Summary description of the data:

Binary point-cloud data were produced for a portion of the New York, Delaware, Maryland, Virginia, and North Carolina coastlines, post-Hurricane

Sandy (Sandy was an October 2012 hurricane that made landfall as an extratropical cyclone on the 29th), from remotely sensed, geographically

referenced elevation measurements collected by Photo Science, Inc. (Delaware, Maryland, Virginia, and North Carolina) and Woolpert, Inc.

(Fire Island, New York) 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:

2012-11-05, 2012-11-08, 2012-11-09, 2012-11-10, 2012-11-11, 2012-11-12, 2012-11-16, 2012-11-26, 2012-11-28, 2012-11-29

1.5. Actual or planned geographic coverage of the data:

W: -76.680203, E: -72.70305, N: 40.790453, S: 34.566094

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:

- 2012-11-05 00:00:00 - Using an Optech Gemini lidar sensor, 11 flight lines of high-density data, at a nominal pulse spacing (NPS) of 1 meter, were collected by Woolpert along the southern shore of Long Island, New York (approximately 15 square miles). Data Acquisition Height = 3,500 feet Above Ground Level (AGL) - Aircraft Speed = 125 Knots. Multiple returns were recorded for each laser pulse along with an intensity value for each return. A total of one mission was flown on November 5th. Two airborne global positioning system (GPS) base stations were used in support of the lidar data acquisition. Eight ground control points were surveyed through static methods. The GEOID used to reduce satellite-derived elevations to orthometric heights was GEOID96. Data for the task order is referenced to the UTM Zone 18N, North American Datum of 1983 (NAD83), and North American Vertical Datum of 1988 (NAVD88), in meters. 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. In addition to the LAS deliverables, one layer of coverage was delivered in the ERDAS Imagine (IMG) Format: bare earth.
- 2012-01-01 00:00:00 - The lidar calibration and system performance are verified on a periodic basis using Woolpert's calibration range. The calibration range consists of a large building and runway. The edges of the building and control points along the runway have been located using conventional survey methods. Inertial measurement unit (IMU) misalignment angles and horizontal accuracy are calculated by comparing the position of the building edges between opposing flight lines. The scanner scale factor and vertical accuracy are calculated through comparison of lidar data against control points along the runway. Field calibration is performed on all flight lines to refine the IMU misalignment angles. IMU misalignment angles are calculated from the relative displacement of features within the overlap region of adjacent (and opposing) flight lines. The raw lidar data are reduced using the refined misalignment angles.
- 2012-11-07 00:00:00 - Once the data acquisition and GPS processing phases are complete, the lidar data were processed immediately by Woolpert to verify the coverage had no voids. The GPS and IMU data were post-processed using differential and Kalman filter algorithms to derive a best estimate of trajectory. The quality of the solution was verified to be consistent with the accuracy requirements of the project.
- 2012-11-07 00:00:00 - The individual flight lines were inspected by Woolpert 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. The point cloud underwent a classification process to determine bare-earth points and non-ground points utilizing "first and only" as well as "last of many" lidar returns. This process

determined Default (Class 1), Ground (Class 2), Noise (Class 7), Water (Class 9), Ignored Ground (Class 10), Overlap Default (Class 17), and Overlap Ground (Class 18) 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.
- 2012-01-01 00:00:00 - Photo Science, Inc. located a total of 29 calibration control points used in the post processing of the lidar data. The points were located on relatively flat terrain on surfaces that generally consisted of grass, gravel, or bare earth. 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 GEOID96. Data for the task order is referenced to the UTM Zone 18N, NAD83, and NAVD88, in meters. 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 and to remove the side overlap between parallel flight lines. 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 the Lake Pond and Double Line Drain hydro flattening breaklines were then classified to water (ASPRS Class 9) using TerraScan macro functionality. All Lake Pond and Double Line Drain Island features were checked to ensure that the ground (ASPRS Class 2) were reclassified to the correct classification after the automated classification was completed. All overlap data were processed through automated functionality provided by TerraScan to classify the overlapping flight line data to approved classes by USGS. The overlap data were classified to Class 17 (USGS Overlap Default) and Class 18 (USGS Overlap Ground). These classes were created through automated processes only and were not verified for classification accuracy. 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.
- 2013-02-01 00:00:00 - All Woolpert, Inc. LAZ files were extracted to LAS and converted to ASCII xyz point files using LASTools las2las.exe. The ASCII point files were then written to netcdf format using MATLAB 8.0.0.783.

- 2013-05-01 00:00:00 - The NOAA Office for Coastal Management (OCM) received topographic files in LAS format. The files contained lidar elevation and intensity measurements. The data were received in UTM Zone 18N coordinates and were vertically referenced to NAVD88 using the Geoid96 model. The vertical units of the data were meters. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. The topographic las files were horizontally converted from UTM Zone 18N to Geographic Coordinates. 2. The horizontal units of the data were converted from meters to decimal degrees. 3. The topographic las files were vertically converted from orthometric (NAVD88) heights to ellipsoidal (NAD83) heights. 4. Classes 11 (Unknown), 15 (Unknown) and 17 (Default Overlap) were combined to Class 12 (Overlap). Class 11 points were assigned a User Data value of '1', Class 15 points were assigned a User Data value of '2', and Class 17 points were assigned a User Data value of '3'.
- 2014-05-20 00:00:00 - The original data received from USGS had several corrupted tiles. Replacement files were received from USGS in March 2014. These tiles had been processed using GEOID09, but were otherwise the same projection and classes. Files were converted as previously, but using GEOID09 to transform to ellipsoid heights. Replacement tiles were 18SVH486232, 18TXL600015, 18SUD350836, 18SUD358828, and 18SVH494254.

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/49845

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=2488
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/2488/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=2488

;

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.