

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:

2011 Delaware Department of Natural Resources and Environmental Control (DNREC)  
Lidar: Bombay Hook National Wildlife Refuge

### 1.2. Summary description of the data:

Terrapoint collected LiDAR for over 177 square kilometers of the Bombay Hook National Wildlife Refuge in Kent County, Delaware.

The nominal pulse spacing for this project was no greater than 0.75 meters. This project was collected with a sensor which collects

waveform data and provides an intensity value 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

project specifications: 1-Unclassified, 2-Ground, 7-Noise, 9-Water, 12-Overlap. Once the data was received by NOAA OCM, all of the

class 7 (noise) points were removed from the data set. Dewberry produced classified LAS and DEMs for the 99 tiles (1700 m x 1700 m) that

cover the project area.

Original contact information:

Contact Org: NOAA Office for Coastal Management

Phone: 843-740-1202

Email: coastal.info@noaa.gov

### 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:

2011-04-18 to 2011-04-20

**1.5. Actual or planned geographic coverage of the data:**

W: -75.530873, E: -75.389419, N: 39.309361, S: 39.046286

**1.6. Type(s) of data:**

*(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)*

**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:**

- 2011-04-01 00:00:00 - Terrapoint used their Optech ALTM 3100EA LiDAR sensor to collect the data for the Bombay Hook project. Three flight missions were required to obtain data over the entire project area. Flightlines were flown in a North-South orientation to optimize flying time in regards to the project layout. A combination of Sokkia GSR 2600 and NovAtel DL-4+ dual-frequency GPS receivers were used to support the airborne operations of this survey and to establish the GPS control network. Terrapoint used three existing published survey monuments and one newly established control station to control all flight missions and kinematic and static ground surveys. 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. For all flights, the GPS data can be classified as excellent, with GPS residuals of 3 cm average or better but no larger than 10 cm being recorded. The initial step of calibration is to verify availability and status of all needed GPS and Laser data against field notes and compile any data if not complete. Subsequently the mission points are output using Optech's Dashmap, initially with default values from Optech or the last mission calibrated for system. The initial point generation for each mission calibration is verified within Microstation/Terrascan for calibration errors. If a calibration error greater than specification is observed within the mission, the roll pitch and scanner scale corrections that need to be applied are calculated. The missions with the new calibration values are regenerated and validated internally once again to ensure quality. All missions are validated against the adjoining missions for relative vertical biases and collected GPS kinematic validation points for absolute vertical accuracy purposes. On a project level, a supplementary coverage check is carried out, to ensure no data voids unreported by Field Operations are present.
- 2011-05-01 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 into the client provided tiling schema (1700 m x 1700 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 first part of the ground routine is to classify all points with a scan angle greater than 20 degrees to class 12, overlap. These points have the highest potential to cause issues in the ground surface. Therefore, they are classified to class 12 immediately where they will not be available for the remaining ground routine. 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. The ground routine also identifies extremely low or high points that should be excluded from the ground surface and classifies them as class 7, noise. 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. 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 (These points were removed from the data set by NOAA OCM during processing for data storage and Digital Coast provisioning). Class 9 = Water Class 12= Overlap Points with a scan angle greater than 20 degrees The LAS header information was verified to contain the following: Class (Integer) GPS Week Time (0.0001 seconds) Easting (0.01 foot) Northing (0.01 foot) Elevation (0.01 foot) Echo Number (Integer 1 to 4) Echo (Integer 1 to 4) Intensity (8 bit integer) Flight Line (Integer) Scan Angle (Integer degree) - 2012-04-01 00:00:00 - The NOAA Office for Coastal Management (OCM) received the files in las format. The files contained LiDAR elevation as well as intensity values. The data were in Delaware State Plane, NAD83 coordinates and NAVD88 heights. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. The data were converted from Delaware State Plane, NAD83 coordinates to geographic coordinates. 2. The data were converted from NAVD88 heights to ellipsoid heights using Geoid09. 3. Data points that were classified as 7 (noise) were removed from the data set. 4. The data were sorted and converted to LAZ format.

**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:

- 1.6. Type(s) of data
- 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/49661>

**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-](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=1172>

<https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/1172/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=1172>

This data set is dynamically generated based on user-specified parameters.

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### 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.*