

*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 Georgia Department of Natural Resources (GADNR) Environmental Protection Division (EPD) Lidar: Four Counties (Burke, Columbia, Lincoln, and Richmond)

### **1.2. Summary description of the data:**

This data set is the topographic elevation point data derived from multiple return light detection and ranging (LiDAR) measurements for four

counties in Georgia. These counties are: Burke, Columbia, Lincoln, and Richmond. The Statement of Work (SOW) was developed

by the National Oceanic and Atmospheric Administration's (NOAA) Office for Coastal Management (referred to as the Center) in partnership

with the Georgia Department of Natural Resources (GADNR) Environmental Protection Division (EPD).

LiDAR data is a remotely sensed high resolution elevation data collected by an airborne platform. The LiDAR sensor uses a combination of

laser range finding, GPS positioning, and inertial measurement technologies. The LiDAR systems collect data point clouds that are used to

produce highly detailed Digital Elevation Models (DEMs) of the earth's terrain, man-made structures, and vegetation. The LiDAR data acquisition

and processing for Burke, Lincoln, and Richmond County was performed in the Winter of 2011. The LiDAR data was provided to NOAA OCM,

as part of the 4 GA Counties of Elevation Data task order. The 4 GA Counties of Elevation Data task order AOI encompassed approximately

1,739 square miles. The area of interest acquired and processed for Burke, Lincoln, and Richmond County is approximately 1,386 square miles.

The task order required the LiDAR data to be collected at a nominal pulse spacing (NPS) of 1.0 meter. The LiDAR data was collected to

meet Fundamental Vertical Accuracy (FVA) Root Mean Square Error (RMSE) of 18.0 cm or better at a 95% confidence level, so that when

combined with breaklines, the data adequately supports the generation of two (2) foot FEMA compliant contours. The final LiDAR data

was delivered in 5,000' x 5,000' tiles using North American Datum 1983, Georgia State Plane Coordinate System, East Zone, and expressed

in US Survey Feet. For data storage and Digital Coast provisioning purposes, the NOAA OCM converted the data to geographic coordinates

and ellipsoid heights in meters. Special Note: Temporal changes of water levels will be observed in any data from Richmond and Lincoln

counties overlapping any previously delivered data from Columbia County.

The final products include full classified LAS, hydrologically flattened four (4) foot pixel raster DEM's of the bare earth surface in

ESRI Floating Point Grid Format (ArcGRID DEMs), and hydrologically flattened breaklines.

The data were collected on the following dates:

Burke and Richmond Counties: December 13, 14, 17, 2011

Columbia County February 26, 2011

Lincoln County December 18, 2011

The data contains las points with the following classifications:

Class 0 No Classification

Class 2 Ground

Class 7 Low Point (Noise)

Class 9 Water

Class 10 Land below sea level

Class 12 Overlap

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:**

2011-02-26, 2011-12-13, 2011-12-14, 2011-12-17, 2011-12-18

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

W: -82.641278, E: -81.540949, N: 33.982767, S: 32.797092

**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:

- 2011-12-13 00:00:00 - Using a Leica LiDAR system, 100 flight lines of high density data, at a nominal pulse spacing (NPS) of 1.0 meter, were collected over Burke, Lincoln and Richmond Counties, GA (approximately 1,386 square miles). Multiple returns were recorded for each laser pulse along with an intensity value for each return. A total of six (6) missions were flown on December 13, 14, 17, and 18 in 2011.

The geoid used to reduce satellite derived elevations to orthometric heights was Geoid09. The horizontal datum used for this survey is North American Datum 1983, Georgia State Plane Coordinate System, East Zone, and expressed in US Survey Feet. The vertical datum used for this survey is North American Vertical Datum 1988 (NAVD88), and expressed in US Survey Feet. Airborne GPS data was differentially processed and integrated with the post processed 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. System Parameters: Type of Scanner = Leica Data Acquisition Height = 6,500-feet AGL Scanner Field of View = 40 degrees The Scan Frequency = 41.8 Hertz Pulse Repetition Rate - 115.6 Kilohertz Aircraft Speed = 130 Knots Swath Width = 4,732-feet Number of Returns Per Pulse = Maximum of 4 Distance Between Flight Lines = 3,289-feet

- 2011-12-13 00:00:00 - The Leica ALS50/60 LiDAR systems calibration and performance is 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 is 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 is reduced using the refined misalignment angles.

- 2011-12-18 00:00:00 - Once the data acquisition and GPS processing phases are complete, the LiDAR data was processed immediately to verify the coverage had no voids. The GPS and IMU data was 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 task order.

- 2011-12-19 00:00:00 - The individual flight lines were inspected 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 bare-earth points (Class 2), noise (Class 7), water (Class 9) ignored ground (Class 10), unclassified data (Class 1), and overlap points (Class 12). 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.

- 2012-01-12 00:00:00 - Breaklines defining lakes, greater than two acres, and double-line streams, wider than 100 feet (30.5 meters), were compiled using digital photogrammetric techniques as part of the hydrographic flattening process and provided as a geodatabase containing ESRI Polyline Z and Polygon Z feature classes. Breaklines defining water bodies and streams were compiled for this task order. The breaklines were used to perform the hydrologic flattening of water bodies, and gradient hydrologic flattening of double line streams. Lakes, reservoirs and ponds, at a nominal minimum size of two (2) acres or greater, were compiled as closed polygons. The closed water bodies were collected at a constant elevation. Rivers and streams, at a nominal minimum width of 100 feet (30.5 meters), were compiled in the direction of flow with both sides of the stream maintaining an equal gradient elevation. The hydrologic flattening of the LiDAR data was performed for inclusion in the National Elevation Dataset (NED). For this specific project, NOAA requested that Woolpert define the Strom Thurmond Reservoir using a contour set to match the water level used for the portion of the reservoir located in Columbia County. This elevation is 323.55 survey feet. The Columbia county data was acquired several months prior to the Burke, Richmond, and Lincoln Counties. Due to this, the water levels in the reservoir were different. Woolpert set the contour to 325.55 survey feet and classified the las and produced the required products using the contour derived Strom Thurmond Reservoir.

- 2012-08-01 00:00:00 - The NOAA Office for Coastal Management (OCM) received the files in las format. The files contained lidar elevation and intensity measurements. The data were in State Plane projection (NAD83, Georgia East), and vertically referenced to NAVD88 using the Geoid 09 model. Both horizontal and vertical units were in survey feet. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. The data were converted from Georgia State

Plane coordinates to geographic (NAD83) coordinates. 2. The data were converted from orthometric (NAVD88) heights to ellipsoidal heights (GRS80) using Geoid09. 3. The data were converted from vertical units of survey feet to meters. 4. Elevation outliers were 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:

- 1.6. 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/48181>

#### **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](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=1389>

<https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/1389/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=1389>

The 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.*