

*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:**

2017 NOAA/MCP Topobathy Lidar DEM: Blue Hill Bay, ME - Riegl Sensor

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

Fugro was contracted in July 2017 by the State of Maine Department of Marine Resources (SMDMR), Maine Coastal Program (MCP), and the NOAA Office for Coastal Management (OCM) to conduct an Airborne LiDAR Bathymetry (ALB) survey in the vicinity of Blue Hill Bay in Maine, and to deliver fully processed and verified hydrographic survey data. The ALB survey was conducted with the SHOALS-1000T and Riegl VQ-820-G lidar systems in a concurrent acquisition. The SHOALS system, with a high power laser, provided the better probability for deep sounding detections at a reduced point density (about 0.15 pts/m<sup>2</sup>); whilst the Riegl VQ-820-Q provided high density coverage (up to 8.5 pts/m<sup>2</sup>) but at reduced depth detection.

This metadata record describes the bare earth, 1 meter digital elevation model (DEM) created from the topographic and bathymetric LiDAR elevations generated from data collected with the Riegl VQ-820-Q LiDAR system along Blue Hill Bay on the coastline of Maine. These files contain topographic and bathymetric LiDAR elevations generated from data collected with the Riegl VQ-820-G LiDAR system along Blue Hill Bay on the coastline of Maine. Data were collected by Fugro for NOAA OCM. The Riegl VQ-820-G system is a bathymetric LiDAR sensor for use in coastal mapping and charting activities because the laser's ability to penetrate the water column and detect targets up to 1 time the Secchi disk depth. Survey coverage is based on a delimiting polygon provided by NOAA OCM, which envelopes the area between the 0 m contour (NAVD88) down to approximated -10 meters. Riegl VQ-820-G data were processed on Riegl RiProcess software for: point cloud generation, boresight calibration, water surface classification and modeling, refraction correction; and exported with a minimal classification LAS format v1.4 for delivery. Additional classification was performed after delivery to extract ground and bathymetric points.

In addition to these bare earth Digital Elevation Model (DEM) data, the lidar point data that these DEM data were created from, are also available. These data are available for custom download at the link provided in the URL section of this metadata record.

A link to custom download the bare earth DEM that was created from the concurrently collected topographic and bathymetric data (collected with the SHOALS-1000T lidar system) is provided in the URL section of this metadata record.

**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:**

2017-06-29 to 2017-07-05

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

W: -68.566, E: -68.432, N: 44.313, S: 44.194

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

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

**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:**

- The airborne raw files from the VQ-820-G sensor are downloaded into RIEGL LMS RiProcess version 1.8.3. The system collects bathymetric LiDAR data at 520 kHz Pulse Repetition Rate for an approximated point density of 8.5 pts/m<sup>2</sup> at 400 m altitude (AGL) and 100 kts (speed over ground). Aircraft position, velocity, angular and acceleration information collected with an Applanix POS AV 510 v6 equipment were processed using Applanix POSpac v 7.1 software to produce a Smoothed Best Estimate Trajectory (SBET) solution file that is used by RiProcess to produce 3D positions for each LiDAR shot (point clouds). The RiProcess process also produced the automated and semi-automated classification of water surface points to generate a water surface model for refraction correction of all lidar points underwater. Point clouds data was exported to LAS format where additional QC reviews were performed in external tools (Terrascan), including positioning adjustments to overlapping line data. Elevations referenced to NAVD88 datum were reduced with the application with VDatum v3.6.1. and GEOID12b. Data was exported to LAS format 1.4 for delivery. LAS data has a basic classification produced during the refraction correction process: Emerged and topographic points (1), Noise (7), Submerged Underwater points (40), Derived water surface (42). However, other than this necessary processing classification, the dataset has not been further classified or edited.
- 2018-02-01 00:00:00 - The delivered LAS files were reviewed and processed to classify the point cloud and compute vertical accuracy. A variety of LAsTools executables were used to tile the swaths, classify points (noise, ground, and

bathymetric points), generate gridded products, and perform the final quantitative accuracy assessment. Global Mapper was used to perform qualitative assessments of the point clouds and gridded products at each step of the classification process. Ecognition was used to generate a water mask for extracting bathymetric points and identifying water surface and other non-bottom bathymetric points. ArcGIS Pro was used to organize and visualize all delivered products and generate web services for team reviews. The final classification includes class 1 (unclassified), class 2 (bare ground), class 7 (low noise), and class 40 (bathymetric point). Class 40 represents seafloor points. Class 1 on land includes all non-ground points (e.g., vegetation, buildings, powerlines). Class 1 in the water includes all non-bathymetric points (e.g., water surface, water column, floating submerged aquatic vegetation, and docks/piers).

- 2018-04-02 00:00:00 - The Riegl digital terrain model (DTM) was produced from the classified lidar points using LAStools. Points were filtered to keep only class 2 (ground) and class 40 (bathymetric point). The filtered points were used to construct a triangulated irregular network (TIN) with no triangles being built with edges longer than 10 meters. The TIN was then rasterized onto a 1 meter resolution digital elevation model (DEM).

- 2018-05-10 00:00:00 - The data were in UTM Zone 19 North coordinates and NAVD88 (Geoid12B) elevations in meters. The bare earth raster files were at a 1 meter grid spacing. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. Copied the files to https.

**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/52605>

**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=8527>

[https://noaa-nos-coastal-lidar-pds.s3.us-east-1.amazonaws.com/dem/ME\\_Blue\\_Hill\\_Bay\\_Riegl\\_DEM\\_2](https://noaa-nos-coastal-lidar-pds.s3.us-east-1.amazonaws.com/dem/ME_Blue_Hill_Bay_Riegl_DEM_2)

**7.3. Data access methods or services offered:**

Data is available online for custom and bulk 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.*