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:

2019 NOAA NGS Topobathy Lidar DEM: Puerto Rico

1.2. Summary description of the data:

These data were collected by Leading Edge Geomatics using a Riegl VQ-880-G II sensor. The data acqusition began January 20, 2019 through June 2, 2019. The data includes topobathy data in LAS 1.4 format classified as created, never classified (0); unclassified (1); ground (2); noise (7); bathymetric bottom (40); water surface (41); derived water surface (42); submerged object, not otherwise specified (e.g., wreck, rock, submerged piling) (43); International Hydrographic Organization S-57 object, not otherwise specified (44); no bottom found (bathymetric lidar point for which no detectable bottom return was received) (45); bathymetic bottom temporal changes (46) in accordance with project specifications.

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:

2019-01-20 to 2019-06-02

1.5. Actual or planned geographic coverage of the data:

W: -67.498451, E: -65.166, N: 18.528116, S: 17.626749
Data only covers coastal area.

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?
Yes

4.2. Approximate percentage of the budget for these data devoted to data management (specify percentage or "unknown"):
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:

- 2020-01-22 00:00:00 - Data for the Puerto Rico and the US Virgin Islands project was acquired by Leading Edge Geomatics using a Riegl VQ-880-G II sensor. All delivered Puerto Rico lidar data is referenced to: Horizontal Datum-NAD83 (2011) epoch: 2010 Projection-UTM Zone 20 North Horizontal Units-meters Vertical Datum-NAD83 (2011) Vertical Units-meters Both green lidar data and NIR lidar data were acquired. Leading Edge Geomatics acquired, calibrated, and performed refraction correction for the lidar data.
- 2021-01-22 00:00:00 - Dewberry received the calibrated green and NIR data and verified complete coverage. Relative accuracy of the green swaths compared to overlapping and adjacent green swaths as well as the relative accuracy of green swaths compared to overlapping and adjacent NIR swaths was verified through the use of Delta-Z (DZ) orthos created in GeoCue software. Intraswath relative accuracy was verified using Quick Terrain Modeler. Profiles of elevated planar features, such as roofs, were used to verify horizontal alignment between overlapping swaths. Dewberry then verified absolute vertical accuracy of the swath data prior to full-scale production. Dewberry used algoritms in TerraScan to create the intial ground/submerged topography surface. Dewberry used rasterized aggregate extents of refracted points to create automated 2-D breaklines with LAStools and ArcGIS. Light travels at different speeds in air versus water and its speed and direction of travel change when it enters the water column. The refraction correction process accounts for this difference by adjusting the depth (distance traveled) and horizontal position (change of angle/direction) of the lidar points acquired within water. These breaklines delineate areas where the refraction correction was applied to the lidar data by Riegl's automated refraction correction software based on the software's detection of water. Where the automated process missed discrete water bodies that did not contain valid bathymetry (submerged topography) data, breaklines were manually drawn and added to a separate feature class to ensure the correct classification of the point cloud. Dewberry used the 2-D refraction extents and additional bathy features to classify the bathymetric bottom and ground points properly in TerraScan. All lidar data was peer-reviewed. Dewberry's QAQC also included creating void polygons for use during review. All necessary edits were applied to the dataset. GeoCue software was used to update LAS header information, including all projection and coordinate reference system information. The final lidar data are in LAS format 1.4 and point data record format 6. The final classificaton scheme is as follows: 0-Created, never classified 1-Unclassified 2-Ground 7-Noise 40-Bathymetric bottom 41-Water surface 42-Derived water surface 43-Submerged object, not otherwise specified 44-International Hydrograpic Organization (IHO) S-57 objects 45-No bottom found (bathymetric lidar point for which no detectable bottom return was received) 46-Bathymetric bottom temporal changes All data was then verified by an Independent QC department within Dewberry. The independent QC was performed by separate analysts who did not perform manual classification or editing. The independent QC involved quantitative and qualitative reviews.

- Lidar data classified as ground (2) and submerged topography (40) were converted to Esri multipoint format. These multipoints were then used to generate a terrain and the terrain was converted to a raster in IMG format with 1 meter pixel resolution. The terrain and output raster were created over the full project area to reduce edge-matching issues and improve seamlessness. The raster was clipped to the tile grid and named according to project specifications to result in tiled topobathymetric DEMs. All tiled DEMs incorporate the use of the void polygons. The void polygons represent bathymetric areas with no bathymetric bottom returns and are set as NoData in the DEMs. Void polygon creation is described in the final project report and the void polygon metadata. A point density layer has been created and provided to NOAA as part of the deliverables. The point density layer is a raster product in IMG format with 1 meter square pixels. The density grid identifies the number of ground and/or bathy bottom points located within each pixel. The pixels in the point density layer align with the pixels in the topobathy DEMs so that the point density layer shows the density of ground/submerged topography points located in each cell that were used to determine elevations for each cell in the topobathy DEMs. Higher density lends itself to higher confidence. The point density layer can be displayed by unique values or classified into desired bins/ranges for analysis over larger areas. A confidence layer has been created and provided to NOAA as part of the deliverables. The confidence layer is a raster product in IMG format with 1 meter square pixels. The confidence layer provides a standard deviation value for every pixel by calculating the standard deviation of all ground and/or submerged topography lidar points that are located within a single pixel. The confidence layer pixels align to the pixels in the topobathy DEMs. The confidence layer can be displayed by unique values or classified into desired bins/ ranges for analysis over larger areas.
- 2021-10-08 00:00:00 - The NOAA Office for Coastal Management (OCM) received files in IMG format. . OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. Converted from IMG to GEOTIFF

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
- 5.2. Quality control procedures employed
- 7.1.1. If data are not available or has limitations, has a Waiver been filed?
- 7.4. Approximate delay between data collection and dissemination
- 8.3. Approximate delay between data collection and submission to an archive facility

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/65633

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?

Yes

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=9392
https://noaa-nos-coastal-lidar-pds.s3.us-east-1.amazonaws.com/dem/NGS_PR_Topobathy_DEM_2019_

7.3. Data access methods or services offered:

Data is available online for bulk or 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)

NCEI_CO

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

Data is backed up to tape and to cloud storage.

9. Additional Line Office or Staff Office Questions

Line and Staff Offices may extend this template by inserting additional questions in this section.