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:

1887 - 2016 USGS CoNED Topobathy DEM (Compiled 2016): New England

1.2. Summary description of the data:

Hurricane Sandy was the deadliest and most destructive hurricane of the 2012 Atlantic hurricane season, and the second-costliest with an estimated $71.4 billion (2013 USD). Hurricane Sandy affected 24 states, including the entire eastern seaboard with particularly severe damage in New Jersey and New York. In response to the storm, the U.S. Geological Survey (USGS) Coastal and Marine Geology Program in collaboration with the USGS National Geospatial Program (NGP), and National Oceanic and Atmospheric Administration (NOAA) developed a three-dimensional (3D) 1-meter topobathymetric elevation model (TBDEM) for the New England sub-region including the and adjacent coastline. High-resolution coastal elevation data is required to identify flood, hurricane, and sea-level rise inundation hazard zones and other earth science applications, such as the development of sediment transport and storm surge models. The new TBDEM consists of the best available multi-source topographic and bathymetric elevation data for New York, Connecticut, Rhode Island and Massachusetts coastal areas.The New England TBDEM integrates over 321 different data sources including topographic and bathymetric LiDAR point clouds, hydrographic surveys, side-scan sonar surveys, and multi-beam surveys obtained from USGS, NOAA, the U.S. Army Corps of Engineers (USACE), Federal Emergency Management Agency (FEMA), and other state and local agencies. The LiDAR and bathymetry surveys were sorted and prioritized based on survey date, accuracy, spatial distribution, and point density to develop a model based on the best available elevation data. Because bathymetric data is typically referenced to tidal referenced datums (such as Mean High Water or Mean Low Water), all tidally-referenced heights were transformed into orthometric heights that are normally used for mapping elevation on land (based on the North American Vertical Datum of 1988). The spatial resolution is 1 meter and includes the coastal areas of New York, Connecticut, Rhode Island, and Massachusetts. The temporal range of the input topography and bathymetry is 1887 to 2016.

Original contact information:

Contact Name: Jeffrey Danielson / Dean Tyler *

Contact Org: U.S. Geological Survey

Title: Physical Geographer

Phone: 605-594-6148 / 605-594-2624 *

Email: daniels@usgs.gov / dtyler@usgs.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:
1887-01-03 to 2016-02-01

1.5. Actual or planned geographic coverage of the data:
W: -74.786924, E: -69.761458, N: 42.79872, S: 40.377544

1.6. Type(s) of data:
(e.g., digital numeric data, imagery, photographs, video, audio, database, tabular data, etc.)
Map (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:

- 2016-04-04 00:00:00 - The principal methodology for developing the integrated topobathymetric elevation model can be organized into three main components. The "topography component" consists of the land-based elevation data, which is primarily comprised from high-resolution LiDAR data. The topographic source data will include LiDAR data from different sensors (Topographic, Bathymetric) with distinct spectral wavelengths (NIR-1064nm, Green-532nm). The "bathymetry component" consists of hydrographic sounding (acoustic) data collected using boats rather than bathymetry acquired from LiDAR. The most common forms of bathymetry that are used include: multi-beam, single-beam, and swath. The final component, "Integration", encompasses the assimilation of the topographic and bathymetric data along the near-shore based on a predefined set of priorities. The land/water interface (+1 m- -1.5 m) is the most critical area, and green laser systems, such as the Experimental Advanced Airborne Research LiDAR (EAARL-B) and the Coastal Zone Mapping and Imaging LiDAR (CZMIL) that cross the near-shore interface are valuable in developing a seamless transition. The end product from the topography and bathymetry components is a raster with associated spatial masks and metadata that can be passed to the integration component for final model incorporation. Topo/Bathy Creation Steps: Topography Processing Component: a) Quality control check the vertical and horizontal datum and projection information of the input lidar source to ensure the data is referenced to NAVD88 and NAD83, UTM. If the source data is not NAVD88, transform the input LiDAR data to NAVD88

reference frame using current National Geodetic Survey (NGS) geoid models. Likewise, if required, convert the input source data to NAD83 and reproject to UTM. b) Check the classification of the topographic LiDAR data to verify the data are classified with the appropriate classes. If the data have not been classified, then classify the raw point cloud data to non-ground (class 1) ground (class 2), and water (class 9) classes using LP360-Classify. c) Derive associated breaklines from the classified LiDAR to capture internal water bodies, such as lakes and ponds and inland waterways. Inland waterways and water bodies will be hydro-flattened where no bathymetry is present. d) Extract the ground returns from the classified LiDAR data and randomly spatial subset the points into two point sets based on the criteria of 95 percent of the points for the "Actual Selected" set and the remaining 5 percent for the "Test Control" set. The "Actual Selected" points will be gridded in the terrain model along with associated breaklines and masks to generate the topographic surface, while the "Test Control" points will be used to compute the interpolation accuracy (Root Mean Square Error) from the derived surface. e) Generate the minimum convex hull boundary from the classified ground LiDAR points that creates a mask that extracts the perimeter of the exterior LiDAR points. The mask is then applied in the terrain to remove extraneous terrain artifacts outside of the extent of the ground LiDAR points. f) Using a terrain model based on triangulated irregular networks (TINs), grid the "Actual Selected" ground points using breaklines and the minimum convex hull boundary mask at a 3-meter spatial resolution using a natural neighbor interpolation algorithm. g) Compute the interpolation accuracy by comparing elevation values in the "Test Control" points to values extracted from the derived gridded surface; report the results in terms of Root Mean Square Error (RMSE).
- 2016-04-11 00:00:00 - Bathymetry Processing Component: a) Quality control check the vertical and horizontal datum and projection information of the input bathymetric source to ensure the data is referenced to NAVD88 and NAD83, UTM. If the source data is not NAVD88, transform the input bathymetric data to NAVD88 reference frame using VDatum. Likewise, if required, convert the input source data to NAD83 and reproject to UTM. b) Prioritize and spatially sort the bathymetry based on date of acquisition, spatial distribution, accuracy, and point density to eliminate any outdated or erroneous points and to minimize interpolation artifacts. c) Randomly spatial subset the bathymetric points into two point sets based on the criteria of 95 percent of the points for the "Actual Selected" set and the remaining 5 percent for the "Test Control" set. The "Actual Selected" points will be gridded in the empirical bayesian krigging model along with associated masks to generate the bathymetric surface, while the "Test Control" points will be used to compute the interpolation accuracy (Root Mean Square Error) from the derived surface. d) Spatially interpolate bathymetric single-beam, multi-beam, and hydrographic survey source data using an empirical bayesian krigging gridding algorithm. This approach uses a geostatistical interpolation method that accounts for the error in estimating the underlying semivariogram (data structure - variance) through repeated simulations. e) Cross validation - Compare the predicted value in the

geostatistical model to the actual observed value to assess the accuracy and effectiveness of model parameters by removing each data location one at a time and predicting the associated data value. The results will be reported in terms of RMSE. f) Compute the interpolation accuracy by comparing elevation values in the "Test Control" points to values extracted from the derived gridded surface; report the results in terms of RMSE.
- 2016-04-18 00:00:00 - Mosaic Dataset Processing (Integration) Component: a) Determined priority of input data based on project characteristics, including acquisition dates, cell size, retention of features, water surface treatment, visual inspection and presence of artifacts. b) Develop an ArcGIS geodatabase (Mosaic Dataset) and spatial seamlines for each individual topographic (minimum convex hull boundary) and bathymetric raster layer included in the integrated elevation model. c) Generalize seamline edges to smooth transition boundaries between neighboring raster layers and split complex raster datasets with isolated regions into individual unique raster groups. d) Develop an integrated shoreline transition zone from the best available topographic and bathymetric data to blend the topographic and bathymetric elevation sources. Where feasible, use the minimum convex hull boundary, create a buffer to logically mask input topography/bathymetry data. Then, through the use of TINs, interpolate the selected topographic and bathymetric points to gap-fill, if required any near-shore holes in the bathymetric coverage. Topobathymetric LiDAR data sources such as the EAARL-B or CZMIL systems provide up-to-date, high-resolution data along the critical land/water interface within inter-tidal zone. e) Prioritize and spatially sort the input topographic and bathymetric raster layers based on date of acquisition and accuracy to sequence the raster data in the integrated elevation model. f) Based on the prioritization, spatially mosaic the input raster data sources to create a seamless topobathymetric composite at a cell size of 3 meters using blending (spatial weighting). g) Performed a visual quality assurance (Q/A) assessment on the output composite to review the mosaic seams for artifacts. h) Generate spatially referenced metadata for each unique data source. The spatially reference metadata consists of a group of geospatial polygons that represent the spatial footprint of each data source used in the generation of the topobathymetric dataset. Each polygon is to be populated with attributes that describe the source data, such as, resolution, acquisition date, source name, source organization, source contact, source project, source URL, and data type (topographic LiDAR, bathymetric LiDAR, multi-beam bathymetry, single-beam bathymetry, etc.).
- 2017-03-01 00:00:00 - Data were received from USGS by NOAA and ingested into the Digital Coast system for download via custom processing and ftp. Metadata was modified to reflect distribution through this mechanism.

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/49419

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=6194
https://noaa-nos-coastal-lidar-pds.s3.us-east-1.amazonaws.com/dem/New_England_Coned_Topobathy

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=6194;

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.