

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:

2020 USGS Lidar: Hurricane Michael, FL

1.2. Summary description of the data:

Product: These lidar data are processed Classified LAS 1.4 files, formatted to 9702 individual 5,000 ft x 5,000 ft tiles; used to create intensity images, 3D breaklines and hydro-flattened DEMs as necessary.

Geographic Extent: Florida Hurricane Michael, Florida, covering approximately 8,263 square miles. These data cover the following counties:

Bay, Calhoun, Franklin, Gadsden, Gulf, Holmes, Jackson, Jefferson (portion), Leon, Liberty, Wakulla, Walton (portion), Washington

Dataset Description: Hurricane Michael, Florida 2020 Lidar project called for the Planning, Acquisition, processing and derivative products of lidar data to be collected at a nominal pulse spacing (NPS) of 0.35 meter. Project specifications are based on the U.S. Geological Survey National Geospatial Program Base Lidar Specification, Version 2.1. The data was developed based on a horizontal datum/projection of NAD83 (2011), State Plane North, U.S. Survey Feet and vertical datum of NAVD88 (GEOID12B), U.S. Survey Feet. Lidar data was delivered as processed Classified LAS 1.4 files, formatted to 5000 ft x 5000 ft tiles. All tiled to the same 5000 ft x 5000 ft schema.

Ground Conditions: Lidar was collected in late 2019 through early 2020, while no snow was on the ground and rivers were at or below normal levels. In order to post process the lidar data to meet task order specifications and meet ASPRS vertical accuracy guidelines.

This metadata supports the data entry in the NOAA Digital Coast Data Access Viewer (DAV). For this data set, the DAV is leveraging the Entwine Point Tiles (EPT) hosted by USGS on Amazon Web Services. At the time of processing to DAV, the data in Work Unit 229804 (Block 7: Bay (portion), Calhoun (portion) , Franklin (portion) , Gulf, Liberty (portion), and Washington (portion)) counties, were not available in EPT format. These data will be added when they become available from the USGS.

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:

2019-12-16 to 2020-01-07, 2019-12-18 to 2020-01-07, 2019-12-18 to 2019-12-25, 2019-12-16 to 2020-01-25, 2020-02-14 to 2020-02-27, 2019-12-16 to 2020-04-21

1.5. Actual or planned geographic coverage of the data:

W: -86.2, E: -83.65, N: 31.03, S: 29.56

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):

Lineage Statement:

The FL Hurricane Michael lidar was ingested into the Data Access Viewer for custom product generation by leveraging USGS hosted Entwine Point Tiles.

Process Steps:

- 2020-10-15 00:00:00 - The boresight for each lift was done individually as the solution may change slightly from lift to lift. The following steps describe the Raw Data Processing and Boresight process: 1) Technicians processed the raw data to LAS format flight lines using the final GPS/IMU solution. This LAS data set was used as source data for boresight. 2) Technicians first used proprietary and commercial software to calculate initial boresight adjustment angles based on sample areas selected in the lift. These areas cover calibration flight lines collected in the lift, cross tie and production flight lines. These areas are well distributed in the lift coverage and cover multiple terrain types that are necessary for boresight angle calculation. The technician then analyzed the results and made any necessary additional adjustment until it is acceptable for the selected areas. 3) Once the boresight angle calculation was completed for the selected areas, the adjusted settings were applied to all of the flight lines of the lift and checked for consistency. The technicians utilized commercial and proprietary software packages to analyze how well flight line overlaps match for the entire lift and adjusted as necessary until the results met the project specifications. 4) Once all lifts were completed with individual boresight adjustment, the technicians checked and corrected the vertical misalignment of all flight lines and also the matching between data and ground truth. The relative accuracy was less than or equal to 6 cm RMSEz within individual swaths and less than or equal to 8 cm RMSEz or within swath overlap (between adjacent swaths). 5) The technicians ran a final vertical accuracy check of the boresighted flight lines against the surveyed check points after the z correction to

ensure the requirement of NVA = 19.6 cm 95% Confidence Level (Required Accuracy) was met. Point classification was performed according to USGS Lidar Base Specification 2.1, and breaklines were collected for water features. Bare earth DEMs were exported from the classified point cloud using collected breaklines for hydroflattening. Synthetic points generated by Riegl processing software are present in this dataset and were used to fill MTA zones. Please see the project report for more details on the synthetic points.

- 2021-09-01 00:00:00 - LAS Point Classification: The point classification is performed as described below. The bare earth surface is then manually reviewed to ensure correct classification on the Class 2 (Ground) points. After the bare-earth surface is finalized, it is then used to generate all hydro-breaklines through heads-up digitization. All ground (ASPRS Class 2) lidar data inside of the WATERBODY, COASTAL and Double Line Drain hydro flattening breaklines were then classified to water (ASPRS Class 9) using TerraScan macro functionality. A buffer of 2.29 feet was also used around each hydro-flattened feature as well as Single Line Drains to classify these ground (ASPRS Class 2) points to Ignored ground (ASPRS Class 20). All WATERBODY Island, COASTAL Island, and Double Line Drain Island features were checked to ensure that the ground (ASPRS Class 2) points were reclassified to the correct classification after the automated classification was completed. Buildings (ASPRS Class 6) were classified through an automated process in the initial ground routine. All data was manually reviewed and any remaining artifacts removed using functionality provided by TerraScan and TerraModeler. Global Mapper was used as a final check of the bare earth dataset. The withheld bit was set on the withheld points previously identified in TerraScan before the ground classification routine was performed. The withheld bit was set on class 7 and class 18 in TerraScan after all classification was complete. These LAS files contain synthetic points. These points were generated by the Riegl processing software to fill Multiple Time Around (MTA) zones, which are a physical phenomenon that exists in any time of flight lidar system which has multiple pulses in air and wishes to record all of them seamlessly without range gate limitations. The MTA zones only exist in narrow bands of ranges and typically are dependent on flight planning parameters and project area topography. Dewberry proprietary software was then used to create the deliverable industry-standard LAS files for both the All Point Cloud Data and the Bare Earth. Dewberry proprietary software was used to perform final statistical analysis of the classes in the LAS files, on a per tile level to verify final classification metrics and full LAS header information.

- 2021-02-07 00:00:00 - Data was tested at 0.27 meter nominal pulse spacing and 14.22 points per square meter (ppsm). The average density was tested on the LAS data using geometrically reliable (withheld and noise points excluded) first-return points. (A)NPD was tested using rasters which produce the average number of points within each cell.

- Original point clouds in LAS/LAZ format were restructured as Entwine Point Tiles and stored on Amazon Web Services. The data were re-projected horizontally to WGS84 web mercator (EPSG 3857) and no changes were made to the vertical (

NAVD88 GEOID12B feet).

- 2023-01-05 00:00:00 - The NOAA Office for Coastal Management (OCM) created references to the Entwine Point Tiles (EPT) that were ingested into the NOAA Digital Coast Data Access Viewer (DAV). No changes were made to the data. The DAV will access the point cloud as it resides on Amazon Web Services (AWS) under the usgs-lidar-public container. This is the AWS URL being accessed: https://s3-us-west-2.amazonaws.com/usgs-lidar-public/FL_HurricaneMichael_1_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/FL_HurricaneMichael_2_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/FL_HurricaneMichael_3_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/FL_HurricaneMichael_4_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/FL_HurricaneMichael_5_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/FL_HurricaneMichael_6_2020/ept.json Block 7 was not available at the time of DAV processing. It will be added when it becomes available from USGS.

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/69038>

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=9686/details/9686>

https://rockyweb.usgs.gov/vdelivery/Datasets/Staged/Elevation/LPC/Projects/FL_HurricaneMichael_2

7.3. Data access methods or services offered:

Data is available online for bulk and 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.