

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 - 2020 USGS Lidar: Hurricane Florence, NC

1.2. Summary description of the data:

Product: These lidar data are processed Classified LAS 1.4 files, formatted to individual 750 m x 750 m tiles; used to create intensity images, 3D breaklines, and hydro-flattened DEMs as necessary.

Geographic Extent: Eastern North Carolina

NC_HurricaneFlorence_1 (Work Unit 186825) covering approximately 2543 total square miles in 13 counties: Bladen, Brunswick, Columbus, Dillon, Duplin, Hoke, Horry, Marlboro, New Hanover, Pender, Robeson, Sampson, Scotland

NC_HurricaneFlorence_2 (Work Unit 196896) covering approximately 1717 total square miles in 8 counties: Brunswick, Carteret, Craven, Duplin, Jones, New Hanover, Onslow, Pender

NC_HurricaneFlorence_3 (Work Unit 198494) covering approximately 1124 total square miles in 9 counties: Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pitt, Wayne, Wilson

NC_HurricaneFlorence_4 (Work Unit 208939) covering approximately 516 total square miles in 5 counties: Franklin, Granville, Mecklenburg, Vance, Warren

NC_HurricaneFlorence_5 (Work Unit 210877) covering approximately 2152 total square miles in 7 counties: Cumberland, Duplin, Harnett, Johnston, Sampson, Wake, Wayne

NC_HurricaneFlorence_6 (Work Unit 224678) covering approximately 2239 total square miles in 9 counties: Beaufort, Bertie, Dare, Edgecombe, Hyde, Martin, Pitt, Tyrrell, Washington

NC_HurricaneFlorence_7 (Work Unit 217033) covering approximately 1834 total square miles in 8 counties: Bladen, Columbus, Cumberland, Dillon, Hoke, Horry, Robeson, Sampson

NC_HurricaneFlorence_8 (Work Unit 218544) covering approximately 1181 total square miles in 11 counties: Brunswick, Franklin, Granville, Halifax, Johnston, Mecklenburg,

Nash, Wake, Warren, Wayne, Wilson

NC_HurricaneFlorence_9 (Work Unit 220804) covering approximately 2546 total square miles in 17 counties: Bertie, Camden, Chesapeake, Chowan, Currituck, Edgecombe, Gates, Greenville, Halifax, Hertford, Martin, Northampton, Pasquotank, Perquimans, Southampton, Suffolk, Virginia Beach

NC_HurricaneFlorence_10 (Work Unit 225700) covering approximately 1833 total square miles in 11 counties: Beaufort, Carteret, Craven, Duplin, Greene, Jones, Lenoir, Pamlico, Pitt, Wayne, Wilson

NC_HurricaneFlorence_11 (Work Unit 225793) covering approximately 2120 total square miles in 11 counties: Brunswick, Edgecombe, Franklin, Greene, Greenville, Halifax, Nash, Northampton, Pitt, Warren, Wilson

Dataset Description:

The NC_HurricaneFlorence_2020_D20 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 meters. Project specifications were based on the U.S. Geological Survey National Geospatial Program Base LiDAR Specification, Version 2.1. The data were developed based on a horizontal projection/datum of NAD 1983 2011 UTM Zones 17N and 18N, Meters and vertical datum of NAVD88 Geoid18, Meters. LiDAR data were delivered as processed Classified LAS 1.4 files formatted to individual 750 m x 750 m tiles, as tiled intensity imagery, and as tiled bare earth DEMs; all tiled to the same 750 m x 750 m schema. Continuous breaklines were produced in Esri file geodatabase format.

Ground Conditions: LiDAR was collected in winter 2019 and 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 record 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.

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:

2019-12-10 to 2020-02-15, 2019-12-08 to 2020-01-08, 2019-12-08 to 2020-01-26, 2020-01-30 to 2020-02-02, 2019-12-12 to 2020-01-26, 2019-12-16 to 2020-02-08, 2019-12-12 to 2020-01-08, 2019-12-16 to 2020-02-23, 2020-01-18 to 2020-02-28, 2019-12-08 to 2020-01-26, 2019-12-15 to 2020-02-28

1.5. Actual or planned geographic coverage of the data:

W: -79.5, E: -77.94, N: 34.92, S: 33.87

NC_HurricaneFlorence_1 (Work Unit 186825) covering approximately 2543 total square miles in 13 counties: Bladen, Brunswick, Columbus, Dillon, Duplin, Hoke, Horry,

Marlboro, New Hanover, Pender, Robeson, Sampson, Scotland

W: -78.04, E: -76.48, N: 34.94, S: 33.94

NC_HurricaneFlorence_2 (Work Unit 196896) covering approximately 1717 total square miles in 8 counties: Brunswick, Carteret, Craven, Duplin, Jones, New Hanover, Onslow, Pender

W: -77.89, E: -77.08, N: 35.59, S: 34.88

NC_HurricaneFlorence_3 (Work Unit 198494) covering approximately 1124 total square miles in 9 counties: Craven, Duplin, Greene, Jones, Lenoir, Onslow, Pitt, Wayne, Wilson

W: -78.52, E: -78.17, N: 36.56, S: 36.13

NC_HurricaneFlorence_4 (Work Unit 208939) covering approximately 516 total square miles in 5 counties: Franklin, Granville, Mecklenburg, Vance, Warren

W: -78.71, E: -77.93, N: 35.82, S: 34.85

NC_HurricaneFlorence_5 (Work Unit 210877) covering approximately 2152 total square miles in 7 counties: Cumberland, Duplin, Harnett, Johnston, Sampson, Wake, Wayne

W: -77.44, E: -75.79, N: 35.94, S: 35.39

NC_HurricaneFlorence_6 (Work Unit 224678) covering approximately 2239 total square miles in 9 counties: Beaufort, Bertie, Dare, Edgecombe, Hyde, Martin, Pitt, Tyrrell, Washington

W: -79.11, E: -78.32, N: 34.96, S: 34.26

NC_HurricaneFlorence_7 (Work Unit 217033) covering approximately 1834 total square miles in 8 counties: Bladen, Columbus, Cumberland, Dillon, Hoke, Horry, Robeson, Sampson

W: -78.57, E: -77.94, N: 36.55, S: 35.57

NC_HurricaneFlorence_8 (Work Unit 218544) covering approximately 1181 total square miles in 11 counties: Brunswick, Franklin, Granville, Halifax, Johnston, Mecklenburg, Nash, Wake, Warren, Wayne, Wilson

W: -77.46, E: -76.01, N: 36.57, S: 35.93

NC_HurricaneFlorence_9 (Work Unit 220804) covering approximately 2546 total square miles in 17 counties: Bertie, Camden, Chesapeake, Chowan, Currituck, Edgecombe, Gates, Greenville, Halifax, Hertford, Martin, Northampton, Pasquotank, Perquimans, Southampton, Suffolk, Virginia Beach

W: -78.03, E: -76.06, N: 35.62, S: 34.8

NC_HurricaneFlorence_10 (Work Unit 225700) covering approximately 1833 total square miles in 11 counties: Beaufort, Carteret, Craven, Duplin, Greene, Jones, Lenoir, Pamlico, Pitt, Wayne, Wilson

W: -78.03, E: -77.45, N: 36.56, S: 35.6

NC_HurricaneFlorence_11 (Work Unit 225793) covering approximately 2120 total square miles in 11 counties: Brunswick, Edgecombe, Franklin, Greene, Greenville, Halifax, Nash, Northampton, Pitt, Warren, Wilson

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 NOAA Office for Coastal Management (OCM) ingested references to the USGS Entwine Point Tiles (EPT) hosted on Amazon Web Services (AWS) into the Digital Coast Data Access Viewer (DAV). The DAV accesses the point cloud as it resides on AWS under the usgs-lidar-public-container.

Process Steps:

- 2022-01-01 00:00:00 - Raw Data and Boresight Processing: 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 NV5 Geospatial 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 technicians then analyzed the results and made any necessary additional adjustment until it was 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 matched 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 7 cm RMSEz within individual swaths and less than or equal to 10 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 checkpoints after the z correction to ensure the requirement of NVA = 19.6 cm 95% Confidence Level (Required Accuracy) was met.
- 2022-01-01 00:00:00 - LAS Point Classification: The point classification was performed as described below. The bare earth surface was manually reviewed to

ensure correct classification on the Class 2 (Ground) points. After the bare-earth surface was finalized, it was then used to generate all hydro-breaklines through heads-up digitization. All ground (ASPRS Class 2) LiDAR data inside of the Lake Pond and Double Line Drain hydro-flattened breaklines were then classified to Water (ASPRS Class 9) using proprietary tools. A buffer of 0.5 meter was also used around each hydro-flattened feature to classify these ground (ASPRS Class 2) points to Ignored ground (ASPRS Class 20). All Lake Pond 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. Any noise that was identified either through manual review or automated routines was classified to the appropriate class (ASPRS Class 7 and/or ASPRS Class 18) followed by flagging with the withheld bit. All data were 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. GeoCue was then used to create the deliverable industry-standard LAS files for point cloud data. NV5 Geospatial 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.

- 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 GEOID18 meters).

- 2024-02-26 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. These are the AWS URLs being accessed: https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_1_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_2_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_3_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_4_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_5_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_6_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_7_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_8_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_9_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_10_2020/ept.json https://s3-us-west-2.amazonaws.com/usgs-lidar-public/NC_HurricaneFlorence_11_2020/ept.json

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/72221>

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=10082/details/10082>

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

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_NC

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 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.