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:

2015-2016 Lake County, California Lidar; Classified Point Cloud

1.2. Summary description of the data:

Compass PTS JV was tasked by FEMA to plan, acquire, process, and produce derivative products of LiDAR data at a nominal pulse spacing (NPS) of 0.7 meters based on the "U.S. Geological Survey National Geospatial Program LiDAR Base Specification Version 1.2". The project consists of approximately 1,329 square miles (1,342 with 100 meter buffer). Fugro acquired 83 flight lines in 14 lifts between December 29th, 2015 and February 14th, 2016. LiDAR data collection was performed with a twin engine aircraft, utilizing a Leica ALS-70 sensor; collecting multiple return x, y, and z as well as intensity data. Specialized in-house and commercial software processes the native LiDAR data into 3-dimensional positions that can be imported into GIS software for visualization and further analysis.

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:

2015-12-29, 2015-12-31, 2016-01-31, 2016-02-01, 2016-02-05, 2016-02-06, 2016-02-07, 2016-02-08, 2016-02-09, 2016-02-13, 2016-02-14

1.5. Actual or planned geographic coverage of the data:

W: -123.09338, E: -122.34202, N: 39.58116, S: 38.66872

1.6. Type(s) of data:

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

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:

- 2016-06-01 00:00:00 - Fugro was tasked with planning, acquiring, processing, and producing derivative products of LiDAR data collected at a NPS of 0.7 meters, including overlap, for an Area of Interest (AOI) covering a portion of Lake County, California. The AOI covers approximately 1,329 square miles. A 100-meter buffer was added to the AOI covering approximately 1,342 square miles; all products were generated to the limit of this buffered boundary. LiDAR data was acquired using a twin engine aircraft equipped with an antenna and receiver for airborne GPS collection. Flight status was communicated during data collection. All acquired LiDAR data went through a preliminary review to assure that complete coverage was obtained and that there were no gaps between flight lines before the flight crew left the project site. Once back in the office, the data was run through a complete iteration of processing to ensure that it is complete, uncorrupted, and that the entire project area has been covered without gaps between flight lines. There are essentially three steps to this processing: 1) GPS/IMU Processing - Airborne GPS and IMU data was immediately processed using the airport GPS base station data, which was available to the flight crew upon landing the plane. This ensures the integrity of all the mission data. These results were also used to perform the initial LiDAR system calibration test. 2) Raw LiDAR Data Processing - Technicians processed the raw data to LAS format flight lines with full resolution output before performing QC. A starting configuration file is used in this process, which contains the latest calibration parameters for the sensor. The technicians also generated flight line trajectories for each of the flight lines during this process. 3) Verification of Coverage and Data Quality - Technicians checked flight line trajectory files to ensure completeness of acquisition for the flight lines, calibration lines, and cross flight lines. The intensity images were generated for the entire lift at the required 0. 7 meter nominal post spacing for the project. The technician visually checked the intensity images against the acquisition boundary to ensure full coverage to the 100 meter buffer beyond the project boundary. The technician also thoroughly reviewed the data for any gaps in project area. The technician generated a sample TIN surface to ensure no anomalies were present in the data. Turbulence was inspected for each flight line; if any adverse quality issues were discovered, the flight line was rejected and re-flown. The technician also evaluated the achieved post spacing against project specified 0.7 meter nominal post spacing as well as making sure no clustering in point distribution.
- 2016-06-01 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 Fugro 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. 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 (Required Accuracy) was met.
- 2016-06-01 00:00:00 - Once boresighting was complete for the project, the project was first set up for automatic classification. The LiDAR data was cut to production tiles. The flight line Overlap points, Noise points and Ground points were classified automatically in this process. Fugro utilized commercial software, as well as proprietary, in-house developed software for automatic filtering. The parameters used in the process were customized for each terrain type to obtain optimum results. Once the automated filtering was completed, the files were run through a visual inspection to ensure that the filtering was not too aggressive or not aggressive enough. In cases where the filtering was too aggressive and important terrain were filtered out, the data was either run through a different filter within local area or was corrected during the manual filtering process. Interactive editing was completed in visualization software that provides manual and automatic point classification tools. Fugro utilized commercial and proprietary software for this process. All manually inspected tiles went through a peer review to ensure proper editing and consistency. After the manual editing and peer review, all tiles went through another final automated classification routine. This process ensures only the required classifications are used in the final product (all points classified into any temporary classes during manual editing will be re-classified into the project specified classifications). During this process, the points originally classified as flight line overlap were tagged as withheld points. Once manual inspection, QC and final autofilter is complete for the LiDAR tiles, the LAS data was packaged to the project specified tiling scheme, clipped to project boundary including the 100 meter buffer and formatted to LAS v1.4. It was also re-projected to UTM Zone 10; NAD83(2011), meters; NAVD88(GEOID12B), meters. The file header was formatted to meet the project specification with File Source ID assigned. This Classified Point Cloud product was used for the generation of derived products. This product was delivered in fully compliant LAS v1.4, Point Record Format 1 with Adjusted Standard GPS Time at a precision sufficient to allow unique timestamps for each return. Georeference information is included in all LAS file headers. Intensity values are included for each point. Each tile has unique File Source ID assigned. The Point Source ID matches to the flight line ID in flight trajectory files. The following classifications are included: Code 1 – Processed, but unclassified; Code 2 –

Bare-earth ground; Code 7 – Noise (low or high, manually identified, if needed); Code 9 – Water; and Code 10 – Ignored Ground (Breakline Proximity); Code 17 - Bridges; Code 18 - High noise.
- NOAA downloaded the lidar point cloud from USGS in NAD82(2011) UTM zone 11 meters with vertical coordinates in meters NAVD88 (Geoid12b). Data were converted to geographic coordinates and ellipsoid heights for ingest in the NOAA Digital Coast Data Access Viewer. (Citation: Classified Point Cloud)

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/55316

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=8661
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid12b/8661/index.html

7.3. Data access methods or services offered:
Data is available online for 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)

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.