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:

2010 Northern San Francisco Bay Area Lidar: Portions of Alameda, Contra Costa, Marin, Napa, San Francisco, Solano, and Sonoma Counties

1.2. Summary description of the data:

This Light Detection and Ranging (LiDAR) dataset is a survey of northern San Francisco Bay, California. The project area consists of

approximately 437 square miles in portions of seven California counties: Alameda, Contra Costa, Marin, Napa, San Francisco, Solano, and

Sonoma. The project design of the LiDAR data acquisition was developed to support a nominal post spacing of 1 meter. Fugro EarthData, Inc.

acquired 147 flight lines in nine lifts on February 25, 26, and 28; March 1, 24, and 26; and April 3, 15, and 16, 2010. The data was

divided into 1500 by 1500 meter cells that serve as the tiling scheme. LiDAR data collection was performed with a Piper Navajo twin

engine aircraft, utilizing a Leica ALS60 MPiA sensor, collecting multiple return x, y, and z as well as intensity data. LiDAR data is

remotely sensed high-resolution elevation data collected by an airborne collection platform. This data of northern San Francisco Bay,

California, is classified according to the ASPRS classification scheme and was collected at sufficient resolution to provide a nominal

point spacing of 1 m for collected points. Up to 4 returns were recorded for each pulse in addition to an intensity value.

Original contact information:

Contact Org: NOAA Office for Coastal Management

Phone: 843-740-1202

Email: coastal.info@noaa.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:
2010-02-25, 2010-02-26, 2010-02-28, 2010-03-01, 2010-03-24, 2010-03-26, 2010-04-03, 2010-04-15, 2010-04-16

1.5. Actual or planned geographic coverage of the data:
W: -122.646374, E: -122.111077, N: 38.350295, S: 37.753405

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

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:

- 2010-04-09 00:00:00 - 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 is 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 ensured 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 was used in this process, which contain the latest calibration parameters for the sensor. The technician 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 project flight lines, calibration lines, and cross flight lines. The intensity images were generated for the entire lift at the required post spacing for the project. The technician visually checked the intensity images against the project boundary to ensure full coverage. The intensity histogram was analyzed to ensure the quality of the intensity values. 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 and if it affected the quality

of the data, the flight line was rejected and reflown. The technician also evaluated the achieved post spacing against project specified post spacing.
- 2010-05-24 00:00:00 - The following steps describe the Raw Data Processing and Boresight process; 1. The calibration flight lines were first processed with the starting configuration file which contains the latest calibration parameters for the sensor. The boresight for each lift was done individually as the solution may change slightly from lift to lift. 2. Lift boresighting was accomplished using the tri-directional calibration flight lines over the project area. 3. Once the boresighting was done for the calibration flight lines, the adjusted settings were applied on all of the flight lines of the lift and checked for consistency. The technician selected a series of areas in the dataset to be inspected where adjacent flight lines overlay. A routine was run to calculate the misalignment of the adjacent flight lines and a statistical report was generated. The technician analyzed the result and applied more adjustment if necessary to optimize the result for the entire lift. Color coded elevation difference images were generated for all flight line overlaps including cross ties in the lift once the boresight adjustment was complete. The technician reviewed these images to ensure that systematic errors were eliminated for the lift and the results met the project specifications. 4. Once the boresight adjustment was completed for each lift individually, the technician checked and corrected the vertical misalignment of all flight lines and also the matching between data and ground truth. This process included calculating the z bias value for each flight line so that all flight lines are aligned vertically. The entire dataset was then matched to ground control points within the project specified accuracy range. 5. The technician ran a final vertical accuracy check after the z correction. The result was analyzed against the project specified accuracy to make sure it met the project requirements.
- 2011-04-20 00:00:00 - Fugro EarthData, Inc. has developed a unique method for processing LiDAR data to identify and re-classify elevation points falling on vegetation, building, and other above ground structures into separate data layers. The steps are as follows; 1. Fugro EarthData, Inc. utilized commercial software as well as proprietary software for automatic filtering. The parameters used in the process were customized for each terrain type to obtain optimum results. 2. The Automated Process typically re-classifies 90-98% of points falling on vegetation depending on terrain type. 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 features were filtered out, the data was either run through a different filter or was corrected during the manual filtering process. 3. Interactive editing was completed in 3D visualization software which also provides manual and automatic point classification tools. Fugro EarthData, Inc. used commercial and proprietary software for this process. Vegetation and artifacts remaining after automatic data post-processing were reclassified manually through interactive editing. The hard edges of ground features that were automatically filtered out during the automatic filtering process were brought back into ground class during manual editing. Auto-filtering routines were utilized as much as possible within

fenced areas during interactive editing for efficiency. The technician reviewed the LiDAR points with color shaded TINs for anomalies in ground class during interactive filtering. 4. Upon the completion of peer review and finalization of bare earth filtering, the classified LiDAR point cloud work tiles went through a water classification routine based on the collected hydro-flattened water polygons. 5. Upon the completion of peer review and finalization of the classified LiDAR point cloud work tiles, the tiles were reprojected to NAD83 (NSRS2007), UTM zone 10 north, meters; NAVD88, meters, using GEOID09. The data was also cut to the approved tile layout. The classified LiDAR point cloud data is in LAS format after this process. The technician checked the output LAS files for coverage and format. 6. The classified LiDAR point cloud data were delivered in LAS 1.2 format; 2 - ground, 1 - unclassified, 9 - water, 7 - low points/noise, and 12 - overlap points.
- 2011-05-01 00:00:00 - The NOAA Office for Coastal Management (OCM) received the lidar files in las format. The files contained lidar intensity and elevation measurements. OCM performed the following processing for data storage and Digital Coast provisioning purposes: 1. Data converted from UTM Zone 10 coordinates to geographic coordinates. 2. Data converted from NAVD88 heights to ellipsoid heights using GEOID09. 3. The LAS data were sorted by latitude and the headers were updated.

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:
- 1.6. Type(s) of data
- 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/48217

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=584
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/584/index.html

7.3. Data access methods or services offered:

This data can be obtained on-line at the following URL: https://coast.noaa.gov/dataviewer

;

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.