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:

2016 DOWL Lidar: Chena River Lakes, Alaska

1.2. Summary description of the data:

This metadata record was created by the NOAA Office for Coastal Management (OCM) because no metadata record was available for the data. Information to create this record was taken from the Quantum Spatial Chena River Lakes LiDAR Technical Data Report. There is a link to this report in the URL section of this metadata record. The data set deliverable parameters provided in the technical report for projection and units, are incorrectly provided in the report for the point data. The report indicates that the data are in Alaska State Plane Zone 3, NAD83 (NSRS2007), US survey feet and in NAVD88 (GEOID06) with vertical units in US survey feet. After examining the data and using the LAStools script lasinfo, the data downloaded from AK DGGS, appear to actually be in UTM Zone 6N, NAD83, meters, and in vertical units of meters.

The NOAA Office for Coastal Management (OCM) downloaded this lidar data from the AK DGGS site (https://elevation.alaska.gov/) and processed the data to be available on the Digital Coast Data Access Viewer (DAV).

In addition to these lidar point data, the bare earth Digital Elevation Models (DEM) created from the lidar point data are also available. These data are available for custom download at the link provided in the URL section of this metadata record.

In early 2016, Quantum Spatial (QSI) was contracted by DOWL, Inc. to collect Light Detection and Ranging (LiDAR) data in the spring of 2016 for the Chena River Lakes site in Alaska.

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:

2016-05-01

1.5. Actual or planned geographic coverage of the data:

W: -147.321, E: -147.04, N: 64.838, S: 64.7

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

- Planning In preparation for data collection, QSI reviewed the project area and developed a specialized flight plan to ensure complete coverage of the Chena River Lakes LiDAR study area at the target point density of ≥12.0 points/m2 (1.11 points/ ft2). Acquisition parameters including orientation relative to terrain, flight altitude, pulse rate, scan angle, and ground speed were adapted to optimize flight paths and flight times while meeting all contract specifications. Factors such as satellite constellation availability and weather windows must be considered during the planning stage. Any weather hazards or conditions affecting the flights were continuously monitored due to their potential impact on the daily success of airborne and ground operations. In addition, logistical considerations including private property access and potential air space restrictions were reviewed.
- 2016-05-01 00:00:00 - Acquisition The LiDAR survey was accomplished using a Leica ALS80 system mounted in a Cessna Caravan. Table 3 in the technical report summarizes the settings used to yield an average pulse density of greater than or equal to 12 pulses/m2 over the Chena River Lakes project area. The Leica ALS80 laser system can record unlimited range measurements (returns) per pulse. It is not uncommon for some types of surfaces (e.g., dense vegetation or water) to return fewer pulses to the LiDAR sensor than the laser originally emitted. The discrepancy between first return and overall delivered density will vary depending on terrain, land cover, and the prevalence of water bodies. All discernible laser returns were processed for the output dataset. All areas were surveyed with an opposing flight line side-lap of ≥60% (≥100% overlap) in order to reduce laser shadowing and increase surface laser painting. To accurately solve for laser point position (geographic coordinates x, y and z), the positional coordinates of the airborne sensor and the attitude of the aircraft were recorded continuously throughout the LiDAR data collection mission. Position of the aircraft was measured twice per second (2 Hz) by an onboard differential GPS unit, and aircraft attitude was measured 200 times per second (200 Hz) as pitch, roll and yaw (heading) from an onboard inertial measurement unit (IMU). To allow for post-processing correction and calibration, aircraft and sensor position and attitude data are indexed by GPS time.
- Ground Control Ground control surveys, including monumentation and the collection of ground survey points (GSPs), were conducted by DOWL to support the airborne acquisition. Ground control data were used to geospatially correct the

aircraft positional coordinate data and to perform quality assurance checks on final LiDAR data. QSI used static GNSS data provided by DOWL from base stations set up over three monument locations for the Chena River Lakes LiDAR project All survey data were reviewed by QSI staff upon receipt, and monument positions were verified by processing static GNSS data against nearby Continuously Operating Reference Stations (CORS) using the Online Positioning User Service (OPUS1). Ground survey points were collected by DOWL using real time kinematic survey techniques and supplied to QSI for LiDAR calibration. In addition to ground survey points, land cover class control points were collected and provided by DOWL throughout the study area. Individual accuracies were calculated for each land cover type to assess confidence in the LiDAR-derived ground models across land cover classes.
- Lidar Processing Upon completion of data acquisition, QSI processing staff initiated a suite of automated and manual techniques to process the data into the requested deliverables. Processing tasks included GPS control computations, smoothed best estimate trajectory (SBET) calculations, kinematic corrections, calculation of laser point position, sensor and data calibration for optimal relative and absolute accuracy, and LiDAR point classification. Processing methodologies were tailored for the landscape. Resolve kinematic corrections for aircraft position data using kinematic aircraft GPS and static ground GPS data. Develop a smoothed best estimate of trajectory (SBET) file that blends post-processed aircraft position with sensor head position and attitude recorded throughout the survey. Calculate laser point position by associating SBET position to each laser point return time, scan angle, intensity, etc. Create raw laser point cloud data for the entire survey in *.las (ASPRS v. 1.2) format. Convert data to orthometric elevations by applying a geoid06 correction Import raw laser points into manageable blocks to perform manual relative accuracy calibration and filter erroneous points. Classify ground points for individual flight lines. Using ground classified points per each flight line, test the relative accuracy. Perform automated line-to-line calibrations for system attitude parameters (pitch, roll, heading), mirror flex (scale) and GPS/IMU drift. Calculate calibrations on ground classified points from paired flight lines and apply results to all points in a flight line. Use every flight line for relative accuracy calibration. Classify resulting data to ground and other client designated ASPRS classifications. Assess statistical absolute accuracy via direct comparisons of ground classified points to ground control survey data. Generate bare earth models as triangulated surfaces. Generate highest hit models as a surface expression of all classified points. Export all surface models as ESRI GRIDs at a 3.0 foot pixel resolution. Correct intensity values for variability and export intensity images as GeoTIFFs at a 1.5 foot pixel resolution.
- 2018-06-11 00:00:00 - The NOAA Office for Coastal Management (OCM) downloaded 507 laz files from the Alaska Division of Geological and Geophysical Surveys data Portal (https://elevation.alaska.gov/). The files contained elevation and intensity measurements for the 2016 Chena River Lakes data set. The data set deliverable parameters provided in the technical report for projection and units, are

incorrectly provided in the report for the point data. The report indicates that the data are in Alaska State Plane Zone 3, NAD83 (NSRS2007), US survey feet and in NAVD88 (GEOID06) with vertical units in US survey feet. After examining the data and using the LAStools script lasinfo, the data downloaded from AK DGGS, appear to actually be in UTM Zone 6N, NAD83, meters, and in vertical units of meters. The data were classified as: 1 - Unclassified, 2 - Ground, 7 - Noise, 9 - Water. The NOAA Office for Coastal Management processed all points to the Digital Coast Data Access Viewer (DAV). OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. The LAStools software scripts lasinfo and lasvalidate were run on the laz files to check for errors. 2. An internal OCM script was run to check the number of points by classification and by flight ID and the gps and intensity ranges. 3. Internal OCM scripts were run on the laz files to convert from UTM Zone 6N, NAD83, meters coordinates to geographic coordinates, to convert from NAVD88 elevations to ellipsoid elevations using the GEOID06 model, to assign the geokeys, to sort the data by gps time and zip the data to database and to http.

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/52861

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=8540
https://coast.noaa.gov/htdata/lidar2_z/geoid12b/data/8540

7.3. Data access methods or services offered:
Data is available online for custom and bulk 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.