

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:**

2017 WA DNR Lidar: Tacoma Water Service Area - Green River, WA

1.2. Summary description of the data:

No metadata record was provided with the data. This record is populated with information from the Quantum Spatial, Inc. technical report downloaded from the Washington Dept. of Natural Resources Washington Lidar Portal. The technical report is available for download from the link provided in the URL section of this metadata record.

In September 2017, Quantum Spatial (QSI) was contracted by the Washington Department of Natural Resources (WADNR) to collect Light Detection and Ranging (LiDAR) data and digital imagery in the winter of 2017 and summer of 2018, respectively, for the Tacoma Water Service Area (TWSA) site in Washington. This contract also incorporates LiDAR data and digital imagery collection and processing over additional nearby sites, including the Green River Watershed, Green River Corridor, and a selected portion of the Green River Watershed which will be used for forestry analytics. QSI provided TWSA Delivery 1 on April 6th, 2018, representing approximately 94% (104,495 acres) of the site. TWSA Delivery 2 represents the remaining 6% (7,186 acres) of the site. This data report summarizes the collection and processing of the full extent of the TWSA site (111,681 acres), consisting of Delivery 1 and Delivery 2 areas of interest. Data were collected to aid WADNR in assessing the topographic and geophysical properties of the study area.

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.

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:

2017-12-10, 2018-11-11 to 2018-11-12, 2017-12-05 to 2017-12-06, 2017-12-09 to 2017-12-10

1.5. Actual or planned geographic coverage of the data:

W: -122.591663, E: -121.737143, N: 47.340071, S: 47.065263

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) downloaded the LAZ files from the Washington Lidar Portal.

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 Tacoma Water Service Area LiDAR study area at the target point density of greater than or equal to 8.0 points/m² (0.74 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.
- Airborne Survey The Delivery 1 LiDAR survey was accomplished using a Leica ALS80 system mounted in a Cessna Caravan while the Delivery 2 LiDAR survey utilized a Riegl VQ-1560i system mounted in a Cessna Caravan. The Leica ALS80 and Riegl VQ-1560i laser systems 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 greater than or equal to 50% (greater than or equal to 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.

- 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. Brief descriptions of these tasks are shown below.

Lidar Processing Steps

Resolve kinematic corrections for aircraft position data using kinematic aircraft GPS and precise point positioning (PPP) techniques. 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.

Software used - Waypoint Inertial Explorer v.8.7 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 geoid correction.

Software used - Waypoint Inertial Explorer v.8.7 Leica CloudPro v. 1.2.4 Import raw laser points into manageable blocks (less than 500 MB) to perform manual relative accuracy calibration and filter erroneous points. Classify ground points for individual flight lines.

Software used - TerraScan v.18 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.

Software used - TerraMatch v.18 Classify resulting data to ground and other client designated ASPRS classifications (Table 6). Assess statistical absolute accuracy via direct comparisons of ground classified points to ground control survey data.

Software used - TerraScan v.18, TerraModeler v.18

- 2022-06-27 00:00:00 - The NOAA Office for Coastal Management (OCM) downloaded this data set from the Washington Lidar Portal. The total number of files downloaded and processed was 539. No metadata record was provided with the data. This record is populated with information from the Quantum Spatial, Inc. technical report downloaded from the Washington Dept. of Natural Resources Washington Lidar Portal. The technical report is available for download from the Washington Lidar Portal. The link is provided in the URL section of this metadata record. The data were in Washington State Plane South (NAD83 HARN), US survey feet coordinates and NAVD88 (Geoid12B) elevations in feet. From the provided report, the data were classified as: 1 - Unclassified, 2 - Ground, 7 - Low Noise, 9 - Water, 17 - Bridge Deck. OCM processed all classifications of points to the Digital Coast Data Access Viewer (DAV). Classes available in the DAV are: 1, 2, 7, 9, 17. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes:

1. An internal OCM script was run to check the number of

points by classification and by flight ID and the gps and intensity ranges. 2. Internal OCM scripts were run on the laz files to convert from orthometric (NAVD88) elevations to ellipsoid elevations using the Geoid12B model, to convert from Washington State Plane South (NAD83 HARN), US survey feet coordinates to geographic coordinates, to convert from elevations in feet to meters, to filter out elevations less than -200 feet, to assign the geokeys, to sort the data by gps time and zip the data to database and to the Amazon s3 bucket.

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):

QSI has high standards and adheres to best practices in all efforts. In the laboratory, quality checks are built in throughout processing steps, and automated methodology allows for rapid data processing. QSI's innovation and adaptive culture rises to technical challenges and the needs of clients like Washington DNR. Reporting and communication to our clients are prioritized through regular updates and meetings.

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
- 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/67479>

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=9549/details/9549>
<https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/9549/index.html>

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.