

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 USDA Forest Service Lidar DEM: Olympic National Forest, WA

### 1.2. Summary description of the data:

No metadata record was provided with the data. This record is populated with information from the Tetra Tech 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.

Tetra Tech was contracted by the USDA Forest Service, Region 6 to provide high-density airborne LiDAR data and derived mapping products for 2 areas within the Olympic National Forest covering an area of 232 square miles. The LiDAR acquisition took place during 4 flight missions on October 29, 2017 and December 11, 2017, December 13 - 14, 2017.

### 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:

2017-12-13 to 2017-12-14, 2017-10-29, 2017-12-11

### 1.5. Actual or planned geographic coverage of the data:

W: -124.004831, E: -122.938469, N: 48.000119, S: 47.314651

### 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 GeoTiff files from the Washington Lidar Portal.

Process Steps:

- Lidar Acquisition The LiDAR acquisition took place during 4 flight missions on October 29, 2017 and December 11, 2017, December 13 - 14, 2017. Weather conditions during collection were clear and free of cloud/fog, precipitation, and any other weather phenomena which would negatively impact the collection. Collection occurred during leaf-off conditions and with no snow in the area of interest, as to acquire the most accurate ground model possible. 105 flight lines of LiDAR were collected to achieve the required specifications for each area. The LiDAR data was collected using an Riegl LMS-Q1560 and Optech Galaxy T1000 system. For the Q1560 LiDAR acquisition, the nominal flying height was 1400m above ground level (AGL) and flying speed was approximately 145kts. The Galaxy LiDAR acquisition was flown from 975m AGL at a similar flying speed. The scan field of view for the Riegl Q1560 is 29 degrees either side of nadir, for a total scan field of view (FoV) of 58 degrees and scans at a rate of 800 kHz. Due to the nature of the 4-sided rotating mirror in Riegl scanners, only 2/3 of pulses are recorded (533 kHz usable). The Galaxy acquires a variable FoV (10 - 60 degrees) in order to account for terrain variation, and was operated at a 400 kHz scan rate. The settings on the sensors yield an average pulse density of 4+ pulses per flight line. Acquiring data with double coverage ensures that the desired point density is met. Note that each pulse may result in one or more returned points as the pulse filters through vegetation, etc. Water or highly absorbent material may result in very few or no LiDAR returns as these materials poorly reflect the laser pulse. During the flight, the airborne trajectory was monitored with kinematic AGPS combined with IMU observations. The LiDAR data was combined with the GPS/IMU data to create the raw .las files. These raw files were then calibrated to create a dataset that was then used to create the desired mapping products. GNSS post-processing determines the position and attitude of the aircraft at 200Hz along the entire flight path. This data is logged for the Riegl Q1560 via an Applanix POS AV510 and an Applanix AP60 for the Optech Galaxy. Post-processing requires data from the onboard GNSS and Inertial Measurement Unit (IMU) as well as data from one or more static GNSS base station(s) with known coordinates. Post processing is performed in Applanix PosPAC MMS software. Here the aircraft GNSS / IMU data is referenced to the base station data to provide adjusted positions for the aircraft in latitude, longitude, and height, roll, pitch, and yaw / heading. The final trajectory is then smoothed, and exported in .pos format for use in the LiDAR point cloud extraction. The resulting flight path is commonly referred to as a Smoothed Best Estimate of Trajectory (SBET). In this project location there is a great distribution of 1Hz CORS and WSRN reference stations publicly available. These base stations were combined into an Applanix Smart Base during post-processing to model GNSS corrections over the entire AOI. The result is a high accuracy baseline with reduced dropouts or PDOP spikes due to satellite loss on a single station. Mission planning ensures the project is flown during periods of good satellite visibility, resulting here in an average PDOP of 1.5

and maximum spike to 2.8.

- Lidar Boresight Prior to acquisition of the project area, a boresight mission was flown over Port Coquitlam, BC in an area with many buildings and other planar objects. The boresight flight consisted of 3 lines in a north-south direction and 3 lines in an east-west direction, with significant overlap between all lines. The boresight data was then calibrated using Riegl's RiProcess software. A quality check was performed using matching tie planes which are calculated automatically and analyzed via a least-squares adjustment. Adjustments to the scanner orientation parameters can then be calculated to minimize residuals between the tie planes. Manual cross section checks were also performed to verify the automatic results. Once deemed properly calibrated, scanner parameters are then carried forward with all subsequent acquisition datasets for the project.

- Once the QA of the collected LiDAR was complete, classification of the LiDAR began. An automated ground classification filter was developed using TerraScan software, and applied to the LiDAR data. After the automated filter was run, a manual QC was conducted to review of all of LiDAR within the area of interest. Special attention was used in both the automation and manual classification to ensure that the ground was classified correctly due to the density of the low vegetation. The LiDAR was classified into: 1 - Unclassified 2 - Ground 7 - Low Point 18 - High Noise Once the review of the classified LiDAR was complete, DTMs and DSMs were created. The DTMs were created using the ground classified LiDAR. The DSMs were created using first and only return LiDAR points. In addition, intensity Images were generated from the LiDAR dataset.

- 2022-05-23 00:00:00 - The NOAA Office for Coastal Management (OCM) downloaded 21 raster DEM files in GeoTiff format from the Washington Lidar Portal. The data were in Washington State Plane South NAD83(HARN), US survey feet coordinates and NAVD88 (Geoid12A) elevations in feet. The bare earth raster files were at a 3 feet grid spacing. No metadata record was provided with the data. This record is populated with information from the Tetra Tech technical report downloaded from the Washington Dept. of Natural Resources Washington Lidar Portal. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. Used an internal script to assign the EPSG codes ( Horizontal EPSG: 2927 and Vertical EPSG: 6360) to the GeoTiff formatted files. 2. Copied the files to https.

**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/67284>

**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](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://chs.coast.noaa.gov/htdata/raster5/elevation/WA\\_Olym\\_For\\_DEM\\_2017\\_9512](https://chs.coast.noaa.gov/htdata/raster5/elevation/WA_Olym_For_DEM_2017_9512)  
<https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=9512/details/9512>

**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.*