

*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:**

2020 OR DOT Lidar DEM: Blue Pool, OR

**1.2. Summary description of the data:**

In December 2019, Quantum Spatial (QSI) was contracted by the State of Oregon's Department of Administrative Services (DAS) on behalf of Oregon State Parks and the Oregon Department of Transportation to collect Light Detection and Ranging (lidar) data and digital imagery in the spring of 2020 for the Blue Pool Lidar & Imagery site in Oregon.

The NOAA Office for Coastal Management received the data from the Oregon Department of Parks and Recreation and processed it to the Data Access Viewer (DAV) and http. In addition to these bare earth Digital Elevation Model (DEM) data, the lidar point data that these DEM data were created from, are also available. These data are available for custom download at the link provided in the URL section of this metadata record. No metadata record was provided for this data set. This record was created by the NOAA Office for Coastal Management (OCM) using information from the data report.

**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:**

2020-06-18 to 2020-06-19

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

W: -122.414411, E: -122.082457, N: 43.803672, S: 43.590079

**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:**

Data were collected and processed by Quantum Spatial, Inc. for the OR DAS, on behalf of the OR DOT. The data were provided to the NOAA Office for Coastal Management (OCM) where the data were processed to make it available for custom download from the Data Access Viewer (DAV) and bulk download from <https://dataaccessviewer.noaa.gov/>.

**Process Steps:**

- 2020-06-19 00:00:00 - Ground Survey Ground control surveys, including monumentation, aerial targets and ground survey points (GSPs) were conducted 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 and orthoimagery products. Base stations were utilized for collection of ground survey points using real time kinematic (RTK), post processed kinematic (PPK), and fast static (FS) survey techniques. Base station locations were selected with consideration for satellite visibility, field crew safety, and optimal location for GSP coverage. QSI utilized nine existing base stations for the Blue Pool, Oregon project. Base stations were set with a 9" MAG spike marked with orange flagging. QSI's professional land surveyor, Evon Silvia (ORPLS#81104) oversaw and certified the establishment of all monuments. QSI utilized static Global Navigation Satellite System (GNSS) data collected at 1 Hz recording frequency for each base station. During post-processing, the static GNSS data were triangulated with nearby Continuously Operating Reference Stations (CORS) using the Online Positioning User Service (OPUS1) for precise positioning. Multiple independent sessions over the same monument were processed to confirm antenna height measurements and to refine position accuracy. Monuments were established according to the national standard for geodetic control networks, as specified in the Federal Geographic Data Committee (FGDC) Geospatial Positioning Accuracy Standards for geodetic networks. This standard provides guidelines for classification of monument quality at the 95% confidence interval as a basis for comparing the quality of one control network to another. For the Blue Pool, Oregon project, the monument coordinates contributed no more than 5.6 cm of positional error to the geolocation of the final ground survey points and lidar, with 95% confidence. Ground Survey Points Ground survey points were collected using real time kinematic (RTK), post-processed kinematic (PPK), and fast-static (FS) survey techniques. For RTK surveys, a roving receiver receives corrections from a nearby base station or Real-Time Network (RTN) via radio or cellular network, enabling rapid collection of points with relative errors less than 1.5 cm horizontal and 2.0 cm vertical. PPK and FS surveys compute these corrections during post-processing to achieve comparable accuracy. RTK and PPK surveys record data while stationary for at least five seconds, calculating the position using at least three one-second epochs. FS surveys record observations for up to fifteen minutes on each GSP in order to support longer baselines. All GSP measurements were made during periods with a Position Dilution of Precision (PDOP) of  $\leq 3.0$  with at least six satellites in

view of the stationary and roving receivers. See for Trimble unit specifications. GSPs were collected in areas where good satellite visibility was achieved on paved roads and other hard surfaces such as gravel or packed dirt roads. GSP measurements were not taken on highly reflective surfaces such as center line stripes or lane markings on roads due to the increased noise seen in the laser returns over these surfaces. GSPs were collected within as many flightlines as possible; however, the distribution of GSPs depended on ground access constraints and monument locations and may not be equitably distributed throughout the study area.

- 2020-06-19 00:00:00 - Airborne Survey The lidar survey was accomplished using a Riegl VQ 1560ii system mounted in a Cessna Caravan. The survey settings and specs were used to yield an average pulse density of greater than or equal to 20 pulses/m<sup>2</sup> over the Blue Pool, Oregon project area. The Riegl laser system can record unlimited range measurements (returns) per pulse, although only up to 15 pulses can be stored due to restraints of the LAS v1.4 format. 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  $\geq 50\%$  ( $\geq 100\%$  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.

- 2020-10-31 00:00:00 - 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. 1.4) format. Convert data to orthometric elevations by applying a geoid 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 (Table 9). 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 GeoTIFF format at a 1.0 meter (3.0 ft) pixel resolution.

- 2021-06-02 00:00:00 - The NOAA Office for Coastal Management (OCM) received 9 digital elevation model (DEM) files in GeoTiff format from the Oregon Parks and Recreation Dept. The bare earth raster files were at a 3 ft grid spacing. The data were in Oregon Lambert Conformal Conic NAD83 (2011), international feet coordinates and NAVD88 (Geoid 12B) elevations in feet. OCM assigned the appropriate EPSG codes (Horiz - 6557, Vert - 8228) and copied the raster files to https for Digital Coast storage and provisioning purposes. No metadata record was provided for this data set. This record was created by the NOAA Office for Coastal Management (OCM) using information from the data report.

**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/64727>

**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/OR\\_Blue\\_Pool\\_DEM\\_2020\\_9308](https://chs.coast.noaa.gov/htdata/raster5/elevation/OR_Blue_Pool_DEM_2020_9308)  
<https://coast.noaa.gov/dataviewer/#/lidar/search/where:ID=9308/details/9308>

**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.*