*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 FEMA Lidar DEM, Malheur, OR

**1.2. Summary description of the data:**
This data set is a high resolution data set of lidar covering the total task order area ( approximately 885 square miles) in southeast Oregon.  The data delivered in this task order is compliant with US. Geological Survey National Geospatial Program Lidar Base Specification Version 1.2. Lidar data is a remotely sensed high resolution elevation data collected by an airborne platform. The lidar sensor uses a combination of laser range finding, GPS positioning, and inertial measurement technologies. The lidar systems collect data point clouds that are used to produce highly detailed Digital Elevation Models (DEMs) of the earth's terrain, man-made structures, and vegetation. The task required the LiDAR data to be collected at a nominal pulse spacing (NPS) of 0.35 meters. The final products include classified LAS, 0.5 meter pixel raster DEMs of the bare-earth surface in ERDAS IMG Format, and Intensity data in TIFF format. Tiled data was delivered in 1500m x 1500m tiles. Each LAS file contains lidar point information, which has been calibrated, controlled, and classified. Additional deliverables include hydrologic breakline data, bridge abutment breaklines, control data, project boundary, and tile index provided as ESRI shapefile, lidar processing and survey reports in PDF format, FGDC metadata files for each data deliverable in .xml format, and LAS swath data. Ground conditions: Water at normal levels; no unusual inundation; no snow; leaf off.

FEMA HQ Malheur, OR QL1 Lidar 0.35m NPS Lidar Data

Acquisition and Processing Production Task

USGS Contract No. G10PC00057

Task Order No. G15PD00642

Woolpert Order No. 75818

Contractor: Woolpert, Inc.

**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:**
2016-03 to 2016-06

**1.5. Actual or planned geographic coverage of the data:**
W: -117.532244, E: -116.562224, N: 43.191709, S: 42.403149

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

**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:

- 2016-03-23 00:00:00 - All lidar data were acquired using a Dual-Head DragonEye ( DE) sensor owned and operated by GDS installed in a Cessna 401. The sensor was mounted in a Leica PAV100 gyro-stabilized mount integrated with a NovAtel SPAN GNSS and LCI-100C IMU. Real time navigation and GNSS/IMU data logging was provided by Leica FlightPro software. Lidar data were logged on the Airborne Hydrography, AB (AHAB) operator console. A calibration flight was conducted at Nampa Airport, ID on 30 March, 2016. Project data were acquired from 23 March 2016 until 09 April, 2016. Some blocks remained snow covered at this time. Once the snow had cleared, calibration flights were conducted at Nampa Airport, ID on 08 and 09 June, 2016, with the final survey data being acquired on 10 June and 15 June, 2016. Field calibration of the DE system is carried out to eliminate systematic errors by calculating corrections for boresight errors, scanner angle errors, remaining IMU angle errors and any necessary internal timing errors. Initial data coverage analysis and quality checks were performed to ensure there were no potential system issues were carried out in the field prior to demobilization of the sensor. Data were initially processed in Leica's Lidar Survey Studio (LSS) using final processed trajectory information. LAS files from LSS were imported to a Terrascan project where spatial algorithms were used to remove gross system noise and a basic ground classification was conducted per flight line for Terra Match use. TMatch was then run on the project, and a comparison to the lidar control points was conducted. This calibrated/controlled LAS dataset was then provided to Woolpert for further processing and deliverable production.
- 2016-03-09 00:00:00 - Woolpert utilized 2 Trimble Navigation R10 Model GNSS dual-frequency GPS receivers and 1 TSC3 data collector for this project. The field crew utilized Real-Time Kinematic (RTK) and GPS Rapid Static methods throughout the ground control data collection process. Using these observations were performed on a total of 244 points. The survey was conducted using a 1-second epoch rate, in a

fixed solution RTK mode, with each observation lasting between 60 to 180 seconds. Each station was occupied twice to insure the necessary horizontal and vertical accuracies were being met for this LiDAR / photogrammetric project.
- 2016-03-23 00:00:00 - Once calibration of the flightline data was completed by GDS the data was then provided to Woolpert. The point cloud underwent a classification process to determine bare-earth points and non-ground points utilizing "first and only" as well as "last of many" lidar returns. This process determined Default (Class 1), Ground (Class 2), Low Noise (Class 7), Water (Class 9), Ignored Ground (Class 10), Bridge Decks (Class 17) and High Noise (Class 18). The bare-earth (Class 2 - Ground) lidar points underwent a manual QA/QC step to verify the quality of the DEM as well as a peer-based QC review. This included a review of the DEM surface to remove artifacts and ensure topographic quality. Classification of water (class 9) and ignored ground (class 10) was completed via the use of the hydrologic breaklines collected for the hydro-flattening phase. The overlap classes were determined by first identifying the overlapping areas and reclassifying the LAS data by offset from a corridor. This allows the returns located on the edge of the swath to be removed from the bare earth coverage in an effort to produce a more uniform data density. The returns determined to be overlap including overlap default, ground, water, and ignored ground are then applied an overlap flag and reclassified to their respective standard classification value. Supervisory QC monitoring of work in progress and completed editing ensured consistency of classification character and adherence to project requirements across the entire project area. The resulting deliverables for this task order consist of classified LAS file in LAS 1.4 format, Raw Swath LAS files in LAS 1.4 format, 0.5 meter pixel size DEM files in ERDAS IMG format, 8-bit Intensity files in GeoTIFF format, Hydrologic and Bridge abutment breakline data in ESRI Geodatabase format. The method used to create the DEM consisted of isolating the ground (class 2) points and introducing 3-d breakline data derived from delineating hydrologic features and bridge breaklines applying USGS v1.2 hydro flattening specification z-values. This combined dataset was then processed into a gridded format for additional QAQC to ensure DEM quality. Following QAQC process completion, a gridded raster file was created on a per tile basis. The task order projection information was applied to the final raster dataset. Prior to delivery, all raster files were visually reviewed to ensure coverage and reviewed using automated processes to ensure proper formatting.
- NOAA/OCM received DEM files in IMG format from DOGAMI. Data were in NAD83( 2011) UTM 11N horizontally and NAVD88 (Geoid12B) vertically. All units were meters. For ingest into the Digital Coast Data Access Viewer and adhere to the Open Data Policy, data were converted to GeoTiff format.

**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/58252

**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=8940
https://noaa-nos-coastal-lidar-pds.s3.us-east-1.amazonaws.com/dem/FEMA_Malheur_2016_8940/inde

**7.3. Data access methods or services offered:**
Data is available online for bulk or 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)*

**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.*