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:

2015 FEMA Lidar: Ashland County, WI

1.2. Summary description of the data:

This task order requires lidar data to be acquired over Ashland County, Wisconsin. The total area of the Ashland AOI is approximately 1,011 square miles. The lidar data will be acquired and processed under the requirements identified in this task order. 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 1.0 meter. Each LAS file contains lidar point information, which has been calibrated, and controlled. Additional deliverables include lidar processing report in PDF format, FGDC project level metadata file in .xml format. Ground conditions: Water at normal levels; no unusual inundation; no snow; leaf off.

TASK NAME: Ashland County Wisconsin Lidar

Lidar Data Acquisition and Processing Production Task

STARR Project No. 400000254

Task Order No. HSFE05-14-J-0037

Woolpert Order No. 74908

CONTRACTOR: Woolpert, Inc.

This data set is comprised of lidar point cloud data, project tile index, project data extent, base station shapefile, flight line trajectories shapefile, planned flight line shapefile, and swath index shapefile

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:
2014-11-01, 2014-11-02, 2015-04-17

1.5. Actual or planned geographic coverage of the data:
W: -90.951599, E: -90.256338, N: 46.881274, S: 45.967043

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):

Process Steps:

- 2014-11-01 00:00:00 - Using two Leica ALS70 (lidar) systems on board a Cessna 404 and Cessna 310 aircraft, high density data, at a nominal pulse spacing (NPS) of 1.0 meter, were collected for this task order (approximately 1, square miles). AGL = 7800 feet - Aircraft Speed = 150 Knots, Field of View (Full) = 40 degrees, Pulse Rate = 230 kHz, Scan Rate = 34.4 Hz, with an average side lap of 25%. Multiple returns were recorded for each laser pulse along with an intensity value for each return. Three (3) missions were flown between November 1, 2014 and April 17, 2015. Two (2) Global Navigation Satellite System (GNSS) Base Stations were used in support of the lidar data acquisition. Specific information regarding latitude, longitude, and ellipsoid height to the L1 phase center is included in the lidar processing report. The geoid used to reduce satellite derived elevations to orthometric heights was GEOID12A. Data for the task order is referenced to the UTM Zone 15N, North American Datum of 1983 (2011) meters, and NAVD88, in US Survey Feet. Once the data acquisition and GPS processing phases are complete, the lidar data was processed immediately to verify the coverage had no voids. The GPS and IMU data was post processed using differential and Kalman filter algorithms to derive a best estimate of trajectory. The quality of the solution was verified to be consistent with the accuracy requirements of the project. The SBET was used to reduce the lidar slant range measurements to a raw reflective surface for each flight line. The ALS70 calibration and system performance is verified on a periodic basis using Woolpert's calibration range. The calibration range consists of a large building and runway. The edges of the building and control points along the runway have been located using conventional survey methods. Inertial measurement unit (IMU) misalignment angles and horizontal accuracy are calculated by comparing the position of the building edges between opposing flight lines. The scanner scale factor and vertical accuracy is calculated through comparison of lidar data against control points along the runway. Field calibration is performed on all flight lines to refine the IMU misalignment angles. IMU misalignment angles are calculated from the relative displacement of features within the overlap region of adjacent (and opposing) flight

lines. The raw lidar data is reduced using the refined misalignment angles.
- 2015-04-16 00:00:00 - The individual flight lines were inspected to ensure the systematic and residual errors have been identified and removed. Then, the flight lines were compared to adjacent flight lines for any mismatches to obtain a homogenous coverage throughout the project area. The surveyed ground control points provided by Compass Data are used to make vertical adjustments to the data set and to perform the accuracy checks and statistical analysis of the lidar dataset. This LAS 1.2 dataset contains return numbers beyond a 5th return (6th, 7th, 8th, etc). A fully compliant LAS 1.2 file only supports the encoding of up to and including 5 returns in the LAS header information. Any subsequent returns (6th, 7th, 8th, etc) cannot be encoded in the header and most lidar processing software will generate a warning stating "Number of points by return not equal point record count". The scan angle rank in point data record is the angle at which the laser point was output from the laser system includes roll of the aircraft added by roll compensation. Due to the tiled nature of the LAS data, some LAS files may exhibit a lower scan angle rank than what the overall project was acquired at and/or contain only negative or positive scan angle ranks. This is due to the fact that when swath data is imported to a tiled format that tile assumes whatever scan angle rank values that fall within that tile boundary. Scale Factor- The vertical scale factor of this lidar dataset is 0. 01. The LAS generating software defaults the vertical scale factor to 0.001. The Z-value of a lidar point at 50.53 ft is stored by the software as 50.530 ft. This is what is known as “fluff”. There is nothing wrong with the data only that most lidar processing softwares are able to detect this “fluff” and display a warning. Supervisory QC monitoring of work ensured consistency of calibration and adjustments in adherence to project requirements across the entire project area. The resulting deliverables for this task order consist of unclassified LAS 1.2 files provided in a tiled format, fgdc metadata, and a post-flight aerial acquisition and calibration report. As part of this report, additional shape files were delivered and include flight line trajectories, planned flight lines, swath index, base station locations, tile index, and buffered AOI.
- 2014-11-01 00:00:00 - Tile Size: 1,500m x 1,500m. The tile file name was derived from the southwest corner of each tile.
- NOAA OCM retrieved 1,276 las files from the WisconsinView wbestie (https://wisconsinview.org/). The files had intensity values, were in UTM 15N projection referenced to NAD83(2011) with linear units in meters, and orthometric heights having used geoid 12A with vertical units in US Survey feet. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. The las files were converted from las to laz format using LASTools laszip. 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 orthometric (NAVD88) elevations to ellipsoid elevations using the Geoid 12A model, to convert from UTM 15N (NAD83 2011) coordinates in meters to geographic coordinates, to convert vertical units from feet to meters, 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
- 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/58871

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=9017
https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/9017/index.html

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)

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.