

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:

2008 MN DNR Lidar: Southeast Minnesota

1.2. Summary description of the data:

This high accuracy, bare-earth processed lidar data includes one-meter resolution DEMs, two-foot contours, edge-of-water breaklines and LAS points for nine counties in Southeast Minnesota: Dodge, Fillmore, Freeborn, Houston, Mower, Olmsted, Steele, Wabasha, and Winona. The project was coordinated by the Minnesota Department of Natural Resources and several partners including the U.S. Geological Survey, the Minnesota Department of Transportation, and staff from the affected counties.

The data was collected by AeroMetric, Inc. (now Quantum Spatial) in November 2008 and was delivered in tiles that covered an area 1/16th of a 1:24,000-scale USGS quadrangle (approximately 3.25 square miles). DNR conducted the QA/QC starting April 2009. As part of the processing, one- and three-meter county mosaic DEMs were created and used for visual quality assessment.

The original metadata record was created at the Minnesota Geospatial Information Office by combining information supplied by AeroMetric and the DNR.

This metadata record reflects the Southeast Minnesota data that are available from the NOAA Digital Coast Data Access Viewer (DAV).

The NOAA Office for Coastal Management (OCM) downloaded 1545 laz point data files from this USGS site:

https://rockyweb.usgs.gov/vdelivery/Datasets/Staged/Elevation/LPC/Projects/MN_SEMN_2008/laz/

The data were processed to the NOAA Digital Coast Data Access Viewer (DAV) to make the data available for custom downloads and to AWS S3 for bulk downloads.

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:

2011-11-18 to 2011-11-24

1.5. Actual or planned geographic coverage of the data:

W: -93.437889, E: -91.19341, N: 44.484934, S: 43.496441

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 AeroMetric, Inc. and made available on the USGS ftp site. The data were downloaded from the USGS ftp site by the NOAA Office for Coastal Management (OCM) where the data were processed to make it available for custom download from the NOAA Digital Coast Data Access Viewer (DAV) and for bulk download from AWS S3.

Process Steps:

- The lidar data was captured using fixed wing aircraft equipped with lidar systems. The lidar system included a differential GPS unit and inertial measurement system to provide superior accuracy. Both AeroMetric, Inc. and Surdex Corporation acquired lidar data over the project area. Surdex's data was post-processed to a raw point cloud by Surdex and then delivered to AeroMetric to be merged into one raw point cloud dataset. Acquisition parameters: 1. Scanners - Optech ALTM Gemini (AeroMetric) and Leica ALS50-2 (Surdex) 2. Flight Height - 2400 meters above mean terrain 3. Swath Width - 32 degrees 4. Sidelap - 60% 5. Nominal Post Spacing - 1.0 meter GPS and IMU processing parameters: 1. Processing Programs - AeroMetric= Applanix - POSGPS and POSProc; Surdex= GravNav GNSS and Leica IPAS 2. Maximum baseline length - Not greater than 30km. 3. Number of base stations during lidar collection - A minimum of 2 MnDOT CORS stations were occupied during any of the lifts to acquire the lidar data. The following were the occupied base stations: BLUE, CLDN, DDGC, ELKT, EYTA, LCHI, LCRS, NALB, PRSP, REDW, RSHF, STWV, TWNL, WBSH, WINO, and WSCA. 4. GPS and IMU processing monitored for consistency and smoothness - Yes. Point Cloud Processing: 1. Program - AeroMetric= Optech Dashmap; Surdex= Leica ALS Post Processor 2. Horizontal Datum - NAD83(NSRS2007) 3. Horizontal Coordinates - UTM, Zone 15, in meters 4. Vertical Datum - NAVD88 5. Geoid Model used to reduce satellite derived elevations to orthometric heights - NGS Geoid03.
- Lidar Processing: 1. Processing Programs and versions - TerraSolid TerraScan (version 009.010), TerraModeler (version 009.002) and TerraMatch (version 009.003) and Intergraph MicroStation (version.08.01.02.15). 2. Point Cloud data was imported to TerraScan in a Microstation V8 (V) CAD environment. 3. The data is

projected to the horizontal project coordinate system of UTM - Zone 15 in meters. 4. Analyzed the data for overall completeness and consistency. This was to ensure that there are no voids in the data collection. 5. Inspected for calibration errors in the dataset using the TerraMatch software. This was accomplished by sampling the data collected across all flight lines and classifying the individual lines to ground. The software used the ground-classified lines to compute corrections (Heading, Pitch, Roll, and Scale). 6. Orientation corrections (i.e., calibration corrections) were then applied to the entire dataset. 7. Automatic ground classification was performed using algorithms with customized parameters to best fit the project area. Several areas of varying relief and planimetric features were inspected to verify the final ground surface. 8. AeroMetric provided Quality Assurance and Quality Control (QA/QC) data for this project. AeroMetric captured 127 QA/QC points in multiple land cover categories that were used to test the accuracy of the lidar ground surface. TerraScan's Output Control Report (OCR) was used to compare the QA/QC data to the lidar data. This routine searches the lidar dataset by X and Y coordinate, finds the closest lidar point and compares the vertical (Z) values to the known data collected in the field. Based on the QA/QC data, a bias adjustment was determined, and the results were applied to the lidar data. A final OCR was performed with a resulting RMSE of 0.109 meters. 9. Once the automatic processing and the testing of lidar was complete, AeroMetric meticulously reviewed the generated bare-earth surface data to insure that proper classification was achieved as part of a Quality Control process. 10. Final deliverables were generated and cut out according to the MnDNR tiling and naming scheme (1/16 USGS 7.5 minute quadrangles).

- Geodatabase Creation: 1. The final geodatabase for each of the 1544 tiles (1/16 USGS 7.5 minute quadrangles) was created using Esri ArcInfo software. 2. Each MicroStation contour file was converted into shapefile format. The contours were created using only the keypoint point features from the LAS data files. 3. The shapefile was inserted into the geodatabase as a feature class named 'Contours' inside the defined feature dataset 'Contour_Data'. 4. Topology checks were done to look for dangles, crossing and intersecting contours, as well as other anomalies. All errors were fixed and a second topology check was done to verify an error free dataset. 5. The contour features have two attributes, 'Contour_Type', which identifies the contour type (index, intermediate, depression, and depression_index) and 'ELEVATION' which indicates the contour elevation in U.S. feet. 6. The BareEarth data within the LAS point files was imported into a feature class named 'Bare_Earth_Points' inside the defined feature dataset 'Terrain_Data'. The points were created as multipoint features which group the LAS points into blocks of data in order to reduce the number of records in the geodatabase. 7. The breaklines were imported as polylines into a feature class named 'Hydro_Breaklines' inside the defined feature dataset 'Terrain_Data'. 8. The 1.0 meter DEM data was imported as raster points into the defined feature dataset 'DEM01'. Each point in the DEM file became a pixel with an assigned elevation in meters.

- Final Deliverables: 1. One paper copy of the Lidar Accuracy Assessment Report. 2.

One firewire hard drive containing the following data: a. Point Cloud Data in LAS 1.1 format for each of the 1544 tiles (1/16 USGS 7.5 minute quadrangles). x=Easting (0.01 resolution), y=Northing (0.01 resolution), z=Elevation (0.01 resolution), i=Intensity (0.1 resolution) LAS data classified using the following codes: 0, 2, 5, 6, 8, 9, 10, 12 according to ASPRS LAS format classification table. Units in meters. b. Geodatabase files for each of the 1544 tiles (1/16 USGS 7.5 minute quadrangles) including the following feature classes: i. Bare_Earth_Points - LAS Point Cloud Data ii. Hydro_Breaklines - Water/shoreline breakline data iii. Hydro_Breaklines - Enhanced breakline data included, but was not limited to, retaining walls, road edges, ridge lines, dams for Project Area B only. iv. DEM01 - Bare-Earth DEM raster at 1.0 meter resolution per tile. Vertical units in meters at 0.01 meter resolution. v. Contours - Vector contours at 2 foot intervals represented in U.S. feet vertically and meters horizontally. 3. FGDC Compliant metadata for the Point Cloud Data LAS delivery. 4. FGDC Compliant metadata for the Geodatabase delivery. MnDNR reviewed the deliverables for content and accuracy. Any needed corrections to the content of the dataset were addressed and corrected by AeroMetric and redelivered.

MnDNR created the 3-meter DEM using the following method: - Step 1: Mosaic all the tiles that make up the county into a file geodatabase. - Step 2: The 1-meter grid is then "filled" to fill in any NO DATA cells that have data around them. This is common when grid tiles are merged. The command that was used is the focalmean tool within the con tool in the Spatial Analyst | Map Algebra tool. The equation used is: con(isnull(dem01),focalmean dem01,rectangle,3,3,data),dem01). The DEM01 grid is then deleted and replaced with the output from this step. - Step 3: The filled raster is then reduced to 3-meter resolution using the Spatial Analyst, Aggregate Tool. A 3x3 window of 1-meter cells are combined into one 3x3 meter cell and assigned a value based on the mean of the 9 cells.

- 2022-12-14 00:00:00 - The NOAA Office for Coastal Management (OCM) downloaded 1545 laz point data files from this USGS site: https://rockyweb.usgs.gov/vdelivery/Datasets/Staged/Elevation/LPC/Projects/MN_SEMN_2008/laz/ The data were in UTM Zone 15N NAD83 (NSRS2007), meters coordinates and NAVD88 (Geoid03) elevations in meters. The data were classified as: 0 - Never Classified, 2 - Ground, 5 - Vegetation, 6 - Buildings, 8 - Model Key Point, 9 - Water, 10 - Bridge Decks, 12 - Overlap. OCM processed all classifications of points to the Digital Coast Data Access Viewer (DAV). Classes available on the DAV are: 0,2,5,6,8,9,10,12. OCM performed the following processing on the data for Digital Coast storage and provisioning purposes: 1. Internal OCM scripts were run to check the number of points by classification and by flight ID and the gps, elevation, and intensity ranges. 2. Internal OCM scripts were run on the laz files to: a. Convert from orthometric (NAVD88) elevations to NAD83 (2011) ellipsoid elevations using the Geoid03 model b. Convert the laz files from UTM Zone 15N NAD83 (NSRS2007) meters coordinates to geographic coordinates c. Assign the geokeys, sort the data by gps time and zip the data to database.

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/68818>

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=9684/details/9684>
<https://noaa-nos-coastal-lidar-pds.s3.amazonaws.com/laz/geoid18/9684/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.