Metadata for the

MnModel Phase 4

DTM10CONDPR

Developed by

Minnesota Department of Transportation (MnDOT)

These metadata were created using the [Minnesota Geographic Metadata Guidelines](#) .

Section 1   Identification Information

Originator   Minnesota Department of Transportation (MnDOT)

Title   DTM10CONDPR (2017)

Abstract   DTM10COND was generated from existing statewide LiDAR elevation data, and processed to remove man-made features such as roads and ditches to the greatest extent possible.   Bathymetric data were used to replace level lake planes for large lakes with existing bathymetric survey data. Topographic data from 1899, digitized by MGS were used to replace a portion of the Mesabi Iron Range, restoring the pit mines to a more natural surface. DTM10CONDPR is a pit-removed 32 bit floating point version of DTM10COND, that was processed with the TauDEM

(**T**errain **A**nalysis **U**sing **D**igital **E**levation **M**odels) Pit Removal tool to fill-in all sinks so that statewide surface hydrology calculations could be performed using other TauDEM tools. TauDEM is a collection of surface hydrology processing tools available from Utah State University, created by David Tarboton, version 5 of the software can be accessed [here](#).

Purpose	To provide a 32bit floating point higher spatial resolution elevation data set suitable for surface hydrology analysis that is substantially more accurate in the vertical plane for MnModel, derived from modern LiDAR source datasets. Also, to minimize the negative effects man-made features have on MnModel, and provide bathymetric replacement elevation data for large lakes within the state's border.
Time Period of Content Date	2011 – 2017.
Currentness Reference	2011 - 2017
Progress	Complete for entire state.
Maintenance and Update Frequency	Unknown
Spatial Extent of Data	Statewide plus 15-mile buffer zone.
Bounding Coordinates (UTM)	Top 5496563.77026 Left 165634.221951 Right 785804.221951 Bottom 4792163.77026
Place Keywords	Minnesota
Theme Keywords	MnModel, LiDAR, TauDEM.
Theme Keyword Thesaurus	none
Access Constraints	None
Use Constraints	None

Contact Person Information	OES GIS Support Minnesota Department of Transportation (MnDOT) MS 620 Transportation Building, 395 John Ireland Blvd. St. Paul, MN 55155 E-mail: EnvironmentalDataManager.DOT@state.mn.us
Browse Graphic File Name	none available
Browse Graphic File Description	
Associated Data Sets	Minnesota LiDAR, USGS National Elevation Data DEM, Lake Bathymetric Contours (MN DNR), One-hundred years of mining: alterations to the physical and cultural geography of the western half of the Mesabi Iron Range, northern Minnesota (MGS).

Section 2   Data Quality Information - - - - - - - <u>**Go back to top**</u>

Attribute Accuracy	N/A
Logical Consistency	All data sets were processed using as close to the same methods as possible.
Completeness	LiDAR source data were available for the entire state boundary extent. For the 15-mile buffer, LiDAR data were used where available, but if not available, older USGS NED 10 meter DEM data were used to fill in.
Horizontal Positional Accuracy	+/- 33 Feet, or approximately 1 raster cell
Vertical Positional Accuracy	Surface elevation vertical accuracy is +/-2FT.
Lineage	All source data were down-sampled to 10 meters from original 3-meter resolution county LiDAR data. Additionally, all elevation values were converted from meters to feet, and all county datasets were mosaicked into a seamless statewide LiDAR dataset. At the county boundaries, small strips of "NoData" cells were replaced with a 3x3 focal mean value. Bathymetric data were also used to replace level lake planes for large lakes with existing

bathymetric survey data. Topographic data from 1899, digitized by MGS were used to replace a portion of the Mesabi Iron Range, restoring the pit mines to a more natural surface. Additionally, man-made features were removed to the greatest extent possible by buffering existing features such as roads, ditches, gravel pits, railroads, airports, then merging together and dissolving the buffers, and using this composite buffer to clip the features out of the modern statewide LiDAR-based DTM. Then a set of custom processing tools were developed in Python to search for "NoData" cells and if found, replace these cells with a dynamic cut-fill process that referenced the existing terrain using multiple, iterative passes to fill in the clipped areas one row of cells per pass starting along the outermost edge. The main methodology behind this approach was to raise ditches and lower road crowns based on calculating a local mean elevation to approximate the original terrain surface as close as possible. Also, the secondary goal was to reduce the slopes within the replacement zones to less than 15 degrees since MnModel's terrain variables have sensitivity to slopes of 15 degrees or greater. DTM10CONDPR was generated by simply running the TauDEM Pit Remove tool on DTM10COND using the default settings.

Source Scale Denominator   1:24,000

Section 3 Spatial Data Organization Information - - - - - - [Go back to top](#)

Native Data Set Environment   ArcMap 10.3

Geographic Reference for Tabular Data   none

Spatial Object Type   Raster

Vendor Specific Object Types   N/A

Tiling Scheme   State

Section 4	**Spatial Reference Information - - - - - - [Go back to top](#)**
Horizontal Coordinate Scheme	UTM
Ellipsoid	GRS80
Horizontal Datum	NAD83
Horizontal Units	Meters
Distance Resolution	10
Cell Width	10 METER
Cell Height	10 METER
UTM Zone Number	15E

Section 5	**Entity and Attribute Information - - - - - - [Go back to top](#)**
Entity and Attribute Overview	**[Detailed Attribute Metadata Table](#)** N/A
Entity and Attribute Detailed Citation	

Section 6	**Distribution Information - - - - - - [Go back to top](#)**
Publisher	Minnesota Department of Transportation (MnDOT)
Publication Date	2017

Contact Person Information	OES GIS Support Minnesota Department of Transportation (MnDOT) MS 620 Transportation Building, 395 John Ireland Blvd. St. Paul, MN 55155 E-mail: EnvironmentalDataManager.DOT@state.mn.us
Distributor's Data Set Identifier	DTM10CONDPR
Distribution Liability	to be determined by MnDOT
Transfer Format Name	ArcMap
Transfer Format Version Number	10.3
Transfer Size	14.1GB
Ordering Instructions	E-mail: EnvironmentalDataManager.DOT@state.mn.us
Online Linkage	none available

Section 7 **Metadata Reference Information - - - - - - - Go back to top**

Metadata Date	9/18/17
Contact Person Information	OES GIS Support Minnesota Department of Transportation (MnDOT) MS 620 Transportation Building, 395 John Ireland Blvd. St. Paul, MN 55155 E-mail: EnvironmentalDataManager.DOT@state.mn.us
Metadata Standard Name	Minnesota Geographic Metadata Guidelines
Metadata Standard Version	1.1

Metadata
Standard
Online
Linkage

This page last updated 04/17/2019.

Detailed Attribute Metadata Table

Variable Name	Type	Description	Valid Values
DTM10CONDPR	32 bit float.	Pit-removed version of DTM10COND.	0 to 2293 NoData=Null