

MnModel Surficial Geology Landscape Model, Minnesota

This page last updated: 08/28/2019
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Section 1: Overview

Originator: Minnesota Department of Transportation

Title: MnModel Surficial Geology Landscape Model, Minnesota

Abstract: The MnModel Surficial Geology Landscape Model (LANDMOD) is the product of the MnModel Phase 4 project's mosaicking of DNR-, MGS-, and MnDOT-derived regional and local surficial geology and geomorphic models.

No single data source covered the entire state at a scale (<1:100,000) meaningful to the MnModel project. Different models have been edge-matched where needed. Each of the mosaicked portions were categorized into the following list of data fields: Region, Region Name, Subregion, Subregion Name, Landscape, Landform, and Mantle. Some reinterpretations at and near boundaries with adjoining model segments were made to provide for a more logical transition at the mosaicked seams.

Purpose: The purpose of this collection of data is to provide the source data used for predicting the potential for finding unknown archaeological sites early in the

transportation construction planning process, so that impacts on these sites can be avoided.

This dataset is best suited for general reference only. It is not suitable for precise land measurements or ground surveys. Data are incomplete, as large areas of the state are unmapped.

For more information please visit MnModel's website: <https://www.dot.state.mn.us/mnmodel/index.html>

Time Period of Content Date:

Currentness Reference: 1997-2017

Progress: Different scales of source models/maps were mosaicked because of incomplete coverage at any meaningful scale.

Maintenance and Update Frequency: Further mapping at more meaningful scales is required to help improve the efficiency of the modeling in future years. 1:24,000 scale mapping is suggested as a minimum scale for all future mapping in areas not already mapped at that scale or larger.

Spatial Extent of Data: Minnesota

Bounding Coordinates: -97.508970
-89.028990
49.652543
43.192405

Place Keywords: Minnesota

Theme Keywords: geoscientificInformation, Surficial Geology, Geomorphology, Landscape Model, Landform-Sediment Assemblages, LfSA, Mn/Model4, MnModel

Theme Keyword Thesaurus: ISO 19115 Topic Category

Access Constraints: None

Use Constraints: This dataset is best suited for general reference only. It is not suitable for precise land measurements or ground surveys. Data are incomplete, as large areas of the state are unmapped.

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Browse Graphic: [Click to view a data sample.](#)

Associated Data Sets: Landform-Sediment Assemblages, Surficial Geology (1:500k; DNR), Surficial Geology (1:200k, 1:100k, 1:24k; MSG). For more information please visit MnModel's website: <https://www.dot.state.mn.us/mnmodel/index.html>

Section 2: Data Quality

Attribute Accuracy: Field verified.

Logical Consistency: Data have been topologically structured and verified.

Completeness: Mostly a statewide boundary excluding islands in Lake Superior.

Horizontal Positional Accuracy: Accuracy of this data set varies from +/- 50 meters (1:100,000 scale) to 2.5 meters (1:5,000 scale). The dataset is not intended for legal land survey use, and is best suited for general reference.

Vertical Positional Accuracy: Not Applicable

Lineage: These data were developed for LfSA (Landform-Sediment Assemblage) mapping as landscape or surficial geology units and were identified from NAPP aerial photos (1:40,000 scale), USDA historical aerial photos (1:20,000 scale), 10-meter resolution USGS DEM, 1-meter resolution LiDAR DEM (where available), county soil surveys, and gSSURGO soil models mapped onto various quad maps or digital files.

Prior to 2001, maps were digitized in AutoCAD, converted to PC ARC/INFO coverages in ArcCAD, and attributes were attached. Since approximately 2001, maps have been

created by heads-up digitizing in ArcMap. Prior to 2001, river valley coverages were mapped for groups of quad sheets, but not whole valleys. These were joined to create whole valley coverages, which were then clipped by counties for distribution. Edge-matching was performed at a later step, and updated attributes were attached. PC ARC/INFO coverages were converted to ARC/INFO v. 7.0.3 coverages.

The Anoka Sand Plain and Mississippi River Valley from St. Paul to the Iowa border were mapped at approximately 1:5,000 scale by using high resolution LiDAR dating to 2008-2011.

For the remainder of the state, multiple source data sets from the Department of Natural Resources (DNR) and Minnesota Geological Survey (MGS) were reviewed in detail to determine a means to facilitate covering the entire state with the most detailed geomorphic landforms as possible. The only statewide data coverage was at a 1:100,000 scale. More detailed scaled maps were used to replace the DNR 100K coverage wherever possible. The data sources along with their names, scales (e.g., MGS100KANoka), and year published are provided as separate fields in the GIS tables, as well as in Section 3 below.

Many of these data sources were surface geology maps and not specifically geomorphic in nature. That said, many of these surface geology maps did include geomorphic landforms as part of their mapping process. The upland data sources often conflicted with respect to glacial geology and phases, and it was up to the MnDOT team to make a best judgement case in favor of one data source over the other where the two data sources edge-matched and beyond. Our revision and reclassification of the original data sources did not include reshaping or redrawing any of geospatial data (i.e., lines and polygons). On rare occasion, polygons of like tabular values on either side of an edge-matched seam were joined to help reduce both editing time and the appearances of straight line edges.

Several data sources were apparently mapped at a finer scale than what was eventually published; or, the mappers took more time to capture more geomorphic/geology detail at their current working and published scale. We tried to capture this extra detail in a field labeled "Relative Mapping Detail."

Lastly, our levels of confidence (1 = Low Confidence to 5 = High Confidence) vary across the mosaicked statewide landscape model. These levels of confidence were determined by assigning a point system to each of the following factors: published map scale of source data, relative mapping detail of source data for its respective

published scale, available soils data used to help produce the original source data, and metadata quality of the source data.

Source scale varies from 1:100,000 to 1:5,000, depending on the source scale for any given area.

For more information please visit MnModel's website: <https://www.dot.state.mn.us/mnmodel/index.html>

Section 3: Spatial Data Organization (not used in this metadata)

Section 4: Coordinate System

Horizontal Coordinate Scheme: Universal Transverse Mercator

UTM Zone Number: 15

Horizontal Datum: NAD83

Horizontal Units: meters

Vertical Datum: not applicable

Vertical Units:

Depth Datum: not applicable

Depth Units:

Section 5: Attributes

Overview: Confidence levels have been built into the GIS database, scoring from 1 – Low to No Confidence up to 5 = High Confidence. High Confidence and High to Moderate Confidence Areas usually have ground truth data collected by the original mapping projects mentioned above in Section 1’s Associated Data Sets subsection.

See attached key code table for LANDMOD detailed attributes [Surficial Geology Landscape Code Key List \(PDF\)](#)

Detailed Citation:

Table Detail:

Field Name	Definition
Key Codes	ftp://ftp.gisdata.mn.gov/pub/gdrs/data/pub/us_mn_state_dot/geos_surf_geol/metadata/LANDMOD_LookupTable.pdf

Section 6: Distribution

Publisher: Minnesota Department of Transportation

Publication Date: 09/03/2019

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Distributor's Data Set Identifier: Mn/Model4 Statewide Landscape (Surficial Geology) Model (LANDMOD)

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at <http://www.dot.state.mn.us/information/disclaimer.html>

Ordering Instructions: Please visit the download page for this dataset on the Minnesota Geospatial Commons website using the web link below (Online Linkage).

The following citation is suggested for reference: Minnesota Department of Transportation. Mn/Model4: Surficial Geology Landscape Model. Saint Paul, MN.: Cultural Resources Unit, Office of Environmental Stewardship, 2018.

Online Linkage: [I AGREE](#) to the notice in "Distribution Liability" above. Clicking to agree will either begin the download process, link to a service, or provide more instructions. See "Ordering Instructions" above for details.

Section 7: Metadata Reference

Metadata Date: 08/28/2019

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Metadata Standard Name: Minnesota Geographic Metadata Guidelines

Metadata Standard Version: 1.2

Metadata Standard Online Linkage:

<https://www.mngeo.state.mn.us/committee/standards/mgmg/metadata.htm>

This page last updated: 08/28/2019

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