MnModel From Everywhere To Everywhere, Minnesota

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Section 1: Overview

Originator: Minnesota Department of Transportation

Title: MnModel From Everywhere To Everywhere, Minnesota

Abstract: The From Everywhere To Everywhere (FETE_RGB) is a historical pedestrian transportation least-cost path model for Minnesota that does not require knowledge of origins and destinations for travel. The model is a map of the most likely locations for high traffic pedestrian corridors determined by overlaying a historical vegetation resistance model with a conditioned (pit-removed) LiDAR-based digital terrain reconstruction. This dataset was developed for use in Mn/Model4 archaeological predictive model.

Purpose: The purpose of this 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.

Digital terrain model (DTM) data used to develop the FETE model were from 2017 and had been conditioned to remove infrastructure and other modern features as

well as pits; path resistance values were derived from historical vegetation types as mapped by Marschner from the Public Land Survey records (1848-1907).

Related datasets include the presettlement vegetation data used available here: https://gisdata.mn.gov/dataset/biota-marschner-presettle-veg and the Mn/Model4 DTM10CONDPR grid available here: https://gisdata.mn.gov/dataset/elev-dtm-10m-condpr

White applied 'From Everywhere To Everywhere' (FETE) model (White and Barber 2012) to these data to generate the resulting surface indicating the intensity of pedestrian traffic that may have existed in any given cell. This surface is essentially a map of potential pedestrian networks based on terrain, hydrography, and historic vegetation. In the FETE_RGB version, the networks are visualized so that the cells carrying the most traffic red, those carrying intermediate levels of potential traffic are green, and those estimated to have the lowest levels of potential pedestrian traffic are yellow. For more information on FETE see: White, Devin A. and Sarah B. Barber 2012. Geospatial modeling of pedestrian transportation networks: a case study from precolumbian Oaxaca, Mexico. Journal of Archaeological Science 39: 2684-2696.

This dataset is best suited for general reference only. It is not suitable for precise land measurements or ground surveys.

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

Time Period of Content Date:

Currentness Reference: Currentness: 1848-1907 and 2017. Digital terrain data derived from 2017 LiDAR; resistance values were derived from vegetation types mapped by Marschner from the Public Land Survey records (1848-1907).

Progress: Complete

Maintenance and Update Frequency: None Planned

Spatial Extent of Data: Minnesota with 15 mile buffer

Bounding Coordinates:-97.374
-89.259

49.463
43.310

Place Keywords: Minnesota

Theme Keywords: Society, Digital Terrain Model, Vegetation, Least-Cost Path, Pedestrian Traffic, Archaeology, 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.

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Browse Graphic: Click to view a data sample.
RGB layer view of traffic intensity (use) classes.

Associated Data Sets: Digital Terrain Model (Pits Removed), Presettlement Vegetation (Marschner), MnModel. For more information please visit MnModel's website: https://www.dot.state.mn.us/mnmodel/index.html

Section 2: Data Quality

Attribute Accuracy:

Logical Consistency: All data were processed using as close to the same methods as possible.

Completeness: Complete

Horizontal Positional Accuracy: Source scale denominators: DTM and NWI: 1:24k; Marschner: 1:500k. The dataset is not intended for legal land survey use, and is best suited for general reference.

Lineage: MnDOT provided Devin White, Sandia National Laboratires, with three dataset: 1) a 30m resolution digital terrain model (DTM) in which infrastructure (roads, mines, etc.) had been removed using TauDEM tools; 2) the digital Marschner presettlement vegetation map to which resistance coefficients were assigned to vegetation classes; and 3) water bodies from the National Wetlands Inventory (NWI). Resistance coefficients were determined by a review of the literature. Vegetation classes and their coefficients are listed in the attribute section below.

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:

Cell Width: 10
Cell Height: 10

Section 5: Attributes

Overview: From Everywhere To Everywhere

Detailed Citation: Least-cost path estimates based upon digital terrain model (pits removed) proximity to travel corridors and presettlement vegetation resistance to pedestrian travel.

Table Detail:
Resistance coefficients were determined by a review of the literature. Vegetation classes and their coefficients used were as follows:

Field Name	Definition
Aspen-Birch	1.5
Aspen-Oak Land	1.5
Big Woods	1.5
Brush Prairie	1.2
Conifer Bogs and Swamps	1.8
Jack Pine Barrens and Openings	1.2
Mixed Hardwood and Pine	1.5
Oak Openings and Barrens	1.2
Open Muskeg	1.8
Pine Flats	1.5
Prairie	1.2
River-Bottom Forest	1.5
Water	1.7
Wet Prairies, Marshes, and Sloughs	1.8
White and Norway Pine	1.5
White Pine	1.5

Table Detail:
Pedestrian traffic least-cost path

Field Name	Valid Values	Definition
High Traffic Intensity	-	RED
Intermediate Traffic Intensity	-	GREEN
Low Traffic Intensity	-	YELLOW

Section 6: Distribution

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Distributor's Data Set Identifier: Mn/Model4 From Everywhere To Everywhere
(FETE_RGB)

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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: From Everywhere To
Everywhere. 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: 09/03/2019

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Metadata Standard Name: Minnesota Geographic Metadata Guidelines

Metadata Standard Version: 1.2

Metadata Standard Online Linkage:

http://www.mngeo.state.mn.us/committee/standards/mgmg/metadata.htm

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