

USGS National Elevation Dataset (NED)

The U.S. Geological Survey (USGS) National Elevation Dataset (NED) has been developed by merging the highest resolution, best quality elevation data available across the United States into a seamless raster format. NED is the result of the maturation of the USGS effort to provide 1:24,000 scale Digital Elevation Model (DEM) data for the conterminous U.S. and 1:63,360 scale DEM data for Alaska. NED data for Nebraska are now being distributed by the University of Nebraska-Lincoln (UNL) Conservation and Survey Division (CSD) <http://csd.unl.edu/csd.html> with support from the UNL Center for Advanced Land Management Information Technologies (CALMIT) <http://www.calmit.unl.edu/calmit.html> and the Nebraska Research Initiative on Geospatial Decision Support Systems <http://spatial-info.unl.edu/>.

For a good primer on digital elevation models, see http://feature.geography.wisc.edu/sco/maps/m_dem.html

Background

The National Elevation Dataset (NED) is a new raster product assembled by the U.S. Geological Survey. NED is designed to provide National elevation data in a seamless form with a consistent datum, elevation unit, and projection. Data corrections were made in the NED assembly process to minimize artifacts, perform edge matching, and fill sliver areas of missing data. NED has a resolution of one arc-second (approximately 30 meters) for the conterminous United States. For details on NED, see <http://edcnts12.cr.usgs.gov/ned/default.htm>

NED data were derived from a variety of sources having differing elevation units, horizontal datums, and map projections. In the NED assembly process the elevation values were converted to decimal meters as a consistent unit of measure, NAD83 was consistently used as the horizontal datum, and all the data were recast in a geographic projection. Older DEM's produced by methods that are now obsolete have been filtered during the NED assembly process to minimize artifacts that are commonly found in data produced by these methods. Artifact removal greatly improves the quality of the slope, shaded_relief, and synthetic drainage information that can be derived from the elevation data. NED processing also included steps to adjust values where adjacent DEM's did not match well, and to fill sliver areas of missing data between DEM's. These processing steps ensure that NED has no void areas and artificial discontinuities have been minimized.

As higher-resolution or higher-quality data become available, the NED will be periodically updated to incorporate best-available coverage. As USGS's 7.5-minute and 15-minute digital elevation products near completion for the conterminous United States and Alaska respectively, NED data will soon be derived from these sources at a minimum. For the small areas that are not yet covered, the lower resolution 30-minute and 1-degree USGS DEM products were interpolated to obtain values used in NED. Original elevation files are currently available from the USGS at <http://edcwww.cr.usgs.gov/doc/edchome/ndcdb/ndcdb.html>. In cases where 7.5-minute DEM's have a ten meter resolution, the original source data will be at a higher resolution than the NED. As more data become available at a finer resolution than NED, the feasibility of developing a finer resolution NED will be investigated.

Applications of Digital Elevation Models

To capture the most value from a DEM, most users will want to use geographic information systems (GIS) software. With a GIS one can derive many types of digital map products from a DEM. For example, one can produce maps of terrain slope and aspect (i.e., the compass direction a specific slope faces), shaded relief maps, perspective views (i.e., pseudo three-dimensional), and maps of watersheds or hydrologic units. Other data, such as a digital image (e.g., digital orthophoto), or a soils or land use map, can be “draped” over a terrain model to allow a viewer to visualize relationships between terrain position and other phenomena of interest. A selected set of sample NED datasets and applications are available at <http://edcnts12.cr.usgs.gov/NED/Samples.htm>. Additional information on understanding GIS and GIS applications is available at <http://www.calmit.unl.edu/gis/understanding.html>.

Examples of Derived Digital Map Products



Shaded Relief



Percent Slope



Aspect (direction of facing slope)

Products available from CSD

The Conservation and Survey Division provides NED data for Nebraska in ArcInfo Grid format for the following:

1. Data clipped to county boundaries (surrounded by a 1 km buffer) can be downloaded directly from the CSD web site at <http://csd.unl.edu/csd.html>.
2. Data can also be purchased on CD-ROM. Three standard products are available:
 - seamless, statewide coverage
 - data clipped by county boundaries with a 1 km buffer
 - data clipped by Natural Resources District (NRD) boundaries with a 1 km buffer
3. CSD will also process custom orders. For example, CSD staff will provide DEM data clipped to any boundary desired. In addition, derived products, including slope, aspect, perspective views and others, can be provided. All custom orders are priced according to level of effort involved. For additional details, contact Les Howard at lhoward@unlnotes.unl.edu.