NED Release Notes

February 2010

The February 2010 release of the National Elevation Dataset (NED) marks the 52st update of the 1-arc-second layer since bi-monthly revisions began in June, 2000. This release incorporates some new lidar data, in addition to all the USGS 7.5-minute digital elevation models (DEM's) that were revised between the previous NED release as of January 14, 2010. Spatially referenced metadata, in the form of ESRI shapefiles and a corresponding data dictionary in pdf format are available for download at: http://ned.usgs.gov/Ned/metadata.asp

The next NED release is scheduled for April 5, 2010.

Areas where new source data were incorporated for this release (and previous releases) are indicated in Figure 1.

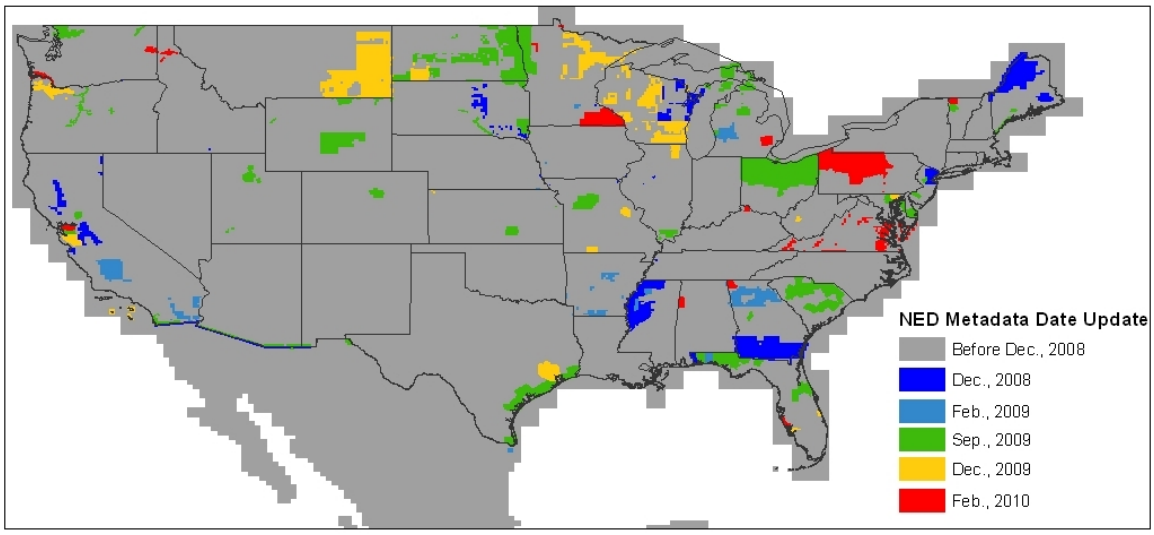

Figure 1. 1-arc-second NED, updated areas by release date—February 2010 release

The following figures show additional information that is available in the spatially referenced metadata that accompanies the NED data layers.

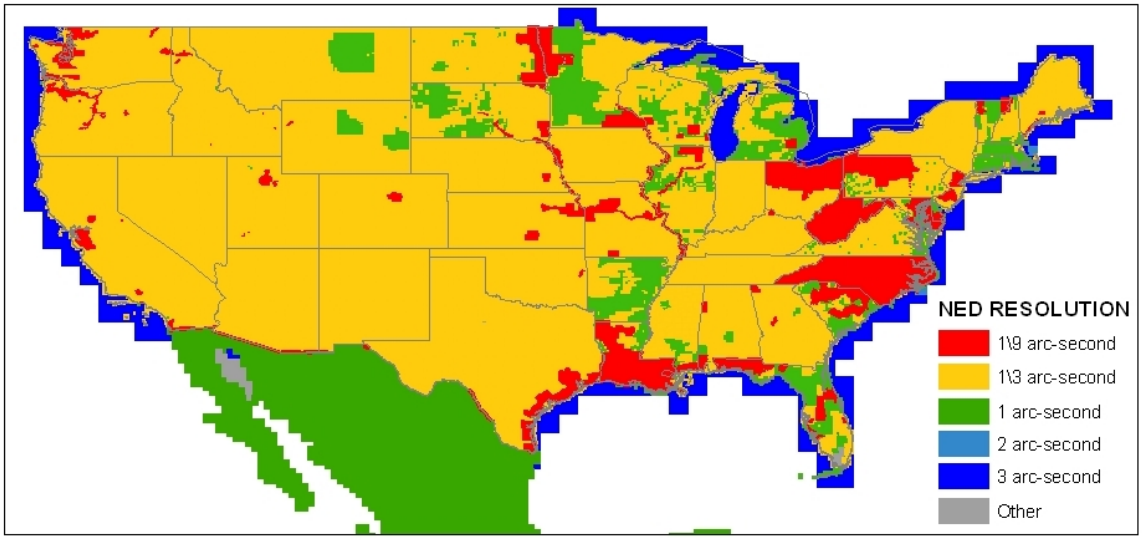

Figure 2. NED source data by resolution – February 2010 release

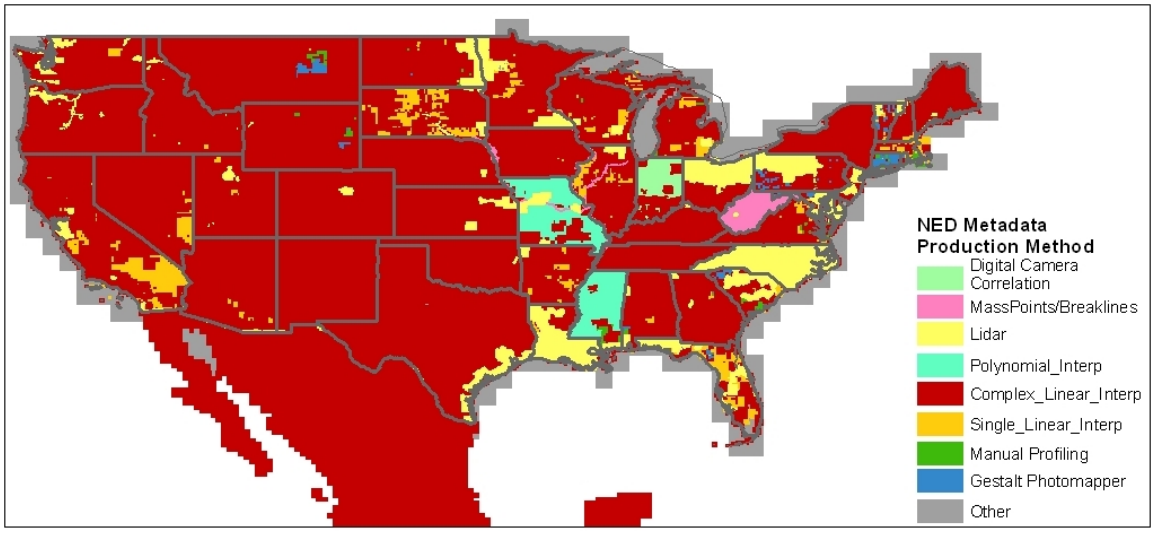

Figure 3. NED source data by production method – February 2010 release

In addition to the spatial metadata, a NED Data Dictionary, which explains the codes and terms in the spatial metadata, is available at the documentation download Web site. (http://ned.usgs.gov/Ned/NED_DataDictionary.pdf

NED Tile Processing

To address practical concerns of data processing and storage, the NED (at all but the 1/9-arc-second resolution) is processed in tiles of 1 degree x 1 degree, coincident with integer degree boundaries of the GRS80 ellipsoid. A small amount of overlap is added to ensure that adjacent tiles are logically seamless. Additional tiles are added as required to accommodate new areas of coverage.

Release date	Number of tiles	Note
June 2000	1,367	CONUS: 925 tiles; AK: 428 tiles; HI: 14 tiles
April 2001	1,375	8 tiles added: Puerto Rico and Virgin Islands
June 2001	1,387	12 tiles added: Pacific islands
August 2001	1,392	5 tiles added: Pacific islands
October 2008	1,651	259 tiles added: Country of Mexico

Table 1. Number of NED tiles and changes, by release date.

In the current release, 54 tiles were updated, representing 10% of NED, excluding Alaska and Mexico for which the extent of coverage is resolution-specific. The numbers in figure 4 were obtained from the metadata of for the 1-arc-second NED layer, but only from areas that are common to it and the 1/3-arc-second layer.

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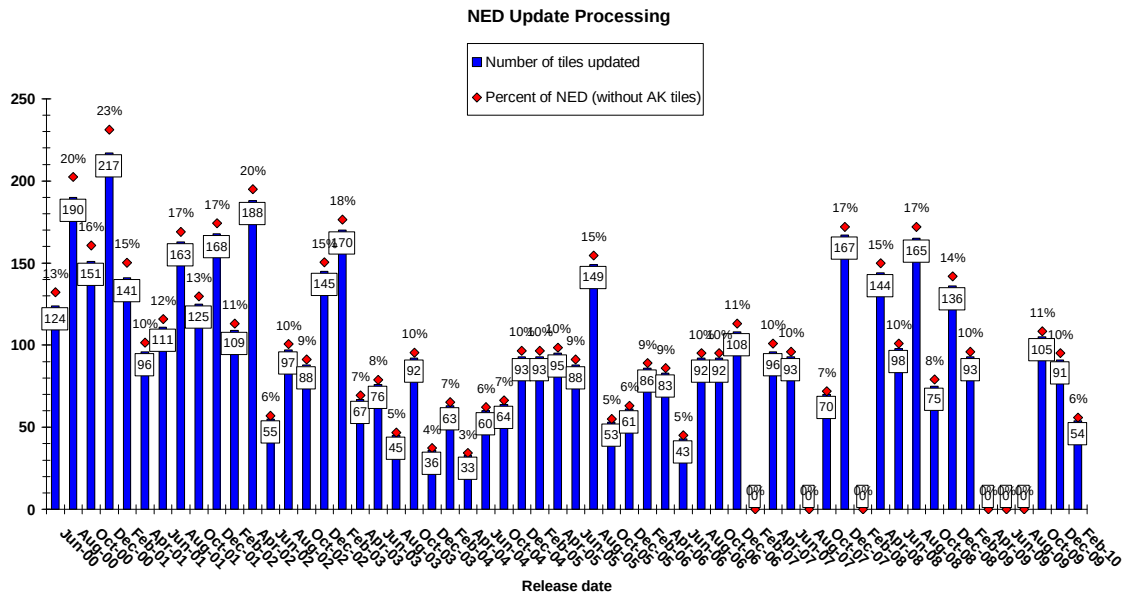


Figure 4. Number and percentage of NED tiles processed, by release date

Source Data

NED source data are selected from an ever-growing inventory of DEM's, produced both by USGS standard production and by other methods. With first consideration being given always to data quality, the selections are made according to the following ranking and listed in the order of descending priority:

1. High-resolution data, typically derived from lidar or digital photogrammetry, and often break line enforced. If collected at a ground sample distance no coarser than 5 meters, such data may also be offered within the NED at a resolution of 1/9th arc-second.

2. Moderate-resolution data, other than that compiled from cartographic contours. This data may also be derived from lidar or digital photogrammetry, or less often by IFSAR. A typical ground sample distance is 10 meters, commonly called "1/3-arc-second data"

3. 10-meter DEM's derived from cartographic contours and mapped hydrography. Most often, such data are produced by or for the USGS as a standard elevation product, and they currently account for the bulk of the NED.

4. 30-meter cartographically derived DEM's. Similar in most respects to their 10-meter counterparts, though usually of lower overall quality.

5. 30-meter photogrammetrically derived DEM's. These are the oldest DEM's in the 7.5-minute series. These data were derived directly from stereo photography, either by a human operator or by an early form of electronic image correlation. They are typically marred by erroneous production artifacts that are addressed to the greatest practical extent by digital filtering within the NED production process.

6. 2-arc-second DEMs are a standard USGS product. They are derived from cartographic contours at a scale of 1:63,360 over the state of Alaska, and a scale of 1:100,000 elsewhere.

7. 1-arc-second Shuttle Radar Topography Mission (SRTM) data, to date, are only used in preference to 3-arc-second data in the Aleutian Islands.

8. 3-arc-second DEMs are another standard USGS product, and are generally only used within the NED as a source of fill values over large water bodies.

The composition of source data within the December, 2009 NED release continues the trend seen in previous releases, with an increase in coverage from 10-meter or better sources. (fig. 5)

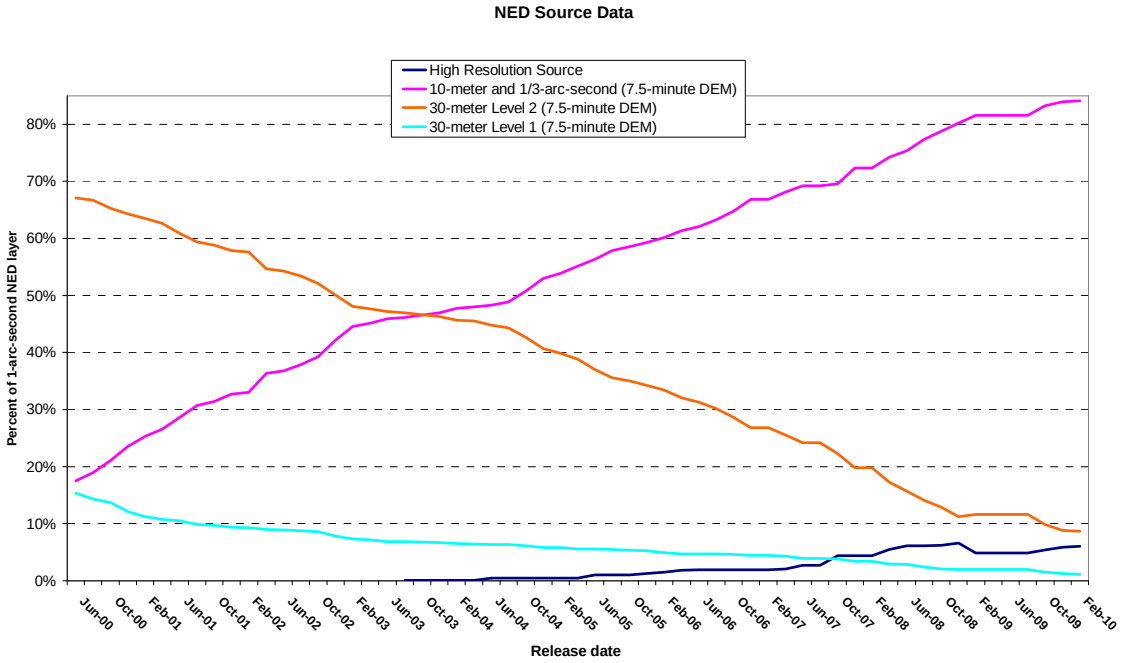


Figure 5. Type of DEM source data, 1-arc-second NED, by release date

Changes in NED processing over Alaska.

All NED data are currently distributed in the North American Datum of 1983 (NAD83). Prior to April, 2008, NED data over Alaska were cast in the North American Datum of 1927 (NAD27)

Additionally, some portions of Alaska are now available at resolutions of 1 and 1/3 arc seconds. The most current data is radar-derived, either from airborne interferometric synthetic aperture radar (IFSAR) or from the Shuttle Radar Topography Mission (SRTM). The inclusion of SRTM data in the Aleutian chain is particularly significant, as it replaces 3-arc-second DEM's, which are generally of poor quality and are cast in the World Geodetic System of 1972 (WGS72).

The first lidar data of the Kenai Peninsula was added to the NED 1/9-arc-second NED layer during the September, 2009 release. It joins a small amount of data covering the port city of Valdez, which was added in December, 2008.

Mexico addition to the NED 1-arc-second layer

Elevation data for Mexico are being included in the 1-arc-second layer as of the October 2008 release. The Mexico dataset is a result of collaboration between the USGS and Mexico's National Institute of Statistics and Geography (INEGI). The data were provided and quality control conducted by INEGI. Topographic staff at USGS EROS processed the data to improve edge matching, making the dataset seamless within itself and along the U.S. / Mexico border.

Multi-resolution NED

In addition to the standard 1-arc-second resolution, NED data for all of the continental United States are available in 1/3-arc-second resolution (approximately 10 meters). These higher resolution data have been produced where 10-meter DEMs and other higher-resolution DEMs are available as NED source data. The current release of 1/3-arc-second NED (February 8, 2010) includes all USGS 10-meter and 1/3-arc-second DEMs produced as of January 14, 2010. Figure 6 shows the current coverage of 1/3-arc-second NED over CONUS. In addition, 1/3-arc-second NED is available over Hawaii and the Pacific basin islands. As with 1-arc-second NED, some of the 1/3-arc-second NED is derived from "non-standard" source data (data other than standard USGS 7.5-minute DEMs). As new source data (either higher resolution data or USGS 10-meter DEMs) become available, production of 1/3-arc-second NED will continue, and additional areas will be made available as they are completed. The data are available for download through the seamless data distribution system (SDDS) (http://seamless.usgs.gov) or for NED bulk data delivery via hard drive -- contact USGS EROS Customer Service **custserv@usgs.gov** (605-594-6151) to order.

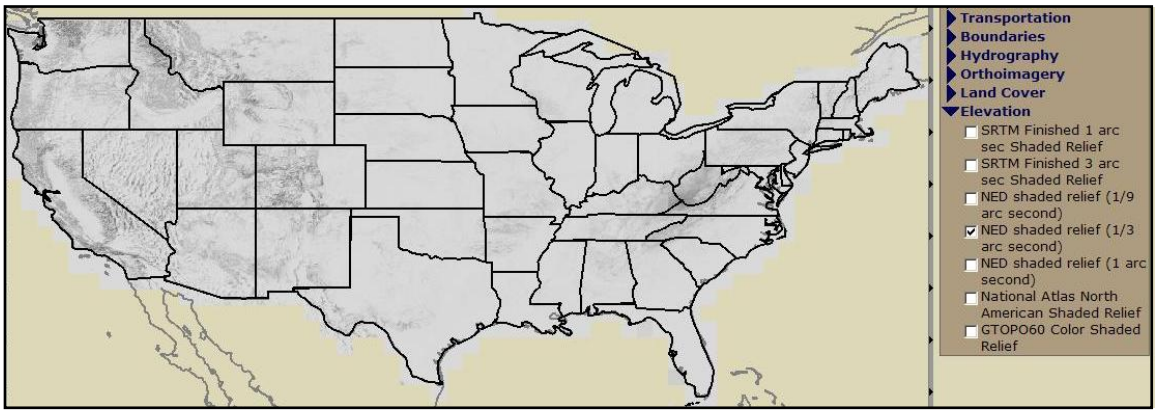


Figure 6. 1/3-arc-second NED available through SDDS

The 1/3-arc-second NED shown in Figure 6 currently covers 100% of the United States (excluding Alaska). However, source data with a resolution of 10 meters or higher currently exists for only 90% of the United States (excluding Alaska); the other 10% of the current 1/3-arc-second NED coverage is derived from oversampling of 30-meter DEM source data. The oversampling of 30-meter data occurs where no high resolution (10-meter or better) data exist. Figure 7 shows the distribution of source data resolution within the current 1/3-arc-second NED coverage. The NED spatial metadata delivered with each order can be queried to determine the source data used to produce the 1/3-arc-second NED over any given area. As new high resolution source data become available, either from 10-meter DEMs or other sources, the data derived from 30-meter DEMs will be replaced. Oversampled 30-meter data has been assembled into the 1/3-arc-second NED as a convenience to the user community. If the data were not available from the SDDS download site, users would have to complete the oversampling themselves for many study areas.

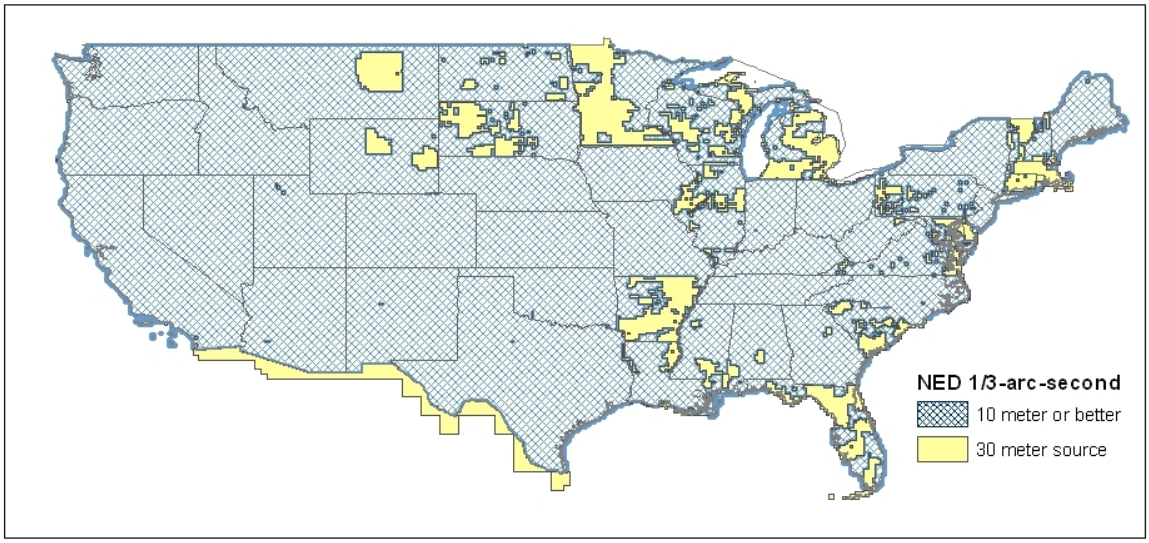


Figure 7. 1/3-arc-second NED, February 2010 release, by source resolution

NED High Resolution Data

The 1/9-arc-second NED is being developed from high resolution source data (3-meter or better point spacing from lidar, photogrammety, or other sources). Higher resolution layers are being populated through the integration of data from various sources, using new technologies, and are acquired through partnerships with Federal, State, and local partners, providing access to the best available local information. As data are acquired and made available in the public domain, they are incorporated into the NED at a 1/9-arc-second resolution. Figure 8 shows the areas that reside in the NED 1/9-arc-second layer, as of February, 2010.

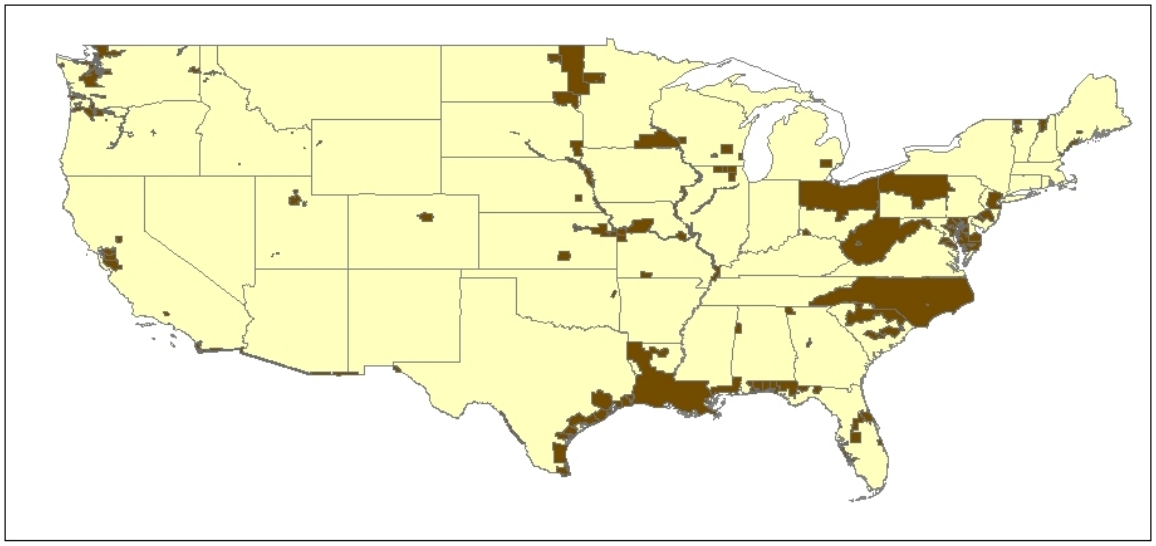


Figure 8: 1/9-arc-second NED available through SDDS—February 2010 release

The following are NED 1/9-arc-second datasets released since the last release notes were distributed. These datasets are shown by state and project name:

February, 2010

MN 9COUNTY	FL SARASOTA	OR LWR COLUMBIA
GA DADE WLKER	MI OAKLAND	VT ROCKRIVR
WA SPOKANE	PA STATE_MW	ID COEUR TRIB
KY KNTNCAMP	AL LAMAR	

Figure 9 show the status of the datasets known and anticipated for NED 1/9th.

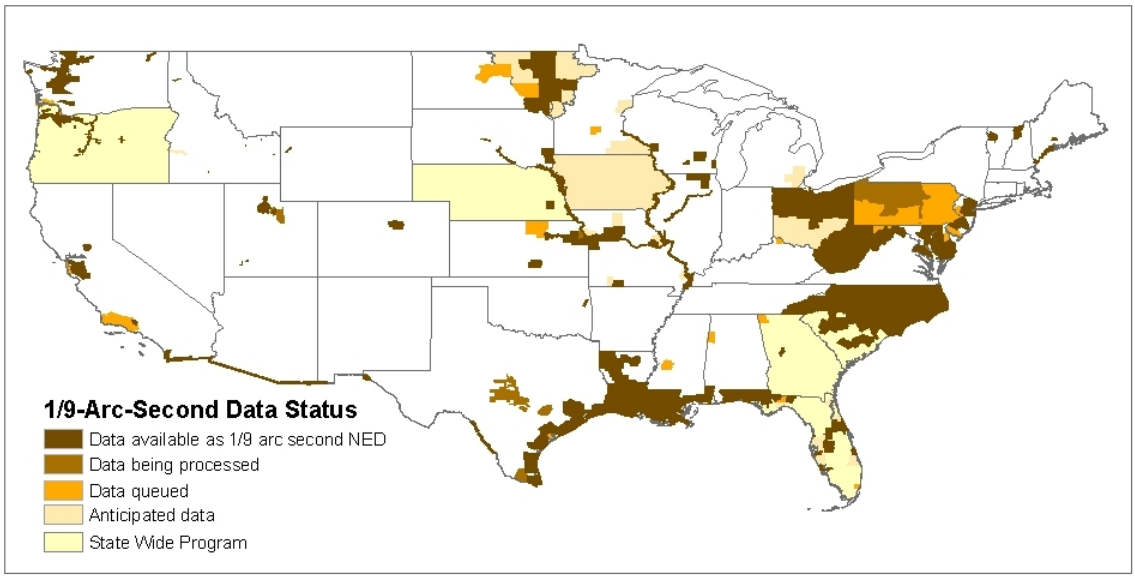


Figure 9. Status of the NED 1/9-arc-second layer—February 2010 release

Most of the high resolution data are being generated from lidar bare earth point data. NED distributes the elevation data but does not distribute the bare earth point cloud data. The released data are available for download through the seamless data distribution system (SDDS) (http://seamless.usgs.gov) or for NED bulk data delivery via hard drive -- contact USGS EROS Customer Service **custserv@usgs.gov** (605-594-6151) to order.

As the higher resolution data set are released into the 1/9-arc-second NED layer they are also evaluated for possible inclusion into the NED 1- and 1/3-arc-second layers. Several higher resolution datasets were used as source into the other NED layers for this update cycle. The intention was to keep the 1/9-arc-second layer in sync with both the NED 1 and 1/3 layers even though there would be a time delay due to the differences in the processing flows. Unfortunately, the consistency of the 1/9-arc-second data is variable. Some of the 1/9th-arc-second datasets received by the National Elevation Team (NET) are very useful for specific applications and are the best available at the 1/9-arc-second resolution, but may not meet the criteria to which the NED 1- and 1/3-arc-second layers are held, such as flattened water bodies and bare-earth digital

elevation models. Therefore, some of the datasets will not be used as source data for the NED 1 and 1/3rd.

The following is a list of the NED1/9-arc-second source data recently incorporated into the NED 1- and 1/3-arc-second:

February, 2010

WI_MILWAUKEE	WI_MADISON_CITY	MO_WARREN
MO_TANEY	TX_HOUSTON_CITY	

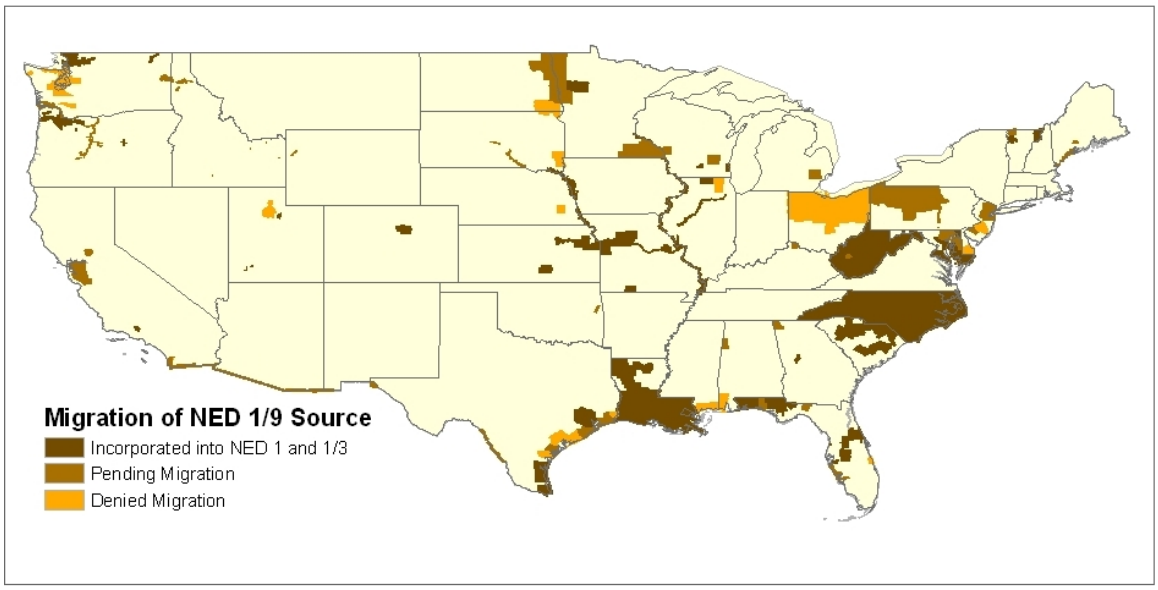


Figure 10. Migration status of NED 1/9 to other Ned layers—February 2010 release

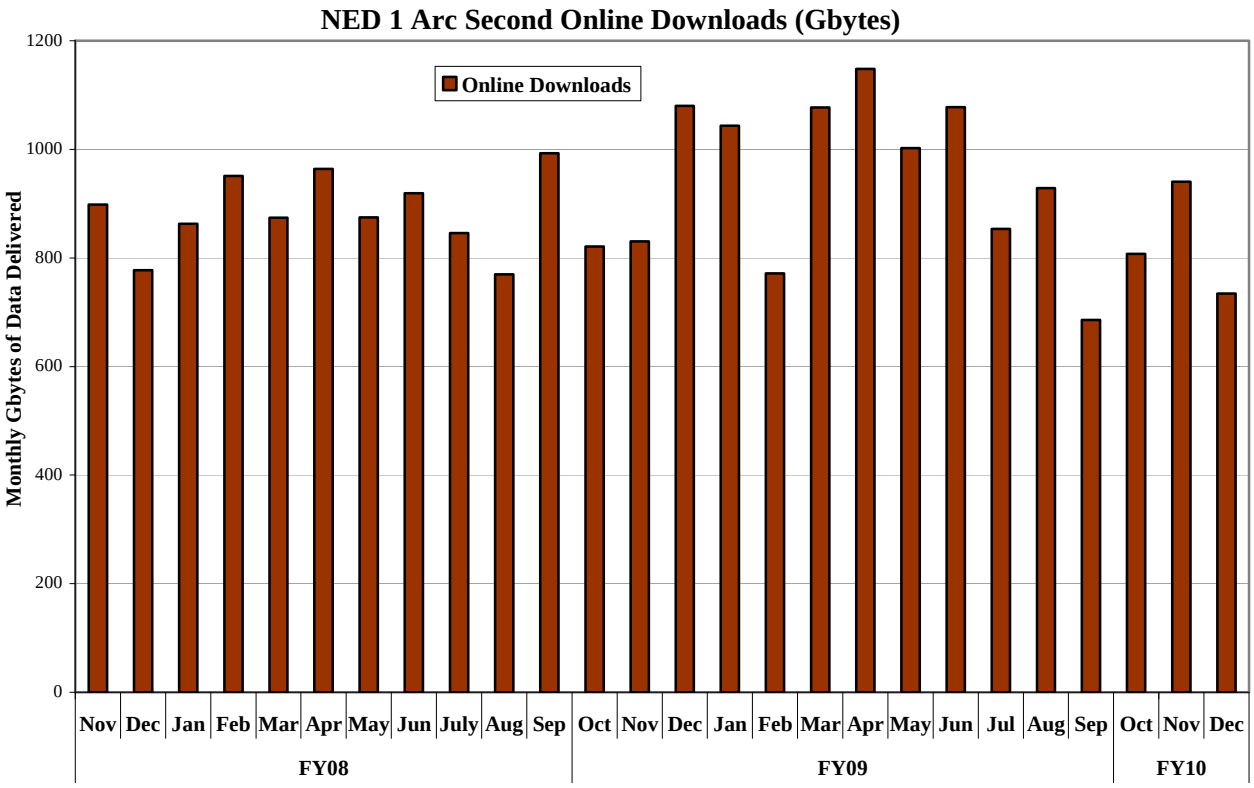
Notes

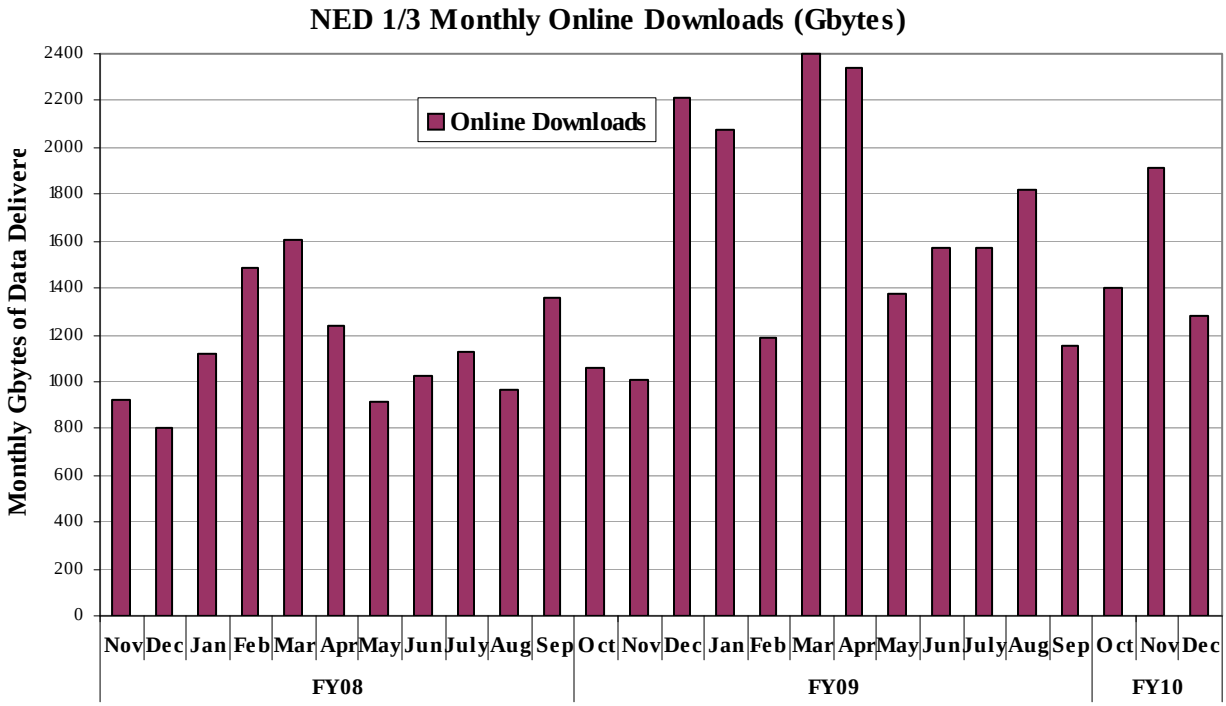
• The following are available from the NED Web site: the NED spatial metadata in Shapefile (.shp) and Arc Export (.E00) format; the NED data dictionary with definitions of the attributes of the spatial metadata coverage; previous issues of the NED Release Notes; and Shapefiles that outline the areas updated in the December 2009 and previous releases. The URL for these items is http://ned.usgs.gov/Ned/metadata.asp

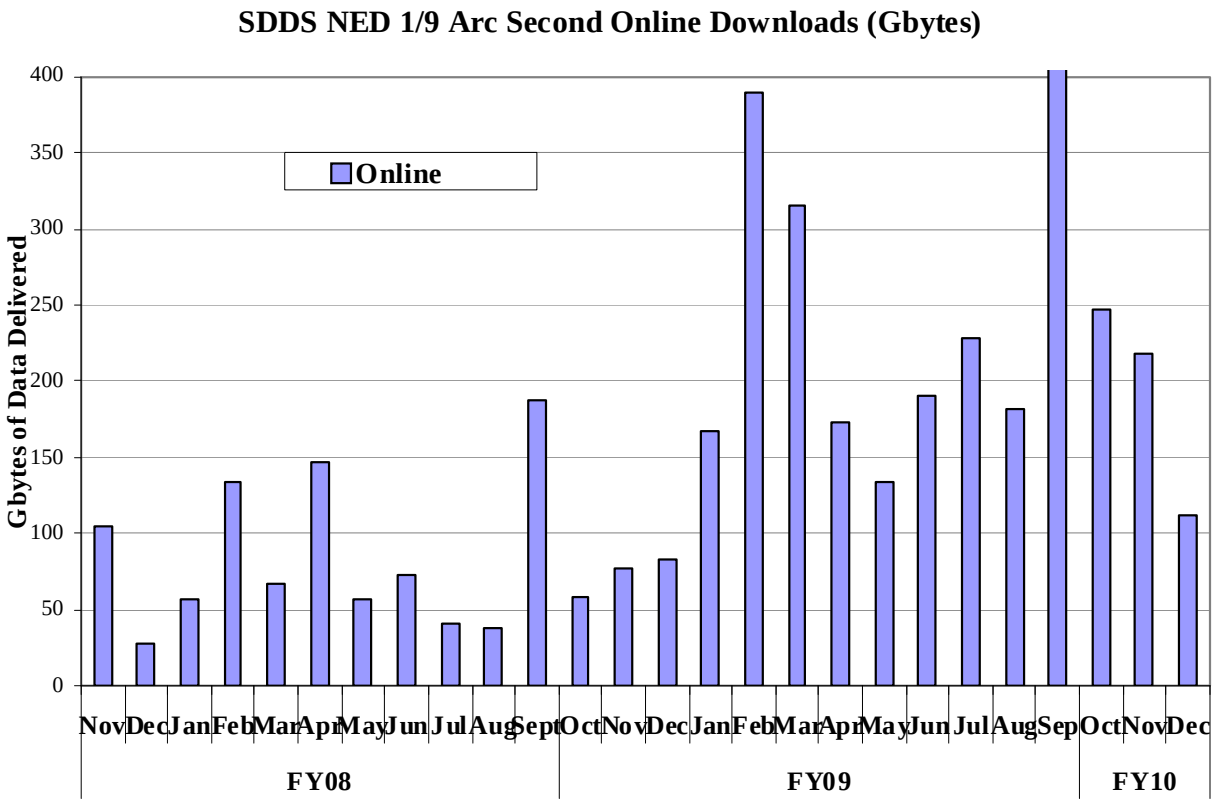
• No new information was added to the FAQ list on the NED home page (http://ned.usgs.gov)

• A complementary USGS activity to the NED is the Center for Lidar Information Coordination and Knowledge (CLICK) which provides lidar point cloud data for download (http://lidar.cr.usgs.gov/).

Download Statistics






SDDS NED 1/9 Arc Second Online Downloads (Gbytes)
Online
Gbytes of Data Delivered
400
350
300
250
200
150
100
50
0
Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sept Oct Nov Dec Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec
FY08
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