

# National Elevation Dataset

## April 2011 Release Notes

The April 2011 update of the National Elevation Dataset (NED) was released on April 26, 2011. It marks the 59<sup>th</sup> update of the 1 arc-second layer since bi-monthly revisions began in June, 2000. This release incorporates new lidar data in addition to new standard production 10 meter DEMs

The next release is scheduled for June 7, 2011.

Areas where new data were incorporated in this and other recent releases are indicated in Figure 1.

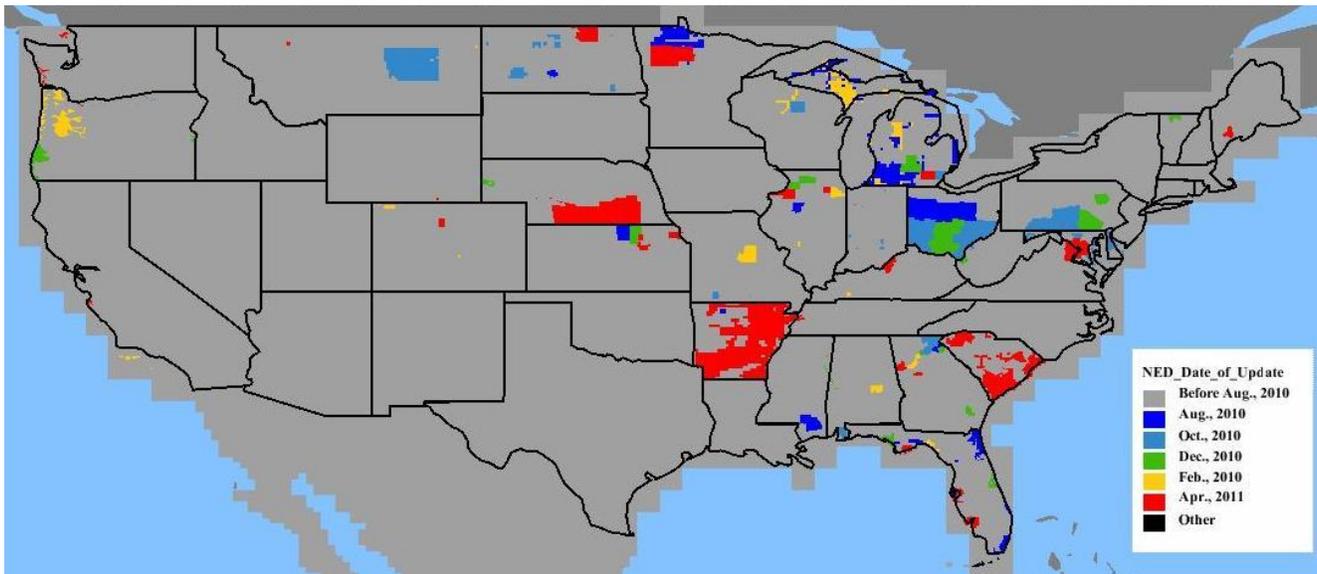


Figure 1. 1-arc-second NED, updated areas by release date—April 2011 release

The following figures show additional information derived from the spatial metadata that accompanies the NED.

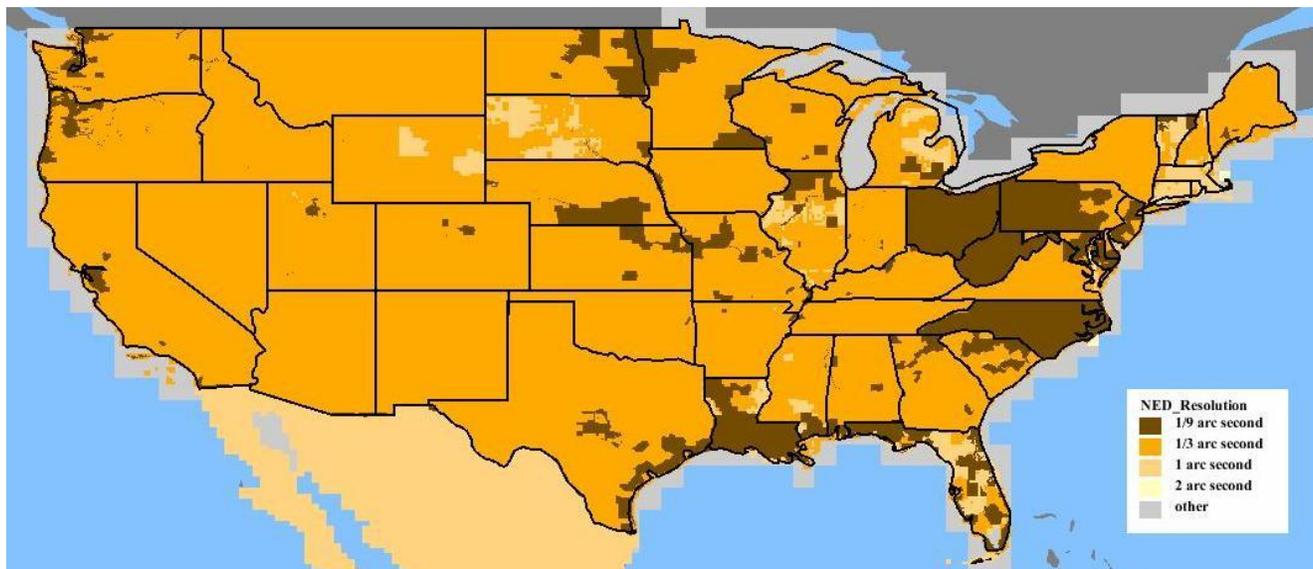


Figure 2. NED source data by resolution – April 2011 release

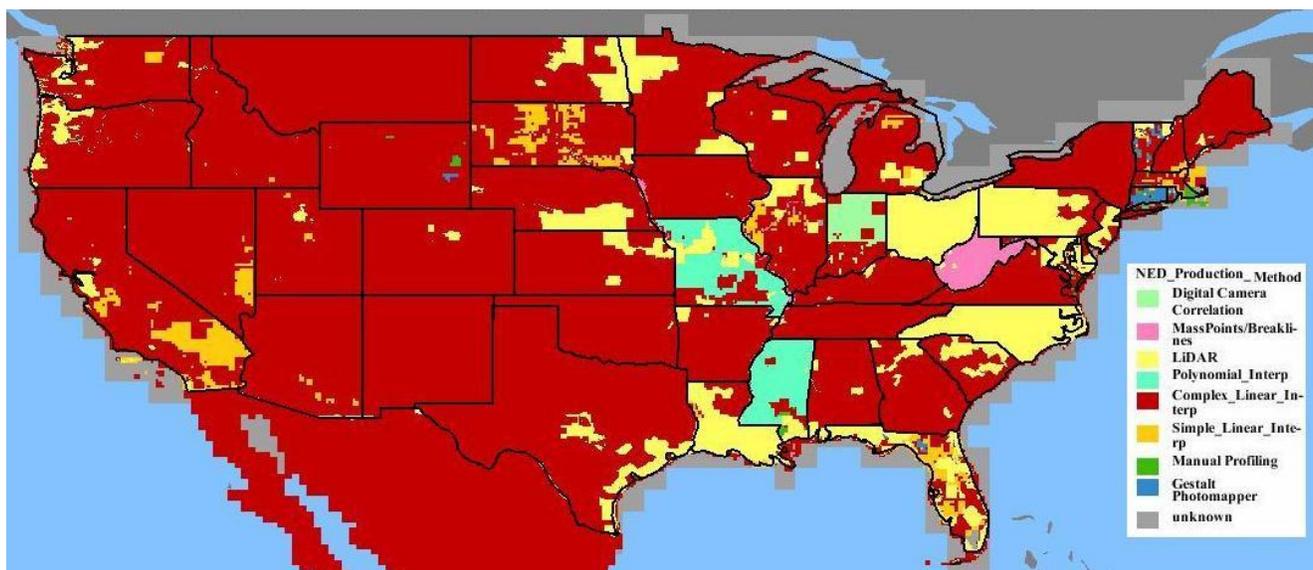


Figure 3. NED source data by production method – April 2011 release

## NED Tile Processing

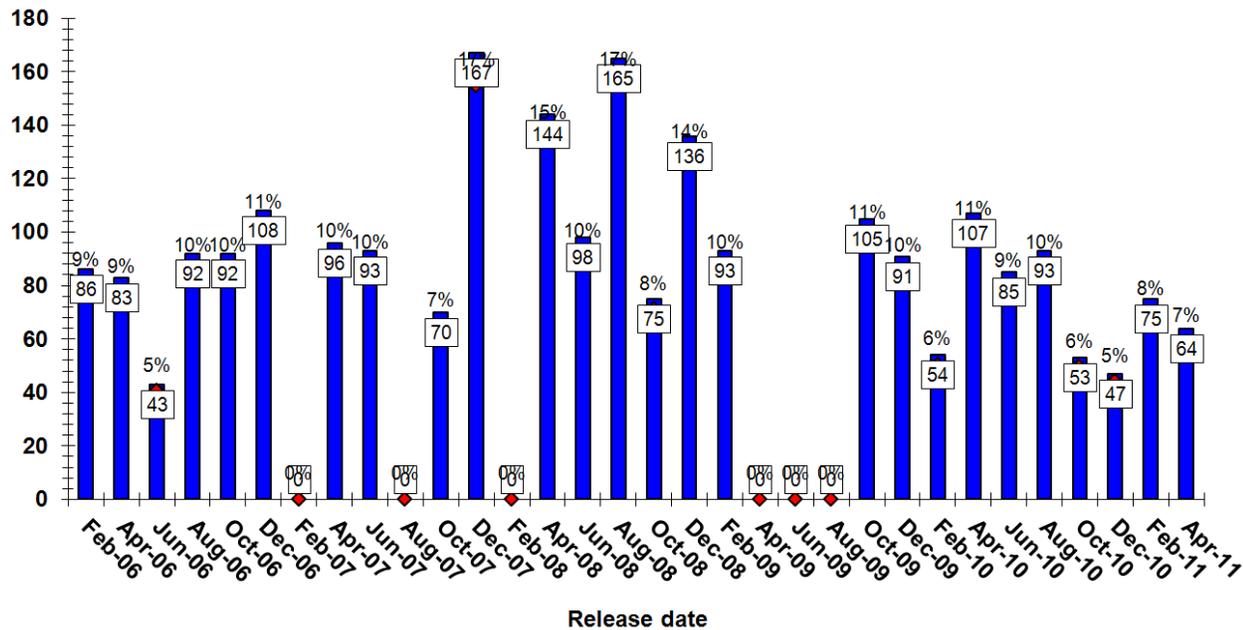
To address practical concerns of data processing and storage, the NED (at all but the 1/9<sup>th</sup> arc-second resolution) is processed in tiles of 1° × 1°, coincident with integer degree boundaries of the GRS80 ellipsoid. A small amount of overlap is added to ensure that adjacent tiles are logically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

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, 64 tiles were updated, representing 7% of NED, excluding Alaska and Mexico for which the extent of coverage is resolution-specific.(Figure 4).

### NED Update Processing



**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 1/9<sup>th</sup> 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<sup>rd</sup> 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 April, 2011 NED release continues the trend seen in previous releases, with an increase in coverage from 10-meter or better sources. (Figure. 5)

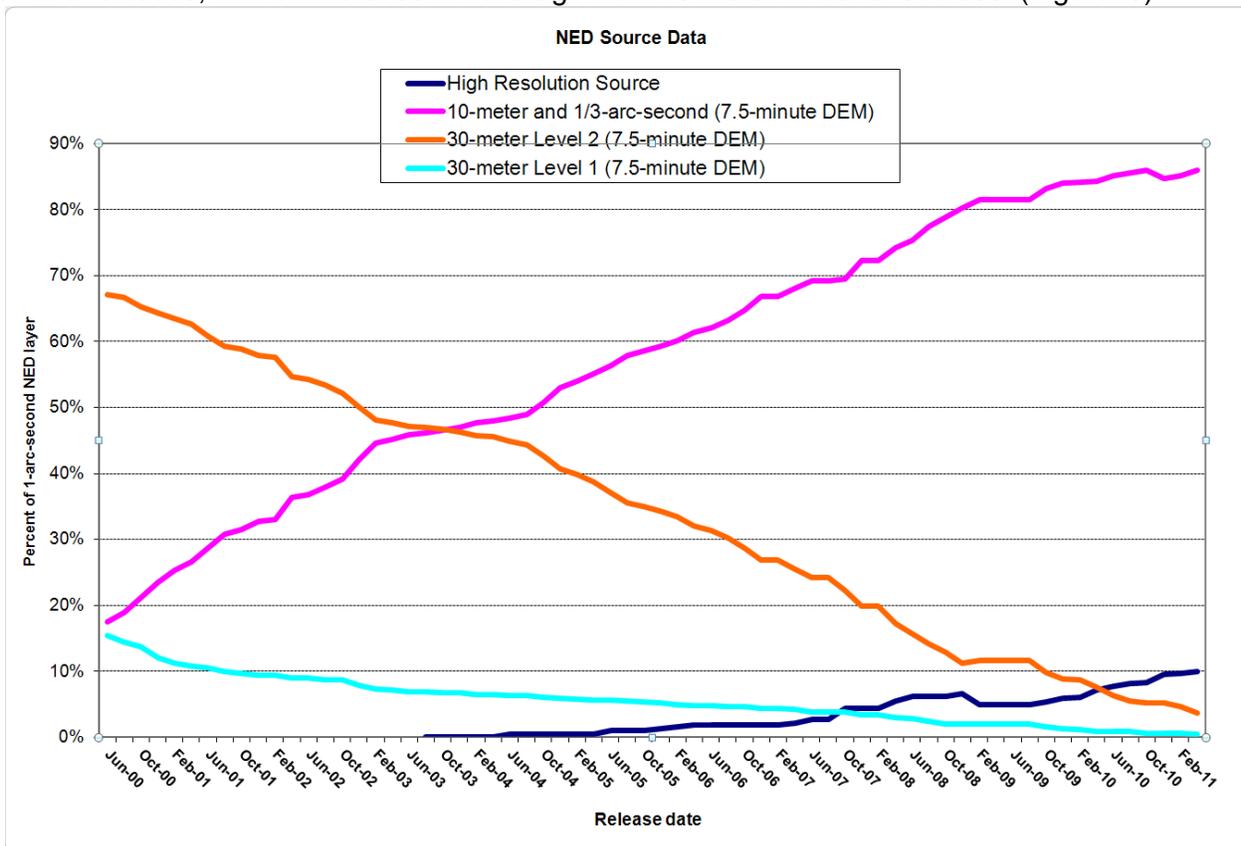


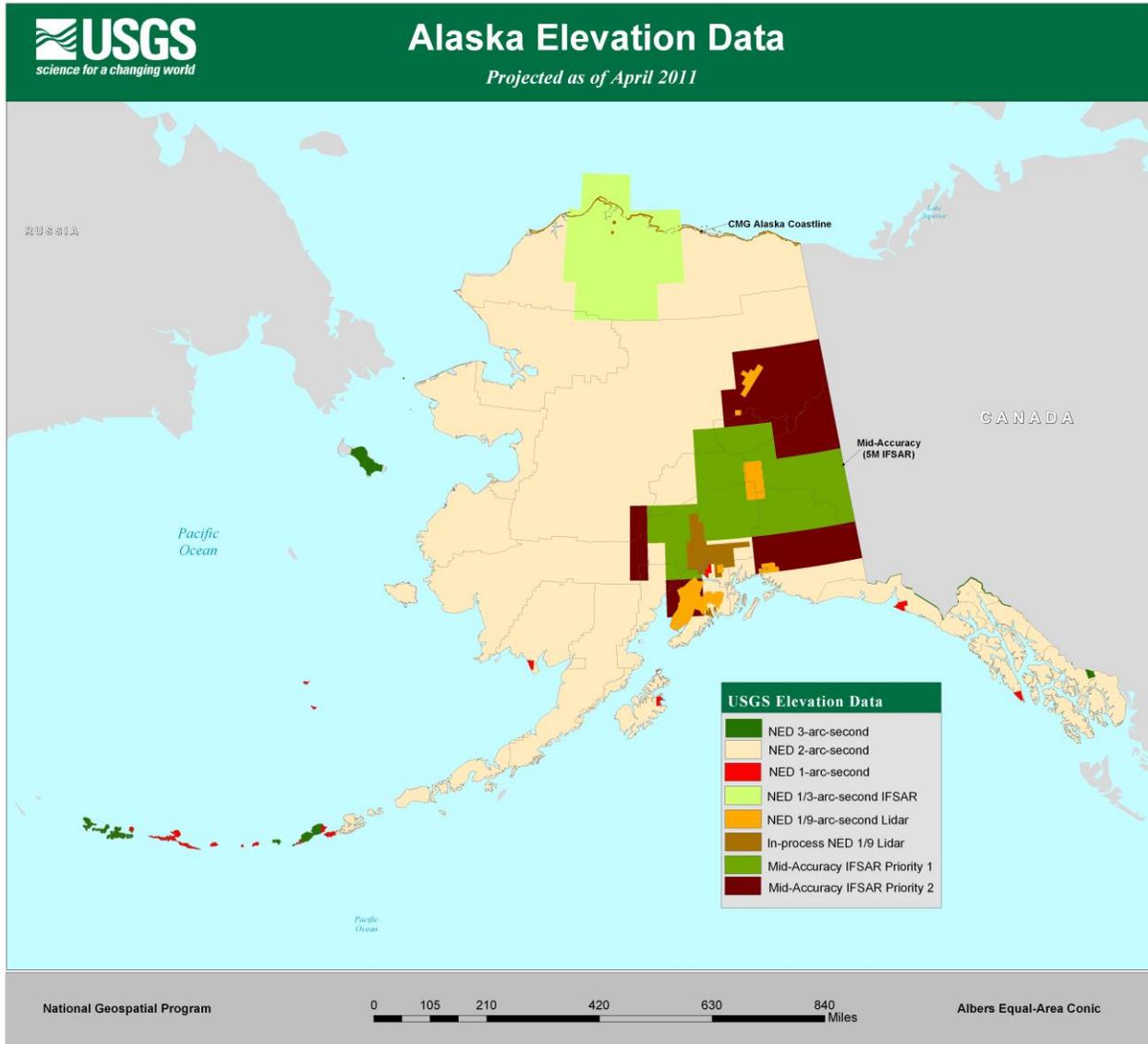
Figure 5. Type of DEM source data, 1-arc-second NED, by release date

### 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 1/9-arc-second NED in September, 2009 adding to the small amount of data covering the port city of Valdez added in December, 2008. Additional lidar datasets were released in July and August of 2010, including two more Kenai areas and Yukon Flats. The original Kenai dataset released in September, 2009 was reworked to fill the many data voids in December, 2010. A large portion of central Kenai area was added in February, 2011. A pilot area of the priority 1 mid-accuracy 5 meter IFSAR was added during the April, 2011 update as well a small

piece of lidar data along the northern coast. The resolution of existing Alaska data, and of the data anticipated in the upcoming year are shown in Figure 6.



**Figure 6. Available and anticipated Alaska elevation data**

### Mexico addition to the NED 1 arc-second layer

Elevation data for country of Mexico were added to the 1 arc-second NED in October, 2008. These data are 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 US / Mexico border.

## 1/3 arc-second NED

In addition to the standard 1 arc-second resolution, NED data for all of the contiguous United States, Hawaii, and many Pacific Islands are available at a resolution of 1/3 arc-second (approximately 10 meters). The current release of 1/3<sup>rd</sup> arc-second NED (April 26, 2011) includes all USGS 10-meter and 1/3<sup>rd</sup> arc-second DEMs produced as of April 1, 2011. (Figure 7)

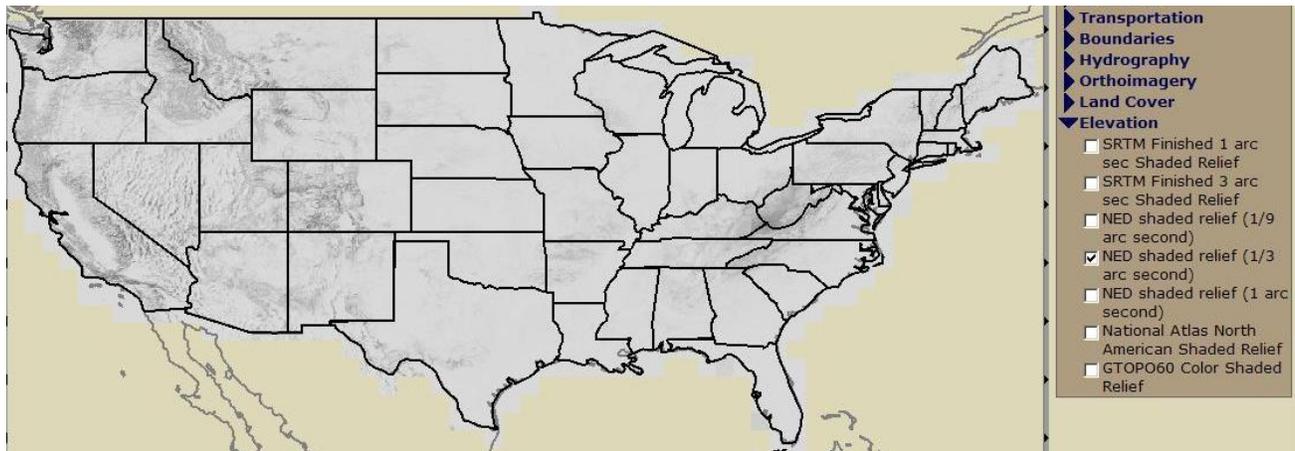


Figure 7. 1/3 arc-second NED available through SDDS

Source data with a resolution of 10 meters or higher currently exists for 94% of the United States (excluding Alaska). To complete 1/3<sup>rd</sup> arc-second coverage, the remaining areas are derived by oversampling 30-meter source data. Figure 8 shows the distribution of source data resolutions. The spatial metadata delivered with each order can be queried to determine the resolution of the source data used over any given area. As higher resolution source data become available, the data derived from 30-meter DEMs will be replaced. Oversampled 30-meter data has been assembled into the 1/3<sup>rd</sup> arc-second NED as a convenience to the user community. Users would otherwise have to perform the oversampling themselves to fully cover study areas.

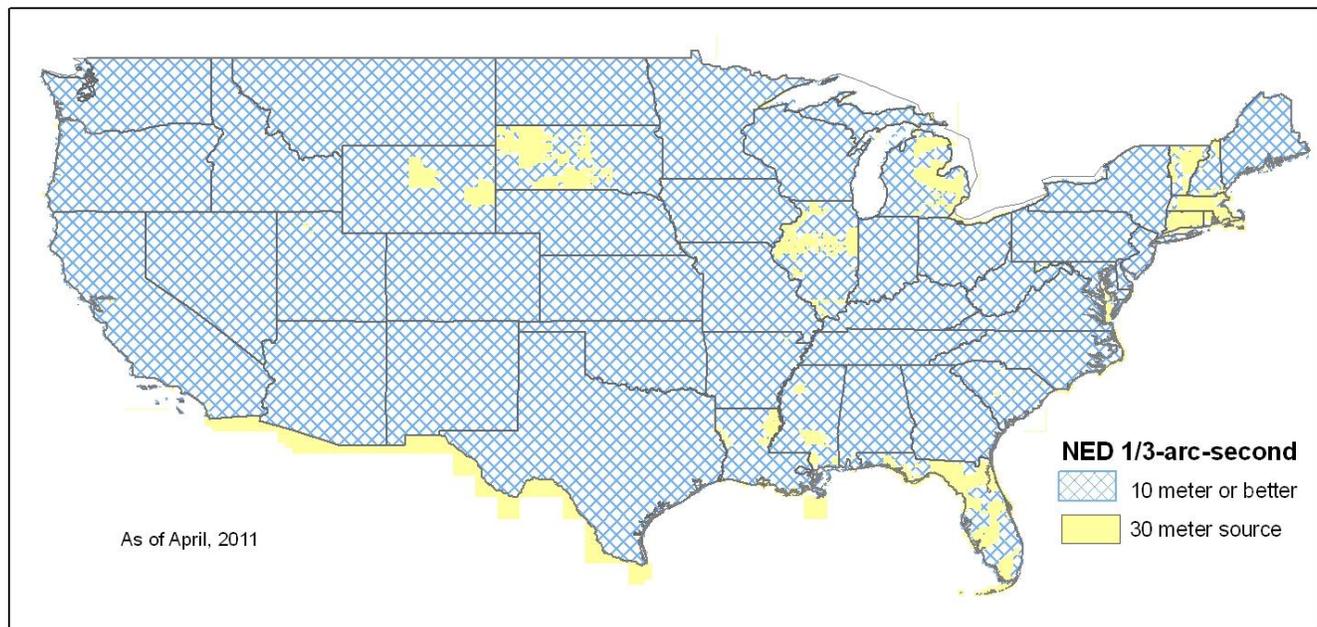
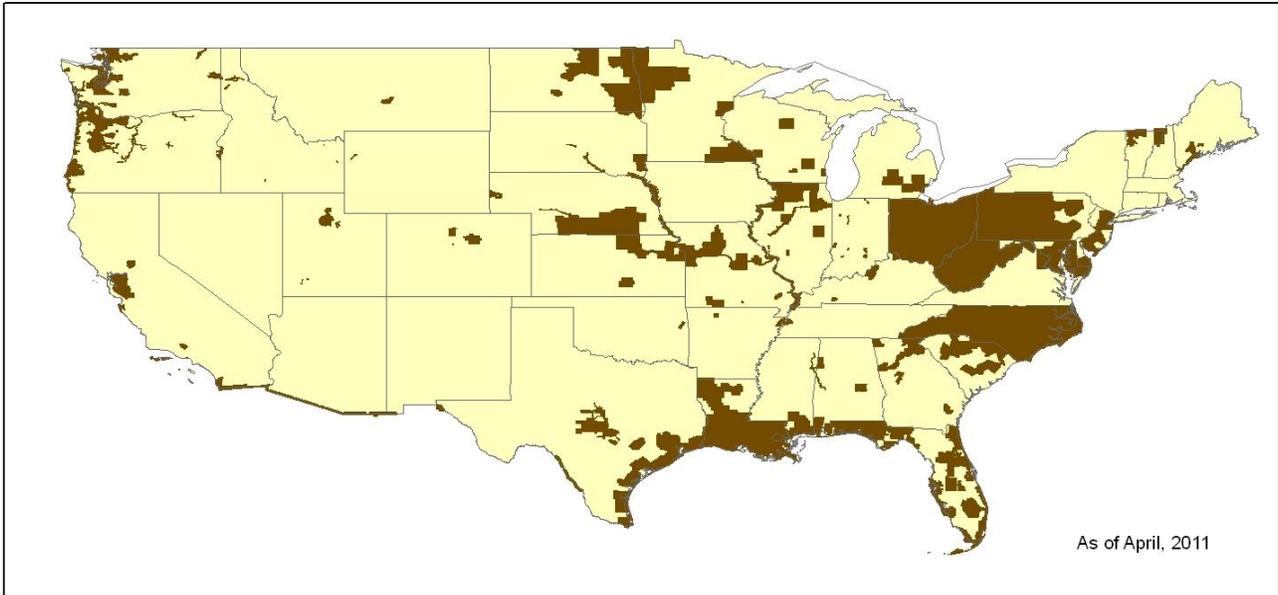


Figure 8. 1/3 arc-second NED, April 2011 release, by source resolution

## NED High Resolution Data

The 1/9<sup>th</sup> arc-second NED is being developed from high resolution source data (3-meter or better point spacing from lidar, photogrammetry, 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<sup>th</sup> arc-second resolution. Figure 9 shows the areas that reside in the NED 1/9<sup>th</sup> arc-second layer, as of April, 2011.



**Figure 9. 1/9-arc-second NED available through SDDS—April 2011 release**

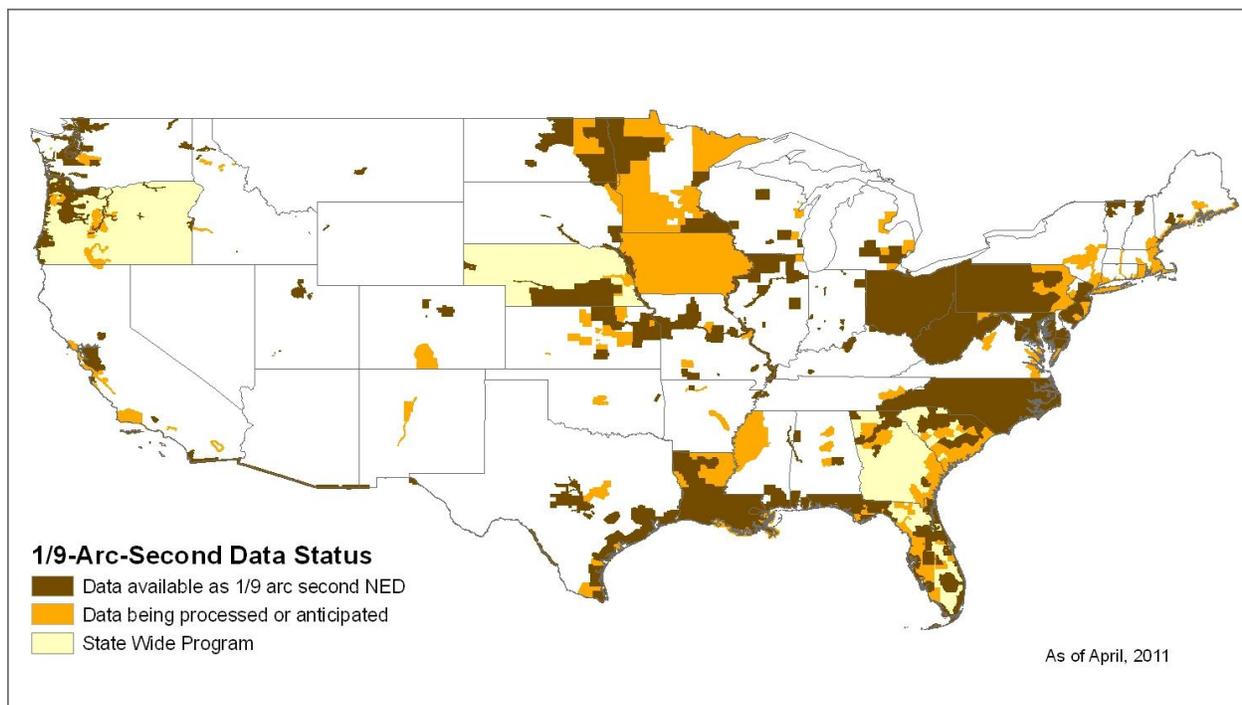
The following are NED 1/9-arc-second datasets released since the last Release Notes were distributed. These datasets are shown by state and project name:

April, 2011

AK\_CSTNENS10  
AR\_TN\_NRCS10  
CO\_GRANDCO10  
FL\_LEE07  
IL\_HNRYRKIS09  
KS\_GEARY10  
MD\_DC008  
MN\_REDRVRJ09  
NE\_RAINWTR09  
WA\_PGRYSHRBR09

AK\_IFSAR10  
CA\_CNCSTBL310  
FL\_FRNKLNHF07  
GA\_CARROLL10  
IL\_KENDALL10  
KS\_RILEY10  
ME\_ANDRSCGN09  
MT\_SGEGROUS10  
OR\_SNDYRVHF10  
WA\_SANJUAN09

AK\_NOMECKR10  
CA\_CHANLIS10  
FL\_HILSBMAN10  
GA\_SPALDING10  
KS\_ATCHISN10  
KY\_LOUISVL09  
MI\_WASHTNAW09  
ND\_REDRVRN08  
WA\_CEDRRVR10



**Figure 10. Status of the NED 1/9<sup>th</sup> arc-second layer—April 2011 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](mailto:custserv@usgs.gov) (605-594-6151) to order.

As the higher resolution data set are released into the 1/9<sup>th</sup> arc-second NED layer they are also evaluated for possible inclusion into the NED 1 and 1/3<sup>rd</sup> 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<sup>th</sup> 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<sup>th</sup> arc-second data is variable. Some of the 1/9<sup>th</sup> 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<sup>th</sup> arc-second resolution, but may not meet the criteria to which the NED 1 and 1/3<sup>rd</sup> 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 1/3<sup>rd</sup>.

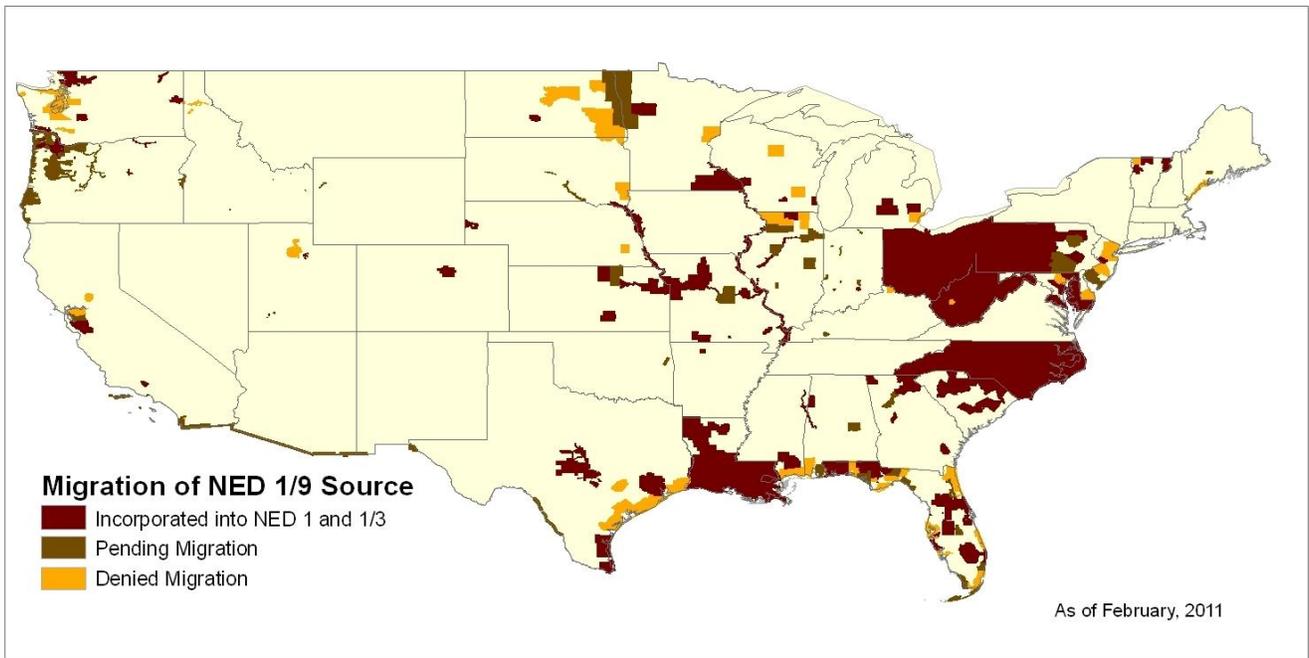
The following is a list of the NED1/9<sup>th</sup> arc-second source data recently incorporated into the NED 1 and 1/3<sup>rd</sup> arc-second:

**April, 2011**

CA\_CHANLIS10  
IL\_MACMONT10

GA\_FULTON06  
KY\_CHRSTODD10

OR\_WILAMET09  
MO\_COLCALOS10

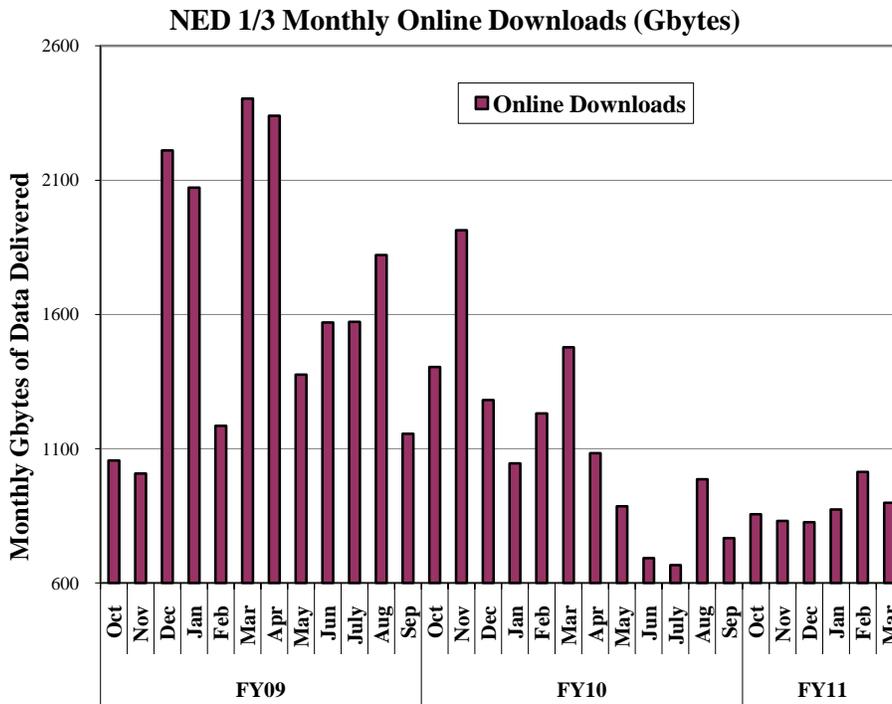
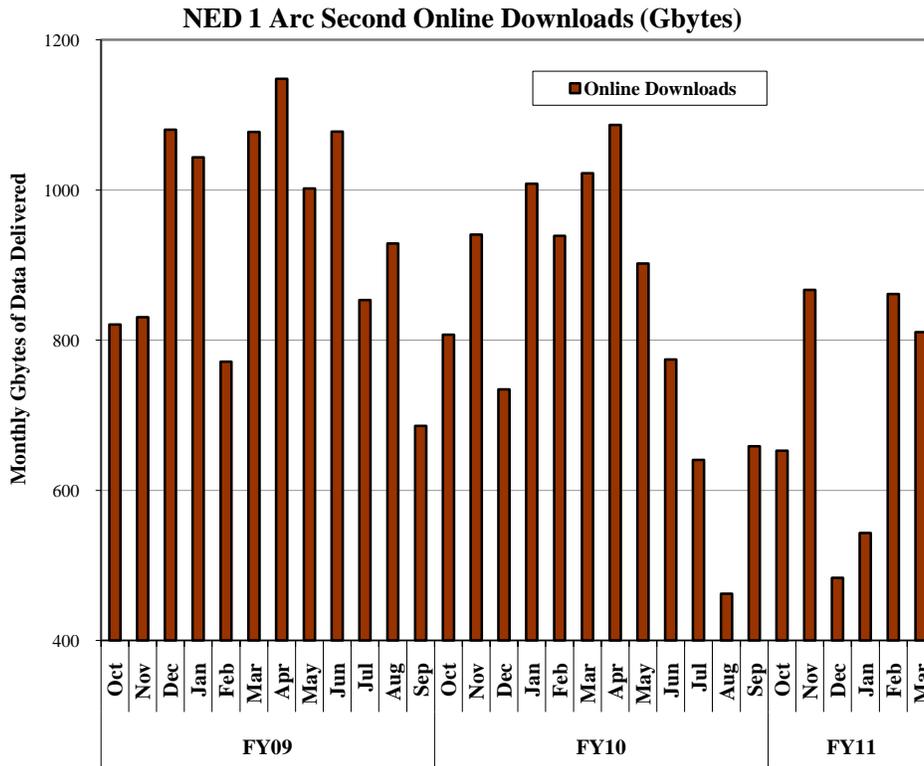


**Figure 11. Migration status of NED 1/9 to other NED layers—April 2011 release**

**Notes**

- The following are available from the NED Web site (<http://ned.usgs.gov/Ned/metadata.asp>): the NED spatial metadata in shapefile (.shp), the NED data dictionary with definitions of the attributes of the spatial metadata coverage; previous issues of the NED Release Notes; and spatial metadata shapefiles of previous releases.
- 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)**

