National Elevation Dataset
August 2010 Release Notes

The August 2010 release of the National Elevation Dataset (NED) was released on August 10, 2010. This early release is in support of the National Geospatial Technical Operations Center's (NGTOC) contour generation activities. It marks the 55th update of the 1-arc-second layer since bi-monthly revisions began in June, 2000. This release incorporates 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 and July 8, 2010. Spatially referenced metadata of all three resolutions data layers, 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 October 5, 2010.

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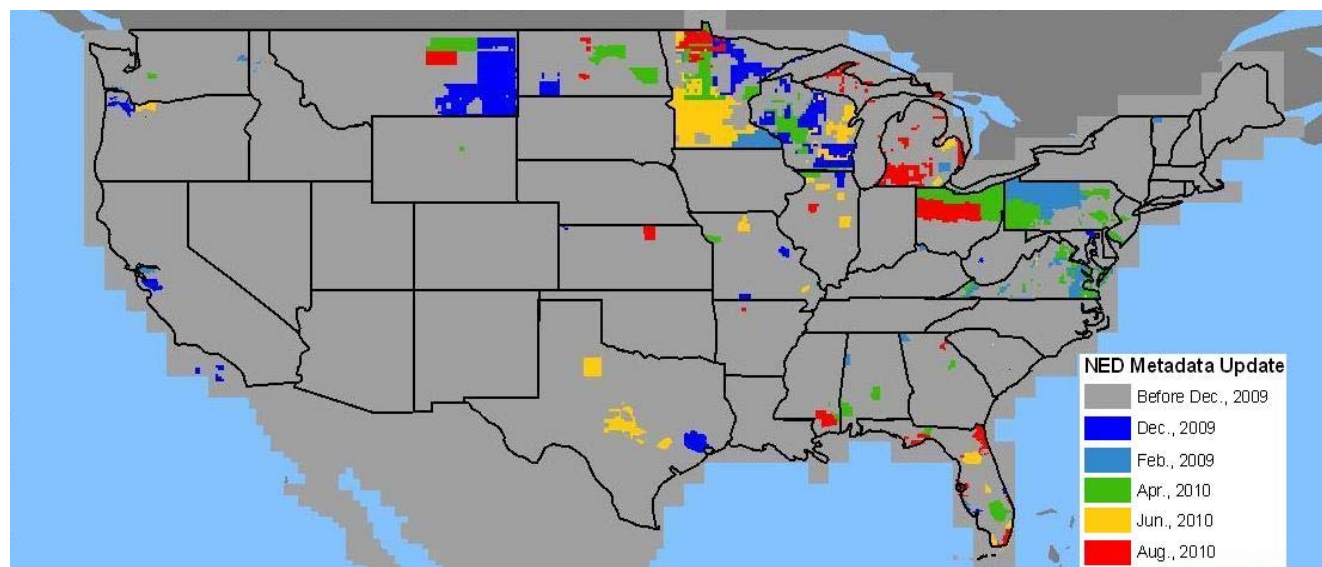

Figure 1. 1-arc-second NED, updated areas by release date—August 2010 release

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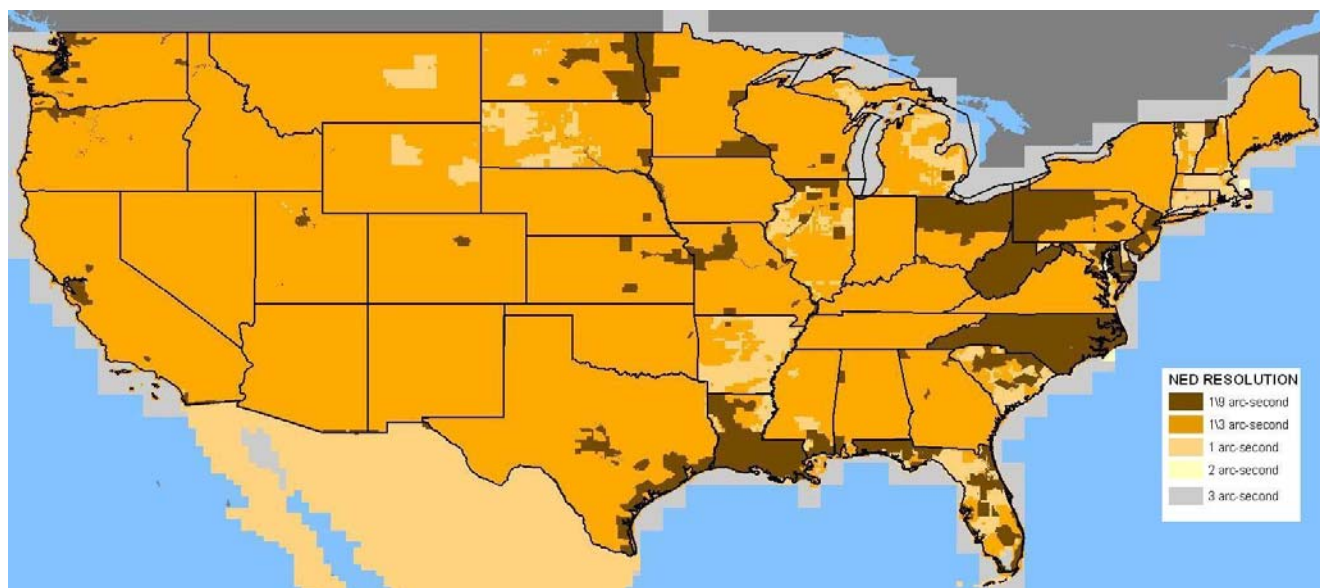

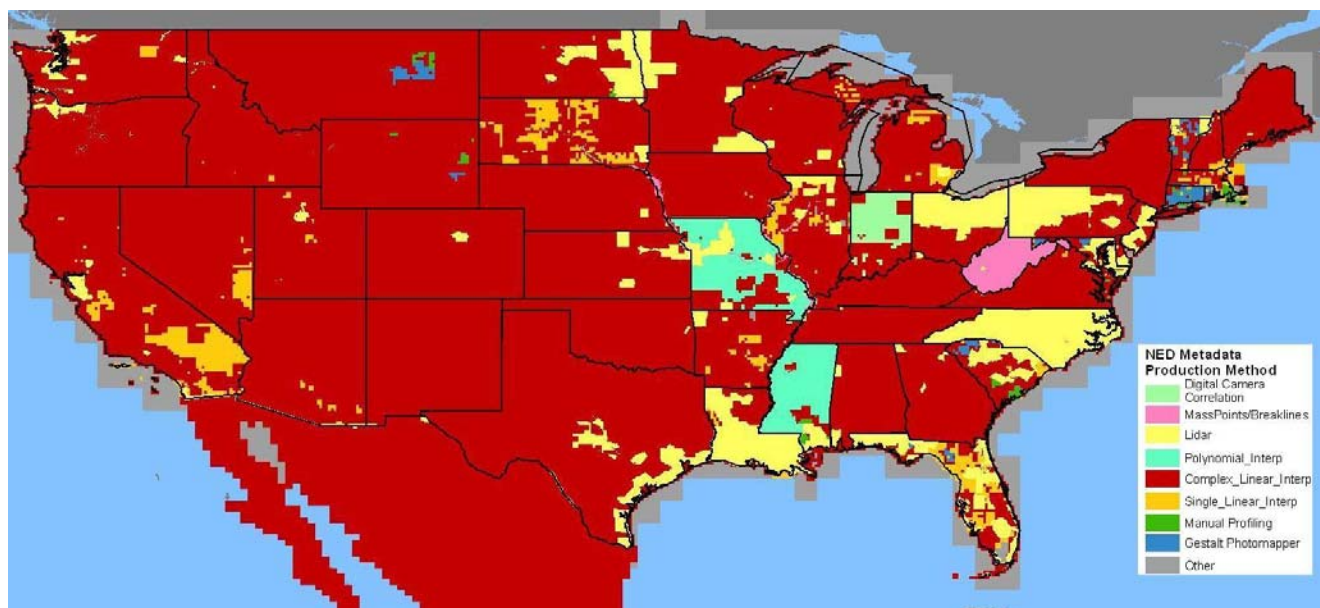**Figure 2. NED source data by resolution – August 2010 release**

Figure 3. NED source data by production method – August 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, 93 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.
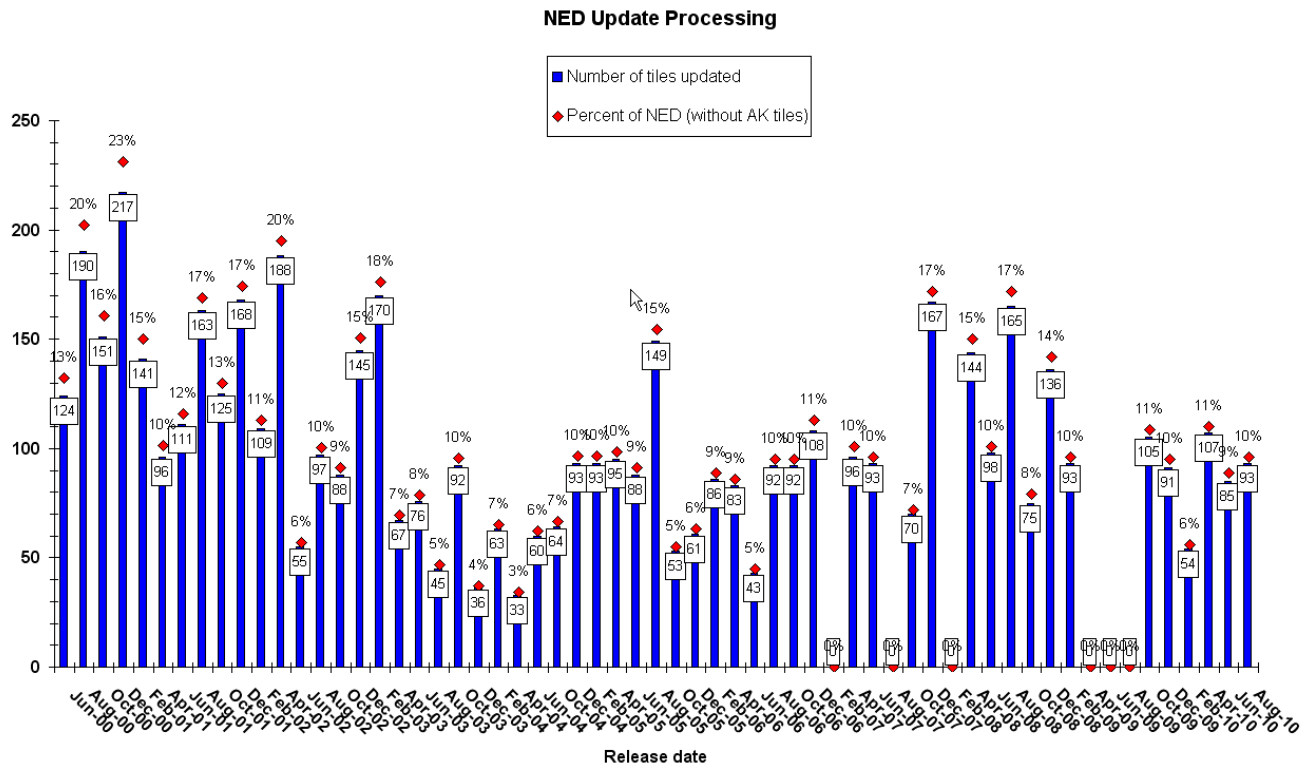.

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

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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 June, 2010 NED release continues the trend seen in previous releases, with an increase in coverage from 10-meter or better sources. (fig. 5)
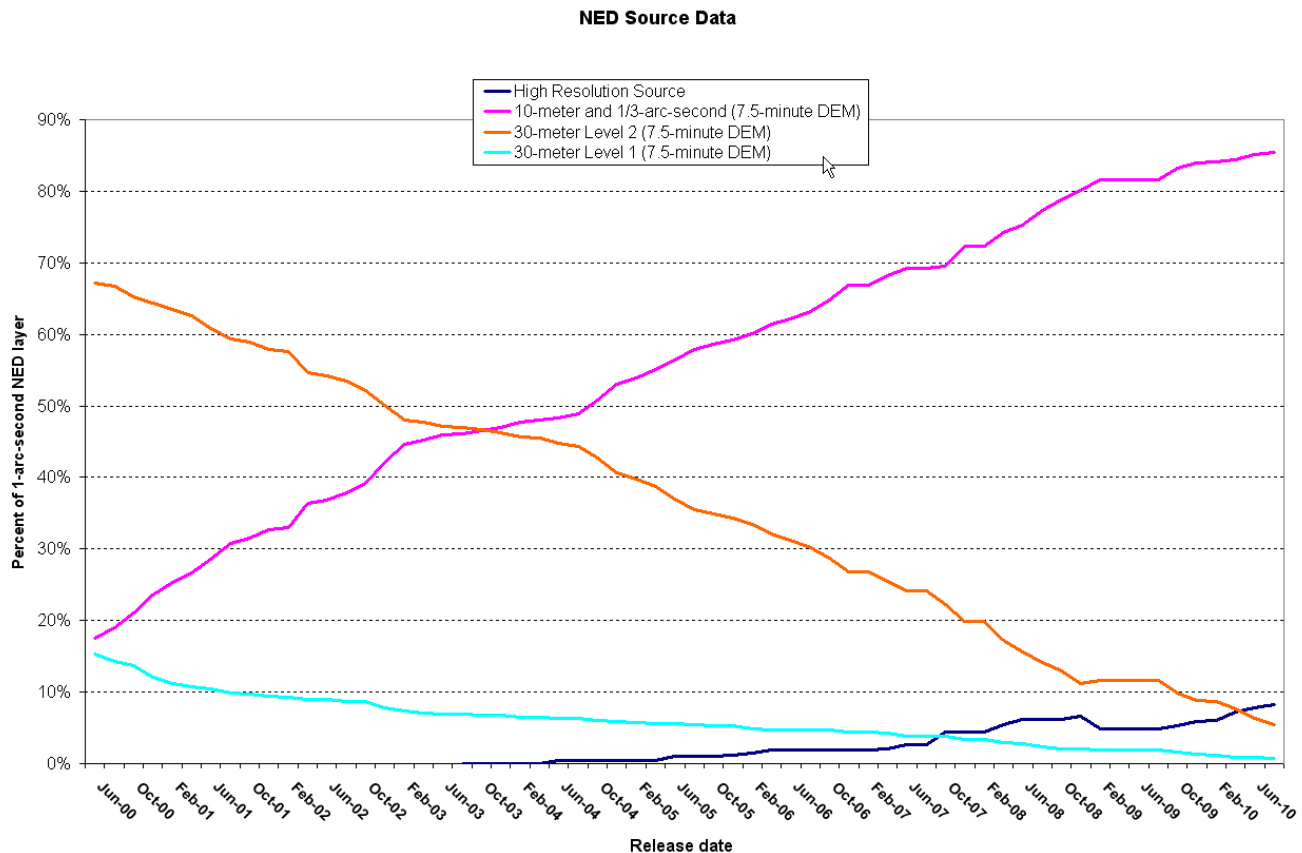
NED Source Data

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. Several more Alaska lidar datasets were released in July and August of 2010. This included two more Kenai areas and Yukon Flats. Also the original Kenai dataset release in September, 2009 was reworked filling the many data voids. Below is a graphic of Alaska showing the resolution of the existing elevation data and the data anticipated in the upcoming year.
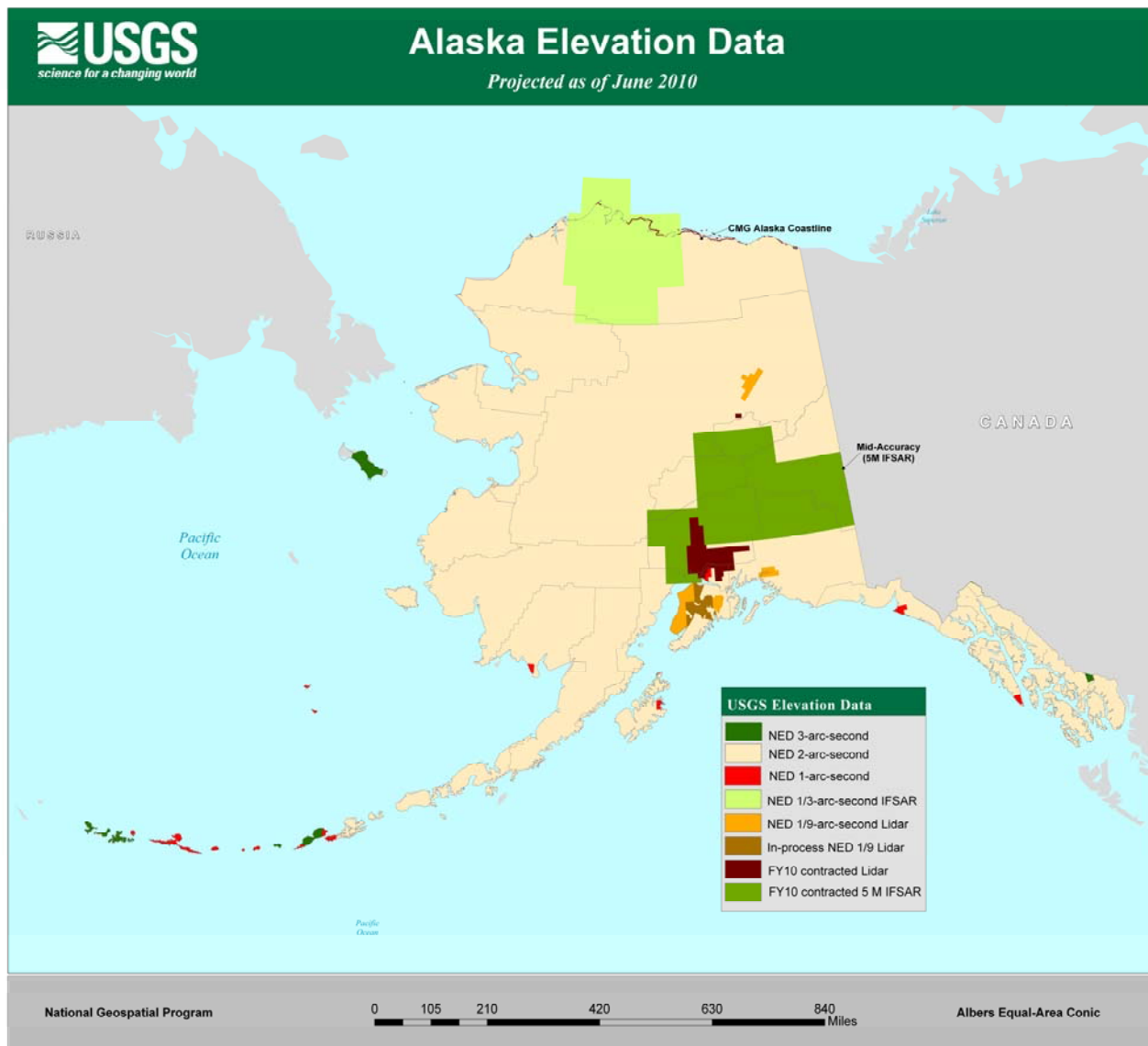
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Figure 6. Available and anticipated Alaska elevation data

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 (August 10, 2010) includes all USGS 10-meter and 1/3-arc-second DEMs produced as of July 8, 2010. Figure 7 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 may be ordered for bulk data delivery via hard drive through USGS EROS Customer Service **custserv@usgs.gov** (605-594-6151).
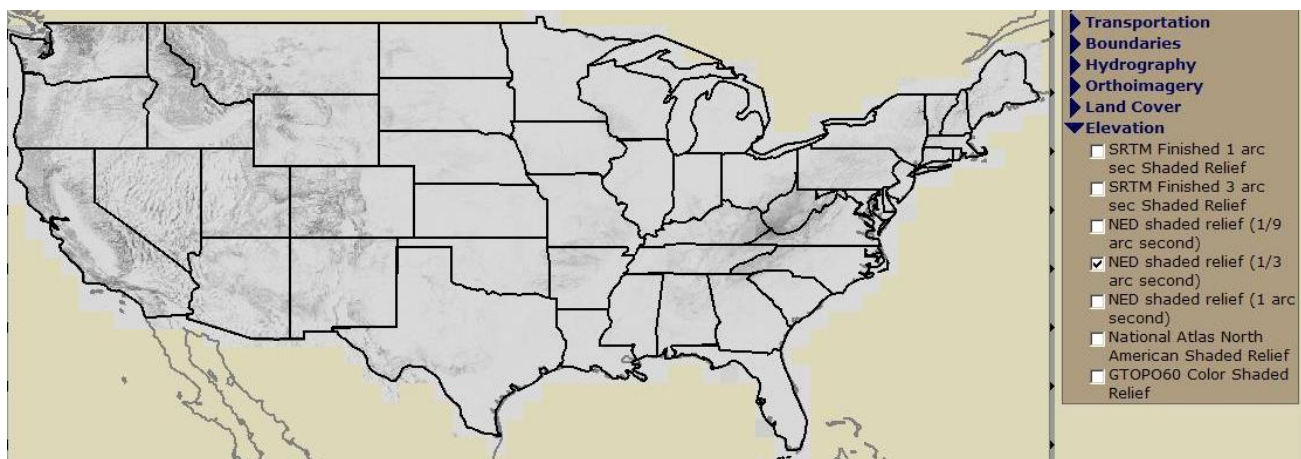

Figure 7. 1/3-arc-second NED available through SDDS

The 1/3-arc-second NED shown in Figure 7 currently covers 100% of the United States (excluding Alaska). However, source data with a resolution of 10 meters or higher currently exists for only 92% of the United States (excluding Alaska); the other 8% 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 8 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.
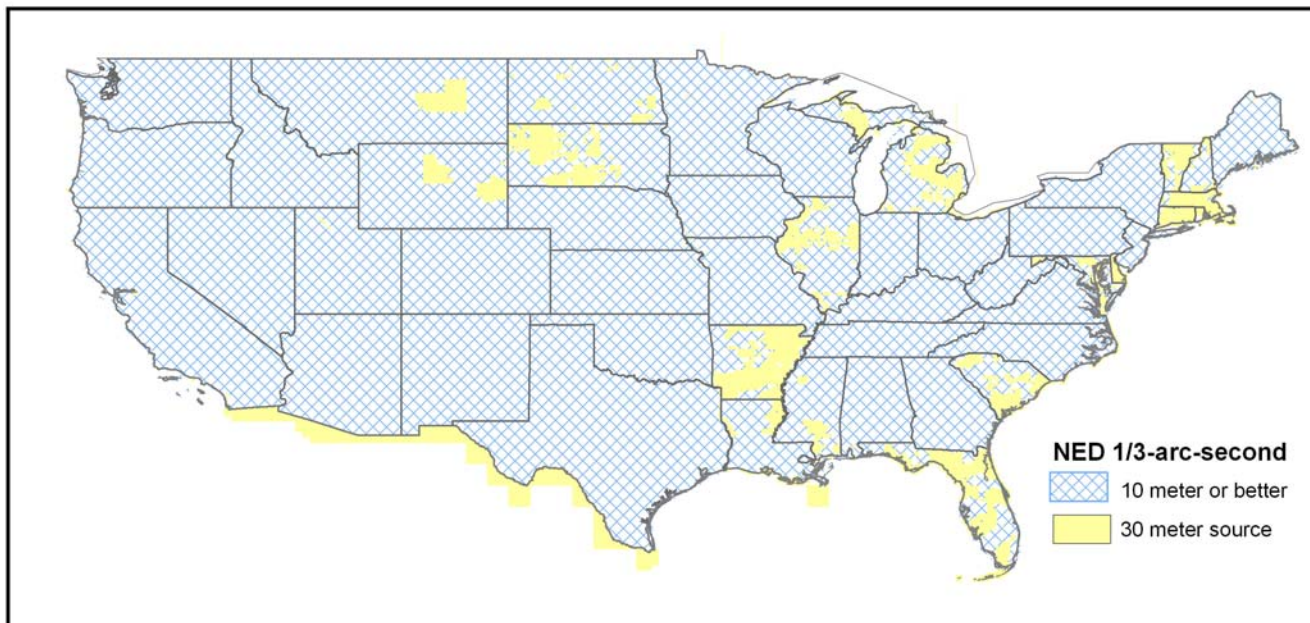
Figure 8. 1/3-arc-second NED, August 2010 release, by source resolution

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 9 shows the areas that reside in the NED 1/9-arc-second layer, as of August, 2010.
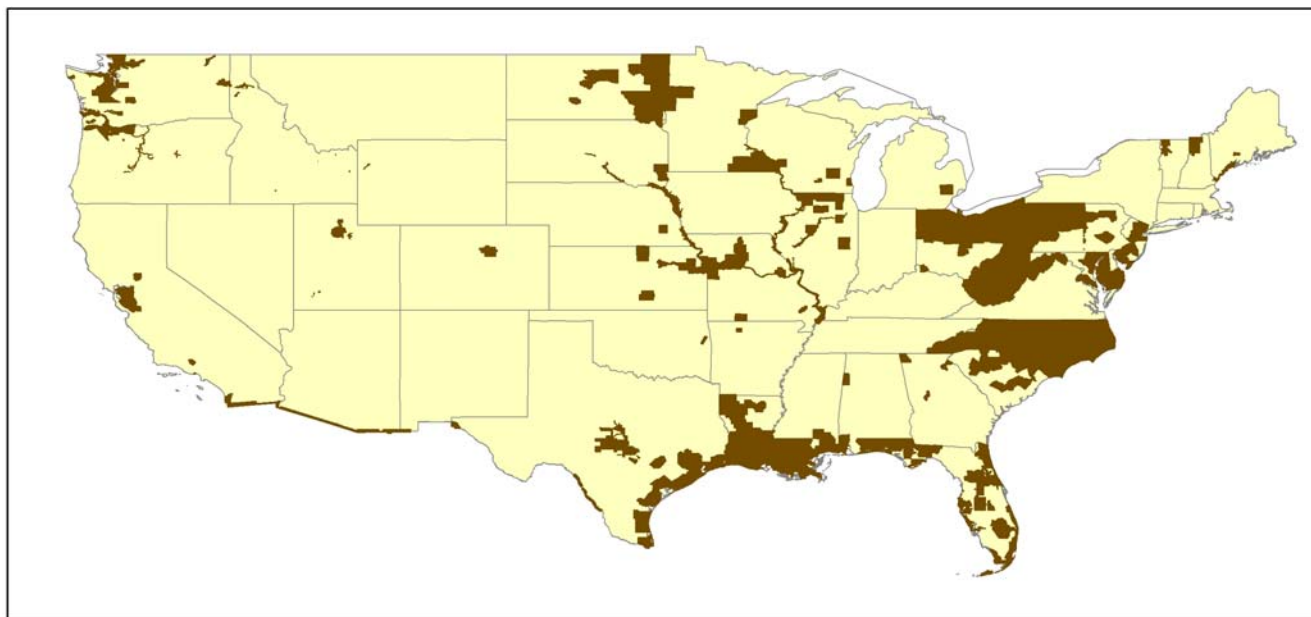

Figure 9. 1/9-arc-second NED available through SDDS--August 2010 release

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:

July, 2010

AK_KENAIEST08	AK_KENAIS08	AK_YKNFLATS09
FL_CLAYPTNM07	FL_DUVAL07	FL_FLAGLER04
FL_FRANKLN07	FL_GULFNRTH07	FL_HILLSBOR07
FL_MANATEE08	FL_MARSTLUC08	FL_MIAMDADE08
FL_NASSAU07	FL_OKLOSASO07	FL_PASCOCST07
FL_PINELL07	FL_STJOHNS08	FL_WAKULLA07
GA_BANKS09	KS_CLOUDREP09	FL_POLK07

August, 2010

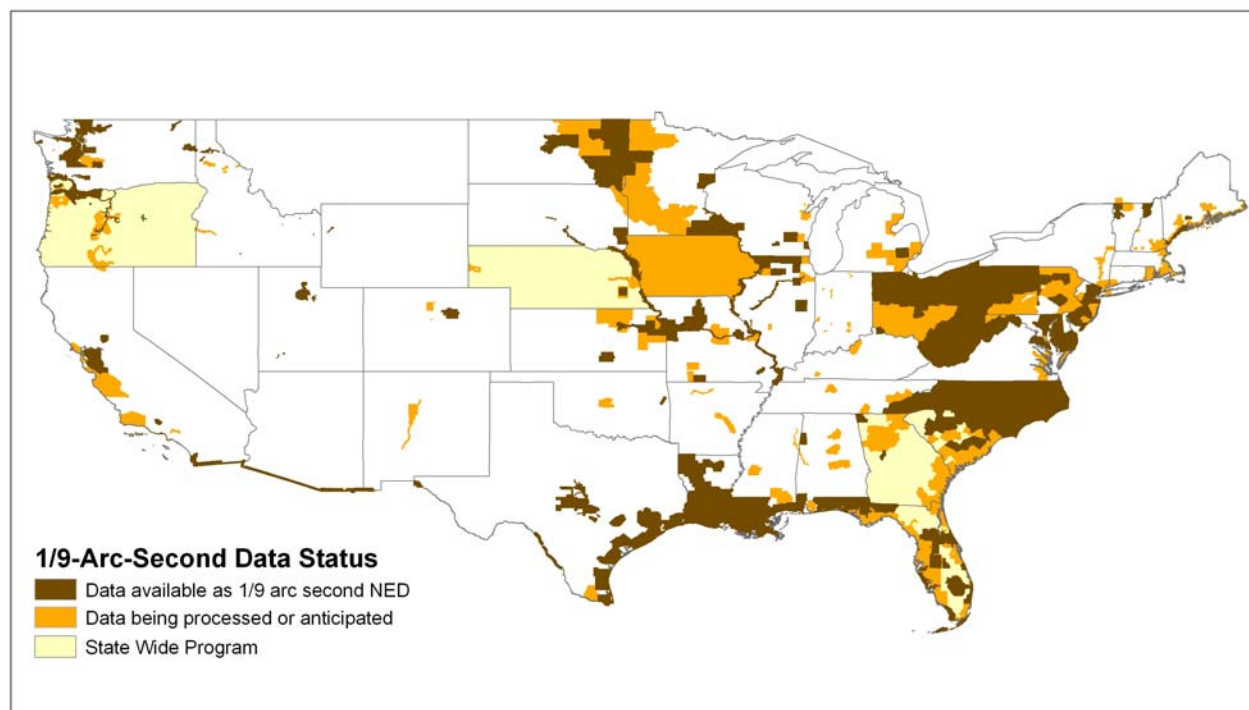|		
AK_KENAI	AR_BUFLORVR09	GA_STEPHENS09
IL_PEORIA08	MS_CPSHELBY06	ND_BISMNDN09
OH_NORTH_HF	OH_NORTH_NHF	

Figure 10. Status of the NED 1/9-arc-second layer—August 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:

August, 2010

AL_LAMAR	FL_MARION05	GA_BANKS09
KS_CLOUDREP09	MI_OAKLAND	MO_CLAYPLAT
MO_DUCKCRK09	MO_LINNSLVN08	MO_SCOTT
NJ_MERCER	TX_CENTRAL	WA_MT_RAINIER
WA_SPOKANE	WI_LACROSSE	

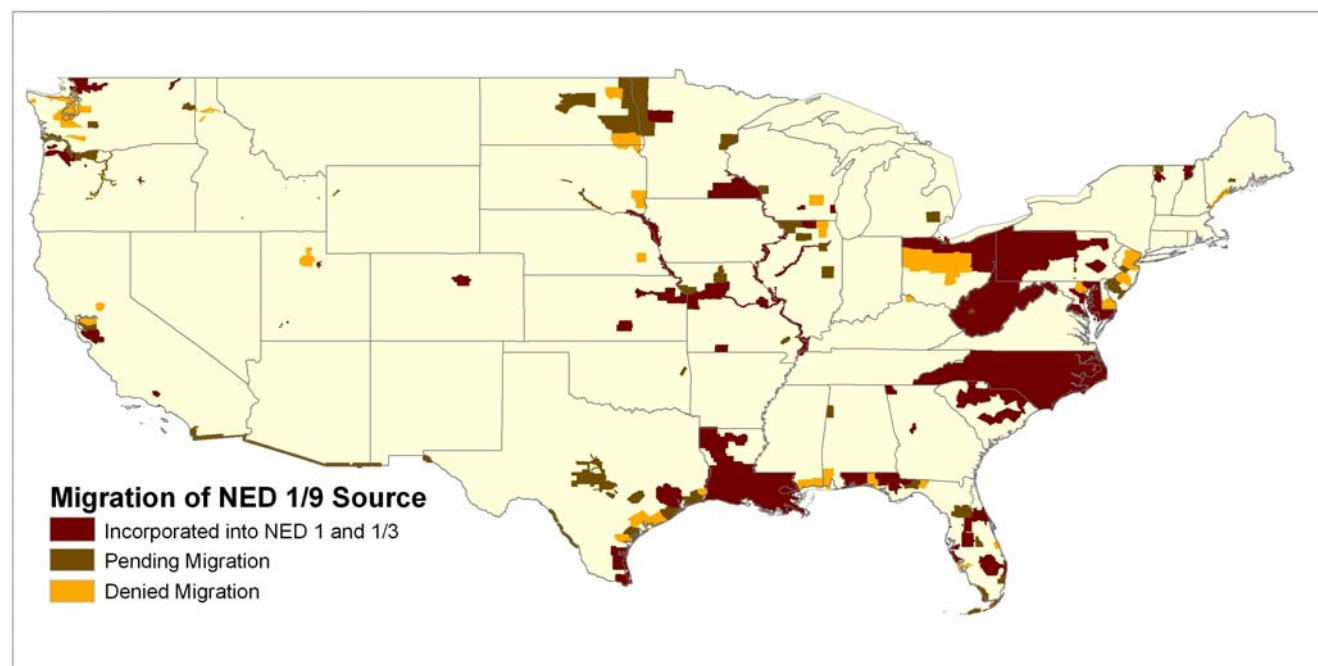**Figure 11. Migration status of NED 1/9 to other NED layers—August 2010 release**

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

NED 1 Arc Second Online Downloads (Gbytes)

NED 1/3 Monthly Online Downloads (Gbytes)

SDDS NED 1/9 Arc Second Online Downloads (Gbytes)