

USGS National Hydrography Dataset Newsletter

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by Steve Aichele and Al Rea, USGS

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NHDPlus Workshop, Sacramento, July 14-15, 2016

The NHDPlus Workshop Announcement has been posted on the [California Water and Environmental Monitoring Forum](#) website.

The NHDPlus team in collaboration with the California Water and Environmental Modeling Forum is pleased to invite you to participate in the upcoming “Getting to Know NHDPlus: Applying A National Geospatial Surfacewater Framework” Technical Workshop to be held on July 14-15, 2016 at the U.S. Forest Service (USFS) Wild Fire Training Center (WFTC) in Sacramento, CA. The Workshop is intended for Geographic Information System (GIS) practitioners, hydrologic modelers, and water resource analysts. It will provide the first opportunity, since the release of NHDPlus Version 2 in late 2012, for users to gather for formal training and to share their many applications and experiences. The latest techniques, tools, and data enhancements will be among the many topics covered. Attendees will have the chance to interact and share their own lessons learned with others from a growing and diverse NHDPlus user community. The Workshop will be conducted by the joint EPA-USGS NHDPlus team that developed and supports NHDPlus.

The NHDPlus Workshop immediately follows the American Water Resources Association Specialty Conference on GIS and Water Resources that will be held in Sacramento on July 11-13, 2016 (www.awra.org/meetings/Sacramento2016). This pairing of events presents a unique opportunity for you to engage a very active water resources geospatial community. We encourage you to attend both if you can.

The Workshop web site at www.cwemf.org/workshops/nhdpluswrkshp.htm contains information on registration, directions, computer requirements and contact information for any questions.

Attendees should bring a laptop computer with the minimum software configuration specified on the web site.

Please confirm your attendance at the Workshop by registering in advance. There is a nominal registration fee required to attend the Workshop. See the Workshop web site for payment options.

Using the Coefficient of Areal Correspondence (CAC) to Evaluate Differences between WBD Versions

By Seth Mann

The Watershed Boundary Dataset (WBD) is a national set of hydrologic boundaries that provide a common framework for water resources management and reporting. These watershed boundaries are based on standardized hydrographic and topographic delineations implemented and maintained through a USGS-led state stewardship program. While updates to WBD boundaries and codes improves their content, they require users combining information that has been associated with different WBD versions to understand how the differences may affect their project. For example, a user may desire to use the land cover indicators associated with one WBD version in combination with the demographic indicators associated with a second WBD version.

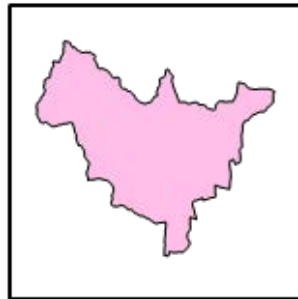
Pinpointing spatial changes between WBD versions can greatly benefit those attempting to use existing WBD indicators associated with more than one WBD version. These spatial changes can be quantified by computing a Coefficient of Areal Correspondence (CAC). The CAC is a metric used to quantify the overlap of two areas¹. It is a measure of the area covered jointly expressed as a percentage of the total area covered by both phenomena. In GIS terms, the “intersection area” divided by the “union area” for the spatial features being compared. The resulting score quantifies the extent to which a feature’s geometry and location has changed between WBD versions. A CAC score of 100 indicates no change in geometry and location for the same feature between the two versions of WBD.

The CAC process is performed in a few basic steps. First, the comparison WBD datasets are dissolved by their unique identifiers (hydrologic unit codes) to produce multi-part features. The resulting datasets are intersected, which provides the intersection area for every pair of overlapping features. Union areas are calculated for every intersecting pair of features by summing the features’ areas and subtracting their intersection area. Finally, CAC values are calculated for each pair of features by dividing the intersection area by the union area. Applying the CAC process when confronted with different WBD datasets offers a systematic approach for computing and understanding the differences so they can be considered when contemplating the intended use. For example, small differences in the geometries and location that fall below a certain user-defined threshold may be acceptable for the project.

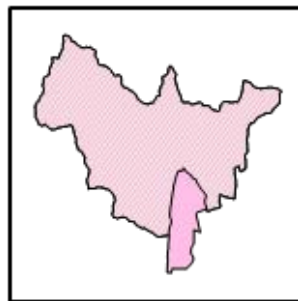
¹ Taylor, P.J., 1977, Quantitative methods in geography, an introduction to spatial analysis: Prospect Heights, IL, Waveland Press, chap. 5, 375 p.

Feature x – Past WBD Version
Area = 100 SqKM

Feature x – Current WBD Version
Area = 96 SqKM



Intersection Area (crosshatch) = 96 SqKM



Union Area = Area of both features minus the intersection area of the features
 $(100 + 96) - (96) = 100$ SqKM

CAC Value = $(\text{Intersection Area} / \text{Union Area}) \times 100$
 $(96 / 100) \times 100 = 96$

NHD Status in Region 3

By Joel Skalet

The National Hydrography Dataset (NHD) Stewardship Region 3 consists of 17 states including Minnesota, Iowa, Wisconsin, Illinois, Indiana, Michigan, Ohio, Kentucky, Pennsylvania, New York, New Jersey, Massachusetts, Rhode Island, Connecticut, Vermont, New Hampshire, and Maine. Also there are several US Forest Service sub-stewardship activities occurring in many of the states. Many different forms of stewardship exist in this region and more information will come in future newsletters. Information here has been provided by the IA State Stewards.

Stewardship in Iowa

Iowa High Resolution Hydrography and Watershed Boundary datasets is a key component of the NHD/WBD datasets and The National Map. Utilizing NHD infrastructure, IDNR continues to improve the statewide datasets to meet the needs of all stakeholders. Since the mid 2000's, the IDNR has invested heavily in the development of linework, local resolution data which is the bases for NHD high resolution. The linework derived from LiDAR and Air photo is much more precise and comprehensive in data quality and coverage.

NHD conflation includes flowline, waterbody area delineation, and segmentation to integrate NHDFlowline, NHDArea, and NHDWaterbody from local resolution dataset to high resolution datasets according to the standards of the NHD. IDNR is developing robust and seamless high resolution hydrography dataset that will improve the statewide coverage of hydrography data. As part of the development of this dataset, great efforts have been made to incorporate rich and useful data attributes into the NHD.

The dataset provides not only cartographic representation but the IDNR is utilizing the dataset in various programs as a baseline dataset and as an Inventory Systems and Hydrological Event Management tool. As a result, the state of Iowa continues to provide the National Hydrography Dataset (NHD) and Watershed Boundaries Dataset (WBD) high resolution datasets according to the standards and framework of the NHD. This benefits all stakeholders including the various programs within the state and NHD/WBD and The National Map.

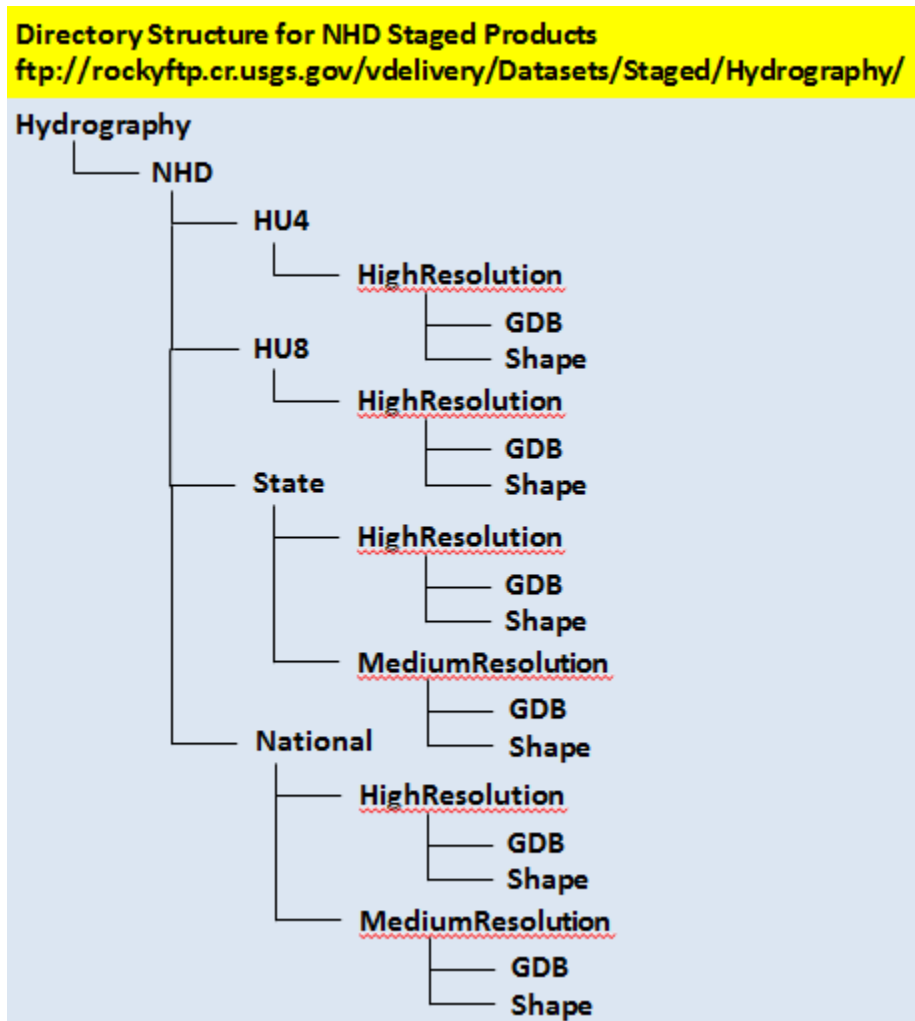
Changes to NHD Staged Products Distribution

By Helmut Lestinsky

Data for NHD staged products has been moved to a different directory on the ftp server. The names of files have also been changed, although this name change is still a work in progress, as explained below. The new ftp directory is

<ftp://rockyftp.cr.usgs.gov/vdelivery/Datasets/Staged/Hydrography/>

In the previous ftp directory, all NHD products were placed into one directory, which sometimes required some effort to locate a desired product. In the new and improved structure, notice that the products are split into separate domain areas of interest - HU4 and HU8, as well as State and National. For example, all State products are placed into a separate directory, then split into separate resolution directories, and then split into separate directories for GDBs and Shapefiles.



In each GDB or Shape directory (except National), there should be three files for every product. These three files are an xml metadata file that is required for internal database cataloging, a jpg snapshot file that is required for internal use that applications such as the TNM viewer consume, and a zip file that contains all of the data, plus also includes the aforementioned external xml and jpg, which both are redundant, but required for internal USGS use.

The xml provides both generic boilerplate and product specific metadata information. Tags of note in the metadata xml are:

| | |
|-----------------|--|
| <pubdate> | when this file was created |
| First <onlink> | path to file on ftp server |
| First <begdate> | earliest date found in NHDMetadata table |
| First <enddate> | latest date found in NHDMetadata table |

The naming convention for a typical HU4 product is

NHD_H_0105_GDB.zip or NHD_H_0105_Shape.zip
H means it is high resolution, and 0105 is the number of the HU4. There are no medium resolution HU4 products.

The naming convention for a typical HU8 product is

NHD_H_01010009_GDB.zip or NHD_H_01010009_Shape.zip
H means it is high resolution, and 01010009 is the number of the HU8. There are no medium resolution HU8 products.

The naming convention for a typical State product is

NHD_H_08_GDB.zip or NHD_H_08_Shape.zip
H means it is high resolution, _M_ means it is medium resolution, and 08 is the FIPS code number for the state, in this example, Colorado. There are medium resolution State products, but the data is vintage 2014. The state FIPS code in the name is a temporary oversight, and soon future products will have the state abbreviation in the name rather than the FIPS code, for example, NHD_H_CO_GDB.zip. Until that time, file lookup aids have been placed in the State subdirectories that provide the FIPS code conversion, such as this sample in the State GDB subdirectory,
ftp://rockyftp.cr.usgs.gov/vdelivery/Datasets/Staged/Hydrography/NHD/State/HighResolution/GDB/!State_FIPS_Codes_Readme.htm

The naming convention for the National product is

National_NHD.zip
There are currently no National Shapefile products, just GDBs.

Metadata Viewer v1.1.2.0 for ArcGIS 10.3.1 available

By Mike Tinker

USGS would like to announce the official release of the Metadata Viewer 1.1.2.0 for ArcGIS 10.3.1. The Metadata Viewer Add-In tool allows for quick display of feature-level metadata and source citation records for NHD and WBD features. The traditional method to view metadata for both NHD and WBD features is to select the features in ArcMap, then follow relates to the records in the metadata tables. Data extracts from the National Map viewer or downloads from the NHD FTP site include relationship classes (though replicate checkouts from the stewardship site do not.) The Metadata Viewer replaces the need to navigate all those relates. Now, you can just select the features with the Metadata Viewer cursor, and the associated metadata and source citation records are immediately displayed in the Metadata Viewer. The tool also provides export options in PDF and Excel formats. Currently this tool operates with NHD model 2.2 data, in ArcMap 10.3.1, on both NHD data downloads from the NHD FTP site, as well as on data acquired from the NHD stewardship site. The Metadata Viewer does not display dataset-level FGDC metadata, however, this is normally viewed in ArcCatalog. Download the tool from: <http://nhd.usgs.gov/tools.html>

April 2016 NHD Network Improvement Project Status Report

By Cynthia Ritmiller, Project Manager

The NGTOC continues its focus on the Network Improvement Project with the goal of identifying and correcting network and data quality issues existing in the high resolution NHD. One of the key drivers for this effort is the need to provide data ready to use for the production of NHDPlus High Resolution (NHDPlusHR). Data is being reviewed and edited to support the production schedule for NHDPlusHR beginning with Regions 06, 01,12,02,14,and 15. Coordination with appropriate NHD POC's will begin prior to review. Please see status information for details.

Network Improvement- Status:

Network Improvement Regions Completed: 06, 20, 21 and 22

Network Improvement Regions In Work:

***Note: For all regions listed below, as new data becomes available it will go through the QA/QC process.

Region 01- Sub-regions 0101-0109 were sent to Horizon systems. Sub-region 0110 will be sent to Horizon Systems soon. Cynthia Ritmiller is reviewing and completing any necessary edits.

Region 02- Chris Helm is reviewing sub-regions 0202 - 0208.

Region 04- Cynthia Ritmiller completed edits in 0409.

Region 07- Cynthia Ritmiller is reviewing sub-region 0714.

Region 10- Bob Merson, Tanya Torres, and Allen Karsh is reviewing sub-regions 1005 - 1030.

Region 12- Sub-regions 1201, 1202, 1207, 1210, and 1211 were sent to Horizon Systems in April. Sub-region's 1205, 1208, and 1209 were sent to Horizon Systems in March. Sub-regions 1203, 1204, and 1206 are being edited by Cynthia Ritmiller and Tanya Torres.

Region 13- Cynthia Ritmiller is reviewing sub-regions 1301 and 1304. Sub-regions 1302- 1303, 1305 - 1309 have been reviewed.

Region 14- New data was received for 1401 - 1408. Chris Helm and Tanya Torres will be reviewing sub-regions 1401- 1408.

Region 15- New data was received for 1501 - 1508. Once the data has been QC'ed sub-region's will be assigned and reviewed.

Region 16- Carol Brady is reviewing sub-regions 1601-1606.

Region 17- Cynthia Ritmiller completed the last remaining sub-basin 1707.

NHD Photo

The NHD Photo this month is contributed by Al Rea. The photo depicts DOI's mascot wading in to the Yellowstone River. Kudos to Al for getting the bison to pose facing in the official direction.

Check it out at [NHD Photo of the Month](#)

NHD Quiz

The answer to last month's hydrography quiz was Keuka Lake, the prehensile digit of the Finger Lakes in Upstate New York.

James Simard was the first to respond with the correct answer to last month's hydrography quiz. James is a GIS Analyst and Manager for inland flood models at AIR Worldwide. AIR Worldwide (AIR) provides catastrophe risk modeling solutions that make individuals, businesses, and society more resilient. AIR models the risk from natural catastrophes and terrorism globally. Insurance, reinsurance, financial, corporate, and government clients rely on AIR's advanced science, software, and consulting services for catastrophe risk management, insurance-linked securities, site-specific engineering analyses, and agricultural risk management. AIR Worldwide is headquartered in Boston with additional offices in North America, Europe, and Asia.

Others with the correct answer were: David Straub, Joanna Wood, Stephanie Kula, Evan Hammer, Ellen D'Amico, Ricardo Lopez-Torrijos, Barbara Rosenbaum, Gerry Daumiller, Matt Rehwald, and Jennifer Foote. Hammondsport, the village at the south end of Keuka Lake, was the home of Glenn Curtiss, a pioneer in aviation, and possibly the inspiration for Tom Swift in the eponymous series. Much of the early testing (and some of the crashing) was done on Keuka Lake. I also discovered from the responses that Hammondsport is the home of the first bonded winery in the U.S.

This month's hydrography quiz can be found at the [Hydrography Quiz](#)

What is the name of the feature indicated by the red arrows?

Send your responses to saichele@usgs.gov