

USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

High Resolution NHDPlus

The USGS is moving forward with the development of the high resolution (1:24,000-scale) NHDPlus for the nation. The NHDPlus at medium resolution (1:100,000-scale) has been around for several years and has had a huge impact in developing new methods for analyzing surface water systems. Now it is time to continue this success story with the high resolution NHD. This will enable users to get the best of both worlds, detailed data and powerful attributes, in one dataset, and eliminate the quandary of having to choose between one of the two, which splits data enhancement investments.

It is envisioned that the high resolution NHDPlus value-added attributes can be used to produce generalized NHDPlus products at courser scales, such as 1:100,000-scale. If a generalized 1:100,000-scale product meets the needs of current medium resolution NHDPlus users, there may be no reason to manage and maintain a separate medium resolution NHDPlus in the future.

The key benefit of NHDPlus is obtaining stream flow and velocity estimates for each flowline reach. This is a major milestone in mapping and transitions geospatial science from an era of simply mapping that a stream is there, to an era in which the amount of water in the stream is known through streamflow estimate modeling. A stream will no longer be just a stream, but rather a stream characterized with flow volume and velocity. This is done by integrating a vast set of parameters about the landscape and running them through a model.

During the week of October 27, the USGS met with its NHDPlus contractor, Horizon Systems Corporation, to finalize the production strategy. Horizon Systems has been the NHDPlus contractor for EPA in developing the medium resolution NHDPlus. They will modify the existing NHDPlus production software for high resolution production. In addition, the USGS will modify its existing NHDPlus terrain processing software for high resolution production.

Important subjects of the meeting were: (1) The data model to house the new information with minimal change to the existing NHD and NHDPlus. (2) Creating Value Added Attributes to make the flow network more intelligent. (3) Improving the network to eliminate flow errors. (4) Working with elevation data at a ten-meter resolution, a nine-time expansion from existing NHDPlus. (5) Working with vector data at high and local resolution, a ten-time expansion from existing NHDPlus. (6) The 22-step workflow necessary to combine NHD, WBD, and NED into an integrated landscape model. (7) How to deal with known problems in NHD, WBD, and NED. (8) How to resolve conflicts in the interaction between NHD, WBD, and NED. (9) Scheduling the inputs and outputs of the production process. (10) Designing software that will transition from contractor to government systems. (11) Sizing the proper hardware configurations. (12) Optimizing the interoperability between NHDPlus and StreamStats. (13) Interface between U.S., Canadian, and Mexican data. (14) Creating layer level and feature level metadata. (15) Maintenance of the processes. (16) Applying generalization to build applications-appropriate datasets.

Much progress was made at resolving the above list, but much additional work will be needed as production is ramped up and initiated. This contract calls for the production of six hydrologic regions by October, 2015. The government will then assume production for the remaining sixteen hydrologic regions in the following three years with completion estimated for 2018.

October WBD Status Report by Stephen Daw

The USGS is working with the 10.0 and 10.1 versions of the WBD ArcGIS edit tool. No official new release of the software was released in FY14. The development team is now working on a release of the software for ArcGIS 10.2.2. This release is expected before the end of the 2014 calendar year. Minor bug fixes have been addressed, but no enhancements to the tool are going to be implemented. Behind the scenes, the ArcGIS 10.2.2 version of the WBD Edit tool will support USGS' backend database migration to ArcSDE 10.1. The new tool will support ArcSDE 9.3.1 until the upgrade in databases is made. It should be noted that once the upgrade in databases is made at the USGS, the WBD Edit tools for ArcGIS 10.0 and ArcGIS 10.1 will no longer work and cannot be used.

Some users have reported difficulty submitting completed jobs to USGS for National Quality Control (NQC). The reason for this is a heightened awareness of possible cyber threats to USGS and Department of the Interior networks and computers. All incoming data must pass through appropriate security measures before it can arrive on the WBD FTP server. Because of this needed security, failed jobs may need to be resubmitted in order to get through. The best and easiest way to resolve this is to check out smaller areas to work on. Large jobs are particularly prone to failure. Please contact Stephen Daw through the Hydrographic Data Community to report posting issues.

The most current national seamless WBD posted on the pre-staged ftp site (<ftp://rockyftp.cr.usgs.gov/vdelivery/Datasets/Staged/WBD/>) is dated September 24, 2014. There are some problems with this dataset as some lines are missing around the Great Lakes and in Canada as well as some polygons missing in Canada. No National Seamless was generated in October. A new National Seamless WBD should be available in November that will include many updates to the ToHuc field. The USGS is making every effort to ensure that the missing lines and polygon problem will be fixed in the November release.

Please note that the Hydrographic Data Community (HDC) is now the primary method of communication with the WBD steward community. If stewards have a question or concern, please visit <https://my.usgs.gov/confluence/display/hdc/Hydrographic+Data+Community> first to find answers to your questions or concerns. Also, if stewards do not find an answer on the HDC pages, please make a blog post there with a question, comment, or concern and the USGS will address the issue forthright. Also be sure to "watch" the WBD HDC pages for updates and important notices. For more information contact Stephen Daw, WBD National Technical Coordinator, sgdaw@usgs.gov, 303-202-4418 / 720-545-7087

Proposed Changes to NHD Maintenance Training Program by Bill Smith and Joel Skalet

In an effort to keep the NHD Maintenance Training Program current and efficient for potential NHD editors, the USGS is proposing changes to the Web Based training program.

Current Web Based NHD Training Program: Currently, there are two web-based classes held each month. The first Thursday of each month a web-based training session is offered. This session consists of (1) NHD background information, including how the NHD was created, (2) from what digital data, (3) the scale of the NHD, (4) an overview of the NHD delivery and editing format, (5) a discussion of the Feature Datasets, and (6) Feature Classes and all features found in the NHD. A discussion detailing the difference between the "Training/Testing/Development" websites and NHD Update Toolbar versus the "Production" website and tool is highlighted. How to "Check Out" an NHD dataset for editing, how to load and display the NHD Update Toolbar, and functionality of the NHD Toolbar are discussed. All Questions are answered, and attendees are asked to "Check Out" a training dataset, load the training data, and complete several edits before the next session.

The third Thursday of each month, a follow up session is conducted. This session answers any questions from the previous session, then discusses in detail the Quality Control (QC) process required to upload any edits back to the NHD National Geodatabase. During this session, attendees ask any editing or QC related questions they may have found in their practice editing.

Proposed New Web Based NHD Training Program: The proposed new NHD Maintenance Training will consist of three (3) web-based sessions, each of which must be completed successfully to move on to the next web-based session.

Initial Contact with USGS: Before a potential NHD editor/attendee may sign up for the first web-based session, they will be required to contact their USGS NHD Point of Contact (POC) to discuss their interest in editing the NHD, and understand all the training requirements which must be completed successfully before moving to production editing. Each trainee will be required to create a new NHD User account to gain access to the Development/Training Stewardship website, all required software will be discussed, loaded, and verified to be operational, the NHD User Guide will be discussed and reviewed, and each potential NHD editor will be required to create a new MyUSGS account to access the Confluence, Hydrography Data Community (HDC), where all training information concerning the NHD will be located. After all of the above have been successfully completed, attendee will be qualified for NHD 101 – NHD Basic training session.

NHD 101 – Basic NHD Training: The first Web Based session, NHD 101 – NHD Basic Training will be conducted the first Thursday of each month, typically running for four hours (breaks included). This web-based session will discuss all NHD background information, discuss the different NHD Feature Datasets, Feature Classes and features, and important concepts in the NHD, including Permanent Identifiers, ReachCodes, and flow in the NHD. Upon successful completion and evaluation, each attendee will be qualified for Part 1 - NHD Update Toolbar Training session.

Part 1 - NHD Update Toolbar Training: The second Web Based session, Part 1 - NHD Update Toolbar Training, will be conducted the second Thursday of each month, typically running five hours (including breaks). This web-based session will review the NHD Update Toolbar, discuss Development versus Production websites and tools, review the entire NHD editing process from Check-Out to Check-In including basic Initial Quality Control (QC) checks, basic understanding of the Reviewer table, a review of all Utilities functions, basic Final QC checks, and start actual hands on use of the functionality of the NHD Update Toolbar. After successful completion and evaluation each attendee will be qualified for Part 2 - NHD Quality Control Training.

Part 2 - NHD Quality Control Training: The Third Web Based session, Part 2 - NHD Quality Control Training, will be conducted the fourth Thursday of each month, typically running five hours (including breaks). This web-based session will discuss Initial and Final Quality Control (QC) processes, will detail the use of the Reviewer table, and will review all steps required to complete the QC process. Each attendee will be required to access, load, and pass Final QC on a prepackaged NHD dataset and resolve particular Final QC issues, to demonstrate the attendee understands the basic steps required to resolve QC issues.

Completion of Training and Advancement to Production Editing: Once all the above training requirements have successfully been completed, the potential NHD editor will be contacted by the USGS Regional POC, and given instructions on how to create a new Production NHD User account on the Production Stewardship web site. They will then be able to Check Out and edit Production NHD. Congratulations.

Question and Answer Session – Technical Exchange Meetings: Twice monthly, typically the first and third Wednesday’s of each month, an NHD Technical Exchange Meeting (TEM) will be held. The TEM schedule is available on the Hydrographic Data Community (HDC)/Hydro Community Events calendar. These meeting will be conducted to provide the latest information on the NHD Update Toolbar and process, and answer any questions NHD editors might have. Any NHD editor may attend these sessions and may ask any NHD related questions they may have. The goals of these meetings are to give all NHD editors the latest information on issues and techniques that will make the NHD editing process more efficient.

If anyone has any questions or comments concerning the proposed direction of the NHD Training program, please feel free to contact Bill Smith at 303-202-4493, email at wjsmith@usgs.gov, or Joel Skalet at 608-238-9333, extension 152, email at jjskalet@usgs.gov.

New Stewardship Fact Sheet

A new fact sheet about hydrography stewardship is available at: <http://pubs.usgs.gov/fs/2014/3084/>

Abstract: The National Hydrography Dataset (NHD) and Watershed Boundary Dataset (WBD) were designed and populated by a large consortium of agencies involved in hydrography across the United States. The effort was led by the U.S. Geological Survey (USGS), the U.S. Environmental Protection Agency (EPA), and the Natural Resources Conservation Service (NRCS). The high-resolution NHD dataset, completed in 2007, is based on the USGS 7.5-minute series topographic maps at a scale of 1:24,000. There are now 26 million features in the NHD representing a 7.5 million mile stream network with over 6.5 million waterbodies. The six-level WBD, completed in 2010, is based on 1:24,000 scale data and contains over 23,000 watershed polygons.

The NHD’s flow network, attribution, and linear referencing are used to conduct extensive scientific analyses. The NHD is ideal for cartographic applications such as the US Topo topographic map series, and also is available on the Geospatial Platform, which provides shared and trusted geospatial data, services, and applications for use by government agencies, their partners, and the public. The WBD watersheds are used by scientists and managers to identify discrete drainage areas. The ongoing maintenance of the NHD and WBD is essential for improving these datasets to meet the ever increasing demand for currency, additional detail, and more significant attribution. The best source of information about changes in local hydrography are users closest to the data, such as State and local governments, as well as Federal land management agencies, and other users of the data. The need for local knowledge has led to the creation of a collaborative data stewardship process to revise and maintain the NHD.

Mapping Alaska’s Water

The Alaska Hydrography Technical Working Group (AHTWG) has produced a brochure on mapping Alaska’s Water. The AHTWG promotes a strategic vision that supports the maintenance, stewardship, and use of common hydrography datasets for state, federal and other partners. See ftp://nhdftp.usgs.gov/Hydro/Images/AHTWG_brochure.pdf

Network Improvement Project Status by David Kraemer

During October Region 15 (Lower Colorado) was completed for the Double Check phase of the Network Improvement project. Currently in work for the Double Check phase are Regions 05 (Ohio), 14 (Upper Colorado), and 16 (Great Basin). The Double Check phase is correcting any additional errors in the NHD Geodatabase that would prevent the creation of NHDPlus. Regions 01 (New England), 06 (Tennessee), and 22 (Pacific Islands) are in work for NHDPlus preparation. Region 19 (Alaska) is the final Initial

phase Network Improvement Region in work and is being edited as part of the Alaska Hydrographic Image Integration project.

October is also a month of employee transition within Network Improvement. Cynthia Ritmiller will now lead the project as David Kraemer transfers to transportation data. Charles Bowker is now editing Region 19 (Alaska), replacing Anthony Litschewski who retired. Allen Karsh is continuing on in Network Improvement and Catlin Reusch-Zerr has joined the project.

The Network Value Added Attribute of the Month

Do you know your VAA's? This NHD Newsletter article is the ninth in a series to describe each of the Network Value Added Attributes. The flow network embedded in the NHD is what gives NHD its analytic power. The Network VAA's boost this power by pre-calculating a number of network characteristics to make network analysis richer and easier to exploit. This month will examine Divergence.

Divergence is another flag, similar in concept to StartFlag and TerminalFlag discussed last month. All NHDFlowlines will be linked to Divergence flag in the VAA table. If Divergence = 0, the flowline is not part of a divergence. If Divergence = 1, the flowline is the main path of the divergence. If Divergence = 2, the flowline is the minor path of the divergence. Thus, if Divergence = 1 the NHDFlowline would likely be a canal or ditch that is taking water out of a stream or lake and diverting it for some use such as irrigating crop lands. Divergences can be very common, particularly in farming and ranching country of the west. For example, the Colorado Headwaters sub-region in Colorado has over 12,500 divergences. However, most of the ditches that water is diverted into are not in the NHD.

NHD Photo of the Month

This month's photo was submitted by Jeff Simley of the USGS.

See ftp://nhdftp.usgs.gov/Hydro_Images/ShoshoneDam.JPG. It is a picture of Shoshone Dam on the Colorado River just east of Glenwood Springs, Colorado. At the time of the photo the water was flowing at 2,200 cubic feet per second. The drainage area is 4,390 square miles. Submit your photo for the NHD Photo of the Month by sending it to jdsimley@usgs.gov.

September Hydrography Quiz / New October Quiz

Amy Prues of CSS-Dynamac was the first to guess the September NHD quiz as Upper Bay in New York Harbor. See <ftp://nhdftp.usgs.gov/Quiz/Hydrography110.jpg>. Amy is a GIS Specialist with Dynamac Corporation in Cincinnati, Ohio, working as an on-site contractor for the U.S. EPA. Her current projects involve watershed studies, Green Infrastructure in Health Impact Assessments (HIAs), and urban soils research.

Others with the correct answer (in order received) were: Duane Lund, Gerry Daumiller, Daniel Button, Al Rea, John Griffin, Jim Sherwood, Richard Patton, Dave Hockman-Wert, Jon Becker, David Straub, Roger Barlow, Linda Davis, Stephanie Kula, Matt Rehwald, Donovan Powers, Carl Zulick, Tom Christy, Joanna Wood, John Lynam, John Kosovich, Dennis Dempsey, Evan Hammer, and Janet Kellam.

This month's hydrography quiz can be found at <ftp://nhdftp.usgs.gov/Quiz/Hydrography111.jpg>. What is the name of the highlighted lake? Judging from the surrounding lakes you should know whereabouts in the country this is located. Then it's a matter of honing in and finding the right pattern of lakes and finally recognizing the lake amongst the lakes. See <http://www.youtube.com/watch?v=o83xxWCe18g>. Send your guess to jdsimley@usgs.gov.

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

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The NHD Newsletter is published monthly. Get on the mailing list by contacting jdsimley@usgs.gov.

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Jeff Simley, USGS, assumes full responsibility for the content of this newsletter.