

USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

The State of NHD Region Four: Part 1 by Dave Arnold

National Hydrography Dataset (NHD) Stewardship Region Four is comprised of 14 eastern states, the District of Columbia, the U.S. Virgin Islands, and Puerto Rico. It is one of the most active areas of stewardship in the country. While many of these states are active in stewardship, others have a stewardship that is currently dormant, or in some states there is no stewardship at all. The following is part 1 of an assessment of each state. Much of this is provided by state stewards or USGS state liaisons.

Florida: Florida continues supporting the NHD program by providing a full time team of five employees dedicated to the maintenance and improvement of the database. The NHD is recognized and used as the base hydrography layer for analysis, mapping, and modeling needs. The state communicating to the end users through newsletters has increased awareness of what the NHD offers, generated requests on how to use the database in analysis, and they have also triggered feedback with local knowledge that editors sometimes wouldn't be able to determine through aerial imagery assessment alone. Increased use of Light Detection and Ranging (lidar) data, availability of local digitized storm water drainage systems, continued database enhancement with estuary delineation, coastline improvement, and updating named bays are some of the things the NHD team is looking forward to in future work.

Missouri: The Missouri Department of Natural Resources became the primary steward of the NHD in 2010 and started editing the NHD based on the prioritization of watersheds that came from comments the staff in the department's Water Protection Program had been recording in the Missouri Clean Water Information System over the years. The state uses the NHD in the Water Quality Assessment System. This web application manages spatial and business data regarding water quality monitoring sites, impaired waters, use attainability assessments, acute toxicity events, and non-point source pollution areas. The NHD is also used in the public e-permitting system that was implemented in the summer of 2012 that was designed to automate applying for and obtaining National Pollutant Discharge Elimination System (NPDES) land disturbance permits. The state uses the Hydrography Event Management (HEM) tool, to create and manage a suite of event themes. The department is currently managing over 100,000 linked data events as versioned data sets with attribute rich data views in their enterprise geodatabase. In the future these events will be published to the state's spatial data clearinghouse.

Arkansas: Arkansas has recently completed a number of NHD projects including, pipeline/stream crossings in the Fayetteville Shale areas of the state, introduced local resolution NHD using LiDAR data, and edited and updated the high resolution NHD for the entire state. Arkansas continues to refine the high resolution NHD for the state, and they will continue to use lidar to add local resolution data.

West Virginia: West Virginia has played an NHD stewardship role since 2001. Through long-term collaborative efforts with other state partners such as the West Virginia Division of Natural Resources, the West Virginia Department of Environmental Protection (WVDEP), and the West Virginia Bureau of Public Health these efforts have helped in the analysis of issues critical to the state's water resources, such as the impacts of surface mining on stream loss and changes to hydrologic regimes, stream habitat health, and threats to public water supplies. These efforts laid the foundation for subsequent work at the USGS and with partners such as WVDEP with the current implementation of StreamStats and WaterSmart initiatives in West Virginia.

Louisiana: Louisiana recently finished a 2.25-million dollar project that completed statewide updates of the high resolution NHD. For areas north of the Intracoastal Waterway, conflation was used to update the

existing data, while south of this boundary the existing data was completely removed and new data was introduced. The state steward is currently promoting the NHD to end users in the state. To date, the updated NHD has been used by the Louisiana Department of Transportation & Development (LADOTD) in preparing Municipal Separate Storm Sewer System (MS4) storm water permits. Using the NHD saved thousands of hours of fieldwork and hundreds of thousands of dollars that would have been needed to perform that work. Recently, the newly updated flowlines were used in a “story map” to depict the new flow pattern created by the formation of Mardi Gras Pass. LADOTD, the state geographic names authority, is using the story map as part of their application to the US Board on Geographic Names (BGN), to officially name the feature that became the first distributary to form in the Mississippi River Delta in almost a century, on Mardi Gras Day, February 21, 2012. The map can be found in the LADOTD Map Gallery at <http://gis.dotd.la.gov/AGOSToryMaps/MardiGrasPass/index.html>.

Network Improvement Project Status by David Kraemer

This month for the Network Improvement project Region 04 was completed for the Initial phase and Region 12 was completed for the Double Check phase. All NHDPlus QA/QC checks that have a Severity Level 1 (must be fixed) are included for the first time in the NHD Update Tools version 6.1.0.21 that was released on July 10th.

The Initial phase (NHD HUC-02 late 2011 snapshot) of the Network Improvement project has two remaining sub-basins in the continental United States; 08030202 and 08030207. Once Mississippi completes conflation then Network Improvement will edit these sub-basins. Region 19 is also in the Initial phase and is being edited as part of preparing the Alaska Hydro Image Integration projects. The Double Check phase (NHD HUC-04 multiple dates snapshot) is correcting any additional errors that would prevent the creation of the NHDPlus VAA. Currently in work for the Double Check edits are Regions: 01, 05, 09, 13, 15, and 18. Region 06 has been run through NHDPlus QA/QC checks a third phase and 06010105 is being edited before creating NHDPlus VAA.

The additional rounds of running NHDPlus QA/QC checks and making Network Improvement edits is necessary due to network errors introduced into the NHD Geodatabase by NHD edits done in the time between Network Improvement completion and the creation of NHDPlus VAA. Most pre-staged NHD File Geodatabase Sub-Regions are available with mid-May, 2014 dates (Model 2.1) and late-July, 2014 dates (Model 2.2). So any Network Improvement edits to the NHD Geodatabase after those dates are only available through custom extracts.

Initial Network Improvement Regions Completed: 01, 02, 03, 04, 06, 07, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, and 22.

Double Check Network Improvement Regions Completed: 02, 06, 07, 12, and 20.

Ready for NHDPlus: Regions 07, 12, and 20

NHD Update Tools Monthly Training by Joel Skalet

NHD Update Tools training sessions are being held on a monthly basis in a 2-part series via webex. Training is being coordinated by Joel Skalet, NHD Region 3 Point of Contact, and presented by Bill Smith, NHD Region 2 Point of Contact. Part 1 will be held on the first Thursday of each month, and Part 2 will be held on the third Thursday of each month (subject to change due to conflicts). To be qualified for the training, students must have a basic knowledge of the NHD. This would include having an understanding of the NHD model, PermanentID's, Reachcodes, the flow network, feature attribution, and features found in the NHD. This information can be obtained on the NHD website, <http://nhd.usgs.gov/>. There are many videos and tutorials including the User Guide which has all of the necessary information to gain that basic knowledge. A document will be made available to all trainees detailing what is required

to be completed prior to attending the webex training. Interested trainees will be asked to create an NHD User Account, first on the Stewardship Beta Website (<http://usgs-mrs.cr.usgs.gov/stewardbeta/>), and then after training on the Production Stewardship Website (<http://usgs-mrs.cr.usgs.gov/stewweb/>). Also, trainees will need to create an account on the NHD Confluence site known as the Hydrographic Data Community (<https://my.usgs.gov/confluence/display/hdc/Hydrographic+Data+Community>). As always, if anyone has questions about any of this, please contact your NHD Regional Point of Contact.

Part 1 of the training will discuss the difference between the beta website and the production website. The NHD User Guide will be introduced. The USGS will display the Update Tool, and do a complete review of it. Trainees will learn how to access data, download a job, and open a job. There will also be a complete review of the NHD Editing Process. Part 2, which is a review of the QC process, will include 'Initial QC', 'Severity 1 vs. Severity 3 errors', 'how to use the Reviewer table', 'creating filters with the Reviewer table', and 'Final QC'. In the two weeks in between Parts, students will be asked to use training data and training software to exercise what they've learned without fear of corrupting data. For further information or to sign up for training please contact Joel Skalet, jskalet@usgs.gov.

How to use the National Hydrography Dataset (NHD) in ArcGIS Online by Al Rea

Have you ever wanted to get a very quick view of what's in the NHD for an area that you haven't downloaded? Even if you have the data on your hard drive, I've found the quickest way to see the basic NHD features is through the ArcGIS Online (AGOL) viewer. (Note: This is a great tool to use for the monthly Hydro Quiz.) I've made a very simple web map in AGOL that accesses an NHD dynamic map service from The National Map (TNM). To give it a try, open this link: <http://bit.ly/1puvHOn>

Zoom to your area of interest. You can use the standard map zoom tools, or type in a place name or street address in the search box in the upper right of the window. You need to be zoomed in to a scale where the NHD streams can be displayed reasonably. If you don't see any streams on the map, click on the "plus" symbol in the upper left corner of the map to zoom in more. Notice that in the legend there is a scrollbar once you're zoomed in so that streams begin to display. The NHD streams are called "Flowline – Small-Scale" or "Flowline – Large Scale", and appear at the bottom of the legend. You will need to zoom in so that the scale bar in the lower left corner of the map shows one mile or less to see the ephemeral streams, which are in a dashed brown line style. (Note that ephemeral streams are not shown in all areas.) Intermittent streams are shown in a light blue dashed line style. If you have used this service in the past, you may notice that the symbology has changed recently.

There are several other map services from The National Map that might be of interest to you. A listing can be found here: <http://viewer.nationalmap.gov/example/services/serviceList.html>. You can bookmark that URL, or just remember this: Search for The National Map, go to the main page, and on the left under Products and Services, click on the Framework Web Feature Services link. You should be able to open the ArcGIS Online map above without having an AGOL login account. If you do have an account, you can save the map as your own and customize it as you like. The TNM services listed above may also be added to your map, along with anything else that is out there on the web.

Enhancements and Edits to the NHD Update Tool Documentation by Dave Arnold

The NHD Update Tool documentation was released in March 2012 along with the initial release of NHD Update Tool version 4.0.3 for ArcMap 9.3. There have been a number of intermittent versions of the tool released over the last two years, but the help documentation has remained mostly static. Support for ArcMap 10.0 was released with NHD Update Tool version 5.0.1 in March 2013 and in July 2013 version 6.0.1 was released, providing support for ArcMap 10.1. On July 10, 2014, NHD Update Tool version 6.1.0 was released and included enhancements and bug fixes. This is the best tool to date and all stewards

should be using it. Over the years the tool has had new features added, the user interface has changed significantly, and the ArcMap application has changed in both appearance and functionality, all of which has resulted in the help documentation becoming outdated.

Work has begun on updating the documentation with current screenshots for all tool utilities, and textual descriptions are being changed to match the new screenshots. All contextual help buttons found throughout the tool's user interface, which are associated with specific tool functions have been updated. Pressing these blue buttons with a white question mark will take you directly to the pertinent help document. The quality control check section will be updated to match the current tool, and it will be expanded to include methods for updating each of the quality control check errors that can appear. A frequently asked questions section is being added, along with an index and the ability to search the help documentation. If you find any errors or have suggestions for additional content, please send them to Dave Arnold at darnold@usgs.gov.

HEM News by Mike Tinker

The most recent Hydrography Event Management (HEM) Technical Exchange Meeting, on July 23, covered the following important items:

Next version of HEM Desktop tools:

The next version of the HEM tool version 2.7.2.0 will be compiled Arc10.2.2. This will be released by the end of this fiscal year.

HEM Compatibility:

There have been a few questions recently about compatibility of HEM Desktop tools. The following are the only scenarios for HEM developed, tested, and supported: (1) Win 7/ArcGIS 10.0/NHD Model 2.1 – HEM 2.5, (2) Win 7/ArcGIS 10.1/NHD Model 2.1 – HEM 2.6, (3) Win 7/ArcGIS 10.2.1/NHD Model 2.2 – HEM 2.7. Issues may be encountered in unsupported environments.

Call for user feedback at the Hydrographic Data Community HEM Blog:

The USGS is very interested to know your HEM set up, especially if you are using the HEM tool in an SDE or Citrix environment. HEM on SDE and Citrix should work, but the USGS does not currently have resources to test this setup. So please let the USGS know if you are using HEM in an SDE environment. Please post your experiences in the HEM Blog at:

<https://my.usgs.gov/confluence/display/hdc/HEM+Product+Blog> (Label as “hemblog” when you make the blog post). You will need an account at MyUSGS.gov. If you don't have an account contact Mike Tinker to get set up at hem@usgs.gov. The Hydrographic Community at MyUSGS.gov is the primary method to stay in touch with partners with announcements and blogs. Become involved!

Locations of Tools:

The latest version of the tool is always located at <http://nhd.usgs.gov/tools.html>. All versions of the HEM tools, with source code, located at <https://my.usgs.gov/confluence/display/hdc/HEM+Tool+Downloads>

Re-announcing the HEM WEB:

The HEM Web tool was designed to show off the NHD's first web feature service. Please check it out—the USGS wants your feedback! See: <https://edits.nationalmap.gov/demo/HemWebEditing/>.

The sample web application is a Java script application. It allows the user to place point and line events that are referenced to the NHD. The sample web application was built in-house to show off the Server Object Extension (SOE), the geoprocessing extension that allows HEM functionality. The SOE also allows the HEM Web Sample Application to query a read-only instance of the hydrography layer (NHD) of the National Map. The event types in the sample web application, such as Dams, Stream Gages, Water Quality Stations, are the kinds of events the USGS needs. You may need totally different kinds of events in your organization. It's a *sample application*, and development is limited.

HEM Web Development:

Two weeks ago the USGS finished a HEM Web sprint where some outstanding issues with the SOE product were addressed. The USGS is now in the middle of another HEM Web sprint where a few more

outstanding issues with the SOE will be covered. Development will focus on the SOE, specifically the ability to add and edit multi-route events. The Java script Sample App will see only limited development, if any at all. The USGS is preparing the HEM Web SOE to be the first functionality to be a part of the forthcoming NHD online editing tools, what we are currently calling “Vector Web Edit” tools.

To use the HEM Web in your organization:

Your organization is responsible to build a Web Application that fits your organization's needs. Then set up an SDE or ArcGIS Server to house your agency's events. The USGS will supply the documentation to link your web application into the USGS SOE (which is really just a service at a URL). The USGS can also supply you with its Java script sample Web Application. Study the script if it will help you to set up your own web application, or alter it to suit your agency's purposes. Your events would be stored locally on your own ArcGIS server.

Announcing the release of two new NHDPlusV2 tools – by the NHDPlus Team

The NHDPlusV2 VAA Navigator uses the NHDPlusV2.1 Network Value Added Attributes to provide network navigation with a number of user options. The navigator performs four types of navigations: upstream main stem, upstream with tributaries, downstream main stem, and downstream with divergences. The navigator may be used in ArcMap via the VAA Navigator Toolbar or called from user-written program code. When used in ArcMap, the navigator will navigate any NHDPlusV2.1 Vector Processing Unit (VPU). When called from user-written program code, it is possible to navigate a multi-VPU drainage area like the Mississippi or the Colorado. The Navigator provides navigation stop distances and filtering of navigation results based on several NHDPlusV2 attributes. Navigations can be done with whole NHDFlowline features or from point-to-point along the network.

Catchment Allocation & Accumulation Tool (CA3TV2) has two main functions, an attribute allocation function and an attribute accumulation function, which may be used separately or in combination. The CA3TV2 allocation function takes a user-supplied raster dataset of landscape attributes and allocates the attributes to the NHDPlusV2 catchments. For each NHDPlusV2 NHDFlowline network feature, the CA3TV2 accumulation function builds the upstream accumulated values for attributes that have been allocated to either NHDPlusV2 catchments or NHDPlusV2 NHDFlowline features.

Both tools along with their documentation and associated data are posted on the tools page at

http://www.horizon-systems.com/NHDPlus/NHDPlusV2_tools.php

On the documentation page, there is a new version of the NHDPlusV2 User Guide and new NHDPlus presentations.

http://www.horizon-systems.com/NHDPlus/NHDPlusV2_documentation.php

The first version of the NHDPlusV2 Global Data is also available. It contains BoundaryUnit (polygons for VPUs and RPUs) and Super Catchments (see the User Guide for more details about these files).

<http://www.horizon-systems.com/NHDPlus/V2GlobalData.php>

The Network Value Added Attribute of the Month

Do you know your VAA's? This NHD Newsletter article is the sixth in a series to describe each of the Network Value Added Attributes. The flow network embedded in the NHD is what gives the 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 PathLength.

Last month discussed the TerminalPathID. This is simply the hydrologic sequence number of the network's terminal NHDFlowline feature. For example, if the NHDFlowline emptying into the Gulf of

Mexico on the Mississippi River is “52”, then the TerminalPathID of all flowlines upstream with be “52”. The PathLength is the distance from the current NHDFlowline to the terminating NHDFlowline.

Doug Nebert (1962-2014) by Tommy Dewald

In early June, I learned from a colleague that Doug Nebert had been killed when his private plane crashed in Toledo Oregon. Doug was a good friend and a true pioneer in geospatial data and technologies. I was privileged to work with Doug in the early 1990s, during the formative stages of the National Spatial Data Infrastructure, when he was a member of the joint USGS-USEPA technical team that designed and delivered what we now know as the National Hydrography Dataset. His technical understanding and vision were always highly-valued. Doug had many such successful collaborations over the years both nationally and internationally. Tributes to Doug’s numerous significant contributions can be found on the OGC blog at opengeospatial.org/blog/2038.

NHD Photo of the Month

This month's photo was submitted by Christopher Clauson, Planning Director at Santee-Lynches Regional Council of Governments in Sumter, South Carolina. This photo is of the Wateree River in South Carolina taken at Patriots Landing. See <ftp://nhdftp.usgs.gov/Hydro/Images/WatereeRiver.JPG>. Submit your photo for the NHD Photo of the Month by sending it to jdsimley@usgs.gov.

June Hydrography Quiz / New July Quiz

Gerry Daumiller of the Montana State Library was the first to guess the May NHD Quiz as the south end of San Francisco Bay in California. See <ftp://nhdftp.usgs.gov/Quiz/Hydrography107.jpg> Gerry been a GIS analyst at the Montana State Library since 1988. The Montana State Library Geographic Information program is a Principal Steward of the NHD in Montana and is the state’s steward for administrative boundaries, parcels, geodetic control, geographic names, land use/land cover, structures and addresses, transportation, and wetlands. Gerry maintains the online GIS Data List and the state’s version of the geographic names layer. He is also Montana’s advisor to the U.S. Board on Geographic Names. Gerry recognized the South Bay in the quiz because he was stationed at Travis Air Force Base in the late 1970s and looked at maps of the area whenever there was a need to go to a concert or a beach in the area.

Others with the correct answer (in order received) were: Ray Fox, Linda Davis, Jim Sherwood, Jim Seay, Matt Rehwald, Laurie Williams, Donna Knifong, Carl Zulick, Al Rea, Richard Patton, Joanna Wood, Ron Wencil, David Straub, Steve Shivers, Danniell Button, Ronald Hall, David Asbury, John Kosovich, Janet Kellam, Stephanie Kula, Aaron Cuthbertson, Dennis Dempsey, Bernie McNamara, Chris Cretini, Roger Barlow, and Evan Hammer.

This month’s hydrography quiz can be found at <ftp://nhdftp.usgs.gov/Quiz/Hydrography108.jpg>. Where is this? The purple polygon is an estuary. 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.

Thanks to Dave Arnold, Paul Kimsey, David Kraemer, Joel Skalet, Al Rea, Mike Tinker, Tommy Dewald, and Cindy McKay.

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

You can view past NHD Newsletters at http://nhd.usgs.gov/newsletter_list.html

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