

USGS National Hydrography Dataset Newsletter
Vol. 9, No. 12, October 2010
by Jeff Simley, USGS

StreamStats and the NHD by Al Rea and Pete Steeves

StreamStats is a Web-based Geographic Information System (GIS) that provides users with access to an assortment of analytical tools that are useful for water-resources planning and management, and for engineering design applications, such as the design of bridges. StreamStats allows users to easily obtain streamflow statistics, drainage-basin characteristics, and other information for user-selected sites on streams. NHD users will find several NHD-based tools here that currently are unique to StreamStats. One simple tool is the Zoom To Reach Code tool. If you know an NHD Reach Code in a particular state, this tool will take you there quickly. The StreamStats development team also currently is rolling out a suite of more sophisticated NHD-based network trace tools. These tools currently are available only on the Interactive Maps for Massachusetts, New Jersey, Maryland, New York and Pennsylvania, but eventually these functions will be available on all state web sites. The tools include Raindrop Trace to Network, Network Tracing (which allows the user to discover event data, including stream gages and dams, linked to the network,) and Show Network Path and Profile (a tool that traces a network path between two points and shows the elevation profile of the traced path.) Another tool, Estimate Flows Based on Similar Streamgaging Stations, is application specific for StreamStats, allowing users to search the network for gages up or downstream and offering gage-proximity-weighted flow statistics as an alternative to regression derived ones. See <http://water.usgs.gov/osw/streamstats/instructions1.html> for more details about these functions. The tools are designed to work on hydrographic networks generally, and are not limited to NHD. The initial implementation is based on Hi-Res NHD, but the USGS also plans to add the NHDPlus and potentially other stream networks. The user can configure the tools to work on the network of their choice. In the future, the USGS plans to offer these tools as web services that may be called from other applications, not just the StreamStats map interface.

StreamStats is being implemented on a state-by-state basis, and now more than half the states have been implemented. For more information see the StreamStats web site at <http://streamstats.usgs.gov>. Click the link to State Applications to link to the individual state's explanatory page and then link to the Interactive Map from there.

California Aqueducts in the NHD by Kristiana Elite

A number of major long-distance aqueducts in California play a significant role in the trans-basin transfer of water in the state. The USGS is now working to accurately represent these aqueducts as a part of the NHD flowline network. This will allow modelers to correctly account for water diversions and also provide cartographers with a meaningful mapping of these features. Recent accomplishments for correcting and adding major trans-basin diversions into the NHD are those off the Lower Colorado River system as well as major diversions off the Sacramento River in California. See the August 2010 Newsletter for information on the Central Arizona Project. In addition to correctly representing the Canals and Pipelines of these diversion aqueducts, the Point of Withdrawal point event location on the network has also been identified and encoded in the NHD using NHDPointEventFC.

On the Lower Colorado, the Colorado River Aqueduct, All American Canal and Coachella Canal have all been successfully represented in the NHD. The Colorado River Aqueduct withdraws 1.2-million acre-feet per year from Lake Havasu at Parker Dam and travels 242 miles, terminating near Riverside, CA, supplying water to the Los Angeles basin. The All American Canal withdraws approximately 3-million acre-feet per year at the Imperial Dam and travels 82 miles to supply water to the Imperial Valley in

California. Finally, the 123-mile long Coachella Canal withdraws from the All American Canal to irrigate 78,530 acres of agricultural land in the Coachella Valley of California.

The five major diversions off the Sacramento River have been completed. These aqueducts include the Anderson Cottonwood, Corning, Glenn-Colusa, Tehama Colusa, and the Sacramento River Deep Water Ship Channel. The longest canal being the Tehama Colusa Canal, traveling 111 miles with a maximum capacity of 1.9-million acre-feet per year.

The NHD principally uses the FType of Canal and Pipeline to represent aqueducts with an FCode Aqueduct as a specific descriptor. In some cases Stream/River has been utilized in the aqueduct system. In other cases Artificial Path inside areal canals and rivers is used. As NHDFlowline features, these all allow an accurate flow network of the diversions to be created.

The State of Illinois Receives NHD GeoConflation Training – by Ray Postolovski

The State of Illinois is actively seeking to improve the NHD by utilizing LiDAR data being collected in the state. As a result of the LiDAR collection, the USGS Illinois Water Science Center and the Institute of Natural Resource Sustainability, Illinois State Water Survey are working together to pilot a project to conflate the NHD with more accurate hydro features derived from LiDAR data. To understand the conflation process, a training workshop was held in September with the USGS Illinois Water Science Center and the Illinois State Water Survey. They learned about how to prepare the raw hydro data to conflate and the conflation workflow. To learn more about conflation, contact Ray Postolovski at rpostolovski@usgs.gov or Elizabeth McCartney at emccartney@usgs.gov.

Reach Migration News by Stephen Daw

The modification of NHD ReachCodes to align with the new WBD HU8's continues. Currently 2,175 subbasins out of 2,265, or 96%, have been successfully migrated. Of the remaining 89 subbasins, 28 have been migrated once but are being run again to catch one or two artificial paths that the original migration rule set missed. As these final 89 subbasins are checked in from editing, reach migration will be run. The USGS hopes to complete all reach migrations by the end of the calendar year. If there are any questions about reach migration, the current status, or would like a list of the subbasins that are not completed, please contact Stephen Daw at sgdaw@usgs.gov.

Watershed Boundary Dataset News by Stephen Daw

The latest version of the official WBD is: WBDHU12_19Oct2010_ArcGIS9.2_File.gdb. This file can be found at: <ftp://gateway2.ftw.nrcs.usda.gov/Gateway/WBD/>.

As a reminder, the WBD layer provided in the NHD is not the most current WBD data. Until stewardship operations switch over from the Natural Resource Conservation Service in Ft Worth, Texas to the USGS, in Denver, the WBD data in the NHD will be static. The WBD team is planning a refresh of this data before the Thanksgiving holiday. This will update the WBD from a version created in April 2010 to a version updated this month. That update will remain in place probably until the USGS goes live with the WBD data in early 2011.

WBD editing tools are under development right now. It is anticipated that a beta version of the tools will be released during the month of November for testing by members of the WBD State Stewardship Work Group. If anyone would like to test the tools and provide feed-back, please contact Stephen Daw at sgdaw@usgs.gov within the next week or two.

Canada-U.S. Transboundary Hydrographic Data Harmonization Efforts Gain Momentum

An excellent story appeared in the Vector1 online GIS newsletter on U.S. – Canada hydrography harmonization. Click on the link below. Here is an excerpt: “Understanding these transboundary water resources has never mattered more, from environmental, economic and social perspectives. How the two countries manage their transboundary basins affects the lives and livelihoods of the people who live and work in these basins. Important ecosystems and the wildlife habitat they support depend on the waters of these basins. Major industries – shipping, hydroelectric generation, fishing, forestry, agriculture and tourism – depend on the health of these water resources, and on the level and predictability of their flows. For many Native Americans and Aboriginal peoples, the transboundary waters remain important sources of food and cultural identity.” The story discusses the geospatial solutions for addressing these issues. <http://www.vector1media.com/articles/features/16076-canada-us-transboundary-hydrographic-data-harmonization-efforts-gain-momentum>

Finding a ReachCode in The National Map Viewer

Since the NHD viewer will switch over to an instance of The National Map viewer next month, here is a primer on using the new viewer. For this exercise we will try to find the reach code of the Columbia River just below the Grand Coulee Dam in Washington. Doing this with the viewer is not particularly intuitive, but can be done easily if you push all the right buttons. The best way to do this is to use The National Map Viewer <http://viewer.nationalmap.gov/viewer/>. You can also get to this from the current NHD website <http://nhd.usgs.gov> by clicking on Data and then clicking on Go to NHD Viewer NHD Geodatabase. Then click on To Begin Using the New Viewer bar on top. This takes you into the new The National Map Viewer. Then zoom in to the area of interest (using your mouse left-click-down to pan and wheel-forward to zoom-in), in this case Grand Coulee Dam. If you don't know where the dam is, the task is a bit difficult because the viewer does not show major landmark features at small scale. However you can use the <Find a Place> bar at the top of the map. Enter "Grand Coulee Dam" and click Search. This will zoom-in to the approximate location at 1:72,000-scale. The hydrography data you see is simply a map cache for viewing purposes. You really want to see the actual NHD data in order to interrogate it. To do this click the <Overlays> right arrow on the left margin of the viewer. Check the <Hydrography (NHD)> empty box to turn on the hydrography and the plus box to expand the hydrography layers selection. This is where the task becomes particularly tedious. We are interested in the High Resolution NHD only. So expand <Medium Resolution> and un-check all layers. Then expand <Hydrologic Units> and un-check all layers. Now we want to find the ReachCode for the Columbia River below Grand Coulee Dam. The areal extent of the Columbia River is represented by the polygon in NHDArea, or in this case NHDWaterbody because a Lake/Pond is formed above the dam. However, in either case the river itself is represented by the Artificial Path flowing through the polygon. We cannot see this because the NHDArea and NHDWaterbody overlay NHDFlowline which contains the Artificial Path. So now we need to turn off NHDArea and NHDWaterbody by un-checking these layers in the expanded <High Resolution> theme. Now that this is done, we can see the Artificial Path extending downstream. Note that the map viewing cache is still turned on so we can still see the areal extent of the Columbia River. Now to find the ReachCode: Click on the GIS Tools box at the top of the viewer. Then click on the Identify button. Then use the cursor to click on the Artificial Path. You might need to cycle through this twice to get it to work. On the left panel the Selection window will activate and list the features selected. In this case the Columbia River is listed. Click on this. A window will open to list all feature attributes including the ReachCode which is 17020005008092. Although this process seems complicated, it goes faster the more you become familiar with how the viewer works. As the USGS invests more in this viewer, this process will become more streamlined.

NHD Photo of the Month

This month's photo was submitted by Linda Davis of the Idaho Division of Water Resources. The photo features Silver Creek, which attracts a variety of wildlife and is a well known fly fishing reserve. To see the photo of the month go to ftp://nhdftp.usgs.gov/Hydro/Images/SilverCreek_Idaho.pdf. The map was made by Kathy Isham. Submit your photo for the NHD Photo of the Month by sending it to krisham@usgs.gov.

September Hydrography Quiz / New October Quiz

Al Rea was the first to correctly guess the September hydrography quiz as McNamee Peak, Colorado, which forms the “triple divide” between the Colorado, Missouri, and Arkansas hydrologic regions. See <ftp://nhdftp.usgs.gov/Quiz/Hydrography62.pdf>. Al is well-know within the hydrography and hydrology communities for his extensive work in StreamStats, NHDPlus, and other water modeling systems. He is a hydrologist with the USGS Idaho Water Science Center in Boise, Idaho. Al used StreamStats to find the answer.

Others with the correct answer were (in order received): Linda Davis, Ken Koch, Richard Patton, Calvin Meyer, John Kosovich, Marc Weber, and Joanna Wood. Scott McAfee, David Asbury, and David Straub guessed nearby Wheeler Mountain, which is a very reasonable guess. Many people guessed Headwaters Hill located about 50 miles to the south and is the triple divide between the Colorado, Arkansas, and Rio Grande hydrologic regions. The two mountains that flank McNamee Peak, Cinton Peak and Traver Peak, could also be argued as part of the same triple divide as McNamee.

This month's hydrography quiz can be found at <ftp://nhdftp.usgs.gov/Quiz/Hydrography63.pdf>. This is a very large bay in the United States. Where is it? Send your guess to jdsimley@usgs.gov.

Upcoming NHD Training

November 3: Basic HEM Functions - 4 Hour WebEx, Sign up at: <http://nhd.usgs.gov/tools.html#hem>

Contact: HEM@usgs.gov

November 3–5: NHDGeoEdit Tool - Concord, NH - Contact David Anderson (danderson@usgs.gov) or Greg Barker (greg.barker@des.nh.gov)

December 2: Advanced HEM Functions - 4 Hour WebEx, Sign up at: <http://nhd.usgs.gov/tools.html#hem>

Contact: HEM@usgs.gov

December 14–17: NHDGeoEdit tool - Morgantown, WV - Contact Dave Arnold (darnold@usgs.gov) or Evan Fedorko (evan.fedorko@mail.wvu.edu)

January 12-13: HEM 2 Day Classroom – Denver, CO - Sign up at: <http://nhd.usgs.gov/html#hem>

Contact: HEM@usgs.gov

February 16: Basic HEM Functions - 4 Hour WebEx, Sign up at: <http://nhd.usgs.gov/tools.html#hem>

Contact: HEM@usgs.gov

March 10: Advanced HEM Functions - 4 Hour WebEx, Sign up at: <http://nhd.usgs.gov/tools.html#hem>

Contact: HEM@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 Al Rea, Pete Steeves, Kristiana Elite, Ray Postolovsky, Stephen Daw, and Kathy Isham.

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.