

High Resolution NHDPlus Contract Awarded

The U.S. Geological Survey has awarded a contract to Horizon Systems Corporation of White Stone, Virginia, to produce NHDPlus for the High Resolution NHD. This contract will assist the USGS in building the NHDPlus by (1) generating network value added attributes, (2) hydrologic conditioning of the 10-meter National Elevation Dataset, (3) calculation of flow direction and flow accumulation grids and catchments, calculating landscape attributes, and (4) estimating stream flow and velocities. Horizon Systems Corporation has 20 years of experience applying GIS and database technology to water resources applications for the USGS and USEPA.

Production of the High Resolution NHDPlus for the nation is expected to take a number of years. Efforts in the next year will focus on Hydrologic Region; 06 - The Tennessee River, 01 - New England, 12 – Texas/Gulf, 02 - Mid-Atlantic, 14 – Upper Colorado, and 15 – Lower Colorado.

Coldwater Fisheries Resources Dataset by David Szczebak

In September, 2014, the Massachusetts Division of Fisheries and Wildlife (MADFW) released a publicly-available Coldwater Fisheries Resources dataset. Coldwater Fisheries Resources (CFRs) were mapped at a scale of 1:25,000, and based on the National Hydrography Dataset (NHD) high resolution data for Massachusetts. CFRs are important habitat for a number of cold water species, including trout. Coldwater species are typically more sensitive than other species to alterations to stream flow, water quality and temperature within their aquatic habitat. Identification of CFRs is based on fish samples collected annually by MADFW staff biologists and technicians. New streams are sampled and evaluated yearly.

CFRs had originally been mapped at a scale of 1:100,000, so assigning that data to the much-higher resolution NHD involved significant effort in relocating the fisheries sample sites on the correct stream segment. The other labor-intensive process involved “painting” the correct stream reaches in NHD that corresponded to the original named streams. Storing its CFR data within the NHD framework will greatly enhance the ability of the MADFW to share CFR information with the public on a local level. It will also facilitate data sharing and collaboration with the USGS and other entities that use NHD for mapping and analysis. The datalayer will be updated on an as-needed basis, and is available for free download at: <http://www.mass.gov/itd/dfwcfwr>. The MADFW CFR web page may be found at: <http://170.63.70.137/eea/agencies/dfg/dfw/wildlife-habitat-conservation/what-is-cfr-.html>. For more information, please contact David Szczebak at: david.szczebak@state.ma.us.

WBD and NHD Changes in Alaska by Hank Nelson and Stephen Daw

Hydrologic Unit 1904 (Yukon River), in Alaska has always been a stumbling block in working with hydrography. The unit was just way too big, much larger than the largest HUC4 in the lower 48. As a consequence we couldn't build a personal geodatabase of 1904 in NHD. So the USGS and its partners broke it up into 3 subregions. The west end became 1909 (Lower Yukon River), the middle became 1908 (Middle Yukon River), and east end became 1907 (Upper Yukon River). Subregion 1907 already existed and some of 1904 was migrated to it. The WBD was updated first then the NHDReachCodes were migrated to the new HUC8s.

Splitting 1904 turned out to be a much bigger job than anticipated. From start to finish the job took almost a year. The USGS is learning that the WBD is much more dynamic than originally anticipated when the NHD and WBD were joined together. Hopefully there won't be any changes as big as the 1904 split. Also Subbasins 19010201, 19010202, and 19010203 were changed to 19010210 (Kuiu-Kupreanof-Mitkof Islands), 19010211 (Chichagof Island), and 19010212 (Baranof Island). These updates were proposed by Forest Service partners within the Tongass National Forest. When major changes are made to the HUC8 container (i.e. the container is split into multiple units) the national protocol has been to retire the old HUC8 code and name and assign new codes and names to the updated units.

The Alaska WBD state steward, Sheryl Boyak, has been steadily making updates all across the state that that should be posted in one big job sometime in October.

The State of NHD Region Three: Part 1 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 mostly by individual State Stewards.

Minnesota: In Minnesota, while there is no signed MOU, there is still much activity going on within the state. Minnesota Information Technology has trained employees on the NHD Update Tool and is currently focusing on updating stream geometry based on need expressed by water quality field staff. Also the Minnesota Geospatial Information Office continues to review.

Iowa: As part of Iowa's statewide floodplain mapping effort, all of Iowa's rivers and streams have been mapped using LiDAR and 2-foot aerial imagery. NHD attributes for streams in two HUC8 watersheds are being prepared for conflation as part of a pilot project to determine the costs and timelines associated with a statewide effort. The Iowa DNR GIS Section is currently conducting interviews to hire a GIS analyst who, with assistance from several temporary staff, will assume the responsibility of completing an Iowa Local Res NHD project. Assuming funding is available; Iowa anticipates completing this project in 2017.

Indiana:

There is extensive NHD work being done within the state of Indiana. Local-Resolution NHD development efforts continue, which is a project to update and improve Indiana's NHD to local resolution based on the best available image and elevation data. Criteria are:

- nothing older than 2005
- 1-foot resolution or better orthophotography
- DEM 5-foot resolution or better

To date, 15 subbasins have been completed. Funding sources for the project have come from Indiana Office of Community and Rural Affairs, USGS, and Indiana Department of Environmental Management (IDEM). Partners involved include Indiana Geographic Information Council (IGIC), State of Indiana Geographic Information Office, and USGS. Flowlines are being captured at minimum 6-acre drainage basin area. AECOM has been contracted for the production work. Results compared to High Res after 10 subbasins completed:

- 360% increase in total length of NHDFlowlines
- 14% increase in number of NHDWaterbodies
- 52% increase in area of NHDWaterbodies

- 68% increase in area of NHD Areas

A pilot has been completed of GNIS Names web-based editing and Geo-synchronization management tool. Currently web hosting and deployment is in progress and local community and state-level training is to be scheduled. Finally, an IGIC Subcommittee was formed to develop a plan, methodology, and schedule to update existing WBD to match new Local-Resolution NHD. This Subcommittee includes NRCS's IN WBD Steward; USGS NHD staff and Liaison; IN GIO, IDNR, and IDEM staff; and IGIC waters workgroup staff.

Michigan: In Michigan, the Dept. of Technology, Center for Shared Solutions uses the NHD in cartographic products and basemap tile cache supporting web applications. Also, the U.S. Forest Service has sub-stewardship activity progressing. USFS GIS Technical Personnel have been trained on the Update Tool, and have begun editing in the Ontonagon watershed, specifically making changes to stream segments from intermittent to perennial. The Michigan Association of County Drain Commissioners has scheduled a strategic planning retreat in January to discuss policy and direction for the association. Included in those discussions, as well as a survey being drafted ahead of that retreat, are the topic of asset management and related topics such as the NHD. Based on those results, and the completion of the business plan, the association's NHD committee will look to make recommendations to the Executive committee sometime next summer as to how to move forward.

The State of NHD Region Four: Part 3 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, other state stewardship programs are currently dormant, or in some states there is no stewardship at all. The following is part 2 of an assessment of each state. Much of this is provided by state stewards or USGS state liaisons.

Great Smoky Mountains National Park: Great Smoky Mountains National Park is wrapping up their three yearlong migration toward a position of being able to utilize the NHD as "Authoritative Data" depicting the parks extensive stream and river network. With nearly ten million yearly visitors, accurate representation of the hydrologic processes in the park is of critical importance to resource protection and visitor safety. Collaborating with scientists and regulators from both North Carolina and Tennessee, the park hosted an NHDGeoEdit Tool training class provided by the USGS for both park and North Carolina hydrologists. The park's NHD edit efforts have been focused on planimetric accuracy utilizing a park-wide LiDAR collection in 2011, as well as stream network completeness. Great Smoky Mountains National Park anticipates that use of NHD data, which accurately represents hydrology within the park, by researchers, visitors, and The National Map will result in drastically improved data quality from applications such as STORET, Hydrologic Impairment Statistics, NHD Plus, and Aquarius. Park Service editing included entire 12-digit hydrologic units, resulting in editing of some area outside of their jurisdiction. Source data for these types of multi-agency NHD contributions originated from park service data collection efforts, and stream centerline data generated by both the North Carolina and Tennessee stream mapping programs. Upon completion of the NHD update process, Great Smoky Mountains National Park plans to no longer publish stream map data and will refer requesters of hydrography data to the NHD. Tom Colson and Joel Skalet plan on briefing the National Park Service on the entire process sometime this fall. The park will continue to partner with the USGS, North Carolina, and Tennessee in maintaining the most current NHD data.

South Carolina: On October 1, 2014, The USGS South Carolina Water Science Center will begin a four year StreamStats Project to provide interactive stream flow statistics and basin information through an easy to use web browser interface. The project includes a pre-conflation process that was developed as

the result of a Local Resolution Pilot Project by the University of South Carolina. This process centers on preparing LiDAR-derived hydrography for use with the USGS NHD Conflation Tool. Four counties have expressed interest in participating as substewards on this project.

Tennessee: In Tennessee the steward is continuing to clean up data with many technical issues. The goal is to get the data to the point where it can go through the conflation process. A lack of funding and staff has made the project difficult to complete.

Delaware: In Delaware, reassignment of NHD personnel to another agency has resulted in the search for a new steward within the Delaware Department of Natural Resources & Environmental Control. Official designation of this person has not yet been made. The Delaware Memorandum of Understanding will be reviewed and revised when a new steward is officially recognized.

Virginia: Virginia completed a statewide update of the high resolution NHD in 2012 and continues to use the data. While the stewardship team is not actively engaged in updating the NHD, identified errors are reviewed and tracked for future resolution.

Elsewhere throughout the region there is a lack of stewardship activity. In the U.S. Virgin Islands a steward has never been identified. In Maryland and Georgia the lack of activity is attributable to a lack of funding or user interest, however overall, stewardship activity in Region Four has been very productive. Thank you to Edwin Abbey with the Florida Department of Environmental Protection, Jeff Schloss with the Missouri Office of Administration, Katy Hattenhauer with the Arkansas Department of Environmental Quality, Jim Mitchell with LADOTD, Marilyn Santiago with the Caribbean Water Science Center, Mario Field with the District Office of the Chief Technology Officer, Nancy Lawrence with ADECA, Jim Steil with MARIS, Richard Cochran with the Tennessee Division of Water Resources, Joe Sewash with CGIA, Tom Colson with Great Smoky Mountains National Park, and Craig Neidig, George Heleine, Gary Merrill, Roger Barlow, and Diane Eldridge all with the USGS for contributing to this article.

All New NHD for Guam by Hank Nelson

The Guam Coastal Management Program (Government of Guam) through a cooperative agreement with USGS received funding to update the NHD and WBD for Guam. The Government of Guam worked together (subcontracted) with GIS Specialist Maria Kottermair from the University of Guam to conduct this project.

The update of the NHDFlowlines and watershed boundaries is based on a hydrologic model that was recently developed using a 2-meter LiDAR-derived DEM from 2007. A semi-automated approach was taken to create a hydrologically connected DEM that was used as input for the ArcHydro tools. The resulting NHDFlowlines were then smoothed and slightly generalized, reviewed and further edited where necessary. To update the other features in the updated NHD, a combination of source layers were used: lakes/ponds and waterfalls were updated based on LiDAR data, satellite imagery, and land cover; swamps were extracted from NOAA's Coastal Change Analysis Program (C-CAP) 2011 land cover layer and generalized; and a new shoreline was created based on LiDAR breakline data and a C-CAP shoreline (extracted from 'water'), satellite imagery was used for reference. Overall, the update significantly improved the quality of the NHDFlowlines, not so much on the quantity as there are not that many rivers on Guam that were not mapped before.

This update will benefit many individuals and agencies involved in mapping including resource managers, regulators, and scientists.

Network Improvement Project Status by David Kraemer

During September Regions 09, 13, and 21 were completed for the Network Improvement project Double Check phase. The Double Check phase is correcting any additional errors in the NHD Geodatabase that would prevent the creation of NHDPlus.

Currently in work for Double Check phase edits are Regions: 05, 09, 14, 15, 16, and 22. Region 19 is the final Initial phase Network Improvement Region in work and is being edited as part of preparing the Alaska Hydro Image Integration project. Preparation of the NHD Geodatabase for the NHDPlus contract is occurring in Regions 01, 06, and 21.

Initial Network Improvement Regions Completed: 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, and 22.

Double Check Network Improvement Regions Completed: 01, 02, 06, 07, 09, 12, 13, 18, and 21.

The Network Value Added Attribute of the Month

Do you know your VAA's? This NHD Newsletter article is the eighth 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 StartFlag and TerminalFlag.

This concept is very simple. A NHDFlowline will be linked to a StartFlag and a Terminal Flag. If the StartFlag = 1, the flowline is a headwater NHDFlowline. If the StartFlag = 0, the flowline is not a headwater NHDFlowline. If the TerminalFlag = 1, the flowline is a terminal NHDFlowline feature. If the TerminalFlag = 0, the flowline is not a terminal NHDFlowline. Thus, if the StartFlag = 0 and the TerminalFlag = 0, the NHDFlowline is an intermediate NHDFlowline. Also, if the StartFlag = 1 and the TerminalFlag = 1, the flowline is both a headwater and a terminal NHDFlowline.

NHD Photo of the Month

This month's photo was submitted by Ellen D'Amico, GIS Specialist with Dynamac Corporation in Cincinnati, Ohio. See ftp://nhdftp.usgs.gov/Hydro_Images/LittleMiamiRiver.JPG. It is a picture of the Little Miami River in South Lebanon, OH (about 30 miles north of Cincinnati). The Little Miami River, designated as a National Wild and Scenic River, plays an important role in this region ecologically, recreationally (canoeing, kayaking, fishing and a 68.5 mile bike trail that follows the river), and hydrologically. Ellen crosses the river every day on the way to work and often sees a variety of wildlife (particularly blue herons). On the day she snapped this picture she captured ballooners taking an early morning ride. Thanks for taking a look. Submit your photo for the NHD Photo of the Month by sending it to jdsimley@usgs.gov.

August Hydrography Quiz / New September Quiz

*Evan Hammer with the Montana State Library was the first to guess the August NHD quiz as Patoka Lake in southern Indiana. See <ftp://nhdftp.usgs.gov/Quiz/Hydrography109.jpg> Evan

Others with the correct answer (in order received) were: Matt Rehwald, Chris Morse, Richard Patton, John Kosovich, Kevin Amick, Dennis Dempsey, Bruce Nielsen, Dave Straub, Jeremiah Poling, Joanna Wood, and Roger Barlow.

This month's hydrography quiz can be found at <ftp://nhdftp.usgs.gov/Quiz/Hydrography110.jpg>. What is the name of this bay? Note that in the NHD the name for the feature displayed is incorrect. The purple feature is an estuary. The blue features are rivers. 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.