

USGS National Hydrography Dataset Newsletter  
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by Jeff Simley, USGS

## **NHD Stakeholders Meet to Discuss Future of the NHD**

A number of the Nation's NHD experts gathered in Denver the week of October 10 to plan future development efforts. The group was represented by the U.S. Geological Survey mapping and water programs, the U.S. Environmental Protection Agency, the U.S. Forest Service, the Bureau of Land Management, the National Park Service, and the Pacific Northwest Hydrography Framework. To give a sampling of state interests, representatives from New York, Minnesota, Colorado, and Idaho attended. Over the course of four days of meetings many issues were discussed in an attempt to identify key efforts needed to advance the NHD and maintain its status as one of the nation's premiere Framework geospatial datasets.

### Updating the NHD and the Concept of a Single Dataset

First and foremost, it is clear that the NHD must evolve as more accurate and higher resolution hydrography becomes available across the country. In many cases this will mean a move away from data designed to meet cartographic requirements and move toward true geographic interpretation and extraction. This will lead to greater variability in the representation of hydrography because it will tend to revolve around a more local requirement as an interpretation of hydrography. That means there will be degrees of disparity in scales and density of data throughout the country. Although standards and guidelines are needed to keep this disparity in control, there is strong value in letting local needs govern the representation of hydrography. Otherwise, localized needs for hydrography will proceed outside of the NHD model of a truly national dataset. Because of the need to provide uniformity of hydrography for mapping and modeling, the above situation calls for technology to provide desired levels of hydrologic equity. Fortunately this technology is within reach. Besides developments in standard cartographic generalization, the use of hydrography introduces a number of new possibilities. Some of these have been demonstrated with the NHDPlus using flow volume estimates, the "thinner" code, and the calculation of arbolate sum. The group decided to form a task force to investigate hydrography specific generalization technology, determine the likelihood of success, recommend a strategy, and then oversee the implementation of a strategy that will lead to a highly automated capability to allow users to convert a disparate base dataset into an application ready dataset meeting some form of generalization. The goal is to produce a capability in one year.

Other outcomes of the discussion lead to the conclusion that the 1:100,000-scale Medium Resolution dataset will be maintained as a separate dataset for the foreseeable future. Edits that have been made to this data in the NHDPlus program will be incorporated into this dataset. Also, the goal is to achieve one High Resolution dataset. Currently this dataset revolves around a 1:24,000-scale guideline, but this will be relaxed to include scales of representation such as 1:12,000, 1:4,800 and 1:2,400-scales. When this is done, conflation of the existing 1:24,000-scale attributes such as ReachCode must be exercised to a reasonable degree, and the data must be edge matched to surrounding data to achieve hydrologic consistency. These guidelines are conducive to hydrologic unit-based editing as opposed to political boundary-based editing. The goal is not to keep higher resolutions or densities in a separate "local" resolution dataset. Methods are also needed to trace the "resolution" of a feature. Although metadata will be used, a more specific selectable attribute is needed to identify the origins of a feature for analysis and display purposes.

### Managing the NHD

Key decisions about the NHD are made by a group consisting of the USGS, the USEPA and the USFS, that meet on a weekly basis, known as the Core Management Team. As the NHD user community

continues to grow, additional input from the community is needed to allow the Core Management Team to include the perspectives of users outside its own programs. Additionally, the decisions made by the Core Management Team need to be more widely disseminated through a regularly distributed synopsis. To improve overall communication and achieve a continually improving NHD, an attempt will be made to develop a number of measures including: a monitored listserv/discussion forum, email notification, teleconferences, special meetings, working groups, and communication with USGS regional NHD Point of Contacts and USGS-State liaisons. This will be in addition to the monthly NHD Newsletters. A subject-by-subject index of the NHD Newsletters will be made available for easier searching of topics. If anyone has ideas for the NHD, they are encouraged to engage through these communication mechanisms and help make them successful.

### NHD Geo Edit Tool

This tool is designed to edit the NHD while maintaining a hallmark characteristic of the NHD, data integrity. Its development and implementation has not gone smoothly and has led to many delays. However, incremental improvement is being made and the USFS/USGS are committed to improving the tool immediately and over the long term. Issues and bugs identified in the initial release are being addressed and an update will be released soon. The goal is to open the tool to a wider range of users and one-by-one eliminate the limitations.

### Quality of the NHD

Meeting participants were given a chance to speak out on their view of NHD quality. Generally, quality is quite good with perhaps over 99% of features meeting basic needs, but there is much that can and should be improved. One important characteristic is stream density or content. When to include yet another stream always has and always will be an issue for a hydrography dataset and the NHD has its share of advocates for greater stream density. As stated, the NHD is fully supportive of this within some yet-to-be-developed further guidelines. As common in all of mapping, the temporal factor is always on everyone's mind. In many states the NHD was produced with revised data that is two – eight years old, but even that data is wearing with time. Much more of the NHD was produced from USGS topographic maps which average 20-30 years of age. Fortunately, although hydrography changes, the overall percentage of the network that changes with time is extremely small. Temporal updating will always be an issue for the NHD, or any map. Names are a major issue for the NHD. NHD names must come from the Geographic Names Information System, but many names NHD users need have never been entered into GNIS. Another problem is the misapplication of the GNIS to the NHD in the production process, but these error rates are relatively small. Other quality issues involve artificial paths, missing connectors, isolated networks, perennial/intermittent streams, missing geometry from the topo map, swamp/marsh reliability, reach code assignments, wetlands vs. open water, canal networks, lack of representation in urban areas, and a host of other issues. These issues, however, are overshadowed by density, temporal, and names issues.

### NHDPlus

The NHDPlus, produced at 1:100,000-scale, is essentially complete over the conterminous U.S. and Hawaii. The program will now also look at Alaska, Puerto Rico, and the Virgin Islands. Future development of the program will focus on tools, technical support, and documentation. Under consideration is a new cycle of NHDPlus using the soon to be completed 1:24,000-scale NHD and new Watershed Boundary Dataset completions. The relationship of NHDPlus and StreamStats will also be explored. Studies will likely be conducted on the utility of using the existing NHDPlus with the high resolution NHD.

### Events

The use of linearly referenced events of water data is fundamental to the NHD concept. The USGS in cooperation with the USEPA has indexed about 23,000 streamgages to the medium resolution NHD and

the USGS is now reindexing these to the high resolution NHD and providing them in the NHD PointEventFC feature class. It is likely that streamgages will then be deleted from the NHDPoint feature class. The USGS is also exploring the feasibility of indexing the dams to the NHD. An issue with events will be the maintenance of events such as streamgages. A tool will be needed to detect when a reach is no longer consistent with the event based on reach date to warn of a maintenance need. Also gages may be added that will need to be indexed. The USEPA maintains a large library of events. The EPA goal for 2007 is to migrate these from EPA-held June, 2002 version of the NHD to the improved NHDPlus version of the NHD. The USEPA makes its events available through the WATERS website ([www.epa.gov/waters](http://www.epa.gov/waters)) although some events such as drinking water intakes are restricted. The accessibility of events is an important issue. Methods of accessibility for all events will have to be explored and developed. This is particularly important for national databases, but also for local events produced by states and local agencies. The U.S. Forest Service produces events for fish habitat, stream classification, aquatic biota inventory and other data types including elemental or repetitive recordings. Although the USFS has a general objective that event data will be made available, some types will not.

### Event Management Tool

The Bureau of Land Management unveiled a new event tool developed in cooperation with the USFS and based off the existing USFS EventMaker tool. A demonstration was presented that showed much new functionality that will benefit the NHD community. Development is still underway, but it should become available to the public in the next three months. A complete review of the tool will be provided in an upcoming NHD Newsletter closer to tool release.

More about this important meeting will be available in the next NHD Newsletter.

### **Answer to September Hydrography Quiz / New October Quiz**

Sean Lehman of the U.S Forest Service was the first to correctly guess last month's hydrography quiz <ftp://nhdftp.usgs.gov/Quiz/Hydrography16.pdf> as the Three Rivers area of Pittsburgh where the Allegheny and Monongahela Rivers converge to form the Ohio River. Sean is familiar with the area because his wife is from Pittsburgh, but just to be sure he did a quick look with Google Earth. Sean works at the regional office for the USDA Forest Service, Pacific Southwest Region 5 as a GIS Analyst contractor with General Dynamics. He is in the GIS Data Management Group migrating coverages to region-wide geodatabases for forests in California. For the last three months, he has been migrating and cleaning forest ephemeral streams and processing them by subbasin, so they can be added to the NHD. Sean also conducts spatial analysis and mapping at the regional office.

Others with the right answer were David Asbury, Greg Overtoom, Melvin Landry, James Seay, Joanna Wood, Roger Barlow, Brian Chalfant, Steve Aichele, and August Froehlich. Brian Chalfant makes the interesting point that "Based on the rule that a river keeps the name of the river with greater discharge at a confluence, the Ohio River should be called the Allegheny River... in fact, I think the lower Mississippi should be called the Allegheny too based on that rule! The Ohio River mysteriously appears out of nowhere west of Pittsburgh's point." Also, August Froehlich points out with regard to the sparseness of hydrography at the confluence "caused by urbanization due to capturing natural streams into culverts."

For the October quiz look at <ftp://nhdftp.usgs.gov/Quiz/Hydrography17.pdf>. Can you identify where this is? Note the large lake and its shape that looks like a dam was built on a meandering river in hilly terrain with no floodplain. The key word is hilly. The small red dot to the east is the dam which was built in 1958. You can see the river continue to meander to the east below the dam. Although hard to see, the lake is ringed by a light blue polygon representing inundation area. That means normal pool elevation is slightly below spillway elevation. Send your guess to [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov).

## **Current USGS NHD Data Stewardship Contacts**

Maine, New Hampshire, Vermont, New York, Massachusetts, Connecticut, Rhode Island, Pennsylvania, New Jersey, West Virginia, Maryland, Delaware, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Puerto Rico, and Virgin Islands – Carl Nelson [cwnelson@usgs.gov](mailto:cwnelson@usgs.gov)

Michigan, Indiana, Ohio, Kentucky Tennessee, Minnesota, North Dakota, South Dakota, Nebraska, Wyoming, Montana, Idaho, Washington, Oregon, Alaska – Paul Kimsey [pjkimsey@usgs.gov](mailto:pjkimsey@usgs.gov)

Wisconsin, Illinois, Iowa, Missouri, Arkansas, Kansas – Tim Hines [thines@usgs.gov](mailto:thines@usgs.gov)

Louisiana, Texas, Oklahoma, New Mexico, Colorado, Utah, Arizona Nevada, California, Hawaii, Guam, American Samoa – Bill Smith [wjsmith@usgs.gov](mailto:wjsmith@usgs.gov)

## **Upcoming One-Day NHD Application Workshops**

Phoenix, Arizona – November 1 and 2, 2006. Contact Keri Mich [kmich@fs.fed.us](mailto:kmich@fs.fed.us).

Corvallis, Oregon – November 13, 2006. Contact Nancy Tubbs at [ntubbs@usgs.gov](mailto:ntubbs@usgs.gov).

Salem, Oregon – November 14, 2006. Contact Nancy Tubbs at [ntubbs@usgs.gov](mailto:ntubbs@usgs.gov).

Olympia, Washington – November 16 & 17, 2006. Contact Sam Bardelson at [stbardelson@usgs.gov](mailto:stbardelson@usgs.gov).

Indiana – March 13 2007. Contact Dave Nail at [dnail@usgs.gov](mailto:dnail@usgs.gov).

Idaho – April 2 and 3, 2007. Contact Frank Roberts at [fmroberts@cdatribe-nsn.gov](mailto:fmroberts@cdatribe-nsn.gov).

Michigan – May 7, 2007. Contact Steve Aichele at [saichele@usgs.gov](mailto:saichele@usgs.gov).

California – Winter, 2007. Contact Carol Ostergren at [costergren@usgs.gov](mailto:costergren@usgs.gov).

Illinois – Winter, 2007. Contact Shelley Silch at [ssilch@usgs.gov](mailto:ssilch@usgs.gov).

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The NHD Newsletter is published monthly. Get on the mailing list by contacting [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov).

You can view past NHD Newsletters at [http://nhd.usgs.gov/newsletter\\_list.html](http://nhd.usgs.gov/newsletter_list.html)

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