

USGS National Hydrography Dataset Newsletter
Vol. 7, No. 2, December 2007
By Jeff Simley, USGS

Results of the NHD Management Meeting

Although the National Hydrography Dataset is managed by the U.S. Geological Survey, it has always operated through a consortium of the hydrography community with each member contributing data, funding, production, staffing, tools, capabilities, publications, guidance, management, and leadership. A cross-section of this consortium composed of five federal and six state agencies met recently in an annual meeting to review and plan the management of the program. The meeting began with a review of NHD use. Some of the main points were:

1. Many agencies are heavily dependent on the NHD to meet their business needs in water science.
2. Agencies have shifted their practices to adopt the NHD.
3. The NHD must be upgraded to continually meet business needs in water science.
4. There are many facets and opportunities to the upgrading of the NHD that must be pursued.
5. Agencies are depending on stewardship to upgrade the NHD.
6. Agencies are investing in the stewardship process.
7. The NHD is vital to data integration and more integration activities will be needed.

The meeting then turned its attention to the primary issues:

1. Multiple-Resolution NHD – The movement to increase the resolution of the NHD.
2. Generalization – The importance of normalizing multiple resolutions.
3. Quality Assurance – Stepping up our diligence on making improvements.
4. Stewardship – The critical next step forward in improving the NHD.
5. The Data Model – Keeping up with new demands in technology.
6. Perennial/Intermittent Streams – Developing a future strategy on a difficult issue.
7. Names – Improving the quantity, quality, and utility of names in the NHD.
8. Metadata – Turning it into a valuable asset.
9. NHDGeoEdit Tool – This cornerstone of stewardship needs to be fully functional.
10. NHDGeoConflation Tool – Provide a capability to keep up with local resolution demand.
11. Hydro Event Management Tool – Making events a more valuable utility to the NHD.
12. Documentation on Tools – Giving users the guidance to properly use tools.
13. Projection of NHD – Making it easier to make maps.
14. Watershed Boundary Dataset – Very high demand for integration.
15. DRIRM – A growing importance for integration that must be addressed.
16. NHDPlus – Possibilities for high resolution.
17. Events – Need a clearinghouse for better event availability and management.
18. Canada/Mexico – Strong potential for North American integration.

From a discussion of these topics many points were drawn:

1. Affirmation of the multi-resolution core dataset concept.
2. The NHD will move beyond 1:24,000-scale.
3. Generalization is a key to normalizing a multi-resolution dataset.
4. Generalization should be successful, but can't wait long for capability.
5. A better understanding of NHD quality is needed.
6. The quality of the NHD needs to be improved in many aspects.
7. The future success of the NHD depends on stewardship.
8. There is much that needs to be done to make stewardship successful.
9. More resources must be invested in stewardship.
10. Must have better documentation.

11. Data model must be continually upgraded.
12. Perennial/Intermittent stream classifications are necessary, but beyond the NHD.
13. Names are integral to the NHD and many more must be added, and many need to be fixed.
14. Metadata is important, but does not contain necessary content.
15. NHDGeoEdit tool is vital, but has fallen short of expectations.
16. Tardiness of 9.2 upgrade has been significant problem.
17. NHDConflation tool will be vital to future of NHD and must be successful.
18. Hydro Event Management tool is important to customer use of the NHD.
19. Events are an integral component of the NHD.
20. Documentation of tools is critical. Edit tool needs documentation.
21. Watershed Boundary Dataset integration is necessary.
22. Digital Flood Insurance Maps integration is necessary.
23. NHDPlus will continue to improve and be implemented in applications.
24. Must improve NHD documentation and NHD web site.
25. Elevation technology will become more vital to the NHD.
26. Canada and Mexico will be integrated starting in FY09.

As the four days of meeting drew to a close a number of concluding points were made:

1. Communication is a vital component of the NHD program and must be strengthened through documentation, web pages, discussion forums, user meetings, training sessions, emails, newsletters, publications, conferences, workshops, and interpersonal communication.
2. Documentation is lacking on a number of processes. The USGS needs to dedicate resources to improving this.
3. There is a shortage of people at the USGS to keep up with tool development needed by the user community. More developers are needed to keep pace with demand.
4. An adequate IT infrastructure is necessary to process transactions. The capability offered has been behind the curve continuously. Much has and will be done to fix this.
5. Momentum for stewardship is underway and the program cannot afford to disappoint its clients. The message on stewardship has been well received by the user community. To make it work the USGS must provide the people, tools, documentation, processes, and services necessary.
6. Staffing levels have to improve to make program work. The lack of stewardship personnel has kept the pace of success to a minimum. Developer and other functions also need to be filled.
7. The USGS needs to staff the technical lead function that has been vacant for the last year. This will allow more focus and innovation for solving technical issues and to keep pace with evolving technology that will be used by customers.
8. The USGS has to recognize that other agencies need an effective USGS-led NHD stewardship program.

It was clear from the meeting that the NHD is being used very heavily in many aspects of science and resource management. This has made the NHD an enormously successful program. It is also apparent that the demand is constantly growing. There will never be a shortage of needed improvements. This is simply the nature of the business. The NHD is one part of the ongoing revolution in science and technology and it will be a challenge to keep pace.

Dams in the NHD

Dams are now being added to the NHD as point events in the NHDPointEventFC feature class. This means that the dams exist as a feature with point geometry, and as an event with a linear address. This allows scientists to display the dam in a GIS, and to analyze the dam's position on the nation's flow network. This later capability is important in understanding the relationship of the dam to other events such as other dams, streamgages, fish habitat, impaired water, drinking water intakes, and other points of interest. The dam information was taken from the U.S. Army Corps of Engineers National Inventory of

Dams <http://crunch.tec.army.mil/nid/webpages/nid.cfm>. Those dams with a normal storage capacity of over 2,400 acre-feet were selected and the position upgraded so that they could be snapped to a NHDFlowline. Using the NHDFlowline then positions the dam on the national flow network. The dam is normally positioned on the artificial path just inside the waterbody that the dam impounds. This allows a relationship between the dam, the flowline, and the waterbody. So for example, if you click on the dam, you can see information about the impounded waterbody such as name, surface area, ReachCode, and elevation. You can also relate to such information such as the total length of the upstream network, the names of all tributaries, all upstream dams, and a wealth of other information. Additional relationships with the NHDPlus make it very easy to calculate upstream drainage area. You can also use the SourceFeatureID to provide the USCOE dam identification value which will then allow you to link to the full suite of data from the National Inventory of Dams. This will give you information on the dam's dimensions, construction material, normal and maximum storage capacity, and even the name of the U.S. Congressman who has the dam in their district. At some point in the future, the NHD dams will be used in the USGS StreamStats capability, which will provide web enabled analysis. The NHD dam initiative is working east to west with the eastern half of the country now complete. Traditionally in the NHD dams were portrayed from topographic maps in the NHDPoint, NHDLine, and NHDArea feature classes. However, these dams are not always complete in the NHD. The current initiative will provide a base uniformity nationwide to include all known dams of a storage capacity of at least 2,400 acre-feet.

NHDPlus Workshop

The NHDPlus team is conducting a Technical Workshop "Putting NHDPlus to Work: Applying a National Geospatial Surfacewater Framework" to be held on February 26-28, 2008 at the U.S. Geological Survey (USGS) facilities in Denver, CO. The Workshop is intended for Geographic Information System (GIS) practitioners, hydrologic modelers, and water resource analysts, and will provide the opportunity to learn more about applying NHDPlus through the experience gained by the NHDPlus team and other users, since NHDPlus was first released in early 2006. Techniques, tools, and data enhancements will be among the many topics covered. Attendees will have the chance to interact and share their own lessons learned with others from a growing and diverse NHDPlus user community. The Workshop will be conducted by the joint EPA-USGS NHDPlus team that developed and supports NHDPlus. The NHDPlus is a suite of geospatial products that build upon and extend the capabilities of the National Hydrography Dataset (NHD) by integrating the NHD with the National Elevation Dataset and the Watershed Boundary Dataset (where it exists). NHDPlus includes improved NHD names and networking, value-added attributes (such as stream order) that enable advanced query, analysis and display, elevation-derived catchments that integrate the land surface with the network, stream flow volume and velocity estimates for pollutant dilution modeling, and associated flow direction and accumulation grids. Additional information on NHDPlus is available on the Web at www.epa.gov/waters. If you are interested in attending the workshop, contact Tommy Dewald at Dewald.Tommy@epamail.epa.gov.

November Hydrography Quiz / New December Quiz

James Sherwood, a hydrologist for the U.S. Geological Survey in Columbus, Ohio, was the first to correctly guess last month's hydrography quiz <ftp://nhdftp.usgs.gov/Quiz/Hydrography29.pdf> as the Cumberland River east of Nashville, Tennessee. Others with the correct answer were Bill Samuels, Harry Spanglet, Ken Koch, David Straub, David Asbury, Melony Barrett, Roger Barlow, Mike Wiedmer, Richard Patton, Guy Whitaker, Kevin Amick, and Calvin Meyer. Richard notes that "The meandering river is the Cumberland River. The large lake on that river is Old Hickory Lake."

Old Hickory Lake is impounded by the Old Hickory Lock and Dam, located on the Cumberland River approximately 25 miles upstream from Nashville, Tennessee. The lake extends 97 miles upstream to

Cordell Hull Lock and Dam near Carthage, Tennessee. Old Hickory Lock and Dam was authorized for construction in 1946 as part of a comprehensive development plan for the Cumberland River Basin. The project was designed by the U.S. Army Corps of Engineers and built by private contractors under the Corp's supervision. Construction started in January 1952, and the project was completed for full beneficial use in December, 1957 with the placement of the final hydroelectric power unit in operation. The reservoir contains 22,500 surface acres at an elevation of 445 feet (above sea level). From <http://www.lrn.usace.army.mil/op/old/rec/project.htm>.

This month's hydrography quiz can be found at <ftp://nhdftp.usgs.gov/Quiz/Hydrography30.pdf>. Can you name the northern-most of the three long lakes? All three lakes are shaped by a very powerful geologic force and the water comes from over 100 miles away.

American Water Resources Association

Be sure to mark your calendar for the 2008 AWRA Spring Specialty Conference – GIS and Water Resources V in San Mateo, California on March 17-19, 2008. See http://www.awra.org/meetings/San_Mateo2008/index.html

Upcoming NHD Geo Edit Tool Training

January 7-10, Denver, Colorado (tentative), Contact Bill Smith at wjsmith@usgs.gov or Mark Eaton at maeaton@usgs.gov

January 15-16, Montgomery, Alabama, Contact Carl Nelson at cwnelson@usgs.gov or Phillip Henderson at Phillip.Henderson@adeca.alabama.gov

January 15-17, Indianapolis, Indiana, Contact Hank Nelson at hpnelson@usgs.gov or Dave Nail at dnail@usgs.gov.

February, 2008, Anchorage, Alaska (tentative), Contact Paul Kimsey pjkimsey@usgs.gov or Carl Markon markon@usgs.gov

Upcoming NHD Applications Training

February 11 (tentative), Michigan, contact Steve Aichele at saichele@usgs.gov

February 27, 2008, Wisconsin, contact Dick Vraga at rsvruga@usgs.gov

March 5, 2008, Richmond, Virginia, contact Diane Eldridge at deldridge@usgs.gov

March 6, 2008, Reston, Virginia, contact Diane Eldridge

March 13 and 14, 2008, Reno, Nevada, contact Tom Sturm at tsturm@usgs.gov

April 21, 2008, Kansas City, Missouri, (stewardship), see

<http://www.magicgis.org/magic/symposiums/2008/index.cfm>

Hawaii in planning stages, contract Henry Wolter at hwolter@usgs.gov

California in planning stages, contact Carol Ostergren at costergren@usgs.gov

Washington in planning stages, contact Allyson Jason at ajason@usgs.gov

Oregon in planning stages, contact Sheri Schneider at sschneid@usgs.gov

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Thanks to John Chaney, Tommy Dewald, and Terry Higgins.

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.