

USGS National Hydrography Dataset Newsletter  
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by Jeff Simley, USGS

### **National NHD Stewardship Conference**

The U.S. Geological Survey will host a nationwide conference on the stewardship of the National Hydrography Dataset in Denver, Colorado, April 24-26, 2007. Stewardship is the process by which the NHD will be maintained by the user community in the future. The goal of the conference is to (1) provide information needed to develop a successful stewardship program; (2) provide a platform in which stewards can voice their feedback and ask questions; and (3) give stewards a chance to network, develop contacts, and learn from each other. The conference is free and open to all who are interested. Everyone interested in data stewardship is welcome and encouraged to attend. If you plan on attending, please notify Jeff Simley at [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov) and put NHD Stewardship Conference in the subject line. Also let your USGS Liaison know that you would like to attend. The preliminary agenda consists of:

#### Tuesday, April 24

- Overview and future direction of the NHD
- Overview of stewardship concept and structure
- Meet the USGS stewardship team
- Most common maintenance issues
- How editing and transactional updating work
- Issues on the revision of hydrography
- Agency reports on stewardship progress within their states and organizations

#### Wednesday, April 25

- A series of short demonstrations on common editing functions
- Presentations by states on noteworthy activities
- Developments in "local" resolution NHD
- The role of the Geographic Names Information System
- Integration with Watershed Boundary Dataset
- Integration with National Wetlands Inventory
- Integration with National Elevation Dataset

#### Thursday, April 26

- Meet the USGS technology staff
- Presentations on technological developments
- Future technical developments needed
- Reporting problems
- Adjustments needed to the stewardship program
- Indexing of associated data
- Stewardship documentation/user guide/web site

### **New NHD Features**

A number of new features have been added to the National Hydrography Dataset model effective with the impending release of Version 1.06. A new NHDFlowline>Feature Type=Underground Conduit, FType=42000 is now available to represent underground streams connected with surface water systems as found in Karst and volcanic terrain. A detailed review of underground streams can be found in the December 2006 NHD Newsletter. Underground Conduit can be represented with Definite, Indefinite, and Approximate positional accuracy. Also added is NHDFlowline>Feature Type=Canal/Ditch>Feature

Code=Stormwater, FCode=33603. Additionally, NHDFlowline>Feature Type=Pipeline>Feature Code=Stormwater, with At or Near Surface, Elevated, Underwater, and Underground relationship to surface was also added. These two Stormwater FCodes were added to better represent drainage systems in urban areas. The NHD is remarkably sparse over any metropolitan area of the country, yet the drainage has to go somewhere. So where is it? First of all, the topographic map sources of the NHD were already full of map content over urban areas, so hydrography was not a priority. Secondly, much urban drainage is underground in culverts and large drainage pipelines. Since these could not be seen on the surface, they were not mapped. Stormwater is also carried in large concrete-lined above ground open culverts, which will be represented by Canal/Ditch. It is hoped that the NHD drainage network can be made more complete throughout metropolitan areas by incorporating stormwater databases typically used by cities. These two new stormwater features can then serve as a framework for representing these drainages. This will be a major benefit to pollution control scientists since a great number of permitted discharges found in cities could then be indexed to these new drainage systems.

Also added to the list of new features is NHDWaterbody>Feature Type=Swamp/Marsh>Feature Code=Intermittent and Perennial. FCode=46601 and 46602. These were added to help scientists identify areas that are intermittently flooded forming swamp/marshes with emergent vegetation. Additionally, those swamp/marshes perennially flooded can be distinctly represented. It is anticipated that the “generic” swamp/marsh, FCode=46600, will be maintained where used and no special efforts will be made to use the two new codes unless specifically desired by the data stewards.

Another addition is a new feature class for area events similar to the point and line event feature classes noted in the April, 2006 NHD Newsletter. The new NHDAreaEventFC will be tied to polygon geometry to identify the area event and will use a list of attributes similarly found in NHDPointEventFC and NHDLineEventFC. Added almost a year ago, but not noted in the NHD Newsletter are NHDLine>FType=Levee>FCode=56800, and NHDArea>FType=Levee>FCode=56800. These were added to allow scientists to identify levees within the context of a hydrography database. This makes it possible to allow a linkage between the levee feature and the water feature it is related to. An analyst would then be able to identify all levees associated with a particular water feature query.

### **NGA to Improve Dam Locations**

The National Geospatial Agency (NGA) is undertaking an initiative to improve the geospatial position of dams found in the U.S. Army Corps of Engineers National Inventory of Dams (NID). This is part of NGA’s broader Homeland Security Infrastructure Program (HSIP). Dams are obviously important features to homeland security activities dealing with natural disasters and as potential terrorist targets. Dams are also obviously important to scientific investigations for a number of reasons involving hydrologic modeling, fisheries biology, invasive species control, water supply, and pollution modeling. The NID is a highly valuable resource, but has a number of limitations in its use in a GIS as outlined in the September, 2006 NHD Newsletter. The NGA initiative to correct location errors will realize the potential of NID in a GIS. In the process of positional improvements, the NGA effort will also derive the NHD address of the dam. Not only will this be a boon to scientists, it will also extend the power of HSIP by allowing analyst to understand the role of the dam in the overall surface water network through upstream/downstream navigation. NGA will concentrate its program on about 15,200 dams, including all high hazard dams and all dams with a storage capacity of greater than 2,800 acre-feet.

### **United States – Mexico Border Hydrography Dataset**

International borders politically divide the landscape, but rarely represent barriers for environmental issues. The major issues surrounding the US-Mexico border involve economics and population growth that present challenges to environmental management and natural resource planning. To monitor trends

and analyze the stresses to the environment, bi-nationally integrated baseline datasets that portray the status of the landscape are needed. Geographic data are readily available for both countries, but the data lack a structured framework and compatibility in terms of temporal and positional scale and consistent quality. One goal of the U.S. Geological Survey Border Environmental Health Initiative (BEHI) project is to provide bi-nationally integrated geographic data to allow people to examine the ties between the physical environment and public health issues. Due to copyright issues for some datasets in Mexico, the BEHI project has developed an integrated, Web-based, environmental resource database for display and further analysis within a geographic information system (GIS) framework (<http://borderhealth.cr.usgs.gov>). This information system, available to the public through the Internet Mapping Service (IMS), provides the data and tools needed to examine both the occurrence and distribution of disease-causing agents in the environment, and their specific exposure pathways in water, air, biota, rock, and soil. An important data theme for environmental research is the bi-nationally networked hydrography theme for shared watersheds between the United States and Mexico. The geographic display of hydrographic data for the United States and Mexico allows researchers to identify gaps in monitoring networks, ascertain areas of potential contamination or pollution, recognize health concerns connected to the environment, and, to potentially discover many other environmental health issues.

The US Geological Survey, Texas Water Science Center is creating a 1:24,000/1:50,000 scale bi-national networked hydrography system across the United States and Mexico border from California/Baja California to the Gulf Coast (Texas/Tamaulipas). This project is being completed in different phases. A prototype for the project has been completed for subarea 8 (the easternmost) of 8 subareas. Subareas 1 – 4 are being completed in two phases. Phase I of the 1:24,000/ 1:50,000 Bi-national Networked Hydrography System is now complete and includes subareas 3 and 4 (Southwestern New Mexico-Northwestern Chihuahua and Southeastern Arizona-Northeastern Sonora). In order to create this hydrographic dataset, two existing, separate datasets for Mexico and United States hydrology were combined into one data model containing a routable network. For this data model, the hydrographic data from Mexico was provided by the Instituto Nacional de Estadística, Geografía e Informática (INEGI), and the hydrographic data for the United States was provided by the National Hydrography Dataset (NHD) of the U.S. Geological Survey (USGS). The basic methodology for this data-merging procedure was created by the Center for Research in Water Resources (CRWR) at the University of Texas at Austin, and involved working refinements on the data, and then placing the data into an Environmental Systems Research Institute, Inc (ESRI) geodatabase with the CRWR ArcHydro™ schema. The BEHI website is currently available on the Internet at: <http://borderhealth.cr.usgs.gov>.

### **Answer to December Hydrography Quiz / New January Quiz**

Joanna Wood, a senior environmental manager for the Indiana Department of Environmental Management's Office of Water Quality, was the first to correctly guess last month's hydrography quiz <ftp://nhdftp.usgs.gov/Quiz/Hydrography19.pdf> as Lake Champlain on the border between Vermont and New York. The 121 mile long lake was first visited by Europeans in 1609 by the French explorer Samuel de Champlain. Lake Champlain's surface area is about 435 square miles and contains about 80 islands. The water in Lake Champlain flows from south to north, and is located along the Richelieu River (which connects the lake to the Saint Lawrence River). When Vermonters or New Yorkers refer to a place being "up Champlain," they mean down south. The Champlain Valley (and the river) is located between the Adirondack Mountains of New York and the Green Mountains of Vermont. A canal completed in 1823 connected the lake to the Hudson River (and therefore the Atlantic Ocean). The canal completely changed the commerce of the valley surrounding the lake. The world's second steamship, the *Vermont*, was put into service on Lake Champlain in 1808, just one year after Robert Fulton's ship the *Clairmont* made its maiden voyage. Vermont's four principal rivers all flow into Lake Champlain. (From: <http://geography.about.com>)

Joanna's office handles point and nonpoint source pollution issues through voluntary and regulatory programs. They also monitor water quality and provide assessments and recommendations for the other programs and report findings to the USEPA. Joanna works within a voluntary program that provides Federal funding to help reduce nonpoint source water pollution by working with local groups interested in improving their water quality. She uses GIS and hydrography layers routinely to review, assess, and communicate water quality data results and watershed planning and implementation activities throughout the state. This work uses the NHD and the state's 14-digit subwatersheds to help evaluate point and nonpoint source programs and track watershed management activities. This year, they will be using the NHD to help track program designations by setting up Lyr files housed within a SDE environment. This will replace the various subsets of the NHD that represented the different program stream designations, such as, outstanding resource waters, impaired waters, assessed streams, and TMDL development. Others with the correct answer were: Melvin Landry, David Asbury (who notes "The lake exhibits classic geomorphologic features of a waterbody carved by glacial action."), Mike Wiedmer, Matthew Heberger, Roger Barlow (who notes that this is often called "The sixth Great Lake."), Phil Graf, and Craig Johnston.

For the January quiz look at <ftp://nhdftp.usgs.gov/Quiz/Hydrography20.pdf>. Can you identify where this is? You will need a hint. This seemingly unremarkable hydrography was made immortal by a movie and a song. Name the two rivers upon which the movie was filmed that form the confluence at the "Y" in the upper lake. Send your guess to [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov).

### **Upcoming NHD Geo Edit Tool Training**

Helena, Montana – February 6-8, 2007. Contact Paul Kimsey [pjkimsey@usgs.gov](mailto:pjkimsey@usgs.gov) or Lance Clampitt [lsclampitt@usgs.gov](mailto:lsclampitt@usgs.gov)

Benton County, Arkansas – January 29-30. Contact Tim Hines [thines@usgs.gov](mailto:thines@usgs.gov) or Bill Sneed [wsneed@usgs.gov](mailto:wsneed@usgs.gov)

Little Rock, Arkansas – April, 2007. Contact Tim Hines [thines@usgs.gov](mailto:thines@usgs.gov) or Bill Sneed [wsneed@usgs.gov](mailto:wsneed@usgs.gov)

Anchorage, AK - Spring, 2007 (Possibility). Contact Paul Kimsey or Carl Markon [markon@usgs.gov](mailto:markon@usgs.gov)

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

Redlands, CA – February 1, 2007. Contact Carol Ostergren at [costergren@usgs.gov](mailto:costergren@usgs.gov)

Las Vegas, NV – February 27 & 28, 2007. Contact Tom Sturm at [tsturm@usgs.gov](mailto:tsturm@usgs.gov)

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

Donnelly, Idaho – April 2 and 3, 2007. Contact Frank Roberts at [fmroberts@cdatribe-nsn.gov](mailto:fmroberts@cdatribe-nsn.gov). See [http://www.intermountaingis.org/conference\\_2007.html](http://www.intermountaingis.org/conference_2007.html)

Champaign, Illinois – April 30, 2007. Contact Shelley Silch at [ssilch@usgs.gov](mailto:ssilch@usgs.gov)

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

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