USGS National Hydrography Dataset Newsletter
Vol. 8, No. 9, July 2009
by Jeff Simley, USGS

New USGS Hydrography Fact Sheet

A new USGS *The National Map*—Hydrography fact sheet is now available covering the NHD and WBD. This is publication FS 2009-3054. You can preview it at http://pubs.usgs.gov/fs/2009/3054/. If you would like hard copies, send a request to Kathy Isham at krisham@usgs.gov.

ESRI User Conference

A number of papers were presented at the 2009 ESRI International User Conference of interest to those working with the NHD and WBD. Here is a synopsis of a few:

Integrating Local knowledge into the National Hydrography Dataset – Wilma Robertson, Idaho Department of Water Resources: The state uses the high-resolution NHD, but to make it fully useful, enhancements are needed. For example, 30% of the streams have no names and need to be named. Also, a full complement of dams, springs, and diversions are needed. The best information about the hydrography is in the hands of local land managers in the form of paper maps. This cannot be directly converted into the NHD. Most local users have limited GIS experience. To deal with this, a set of tools have been developed. The NHDFlowline Naming Tool identifies where GNIS names exist and where they need to be added. Canals are very important in Idaho and local canal companies are able to edit parts of the NHD using a custom tool that can add a new canal through the use of drop down menus. The work is done on a copy of the database. An example was given of the Burly Irrigation District where over 200 names have been added. They are able to build better connectivity and create better networks. They have ran into issues where it is easy to over-densify the data. The use of the tool by local irrigation districts allow less sophisticated users to make many updates with as much ease as possible. The tool can be made available to users at large.

Improvements in Modeling Water Resources in West Virginia – Jacquelyn Strager, West Virginia University: West Virginia uses medium, high, and local resolutions of the NHD. They have 1:24,000-scale confluence-to-confluence stream segment-based catchments similar to NHDPlus, flow relationships, and a hydro corrected DEM. The state uses a statewide stream coding system. Custom tools allow for navigation, calculation of length and area, distance to features, and integration and land cover. One important task is to study effects of abandoned mines on water resources. The mines are related to the catchments rather than the stream segments. Distances to nearby mine permits are calculated. 1:4,800-scale digitized linework exists for the entire state, but is not incorporated into the NHD. This is based on 2003 imagery. Conflation with 1:24,000-scale NHD was run on two subbasins to transfer attributes to geometry. The benefits of this 2003 data are that it provides more up-to-date information, better scale, better use in local mapping, integration with photography, better integration with DEM, and reflects how roads and mines have changed the hydrography. However, there are problems with inconsistency in hydro collection from photo tile to photo tile. A generalization capability is very important. Uses are to quantify stream change and measure how mining affects streams. Mine areas are digitized and streams inside are targeted for editing. New mines mean constant change. The use of local resolution had a lot of promise, but also a lot of problems. So the business decision was made to stick with the 1:24,000-scale NHD as the maintenance database.

New Jersey's High Resolution NHD Conflation Project – Seth Hackman, New Jersey Department of Environmental Protection: New Jersey is producing NHD at 1:2,400-scale. Conflation has begun with the 1:24,000-scale NHD this year. So far, 6,000 miles of streams have been added. The 1:2,400-scale

attributes are of little use so it is necessary to conflate with the 1:24,000-scale NHD. Some streams are deleted in the process due to change. The work is going beyond state borders up to the next confluence in the adjacent state. Coordination with New York is necessary due to flow in and out across the border. Work on the coasts is being held to last due to the complexities involved. The management of reach codes is significant to the process. Conflating the local resolution geometry into the NHD allows standardization of data and provides and long-term future for the data. No wetlands are being collected at the 1:2,400-scale so 1:24,000-scale NHD Swamp/Marsh is being used. Future development calls for adhering to the needs of New Jersey DEP, linking supplemental water data, tools for navigating and discovery, links to STORET, TMDL assessments, and improved metadata. This project is of major importance to the state of New Jersey.

FGDC Endorses Wetlands Mapping Standard

The Federal Geographic Data Committee endorsed the Wetlands Mapping Standard in July 2009. The intent of the Wetlands Mapping Standard is to support current and future digital mapping requirements, through the specification of minimum data quality components. The Wetlands Mapping Standard supports the National Wetlands Inventory (NWI) and aligns with the requirements of the National Hydrography Dataset (NHD). It is intended to be extendible, forward-looking, and able to accommodate technology enhancements over time. Adherence to the Wetlands Mapping Standard is required for all wetland mapping activities funded or conducted by the Federal government. For more see: http://www.fgdc.gov/standards/projects/FGDC-standards-projects/wetlands-mapping/. For more about a wetlands mapping standard see http://www.csc.noaa.gov/geotools/sessions/Wed/F08_McGuire.pdf.

Feature Catalog – Fun Facts by Keven Roth

This is the first in a series for the newsletter that will describe NHD features and attributes. It draws on the definitions and examples included in a web-based feature catalog being developed to include all of the features in the NHD. This month, we highlight one of the less common (but not simpler) features - Lock Chamber.

Lock Chamber is associated with Dam/Weir, Gate, Nonearthen Shore , Wall, Stream/River, Lake/Pond, Submerged Stream and Canal/Ditch. Lock Chamber is only one of the features needed to create a representation of the structure. Most locks are associated with dams. All locks have gates. Most locks have walls and concrete shorelines beyond the actual chamber. Some locks are built on streams that create slackwater pools that the NHD calls lakes, and these lakes create submerged streams. Some locks are on canals. The good news: we aren't building many locks these days, and the NHD already contains all of the major locks.

LOCK CHAMBER - An enclosure on a waterway used to raise and lower vessels as they pass from one level to another. In the NHD, lock chamber is one of only two features that can be represented as a point, a line or an area (NHDPoint, NHDArea, and NHDLine). The other feature is rapids. There are only five *point* lock chambers in the NHD. Most (maybe all) of these are on historical canals, like the C&O canal that was built by George Washington. It is a narrow canal that is represented in the NHD as a line and the locks are very small. The locks along this canal are simply gates across the canal. These days, the canal is a tourist attraction and you can get pulled along a stretch of the canal by Park Service mules. These could be the most esoteric features in the NHD. Not much is required in the way of maintenance. There are 178 locks represented by *lines*. These are slightly larger locks on larger canals. The lock chamber is represented as a line between the gates on either end.

There are 317 locks represented as *areas*. These are significant structures that are associated with other NHD features. The feature lock chamber describes the actual basin that allows ships to be raised and

lowered through the dam. Often the locks have walls that are built in the water beyond the extent of the chamber. The ends of the lock chamber are captured as gates. Nonearthen shore is collected to describe the edge of the lock chamber. Locks and dams usually create slackwater pools that can be collected as lake/pond. Lock chamber and lake/pond, stream/river and canal/ditch are features that are allowed to overlap. There is no "hole" in the other feature for the lock chamber. Often there is a submerged stream associated with the lake/pond. Submerged streams exist in the NHD if the submerged stream channel was shown on the published USGS topo map. This only occurred if an earlier edition of the map existed before the lake/pond was created by the dam. The stream channel and the contours were published. USGS started "saving" the submerged features after intense lobbying by sport fishermen.

All of the detail and attention paid to lock chambers and the associated features is related more to map production and display. They are important features in the network and have implications for water quality, habitat, and flow volume and velocity. Their accurate location is needed, but the ability to create all the symbols like the "v" gates which always point upstream is probably less important. In the example, you will notice that the artificial path was drawn through the lock. Although there is no guidance on how to align the artificial path around a lock and dam, this decision seems like a logical choice. There is a separate reach code for the portion of the artificial path through the lock chamber. The WBAreaComID for this artificial path is the ComID for the Lake/Pond. Most dams now have a point event (NHDPointEventFC) that has been created from National Inventory of Dams and it is located on the artificial path to provide a network address to aide in network analysis.

NHD Photos Needed by Kathy Isham

Each month the NHD web site will highlight a photo of a real-world hydrography feature that can be found in the NHD. Send your favorite photograph of a hydrography feature to the USGS and each month one will be selected for the web site. Take pictures of hydrography while hiking, boating, or on vacation. This is open to anyone wishing to participate. Entries should portray an existing NHD feature. Limit one photo per month per participant. Also include a pdf, emf, screen shot or mxd of the photographed water feature as it appears in the NHD. Send digital photographs to the following email address: krisham@usgs.gov.

AWRA Conference – Call for Abstracts

The American Water Resources Association's popular series of conferences on GIS & Water Resources continues with its sixth GIS & Water Resources conference, this time in Orlando, FL March 29-31, 2010. The Call for Abstracts is now open and will close October 9. Geographic Information Systems (GIS) have become a fundamental tool for the analysis, planning and management of environmental and water resources systems. This Specialty Conference continues the AWRA biennial tradition of surveying the state of knowledge in the field, following the 2004 conference in Nashville, 2006 conference in Houston and 2008 conference in San Mateo. Because of its interdisciplinary approach to water resource opportunities and problems, AWRA provides an excellent professional home for the most comprehensive forum on the application of GIS to water resources engineering and sciences. The Conference Organizing Committee invites you to join this important community of scholars and practitioners in GIS and water resources in Orlando by sharing your experiences and knowledge with an oral presentation or present a poster in the gallery at the conference. Plan to submit an abstract and join us to network and experience what your colleagues are doing with GIS and Water Resources. Meet the leaders of geospatial and hydrologic technologies using and applying their skills in the sessions, exhibit hall, Opening Reception, luncheon, workshops, field trip, and networking events. AWRA's Spring Conference will be packed with opportunities for you to learn more, network, and be entertained. For the latest information visit: http://www.awra.org/meetings/Florida2010/

June Hydrography Quiz / New July Quiz

Anji Redmond from the State of Maine was the first to correctly guess the June hydrography quiz as 180 square mile Falcon Reservoir in Texas on the Mexican border. Anji is a GIS Coordinator of Core Services with MEGIS. She is the Principal Steward and Technical Point of Contact for Maine's NHD (soon to include WBD) and is currently coordinating the maintenance and updating of NHD. Her job is enhancing Maine's current 1:24,000 digital hydrography data to create National Hydrography Dataset (NHD) high-resolution data. She also manages the metadata for Maine's spatial data. MEGIS provides technical support for Maine GIS data.

Others with the correct answer (in order received) were: Steve Shivers, Chris Markuson, Stephan Daw, Richard Patton, Dave Straub, Jane Schafer-Kramer, Jennifer Sharpe, Evan Fedorko, David Fetter, Grant Wilcox, David Asbury, Al Rea, Liz O'Dea, Ed Carter, Joanna Wood, Stephanie Kula, Gary Penn, Elaine Blok, Roger Barlow, Tom Owens, Tom Denslinger, and Jim McDonald.

Jennifer Sharpe noted: "The reservoir is the International Falcon Reservoir on the Rio Grande River along the Mexico-United States border. According to Wikipedia, "The dam was dedicated by Mexican President Adolfo Ruiz Cortines and US President Dwight D. Eisenhower in October, 1953. The dam and lake are managed jointly by governments of the United States and Mexico through the International Boundary and Water Commission. The lake is named after María Rita de la Garza Falcón, for whom the town of Falcon (displaced by the creation of the reservoir) was named." In the quiz clue last month it was incorrectly noted that then President Richard Nixon dedicated the reservoir. Nixon dedicated Amistad Reservoir, also on the Rio Grande between Texas and Mexico.

This month's hydrography quiz takes a different approach than normal. The quiz requires some GIS to calculate the answer. It's actually easy, but could take fifteen minutes of your time. What is the distance in the Ohio River between Pittsburgh and Cincinnati in miles? To do this two subregions are needed: 0503 and 0509. There will be a slightly different answer whether using the hi-res or med-res NHD. In either case, start from the confluence of the Ohio and Sawmill Run in Pittsburgh and end at the confluence of the Ohio and Mill Creek in Cincinnati. If you need help in how to figure this out, see http://nhd.usgs.gov/NHD_Quickstart_Feb_09.pdf. Watch out for braids in the Ohio and don't forget about converting from kilometers to miles. Send your guess to jdsimley@usgs.gov.

Upcoming NHD Maintenance Training

September 15-17, Augusta, ME. Contact David Anderson (danderson@usgs.gov) and Anji Redmond (anji.redmond@maine.gov)

Thanks to Keven Roth 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.