USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

100th NHD Newsletter

This issue of the NHD Newsletter, volume 9, number 4, is the 100th newsletter!

NHD Update Process Improvements – by Paul Kimsey

The USGS is taking a serious look at how maintenance is performed on NHD data. This is in response to steward comments that the maintenance process is complex and cumbersome and may be discouraging some stewards from participating in maintaining the NHD. This situation was outlined in the NHD Stewardship Issues paper submitted to the USGS Director in May, 2007. In response, the Director promised certain actions by USGS to address the stewards' concerns. One of these actions is the NHD Update Process Improvement project. The objective of the project is to develop a functional requirements document and implementation plan which will address the stewards' concerns with the update process and result in encouraging maintenance of the NHD, reduce the resources needed to do NHD maintenance and improve the overall quality of the NHD dataset. NHD Update Process enhancements and updates will address: code refactoring, installation enhancements, data management processes, quality control processes, editing environment, NHD update utilities, user interface, and bug fixes/enhancements.

The NHD Update Process is composed of numerous tools, scripts, utilities, data management workflows, editing processes, and quality control checks. Updates, edits, and enhancements will be made to each module comprising the NHD Update Process. This is to include:

1. Clean up current Source Code
    - Update to current version of ArcGIS (libraries etc.)
    - Resolve memory allocation errors
    - Modular design
2. Package all tools/scripts/utilities with NHD Geo Edit tool (includes NHD GeoConflation tool,Hydro Event Management tool and link to WBD tool(s))
    - One install – verify prerequisite software installs
    - One toolbar with logical progression
3. Utilize SDE versioning – check out/check in/change detection
4. Develop method for updating in geographic coordinate system
5. Build queues for all current and proposed QC checks
6. Develop queued edit tool
    - Navigate user through each queue/monitor progress/track status
7. Compatible with Personal Geodatabase (Pgdb) or File Geodatabase (Fgdb)
8. Compatible with Interim NHD model (permanent ID)
9. Tools are not reliant on ESRI Task Assistant User
10. Utilize JTX tracking – process/QC
11. Improve metadata process - Add functionality that exists within HEM (add, edit, view etc.) , use templates
12. Improve reach allocation process - Connection to server is often unavailable
13. Incorporate all enhancements from NHDGeoEditTool.xls

Status reports will be provided on a regular basis and questions should be directed to Carl Nelson cwnelson@usgs.gov or Paul Kimsey pjkimsey@usgs.gov

Datum Shift Update Program by Ariel Bates

Colorado and Wyoming are currently being reviewed for possible datum errors and corrections being made. States that have been inspected and corrected include; Oregon, Nevada, New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Alabama, Tennessee, Kentucky, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Texas, Oklahoma, Kansas, North Dakota, Montana, Idaho, New Mexico, Arizona, California and Washington. It has been found that 0.2% of quadrangles in the NHD require a datum correction fix.

NHD Image Update Program by Ariel Bates

In an effort to inspect and correct major changes to hydrography; Kentucky, Kansas, Oklahoma, Tennessee, Minnesota, Pennsylvania, Texas, Virginia and Indiana have been photoinspected and corrections made. States currently being corrected include Iowa, North Carolina, and Wisconsin. Multiple other states are currently being photoinspected.

Photo Revision in Florida – by Joe North, Florida Department of Environmental Protection

Prior to the early 1900's, the central and southernmost portion of the Florida peninsula was covered by a vast connected series of wetlands commonly known as the Everglades. In an effort to convert these wetlands to human-habitable and agricultural lands, a number of water control projects that included the creation of large dike and canal systems were carried out. Periodic hurricanes threatened development, so in subsequent years, activities aimed at controlling flood waters further changed natural flow patterns. Today, approximately only 50-percent of the natural system remains*. The predominance of man-altered water features at the land's surface in southern Florida is captured in digital geospatial form in the National Hydrographic Dataset. Currently, a Comprehensive Everglades Restoration Plan (CERP) is being implemented through a 50-50 state-federal partnership. The plan provides a framework and guide to restore, protect and preserve the water resources of central and south Florida, including the Everglades. The plan encompasses 16 counties over an 18,000-square-mile area. The goal of CERP is to capture fresh water that now flows unused to the ocean and redirect it to areas that need it most**. This program and other activities both ongoing and planned will further change surface water capture and flow. As a result, the impact of these activities upon the Bureau of Watershed Management's Stewardship of the NHD is manifold and is expected to continue for many years. CERP activities include; wetlands restoration, backfilling canals, capture and diversion of storm water runoff, installation of levee systems, creation of new canal systems and new water control structures among others. Each of these activities will require changes to the NHD that will include the addition and deletion of features, the reassignment of feature types, new feature names, changes in flow directions, and edition of existing feature extents. Special attention will be paid to the timing of CERP activities so that the NHD can remain an accurate and current data layer for those who depend upon it for mapping and analytical purposes. Sub stewardship partnerships with professionals who have expertise with South Florida's hydrology will be key to the success of Florida's NHD stewardship program.

* http://sofia.usgs.gov/publications/circular/1182/

** http://www.dep.state.fl.us/evergladesforever/restoration/projects.htm

USGS StreamStats Application for North Carolina Using Local Resolution NHD Data by Steven Strader, USGS Geospatial Liaison to North Carolina

In 2004, the North Carolina General Assembly tasked the stakeholder community to develop an implementation plan for updating and improving the digital representation of surface waters to support regulatory and planning business processes. The implementation plan was completed in January 2005; the first production phase was funded for a nineteen (19) county region in western North Carolina impacted by Hurricanes Ivan and Frances the previous year. The project Advisory Committee settled on the NHD database schema as a basis for generating local resolution NHD data, with extended tables to store additional attributes. Source datasets used in producing this local-resolution NHD dataset include statewide LiDAR elevation data, high-resolution orthoimagery contributed by local governments, and the high-resolution (24K) NHD. To promote consistency of data collection, six-acre catchments are delineated from flow-corrected LiDAR; stream features are manually compiled to drain each catchment. An accuracy study was completed to quantify the horizontal accuracy of features and confirm ninety percent of perennial / intermittent transitions occur on linear features using the six-acre threshold. Attribution from the 24K NHD is conflated to corresponding features in the local resolution dataset. Production on the first phase was complete in summer 2007. A follow-on pilot project to develop the workflow to integrate the North Carolina local resolution data into the national NHD database was completed in FY2009.

As part of the Phase 1 project, there was interest by both Federal and State partners in a pilot project to determine if local resolution NHD data could be used in the USGS StreamStats application. StreamStats, a Web-based assortment of analytical tools for the planning and management of water resources, can rapidly provide accurate basin characteristics and streamflow statistical data from gaged sites and estimated streamflow statistics from ungaged sites. Historically, StreamStats has used 10 and 30-meter DEMs and 1:24,000-scale and 1:100,000-scale NHD data for this purpose.

A pilot project, led by the USGS, working with the NC Department of Transportation, was funded to build and test a StreamStats application for the upper French Broad River basin in western North Carolina using the local resolution NHD data. The application uses 20ft DEMS derived from the NC LiDAR, regional streamflow regression equations, and landscape characteristics. Rainfall data, slope, drainage area, and land cover classifications were also included. The NC Center for Geographic Information and Analysis (CGIA) generated a separate high-resolution land cover data set for the project using ASTER satellite imagery from 2005-2006. Roads, political boundaries, aerial imagery, and USGS topographic maps are included to aid in navigation.

Multiple functions in the system include display of webservices served on NC OneMap for roads and aerial imagery, zooming to different scales, linkage to the National Water Information System (NWIS), drainage basin delineation and editing, computation of over 35 basin characteristics, peak flow estimation at ungaged sites, elevation profile lines between any 2 or more point locations within the basin, and other capabilities. Streamflow characteristics for ungaged sites can be estimated. The local-resolution NHD stream network can be navigated and any indexed datasets can be identified within the navigation results (only stream gages at the point). Point-to-point navigation of the stream network is also an interactive function which returns a table summarizing the distance between the two points.

NC Stream Mapping project information and data is available at http://www.ncstreams.org.
The full NC StreamStats project factsheet is available at http://pubs.usgs.gov/fs/2009/3088/
The NC StreamStats application can be accessed at
http://water.usgs.gov/osw/streamstats/north_carolina.html

Special NHD Meeting at AWRA Conference

In addition to the formal agenda for the upcoming American Water Resources Association's GIS & Water Resources conference, there will be two informal meetings on the NHD. One is a NHD User's Group meeting, and the other is a roundtable discussion on the role of LiDAR for the NHD. The User's Group discussion will be held over lunch at 12:15 PM on Tuesday, March 30, and the LiDAR discussion will be at 5:15 PM the same day. They will be held in one of the session rooms to be determined. The conference is in Orlando, FL March 29-31, 2010. For the latest conference information visit: http://www.awra.org/meetings/Florida2010/

NHD Management Team Meeting Notes

The notes from the annual NHD Management Team meeting held in December can be found on the myUSGS web site at: https://my.usgs.gov/Public/NHD-Advisory.

Hydrography Event Management Tool by Dan Wickwire, Bureau of Land Management

Development of the Hydrography Event Management (HEM) Tool Version 2.2 began in January, 2010. BLM and its national partners are using an agile development approach with a number of focused sprint efforts scheduled between now and October/November, 2010. The project is on schedule. HEM users should anticipate intermediate releases, scheduled at appropriate times, in the coming months. These releases will be advertised in the NHD Newsletter and on the HEM_Tools myUSGS community. If you have any questions concerning the HEM Tool, please contact HEM@usgs.gov.

Watershed Boundary Dataset by Stephen Daw

The most current version of the Watershed Boundary Dataset is dated January 27th, 2010 and is available at: ftp://gateway2.ftw.nrcs.usda.gov/Gateway/WBD/. A newer version is anticipated the second week of March.

NHD Names by Keven Roth

Stream names in the NHD are based on the official name currently managed in the Geographic Names Information System (GNIS). To assign the names to the NHD, Flowlines were matched to the GNIS records based on the GNIS mouth and source coordinates. Both the mouth and source coordinates for GNIS names were manually collected from the existing published topographic maps, usually at 1:24,000-scale. When the topographic map was being made, the field crew gathered and verified all the names they could and placed the name and, if necessary, indicated the extent of the name on the compilation manuscripts. When the final lettering was applied to the map, the goal was to place the lettering in a manner that allowed accurate identification of the extent of the name. The rule for this interpretation is known as the "one-third" rule. This meant that the type for the name was applied to the middle one-third of the entire extent of the stream known by that name. This rule was used by the digitizers who collected the mouth and the source coordinates for the GNIS database. The GNIS collection was usually done to the best ability from the text location on the map. In most cases it is pretty obvious. In a few cases it may not be so clear. Sometimes the mouth and source coordinates are not as accurate as they could be. As a consequence the application of the name may be incorrect in the NHD. If a NHD steward has questions about the application of a name in the NHD, the first thing is to check the map and use the "one-third rule" to see if the map can clarify the path of the stream. If the map does not resolve the problem, they can work with the State Names authority to provide an authoritative source for the "real" application of the name. Local sources of the extent of the name would need to be provided to GNIS for adjudication. The GNIS has the responsibility for the name *and the application of that name.* This is public law!

New Video on The National Map

The USGS has produced a new video that tells the story of The National Map. It highlights hydrography with comments presented by Tommy Dewald of the EPA. Also joining Tommy are testimonials from Jack Dangermond of ESRI and Allen Carrol of National Geographic. You can see the video at http://www.youtube.com/watch?v=ISzUlINbB4o.

New Intern at USGS

Kristiana Elite is interning at the USGS for the Spring semester specializing in hydrography. Her educational background is comprised of a Bachelors in Anthropology from the University of California, Santa Cruz, followed by a Masters in Urban and Regional Planning which includes a Geographic Information Systems Certificate from the University of Colorado, Denver. Kristiana's professional aspiration is to utilize GIS technologies to support decision makers in making educated and environmentally sound land use planning decisions. Currently as an intern at the USGS, she is creating online tutorials to assist different user groups in understanding NHD data and how it may be used for mapping and analysis. She is also investigating the utility and power of incorporating storm water data into the NHD to fill in the hydrography that is currently largely absent in most urbanized areas.

NHD Photo of the Month

This month's photo was submitted by Keven Roth. It shows a small waterfall near her home in Montana. The map showing where the photo was taken was created by Kathy Isham. To see the photo of the month go to ftp://nhdftp.usgs.gov/Hydro_Images/BitterrootFalls.pdf. To submit your photo for the NHD Photo of the Month, please send it to krisham@usgs.gov.

January Hydrography Quiz / New February Quiz

David Asbury was the first to correctly guess the January hydrography quiz as Pyramid Lake in northwestern Nevada. See ftp://nhdftp.usgs.gov/Quiz/Hydrography54.pdf. David is a GIS Analyst/Cartographer for the Center for Ecosystem Management and Restoration in Oakland, CA. He is currently working on an atlas of the historical distribution and current presence of endangered steelhead trout in coastal streams south of the Golden Gate, California. The NHD, NHD Plus and HEM tools are fundamental and integral to this work.

Joanna Wood forwarded this from Wikipedia: Pyramid Lake is an endorheic salt lake, approximately 188 sq mi, in the Great Basin in the northwestern part of the U.S. state of Nevada. One of the largest lakes in the United States, it is located in southern Washoe County 40 mi northeast of Reno, along the east side of the Virginia Mountains with a surface elevation of about 3,789 ft. Pyramid Lake is fed by the Truckee River after leaving Lake Tahoe upstream and enters the lake from its southern end. There is no outlet, with water leaving only by evaporation, or sub-surface seepage.

Others with the correct answer were (in order received): Michael Wiedmer, Tom Denslinger, Steve Shivers, Charley Hickman, Jim McDonald, Jory Hecht, Calvin Meyer, David Straub, Joanna Wood, John Lynam, John Kosovich, Richard Patton, Gary Penn, Jennifer Campbell-Allison, Gail Jackson, Ray Fox, Ellen Finelli, Alan Rea, Hans Klausner, Tom Christy, Andrew Morris, Linda Davis, Bryan Anderson, Laurie Morgan, Elaine Blok, Roger Barlow, and Andy Woeber

This month's hydrography quiz can be found at ftp://nhdftp.usgs.gov/Quiz/Hydrography55.pdf. Notice that there is a large patch of light density hydrography measuring about 80 miles wide within the

surrounding pattern of higher density hydrography common throughout the rest of the country. This is not an error, but rather a true hydro-morphologic condition. We're looking at high resolution data. The dark blue are perennial streams, light blue are intermittent, orange are canals, and magenta are artificial paths within polygon rivers. There is a significant river draining down through the middle of the image. The patch (or lobe) has a name, which is the same as the river and a big city. Where is this and why is there a lobe of light density hydrography here? Send your guess to jdsimley@usgs.gov.

Upcoming NHD Training

June 2–4, 2010: Conflation, Manhattan, Kansas, Contact Ray Postolovski (rpostolovski@usgs.gov)or Ingrid Landgraf (imlandgraf@usgs.gov)
June 22, 2010: Applications, New York City, N.Y., Contact David Anderson (danderson@usgs.gov)

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The NHD Newsletter is published monthly. Get on the mailing list by contacting jdsimley@usgs.gov.
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