USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

U.S. Coastline for the NHD by Cynthia Miller-Corbett

The NOAA Geodetic Survey Remote Sensing Division is providing updated shoreline data for the coterminous US coastline, including the US Great Lakes, to the USGS National Hydrography Dataset (NHD). The new shoreline vector data is managed through NOAA's Continually Updated Shoreline Product (CUSP). CUSP is built upon the NOAA Contemporary Shoreline data (1988 – 2010) which comprises approximately one-third of our nation's shoreline focused primarily on the most navigational significant areas. CUSP uses and incorporates both NOAA and non-NOAA contemporary sources including stereo and monoscopic imagery from aerial photography, LiDAR, and external shoreline vectors to fill-in shoreline areas of older vintage. Vector data is either high-resolution and tide-coordinated, or interpreted high water line shoreline from non-tide-coordinated imagery. The CUSP also incorporates shoreline derived from the Vertical Datum (VDATUM) tool, commercial satellite imagery, data portals such as NOAA's Digital Coast tool, and other providers to create a continually updated shoreline. Future vector data may include IFSAR-, Hyperspectral Scanner-, and Multispectral-derived shoreline. The source for the vector data is identified in the meta-data file.

To date, the USGS NHD has received new shoreline data that cover 100 percent of coastlines for six of the eight states with Great Lakes shorelines, as well as Connecticut and Rhode Island. On the West Coast, new data are created for 55 to 75 percent of state coastlines. Completion for state coastlines along the East Coast and Gulf of Mexico varies from 15 to about 30 percent. Based on current plans, the majority of the US West Coast shoreline will be completed in the Spring of 2013. It is the goal of the USGS National Geospatial Program Hydrography Section to integrate the new data for the NHD and USTopo maps once product and services tools are online.

Spot-checks to compare the existing NHD shoreline with new NOAA shoreline reveals areas where shoreline change is minimal, and areas such as along the Maine or Washington coast where there is an apparent change of more than 100 meters . These changes can reflect coastal erosion or sea-level changes, but may also be due to differences in methods and techniques for deriving shoreline or because of the timing of shoreline data collection.

NHD/WBD Stewardship Conference - Continued

The fourth bi-annual NHD/WBD Stewardship Conference held March 29 and 30 was a huge success with over 120 people attending from 45 states and 45 people making presentations. The conference was held in New Orleans, Louisiana in conjunction with the American Water Resources Association's 2012 Spring Specialty Conference on Geographic Information Systems and Water Resources VI.

Day Two, Morning II
The second half of morning started out with a panel on the statewide implementation of NHD. First, Anita Stohr from the state of Washington talked about the adoption of the NHD as the state hydrography standard. It's used for the maintenance of state water quality standards, 305(b) and 303(d) assessments, in-stream flow standards, National Pollution Elimination Discharge System, ambient monitoring stations,

drinking water extraction points, dams and diversions, fish distribution, stream identifiers, salmon stock distributions, and fish passage barriers. Anita presented many outstanding maps portraying this information.

Next, Douglas Suitor presented on NHD implementation in Maine where the Department of Environmental Resources in the principal steward. Doug talked about problems facing stewardship outlining: (1) Complexity of NHD editor tools/QAQC tools, (2) Inability to use standard workflows, (3) Troubleshooting difficulties, (4) Difficulties using 9.3.1 tools and other installed software, (5) Incompatibility with Arc 10 /10.1, and (6) Error Reporting. Doug offered that solutions will center on (1) New Tools, (2) Virtual machine install, and (3) NHD WET Tool / ArcGIS Online Tool. Doug went on to point out many benefits of the NHD in Maine that include: (1) Improved mapping, (2) Network connectivity, (3) Water classification, (4) National Assessment Database, (5) Time change mapping, (6) Watershed delineation, and (7) Watershed modeling. Doug stressed the Integrated Water Quality Monitoring and Assessment Report 303(d) data sent to the USEPA as an event table. Next steps for Maine are (1) Wetlands changes, (2) National Wetlands Inventory additions, (3) Impaired Wetlands reporting, (4) Marine waters, (5) LiDAR, and (6) Coastlines.

Mike Kruse of the Missouri Department of Natural Resources then talked about the Missouri Classified Waters program. This was followed by Mike Butler of the Kansas Department of Health and Environment with a mission to protect and improve the health and environment of all Kansans. Mike talked about used of the NHD: (1) As a common base layer for the state, (2) for water quality discharge permits Total Maximum Loads, (3) water rights, (4) fisheries and recreation, (5) water policy, and (6) bridge crossings. Some of the NHD issues involve (1) correct names, (2) flow network, and (3) Strahler stream order. The state also uses the NHDPlus. Kansas has a Surface Water Register, which takes advantage of GIS technology.

Evan Fedorko presented on stewardship in West Virginia. Stewardship is headed by the West Virginia Office of GIS Coordination working with the GIS Technical Center, the Natural Resource Analysis Center, and the Department of Environmental Protection Office of Water Resources. The goals are to establish the stewardship program and then do the edits and updates. One objective is outreach in order to promote the stewardship concepts. Two editors went to work, but editing was slow and required frequent technical support by USGS, resulting in an unsatisfactory process. In 2012 the emphasis is on high change areas, usually associated with surface mining. This produced a catalog of streams in need of edits, including "replacement drainage" at the mine sites. Many natural streams are buried by mining activity. The state is looking forward to restarting editing using the new NHD Update Process.

The formal meeting then concluded with an excellent presentation on Managing the Nation's Hydro Events with Ariel Doumbouya of the USGS, Evan Hammer of Montana, and Jay Stevens of the Oregon BLM office. Jay discussed the Aquatic Resource Information Management System database, which is linked to the NHD using linear events. Millions of records have been linked, actually re-linked, to the NHD using the Hydrography Event Management Tool. Data is stored in an SDE Oracle instance deployed using a Citrix server farm. Events include (1) fish distribution, (2) riparian wetland condition, (3) stream surveys, (4) flow characteristics, and (5) water quality data. This allows for prioritizing stream restoration, fish barrier removal, and establish riparian buffers. Evan talked about work by the Montana Department of Natural Resources and Conservation, Department of Environmental Quality, and the State Library. The Montana State Library Natural Resource Information System is the lead NHD steward. As the framework layer for hydrography in the state, the NHD is used extensively for linear referencing. This includes (1) water rights points of diversion, (2) water quality data, (3) fisheries data, and (4) whole stream identifiers. Evan's colleague Troy Blanford discussed in detail the linking of dams and water rights in the NHD. Dams are a significant factor in water diversion and a very important feature in the state. The state's water rights database contains over 30,000 dams of which 23,000 can be referenced to

the NHD with high accuracy. The NHD has linked 3,500 dams in the state. Troy estimates another 20,000 dams need to be indexed along with 140,000 water rights. Troy and Evan were then joined by colleague Michael Pipp on water quality referencing.

Andy Weiss from Washington also made a presentation. We'll try to cover that next month.

Federal Standards and Procedures for the National Watershed Boundary Dataset (WBD), Third edition, 2012 - by Karen Hanson

The *Federal Standards and Procedures for the National Watershed Boundary Dataset (WBD)*, Third edition, 2012 is published and available electronically at http://pubs.usgs.gov/tm/tm11a3/pdf/tm11-A3-Ed3.pdf. Any future edits should reference the 2012 version, which supersedes the 2011 *Federal Standards and Procedures for the National Watershed Boundary Dataset, Second edition, 2011*. Once the WBD edit moratorium is lifted, all incoming WBD edits submitted by in-state WBD Stewards will be reviewed against this third edition for compliance.

The third edition focuses primarily on updating the WBD Feature Dataset structure in order to accommodate the USGS NHD Geodatabase data model. These changes are reflected in *Section 6. Geospatial Data Structure*. Other significant changes are in *Section 6.2.2.11 WBD_FeaturetoHUMod*. This section outlines the updated domain and definitions for both line and polygon modifications. These updates were made in order to complement the types of conveyances already stored in NHD, avoid duplication, and enhance the design of WBD with NHD for tracking interbasin water transfers. WBD now has the means to track the characteristic of being a Receiving or a Withdrawal 12-digit hydrologic unit.

Throughout *Section 8. Data Checkout, Editing, Verification, and Submittal Process*, many changes have been made as to how data will be checked out and updated with the new process.

In *Section 4.3.4 Delineation using High Resolution Base Products* and in *Section 5.4 International Borders*, specific direction to the WBD in-state Steward is provided on contacting the National WBD Technical Coordinators before processing these data.

Special thanks to the WBD National Technical Coordinators, the WBD State Stewardship Work Group, designated peer and technical reviewers, USGS and NRCS management, and the USGS Enterprise Publishing Network participants for their efforts throughout this process.

Housing National Water Information System (NWIS) Basin Boundaries in WBD/NHD by Karen Hanson

For years there has been a need for a nationally consistent dataset of NWIS basin boundaries. The completed Watershed Boundary Dataset (WBD) now provides the high-resolution geometry needed to develop a national geospatial product of official NWIS basin boundaries. These basin boundaries will be incorporated as a feature class within the WBD feature dataset of the NHD Geodatabase, complementing the current effort to snap the NWIS sites onto the high resolution NHD as point events. Representatives from NHD, WBD, StreamStats and NWIS are coordinating the design and implementation plan to build the national dataset for NWIS basin boundaries. This team is considering ways to leverage current efforts and opportunities to expedite incorporation of basin boundaries into NHD nationwide.

States such as Colorado, Alaska, and South Dakota are already taking advantage of the WBD to create NWIS basin boundaries and these efforts will be part of a pilot to test the process. Once refined, members of the coordinating team will be working with the USGS Water Science Centers to facilitate implementation and to update the attribute information housed within NWIS.

New Hampshire Department of Environmental Services Partners with USGS to Improve Maps of NH's River Systems.

Here's a press release from New Hampshire that does a wonderful job describing stewardship of the WBD: Concord, NH – The New Hampshire Geological Survey, a unit of the New Hampshire Department of Environmental Services, recently completed an agreement with the United States Geological Survey that recognizes NHGS as the official steward of the state's Watershed Boundary Dataset. The dataset subdivides the landscape based on how water flows across the land surface, providing useful information for a variety of water resource management purposes. Because water is a shared resource, which knows no political boundaries, this dataset is an essential tool for managing and protecting the state's precious water resources.

The Watershed Boundary Dataset, abbreviated WBD, is a standardized classification for the entire nation, which divides the landscape into a series of similarly sized areas based on land surface form or topography called hydrologic units. The WBD shows the highest areas from which water runs off to rivers and streams and their many branching tributaries, which together comprise the drainage network, or watershed. Smaller units fit together to create progressively larger units until they encompass the drainage network of major rivers, such as the Connecticut River. The boundary between neighboring units is called a watershed "divide," because rain falling on opposite sides of this imaginary line will flow in different directions. More often than not, these boundaries cross political boundaries, highlighting the fact that water is a shared resource. Even though we live on different streets in different towns, we can still have the same "watershed address."

As the steward of the state's dataset, NHGS is responsible for ensuring that the boundaries are as accurate as possible, and that the most up-to-date version of the dataset is readily accessible to the public. The new stewardship agreement builds upon the commitment made by NHGS in 2009 when a similar agreement was completed for the National Hydrography Dataset, representing the drainage network itself. Combined stewardship of these two related datasets assures that they will both remain current and closely integrated with one another. GIS data for the two national datasets is available from http://m1e.net/c?63106888-VZNyVTdZNT/zw%407547684-NtGPryOFO/Jec or from the National Map Viewer http://m1e.net/c?63106888-8zixm8D1FpmY2%407547685-FCGm2npOVjw8%2e . The New Hampshire Geological Survey strives to provide the most complete and accurate information possible. If while using the WBD you find any errors, please feel free to report them to Neil Olson, NHGS, at neil.olson@des.nh.gov.

This message brought to you by the New Hampshire Department of Environmental Services, 29 Hazen Drive, Concord, NH 03302. Comments or Questions can be directed to Jim Martin at james.martin@des.nh.gov. Also contact Rick Chormann, 603-271-1975.

NHD Photo of the Month

This month's photo was submitted by Jeff Simley of the mighty South Platte River flowing northeast out of Denver. It is the largest river in the northeast quarter of the state of Colorado. Where's all the water? It's being diverted into the Burlington Ditch. That's why diversions are so important to the NHD. To see the photo of the month go to ftp://nhdftp.usgs.gov/Hydro_Images/SPlatteRiverBurD.JPG. Submit your photo for the NHD Photo of the Month by sending it to krisham@usgs.gov. This will allow the program to build a library of real-world photos linked to the NHD.

May Hydrography Quiz / New June Quiz

Tom Denslinger was the first to guess the March NHD Quiz as Lake Matthews in California, the western terminus of the Colorado River Aqueduct, the water supply for the Metropolitan Water District of Southern California. See ftp://nhdftp.usgs.gov/Quiz/Hydrography81.pdf. Tom retired two years ago from the Pennsylvania Department of Environmental Protection after a 35 year career. He was involved with stream hydrography for most of his career at DEP. First as the lead in the completion of the DEP Stream File, DEP's early version of the NHD. Tom the served as maintenance steward of the file until June 16, 2005 when the agency incorporated the high resolution NHD into the agency's spatial database system. Since retiring he has been a member of a subcommittee of PAMAGIC working to bring into development and production a local resolution version of the NHD based on statewide LIDAR data. Tom feels that the local resolution NHD (1:2400) would for the first time allow for the elevation model and the stream hydrography to align and match to the stream channel. This would eliminate the inconsistencies between the statewide current 10 meter DEM and the high resolution NHD. This would also help local government dealing with stormwater management planning and control.

Others with the correct answer (in order received) were Steve Shivers, Jim Mitchell, Roger Barlow, Linda Davis, Evan Hammer, Jim Sherwood, David Straub, John Kosovich, and Claire DeVaughan.

This month's hydrography quiz can be found at ftp://nhdftp.usgs.gov/Quiz/Hydrography82.pdf . Name the river in red made famous by a well known Taos artist. Warning, this is a trick question. In fact, it's a double-trick question. The editor was fooled, so be careful. Send your guess to jdsimley@usgs.gov.

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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.