USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

Tenth Year of the NHD Newsletter

This NHD Newsletter marks the beginning of the tenth year for the newsletter. Every month for the past nine years customers of the NHD have received a newsletter communicating what is happening in the NHD program and also covering related WBD, NHDPlus, and hydrography topics. The tenth year will see the introduction of a revitalized NHDGeoEdit tool and its associated process that will make it much easier to conduct maintenance on the NHD through data stewardship. The NHD Newsletter will provide the latest news of this development and others as they progress.

New NHD Web Site

The NHD has a new web site. Go to http://nhd.usgs.gov and check it out. The redesign of the website enables our users, stewards, and partners to obtain information and data easier than before. The layout now complies with the USGS standard template, which makes for a better presentation. There is plenty of new content mixed in the original content, and much more new information will be added now that the new layout has been established. The WBD is integrated on the site, the NHD Twitter feed will post directly to the front page, there are better instructions for getting data, and a report errors button. Perhaps the best new capability is the Feature Catalog, which can be found by clicking on Documentation and then Interactive Feature Catalog. Thanks to Kathy Isham and Dave Perdue, plus Dave's team for putting this together. If you have suggestions on how we can tweak the website to make it even better, contact Kathy Isham at krisham@usgs.gov.

Follow the NHD On Twitter

Can't wait until the monthly newsletter to get the scoop on NHD? Follow us on Twitter and you can have tweets come right to your mobile phone, desktop computer, or other device. Twitter is a free social networking and microblogging service where messages are restricted to 140 characters. Tweets will contain valuable information on the NHD and will keep you up to date on the goings on of the program.

Washington State's Effort to Adopt a Common Hydrography Dataset – Rick Jordan

Approximately ten years ago, the three Washington State regulatory agencies (Natural Resources, Fish and Wildlife and Ecology) began what has turned out to be a long term effort to adopt a common hydrography dataset. While each agency adopted a "snapshot" of the DNR stream layer, the three agency stream layers quickly began to differ as their separate business requirements were reflected in the changes made their stream layers. The U.S. Forest Service and BLM also managed separate stream layers, which often differed considerably from those managed by state agencies.

State and federal agencies in WA and OR formed the Pacific Northwest Hydrography Framework to pursue the goal of managing a common hydro dataset. Between 2004 and 2006 the agencies integrated their data to create a single stream layer. The DNR "snapshot" was the source for approximately 70% of the streams in WA with most of the remaining streams derived from USFS data. When the USFS adopted the NHD as its national data standard for hydrography, the newly integrated stream layer was submitted to the USGS as the source for the high resolution NHD for both Washington and Oregon. To date, only one WA state agency (Ecology) has been able to successfully adopt the NHD as its corporate dataset. Lack of funding over the past few years has prevented other state agencies from being able to transform

their stream events to the NHD. Alignment differences on federal land still need to be resolved and incorporated into the NHD to facilitate that process.

In an effort to create opportunities for state agencies to seek funding to migrate their existing datasets to the NHD, a demonstration project is being developed on the Skagit River to showcase the advantages of having stream events from both state and federal agencies mapped to the NHD. The Skagit flows into Puget Sound, a focus of intense environmental restoration and protection efforts. The demonstration project will be presented to a state committee responsible for ensuring enterprise approaches to using GIS. A proposal to adopt the NHD as the hydrography data standard for Washington State, with several agencies signing as executive sponsors, will also be presented along with the demonstration. Designating the NHD as the state's hydro standard could allow agencies to seek funding for data migration which might not otherwise be available. Progress is being made. Ecology is using and is maintaining the NHD. Fish and Wildlife, along with the Department of Health have begun migrating of some of their events to the NHD and are pursuing grant opportunities to continue the process. The Northwest Indian Fisheries Commission representing 20 treaty tribes in WA State has also indicated that they will begin migration to the NHD this year. For more information, contact Rick Jordan at rjor461@ecy.wa.gov.

NHD Implementation in Oregon State Agencies by Robert Harmon

There is a well developed GIS framework infrastructure in Oregon with many standards in place for key themes and stewardship plans in the works. Hydrography has been in the forefront of many of those efforts. Most natural resources state agencies in Oregon are using a hydro theme to support their respective business needs. Some maintain their data as events on routes while others are using arc attributes. Migration, i.e., conflation, to the NHD is a major issue for all. Here is a brief status by agency from a report provided at the Pacific Northwest (PNW) Hydrography Framework Steering Committee on November 3, 2010 in Portland, OR (http://www.pnwhf.org).

ODFW (Oregon Fish & Wildlife): Recently revised the following state standards: Barriers to Fish Passage & Fish Habitat Distribution. The updated Barriers standard includes new, optional attributes for mapping locations as NHD events and support maintenance with the HEM tool. The Habitat standard will likely be revised next year to support the NHD. Its required event attributes are currently tied to a whole stream route identifier so migration to the NHD remains a significant issue.

DEQ (Environmental Quality): Maintains a lot of Impaired Water (303d) and permit data on a whole stream routed network at 1:100,000-scale. Investigating existing tools and methodologies for migrating to the NHD (hi-res). For lake-related data hope to leverage work done by Dr. Richard Lycan (Professor Emeritus, Portland State University) in project with the EPA who cleaned up a lot of water body data and developed a crosswalk with the NHD.

ODF (Forestry): Map fish presence data as arc attributes in support of the Oregon Forest Practices Act on 24K+ hydrography derived from DLGs, CFFs, and other sources.

OWRD (Water Resources): Uses a whole stream ID on 1:24,000 scale hydro data which provides links to water right Points of Diversion and surface water availability model data.

DLCD (Land Conservation & Development): Coastal Zone Management program interested in the accurate depiction of the coastline. The agency is also the state contact for FEMA. They work with local communities to help them maintain their flood plain maps.

Summary: Even though the NHD is the *de facto* standard amongst PNW hydro framework partner agencies there remains the need to establish it as a state hydro standard (goal for 2011). This should

provide some impetus for state agencies to develop migration plans and to identify funding sources for carrying out the work. There may be some money available from the Oregon Geographic Information Council (OGIC) Framework Data Development Program, as well. For more information contact Robert Harmon, GISP, GIS Coordinator, Oregon Water Resources Department (OWRD) robert.c.harmon@wrd.state.or.us

New NHD steward for New Hampshire

Neil Olson joins the New Hampshire Geological Survey and the New Hampshire Department of Environmental Services as the NHD data steward for the state. Neil comes to New Hampshire via Wyoming, where he was an intern for the Wyoming Department of Environmental Quality. Prior to that Neil earned his MS in Geoscience with an emphasis in Environmental Geoscience at Idaho State University. The plan to attend graduate school was hatched while working as a Ski Patroller at Stowe in his home state of Vermont. Neil received his BA from Brown in Geoscience. He is excited to join the New Hampshire Geological Survey's team of scientists and work to improve the NHD as a resource for scientists and stakeholders. Contact Neil Olson, Assistant Hydrogeologist, New Hampshire Geological Survey, Neil.Olson@des.nh.gov.

NHD-Image Integration by Chris Lund

Beginning in fiscal year 2010 the National Geospatial Technical Operations Center (NGTOC) began an integration project in support of the new USTopo. NHD over sixteen states were inspected and updated so major hydrography features were integrated with NAIP imagery. High resolution NHD for Kansas, Oklahoma, Texas, New York, Kentucky, Tennessee, Indiana, Iowa, North Carolina, Pennsylvania, Virginia, Wisconsin, Minnesota, Ohio, Colorado and New Mexico were all updated in FY2010.

In anticipation of the fiscal year 2011 USTopo Program of Work, NHD teams in Rolla, MO and Denver, CO have continued this integration work for Idaho, Utah, West Virginia, Georgia, North Dakota, Delaware, Maryland, Arkansas, South Carolina, Michigan and most recently Washington. Over 1,400 Washington quadrangles were inspected; approximately 10% required an update to the NHD geometry. Most updates involved a meandering stream/river having changed course. The goal is to realign (2-D) stream/rivers; greater than 100 ft wide, when the position of the banks have moved more than 1,000 ft. The team is also adding or modifying positions of large lake/ponds and reservoirs.

NHD/Image Integration is currently in work or planned for Montana, Oregon, Puerto Rico, and the Virgin Islands.

NHDPlus Version 2 Developments by Tommy Dewald

The NHDPlus is a suite of geospatial products that build upon and extend the capabilities of the NHD by integrating the NHD with the National Elevation Dataset and the Watershed Boundary Dataset. Interest in estimating NHD stream flow volume and velocity to support pollutant fate-and-transport modeling was the driver behind the joint USEPA and USGS effort to develop NHDPlus, which was first released in late 2006. NHDPlus has been used in a wide variety of applications since its initial release. This widespread positive response prompted the multi-agency NHDPlus team to design an enhanced NHDPlus Version 2 that is currently under production and scheduled for release during mid-2011.

NHDPlus Version 2 both improves and extends Version 1 data content by leveraging the significantly updated ingredient national datasets. The medium resolution NHD has benefited from thousands of updates, including more names, more lakes and a more complete network, primarily resulting from a national review performed by modelers and editors from the USGS National Water Quality Assessment

Program. An estimated thirty percent of the 30M NED has been updated based upon re-sampling of the growing collection of 10M elevation data. Where NHDPlus Version 1 used the WBD data for the handful of certified states that were available at the time, Version 2 will include the now complete national coverage for the Watershed Boundary Dataset. For Version 2, the process used to integrate the snapshots of these three national geospatial ingredient datasets, as described in USGS Scientific Investigations Report 2009-5233, will be enhanced to improve the hydro-enforcement and resulting catchments delineations.

The Version 2 data model accommodates the ability to specify the percent of water that travels down each path at major divergences as well as water additions, removals and inter-basin transfers. Version 2 catchment attributes will again include PRISM temperature and precipitation along with the four 2001 National Land Cover Dataset layers. Over 30,000 USGS streamflow gages, an increase of 7,000, have been located on the NHD network and will be used when producing mean annual and mean monthly streamflow volume and velocity estimates for all networked flowlines in Version 2. These flow estimates will account for the effects of evapotranspiration and are adjusted based upon their network relationships with streamflow gages in the downstream vicinity.

The recently completed software tools being used to produce Version 2 have been designed to work with higher resolution NHD and NED ingredients making high resolution NHDPlus feasible. Minnesota plans to apply the tools in a high resolution NHDPlus pilot project beginning in 2011. NHDPlus Version 2 data and documentation will be served from the NHDPlus Web site which is accessed from www.epa.gov/waters (Quick Link on the right). For more information, contact Tommy Dewald at Dewald.Tommy@epamail.epa.gov.

River Flows Altered by Land and Water Management

New USGS findings released in the journal of Ecological Society of America, *Frontiers in Ecology and the Environment,*accessible found at: http://www.esajournals.org/doi/abs/10.1890/100053.

“Most River Flows across the U.S. are Altered by Land and Water Management, Leading to Ecological Degradation —This USGS assessment provides the most geographically extensive analysis to date of streamflow alteration. Findings show that the amount of water flowing in streams and rivers has been significantly altered from land and water management in nearly 90 percent of waters that were assessed in the nationwide USGS study. Flow alterations are a primary contributor to degraded river ecosystems and loss of native species whose survival and reproduction are tightly linked to specific flow conditions. These consequences can also affect water quality, recreational opportunities and the maintenance of sport fish populations.

Flows are altered by a variety of land- and water-management activities, including reservoirs, diversions, subsurface tile drains, groundwater withdrawals, wastewater inputs, and impervious surfaces, such as parking lots, sidewalks and roads.

The severity and type of stream flow alteration varies among regions, due to natural landscape features, land practices, degree of development, and water demand. Differences are especially large between arid and wet climates. In wet climates, watershed management is often focused on flood control, which can result in lower maximum flows and higher minimum flows. Extremely low flows are the greatest concern in arid climates, in large part due to groundwater withdrawals and high water use for irrigation.”

NHD Photo of the Month

This month's photo was submitted by Anji Auger, the NHD Principal Steward for the Maine Office of GIS. The photo shows a geologic feature called the Phillips Pluton exposed in the Sandy River. The Sandy River is a popular fly fishing location and supports a healthy population of wild brown trout. To see the photo of the month go to ftp://nhdftp.usgs.gov/Hydro_Images/NHD_photo_Sandy_River.pdf. Submit your photo for the NHD Photo of the Month by sending it to krisham@usgs.gov.

October Hydrography Quiz / New November Quiz

Jennifer Sharpe of the USGS Illinois Water Science Center was the first to correctly guess the October hydrography quiz as Grand Traverse Bay in Lake Michigan and located in the northwest corner of the "lower peninsula". See ftp://nhdftp.usgs.gov/Quiz/Hydrography63.pdf. You can find out more about Jennifer by going to her profile at http://il.water.usgs.gov/about/professionalpages/jbsharpe.html. No wonder why Jennifer gets the quiz right month after month!

Others with the correct answer were (in order received): Jennifer Sharpe, Stephen Daw, Michael Smith, David Asbury, Becca ConKlin, Neil Olson, Bruce Tuttle, Bill Samuels, Tom Christy, Steve Aichele, Ken Koch, Barbara Rosenbaum, Aaron Cuthbertson, David Straub, Al Rea, Grant Wilcox, Joanna Wood, Linda Davis, Tom Denslinger, Jim McDonald, Richard Patton, Rosi Yacoub, Jerry Sullivan, Jennifer Campbell-Allison, Mike Laitta, Bryan Anderson, Roger Barlow, and John Lynam.

This month's hydrography quiz can be found at ftp://nhdftp.usgs.gov/Quiz/Hydrography64.pdf. Continuing on the theme of bays, this is not a bay, but is coded in the NHD as an Estuary. That means this is salt water. Where is it? It's not too far from Billy Elliot. Send your guess to jdsimley@usgs.gov.

Upcoming NHD Training

December 2: Advanced HEM Functions - 4 Hour WebEx, Sign up at: http://nhd.usgs.gov/tools.html#hem
Contact: HEM@usgs.gov
December 14–17: NHDGeoEdit tool - Morgantown, WV - Contact Dave Arnold (darnold@usgs.gov) or Evan Fedorko (evan.fedorko@mail.wvu.edu)
January 12-13: HEM 2 Day Classroom – Denver, CO - Sign up at: http://nhd.usgs.gov/html#hem
Contact: HEM@usgs.gov
February 16: Basic HEM Functions - 4 Hour WebEx, Sign up at: http://nhd.usgs.gov/tools.html#hem
Contact: HEM@usgs.gov
March 10: Advanced HEM Functions - 4 Hour WebEx, Sign up at: http://nhd.usgs.gov/tools.html#hem
Contact: HEM@usgs.gov

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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.