

USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

NHD/WBD Stewardship Conference

The fourth bi-annual NHD/WBD Stewardship Conference will be held in New Orleans, Louisiana March 29-30, 2012. It will be held in conjunction with the American Water Resources Association's 2012 Spring Specialty Conference on Geographic Information Systems and Water Resources VI, held March 26-28 in New Orleans at the Sheraton, see <http://www.awra.org/meetings/Spring2012/index.html>. The AWRA conference will focus on applications of GIS in water resources, which involves the NHD and WBD, while the stewardship conference will focus on data stewardship and data maintenance issues. Although abstracts for the AWRA conference close October 3, 2011, abstracts for the stewardship conference will be open through December. Holding the two conferences together will enable travelers who would normally attend both conferences do so in just one trip. More information on the conference will be forthcoming. If you have an interest in the NHD/WBD Stewardship Conference, please contact Jeff Simley at jdsimley@usgs.gov.

Why You Should Attend This Conference

The U.S. Geological Survey and its partners have made a huge investment in the National Hydrography Dataset and the Watershed Boundary Dataset. This was done to elevate the geographic analysis of surface water information to a new level and stimulate advances in science and resource management. This huge investment must be maintained through a process of cooperative stewardship so that it can remain relevant for many years to come. Making this work will rely on a vast partnership of data users across the country to help maintain the data. This conference is an important part of the stewardship process by providing important information that will make stewardship a success. Attendees will learn how others have succeeded in stewardship as well as learn from the challenges faced so far. The conference will provide a wonderful opportunity to network with colleagues to share support and provide a resource to collaborate with. New capabilities and plans for the future will be presented that can help guide the future of surface water GIS.

Completion of Maintenance Lite II - by Chris Lund

The ending of the federal fiscal year also marks the completion of the NHD Maintenance Lite II project that has been on going over the past three years at the USGS. The last ten subregions (HU-2's) were completed in September. This project focused on resolving data quality issues of polygon features by subregion across the conterminous United States. Line features initially reviewed during Maintenance Lite I were also sent through quality assurance checks a second time. The workflow process dealt only with existing data quality issues. No updates to geometry or additions of features were included in the scope of this project. Completing Maintenance Lite II means that the integrity of the NHD nationwide has moved up a few notches to give scientists a more effective surface water analysis system.

NHD Coastline Enhancements – by Cynthia Miller-Corbett

Two activities are underway to update the NHDFlowline Coastline feature of the National Hydrography Dataset that will enhance NHD analytical and modeling applications. The first is incorporation of the NOAA Contemporary Shoreline vector data set for the conterminous U.S coast including the Great Lakes. The majority of the new shoreline vector data is created from 1988 to 2010 aerial imagery collected at Mean High Water where shoreline delineation is based on an office interpretation or verification of a derived vector with contemporary imagery using standard digital photogrammetric procedures. In some

cases, current individual national shoreline projects and processed LiDAR derived shorelines were merged and were joined together and verified using recent imagery (Google Earth and ESRI_Imagery_World_2D) or multiple remote sensing sources (satellite, LIDAR, IFSAR, etc.). The metadata provided with the NOAA shoreline package describe these. Although the new coverage is not comprehensive, the USGS is working with NOAA to continue acquisition of new U.S. coastline data as it becomes available.

The second activity is incorporation of the U.S. coastline classification scheme originally developed as a coastal hazards GIS data base by the Atmospheric and Climate Research Division at Oak Ridge National Laboratory/U.S. Department of Energy to assess vulnerability to sea-level rise and horizontal displacement (erosion/accretion) of coastal landforms. Using the assessment technique described in publications for the U.S. West Coast, East Coast, and Gulf of Mexico, coastlines are classified (ranked) as least to most vulnerable to sea-level and landform changes based on evaluation of seven physical attributes including (1) geomorphology (2) geology, (3) elevation, (4) sea-level trends, (5) erosion/accretion rates, (6) tidal ranges, and (7) wave heights. Geomorphology, considered as the best overall indicator of vulnerability to coastal zone landform change will be encoded by the NHD using linear referencng. The U.S. coastline will be ranked on a scale of 1-5 with 5 representing the most vulnerable. References to the six other physical variables may be provided if there is interest in them. The original data sources are NOAA, the U.S. Army Corp of Engineers, the U.S. Geological Survey, universities, and other federal and state agencies. The geomorphology data are derived from USGS topographic maps at 1:250,000-scale, but are suitable to be applied to the 1:24,000-scale NHD. The NHDFlowline Coastline feature is now being coded for the conterminous U.S. starting on the West coast, then the Gulf, then the East Coast.

Fiscal Year 2012 National Environmental Information Exchange Network Grant Program

The USEPA Exchange Network Grant Program supports a variety of activities, including the development of common data standards, formats, and trading partner agreements for sharing data over the Exchange Network and implementation of collaborative, innovative uses of the Exchange Network. It also supports the standardization, exchange, and integration of geospatial information to address environmental, natural resource, and related human-health issues. Learn more at http://www.epa.gov/exchangenetwork/grants/Stakeholder_Draft_2012_Exchange_Network_Solicitation_Notice_v.2.pdf. The proposal deadline for submitting proposals to EPA is November 4, 2011. The expected award of FY 2012 Exchange Network Grants is July 31, 2012. Categories include: (1) Geographic Information Systems - include software and hardware systems that relate and display collected data in terms of geographic or spatial location. GIS allow users to collect, manage, and analyze large volumes of geospatial data and metadata. (2) Geospatial data - data that identify, depict, or describe the geographic locations, boundaries, or characteristics of the Earth's inhabitants or its natural or human-constructed features, and (3) Geospatial technologies - include the computer hardware and software that are commonly used to collect, import, store, manipulate, analyze, and display digital geospatial data.

EPA Add-On Tools - by Amy Wesley-Snyder

The U.S. Environmental Protection Agency (EPA) has developed a supplemental set of indexing functions for the Hydrography Event Management (HEM) Tool, which are available through the HEM EPA Add-On toolbar. This toolbar allows users to create, edit and manage custom point, line and area events. The toolbar also includes functionality that was previously a part of the PC based Reach Indexing Tool (PC-RIT), such as Find Overlapping Waterbodies, Extract from EPA Program Events, and a post processing tool to aid in preparing events for submission to the EPA's Reach Address Database (RAD). The HEM EPA Add-on Tools are currently available for use with ArcGIS Version 9.3.1., and a version of the HEM EPA Add-on Tools for use with ArcGIS 10 is in development. Please note that The HEM tool

along with the EPA Add-On Tools supersedes the ArcView 3.0 based Reach Indexing Tool (RIT). The tools and training materials are available for download at <http://nhd.usgs.gov/tools.html>.

EPA plans on conducting a Webinar this fall to introduce the HEM EPA Add-On Tools to States. Please contact Wendy Reid at reid.wendy@epa.gov or Shera Reems at reems.shera@epa.gov, if you would like to participate. This webinar will be targeted to users who are already familiar with the core HEM tool.

HEM2XML Tool - by Amy Wesley-Snider

The HEM to NHDEvent XML Conversion Tool (HEM2XML) takes a HEM 2.2 created file geodatabase and exports the events to an Extensible Markup Language (XML) file that matches the Exchange Network hosted NHDEvent schema format. The tool also compresses the XML file for efficient Exchange Network submission. The tool and user guide are available for download at: <http://www.epa.gov/waters/tools/HEM2XML/HEM2XML.html>. Also see information on the EPA Exchange Network web at <http://www.exchangenetwork.net/exchanges/water/index.htm>. In the Geospatial Information section at the bottom of this web page, both the NHDEvent and NHDUpdate flows are described. In addition, the web page contains links to lots of other information about the EPA Exchange Network

Canada-U.S. Transboundary Hydrographic Data Harmonization Efforts Gain Momentum – by Mike Laitta

Canada and the United States share the longest undefended border in the world. What is often overlooked in the observation, though, is that much of the border is water. More than 300 lakes and innumerable streams and rivers are part of or cross the international boundary, accounting for 40 percent of the 5,500-mile long border. Understanding these transboundary water resources has never mattered more, from environmental, economic and social perspectives. How the two countries manage their transboundary basins affects the lives and livelihoods of the people who live and work in these basins. Important ecosystems and the wildlife habitat they support depend on the waters of these basins. Major industries – shipping, hydroelectric generation, fishing, forestry, agriculture and tourism – depend on the health of these water resources, and on the level and predictability of their flows. For many Native Americans and Aboriginal peoples, the transboundary waters remain important sources of food and cultural identity.

Since 1997, the International Joint Commission (IJC) has progressed towards a 21st-century, watershed-based and local participatory approach under the International Watersheds Initiative (IWI). In 2008, the IJC convened the Transboundary Hydrographic Data Harmonization Task Force to develop a binational, coordinated approach to the harmonization and long-term stewardship of hydrographic datasets covering binational drainage areas along the International Boundary. Comprised of representatives from Environment Canada, Agriculture and Agri-Food Canada, U.S. Geological Survey, Natural Resources Canada and the U.S. Environmental Protection Agency, the task force set out to address transboundary hydrographic data.

To accomplish this goal, first the NHN (Canada) and NHD (U.S.) are compared along a 100-meter strip on each side of the border. Then any water features that do not align are connected and re-digitized following agreed upon guidelines. The newly delineated hydrographic features are sent back to the responsible agencies in each country for verification and inclusion into the national data structures. The drainage area harmonization team agreed on an analogous process for reconciling major drainage areas and the subsequent watersheds and subwatersheds that are shared by both nations. The group determined that it would be more meaningful to focus on 1:24,000-1:50,000 delineations, then shift to smaller delineations after the container has been established. The group agreed on protocols for merging the drainage areas within a swath and a process for reporting the harmonized areas back to each country, so

that the respective Canadian and U.S. agencies can update their national datasets. After the individual U.S. and Canadian drainage areas are reconciled, they are sent to the NHN-NHD group where the harmonization of the hydrography can resume.

The ultimate goal of this process is to provide water resource managers and planners at the local, regional, and national levels with datasets and mapping tools at useful and truly integrated scales without the fault-line of the geopolitical border. The data used to inform the public, the governments, and resource specialists needs to be seamless to support communication and avoid redundancies and interpretive confusion. Using common datasets will help in providing more comparable hydraulic and hydrological modeling results and reduce the potential disagreements of study findings. This fully linked and harmonized hydrographic network, and cascading drainage areas encourages the use of existing automated tools that will provide more accurate and sustainable statistics to apply to an array of relevant water resource issues. For more detail see http://nhd.usgs.gov/Canada-US_Hydro_Harmonization.pdf

NHD in Arkansas – by Elizabeth McCartney

Arkansas held their 11th Annual GIS Symposium and Training Workshop on August 29-September 2, 2011 in Bentonville, Arkansas. The theme was "The Next Generation-A Geospatial Voyage." A wide selection of training opportunities and presentations were offered along with a well attended exhibit area. Bill Sneed, the USGS Geospatial Liaison for Arkansas, was awarded the Distinguished Service Award for his leadership in helping to make the conference a success and his continuing role in the promotion and of GIS data in the State of Arkansas. Dave Arnold, the USGS NHD point of contact for the southwestern region, gave a presentation on "Creating Local Resolution NHD with LiDAR Data." Katy Hattenhauer is the Arkansas NHD Data Steward and is instrumental in the success of the state's GIS capabilities. The next conference will be held September 9-13, 2012 in Eureka Springs, Arkansas.

NHD at Great Smoky Mountain National Park – by Dave Arnold

The last NHDGeoEdit Training for tool version 3.3.3 was held September 12-14 at Great Smoky Mountain National Park (GSMNP) near Gatlinburg, Tennessee. In attendance were the National Park Service and North Carolina Department of Environment and Natural Resources Division of Water Quality. The training covered the National Hydrography Dataset (NHD) Model 2.0, walkthroughs for all websites associated with the NHD, and the process of editing the NHD from initial data check out, to editing the geodatabase, to submitting the edits back to the national repository. Staff at the GSMNP plan to utilize this training and recently acquired LiDAR data for the more than 800 square miles of area inside the park to update the NHD with local resolution hydrography. With the Park's area split between the states of Tennessee and North Carolina, the Park will be working as a sub-steward in both states and will work with each state's respective steward to get their edits back to the national database.

Fourth Interagency Conference on Research in the Watersheds

The Fourth Interagency Conference on Research in the Watersheds was held in Fairbanks, Alaska, September 26-30, 2011, see <http://www.hydrologicscience.org/icrw/docs/ICRW4-Program.pdf>. The conference theme was "Observing, Studying, and Managing for Change." The abstracts listed in the link above provide an interesting overview of the issues facing the changing environment. Karen Hanson presented "The National Watershed Boundary Dataset (WBD): A Framework for All Watershed Science." See page 37 in the link above.

Water Risk Mapper

A new web site identifies water availability risks around the world. See <http://insights.wri.org/aqueduct/welcome>. Right click on the map (Launch the Aqueduct Atlas) and click open link. It will then take you into an interactive map viewer. Zoom in on the United States, particularly the Colorado River basin. The information is not details, but provides a great concept.

Stress on water resources poses a threat to sustained business growth. It also creates an opportunity for competitive advantage through effective water risk management. In the past, no tools existed for companies, investors, and others to track water risks at a scale appropriate for developing sound business and investment strategies. WRI designed Aqueduct to meet this need. Aqueduct provides a comprehensive and credible metric for measuring geographic water risks. It consists of a global database and interactive mapping tool that enable companies to quantify and map water risks at a local scale, worldwide. The Aqueduct Atlas can create comprehensive, high resolution maps of water risks tailored to your unique risk exposure profile. In depth basin-level water risk mapping will be released in the early fall 2011.

Map of Stream Names in the U.S.

Streams go by a multitude of names in the United States and Derek Watkins has a map to illustrate that. Watkins pulled the listing of stream names from the National Hydrography Dataset and mapped out the entire contiguous United States based on the local terminology used. The actual waterways using the names creek and river were grayed out due to their widespread use. Bright colors are used to symbolize the localized use of the terms stream, bayou, kill, branch, run, brook, rio, cañada, arroyo, swamp, slough, wash, and fork. Watkin explains: “ I like this map because it illustrates the range of cultural and environmental factors that affect how we label and interact with the world.” Lime green *bayous* follow historical French settlement patterns along the Gulf Coast and up Louisiana streams. The distribution of the Dutch-derived term *kill* (dark blue) in New York echoes the colonial settlement of “New Netherland” (as well as furnishing half of a specific toponym to the *Catskill* Mountains). Similarly, the spanish-derived terms *rio*, *arroyo*, and *cañada* (orange hues) trace the early advances of conquistadors into present-day northern New Mexico, an area that still retains some unique cultural traits. *Washes* in the southwest reflect the intermittent rainfall of the region, while streams named *swamps* (desaturated green) along the Atlantic seaboard highlight where the coastal plain meets the Appalachian Piedmont at the fallline.” See <http://derekwatkins.wordpress.com/2011/07/25/generic-stream-terms/>. Thanks to GeoLounge and DM Geographics, LLC.

Water Data Discovery

The National Water Information System (NWIS) is the Nation's principal repository of water resources data. It includes data from more than 1.5 million sites, some in operation for more than 100 years. Most NWIS data can be accessed directly at: <http://waterdata.usgs.gov>. Additional tools are provided to help find data in NWIS, in other USGS products and services, and from other federal partners and national organizations. See <http://water.usgs.gov/data/> for easy access to water information.

Geospatial Summit 2011: Innovation Behind National Hydrography Data Set

For a great review of the National Hydrography Dataset, see: <http://gov.aol.com/2011/09/14/geospatial-summit-2011-national-hydrography-data-set/>

NHD Photo of the Month by Kathy Isham

This photo was submitted by Chuck Matthys. The Arkansas River, a major tributary of the Mississippi, originates in Colorado where its headwaters receive snow melt from the Collegiate Peaks. The Arkansas River is well known for its recreation, especially in river rafting. To see the photo of the month go to ftp://nhdftp.usgs.gov/Hydro_Images/ArkansasRiverRafting.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.

August Hydrography Quiz / New September Quiz

Bob DenOuden of the Eugene Water & Electric Board in Oregon was the first to guess the June NHD Quiz as the Great Basin hydrologic unit along the Continental Divide in Wyoming (HU8-14040200). See <ftp://nhdftp.usgs.gov/Quiz/Hydrography73.pdf>. Bob is a Senior Business Analyst in the Water Division of the Eugene Water & Electric Board.

Others with the correct answer (in order received) were Ken Koch and Barb Rosenbaum. (This must have been a tough quiz!)

This month's hydrography quiz can be found at <ftp://nhdftp.usgs.gov/Quiz/Hydrography74.pdf>. Send your guess to jdsimley@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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Jeff Simley, USGS, assumes full responsibility for the content of this newsletter.