

USGS National Hydrography Dataset Newsletter  
Vol. 11, No. 11, September 2012  
by Jeff Simley, USGS

**NHD Eastern U.S. Grant Work in Progress** by Dave Arnold

Several states in NHD Region 5 in the Eastern U.S. are currently working to complete deliverables for a number of grants that were awarded to them over the last two fiscal years. In West Virginia the GIS Technical Center and the Natural Resource Analysis Center at West Virginia University (WVU) are working on a grant designed to help them better understand how to account for comprehensive and continuous changes to the drainage pattern, as affected by surface coal mining operations.

In Georgia the Information Technology Outreach Services (ITOS) at the University of Georgia (UGA) is working on a grant to clean up a number of problems with the state's high resolution NHD. Issues include missing features, and existing features that are improperly labeled with a Geographic Names Information System (GNIS) name. Once ITOS finishes the grant, the Georgia Environmental Protection Division (EPD) will take over future maintenance of the state's NHD.

The Caribbean Water Science Center (CWSC) in the Commonwealth of Puerto Rico was awarded a grant to repair and update the high resolution NHD for a study area located in the north central portion of the island. The grant also includes public outreach to local agencies to promote the NHD as a valuable analysis and mapping tool, and the establishment of a stewardship for future NHD updates to Puerto Rico and possibly the United States Virgin Islands.

The Center for Geographic Information Analysis in Raleigh, North Carolina will be presenting a number of deliverables for grants they have received over the last two years. The first grant deals with studying a coastal pilot area in North Carolina to determine directional flow and to address the extensive ditch network that exists along the state's coast. The second grant is a similar study, but revolves around the issue of integrating local government urban surface waters into the NHD. The final grant is a two year project to add existing local resolution data to the high resolution NHD. Previous government disaster funding, associated with the passing of a hurricane several years ago, resulted in the creation of local resolution hydrographic data for nineteen counties in western North Carolina. A small portion of this data is already present in the NHD, and this grant allows for the inclusion of a much larger portion of this data.

**NHD Stewardship in Colorado** by Carol Giffin and Bill Smith

The USGS and the State of Colorado, Department of Natural Resources (DNR), entered into a cooperative agreement in 2009 which established NHD Stewardship with the goal of incorporating Colorado's NHD into a standardized NHD dataset compatible and usable with the national NHD. The DNR and the USGS have worked collaboratively to improve the NHD, which led to a successful implementation for NHD stewardship in Colorado. The USGS and the DNR are continuing NHD stewardship under the current agreement, which provides for collaboration through June 2014 and continues to establish and maintain the authoritative dataset for NHD.

Initially the Colorado NHD was reviewed to find potential errors in the data such as topology overlaps, artificial paths outside of NHD Waterbodies or NHD Areas, improper streams within NHD Waterbodies or NHD Areas, gapped or branched GNIS Names or reach codes, and network issues. These errors were corrected using early versions of the NHDGeoEdit Tool. The Colorado NHD was then compared to newer imagery, and edited to reflect the changing landscape resulting in a number of previously missing features to be added to the dataset with the earlier NHDGeoEdit Tool. Currently, GNIS names in the NHD are being compared to the list of approved names in the USGS GNIS database. Approved GNIS

Names missing from the Colorado NHD are being added to the NHD. Colorado hydrography features that have names, but the name is not yet approved by GNIS will be added in the near future.

This is a great example of State Stewardship! Issues in the data are actively being located and corrected by Colorado to make the data more usable by Colorado's agencies, as well as other Federal, State, and local agencies across the U.S. Many people are benefitting from this stewardship process thanks to the dedicated effort of the State's Chris Brown who has been doing the bulk of the work on the project.

### **Pour Point Project** by Allen Karsh

The HUC8 pour point project is complete! The goal of the project was to find the primary outflow point, or pour point, of all HUC8's in the WBD and then encode the location on the NHD network with the reachcode and measure to give it a linear reference. This then integrates the NHD and WBD datasets in the data model by providing the WBD with a locator in the NHD. The NHD can be located in the WBD using the first 8-digits of the NHD reachcode. The NHD shows the primary pour point for all HUC 8s. The pour point location was usually determined by doing a downstream trace and placing the pour point where the main flow intersects the HUC 8 boundary. There were cases where the location of the pour point was not obvious, such as braided streams, or where two streams meet at one point. In these instances, the main named path or longest stream was chosen. On frontal HUC 8s and islands, where more than one pour point exists, the primary pour point was placed on the stream that had the greatest upstream drainage in cumulative linear distance. Some HUC 8s do not have a pour point, specifically internal draining HUC's such as in the Great Basin. 78 of the HUC8s are sinks, or closed subbasins, and have no pour point, and four HUC 8s have two pour points. There are 2,283 HUC8s in the United States and outlying territories and the data is currently contained in 220 HUC4 geodatabases. A new feature class may soon be added to the NHD Hydrography feature dataset to properly store and distribute these geodatabases, which will then soon be available for download.

### **Data Lifecycle Management in the NHD**

The USGGS working to establish a data lifecycle plan for geospatial data in The National Map. Part of this strategy includes identifying a core set of data that will be maintained using USGS funding. Other features might be maintained by stewards, but the objective is that the USGS would limit its funding to a core set of features. In Hydrography, these features are: Artificial Path, Canal/Ditch, Coastline, Connector, Dam/Weir (Event), Divergence Structure (Event), Gaging Station (Event), Ice Mass, Inundation Area-Controlled, Lake/Pond, Lake/Pond-Perennial, Pipeline-Aqueduct (all cases except Siphon), Playa, Reservoir, Stream/River, Stream/River-Perennial, Stream/River-Intermittent, Stream/River-Area, Swamp/Marsh, Underground Conduit, Wash, Water Quality Station (Event), WBD\_HU2-12, WBD\_Line.

### **WBD Integration with the NHD Project Status Update** by Stephen Daw

The WBD has been delivered with the NHD as a companion dataset since July of 2011. The most recent refresh to the WBD in the NHD was completed in June of this year. Another refresh of the WBD is planned for October 22nd. This refresh includes updates along the Canadian border, improvements throughout Alaska, and some name fixes across the country. The new WBD refresh reflects the updated WBD data model. Changes to the WBD data model include the elimination of the underscore \_ in field and table names, switching to camel casing instead. Camel casing is where the first letter of each word is capitalized with regular letters for the rest of the word (Example: LoadDate). Other changes to the WBD data model include the elimination of the WBDPoint table, the WBDPointEvent table, and the WBDAttributes table. Fields have been added to the WBDHU12 polygon feature dataset that allow

metadata record linking and also include the downstream attribute. NWIS drainage area line and polygon feature classes have been added also.

A moratorium on WBD edits began in December of 2011 and is ongoing. The plan right now is to end the moratorium on November 5<sup>th</sup>, 2012. On November 5<sup>th</sup>, all new edits to the WBD will begin with a check-out from the WBD/NHD Stewardship website, <http://usgs-mrs.cr.usgs.gov/stewweb/>. The WBD Edit tool is required to retrieve, edit and submit data checked out for editing.

The WBD Edit tool is ready for beta testing. Beta testing will begin on October 15, 2012. A beta test plan and training will be provided to all participants. The requirements to test are ArcGIS 10.1 is installed on a Windows 7 OS computer. All who wish to participate please contact Stephen Daw, [sgdaw@usgs.gov](mailto:sgdaw@usgs.gov).

### **Anomalous Arizona – where did the perennial streams go?** by Keven Roth

A presentation at the EMAP Symposium in Corvallis, OR in May 2002 included statistics used to estimate perennial and non-perennial stream and river length in 12 Western States. See <http://www.epa.gov/bioiweb1/pdf/EPA-620-R-05-006WesternStreamsandRiversStatisticalSummary.pdf>

The objectives of the study were to estimate the length of perennial and non-perennial streams and rivers, and to evaluate the condition of perennial streams and rivers in States in EPA Regions 8, 9, and 10. The target population of perennial and non-perennial streams and rivers came from EPA's River Reach File (RF3).

The study used 1:100,000-scale RF3 data (NHD was not yet available) to choose a number of sites. Each selected site was evaluated in the field to determine perennial and non-perennial status. Overall results showed that 82% of perennial sites agreed in both RF3 and in the field, and 76% of non-perennial sites agreed. A state by state examination showed Arizona as an outlier. Only 23% of the perennial RF3 sites were evaluated as perennial in the field, but more than 90% of the sites in Montana were evaluated as perennial. Conversely, none of the Arizona non-perennial RF3 sites was evaluated as perennial in the field.

The study makes the central point that "it is known that RF3 incorrectly codes some stream segments." While "some" is not specified, the paper goes on to list ten factors that contribute to incorrect coding. The implication is that RF3 data is significantly flawed.

Statistics from this study have been cited in other reports and studies, but the unusual results in Arizona have never been fully explained. When comparing the EMAP selected perennial sites in Arizona to both the med-res and the high-res NHD, it is obvious that many of the selected perennial sites were in areas of Arizona that have no perennial streams as demonstrated by a comparison of all the gaging stations with flow statistics against the high-res NHD. In fact, out of 170 gages with flow records clearly showing perennial flow, only 10 are associated with streams in the NHD coded as "intermittent". Nine of those have data problems not related to stream classification, and one is a "borderline" perennial stream based on flow statistics. In all 364 gaging stations were compared to the high-res NHD. Similar comparisons were made for the 160 gages with intermittent flow with only two of the intermittent gages associated with perennial streams in the NHD. Seventeen gages were not used because of limited years of flow records. About 17 gages were classified as "borderline" - they could easily be classified as perennial or intermittent. Most of those were on streams classified as perennial in the NHD.

The examination of the EMAP findings, NHD data and gaging station data indicate that the NHD correlates much more closely with gage data than does the EMAP evaluation in Arizona.

## **U.S. EPA Releases FY2013 Exchange Network Grant Solicitation Notice**

The U.S. EPA has released the FY 2013 Exchange Network Grant Solicitation Notice. The grant guidance states that the program may be used to fund the standardization, exchange and integration of geospatial information to support work to preserve and improve the environment, natural resources, and human health. This grant program has been used in the past to help fund geospatial projects by States, Federally recognized Tribes, and Territories. For example, Minnesota was funded to help establish the NHD Event data exchange described at <http://www.exchangenetwork.net/data-exchange/nhdevent/>. The Solicitation Notice is available at [www.epa.gov/exchangenetwork/grants](http://www.epa.gov/exchangenetwork/grants). Applications are due 9 November 2012.

In FY 2013, EPA expects to award an estimated \$10,000,000 for 40-50 grants of up to \$300,000 for individual applicants and \$500,000 for partnerships. The number of awards will depend on the final amount of EPA's appropriation for the Grant program, the number of applications received, the amounts of proposed budgets, and the outcome of EPA's reviews. Applications may be submitted as hardcopy or electronically at [Grants.gov](http://Grants.gov). EPA anticipates that it will inform applicants of its selection decisions in or around April 2013 and plans to issue awards by 31 July 2013.

## **NHD Photo of the Month**

This month's photo was submitted by Jeff Simley of the USGS. It features the Colorado River in Gore Canyon west of Kremling, Colorado. To see the photo of the month go to [ftp://nhdftp.usgs.gov/Hydro/Images/Colorado\\_Gore.JPG](ftp://nhdftp.usgs.gov/Hydro/Images/Colorado_Gore.JPG). Submit your photo for the NHD Photo of the Month by sending it to [krisham@usgs.gov](mailto: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**

Robert Pruyne (and his wife) was the first to guess the August NHD Quiz as Eufaula Lake on the Canadian River in eastern Oklahoma just upstream from the confluence with the Arkansas River. See <ftp://nhdftp.usgs.gov/Quiz/Hydrography85.pdf>. Robert works for the Rockingham Planning Commission, which is a voluntary local public organization established under New Hampshire state law funded by, sustained by, and tied directly to local governments. It is run by representatives appointed by its member municipalities. A primary function of the Commission and its staff members is serving the needs of constituent local governments by providing technical planning assistance -- doing such things as preparing land use and natural resource inventory maps, preparing water resource plans, providing circuit rider planner services, helping towns develop master plans and capital improvement programs, informing towns about federal and state dollars that are available, and assisting them in applying for grants.

Others with the correct answer (in order received) were Tom Denslinger, Jim Mitchell, David Straub, and John Kosovich. It looks like it was a tough quiz.

This month's hydrography quiz can be found at <ftp://nhdftp.usgs.gov/Quiz/Hydrography86.pdf>. Name this seemingly obscure lake that made big headlines as a result of Hurricane Isaac. The dam holding back the lake threatened to break, forcing the evacuation of 60,000 people. Send your guess to [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov).

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Thanks to Dave Arnold, Carol Giffin, Bill Smith, Allen Karsh, Stephen Daw, Keven Roth, Tommy Dewald, and Kathy Isham.

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