

## Hydrography Seminar Series November 5

The fifth in a series of seminars on the application of hydrography will be held Thursday, November 5, 2015 at 2:00 PM Eastern Time and last one hour. The main topic will be: ***USDA Forest Service Watershed Condition Framework: An approach for assessing and improving watershed condition*** by Mike Eberle, the U.S. Forest Service Surface Water Program Leader

Abstract - The USDA Forest Service (Forest Service) has developed a nationally consistent, comparable, and credible process for maintaining or improving the health of watersheds across all national forests and grassland called the Watershed Condition Framework (WCF). The WCF is a comprehensive approach for proactively implementing integrated restoration on priority watersheds on national forests and grasslands. The WCF structures the way the Forest Service approaches watershed restoration by targeting implementation of integrated suites of maintenance or improvement activities in those watersheds that have been identified as priorities for restoration. The WCF also establishes a nationally consistent reconnaissance-level approach for assessing and classifying watershed condition, using a set of 12 indicators that are surrogate variables representing the underlying ecological, hydrological, and geomorphic functions and processes that affect watershed condition. In late 2010, the Forest Service assessed the condition of over 15,000 6th level (12-digit) HUCs containing National Forest System lands. Since then, over 250 Priority Watersheds have been designated and over 200 associated Watershed Restoration Action Plans (WRAPs) have been developed. Partner engagement has been an integral component of the WCF implementation. During the session, participants will be led through the WCF map viewer website (<http://apps.fs.usda.gov/WCFmapviewer/>), where the public and partners can view the results of WCF planning, including priority watersheds, WRAPs, the watershed selection process, estimated costs, and involved partners. Session participants will learn about plans for future work in the WCF process, focusing on the availability of watershed condition data and tools for the upcoming watershed condition reassessment.

There will also be a five-minute lightning talk on *Preserving High-Quality Riparian Vegetation* by David Richey of the Lane Council of Governments in Eugene, Oregon. A second five-minute lightning talk will be presented on *Streamgage Drainage Area Boundaries* by Curtis Price of the USGS.

Learn more about and register for the seminar at <http://nhd.usgs.gov/HydrographySeminarSeries.html>

## Hydrography Requirements and Benefits Study by Steve Aichele

Results continue to come in from the Hydrography Requirements and Benefits Study (HRBS). Interviews have been completed with the 23 participating Federal agencies, and 49 of the 50 states (the last may be completed by the time you read this).

The interview process resulted in consolidation of the original 595 Mission Critical Activities (MCA) down to 417 MCAs. This consolidation occurred when multiple respondents from the same agency reported the same activity. The 417 MCA spanned 23 Business Uses (a user-specified grouping of the MCAs) including everything from Flood Risk Management to Agriculture to Oil and Gas Resources. Water-quality activities were the most commonly supported by hydrography data, amounting to 81 of the 417 MCAs.

The USGS and Dewberry, the contractor facilitating the survey, are continuing to make refinements to the data and are beginning the analysis and report writing process. The first product will be a data report, summarizing the data collection process and documenting the data collected. This report will be delivered in March 2016.

### **Alaska Status Update** by Kacy Krieger

Alaska is a rugged and diverse state defined by water. Compared to the conterminous United States, where surface water is mapped at 1:24,000-scale or better, most of the NHD in Alaska is based on hydrography from 1950s-era USGS Historical Topographic Maps at 1:63,360-scale. The NHD needs updating to meet modern mapping standards and user needs throughout Alaska.

Until recently, Alaska lacked a single statewide agency or group who was responsible for surface water mapping, and little had been done to address the needs for an improved NHD. In 2013, the Alaska Hydrography Technical Working Group (AHTWG) formed as a collaborative effort between Federal, State and local partners with the goal of addressing these needs. AHTWG promotes a strategic vision that supports the maintenance, stewardship, and use of common hydrography datasets for the benefit of all digital hydrography editors and users in Alaska. AHTWG is an active group, meeting regularly to address surface water mapping needs and issues in Alaska.

This collaborative stewardship of the NHD in Alaska has been instrumental in coordinating, funding and updating hydrography throughout the state since AHTWG's inception. Early on, AHTWG adopted a successful hydrography program known as the Alaska Hydrography Database or AK Hydro. AK Hydro began in 2010 as a regional stewardship model with numerous partners that had two goals: the first, update the NHD in Alaska to national standards and second, meet the needs of Alaskan agencies. AK Hydro streamlines the task of updating the NHD by centralizing NHD maintenance services within a single group for all of Alaska. In doing so, the numerous agencies involved in surface water mapping across the state no longer run complex NHD conflation processes or NHD update tools. Instead, the partners provide updated hydrography data that meet statewide and national standards to AK Hydro. Trained stewards at AK Hydro then use the NHD update and conflation tools to update the NHD.

The successes of early collaborative NHD update efforts in Alaska have led to numerous projects across the state. Notable projects include: the Matanuska-Susitna Basin in southcentral Alaska – at approximately 25,000 mi<sup>2</sup> the project covers an area roughly the size of West Virginia, the Nushagak/Kvichak Basin in southwest Alaska, the Tongass and Chugach National Forests in southcentral and southeast Alaska, the Aleutian Islands where previously there were no data in the NHD, National Park Service lands throughout the state, and prioritized watersheds in Arctic Alaska. These projects represent significant investments in both funding and in-kind contributions from partners. Alaska is an expansive state with abundant water resources. Improvements to the NHD are only just beginning. The efforts of the many partners involved in mapping Alaska's water have already contributed significant time, funds and updates to the NHD. This collaborative model will continue to lead to substantial improvements to the NHD in the coming months and years.

### **Change in NHD Dataset Download Process**

There has been a change to downloading NHD data using the FTP distribution method. Using the NHD web site <http://nhd.usgs.gov> click the [Get Data](#) tab. Then click on [Go to pre-staged Subregions](#). Where you once found the NHD data organized to make your selection easier, you will now find all the data in one giant “flat” file containing several thousand records. You will have to scroll through the list to find your dataset of interest. This situation will be rectified in the near future. There is a bright side, however. You can now download HU8's directly without having to go to The National Map viewer.

## **Using the Trace Geometric Network Tool with NHD by Al Rea**

In the August Newsletter, we saw how the Utility Network Analyst toolbar in ArcMap can be used to trace downstream on the NHD flowline network. (See *Using NHD to Identify What is Downstream of a Spill Site* in [http://nhd.usgs.gov/newsletters/News\\_14\\_10\\_August.pdf](http://nhd.usgs.gov/newsletters/News_14_10_August.pdf).) That approach works fine for a small number of sites of interest which you can identify interactively as “Network Flags” using the Add Edge Flag or Add Junction Flag tools. What if you want to start your trace using many sites, though, such as all the dams or gages? For that you can use the ArcGIS Trace Geometric Network tool, which can be found in the Data Management Toolbox under the Geometric Network Toolset. This tool will take a set of points as input for network flags. It also will take a set of points to use for barriers, which will stop the trace. There are nine different trace task types, as well, so you are not limited to just upstream or downstream traces. This tool, combined with the NHD geometric network, provides a tremendous amount of analytical power.

The geometric network is automatically built in NHD HU4 and HU8 downloads. It is not built automatically on statewide downloads, but you should be able to build it yourself using the Network Builder tool, which is one of the NHD Utilities tools available at <http://nhd.usgs.gov/tools.html>. Also, the NHDPlus team has successfully experimented with building the geometric network on a seamless national version of NHDPlus V2.1 (We’ll have more about that in a future newsletter). See [ftp://nhdfp.usgs.gov/Hydro\\_Images/Rea\\_Figure\\_3.jpg](ftp://nhdfp.usgs.gov/Hydro_Images/Rea_Figure_3.jpg) for an example showing a view of the Western US with all the 1:100,000-scale NHDPlus V2.1 flowlines selected that are downstream of any of the more than 26,000 gages that have been referenced to the NHDPlus network. This downstream trace from 26,000 gages on a network of 2.7 million flowlines took just two-and-a-half minutes.

## **NHD Status in Region Three, Part 4 by Joel Skalet**

The National Hydrography Dataset (NHD) Stewardship Region 3 consists of 17 states including Minnesota, Iowa, Wisconsin, Illinois, Indiana, Michigan, Ohio, Kentucky, Pennsylvania, New York, New Jersey, Massachusetts, Rhode Island, Connecticut, Vermont, New Hampshire, and Maine. Also there are several U.S. Forest Service sub-stewardship activities occurring in many of the states. Many different forms of stewardship exist in this region and more information will come in future newsletters. Information here has been provided mostly by individual State Stewards.

### Maine:

Being a coastal state, Maine is required to manage extensive coastal assets, including estuaries, aquaculture sites, fisheries, and anchorages, among other resources. The National Hydrography Dataset (NHD) can be a useful tool for managing coastal resources; in Maine it is used widely for these purposes. Continuing to build the utility of the NHD for managers and scientists is important to local, state and federal agencies.

The representation of the coastal waters in Maine was fairly arbitrary in its differentiations between freshwater, estuarine and marine environments. The goal of this project involved looking at more meaningful and scientifically-based divisions between estuarine features along the coast of Maine and incorporating these findings into the NHD.

Work is being done refining and updating the Estuary feature class in Maine. It includes QA/QC and incorporating the edits into the stewardship process. A significant amount of time has been in editing and updating Flowline, NHDArea, and Waterbody feature classes in two subbasins-01060001 and 01060002, especially in the urbanized and developing coastal regions. Corrections are based on high resolution imagery (1m) and LiDAR elevation data, so are much more accurate than the original data.

### Connecticut:

Updating the hydrography for Connecticut started in November, 2014, shortly after Connecticut officially became State Steward of the dataset and the work is being carried out by UConn's Center for Land-Use Education and Research (CLEAR) through a CT DEEP grant. The updating of the hydrography is being done at the 1:24,000-scale, digitized at the 1:10,000-scale (per Bill Smith's recommendation), and up-to-date Orthoimagery & lidar are being used as the reference to digitize. The hydrography in the following subbasins (HU8) have been updated at the aforementioned scale to date: The Thames has been fully updated. The Quinebaug, Shetucket, Lower Connecticut, Farmington, and Housatonic and two remaining watersheds are slated to be finished by mid-November. This update will have an immediate impact/use once it is released to the public and state entities like the Connecticut's Department of Energy & Environmental Protection and the 169 towns/municipalities within the State.

The outcome of the research and updates done within the State of Connecticut will be presented this November at the 2015 Northeast Arc Users Conference in Burlington, Vermont. Five other talks, which highlight the use of USGS's NHD in the New England region will all be presented at this conference, as well.

### Rhode Island:

RI has been working on the geoconflation process to conflate Rhode Island 1:5,000-scale hydrography data to the NHD schema. The project was started as a pilot program focusing on the Upper Blackstone River HUC10. This project began in 2013, but due to technical issues with the tools and upgrading the process to run on Arc 10.1, the project was delayed several times. The tools became available in the spring of 2015 and the project resumed. It is anticipated that this portion of the project will be completed in late Fall 2015 and the preliminary results will be presented at the NEARC conference in Burlington, VT in early November. We hope that this project will continue and the remaining areas of Rhode Island will be completed as funding permits.

## **NHD Network Improvement Project October 2015 Status Report by Cynthia Ritmiller**

### Initial Phase Network Improvement – Remaining

Region 19 (Alaska) is being completed as part of the Hydrographic Image Update project using the 2012 Horizon Systems QA/QC check results.

### Initial Network Improvement Regions Completed:

01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 21, and 22.

### Double Check Phase Network Improvement- Status

- Region 01 - Sub-regions 0101-0109 were sent to Horizon systems in August and are being processed in the creation of HiRes NHDPlus. The one remaining sub-region 0110 will be sent to Horizon Systems soon.
- Region 02 - New pre-staged Sub-Regions were received and QA/QC checks were ran, any edits will be completed before the region is sent to Horizon Systems for the creation of HiRes NHDPlus.
- Region 03 - Three sub-basins need to be reviewed and may needs edits, sub-regions include 0309 and 0311. Will complete these edits working with our partners schedules.
- Region 04 - Several sub-basins need to be reviewed and may needs edits, sub-regions include 0407, 0407, 0414, and 0415. Will complete these edits working with our partners schedules.
- Region 05 - New pre-staged Sub-Regions were received, QAQC checks have been run for all HUC4's and are ready to review. POC's have already been contacted.

- Region 06 - The entire region (Sub-regions 0601, 0602, 0603, and 0604) was sent to Horizon Systems in August for the creation of HiRes NHDPlus.
- Region 07 - New pre-staged Sub-Regions were received, QA/QC checks have been run for all HUC4's and are ready to review. POC's have already been contacted.
- Region 08 - Completed sub-regions 0801-0807. Sub-regions 0808, 0809 need QA/QC checks run.
- Region 09 - Completed double check phase. As new data become available it will go through QA/QC check process again.
- Region 10 - New pre-staged Sub-Regions were received, QA/QC checks have been run for all HUC4's. Will be reviewing these data.
- Region 11 - Completed double checks within this region in October.
- Region 12 - New pre-staged Sub-Regions were received, QA/QC checks were ran any edits will be completed, before the region is sent to Horizon Systems for the creation of HiRes NHDPlus.
- Region 13 - Completed double check phase. As new data become available it will go through QA/QC check process again.
- Region 14- New pre-staged Sub-Regions were received, QA/QC checks were ran. Edits will be completed by Cynthia Ritmiller before the region is sent to Horizon Systems for the creation of HiRes NHDPlus.
- Region 15 - New pre-staged Sub-Regions were received, QA/QC checks were run. Edits will be completed before the region is sent to Horizon Systems for the creation of HiRes NHDPlus.
- Region 16 - Completed double checks phase. As new data become available it will go through QA/QC check process.
- Region 17 - Four sub-basins need to be reviewed and may needs edits, sub-regions include 1701, 1705, and 1707. Will complete these edits working with our partners schedules.
- Region 18 - Completed double check phase. As new data become available it will go through QA/QC check process.
- Region 19 (Alaska) - Initial Phase Network Improvement in progress. See above.
- Region 20 - Completed double check phase.
- Region 21 - Completed double check phase.
- Region 22 (Pacific Islands)- Was given to Horizon Systems to begin producing HiRes NHDPlus.

Note: Regions will be edited as per the NHDPlus contract schedule. Before starting a Region the area POC will be contacted. This status report is current as of October 29, 2015.

### **NHD Quality Control Errors and How to Resolve Those Errors** by Bill Smith

Many NHD editors are reporting issues resolving particular errors that are showing up frequently in their Quality Control (QC) error reporting 'Data Reviewer' tables. In some cases, editors are asking why these errors are just now showing up in the QC process. This is a second in a series that takes errors that are appearing on a regular basis, discuss the errors, explain why the errors are showing up, and provide guidance on how to resolve these errors. In the next few issues of the NHD Newsletter, problem jobs submitted to USGS for review will be studied, and prevalent errors will be discussed.

- Error: Isolated Network Feature
- QC Check: Main Flow Checks (Flow Check Validation):
- NOTES Description: NHDFlowline Flow Check Validation Warning (See Status Description) (Flow Check Val)
- REVIEWSTATUS Description: Isolated Network Feature
- Severity: 3

- Description of Error: The error is indicating an NHDFlowline feature does not have a connecting downstream feature.

#### Why are we now seeing this error?

In some cases, this is not a real world error, rather it's a disconnect in the current edited dataset. There are several reasons why a NHDFlowline feature might not have an appropriate downstream feature. Perhaps the offending feature actually is the end of a network. In some cases water does stop flowing, disappearing into the ground. Perhaps this is a case where the offending feature is at a subbasin boundary, so the current edited dataset is not indicating a downstream feature, simply because that downstream feature resides in the adjoining subbasin which is not part of your current 'Check Out'. There is always the possibility that the downstream feature simply was not digitized and this is creating the error.

#### Error Resolution:

An editor must determine if in fact a downstream feature actually should be added to the current edited dataset. Using the latest available imagery, the editor should determine if it is appropriate to add a new downstream feature. If so, the editor would use the NHD Update Toolbar, 'NHD Flowline' tool, 'Add Geometry' function to add the missing feature or connector (if the path of the missing feature is not known). After the feature has been digitized, 'Apply Rules' and 'Save' the edit. Remember to mark your Reviewer table error record as 'Resolved'. If it is determined that the data is correct, and there is no downstream feature, the editor should mark the offending record or records in the Reviewer table as 'Not an Issue, Ignore'.

Next month, I will find several other errors and discuss the issues in a similar fashion. If anyone has an error they would like to see discussed in this forum, please contact BJ Smith at 573-308-3593 or via email at [wjsmith@usgs.gov](mailto:wjsmith@usgs.gov), and we shall attempt to get that error in a future article. Also please note the NHD Technical Exchange Meeting (TEM) held on a regular basis is an excellent forum to discuss any NHD editing issue.

#### **NHD Photo of the Month**

This month's photo is the Snake River in the Blue River subbasin (14010002) located high in the Rocky Mountains of Colorado. The headwaters of the river start at 12,500 feet and the location of the photo is 9,000 feet. The water in this photo was flowing at approximately 170 cubic feet per second. The photo was taken by Jeff Simley of the USGS. See [ftp://nhdftp.usgs.gov/Hydro\\_Images/Snake\\_River\\_2.JPG](ftp://nhdftp.usgs.gov/Hydro_Images/Snake_River_2.JPG). Submit your photo for the NHD Photo of the Month by sending it to [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov).

#### **September Hydrography Quiz / New October Quiz**

James Simard of AIR Worldwide was the first to correctly guess the September NHD quiz as the Illinois River in Illinois, flowing from just south of Chicago to just north of St. Louis. See <ftp://nhdftp.usgs.gov/Quiz/Hydrography122.jpg>

James is a GIS Manager for AIR Worldwide, the scientific leader and most respected provider of risk modeling software and consulting services. More than 400 insurance, reinsurance, financial, corporate, and government clients rely on AIR software and services for catastrophe risk management, insurance-linked securities, detailed site-specific wind and seismic engineering analyses, and agricultural risk management. James is responsible for managing a team of GIS specialists who assemble and create data layers for hydraulic and hydrologic modeling of inland flood models.

Others with the correct answer (in order received) were: Gerry Daumiller, Becca Conklin, Dan Button, Becky Schaffner, Bill Samuels, David Straub, David Betcher, Calvin Meyer, Barb Rosenbaum, Matt Rehwald, Evan Hammer, Janet Brewster, David Asbury, Al Rea, and Roger Barlow.

This month's hydrography quiz can be found at [ftp://nhdftp.usgs.gov/Hydro\\_Images/Hydrography123.jpg](ftp://nhdftp.usgs.gov/Hydro_Images/Hydrography123.jpg). This is an important river in the West. The surrounding hydrography is that of a HU2. What is the river in red? Send your guess to [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov).

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Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

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The NHD Newsletter is published monthly. Get on the mailing list by contacting [jdsimley@usgs.gov](mailto:jdsimley@usgs.gov).

You can view past NHD Newsletters at [http://nhd.usgs.gov/newsletter\\_list.html](http://nhd.usgs.gov/newsletter_list.html)

Jeff Simley, USGS, assumes full responsibility for the content of this newsletter.