USGS National Hydrography Dataset Newsletter

Vol. 16, No. 2, February 2017

NHD and WBD Downtime Scheduled in February

In support of system updates, we expect to have NHD and WBD system downtime that may affect access to the website, services, databases and usability of tools during these two timeframes:

❖ **Friday, February 3 - Sunday, February 5th, 2017**

❖ **Friday, February 17 - Monday, February 20, 2017**

Thank you for your patience!

OGC seeks public comment on OGC WaterML 2 - Part 3, Surface Hydrology Features Conceptual Model

Contact: info@opengeospatial.org

Following is the OGC press release announcement for public review of the HY_Features conceptual model, which will be an important new standard for the hydrography community in general. If you are interested in providing comments, they are due to OGC by Feb 16:

18 January 2017: The membership of the Open Geospatial Consortium (OGC®) seeks public comment on its WaterML 2 - Part 3, Surface Hydrology Features Conceptual Model.

The OGC WaterML 2 - Part 3, Surface Hydrology Features Conceptual Model (HY_Features) is part of an intended 'OGC WaterML 2' suite of standards that groups water-related OGC standards. The candidate standard follows Part 1: Timeseries, and Part 2: Ratings, Gaugings and Sections.

The candidate HY_Features standard defines a common feature model for the identification and description of surface hydrologic features. The feature model is based on established models and patterns in use in the Hydrology domain and endorsed by WMO and UNESCO, such as those documented in the "International Glossary of Hydrology."

The candidate HY_Features standard also defines a common conceptual information model for surface hydrologic features independent of their geometric representation and scale. The model describes fundamental relationship types that exist among major components of the hydrosphere. This includes relationships such as hierarchies of catchments, segmentation of watercourses, and topological connectivity of hydrologic features based on the flow and conservation of water.

The standard is intended to be used to document and share information about real-world objects that are studied in a wide range of hydrologic study types. The original design goal for HY_Features was to link hydrologic information across the scientific and technical programs of organizations with local to global scope, and to assist in discovery, access, and use of hydrologic data from different sources.

The HY_Features model is designed to support many types of hydrologic information and sub-disciplines. The model supports referencing information about a hydrologic feature across disparate information systems or products, thereby improving data integration within and among organizations. Similarly, the model can be applied to cataloging of observations, model results, or other study information involving hydrologic features. The ability to represent the same catchment, river, or other hydrologic feature in several ways is critical for aggregation of cross-referenced or related features into integrated datasets and data products on global, regional, or basin scales.

Agreement on common concepts and methods is necessary to enable semantic interoperability of hydrologic data and services. The HY_Features model was developed in order to formalize concepts and relationships of hydrologic and hydrographic features using the WMO/UNESCO "International Glossary of Hydrology" as a starting point.

The candidate standard is available for review at portal.opengeospatial.org/files/?artifact_id=72353&version=3.

Comments are due by 16 February 2017 and should be submitted to requests@lists.opengeospatial.org.

Time of Travel Estimates through Waterbodies – Now Included as Part of the Medium Resolution NHDPlusV2

Contact: Richard Moore (rmoore@usgs.gov)

We are pleased to announce that time of travel estimates through waterbodies, such as lakes and reservoirs, are now included as part of the NHDPlusV2 data. To provide this data, a simple volumetric approach of estimating lake residence times was employed. It is assumed that the residence time is the time required to replace lake volume. This technique is used to roughly estimate average travel time through each lake or lake segment.

These estimates of lake travel time are provided in the medium resolution NHDPlusV2 NHDPlusFlowlineVAA table, in the field TOTMA – Mean annual time of travel for flowline (in days). The field is shared with stream travel times which are calculated from the stream velocity field (V0001E) and the flowline length (for tidal reaches the field is set to -9999). For waterbodies, such as lakes and reservoirs, the field is calculated based on volume replacement time for each lake or lake segment.

The national availability of lake depth estimates (Hollister and others, 2011; USEPA, Data available at https://edg.epa.gov/clipship/) has made possible this ability to estimate residence time for lakes and reservoirs throughout the contiguous United States. Lake volumes are apportioned to each flowline or artificial path according to the length and flow associated with that flowline. Segment travel times are then calculated to be equal to the lake segment volume / segment flow. Essentially the proportion of the lake volume that should be associated with each flowline within that lake is used to determine the volume replacement time for each lake segment.

The presence of lake stratification, however, introduces a complication where the average travel time is better represented as the time required to replace the upper strata of the lake. In this case the transport can be assumed to occur above the depth where stratification occurs. A direct way to calculate the adjusted mean annual time of travel (in days) for a stratified lake or lake segments is to calculate it equal to TOTMA times the ratio of (depth of stratification / estimated mean depth of the lake). Adjustments for lake stratification cannot be done nationally, but rather must be done on a lake by lake basis. This is because lake specific knowledge on depth (and duration) of stratification is required.

Two new NHDPlusV2 extension tables provide the data that went into calculating these estimates of the travel times through waterbodies. The new attribute table PlusWaterbodyLakeMorphology.dbf provides data for the waterbody as a whole, such as mean depth and lake volume. The new attribute table PlusFlowlineLakeMorphology.dbf provides data that has been allocated to flowlines (or lake segments), such as the fraction of lake and surface area assigned to each flowline. Additional information on these new tables and "time of travel" is provided in the User Guide at the website referenced below.

NHDPlusV2 data is available at https://www.epa.gov/waterdata/nhdplus-national-hydrography-dataset-plus

Reference

Hollister, J.W., Milstead, W.B., Urrutia, M.A., 2011, Predicting Maximum Lake Depth from Surrounding Topography. PLoS ONE 6(9): e25764. doi:10.1371/journal.pone.0025764

WBD News

Contact: Elizabeth Stevens-Klein (estevens-klein@usgs.gov)

Provisional gaged drainage area data was released for 13 states in the new WBD national staged product dated January 24th, 2017. The data (NWISDrainageArea and NWISDrainageLine) represent drainage areas upstream from gage locations stored in the USGS National Water Information System (NWIS), with the drainage-area delineations being constructed mostly from WBD boundaries supplemented by boundaries derived from NHDPlus V2 flow direction rasters. (Note: this provisional data is currently only available in the national WBD product and will be available in WBD HU2 products in the future).

HTTPS Compliant WBD Editor Tools for ArcGIS 10.3.1 were released December 22, 2016. They are available for download on the Stewardship website and the Hydrographic Data Community website. Please note these are the only tools now compatible with the Stewardship website, so WBD stewards and editors, please download and install at your earliest convenience. NRCS stewards and editors, the tools are currently being certified by your IT department. Laura Davenport will keep us posted on the status. For more information, please contact Elizabeth Stevens-Klein (estevens-klein@usgs.gov).

Stewardship website: https://usgs-mrs.cr.usgs.gov/usgssteward/index.html

Hydrographic Data Committee (HDC) website (contact Lily Niknami for access to HDC - lniknami@usgs.gov): https://my.usgs.gov/confluence/display/hdc/WBD+Software+Downloads

Official release of the HTTPs-compliant NHD Update tool for ArcGIS 10.3.1

Contact: Kristiana Elite (keelite@usgs.gov)

The USGS is pleased to announce the official release of the NHD Update tool v6.3.3.x for ArcGIS 10.3.1. This tool version is compatible with the recently mandated HTTPs switch. It was made available on January 6, 2017 in a 'provisional' status because, although component testing was successful, our standard testing procedures were still underway. Those standard testing procedures have successfully completed, therefore the provisional status of this version has been lifted and it has become the official release version. If you have already downloaded and installed the provisional version (v6.3.3.2), then you already have the official version and there is no need to download and re-install the tool. The only change made was that the 'Provisional' label on the software zip folder has been removed.

The software is available for download at the links below on the Stewardship website. For additional information about the functionality that was impacted by this HTTPs switch, please read the release notes that are within the software folder:

https://usgs-mrs.cr.usgs.gov/usgssteward/software_nhd.html or

https://usgs-mrs.cr.usgs.gov/usgsstewardbeta/software_nhd.html

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NHD Update Process Training

Contact: Joel Skalet (jjskalet@usgs.gov), Bill Smith (wjsmith@usgs.gov)

It's never too late to join us for training in the coming months!!

Trainings are listed on the Hydrographic Data Community (HDC) website Events Calendar: https://my.usgs.gov/confluence/pages/viewpage.action?pageId=223543429.

Principal Stewards in each state (if one exists) should be contacted for approval prior to submitting a request for training. The current training being conducted is using ArcGIS 10.3.1. For access to HDC, please contact Lily Niknami (lniknami@usgs.gov).

NHD Basics is a prerequisite class that all attendees are required to complete prior to moving to NHD Update Training sessions. Training begins at 9:30 am Central Time and runs for approximately 2 and a half hours. This session covers: Basic NHD Background – History of the NHD, NHD Stewardship, Resolutions of the NHD, The NHD Model, and Important concepts in the NHD, including: Permanent Identifiers in the NHD, Reachcodes in the NHD, Flow Network in the NHD, Important NHD websites, Supporting Software, NHD User Guide, NHD User Account, NHD MYUSGS Hydrographic Data Community, and Checking out data. Please contact your Regional POC to schedule training.

NHD Update Tools Training Part 1 begins at 9:30 am Central Time and runs for 5 hours (breaks included). Part 1 will be a review of the entire editing process and a complete discussion of the NHD Update Toolbar, including loading data, Initial QC, Reviewer table, resolving 'Invalid Geometry', and using the tool to add geometry, modify geometry and attributes, delete geometry, import geometry, and vertical relationships.

NHD Update Tools Training Part 2 begins at 9:30 am Central Time and runs for 5 hours (including breaks). Part 2 (follow up to Part 1) will be a review of the Reviewer table, a review of Initial QC, Severity 1 versus Severity 3 errors, discussion of the errors one might see in the NHD and how to resolve those errors. We will then discuss Final QC and uploading your edits to the NHD National Geodatabase.

For more information about this training, please contact your Regional NHD POC (https://nhd.usgs.gov/stewardship/#.WJTWPPkrKUk) or Joel Skalet at jjskalet@usgs.gov / (608) 238-9333 x 152.

Naming Conventions for TNM Vector Staged Products

Contact: Andy Stauffer (astauffer@usgs.gov)

Pre-generated and hosted data products, known as "Vector Staged Products", are one of the USGS's means for providing The National Map (TNM) data to the public. Currently, there are approximately 150,000 unique

Vector Staged Products that span the entirety of TNM's seven vector data themes, including hydrography. The file naming conventions for Vector Staged Products have been quite varied, leading to confusion from both the data creation and download perspectives.

To mitigate these problems, the USGS is implementing a cross-theme naming standardization of all Vector Staged Products. We plan for file names to follow the convention of "Theme_ExtentName_Extent_Format.zip". Retaining the "theme" prefix (e.g. NHD_H, TRAN, Elev) will enforce product differentiation and TNM branding enforcement. An easily recognizable "extent name" will enable users to readily locate a product extent of interest (e.g. "10190002" for HU8s, "Colorado" for states, "Denver W" for gridded deliverables). The "extent" (e.g. HU8, State, 1X1) will enable users to identify the extent delivered, and is necessary to maintain file name uniqueness of products offered at various extents. The need for using extents in the naming convention is highlighted when Vector Staged Products are delivered at gridded Map Indices such as a 1° tile or a 7.5' tile where larger tile extent names are traditionally named by prominent nested tile extents. Finally, the "format" (e.g. GDB, Shape) suffix enables a user to quickly identify the data format contained within the product.

While some changes are in store for users who currently leverage the prevailing naming conventions, this type of standardization enables TNM-wide product harmonization, improved understandability of NGTOC Vector Staged Products, and ease of enforcing naming conventions in the future. For hydrography, the table below highlights the current naming convention of existing products and the proposed new naming conventions.

Product	Current Naming Convention (ex.)	Proposed Naming Convention (ex.)
NHD HU8	NHD_H_10190002_GDB	NHD_H_10190002_**HU8**_GDB
NHD HU4	NHD_H_1019_Shape	NHD_H_1019_**HU4**_Shape
NHD State	NHD_H_**8**_Colorado_GDB	NHD_H_Colorado_**State**_GDB
WBD HU2	WBD_10_GDB	WBD_10_**HU2**_GDB
NHDPlus HR HU4	NHDPlus_H_1019_GDB	NHDPlus_H_1019_**HU4**_GDB

For more information, please contact Andy Stauffer at astauffer@usgs.gov.

# NHDPlus High Resolution (NHDPlusHR) Updates

NHDPlusHR Status
Contact: Ellen Finelli (elfinelli@usgs.gov)

The NHDPlusHR Beta production continues to move forward:

● Hydrologic Regions (HU2's) in work: Region 09 - 0903 a Canadian / US NHDPlusHR Pilot, Region 10

● Hydrologic Regions (HU2's) processed: Regions 01, 02, 06, 12, 14, 15, and 16

● Hydrologic Regions (HUC2's) in preparation for distribution: Region 06

- Hydrologic Regions (HU2's) in Beta QC Review process: Region 06, and soon Region 01

NHDPlusHR Status 1/31/17
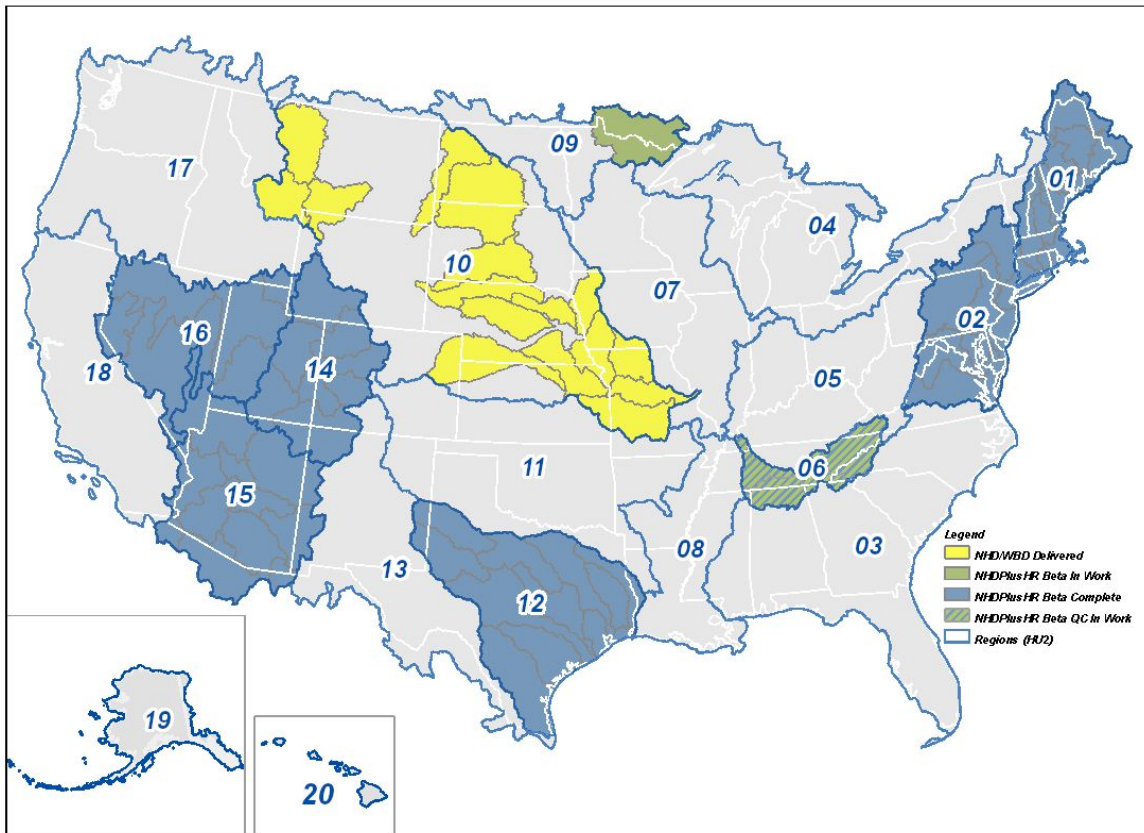
NHDPlusHR Ingredient Dataset Update - Network Improvement

Contact: Hannah Boggs (hboggs@usgs.gov)

The NGTOC continues its focus on the Network Improvement Project with the goal of identifying and correcting network and data quality issues existing in the high resolution NHD. One of the key drivers for this effort is the need to provide data ready to use for the production of NHDPlus High Resolution (NHDPlusHR). Coordination with appropriate NHD POC's will begin prior to review. Please see status

Hydrologic Regions
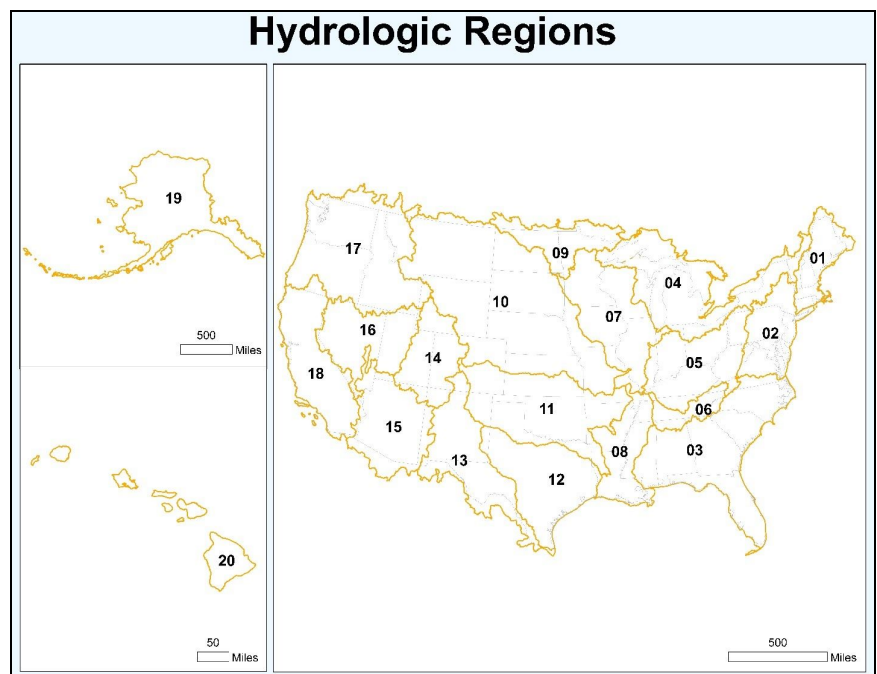
information for details.

Sub-region 0415

Network Improvement- Status (As of January 26, 2017):

Network Improvement Work Completed:
Regions-01, 02, 06, 12, 14, 15, 16, 20, 21 and 22
Subregions-0903

Planned Network Improvement Work:
Subregion- 1902

Network Improvement Regions Remaining:
04 (remainder), 08, 13, 17, 18, and 19 (remainder)

Network Improvement Regions In Work:
03, 05, 07, 09, 10, and 11

Please Note: For all regions listed above, all data will go through the QA/QC process as it becomes available.

NHD Photo of the Month

This month's photo, by Jen Crea, is of Lake Itasca, the headwater lake of the Mississippi River. The river outlet, with the pole announcing the Headwaters of the Mighty Mississippi, is just off to the right (reachcode 07010101008396 Artificial Path).

We'd love to see photos of the hydrology near you or from your travels! Please send submissions to Becci Anderson (rdanderson@usgs.gov).
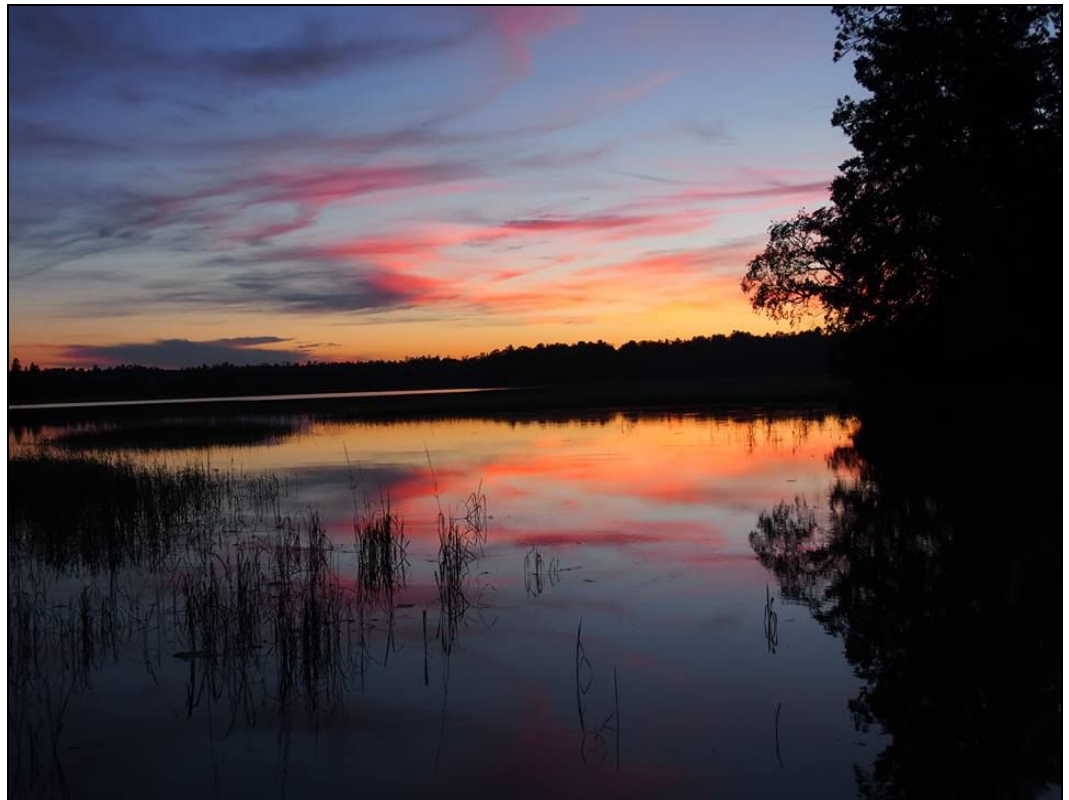
Check out current and past photos at https://nhd.usgs.gov/photo_month.html


NHD Quiz

Congratulations to **Charlie Palmer** as the first to respond to last month's quiz with the correct answer - **Donner und Blitzen River**, which drains the southern portion of Harney Basin in eastern Oregon. Charlie is a hydrologist with the State of Alaska Dept. of Environmental Conservation (DEC) Division of Environmental Health Drinking Water Program in Anchorage, Alaska. Congrats to the many others who also answered correctly: Joseph Kerski, Michael Wiedmer, Barbara Rosenbaum, Florence Thompson, Matt Rehwald, Bob Harmon, and Dave Hockman-Wert.

February Quiz: While on a fishing excursion in the Gopher State, Bob was struck with love's arrow and met his long-lost soulmate. Where was Bob fishing?

Send your answers with an email subject including the word "Quiz" to Becci Anderson (rdanderson@usgs.gov). Happy hydro hunting!

Thanks to USGS interns Lily Niknami and Alex Kaufman for writing this month's quiz!
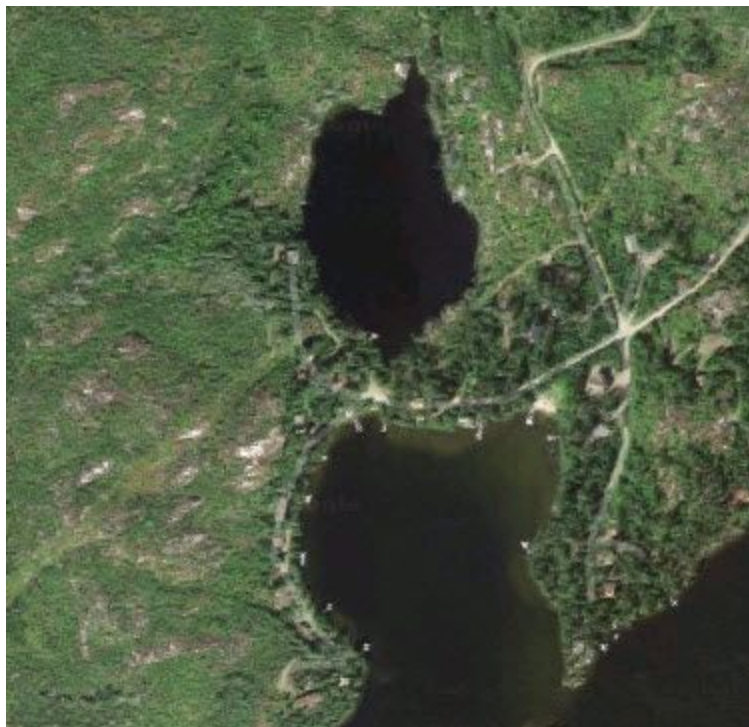
Thank you to the January 2017 USGS National Hydrography Dataset Newsletter contributors:
Richard Moore, Elizabeth Stevens-Klein, Kristiana Elite, Joel Skalet, Bill Smith, Andy Stauffer, Ellen Finelli, Karen Adkins, Hannah Boggs, Lily Niknami, Alex Kaufman, Al Rea, Sue Buto, and Becci Anderson.

Join Our Community!

For more information, to sign up for the newsletter, or to contribute, please contact the newsletter editor Becci Anderson, USGS National Hydrography Co-Lead, at rdanderson@usgs.gov.

Visit us anytime at nhd.usgs.gov

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