

USGS National Hydrography Dataset Newsletter
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High Resolution NHD Complete in Utah

Thanks to teamwork between the State of Utah, the U.S.D.A Forest Service (FS), and the U.S. Geological Survey (USGS), Utah now has border-to-border coverage of the high-resolution National Hydrography Dataset (NHD). This achievement has been a long-time goal of the Automated Geographic Reference Center (AGRC), the State of Utah organization charged with overseeing geospatial data for the State. Much of the work in Utah was performed by private industry under contract to the three government agencies, including Redcon Inc. of Bountiful, Utah, and Titan Corp. of Portland, Oregon. Prior to producing the NHD, almost all of the USGS and USGS/FS 7.5-minute series topographic maps used as source data were revised under programs sponsored by the AGRC with partial funding by the USGS, and the FS. Redcon Inc. performed much of this work. Much of the NHD produced will be used by the FS Natural Resource Information System, which will help resource managers understand the location and relationship of data referenced to the surface water network such as the location of specific fish species. The USGS has addressed the location of all active streamgages to the new high-resolution NHD. This makes it possible to study of flow of water throughout the stream network. As always, the NHD is available free-of-charge from <http://nhd.usgs.gov/>.

How to Bring Events into the NHDinGEO

NHD events can easily be shared amongst NHD users. In fact, the Environmental Protection Agency has produced over 2,000,000 events that you can use. Many of these events, such as the location of impaired waters, known as 303(d), can be obtained from <http://www.epa.gov/waters/data/downloads.html>. You can bring these events into your ArcMap GIS using the Add Route Events command. You can get detailed information on using this software by contacting jdsimley@usgs.gov. Here is a brief tutorial you can do in about five minutes that will make you an expert. (1) Bring up ArcMap and add your favorite NHD dataset. You can get a sample dataset for this exercise from ftp://rockyweb.cr.usgs.gov/nhd_geo/tutorial/NHD22102.zip. This is the medium resolution subbasin 01020004, located in Maine. (2) Next, start the Add Route Events command. You can find this under Tools. (3) The first window will ask for the route reference. As with all NHD data, this is NHDFlowline. Then it asks for the route identifier, this is always the Reach. Then it asks for the event table. You can use the [RAD303\(d\)_P_01020004.dbf](#). It is an extract from the EPA's 303(d) database. It contains one record of a point event. It contains two critical pieces of data that make this file of universal use in all GIS systems using the NHD. It has a reach code, RCH_CODE and a measure along the reach, the P_MEAS. This is a unique and precise location in the United States. It is not necessarily a location in x, y-space, but rather a location on the surface water network of the Nation. You then need to enter the route identifier, the RCH_CODE, and the measure, the P_MEAS. Make sure the Point Event radio button is clicked on. Click Okay. (4) You are done! You have just imported someone else's event into your GIS. It has been added to your display and you can see where it is located (in the center of the subbasin). It is also critical to bring in linear events, particularly in hydrography, because data is often distributed over entire stretches of river. Fortunately, this is just as easy. In step 3, rather than use the point event file, use the linear event file [RAD303\(d\)_L_01020004.dbf](#). The difference is that rather than using the unique point address P_MEAS, it has a starting and ending location on the river, F_MEAS and T_MEAS. So in step 3, click the radio button for linear event and then identify these two fields for the From-measure and To-measure. Click Okay and you are done! You should see two sections of stream identified. This is a very powerful capability because it provides a universal addressing scheme where events can easily be shared amongst users, and it allows analysis within the stream network, making it easy to search for other events upstream or downstream from your location. Additionally, many analysis

functions can be performed outside of the GIS environment when events are used in conjunction with the flow table. The flow table is an object class that comes with every NHD download. To view it, go to ArcCatalog and look for NHDFlow. It is the downstream sequencing of COM_ID's (NHDFlowline). These COM_ID's can be related to Reaches using the NHDReachCode_ComID cross-reference table, also provided with the NHD. Even if you don't do the exercise above, do look at the two .dbf files to become familiar with EPA's event data.

Recent NHD Training

Two half-day NHD workshops sponsored by the Utah Automated Geographic Reference Center were conducted in Salt Lake City on October 13 and 14, 2004. The workshops gave 45 GIS experts the chance to learn how to use the NHDinGEO in ArcMap. Exercises covered the data structure, mapping, navigating, and reach indexing. Attendees came from municipal, county, state, and federal agencies.

An all-day workshop was held in Helena, Montana on Sept. 15 for 16 GIS experts. This session was sponsored by the Montana State Library, which coordinates geospatial data for Montana. The morning session introduced NHD applications while the afternoon session focused on using the data in ArcMap.

An all-day seminar was held at Yellowstone National Park headquarters in Mammoth, Wyoming to give 10 GIS experts from Yellowstone and Grand Teton National Parks the chance to see how their aquatic data can be used with the NHD. Currently, the Parks have extensive holdings of data as features in shapefiles to record such things as specific fish species habitat. The seminar discussed the theory and methods for converting this data to events in the NHDinGEO using ArcMap. By doing this, it is easier to analyze the inter-relationship of this data within the surface water network.

Upcoming NHD Training

An all-day NHD training session will be held in Bismark, North Dakota on Nov. 18, 2004. This session is sponsored by the North Dakota State GIS Technical Committee and is being held in conjunction with North Dakota GIS Day on November 17. The session is being split between a morning seminar to introduce the NHD and demonstrate how it is used in applications, and an afternoon workshop to give specialists an opportunity to get hands-on experience with the NHDinGEO using ArcMap. For information contact Ann Fritz at AFritz@state.nd.us. Currently, 31 GIS experts are registered to attend. Jeff Simley will be the instructor.

A half-day class will be held in Laramie, Wyoming on Dec. 6, 2004. This session is sponsored by the Wyoming Geographic Information Science Center and is one in a series of classes offered on GIS subjects <http://www.wygisc.uwyo.edu/education.html>. This half-day class will cover the characteristics of the new NHDinGEO model and will show how to use this data in ArcGIS. It will cover the NHDinGEO model, using the data to make a meaningful hydrography map, characteristics of navigating the network, how to link attributes to the NHD using reach indexing, and how to analyze the relationship of events. It will also compare advantages and disadvantages of the NHDinGEO model with the NHDinARC and NHDGEOinARC models. Jeff Simley will also instruct this class.

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