USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

NHD at the ESRI User Conference

A number of sessions at the Environmental Systems Research Institute 2005 User Conference in San Diego will feature the National Hydrography Dataset and related hydrography topics:

- Tuesday, July 26, 8:30-10:00 AM – National Hydrography Dataset Applications I
  - National Application of New England SPARROW Catchment Delineation Method
  - Covered by WATERS (Watershed Assessment, Tracking, and Environmental ResultS)
  - National Hydrography Dataset -Plus: Powerful Applications Made Affordable
  - National Hydrography Dataset -Based RiverSpill
  - Building a Repository to Share Hydrologic-Related Geospatial Data
- Tuesday, July 26, 10:30 AM -12:00 PM - National Hydrography Dataset Applications II
  - Creating National Hydrography Dataset Associated Feature Classes
  - Analyzing the Relationship of Events in a Hydrography Network
  - Indexing Stream-Gauge Locations to the National Hydrography Dataset
  - Nutrient Stations Georeferenced to NHD: Value to Nutrient Criteria Development
  - Functional Linkage of Watersheds and Streams: ArcGIS FLoWS Tools
- Tuesday, July 26, 10:30 AM -12:00 PM - Geospatial Clearinghouses and Centralized Repositories
  - Using Web-Based GIS to Improve EPA Permit and Grant Submission
- Tuesday, July 26, 1:30 – 3:00 PM - Arc Hydro - Florida Experience I
  - Arc Hydro for Watershed Characterization and Pollution Load Estimation in Florida
- Tuesday, July 26, 3:00 – 5:30 PM - Cartographic Effects and Techniques II
  - Generalization for The National Map with Emphasis on the NHD
- Wednesday, July 27, 12:15 – 1:30 PM - National Hydrography Dataset User Group Meeting
- Wednesday, July 27, 1:30 – 3:00 PM - GIS Modeling Techniques for Water Resources I
  - Development of a Stream-Channel Profile Smoothing Tool
  - Automatic Delineation of River Banks Using Aerial Photographs

Following the conference, the NHD Newsletter will discuss these topics in more detail.

Status of NHD GEO Edit and NHD Stewardship

The much anticipated software for editing the NHDinGEO, known as NHD GEO Edit, is moving forward, but is not ready to be distributed to the user community yet. Even when NHD GEO Edit becomes available, two other events must be in place before users can use the software and begin making edits. One is that the user must send edits to the USGS through a stewardship process, which is intended to establish a protocol for procedures and responsibility. Since the NHD is intended to serve a community of users, not specific individual entities, that user community must be recognized and informed. Typically the community is organized on a state-by-state basis and one agency within the community is selected to represent the group to the USGS. Edits by users will be sent to the USGS through that lead agency, known as the principal steward. An agreement is needed between the USGS and the principal steward that outlines the responsibility of the principal steward to represent the community. So, before an edit is sent to the USGS, a stewardship protocol must be established. To establish this protocol, contact the USGS liaison for the state. The second event needed is training. The USGS in partnership with the U.S. Forest Service will hold training classes around the Country to teach the correct method for editing the NHD. To receive training, contact Chuck Matthys at cpmatthys@usgs.gov. The information received will allow the development of a coordinated training

program for the Country. Until the NHD GEO Edit tool is available, a limited set of states will receive training on how to edit the NHD using "manual" techniques. This will allow the stewardship of the NHD to move forward, and at a pace slow enough to make sure any problems with processing transactions are ironed out before they affect the larger program.

EventMaker Becoming Available

Within the next few weeks, the EventMaker software will be available from the NHD website http://nhd.usgs.gov. This software was developed by the U.S. Forest Service to fill a gaping hole in the linear referencing tools available in ArcMap, which is the ability to interactively create a linear event based on endpoints. The software also creates point events and will be available for both ArcGIS 8.3 and 9.0. The events will be stored as a feature class within an event geodatabase, providing both a spatial and an address referenced position. To use EventMaker, obtain the zip file and unzip it within a folder. The contents include the software, documentation, and an installer. After running the installer, EventMaker can be added to ArcMap as a toolbar. To use EventMaker, first create an event geodatabase in ArcCatalog. Then, using the toolbar, create an event feature class. Next, choose whether creating linear or point events. For a linear event, the two endpoints need to be clicked on the NHDFlowline. Then it is necessary to solve the path between the two. Alternatively, it is possible to click just one endpoint, and then solve for all upstream paths or the downstream path. When the endpoint is near the endpoint of a reach or reaches, choices are given to be specific about the reach intended for the endpoint. If satisfied with the linear event, the record is then written to the feature class. At this point, a user-supplied identifier for the event is named. This identifier can link the event to a user table of attributes. Creating events for points is similar, but without the need to establish a path. When done, the edits need to be saved. It is then possible to switch to another feature class for another set of events. Simply use the Output tool to select another event feature class. The resulting event feature class contains the event ID, reach, from_measure, to_measure, and event length. The tool creates the output feature class for you with the required attributes. You can then add additional attributes to track the data you need. Getting a correct event length will require the proper projection for the data. Since the events are stored in a feature class, they contain both the linear addresses and the geometry. The EventMaker allows the creation of robust linear and point events in an easy-to-use and reliable software package.

Searching for Events Spatially

The idea of an event indexed to the NHD network is fundamental to the power of the NHD because it allows the analysis of event relationships, such as the relationship between a permitted discharge and a drinking water intake. Many in the NHD program have promoted the idea of using the indexed addresses (reach and measure) on the flow network to establish the relationship. This works extremely well and is the recommended approach (NHD Newsletter Vol. 4, No. 4, February, 2005), but there are others who favor a spatial approach, which uses spatial position, rather than virtual address. Here is how it works: (1) First we need to have events, preferably snapped to the NHDFlowline, but it is also possible for them to simply be near the flowline. (2) Next, we need to establish a flow direction from a point on the network. We want to navigate upstream or downstream in search of events. For example, we want to navigate upstream from a drinking water intake in search of any permitted discharges upstream. (3) From this initial point, navigate using the NHD geometric network. Trace upstream with the result of selected NHDFlowlines. (4) Use the ArcMap Select by Location function. Within the Select by Location window: a) Select features from the b) Permitted Discharge that c) Intersect the features in the layer d) NHDFlowline e) Using selected features. Click on Apply. (5) The permitted discharges upstream of the drinking water intake will be selected. If the permitted discharges are not exactly on the NHDFlowline, go to (4) and add a step f) Apply buffer to features in NHDFlowline. Normally, most events are located within 250 feet of a flowline. You will need to try various buffers for your situation. Give the above process a try to see how well it works in your applications.

Answer to June Hydrography Quiz

The reigning National hydrography champion is Bruce Tuttle, a programmer analyst for the Idaho Department of Water Resources in Boise, Idaho. Bruce correctly guessed the hydrography image attached to the June 2005 NHD Newsletter as being Leech Lake, Minnesota. Calvin Meyer of the USGS in Rolla, Missouri followed with additional information, "This .pdf image is in Minnesota near the origin of the Mississippi River (level 1 feature). The large lake near the NE corner is 'Lake Winnibigoshish' in Itasca/Cass County, MN". Ron Wencl, the USGS liaison to Minnesota, adds this: "The image is distinctly in northern Minnesota with the larger waterbodies being Leech Lake (irregular shape) and Winnebigoshish (or Winnie with the smoother shape to the north). The western portion of this view includes Lake Itasca, the source of the Mississippi River. The medium-size lake in the northwest corner is Lake Bemidji - home of the infamous Paul Bunyan and Babe the Blue Ox statues. These upper reaches of the Mississippi River system are very complex with numerous wetlands and lakes, including State and National Forests, State Parks, Indian Reservations and other diverse characteristics. The NHD work in this area involved the Minnesota Land Management Information Center (LMIC) and St. Cloud State University".

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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.