USGS National Hydrography Dataset Newsletter
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by Jeff Simley, USGS

Datum Shift Update Program by Ariel Bates

Oregon and Nevada have been added to the states that have been inspected and corrections made. Others are New York, Pennsylvania, New Jersey, Delaware, Maryland, Virginia, North Carolina, South Carolina, Georgia, Alabama, Tennessee, Kentucky, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Texas, Oklahoma, Kansas, North Dakota, Montana, Idaho, New Mexico, Arizona, California and Washington. It has been found that 0.2% of quadrangles in the NHD require a datum correction fix.

NHD Image Update Program by Ariel Bates

In an effort to inspect and correct major changes to hydrography, Kentucky, Kansas, Oklahoma, Tennessee, Minnesota, and Indiana have been photoinspected and corrections made. States currently being corrected include Texas, Iowa, North Carolina, Pennsylvania and Virginia. Multiple other states are currently being photoinspected.

Hydrography Event Management Tool by Ariel Bates

The Hydrography Event Management (HEM) Training Plan is available on the HEM_Tools myUSGS community and a training schedule is available. Upcoming web trainings include Basic HEM Functions February 22, 2010 and Advanced HEM Functions during the week of March 22, 2010 (exact date TBD). These trainings are limited to a maximum of 15 participants. Multiple other training options are outlined in the Training Plan. The HEM Tool (in version 2.1) is available from the USGS by accessing: http://nhd.usgs.gov/tools.html#hem. If you have any questions concerning the HEM Tool, please contact HEM@usgs.gov.

Feature Catalog – Fun Facts by Keven Roth

Three related features from the Feature Catalog:

FORESHORE - The part of a seashore between high-water and low-water marks. NHDArea.

SOUNDING DATUM LINE - A line representing the tidal datum to which bathymetric contours are referenced. NHDLine.

COASTLINE - A line of contact between the open sea and the land, including imaginary lines separating inland water bodies from the open sea. NHDFlowline

As described in the Source Interpretation Guidelines in the feature template, FORESHORE is the area affected by the tides (aka - the area that uncovers). It is the area between mean high water and mean lower low water as shown on NOAA Charts. Because most NHD coastal features are captured at mean high water, FORESHORE will overlap the coastal features.

Foreshore was originally mapped with data from NOAA, either provided directly or interpreted from the nautical charts. The sounding datum line represents the Chart Datum which generally corresponds to low water stage of the tide. Coastline represents mean high water. Foreshore may overlap Sea/Ocean, Estuary, Stream/River and Lake/Pond depending on the tidal influence.

Foreshore must be associated with sea/ocean, stream/river, lake/pond, or estuary. If it is associated with sea/ocean, it should always be bounded by coastline and sounding datum line. If it is associated with lake/pond or stream/river, currently the high water line is just the edge of the stream/river or lake/pond. When the feature shoreline is implemented, the shoreline will represent the high water line. For estuaries, rules for which have recently been defined, it will depend on how the estuary and the coastline are implemented.

When displaying the NHD, foreshore can be missed. When symbolized, foreshore often, but not always, appears "under" sea/ocean or stream/river, both of which are also NHDAreas. This has been a bit of a mystery. One expert opined that it has to do with the object id assigned by ArcMap. The feature with the highest object id is symbolized "on top". If the Foreshore has the highest object id you will be able to see it in the display. However, if the foreshore has a lower object id than the sea/ocean or stream/river that it shares space with, it could be overlooked. If displaying foreshore is important in an application, be sure to use transparent symbols.

Sounding Datum Line is the 11th most numerous feature in the NHD and Foreshore is the 12th. The overwhelming majority of these are in Alaska.

Happenings in Idaho by Wilma Robertson

The State of Idaho Division of Water Resources (IDWR) received a grant from the U.S. Geological Survey to study four topics. To keep the public informed on these, IDWR has put together the following web page http://www.idwr.idaho.gov/GeographicInfo/NHD/Projects/customized_tool.htm to show progress on the work. Click on the tabs near the top to read about work that has been done on the following USGS-funded proposals: (1) Collecting and Integrating Hydrological Data from Local Agencies using Customized Editing Tools, (2) Tying Points of Diversions to the NHD as Events, (3) Framework Integration, and (4) Event Survey.

Accessing Maps at the USGS Store by Keven Roth

When Digital Raster Graphics were first being created, most people wanted seamless data. But some really wanted the full map with all the associated "metadata". USGS has now made the individual map sheets available for download as GeoPDFs and the process is extremely easy and fast. This capability can help NHD users understand the lineage of the NHD data without having to go to the library and pull the paper maps. See http://store.usgs.gov.

On the right side there is a box labeled TOPO MAPS with a link to DOWNLOAD. Clicking on the DOWNLOAD button brings up a Map Locator in a familiar Google format. There are two search options; **address or place** and **USGS Map Name**. When you type in a place or a map name, the display will zoom to that area and there will be a marker at the location you specified. Click once on the marker and a bubble will open showing the available maps. The usual maps are the 7.5x7.5-minute quadrangles (24K), the 30x60-minute quadrangles (100K) and the 1x2 degree quadrangles (250K). File sizes and dates of the maps are displayed. Select the map you want and click download. If you want to download another map in the visible window, just click in the quad and a new marker will appear. Follow the same procedures. You can zoom out and pan from the original window and add markers to select a number of quads. You can also display the availability of the new US TOPO and digital maps. These maps are based on current NAIP imagery. If either of these new maps are available, they will appear in the bubble and can be downloaded.

P-Maps by Keven Roth

When downloading maps, you may notice that on some of them, the collar text is in brown type (as opposed to black). This means the map is a Provisional Map or P-Map. P-maps were maps that did not go through the full map editing (cartographic) process before being published. The cartographic finishing process was time-consuming and costly. The USGS had a push to complete 24K coverage of the US by the early 1990s and the only way to do this was to take a few shortcuts. These shortcuts were very painful to the cartographers and most were not happy with the "sloppy" appearance of the P-maps. For example, usually the text was the hand written text of the compiler and the field crew. The symbology was that used in the photogrammetry process.

There are several "classes" of P-maps, but the aspect of most interest to the NHD users is that many of the P-maps contain all of the "drains" that were originally compiled by the photogrametrist. The photogrametrist basically compiled the "drains" first and then drew the contours to match the "drains". Many of these drains were not considered to be "mapworthy" streams. They were compiled to help in portraying the relief and to make sure the contours reflected the terrain. This compilation manuscript was taken into the field and verified by the field crew. A principal activity of the field crew was to classify the streams from observations on the ground and by talking to local residents. Any compiled "drains" that did not meet the definition of perennial or intermittent were left unclassified and therefore not shown as blue lines on the maps. The perennial and intermittent streams were indicated, sometimes by colored pencil, sometimes by a "P" or "I" and sometimes by a general note in the margin of the compilation manuscript. Often, the "drains" on P-maps are printed in black.

WBD Integration Status Update by Stephen Daw

As has been previously reported, the WBD Feature data class data model was designed and finalized during the summer of 2009. The next efforts in the integration process involved creating a process to load the current WBD data into the new model. The first issue was moving the existing state-level metadata reports into the new feature level metadata tables. The month of October was spent mapping out where the existing data would migrate into the new model and then developing a process to automatically perform metadata migration at the appropriate times.

Currently the WBD is primarily a polygon dataset from which the lines are derived. At the time the database was developed, the decision was made to move to a line based dataset from which the polygons would be derived. This would allow greater ease and accuracy in the editing process. The change in philosophy required that during the migration process, lines exactly matching the polygons could be derived into the new model. The process for creating exact matches and then populating the data for these lines was developed during the month of November.

The NHD reach code model is based on the 250,000 hydrologic units feature class. This feature class does not match the current WBD boundaries and in many areas is significantly different from the WBD boundaries. Part of WBD/NHD integration requires that the NHD reach codes be updated to match the WBD boundaries. This reach code migration is a significant task. There are over 28 million NHD features, and roughly ten percent of these features need to have their reach codes updated properly to match the new WBD boundaries while still maintaining the reach flow integrity of the NHD. Efforts to perform this migration have been ongoing through December and January. It is anticipated that in early February tables representing the proposed reach code migrations will be sent out to state stewards and other interested parties for review and process approval.

Also during the previous five months a committee met and documented the requirements for the WBD editing and check-in/check-out processes. Development of these tools will begin this spring. If you have

any questions regarding the WBD/NHD integration process or if you would like to be involved in reviewing the proposed reach code migrations please contact Stephen Daw at sgdaw@usgs.gov.

Catchment Delineation Methods

The New Hampshire Water Science Center, in Pembroke, New Hampshire is pleased to announce the availability of the online report "Evaluation of Catchment Delineation Methods for the Medium-Resolution National Hydrography Dataset," by Craig M. Johnston, Thomas G. Dewald, Timothy R. Bondelid, Bruce B. Worstell, Lucinda D. McKay, Alan Rea, Richard B. Moore, and Jonathan L. Goodall.

Different methods for determining catchments (incremental drainage areas) for stream segments of the medium-resolution (1:100,000-scale) National Hydrography Dataset (NHD) were evaluated by the U.S. Geological Survey (USGS), in cooperation with the U.S. Environmental Protection Agency (USEPA). The need for NHD catchments was driven primarily by the goal to estimate NHD streamflow and velocity to support water-quality modeling. The application of catchments for this purpose also demonstrates the broader value of NHD catchments for supporting landscape characterization and analysis. Five catchment delineation methods were evaluated. The five methods were evaluated by comparing the resulting catchments with the boundaries and the computed area measurements available from several verification datasets that were developed independently using manual methods. The results of the evaluation indicated that the two New England Methods provided the most accurate catchment boundaries. The New England Method with the WBD provided the most accurate results. The time and cost to implement and apply these automated methods were also considered in ultimately selecting the methods used to produce NHD catchments for the conterminous United States and Hawaii. This study was conducted by a joint USGS–USEPA team. The New England Methods were used to produce NHD catchments as part of a multiagency effort to generate the NHD streamflow and velocity estimates for a suite of integrated geospatial products known as “NHDPlus.” For more information on the report see: http://pubs.usgs.gov/sir/2009/5233/

New Intern at USGS

Kenton Curtis is interning at the USGS for the Spring semester specializing in hydrography. He is in his final semester of the Master's in Environmental Sciences program at the University of Colorado-Denver. His goal is to pursue work in the Environmental or Environmental GIS fields. One of Kenton’s projects will be to assess the vector hydrography data used in popular map viewers and do a comparison of characteristics of these data. This includes the techniques for generalization as the user zooms in and out of the viewer. His work will lead to a better understanding of the criteria used in selecting hydrography for general map use.

NHD Photo of the Month

This month’s photo was submitted by Diane Holt, of the Idaho Department of Water Resources. It shows the Snake River from the east side, looking roughly southwest towards Sinker Butte. The map showing where the photo was taken was created by Mike Tinker. To submit your photo for the NHD Photo of the Month, please send it to krisham@usgs.gov.

AWRA Conference

The American Water Resources Association’s popular series of conferences on GIS & Water Resources continues with its sixth GIS & Water Resources conference, this time in Orlando, FL March 29-31, 2010. For the latest information visit: http://www.awra.org/meetings/Florida2010/

December Hydrography Quiz / New January Quiz

Florence Thompson, a Geographer with the U.S. Geological Survey Texas Water Science Center, was the first to correctly guess the December hydrography quiz as Lake Winnebago in Wisconsin. See ftp://nhdftp.usgs.gov/Quiz/Hydrography53.pdf. Florence has been a geographer at the USGS-Texas Water Science Center in Austin, Texas for the last four years. They have a group of about 10 geographers working on a variety of water related GIS projects. For examples see http://tx.usgs.gov/GIS/. One of the big projects Florence has been working on recently is a 1:1 million-scale dataset of networked streams and waterbodies of the U.S. for the National Atlas and Global Map. NHD is the primary source for data so she's spent a lot of time with it. Over the course of the project they've used the network functionality in scripts and custom tools for selecting, modifying, and attributing streams. The NHD has been an invaluable resource.

David Asbury sent this in from Wikipedia: Lake Winnebago is part of the Winnebago Pool, "a group of interconnected lakes including Lake Winnebago, Big Lake Butte des Mortes, Lake Poygan and Lake Winneconne. These lakes combined encompass over 166,000 acres (672 km2) and account for nearly 17% of the total surface water area in Wisconsin (not counting the Great Lakes). They generally have a water surface elevation of about 746, some 170 feet above the Bay of Green Bay which is about 39 river miles to the northeast. The primary feed waters of the Winnebago Pool are the Wolf River, Fox River and Fond du Lac River. Lakes Winnebago and Big Lake Butte des Morts (along with Little Lake Butte des Morts to the northeast) served as part of the Fox-Wisconsin Waterway." (1) The waterway was once "one of the principal routes used by travelers between the Great Lakes and the Mississippi River."

Others with the correct answer were (in order received): Craig Johnston, Barb Rosenbaum, Chris Markuson, Mike Eberle, Tom Denslinger, Richard Patton, David Straub, David Asbury, Jennifer Campbell-Allison, Nancy McWhorter, Al Rea, and Jerry Sullivan.

This month's hydrography quiz can be found at ftp://nhdftp.usgs.gov/Quiz/Hydrography54.pdf. It's the largest lake in the driest state. Also can you tell where the water is draining? Send your guess to jdsimley@usgs.gov. Thanks to Kenton Curtis for the quiz.

Upcoming NHD Training

February 9-11, 2010: Conflation - Madison, WI, Contact Elizabeth McCartney (emccartney@usgs.gov) or Ann Schachte (Ann.Schachte@Wisconsin.gov
March 22, 2010: Applications - New York City, N.Y., Contact David Anderson (danderson@usgs.gov) (This event subject to change)
June 2–4, 2010: Conflation - Manhattan, Kansas, Contact Tim Hines (thines@usgs.gov) or Ingrid Landgraf (imlandgraf@usgs.gov)

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