NSGIC 3DHP FTN Monthly Forum:

Question and Answers

Piloting 3DHP: Uncharted Waters – finding water in elevation data

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Participant Questions:

Are these latest pilots also updating (conflated to) the NHD / WBD or kept in a separate 3DHP?

Data from the TX and OR pilots will end up in the NHD, and we may conflate the PA and SC data. But the objective is a new 3DHP data model that is based on the OGC Surface Hydrography Features model. This model is being used internationally for representing hydrographic data.

How do you envision performing EDH and integrating it into the NHD for urban or semi urban environments?

We've done some urban project work, including Los Angeles and Washington D.C. The OGC Surface Hydrography Features Model is catchment based –connecting the intake and the outfall logically versus necessarily mapping a physical connecting culvert or pipe. That opens up more possibilities in urban environments. The model also includes attributes for mapping conditional flow such as the activation of multiple outfalls for a storm event. This will greatly facilitate the mapping of urban hydrography. Unfortunately, we are likely not able to include this feature on the first generation of 3DHP products but it is useful to know it is an option for future products.

Within the specification documents, are you urging the contractors to use an algorithm derived in-house or are they developing similar algorithms on their own? Are these algorithms available for review/use?

Starting about ten years ago we explored multiple EDH techniques - each had promise but none was not quite right for every environment. As such, the EDH specifications do not specify how the work is done but instead what the product must be. Contractors have developed independent workflows with some overlap in using common practices such as the use of geomorphons or remote sensing feature detection. Innovation is a key component of the program. We also encourage contractors to share information about their processes through presentations and client coordination.

One of the great values of NHD is to be able to relate data through events. Is 3DHP going to maintain that critical feature?

Absolutely.

Are there special rules/processes for dealing with internally draining depressions/potholes that do not connect with other downstream features? Thinking about the Prairie Pothole landscape of the Dakotas.
Yes. The OGC model use of related tables works better than a network of geographically mapped connections. The prairie pothole region is unique and would be a great future test case.

Is there a list of data 'use cases' for each of these pilot projects? The projects appeared to represent a really broad range of regions, hydrography, and partnerships (which is great!). Just curious on what the local, state, NGO, private sector impact will be for the data and if that is being taken into account with the pilots.
Each project does have a partner. In SE TX, an entire consortium working on water management and flood response. Other project teams are smaller but still diverse. Project AOIs were selected primarily for diversity of landscape to better understand issues with EDH in different environments.

I know the USGS is working to develop some products to evaluate data submissions (e.g. using GMI to evaluate geometries). Are there any plans to publish the workflow(s) for generating these products? As a data producer, I would fine that incredibly helpful.
We will consider publishing a generalized process for the community but best techniques are very specific to the geography. We generally don't share specific inspection routines as they can be bypassed if widely known.

For large areas with variable terrain, would it make sense to classify different terrain types in an attempt to generate algorithms that are optimized for each terrain class?
Probably, especially in Alaska where one class does not work for the entire HUC. There is a definite need to re-parameterize across different sub-regions.

Do you intend to map to the full extent of a watercourse and not being restrained by historical mapped extents of 'perennial' and 'intermittent' features? It would be good to restraining the mapping of features that contain water however it scares state agencies as it will impact regulations and applications. I just like to start out calling them a water conveyance feature first, a feature captured by lidar.
Lidar is good at showing depressions. It's terrible at telling you if there is water in that depression or valley. We are actually over-mapping in those areas in an effort to move away from hard classifications of 'intermittent', 'perennial', etc. toward a continuous value system, e.g. wet 365 days/year, 250 days/year, etc.

How do you envision the transition from NHD (including NHDPlus HR) to 3DHP? Periods of using and maintaining both or fast change?
Our intent is to make it a fast change. We are running flat out to maintain all of these products as well as bring 3DHP online and develop QA/QC capabilities. But at some

point the older products will go static because we simply can't maintain them as we shift energies to 3DHP.

Does the inspection process include correcting minor errors or just rejecting components of the data?

At this point there are no geometric corrections to the data. There are some attribute edits, but it's generally a pass/fail with respect to critical errors and tolerances

Will reach mapping be linked to wetland or waterbody mapping? In NC we have many conveyance features that begin as seeps or slope wetlands that would not be captured as a channel by LiDAR.

We are exploring concurrent mapping of NHD and NWI in Alaska. It's still early in the project but the hope is that NWI would be a wetlands component of the 3DHP product, that they would logically map to one another.

What can state GIS programs do now to get ready for the impending BAA (whenever that is)?

The same as you do for the 3DEP BAA. Find and organize stakeholders. Build partnerships. Communicate the need for and value of updated and improved hydrography.

I think I heard you say early into your presentation that hydro enforcement is recognized as a needed component. That subject has been a hot potato for to many years in my opinion. Can you explain a little more detail about the role of enforcement in EDH?

Many of the EDH workflows include a hydroenforcement step, but we also see that as a product of the process. Once monotonic EDH line work is drawn we use it to smooth out the channel areas to eliminate noise such as brush or rocks in the channels.

Interview Questions:

What has most surprised you during this effort?

Nothing, honestly. It was all part of the learning process.

What surprised you during this process?

How difficult this turned out to be. When we started in 2015, I did not think it would take us 7 years to achieve an operational model, to move from a cartographic model to a fully implemented digital resource. Also, the hydrography itself amazes me, all kinds of unique and interesting things to work into an abstract model like wagon wheel urban systems.

Is there anything you would have done differently, any key lessons learned?
In a macro sense, it would have been easier if we had done some of the development work earlier and had these processes in place as 3DEP surged. It would be great to have built a workflow to create hydrography data as part of the 3DEP data collection. Instead, in some cases, we're going to be deriving EDH from older 3DEP.

What resources, e.g. data, tools, documents, SMEs, etc.) have you found of most value to the process?
People. The individuals involved in deriving and developing the EDH specifications. The growing staff at NGTOC with expertise in Hydro and 3DEP- they bring different skills and tools.

What new resource(s) would you recommend for development to assist the process or aid participants?
Partnerships. We need partners with the expertise and energy to feed development and drive data acquisition. We also need a community of users to apply and promote the product.