

3DHP FTN Monthly Forum:

Question and Answers

Harmonizing 3DHP Hydrography, NWI Wetlands, and CCAP Land Cover Data in Wisconsin

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Participant Questions:

Please expand on how the 30-meter datasets inform the 1-meter data.

The 30-meter vegetation classifications will be used for example to distinguish evergreen and deciduous classes into sub classes. We will classify the high-resolution imagery into evergreen and deciduous polygons with the fraction of evergreen and deciduous trees in that polygon, then used a series of spatial overlays to bring the 30 m data into the high-resolution map. We are not planning on a new classification of Landsat because that work has already been done by other organizations.

Do NRCS Soils data factor into OneMap?

Soils are used to help classify the wetland classes for both the CCAP and NWI. It is possible that OneMap products could be used to help any future soil survey mapping, but this is beyond the scope of this project.

Discuss any challenges integrating the NWI data with new EDH data.

We're utilizing the EDH to support the development of the NWI data. Updating the NWI with the more detailed hydrographic data. There are challenges since the definition of some classes differ between protocols. This is one of the goals of the project to understand the differences and work with the agencies responsible for the datasets on how they can be integrated.

One challenge we are working on is how to represent coastal wetlands along Green Bay shoreline. The 2020 lidar was flown during near record high water levels and the boundary of the Bay reflects that, covering a large area normally showing extensive wetlands. The wetland mappers at St. Mary's will be using several different years of leaf-off imagery to distinguish "normal", longer term hydrologic conditions and wetland vegetation occurrences. Changing the boundary of the bay to represent a lower lake level also may also impact the major river polygons entering the lake and their elevation values.

Please describe multiyear trends in automating your workflows. How fast are these technologies developing. How automated do you expect it to get?

As the source data improves, the ability to automate will improve. There will always be a manual component. The ability to scale data processing is improving. Don't try to do any of this without lidar, lidar is fundamental and there are opportunities to automate as lidar improves.

The process uses automation and AI, but each dataset requires some manual review and editing to get to the standards required for the dataset. The Green Bay region has some very flat, extensively modified landscapes that require some local knowledge to understand and map hydro properly.

One of the benefits of OneMap is to reduce the overall time to create these layers, by doing them in sequence, rather than separately over a course of years or decades in some cases. The sequence means that there is no duplication of manual editing and review of the same features in the three datasets.

Do you have any plans to address issues with identifying seasonal wetlands from landcover data, i.e. small tree covered wetlands?

We are adhering to federal NWI mapping standards and for the NWI analysis will classify 'seasonal' wetlands as relevant. Analysis beyond the standard NWI classification will not be undertaken by this project, however the data stack produced by the program will provide the necessary data to do deeper analysis such as looking at vernal pools, etc. We also think that the data stack can be used to identify restoration potential for wetlands and other cover types, although not part of the current scope.

Jim G., have you assessed the cost per HUC 8 watershed or cost per acre (based on your deliverables)?

We have a range for the estimate. We do know that the integration of the data will be less expensive than approaching the datasets individually and the larger the area, the lower the cost. We'll have a better estimate once the work is complete.

A major goal is to get as close as we can to "analysis-ready" data in order to save time and money on the user end – i.e. not waiting for years for a missing layer, or having to work with a mostly incompatible layer. The last year of the Brown County pilot project will examine applications of the data and look for tangible benefits that can be quantified.

Can you discuss the challenges with "harmonizing" different Lidar data? I've heard that differences in quality levels and the sensors used can be difficult to overcome.?

It is difficult. You have to basically go back to the point cloud. You are limited by your lowest resolution data.

The Wisconsin lidar data collection is especially challenging because of the emphasis on locally led acquisitions, which results in a patchwork of dates, coordinate systems,

quality levels and conditions. We are relying heavily on NV5 to harmonize our two main lidar sets, a 2018 QL2 in Outagamie Co and the 2020 QL1 in Brown. So far, the bare earth and hydro-enforced DEMs of the three HUCs do not appear to have any major discontinuities, but there will be limitations on what we can do with the QL2 point cloud to extract vegetation, as compared to the much denser QL1 data.

I'm curious to learn more (at a high level) how you are managing your harmonization work with QL2 and QL1 lidar and the DEM resolution these QL's support. Leading into getting an understanding of a consistent DEM resolution for water feature development?

We are working with a 1-meter resolution DEM since there is an EDH requirement that the hydrography be derived from a 1-meter DEM. This also makes the source data for the program uniform across QL1 and QL2 datasets.

From a local perspective we use the 30 cm QL1 DEMs and intensity images for other uses such as looking for culverts, head cutting, drainage channels in woods and wetlands, and visualizations. These improve our ability to manually edit the linework.

We've blanketed the state with QL1 and see that 3DEP next gen now. States are struggling to determine how 3DHP will support state agencies, priority so that there is buy in.

It's a balance of trying to make a good local product that works nationally. One of the things that we are working towards is a national seamless DEM based on 3DEP data, a one-meter product. As next gen 3DEP evolves, 3DHP will evolve as well.

In Wisconsin, we are primarily a locally led community because of the way GIS data is funded in the state. Because of this, we especially need to make sure the harmonized products and derivatives improve the workflows of local planning, zoning, and conservation departments. State agencies struggle with the cost of updating their basic GIS data with new imagery and lidar data. We are hoping that the OneMap concept can not only be applied to making the federal data layers more aligned, but we will also investigate how to better harmonize the local/state coordination, including funding arrangements that can take advantage of opportunities like 3DEP, 3DHP, CCAP, etc.

Jim G - Any thoughts on the costs of creating new applications to consume the OneMap data?

We have lots of plans to apply and test the data but no estimate of costs. The biggie for us is to determine the feasibility for developing climate vulnerability tools, e.g., where is the water going to go, what changes can we make to infrastructure or land use to reduce flooding, etc.

Is the plan to make these datasets available in cloud optimized formats, i.e., COGs, COPCs, STAC, GeoParquet.?

Each of these formats can be generated. Different agencies have different format requirements, but all can be derived.

Once the data is approved, the federal products will be delivered through standard access methods and formats. For users in Wisconsin, because the common denominator here is water, the final products, derivatives, and critical intermediate layers (like hydro-enforced DEMs) will likely be made available by HUC12 or HUC10s in Geodatabase form, much like Ag Conservation Planning Framework (ACPF) watersheds, and combine vector and raster datasets based on geography, rather than solely based on the data layer. Again, this emphasizes making it easier for users to start working with the data collection rather than spending too much time looking for missing pieces, clipping, processing, etc.

For more project information

- (list any URLs you would like to include) Sorry, none so far.