Drainage Area: GL, VPU: 04 - Release Notes

12/01/2018 – Updated and New Data

Time of Travel and Related Attributes: The new and updated data is included in new versions of the NHDPlusAttributes and EROMExtension components. Specifically,

> EROM mean annual and mean monthly statistics have been re-computed with the following changes:
>> Removal of upper and lower limits for reference gage regression adjustment,
>> Correction of reference gage regression equation, and
>> Reference gage regression included in all flow statistics.
>
> PlusFlowlineLakeMorphology and PlusWaterbodyLakeMorphology tables have been updated based on the new EROM mean annual flows.
>
> PlusFlowlineVAA mean annual time of travel (TOTMA) has been updated based on the new EROM mean annual flows. Path time (PathTime) attribute has been added and populated based on the updated TOTMA values.

09/21/2017 – Updated Components

The NHDPlusAttributes has been updated. Various VAAs in PlusFlowlineVAA for Coastline features have been standardized.

09/06/2016 – EROM Component Updated

VPU 04 (Great Lakes). 165 Flowlines did not properly use the "Supercatchments", which resulted in significant under estimation of flows and drainage areas on these flowlines. The flowlines are on the Detroit, Saint Claire, Niagara, and Saint Lawrence Rivers.

05/10/2016 – Updated Components

The improved HUC12 downstream pointers from the February 2016 WBD Version were updated in the NHDPlus WBDSnapshot. When a correspondence between the two versions could be determined for both the HUC12 and the downstream HUC12, the downstream pointer was updated.

01/05/2016 – Updated Components

EROM Mean Annual and Mean Monthly flow estimates have been re-run to correct incremental flows to be the sum of the incremental flows upstream and on the flowline. EROM velocities were updated to provide velocity estimate only for flowing waters. EROM velocities are now set to -9998 (missing value) in all water bodies except swamp/marsh.

Cumulative drainage areas in NHDPlusAttribute component tables have been corrected to include the super catchments in VPU04

07082015 – Updated Components

The WBDSnapshot was revised to correct the values in the Acres field. The NHDSnapshot and NHDPlusAttributes were revised to correct values in FType/FCode in a handful of features.

1/30/2015 – Revised Component

The VPUAttributeExtension has been updated to include accumulated mean annual and mean monthly runoff files.

04/02/2014 – Replacement components

Six components have been replaced with new versions: NHDPlusCatchment, NHDPlusAttributes, NHDPlusBurnComponents, VPUAttributeExtension, EROMExtension, and VogelExtension. A single bad catchment was discovered. This catchment should include drainage from Canada. After adding the Canadian portion to the catchment, the changes rippled through catchment attributes, cumulative attributes, and flow estimates, among others. In addition to the catchment-related changes, a number of additional cumulative attributes have been added to the VPUAttributeExtension component.

02/12/2014 – Replacement components

Four components have been replaced with new version: NHDPlusAttributes, VPUAttributeExtension, EROMExtension, and VogelExtension. These components changed due to the implementation of the super catchments into the cumulative drainage computations.

1/21/2014 – New Data Release

The EROMExtension was enhanced to include mean monthly flow estimates. See NHDPlusV2 User Guide for additional information.

12/07/2012 – Replacement components

Three NHDPlusV2 components are replaced with new versions: NHDSnapshot, NHDPlusBurnComponents, and NHDPlusAttributes. These replacements represent some changes in NHDFlowline ReachCode values and the inclusion of an NHDReachCrossReference table that tracks ReachCode changes from NHDPlusV1 to NHDPlusV2.

9/26/2012 – Temporary Attribute Cleanup

During NHDPlusV2 processing and subsequent QAQC, some temporary attributes were added. Some of these attributes were not deleted and were inadvertently included in the public release. These extraneous attributes <u>do not</u> affect the usability of the data, but they do violate the official data model and may cause issues with future NHDPlusV2 tools. Users are encouraged to download the new components. In this VPU, the replacement zip files are:

      NHDPlusV21_GL_04_NHDSnapshot_05.7z
      NHDPlusV21_GL_04_WBDSnapshot_04.7z
      NHDPlusV21_GL_04_NHDPlusCatchment_04.7z
      NHDPlusV21_GL_04_NHDPlusBurnComponents_05.7z

9/19/2012 – NHDPlusV21_MS_10L_10b_Catseed_02.7z

Wrong grid in package replaced with correct grid.

9/13/2012 – Update to VPUAttributeExtension Component

An error was discovered in the ArcGIS->Spatial Analyst->Zonal-Statistics-as-Table geoprocessing tool. The error created incorrect results in the catchment allocation and accumulation tables in the VPUAttributeExtension folder. After implementing a work-around, the tables were recreated and are posted as NHDPlusV21_GL_04_VPUAttributeExtension_04.7z.

6/1/2012 - Initial Release Notes

NHD Edits

Region 04 received the standard set of edits described in the NHDPlusV2 User Guide. In addition, artificial paths in the rivers that connect the Great Lakes were edited/added to ensure that the lakes are connected.

Special handling of Great Lake grid cells and the LandSea Polygon

Region 4 is unique, in that it is the only hydro region with flowlines coded as FType = "Coastline" that do not represent features that define an oceanic shoreline. These coastline features define the shoreline of the Great Lakes. This data condition creates some challenges with the NHDPlus BuildRefresh production process, in particular, the HydroDem cell values for the lakes themselves. To simplify the handling of this scenario, it was decided to impose NoData values for the open surface water cells of the Great Lakes. These Nodata cells values are also reflected in the NHDPlus HydroDem derivative products, fdr and fac.

Related to this topic of interior coastlines, the NHDPlus BuildRefresh production software is designed to enforce a uniform vertical drop distance for cells representing "ocean" areas in the LandSea Polygon. This enforcement is done when NHD flowline features coded as FType = "Coastline" are detected by the software for the RPU/VPU being processed. In this scenario, the software expects at least one ocean polygon and one land polygon in the NHDPlus LandSea feature class. This special handling of ocean areas is not applicable for the Great Lakes as the open water area is intended to be NoData. Therefore, to avoid issues with the software two triangular shaped polygons for each RPU area were created in the LandSea polygon for Region 4 to enable the software to function correctly. Within each RPU, the LandSea feature class has one "ocean" polygon placed in a Great Lake, and one "land" polygon.

Sinks placed in empty HUCs

Being the first hydro region to enter NHDPlus production, data condition rules had not yet been standardized. This affected a decision made in region 4, for HUC 12s not classified as "Closed Basin" in the WBD that did not have NHDFlowlines within these areas (termed an "empty huc"). Empty HUCs left as a closed system in the Wall feature class in the DEM hydro-conditioning process, would fill up to one elevation, until it spills over to the lowest elevation of the surrounding HUCs. The filling of an empty HUC is undesirable as it removes the DEM topography within the HUC and the assignment of its area to a surrounding HUC may also be in error.

At the time of production for region 4, the action to alleviate this filling of an empty HUC was to identify a surface water feature to add to the BurnAddLine feature class to breach a wall feature so that the area in the HUC 12 did not fill up erroneously, and to ensure the proper drainage.

In some cases, no surface water connection could be identified from a topographic map or aerial photo. Therefore, an assumption was made that because no surface water feature could be identified, those empty HUCs would get a sink(s) placed within them, which in essence creates a "closed" system. This was done in Region 4 for 3 "empty" HUC 12s and includes: 040601050401; 040700070201; and 040700070401.

Catchment/Burn Settings

The following describes unique settings of Burn and Catchment properties in BurnLineEvent .

1) Flowline ComID 11946403 is a pipeline feature that delivers water to a hydro-electric turbine down gradient of a reservoir. The pipeline is set to "N" for the Burn and Catch fields in BurnLineEvent. Eighty percent of the outflow of this reservoir travels through the pipeline on an annual basis. Twenty percent of the outflow travels over the dam spillway into the natural drainage path. These divergence fractions are included in the NHDPlus DivfracMP.dbf.
2) Several locations along the Erie Canal in New York are elevated above the surrounding terrain. Streams that intersect the canal here are culverted under the canal.The catchment and burn properties have been set to "N" (no) for the flowlines representing these elevated canal sections
3) Flowline ComID 904130023 is a pipeline culvert feature under an airport runway. To ensure upstream connectivity in the fdr/fac grids, but not have a catchment generated; this flowline was set to "Y" for burn and "N" for catchment.
4) At the edge of the VPU, conflict flowlines with the WBD region boundary have been set to "N" for catchment and burn.

Super Catchments

A dataset known as "Supercatchments" was developed to enable representing the entire cumulative drainage areas above the rivers that drain four of the Great Lakes, i.e. the St. Mary's River which drains Lake Superior, the St. Clair River, which drains Lake Huron, the Niagara River, which drains Lake Erie, and the St. Lawrence River, which drains Lake Ontario. The supercatchments were composed from the outer catchment boundaries on the U.S. side, combined with boundaries of hydrologic units for the Canadian side. Most of the Canadian boundaries came from the NHN Index, Edition 5.0, downloaded from this web site:

http://www.geobase.ca/geobase/en/data/nhn/national-index.html

In one area the NHN Index conflicted with the Canadian Fundamental Drainage Areas (FDA) from the http://www.geogratis.gc.ca/geogratis/en/index.html web site. The FDA dataset was used for the boundary in that area instead of the NHN Index.

Canadian NHN Hydro

The Canadian NHN hydrography datasets were downloaded from
http://www.geobase.ca/geobase/en/data/nhn/index.html for areas that drain to NHDPlus flowlines, but not
for the areas that drain to the Great Lakes themselves. These lines were used in the BurnAddLine feature
class to condition the HydroDEM in those areas.

WBD HUC Coding

In the WBD, HUC4s "0111" and "0201" have been re-coded to "0415". The NHDPlusV2 processing for
these re-coded areas was already underway when the changes were detected and, given the timing, it was
not feasible to re-process those areas or to physically move data from one NHDPlusV2 workspace to
another. However, the NHD snapshot Reachcodes on both NHDFlowline and NHDWaterbody features
were adjusted to reflect the HUC8 codes in the 2/1/2012 version of WBD. This means that the
NHDPlusV2 workspaces for regions 01 and 02 contain some NHDFlowline and NHDWaterbody features
will have reachcodes that begin with "0415". If and when NHDPlusV2 is reprocessed for regions 01, 02,
and 04, these issues will be addressed.

EROM

See Appendix A of the NHDPlus V2 User Guide for a detailed explanation of the EROM parameters.
EROM Flow and Velocity estimates are mean annual values.
The time period for these estimates is 1971 to 2000; the runoff, temperature and precipitation grids are for
this time period.
For gage adjustment and Reference Gage Regression, gages must meet the following criteria:
1. A minimum of 20 of the 30 years (1971 to 2000) of complete flow records.
2. Gage versus NHDPlus drainage areas must be within 0.2 (+/- 20%)
Upstream gage drainage area proportion is 0.5 (50%)
Excess Evapotranspiration default coefficients are 0.3 and 0.5.
Gage sequestration proportion is 0.2 (20%)
Because of greatly increased QAQC errors in the Excess Evapotransipiration step, this step is not run in
the following VPUs: 09, 10U, 17, 12. The reasons for this problem are under investigation.