Drainage Area: MS, VPU: 10U - 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.

09/20/2016 – Updated NHDSnapshot

Corrected a handful of incorrect FType/Fcode values and WBAreaCOMID values.

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.

07/08/2015 – 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.

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.

9/21/2012 – 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 do not 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_MS_10U_NHDSnapshot_04.7z
NHDPlusV21_MS_10U_NHDPlusAttributes_05.7z

8/27/2012 – New Release of ALL Components

Due to a variety of packaging issues, 10U all components have been updated.

8/22/2012 – Initial Release Notes

Missing NHDPlusV21 Components

This VPU is being released without the NHDPlusFilledAreas grids. These will be released at a later date.

Harmonized NHD and WBD data in Canada

High-resolution NHD data for the 8-digit HUCs along the border, including harmonized Canadian NHN data, were used in BurnAddLine for hydrography in, or connecting to, Canada. The WBD included harmonized boundaries for those 8-digit HUCs, as well, and these were used as walls.

Many isolated lakes from the harmonized high-resolution NHD were included in BurnAddWaterbody for Canadian areas of "prairie potholes". These were coded as closed lakes, and sinks were inserted for each of them. Rather than using all the isolated lakes in the harmonized high-resolution NHD, a size criterion was applied, removing the smaller lakes, to approximate the lake density present in the medium-resolution NHD on the U.S. side of the border.

The area that drains to Pakowki Lake was included in the NHDPlus Version 1 catchments. Upon closer inspection and consultation with Conrad Wyrzykowski of Agriculture Canada, it was determined that this area would not fill up and connect to the Missouri River Basin except under extremely wet conditions not consistent with the current climate. This area is considered "dead" drainage by Agriculture Canada. This area is not included in the NHDPlus Version 2 catchments.

A number of catchments were generated for sinks in Canada in the northern part of Raster Processing Unit (RPU) 10i, where drainage is to the north, away from the U.S. Although these catchments are not contiguous with the rest of the NHDPlusV2 catchments, they do not pose any problems with using the catchments.

Catchment/Burn Settings by the USGS NAWQA program

In VPUs 10U and 10L, the BurnLineEvent Catchment and Burn attributes are set based on feedback from the USGS National Water Quality Assessment (NAWQA) Regional Assessment program. Many of the features set to either no Catchment and/or no Burn are Canal/Ditch features used for irrigation or miscoded as Stream/River in the NHD.

Catchment/Burn Settings by the NHDPlus production team

Aside from the many Catchment and Burn requested by the NAWQA program, additional Catchment and Burn properties were made by the NHDPlus production team as follows:

- Within the Lake Oahe Reservoir along the Missouri River, there is a minor outlet spillway that is incorrectly designated as the main outlet of the reservoir. This occurred because the true main outlet (ComID 940130432) does not lead back to the Missouri River due to missing geometry in NHD. The Catchment and Burn attributes for the true main outlet were set to "N" (no).
- Within a WBD closed HUC12 (101101011602 – White Lake), a portion of an NHD isolated network was observed to be flowing in the wrong direction. The Catchment attribute was set to "N" (no) for the NHDFlowline features with the wrong coordinate ordering and all NHDFlowline features flowing to these. The Burn attribute was set to "Y" (yes) to ensure these drainage paths flow towards White Lake. A sink was manually placed at the end of ComID 21534452 so that all drainage within the closed system ends at White Lake.
- The NHD has an inappropriate isolated flowline network within HUC 100500020806. The Catchment attributes for the isolated network were set to "N" (no). The Burn attribute was set to "Y" (yes) to ensure the drainage went to the proper downslope flowline (ComID 12342294),
- A closed system identified in the WBD is connected by the NHD in error by a Connector flowline (ComID 12341094). To resolve these differences between the WBD and NHD, the connector flowline is set to "N" for both Catchment and Burn attributes. All upstream flowlines draining to the Connector were hydro-enforced (Burn = "Y" (yes)); no catchments are delineated for these (Catchment = "N"). With a sink feature created in closed HUC12 100500020702, a non-contributing area catchment for the sink was delineated. These actions ensure this closed system does not get allocated to the NHDFlowline network.
- The NHD makes an inappropriate connection of HUC12 100401020402 (Big Lake), identified as a closed basin in the WBD. To resolve these differences, the connector flowline (ComID 12388670) is set to "N" for both Catchment and Burn properties. All upstream NHDFlowline features draining to the connector were hydro-enforced (Burn = "Y") but no catchments are delineated. A sink was added for Big Lake which is the terminating drainage point for the closed HUC12 and a sink catchment was created to ensure this drainage area remains isolated.
- Similar to the previous two examples, an NHDFlowline feature (ComID 12603797) makes an incorrect connection out of a closed WBD HUC12 100402020105 (Lake Thom). NHDFlowline

12603797 is set to "N" for both Catchment and Burn attributes. The NHDFlowline features upstream of 12603797 are set to "Y" for Burn and "N" for Catchment. A sink catchment for Lake Thom is created to ensure this area remains isolated.

- Along the border of the 10U VPU, NHDFlowline features that are in conflict with or outside of the 10U boundary as defined by the WBD, are set to "N" for both Catchment and Burn properties.
- Six NHDFlowlines coded as Pipeline were visited, resulting in setting five of these to "N" for the Catchment attribute. The sixth pipeline feature had both Catchment and Burn attributes set to "N".

Unresolved drainage connectivity conflicts between NHD and WBD

There are 5 WBD closed HUC12s that are connected by the NHD. It could not be determined which dataset was correct (WBD or NHD). Therefore no modifications were made to isolate these HUC12s from the NHDFlowline networks. The unresolved differences occur in the following HUC12s: 101301030902, 101301030903, 10070004086, 100500050106, and 100301021103.

HUC 2 WBD Reassignment

Note that some large areas of WBD have been re-coded with Hydrologic Unit Codes (HUC codes) that differ significantly from previous HUC codes. This occurred in VPU 09 and 10U where HUC4 1001 was renumbered to HUC4 0904. The NHDPlusV2 processing for this re-coded area was already underway when the changes were detected and, given the timing, it was not feasible to re-process this area or to physically move data from VPU 10U to VPU 09. However, the NHD snapshot Reachcodes on both NHDFlowline and NHDWaterbody features were adjusted to reflect the HUC8 recoding.

BurnAddLine Notes

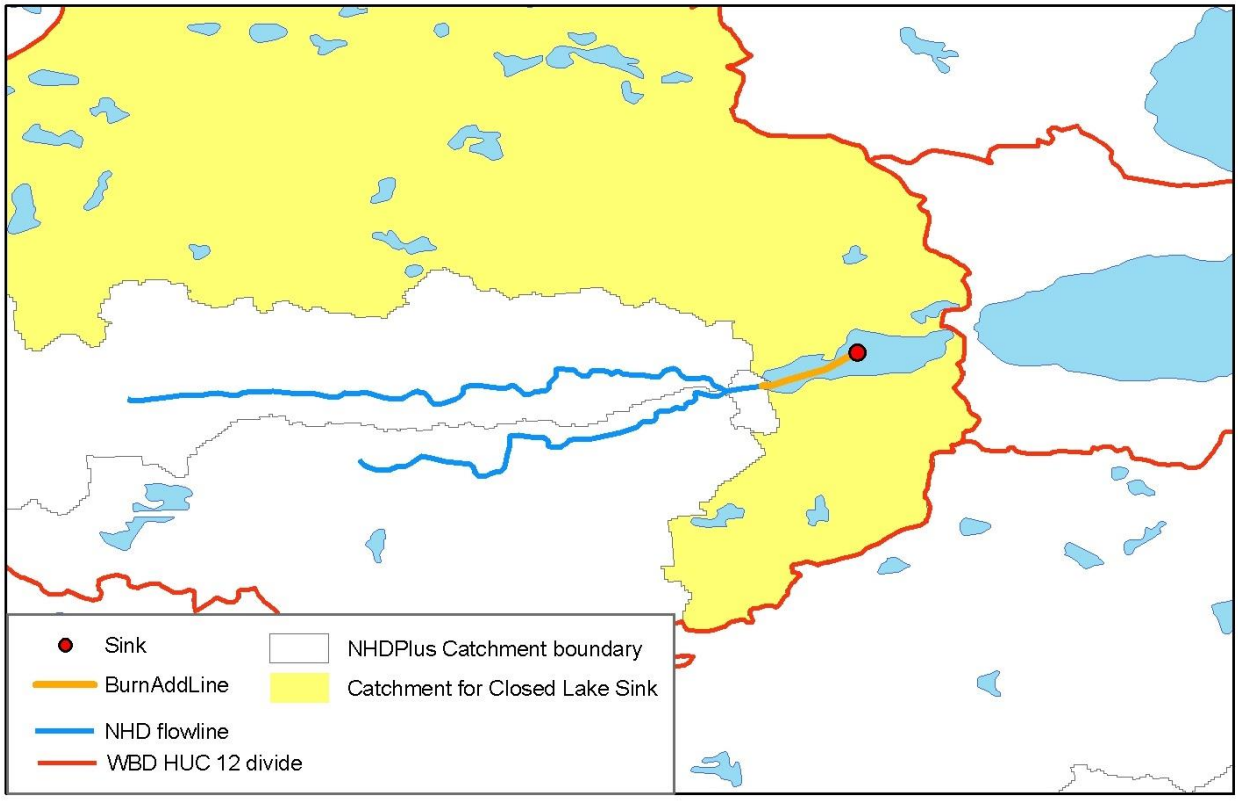
In addition to Canadian hydrography in BurnAddLine (see discussion in these release notes: "Harmonized NHD and WBD data in Canada") additional vector lines were collected for hydro-enforcement purposes in the US. Below describes the various data conditions for these BurnAddLine features:

- Some non-closed WBD HUC12s did not contain any NHDFlowlines. These are referred to as "empty HUC12s". Drainage paths were added in BurnAddLine from high-resolution NHD or other sources to breach the WBD divides at the HUC12 pour points thereby ensuring proper down-slope drainage of the HUC12. During the production process of Region 10U, the time consuming addition of BurnAddLine features was abandoned to favor removing the WBD divides from the Wall feature class. This processes involved identifying the boundary between the empty HUC12 and the next downstream HUC12 and removing that boundary line from the Wall feature class. Region 10U employed both methods described for dealing with empty HUC12s.

- There are several lines in BurnAddLine that represent NHDFlowlines from the downstream VPU 10L. These flowlines were added to BurnAddLine in 10U to constrain the catchment delineations at the inter VPU connection point. GridCode values for VPU NHDFlowline

features are assigned when the VPU is processed, Since 10L had not yet been processed, the GridCode values in BurnAddLine features are temporary values.

- There are a few cases where isolated NHDFlowline networks, which should drain into a closed lake, do not quite touch the lake feature's shoreline. Some effort was made to connect these isolated networks to the closed lake sink by adding connector features in BurnAddLine from the terminal end of the isolated network to a sink in the lake. The BurnAddLine and Sink features ensured that NHDPlusV2 watershed delineation could be performed for the closed lake feature and the closed lake received a proper catchment delineation. The figure below illustrates an isolated network. A BurnAddLine connector (orange line) digitizied joins the terminal end of the isolated network to the closed lake Sink. The catchment for the closed lake is highlighted in yellow. Due to limited resources, this technique was not applied uniformly in VPU 10U.



Points of Addition and Removal

There are several points of water additions and removals in the PlusARPointEvent/PlusFlowAR tables. This information was provided by staff from the USGS NAWQA Regional Assessment program for the Missouri River Basin.

Enhanced Unit Runoff Method (EROM)

See Appendix A of the "NHDPlus V2 User Guide" for a detailed explanation of the EROM parameters.

EROM Flow and Velocity estimates are for 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. NWIS reported drainage area versus NHDPlus drainage area, for the gage, 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 poor QAQC statistics in the Excess Evapotranspiration step, this step is not run in the following VPU 10U. The reasons for the poor QAQC statistics are under investigation.