



# NHDPlus High Resolution User Guide: Data Dictionary

Draft version for NHDPlus HR Beta  
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**DRAFT – Subject to Revision**

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*NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusEROMQAMA (table)*

*NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusEROMQARpt (table)*

*NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusIncrLat (table)*

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*NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusIncrROMA (tables)*

*NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusIncrTempMA and NHDPlusIncrTempMMmm (tables)*

*NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlus\NHDPlusIDGridCode (tables)*

## NHDPlus HR Raster Layers

*VRNHDPlusRasters<vpuid>\cat.tif*

*VRNHDPlusRasters<vpuid>\catseed.tif*

***VRNHDPlusRasters<vpuid>\elev\_cm.tif***

***VRNHDPlusRasters<vpuid>\fac.tif***

***VRNHDPlusRasters<vpuid>\fdr.tif***

***VRNHDPlusRasters<vpuid>\fdroverland.tif***

***VRNHDPlusRasters<vpuid>\filldepth.tif***

***VRNHDPlusRasters<vpuid>\hydrodem.tif***

***VRNHDPlusRasters<vpuid>\shdrelief.jp2***

***VRNHDPlusRasters<vpuid>\swnet.tif***

Domains

Purpose Codes and Descriptions

Other NHDPlus HR Domains

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**Note for Draft Data Dictionary:** This draft data dictionary is intended to become part of the NHDPlus HR User Guide, and contains some references to other sections, which are not yet available.

## NHDPlus HR VPU Feature Classes and Table Descriptions

The vector feature classes and attribute tables for each Vector Processing Unit (VPU) are distributed as a file geodatabase named NHDPlus\_H\_<vpuid>\_GDB.gdb. The attribute field names in the tables below are shapefile compliant (i.e. 10 characters or less), however, in the geodatabase many fields have an alias which provides a more descriptive name.

### *NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlus\NHDPlusCatchment (polygon feature class)*

**Description:** Contains a catchment polygon for either an NHDFlowline feature or a NHDPlusSink feature.

**Note:** Some polygons may be multipart polygons.

Simple feature class		Geometry		Polygon			
<b>NHDPlusCatchment</b>		Contains M values	No	Contains Z values	No		
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
NHDPlusID	Double	Yes			0	0	
SourceFC	String	Yes	<i>SourceFeatureClass</i>				20
GridCode	Long integer	Yes			0		
AreaSqKm	Double	Yes			0	0	
VPUID	String	Yes					8
SHAPE_Length	Double	Yes			0	0	
SHAPE_Area	Double	Yes			0	0	

*Contains a catchment polygon for a NHDFlowline feature or a Sink feature*

Catchment area in square kilometers  
 Source Feature Class ("NHDFlowline" or "NHDPlusSink")  
 Unique, compact identification number for a Catchment  
 Unique identifier of catchment  
 Vector Processing Unit Identifier

### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusDivFracMP (table)***

**Description:** Contains specifications about the fraction of a cumulative attribute to be routed through each path in a divergence. The NHDPlusIDs in this table represent NHDFlowline surface water features that, based on the NHDPlusFlow table, form a network divergence (i.e. a flow split). All the paths in a given divergence are identified in this table by a unique NodeNumber.

All divergences are represented in this table. If DivFracMP values are specified, they are used in the divergence routing method of all NHDPlus accumulated attributes, such as drainage area. Divergences where no information is known about the fractional split have DivFracMP.DivFrac = -9998 for all paths in the divergence. In this case, the Divergence Routing method uses the PlusFlowlineVAA.Divergence field and routes a fraction of 1 to the main path (i.e. Divergence = 1) and a fraction of 0 to all other paths (i.e. Divergence = 2). The impact of using DivFracMP in the Divergence Routing method is discussed in section “Understanding and Using NHDPlus HR”.

When not set to -9998, the sum of the DivFrac values for all paths in a divergence (i.e. all records with the same NodeNumber) must equal 1.

Table <b>NHDPlusDivFracMP</b>							
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
NodeNumber	Double	Yes			0	0	
DivFrac	Double	Yes	<i>DivergenceFraction</i>		0	0	
StatusFlag	String	Yes		StatusFlag Domain			1
VPUID	String	Yes					8

*Contains specifications about the fraction of a cumulative attribute to be routed through each path in a divergence*

NHDPlus identifier of a NHDFlowline feature  
 Unique identifier for the point at the top of the NHDFlowline feature  
 Fraction for routing cumulative attributes down flowlines paths in a divergence  
 Used during NHDPlus Build/Refresh Tools Processing  
 Vector Processing Unit Identifier

### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusMegaDiv (table)***

**Description:** Table containing the NHDPlusFlow records for divergences that have more than two outflow paths.

Table <b>NHDPlusMegaDiv</b>							
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
FromNHDPID	Double	Yes	<i>FromNHDPlusID</i>		0	0	
ToNHDPID	Double	Yes	<i>ToNHDPlusID</i>		0	0	
VPUID	String	Yes					8

A table that holds PlusFlow records for divergences that have two or more outflow paths

Common identifier of the upstream NHDFlowline feature  
Common identifier of the downstream NHDFlowline feature  
Vector Processing Unit Identifier

### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusFlowlineVAA (table)***

**Description:** Value Added Attributes (VAAs) for each NHDFlowline feature that appears in the PlusFlow table (i.e. every NHDFlowline with NHDFlowline.FlowDir = “With Digitized”). The NHDPlus HR Build/Refresh process populates the PlusFlowlineVAA table. The PlusFlowlineVAA table differs from the NHDFlowlineVAA table. NHDFlowlineVAA is an official table in the NHD schema, contains any VAA values that are stored in the NHD central database and is not populated by the NHDPlus HR Build/Refresh process.

Additional documentation on VAAs can be found in the section titled “HRNHDPlus Build/Refresh Process Description” under Steps C, F, Q, and R.

Table NHDPlusFlowlineVAA							
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
StreamLeve	Short integer	Yes	<i>StreamLevel</i>		0		
StreamOrde	Short integer	Yes	<i>StreamOrder</i>		0		
StreamCalc	Short integer	Yes	<i>StreamCalculator</i>		0		
FromNode	Double	Yes			0	0	
ToNode	Double	Yes			0	0	
HydroSeq	Double	Yes	<i>HydrologicSequence</i>		0	0	
LevelPathI	Double	Yes	<i>LevelPathIdentifier</i>		0	0	
PathLength	Double	Yes	<i>PathLength</i>		0	0	
TerminalPa	Double	Yes	<i>TerminalPathIdentifier</i>		0	0	
ArbolateSu	Double	Yes	<i>UpstreamCumulativeStreamKm</i>		0	0	
Divergence	Short integer	Yes	<i>DivergenceCode</i>	Divergence Domain	0		
StartFlag	Short integer	Yes	<i>IsHeadwater</i>	NoYes Domain	0		
TerminalFI	Short integer	Yes	<i>IsNetworkEnd</i>	NoYes Domain	0		
UpLevelPat	Double	Yes	<i>UpstreamMainPathLevelPathID</i>		0	0	
UpHydroSeq	Double	Yes	<i>UpstreamMainPathHydroSeq</i>		0	0	
DnLevel	Short integer	Yes	<i>DownstreamMainPathStreamLevel</i>		0		
DnLevelPat	Double	Yes	<i>DownstreamMainPathLevelPathID</i>		0	0	
DnHydroSeq	Double	Yes	<i>DownstreamMainPathHydroSeq</i>		0	0	
DnMinorHyd	Double	Yes	<i>DownstreamMinorHydroSequence</i>		0	0	
DnDrainCou	Short integer	Yes	<i>DownstreamDrainageCount</i>		0		
FromMeas	Double	Yes	<i>FromMeasure</i>		0	0	
ToMeas	Double	Yes	<i>ToMeasure</i>		0	0	
ReachCode	String	Yes					14
RtnDiv	Short integer	Yes	<i>HasReturningDivergence</i>	NoYes Domain	0		
Thinner	Short integer	Yes	<i>ThinnerCode</i>		0		
VPUIn	Short integer	Yes		NoYes Domain	0		
VPUOut	Short integer	Yes		NoYes Domain	0		
AreaSqKm	Double	Yes			0	0	
TotDASqKm	Double	Yes	<i>TotalDrainageAreaSqKm</i>		0	0	
DivDASqKm	Double	Yes	<i>DivergenceRoutedDrainAreaSqKm</i>		0	0	
MaxElevRaw	Double	Yes	<i>MaximumElevationRaw</i>		0	0	
MinElevRaw	Double	Yes	<i>MinimumElevationRaw</i>		0	0	
MaxElevSmo	Double	Yes	<i>MaximumElevationSmoothed</i>		0	0	
MinElevSmo	Double	Yes	<i>MinimumElevationSmoothed</i>		0	0	
Slope	Double	Yes			0	0	
SlopeLenKm	Double	Yes	<i>SlopeLengthKm</i>		0	0	
ElevFixed	Short integer	Yes	<i>IsElevationFixed</i>	NoYes Domain	0		
HWTtype	Short integer	Yes	<i>HeadwaterType</i>	HeadwaterType Domain	0		
HWNNodeSqKm	Double	Yes	<i>HeadwaterNodeDrainageAreaSqKm</i>		0	0	
StatusFlag	String	Yes		StatusFlag Domain			1
VPUID	String	Yes					8

A table that holds Value Added Attributes (VAAs) for each NHDFlowline feature in the NHDPlusFlow table and is updated by NHDPlus Build/Refresh process. Differs from the NHDFlowlineVAA table

NHDPlus identifier of a NHDFlowline feature

Stream level

Modified Strahler Stream Order

Stream Calculator

Unique identifier for the point at the top of the NHDFlowline feature

Unique identifier for the point at the end of the NHDFlowline feature

Hydrologic sequence number; places flow lines in ascending hydrologic order.

Level Path Identifier – Hydrologic sequence no. of most downstream feature

Distance to terminal NHDFlowline feature downstream along main path

Terminal Path Identifier - Hydrologic sequence number of terminal

Arbolate Sum - Kms of stream upstream of bottom of NHD Flowline feature

See Divergence Domain for coded values

See StartFlag Domain for coded values

0=not a terminal NHDFlowline feature; 1=a terminal NHDFlowline feature

Upstream mainstem level path identifier

Upstream mainstem hydrologic sequence number

Streamlevel of main stem downstream NHDflowline feature

Downstream mainstem level path identifier

Downstream mainstem hydrologic sequence number

Downstream minor hydrologic sequence number

Count of NHDFlowline features immediately downstream

ReachCode route measure (m-value) at bottom of NHDFlowline feature

ReachCode route measure (m-value) at top of NHDFlowline feature

Unique identifier within a Cataloging Unit; first 8 digits=subbasin code, next 6 digits randomly assigned

Returning Divergence Flag

Not valued; Reserved for future use

Are there VPU inflows? 0(no) or 1(yes)

Are there VPU outflows? 0(no) or 1(yes)

Catchment area in square kilometers

Total upstream cumulative drainage area at downstream end of NHDFlowline feature

Divergence-routed cumulative drainage area at downstream end of NHDFlowline feature

Maximum elevation unsmoothed, in centimeters

Minimum elevation unsmoothed, in centimeters

Maximum elevation smoothed, in centimeters

Minimum elevation smoothed, in centimeters

Slope of flowline (meters/meters) based on smoothed elevations

Flag indicating that the downstream elevation is fixed, i.e.; not smoothed

NHDFlowline feature length (kilometers) used to compute slope

Headwater Type; 0=Real headwater, 1=Artificial headwater

Catchment area that drains to headwater node of the NHDFlowline feature

Flag reserved for use during NHDPlus Build/Refresh Process

Vector Processing Unit Identifier

## NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusFlow (table)

**Description:** A table that describes flowing and non-flowing connections between NHDFlowline features. The table contains entries for: (1) pairs of NHDFlowline features that exchange water, (2) headwater NHDFlowline features, (3) terminal NHDFlowline features, (4) surface water NHDFlowline features that connect to coastline NHDFlowline features, and (5) coastline NHDFlowline features that connect to each other.

Note: Native NHD contains a flow table called NHDFlow. NHDFlow contains only geometric connections between NHDFlowline features. NHDPlusFlow, on the other hand, may include non-geometric and geometric connections. Non-geometric connections are used to represent situations such as return flows along an international border and underground connections in karst topography.

Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
FromNHDPID	Double	Yes	<a href="#">FromNHDPID</a>		0	0	
ToNHDPID	Double	Yes	<a href="#">ToNHDPID</a>		0	0	
NodeNumber	Double	Yes			0	0	
DeltaLevel	Short integer	Yes	<a href="#">FromStreamLevMinusToStreamLev</a>		0		
Direction	Short integer	Yes	<a href="#">FlowRelationshipType</a>		0		
GapDistKm	Double	Yes	<a href="#">GapDistanceKm</a>		0	0	
HasGeo	Short integer	Yes	<a href="#">IsGeometricConnection</a>	No/Yes Domain	0		
FromVPUID	String	Yes					8
ToVPUID	String	Yes					8
FromPermID	String	Yes	<a href="#">FromPermanentIdentifier</a>				40
ToPermID	String	Yes	<a href="#">ToPermanentIdentifier</a>				40

A table that describes flowing and non-flowing connections between NHDFlowline features

Common identifier for the upstream NHDFlowline feature  
 Common identifier for the downstream NHDFlowline feature  
 Node number at the bottom of FromComID and the top of ToComID  
 Numerical diff between StreamLevels for FromNHDPID and for ToNHDPID  
 Flow relationship type  
 Distance between the downstream and upstream ends  
 Is geometric connection: 0=No (geometric gap); 1=Yes (connected)

## Burn Components



***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlus\NHDPlusBurnLineEvent (line feature class)***

**Description:** Events describing the parts of NHDFlowline features used for hydro-enforcement.

Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
NHDPlusID	Double	Yes			0	0	
GridCode	Long integer	Yes			0		
ReachCode	String	Yes					14
FromMeas	Double	Yes	<i>FromMeasure</i>		0	0	
ToMeas	Double	Yes	<i>ToMeasure</i>		0	0	
BumLenKm	Double	Yes	<i>BurnLengthKm</i>		0	0	
RPUID	String	Yes					8
StatusFlag	String	Yes		StatusFlag Domain			1
Catchment	Short integer	Yes		NoYes Domain	0		
Bum	Short integer	Yes		NoYes Domain	0		
VPUID	String	Yes					8
SHAPE_Length	Double	Yes			0	0	

*Events describing the parts of NHDFlowline features used for hydro-enforcement*

Unique identifier of a NHDFlowline feature  
 Unique, compact identifier for a NHDFlowline feature  
 Unique identifier within a Cataloging Unit; first 8 digits=subbasin code, next 6 digits randomly assigned  
 Downstream BurnLineEvent Measure (m-value)  
 Upstream BumLineEvent Measure (m-value)  
 Length of BurnLineEvent feature  
 RPU Identifier for the Catchment  
 Reserved for use during Build/Refresh Tools Processing  
 Identifies if line will receive a catchment: 0=No, 1=Yes  
 Identifies if line will be used for hydro-enforcement: 0=No, 1=Yes  
 Vector Processing Unit Identifier

***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlus\NHDPlusBurnWaterbody (polygon feature class)***

**Description:** NHDWaterbody and NHDArea features used for hydro-enforcement.

Simple feature class				Geometry Polygon	
<b>NHDPlusBurnWaterbody</b>				Contains M values	No
				Contains Z values	No
Field name	Data type	Allow nulls	Alias name	Domain	Precision Scale Length
OBJECTID	Object ID				
SHAPE	Geometry	Yes			
NHDPlusID	Double	Yes			0 0
SourceFC	String	Yes	<i>SourceFeatureClass</i>		
OnOffNet	Short integer	Yes	<i>OnNetwork</i>	NoYes Domain	0
PurpCode	String	Yes	<i>PurposeCode</i>	PurposeCodeDomain	2
Bum	Short integer	Yes		NoYes Domain	0
VPUID	String	Yes			8
SHAPE_Length	Double	Yes			0 0
SHAPE_Area	Double	Yes			0 0

*NHDWaterbody and NHDArea features used for hydro-enforcement*

Unique identifier of NHDWaterbody or NHDArea feature  
 NHD Feature Class – "NHDWaterbody", "NHDArea"  
 On/Off network flag (1 = On network, 0 = Off network)  
 Code describing purpose of feature  
 Identifies if line to be used for hydro-enforcement: 0=No, 1=Yes  
 Vector Processing Unit Identifier

***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlus\NHDPlusLandSea (polygon feature class)***

**Description:** Polygons used for hydro-enforcement along the NHD coastline.

Simple feature class				Geometry Polygon	
<b>NHDPlusLandSea</b>				Contains M values	No
				Contains Z values	No
Field name	Data type	Allow nulls	Alias name	Domain	Precision Scale Length
OBJECTID	Object ID				
SHAPE	Geometry	Yes			
NHDPlusID	Double	Yes			0 0
Land	Short integer	Yes		LandSea Domain	0
VPUID	String	Yes			8
SHAPE_Length	Double	Yes			0 0
SHAPE_Area	Double	Yes			0 0

*Polygons used for hydro-enforcement along the NHD coastline*

Unique identifier of Land/Sea polygon  
 A numeric code to identify land/sea/estuary area  
 Vector Processing Unit Identifier

***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlus\NHDPlusSink (point feature class)***

**Description:** Point locations of sinks used for hydro-enforcement.

Simple feature class		Geometry		Point			
<b>NHDPlusSink</b>		Contains M values	No	Contains Z values	No		
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
NHDPlusID	Double	Yes			0	0	
GridCode	Long integer	Yes			0		
PupCode	String	Yes	<i>PurposeCode</i>	PurposeCodeDomain			2
FeatureID	Double	Yes			0	0	
SourceFC	String	Yes	<i>SourceFeatureClass</i>				20
RPUID	String	Yes					8
StatusFlag	String	Yes		StatusFlag Domain			1
Catchment	Short integer	Yes		NoYes Domain	0		
Bum	Short integer	Yes		NoYes Domain	0		
VPUID	String	Yes					8

*Point locations of sinks used for hydro-enforcement*

Unique identifier of Sink point  
 Unique, compact identification number assigned to a Sink point  
 Code describing purpose of Sink  
 ID of feature in another feature class (ComlD, Gaz\_ID, PolyID)  
 Feature class of the feature referenced in FeatureID  
 RPUID that holds the Sink  
 Flag reserved for use during NHDPlus Build/Refresh Process  
 0 (no) or 1 (yes) if line will receive catchment  
 0 (no) or 1 (yes) if line will be used for hydro-enforcement  
 Vector Processing Unit Identifier

### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlus\NHDPlusWall (line feature class)***

**Description:** Lines used as walls in hydro-enforcement.

Simple feature class		Geometry		Polyline			
<b>NHDPlusWall</b>		Contains M values	No	Contains Z values	No		
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
SHAPE	Geometry	Yes					
NHDPlusID	Double	Yes			0	0	
WallSource	String	Yes					30
VPUID	String	Yes					8
Bum	Short integer	Yes		NoYes Domain	0		
SHAPE_Length	Double	Yes			0	0	

*Lines used as walls in hydro-enforcement*

Unique identifier of Wall line  
 Vector Processing Unit Identifier  
 0 (no) or 1 (yes) if line will be used for hydro-enforcement

### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusEROMMA (table)***

**Description:** Extended Unit Runoff Method (EROM) mean annual flow estimates for NHDFlowline features in the NHDPlus HR network. These flow estimates reflect the 1971 to 2000 time period. The best EROM flow and velocity estimates are the gage adjusted values, QE and VE, respectively. Table 2 of the EROM QA report (NHDPlusEROMMAQA table) provides an estimate of how good these flow estimates are as compared to gage flows. For “natural” flows and velocities, the best estimates are the Reference Gage Regression values, QC and VC, respectively. The “RefGage Reg” column in Table 3 of the EROM QA report (NHDPlusEROMMAQA table) provides an estimate of how good these flow estimates are as compared to gage flows.

All Flow estimates are in cubic feet per second (cfs) and represent the flow at the bottom (downstream end) of the NHDFlowline feature.

All Velocity computations are in feet per second (fps) using the Jobson Method (1996) and represent the velocity at the bottom of the NHDFlowline feature.

Table NHDPlusEROMMA						
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale Length
OBJECTID	Object ID					
NHDPlusID	Double	Yes			0	0
QAMA	Double	Yes	<i>FlowEstARunoffMA</i>		0	0
VAMA	Double	Yes	<i>VelocityARunoffMA</i>		0	0
QIncrAMA	Double	Yes	<i>IncrFlowEstARunoffMA</i>		0	0
QBMA	Double	Yes	<i>FlowEstBExcessETMA</i>		0	0
VBMA	Double	Yes	<i>VelocityBExcessETMA</i>		0	0
QIncrBMA	Double	Yes	<i>IncrFlowEstBExcessETMA</i>		0	0
QCMA	Double	Yes	<i>FlowEstCRefGageRegressMA</i>		0	0
VCMA	Double	Yes	<i>VelocityCRefGageRegressMA</i>		0	0
QIncrCMA	Double	Yes	<i>IncrFlowEstCRefGageRegressMA</i>		0	0
QDMA	Double	Yes	<i>FlowEstDAdditionRemovalMA</i>		0	0
VDMA	Double	Yes	<i>VelocityDAdditionRemovalMA</i>		0	0
QIncrDMA	Double	Yes	<i>IncrFlowEstDAdditionRemovalMA</i>		0	0
QEMA	Double	Yes	<i>FlowEstEGageAdjustedMA</i>		0	0
VEMA	Double	Yes	<i>VelocityEGageAdjustedMA</i>		0	0
QIncrEMA	Double	Yes	<i>IncrFlowEstEGageAdjustedMA</i>		0	0
QFMA	Double	Yes	<i>FlowEstFGageSequesterMA</i>		0	0
QIncrFMA	Double	Yes	<i>IncrFlowEstFGageSequesterMA</i>		0	0
ArQNavMA	Double	Yes	<i>AddRemoveFlowNotAvailableMA</i>		0	0
PETMA	Double	Yes	<i>CatchmentPotentialETMA</i>		0	0
QLossMA	Double	Yes	<i>FlowLossFromPotentialETMA</i>		0	0
QGAdjMA	Double	Yes	<i>GageFlowAdjustedMA</i>		0	0
QGNVMA	Double	Yes	<i>GageAdjustmentNotAvailableMA</i>		0	0
GageAdjMA	Short integer	Yes	<i>IsGageAdjustedMA</i>	NoYes Domain	0	
AvgQAdjMA	Double	Yes	<i>GageFlowFlowlineBottomMA</i>		0	0
GageIDMA	String	Yes	<i>NWISGageIDMA</i>			16
GageQMA	Double	Yes	<i>GageFlowMA</i>		0	0
VPUID	String	Yes				8

*Extended Unit Runoff Method (EROM)  
Mean Annual (MA) Flow estimates for  
NHDFlowline features in the  
NHDPlus network*

NHDPlus identifier of a NHDFlowline feature  
Flow from runoff (cfs)  
Velocity for QAMA (fps)  
Incremental flow from runoff (cfs)  
Flow with Excess ET (cfs)  
Velocity for QBMA (fps)  
Incremental flow with Excess ET (cfs)  
Flow with Reference Gage Regression applied to QBMA (cfs)  
Velocity for QCMA (fps)  
Incremental Flow by subtracting the sum of upstream QCMA  
Flow with PlusFlowAR (cfs)  
Velocity for QCMA (fps)  
Incremental flow with PlusFlowAR (cfs)  
Flow from gage adjustment (cfs)  
Velocity from gage adjustment (cfs)  
Incremental flow from gage adjustment (cfs)  
Flow from gage sequestration step (cfs)  
Incremental flow from gage sequestration step (cfs)  
PlusFlowAR flow not available on flowline (cfs)  
Catchment potential ETMA  
Catchment flow loss from Excess ET (cfs)  
Gage adjustment flow (cfs)  
Gage adjustment flow not available  
Flag indicating if QEMA and QIncrEMA were adj by gage flow  
Gage Q adjusted for bottom of a NHDFlowline feature (cfs)  
Identifier of the gage located on the NHDFlowline feature  
Gaged flow measured by gage on NHDFlowline feature (cfs)  
Vector Processing Unit Identifier

### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusEROMQAMA (table)***

**Description:** QA statistics in table form for the EROM mean annual flow estimates in the NHDPlusEROMMA table. The file layout is designed to facilitate graphical and statistical analyses. All data values are adjusted for the bottom of the flowline. The files are sorted by GageRef so that all of the reference gages are at the top of the file; this is useful for users who want to look at graphs or additional statistics for only the reference gages.

Table NHDPlusEROMQAMA							
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
GageID	String	Yes	<i>NWISGageID</i>				16
GageRef	Short integer	Yes	<i>IsReferenceGage</i>	NoYes Domain	0		
QE	Double	Yes	<i>FlowEstEGageAdjusted</i>		0	0	
QA	Double	Yes	<i>FlowEstARunoff</i>		0	0	
QB	Double	Yes	<i>FlowEstBExcessET</i>		0	0	
QC	Double	Yes	<i>FlowEstCRefGageRegression</i>		0	0	
QD	Double	Yes	<i>FlowEstDAdditionRemoval</i>		0	0	
QEUnitRo	Double	Yes	<i>UnitFlowEPerSqKm</i>		0	0	
QAUnitRo	Double	Yes	<i>UnitFlowAPerSqKm</i>		0	0	
QBUnitRo	Double	Yes	<i>UnitFlowBPerSqKm</i>		0	0	
QCUnitRo	Double	Yes	<i>UnitFlowCPerSqKm</i>		0	0	
QDUnitRo	Double	Yes	<i>UnitFlowDPerSqKm</i>		0	0	
QADelta	Double	Yes	<i>FlowEstEMinusFlowEstA</i>		0	0	
QBDelta	Double	Yes	<i>FlowEstEMinusFlowEstB</i>		0	0	
QCDelta	Double	Yes	<i>FlowEstEMinusFlowEstC</i>		0	0	
QDDelta	Double	Yes	<i>FlowEstEMinusFlowEstD</i>		0	0	
QAUroDelt	Double	Yes	<i>UnitFlowEMinusUnitFlowA</i>		0	0	
QBUroDelt	Double	Yes	<i>UnitFlowEMinusUnitFlowB</i>		0	0	
QCURoDelt	Double	Yes	<i>UnitFlowEMinusUnitFlowC</i>		0	0	
QDURoDelt	Double	Yes	<i>UnitFlowEMinusUnitFlowD</i>		0	0	
VPUID	String	Yes					8

A table that holds QA statistics for the EROM mean annual flow estimates

NHDPlus identifier of a NHDFlowline feature  
 NWIS GageID value  
 Identifies if gage is Falcone Reference: 0=No, 1=Yes  
 Gage flow (cfs)  
 Cumulative runoff (cfs)  
 QA – Excess ET (EET) (cfs)  
 QA - EET +/- Refgage Regression Adjustment (cfs)  
 QA – EET +/- Refgage Regression Adjustment +/- PlusFlowAR (cfs)  
 QE / DivDASqKm (cfs/sqkm)  
 QA / DivDASqKm (cfs/sqkm)  
 QB / DivDASqKm (cfs/sqkm)  
 QC / DivDASqKm (cfs/sqkm)  
 QD / DivDASqKm (cfs/sqkm)  
 QE – QA (cfs)  
 QE – QB (cfs)  
 QE – QC (cfs)  
 QE – QD (cfs)  
 Q\_Eunitro – Q\_Aunitro (cfs/sqkm)  
 Q\_Eunitro – Q\_Bunitro (cfs/sqkm)  
 Q\_Eunitro – Q\_Cunitro (cfs/sqkm)  
 Q\_Eunitro – Q\_Dunitro (cfs/sqkm)  
 Vector Processing Unit Identifier

### NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusEROMQARpt (table)

**Description:** EROM QA Report stored as a table of report lines.

Table NHDPlusEROMQARPT							
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
RptLine	String	Yes					120

QA Report for each Vector Processing Unit (VPU) in run

***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusIncrLat (table)***

**Description:** Mean latitude of each NHDPlus HR catchment. The mean latitude is needed in EROM as part of the potential evapotranspiration calculation.

Table <b>NHDPlusIncrLat</b>							
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
MissLat	Double	Yes	<i>CatchmentAreaNoDataLatitude</i>		0	0	
MeanLat	Double	Yes	<i>CatchmentMeanLatitude</i>		0	0	
HydroSeq	Double	Yes	<i>HydrologicSequence</i>		0	0	
VPUID	String	Yes					8

*Mean latitude of each NHDPlusV2 catchment*

NHDPlus identifier of a catchment (NHDFlowline or Sink)  
 Area of catchment with no data  
 Mean latitude in degrees  
 Hydrologic sequence number  
 Vector Processing Unit Identifier

## Annual & Monthly Precipitation

***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusIncrPrecipMA and NHDPlusIncrPrecipMMmm (tables)***

**Description:** Mean annual and mean monthly precipitation averaged over the area of each NHDPlus catchment. NHDPlusIncrPrecipMA contains the mean annual precipitation and the 12 NHDPlusIncrPrecipMMmm tables contain the mean monthly values where mm = 01 through 12). The precipitation values have been computed using a raster which combined the Parameter-elevation Regressions on Independent Slopes Model data (PRISM) for the conterminous U.S. and a set of 1-km grids from the Canadian Forest Service, Natural Resources Canada, for areas in Canada and Mexico. Mean annual precipitation values were

used in computing EROM mean annual flow estimates. The mean monthly precipitation values are used for estimating excess evapotranspiration in EROM. The precipitation data is for the 1971 to 2000 time period.

**Note:** If a catchment extends beyond the extent of the precipitation data, the value will be the average over the portion of the catchment which does have data. MissDataA will contain the area in the catchment where data were not available.

**Note:** NHDPlusIncrPrecipMA is not needed for EROM and is intentionally empty.

Table <b>NHDPlusIncrPrecipMA</b>							
Field name	Data type	Allow nulls	Alias name	Domain	Prec- ision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
MissPMA	Double	Yes	<a href="#">MissingDataAreaPrecipitationMA</a>		0	0	
PrecipMA	Double	Yes	<a href="#">CatchmentMeanPrecipitationMA</a>		0	0	
HydroSeq	Double	Yes	<a href="#">HydrologicSequence</a>		0	0	
VPUID	String	Yes					8

*Mean annual precipitation averaged over the area of each catchment*

NHDPlus identifier of a catchment (NHDFlowline or Sink)  
 Area of catchment with no data  
 Mean annual precipitation in millimeters x 100  
 Hydrologic sequence  
 Vector Processing Unit Identifier

*MM (Mean Monthly) is 01 through 12 for January through December.*

Table <b>NHDPlusIncrPrecipMM12</b>							
Table <b>NHDPlusIncrPrecipMM01</b>							
Field name	Data type	Allow nulls	Alias name	Domain	Prec- ision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
MissPMM01	Double	Yes	<a href="#">MissingDataAreaPrecipMM01</a>		0	0	
PrecipMM01	Double	Yes	<a href="#">CatchmentMeanPrecipitationMM01</a>		0	0	
HydroSeq	Double	Yes	<a href="#">HydrologicSequence</a>		0	0	
VPUID	String	Yes					8

*Mean monthly precipitation averaged over the area of each catchment*

Unique identifier of a NHDPlus catchment  
 Area of catchment with no data  
 Mean monthly precipitation in millimeters x 100  
 Hydrologic sequence  
 Vector Processing Unit Identifier



### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusIncrROMA (tables)***

**Description:** Mean annual runoff in the area of each NHDPlus HR catchment. Mean annual runoff values were used in computing EROM mean annual flow estimates. The runoff values are for the 1971 to 2000 time period.

**Note:** If a catchment extends beyond the extent of the runoff data, the value will be the runoff over the portion of the catchment which does have data. MissRMA will contain the area in the catchment where data was not available.

Table <b>NHDPlusIncrROMA</b>							
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
MissRMA	Double	Yes	<i>MissingDataAreaRunoffMA</i>		0	0	
RunOffMA	Double	Yes	<i>CatchmentMeanRunoffMA</i>		0	0	
HydroSeq	Double	Yes	<i>HydrologicSequence</i>		0	0	
VPUID	String	Yes					8

*Mean annual runoff values*

Unique identifier of a NHDPlus catchment  
Area of catchment with no data  
Mean runoff (mm)  
Hydrologic sequence  
Vector Processing Unit Identifier

## Annual & Monthly Temperature

### ***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusIncrTempMA and NHDPlusIncrTempMMmm (tables)***

**Description:** Mean annual and mean monthly temperature averaged over the area of each NHDPlus catchment. NHDPlusIncrTempMA contains the mean annual temperature and the 12 NHDPlusIncrTempMMmm tables contain the mean monthly values where mm = 01 through 12. The temperature values have been computed using a grid which combined the Parameter-elevation Regressions on Independent Slopes Model data (PRISM) (<http://www.prismclimate.org>) for the conterminous U.S. and a set of 1-km grids provided by the Canadian Forest Service, Natural Resources Canada, for areas in Canada and Mexico. The temperature data is for the 1971 to 2000 time period.

**Note:** If a catchment extends beyond the extent of the temperature data, the value will be the average over the portion of the catchment which does have data. MissDataA will contain the area in the catchment where data was not available.

**Note:** NHDPlusIncrTempMA is not needed for EROM and is intentionally empty.

Table  
**NHDPlusIncrTempMA**

Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
MissTMA	Double	Yes	<i>MissingDataAreaTemperatureMA</i>		0	0	
TempMA	Double	Yes	<i>CatchmentMeanTemperatureMA</i>		0	0	
HydroSeq	Double	Yes	<i>HydrologicSequence</i>		0	0	
VPUID	String	Yes					8

*Mean annual precipitation averaged over the area of each catchment*

Unique identifier of a NHDPlus catchment  
Area of catchment with no data  
Mean annual temperature in degrees centigrade x 100  
Hydrologic sequence  
Vector Processing Unit Identifier

*MM (Mean Monthly) is 01 through 12 for January through December.*

Table  
**NHDPlusIncrTempMM12**

Table  
**NHDPlusIncrTempMM01**

Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale	Length
OBJECTID	Object ID						
NHDPlusID	Double	Yes			0	0	
MissTMM01	Double	Yes	<i>MissingDataAreaTemperatureMM01</i>		0	0	
TempMM01	Double	Yes	<i>CatchmentMeanTemperatureMM01</i>		0	0	
HydroSeq	Double	Yes	<i>HydrologicSequence</i>		0	0	
VPUID	String	Yes					8

*Mean monthly temperature averaged over the area of each catchment*

Unique identifier of a NHDPlus catchment  
Area of catchment with no data  
Mean monthly temperature in degrees centigrade x 100  
Hydrologic sequence  
Vector Processing Unit Identifier

***NHDPlus\_H\_<vpuid>\_GDB.gdb\NHDPlusNHDPlusIDGridCode (tables)***

**Description:** Crosswalk table between NHDPlusIDs and gridcodes assigned during the raster processing.

Table <b>NHDPlusNHDPlusIDGridCode</b>						
Field name	Data type	Allow nulls	Alias name	Domain	Precision	Scale Length
OBJECTID	Object ID					
NHDPlusID	Double	Yes			0	0
SourceFC	String	Yes	<i>SourceFeatureClass</i>			20
GridCode	Long integer	Yes			0	
VPUID	String	Yes				8

*A table that crosswalks the Catchment feature IDs and Grid Codes*

NHDPlus identifier of a catchment (NHDFlowline or Sink)  
 Source feature class: NHDFlowline or NHDPlusSink  
 Unique, compact identifier for a catchment  
 Vector Processing Unit Identifier



## NHDPlus HR Raster Layers

### *\HRNHDPlusRasters<vpuid>\cat.tif*

**Description:** Raster catchments. Each catchment has a unique GridCode value with a one-to-one match to NHDPlusID.

Field Name	Description	Format
Value	GridCode of each catchment.	Integer
Count	Number of cells with GridCode value	Integer
NHDPlusID	Identifier of an NHDPlusBurnLineEvent or NHDPlusSink Feature	Double

### *\HRNHDPlusRasters<vpuid>\catseed.tif*

**Description:** Seed raster used to produce the NHDPlus HR catchments using the *fdr.tif* raster with the ArcGIS Watershed tool.

Field Name	Description	Format
Value	GridCode of each catchment seed	Integer
Count	Number of cells with GridCode value	Integer

### *\HRNHDPlusRasters<vpuid>\elev\_cm.tif*

**Description:** Elevation raster projected to raster coordinate system. Elevation values are represented as integer centimeters. An attribute table is not created for this raster.

***\HRNHDPlusRasters<vpuid>\fac.tif***

**Description:** Flow accumulation grid which contains the number of cells within the RPU draining to each cell within the RPU based on the HydroDEM. (Attribute table will only be built if this raster can be stored in integer format (max value < 2.1e9) -- see Esri documentation of Flow Accumulation tool.)

Field Name	Description	Format
Value	Number of cells that drain to each cell.	Integer
Count	Number of cells with each Value	Integer

***\HRNHDPlusRasters<vpuid>\fdr.tif***

**Description:** Integer flow direction grid which contains the codes that show the direction water would flow from each grid cell within the RPU based on the HydroDEM. The raster is saved as 8-bit unsigned.

Field Name	Description	Format
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Value	The value for the grid cell. Can be assigned one of eight possible values: 0 _ Flow ends (sink) 1 – Flow is to the East 2 – Flow is to the Southeast 4 – Flow is to the South 8 – Flow is to the Southwest 16 – Flow is to the West 32 – Flow is to the Northwest 64 – Flow is to the North 128 – Flow is to the Northeast	Integer
Count	Number of cells with each Value	Integer

***\\HRNHDPlusRasters<vpuid>\fdroverland.tif***

**Description:** Overland flow direction raster. This raster is the same as *fdr.tif*, with cells coincident with flow network or water bodies and flow network (*swnet.tif* data cells) are set to NoData. The raster is saved as 8-bit unsigned.

<b>Field Name</b>	<b>Description</b>	<b>Format</b>
Value	The value for the grid cell. Can be assigned one of eight possible values: 0 _ Flow ends (sink) 1 – Flow is to the East 2 – Flow is to the Southeast 4 – Flow is to the South 8 – Flow is to the Southwest 16 – Flow is to the West 32 – Flow is to the Northwest 64 – Flow is to the North 128 – Flow is to the Northeast	Integer
Count	Number of cells with each Value	Integer

***\\HRNHDPlusRasters<vpuid>\filldepth.tif***

**Description:** Difference raster between hydrodem.tif and the intermediate grid (not included in the final product) that was filled to create it.. This raster is useful for examining the results of hydroconditioning process. The “burned and walled” raster before filling can be re-created by subtracting this grid from hydrodem.tif. The units of this raster are in cm (although some values are very large due to burn and wall values used in the processing). This table may not be created if the number of unique values is large.

Field Name	Description	Format
Value	Fill depth value (in cm)	Integer
Count	Number of cells with each Value	Integer

***\HRNHDPlusRasters<vpuid>\hydrodem.tif***

**Description:** An integer grid of the hydro-conditioned digital elevation model, with all aspects of the NHDPlus burn components integrated and filled. This grid is used to generate the flow direction grid from which the flow accumulation and catchment grids are generated. The elevations are in centimeters. An attribute table is not created for this raster.

***\HRNHDPlusRasters<vpuid>\shdrelief.jp2***

**Description:**

Shaded relief raster built from elev\_cm.tif. Values are scaled from 0 to 255. For more details, see the Esri documentation for the Hill Shade tool. The raster is saved as 8-bit unsigned.

Field Name	Description	Format
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Value	Shaded relief brightness value	Integer
Count	Number of cells with shaded relief Value	Integer

***\HRNHDPlusRasters<vpuid>\swnet.tif***

**Description:**

Raster flow network. All cells besides cells on the flow network or on waterbodies are assigned a value of NoData. The raster is saved as 8-bit unsigned.

Field Name	Description	Format
Value	Can be assigned one of two possible values: 1 – Network flow cell 2 – Waterbody cell	Integer
Count	Number of cells with Value	Integer

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## Domains

# Domains

## Purpose Codes and Descriptions

Coded value domain <b>PurposeCodeDomain</b> Description: <i>Purpose Code Domain</i> Field type: <i>String</i> Split policy: <i>Duplicate</i> Merge policy: <i>Default value</i>		Applicable feature classes					
Code	Description	NHDPlus-Burn-LineEvent	NHDPlus-Burn-Waterbody	NHDPlus-Burn-AddLine	NHDPlus-Burn-AddWaterbody	NHDPlusSink	WBDHU12
SE	Network End	X	X	X	X	X	
SN	BurnLineEvent non-spatial connection	X	X	X	X	X	
SP	NHDWaterbody playa		X	X	X	X	
SC	NHDWaterbody closed lake		X	X	X	X	
SH	HUC12 polygon min point or centroid					X	X
SK	Karst sinkhole					X	
SD	Togographic depression					X	
SO	Other sink					X	
AC	Coastline from adjacent VPU			X			
AF	Added feature from adjacent VPU (non-upstream)			X	X		
AU	Added feature from adjacent VPU (upstream)			X	X		
AI	Inflow connecting feature from upstream VPU			X	X		
AO	Outflow flowlines to elevation clip boundary			X	X		

UF	Unused feature (FCode or by feature)			X	X		
DO	Digitized outlow path			X			
DC	Digitized connector flowline			X			
OC	NHDWaterbody sea, bay, estuary		X				
WB	NHDWaterbody (other)		X				

## Other NHDPlus HR Domains

Coded value domain	
<b>NoYes Domain</b>	
Description <i>NoYes Domain</i>	
Field type <i>Short integer</i>	
Split policy <i>Duplicate</i>	
Merge policy <i>Default value</i>	
Code	Description
1	Yes
0	No

Coded value domain	
<b>HeadwaterType Domain</b>	
Description <i>HeadwaterType</i>	
Field type <i>Domain</i>	
Split policy <i>Short integer</i>	
Merge policy <i>Duplicate</i>	
Code	Description
1	Artificial Heawater
0	Real Headwater

Coded value domain  
**LandSea Domain**  
 Description *LandSea Domain*  
 Field type *Short integer*  
 Split policy *Duplicate*  
 Merge policy *Default value*

Code	Description
0	Estuary
1	Land
2	Sea

Coded value domain  
**Divergence Domain**  
 Description *Divergence Domain*  
 Field type *Short integer*  
 Split policy *Duplicate*  
 Merge policy *Default value*

Code	Description
2	Feature is a minor path of a divergence
0	Feature is not part of a divergence
1	Feature is the main path of a divergence

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