

## How to Join Elevation, Contributing Area, and Slope to NHDPlus Stream Segments

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**Introduction** NHDPlus is an integration of the medium resolution (1:100,000) National Hydrography Dataset (NHD), the National Elevation Dataset (NED), and the Watershed Boundary Dataset (WBD). NHDPlus includes several stream and watershed attributes that are valuable for analysis and modeling.

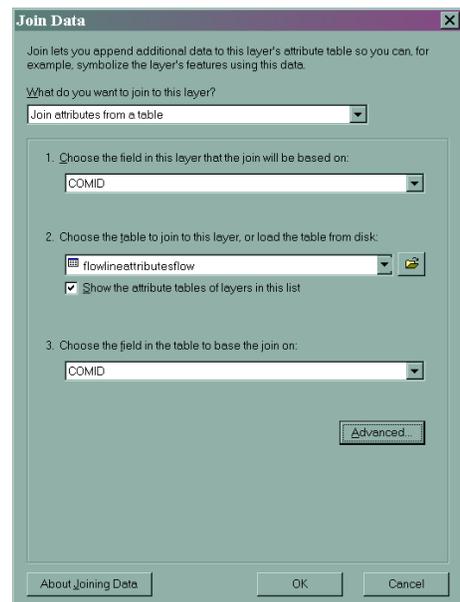
This document provides a simplistic guide for linking physical properties to a stream network. Refer to the User Guide for more information about the benefits of NHDPlus: [ftp://ftp.horizon-systems.com/NHDPlus/documentation/NHDPLUS\\_UserGuide.pdf](ftp://ftp.horizon-systems.com/NHDPlus/documentation/NHDPLUS_UserGuide.pdf)

1. Open an ArcMap project and add the following files:

- NHDPlus stream line (...\\NHDPlus17\\Hydrography\\nhdf\\flowline.shp)
- NHDPlus attribute table (\\NHDPlus17\\flowlineattributesflow.dbf)

2. Join NHDPlus stream layer with *flowlineattributesflow.dbf*:

- Right click on stream layer > Join and Relates > Join
- Join attributes from a table
- based on: COMID
- Choose the table:  
*flowlineattributesflow*
- Choose the field in the table: COMID
- OK



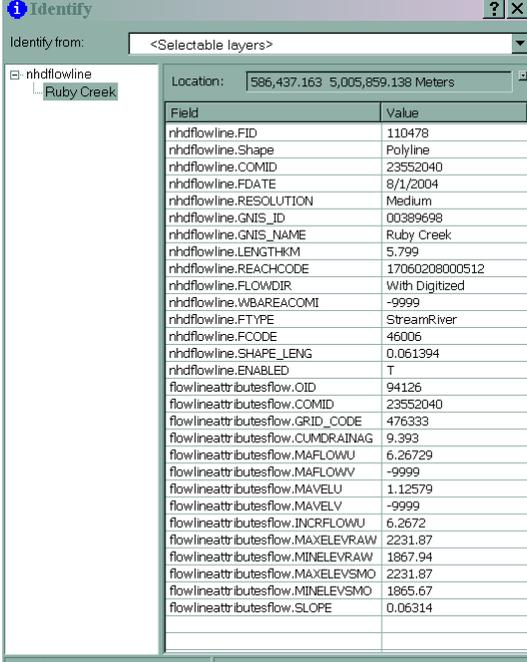
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- Select a stream segment, or open the shapefile attribute table, to view the list of attributes by stream. The attributes for Ruby Creek are shown in the following table. There are 2 sources of data in the table, the *nhdflowline* and *flowlineattributesflow*. Each attribute is preceded by the name of the source of the data.

*nhdflowline* provides stream name (GNIS\_NAME) and stream length (LENGTHKM).

*flowlineattributesflow* table has several attributes including:

- **Cumulative Drainage Area (km<sup>2</sup>)**
  - CUMDRAINAG: drainage area that has accumulated at the bottom of the stream segment
- **Elevation (m)**
  - MAXELEVSMO: elevation at the upstream end of the stream segment,
  - MINELEVSMO: elevation at the downstream end,
  - MAXELEVRAW: unsmoothed<sup>1</sup> elevation at the upstream end,
  - MINELEVRAW: unsmoothed<sup>1</sup> elevation at the downstream end
- **Slope (m/m)**
  - SLOPE: the slope of the stream segment



Field	Value
nhdflowline.FID	110478
nhdflowline.Shape	Polyline
nhdflowline.COMID	23552040
nhdflowline.FDATE	8/1/2004
nhdflowline.RESOLUTION	Medium
nhdflowline.GNIS_ID	00389698
nhdflowline.GNIS_NAME	Ruby Creek
nhdflowline.LENGTHKM	5.799
nhdflowline.REACHCODE	17060208000512
nhdflowline.FLOWDIR	With Digitized
nhdflowline.WBAREACOMI	-9999
nhdflowline.FTYPE	StreamRiver
nhdflowline.FCODE	46006
nhdflowline.SHAPE_LEN	0.061394
nhdflowline.ENABLED	T
flowlineattributesflow.OID	94126
flowlineattributesflow.COMID	23552040
flowlineattributesflow.GRID_CODE	476333
flowlineattributesflow.CUMDRAINAG	9.393
flowlineattributesflow.MAFLOWU	6.26729
flowlineattributesflow.MAFLOWV	-9999
flowlineattributesflow.MAVELU	1.12579
flowlineattributesflow.MAVELV	-9999
flowlineattributesflow.INCRFLOWU	6.2672
flowlineattributesflow.MAXELEVRAW	2231.87
flowlineattributesflow.MINELEVRAW	1867.94
flowlineattributesflow.MAXELEVSMO	2231.87
flowlineattributesflow.MINELEVSMO	1865.67
flowlineattributesflow.SLOPE	0.06314

<sup>1</sup>NHDPlus User Guide recommends using smoothed (...SMO) elevations, vs. raw (...RAW) elevations, to ensure there are no negative values.

NHDPlus does not provide Mean Elevation, but we recommend creating it using MAXELEVSMO and MINELEVSMO.