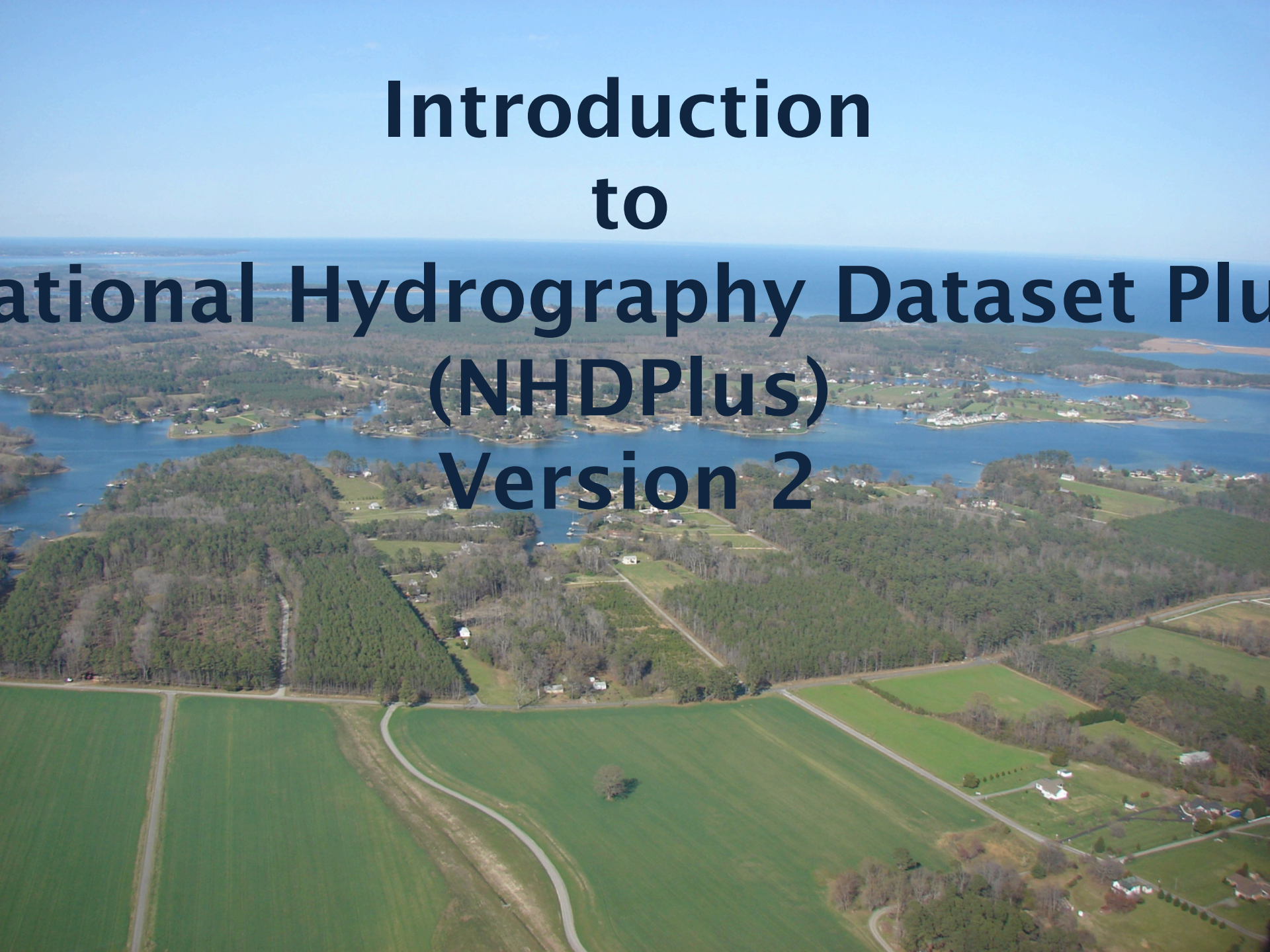
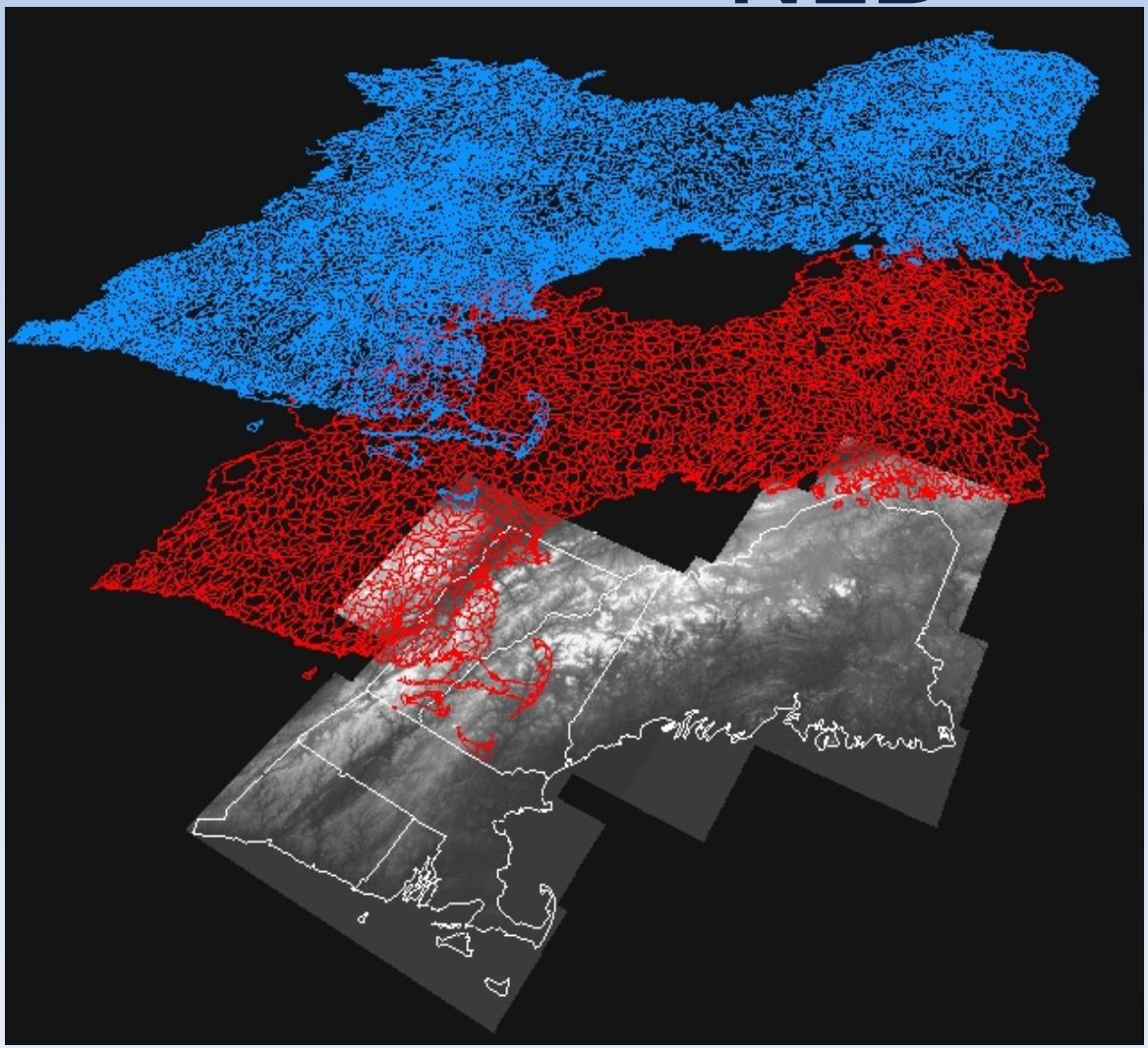
Introduction to ational Hydrography Dataset Plu (NHDPlus) Version 2



NHDPlus Concepts: Integration of NHD, WBD, and NED



National Hydrography Dataset (NHD)

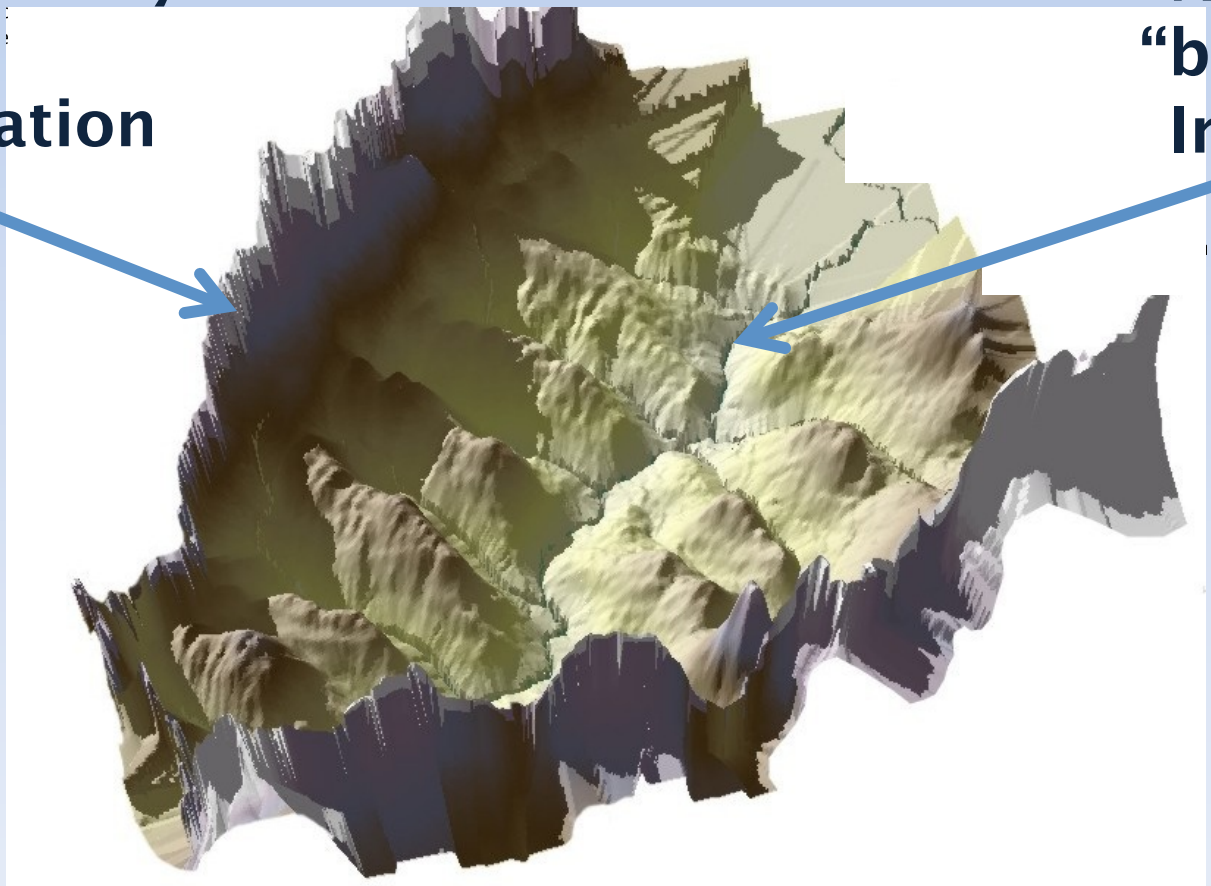
Watershed Boundary Dataset (WBD)

National Elevation Dataset (NED)

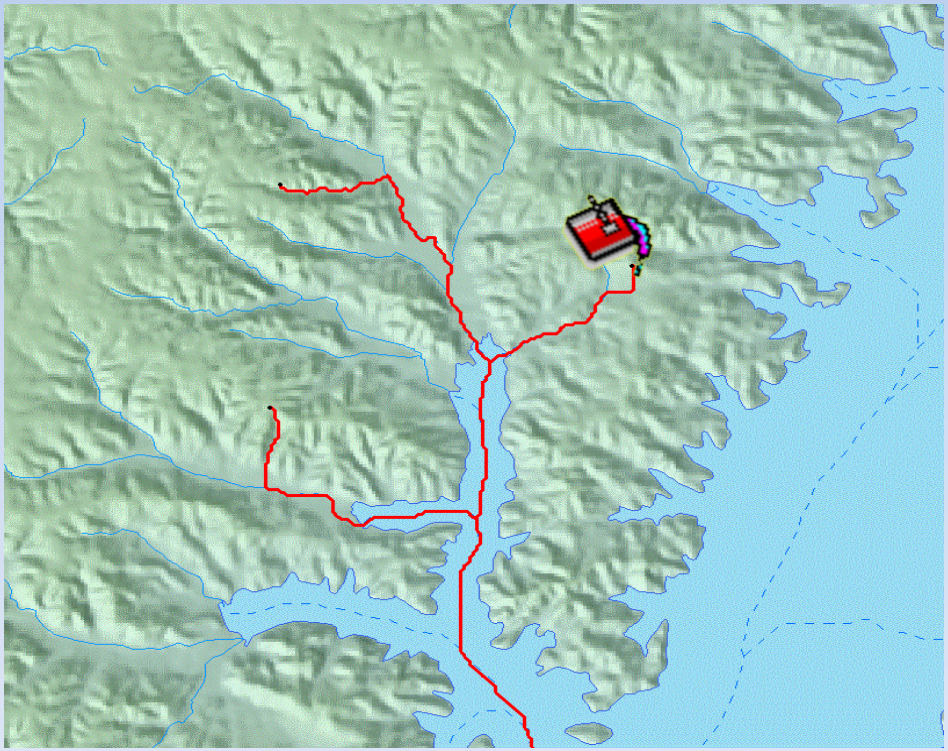
NHDPlus Concepts: Integration of NHD, WBD, and NED

WBD Boundary
"walled"
Into Elevation

NHD Streams
"burned"
Into Elevatio



NHDPlus Concepts: *Link the Landscape to the Mapped Stream Network*

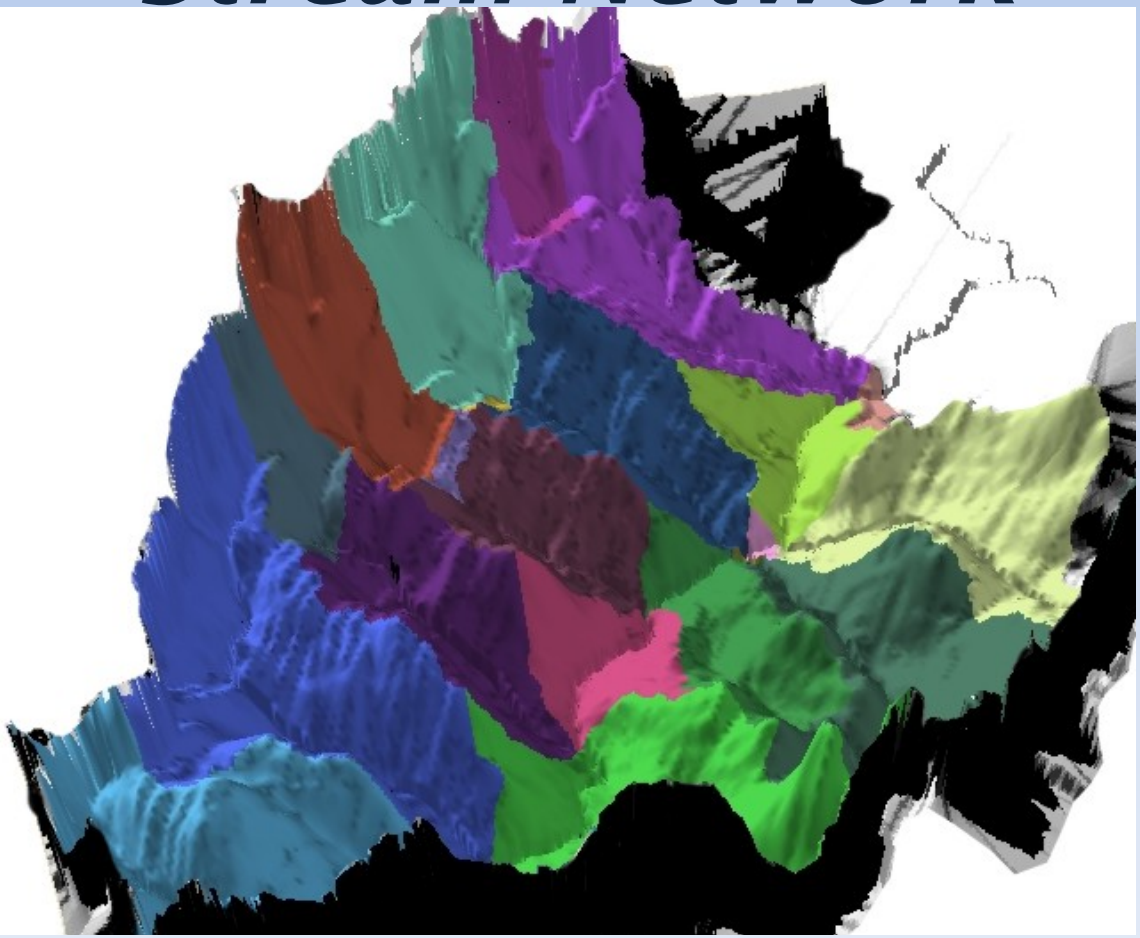


NHDPlus Elevation Derivatives: Flow Direction Grid to perform "raindrop" transport

NHDPlus Concepts: *Link the Landscape to the Mapped Stream Network*

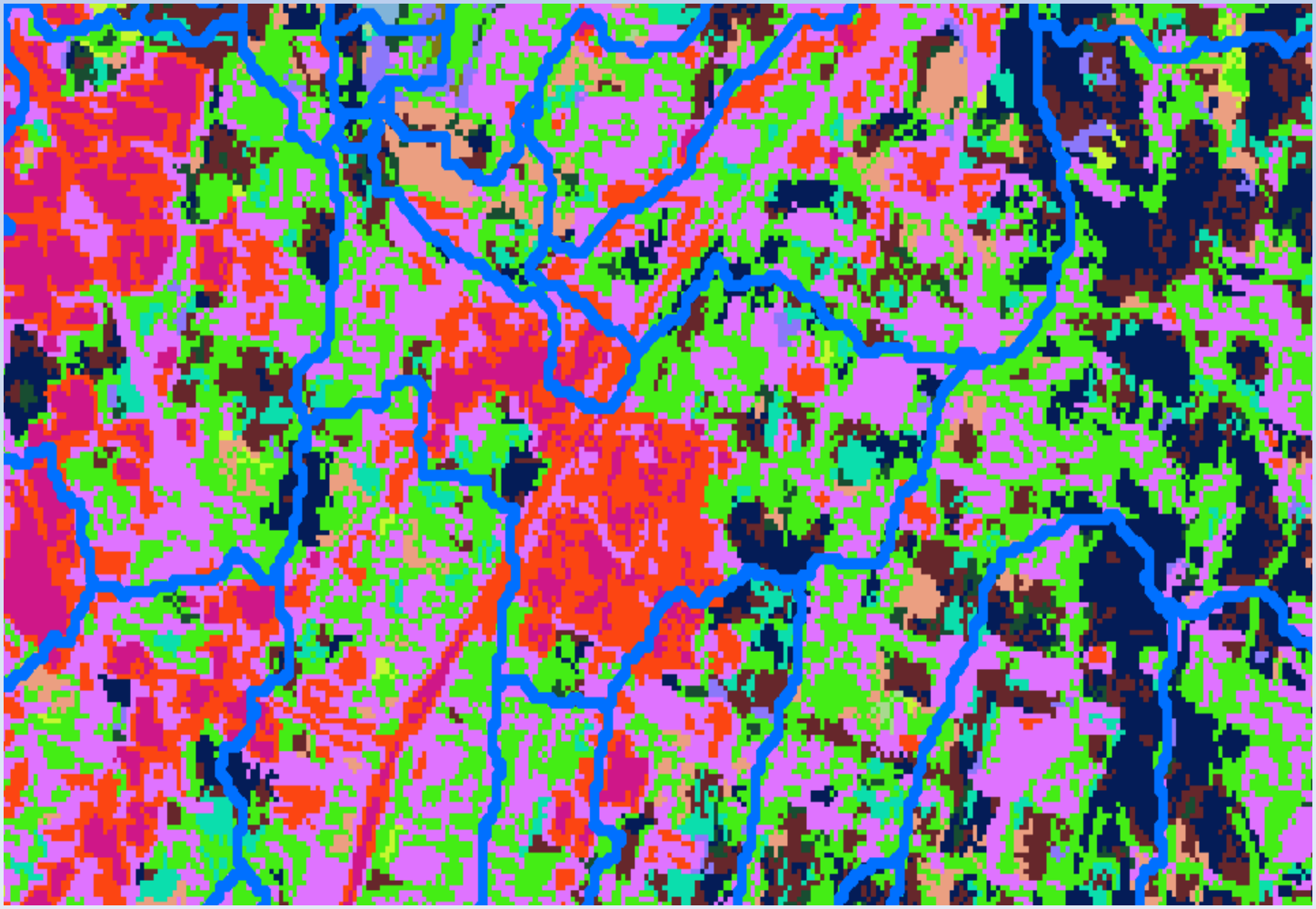
NHDPlus Catchments: Define the land surface that drains to each stream segment.

NHDPlus Concepts: *Link the Landscape to the Mapped Stream Network*

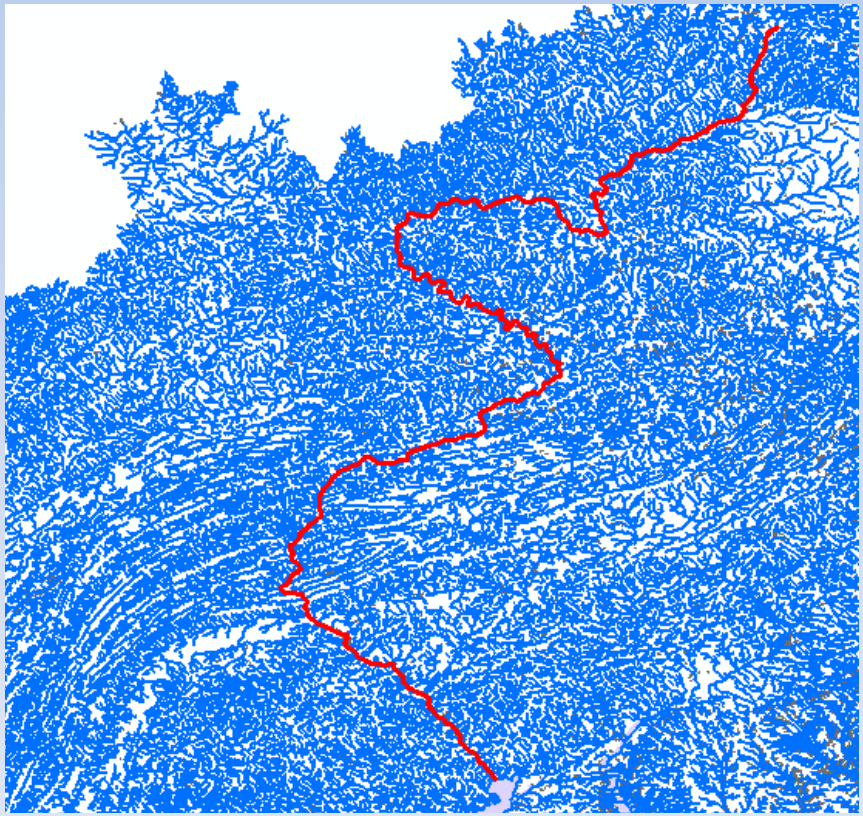


NHDPlus Catchments in 3D

NHDPlus Concepts: Link Landscape Characteristics to the Stream Network

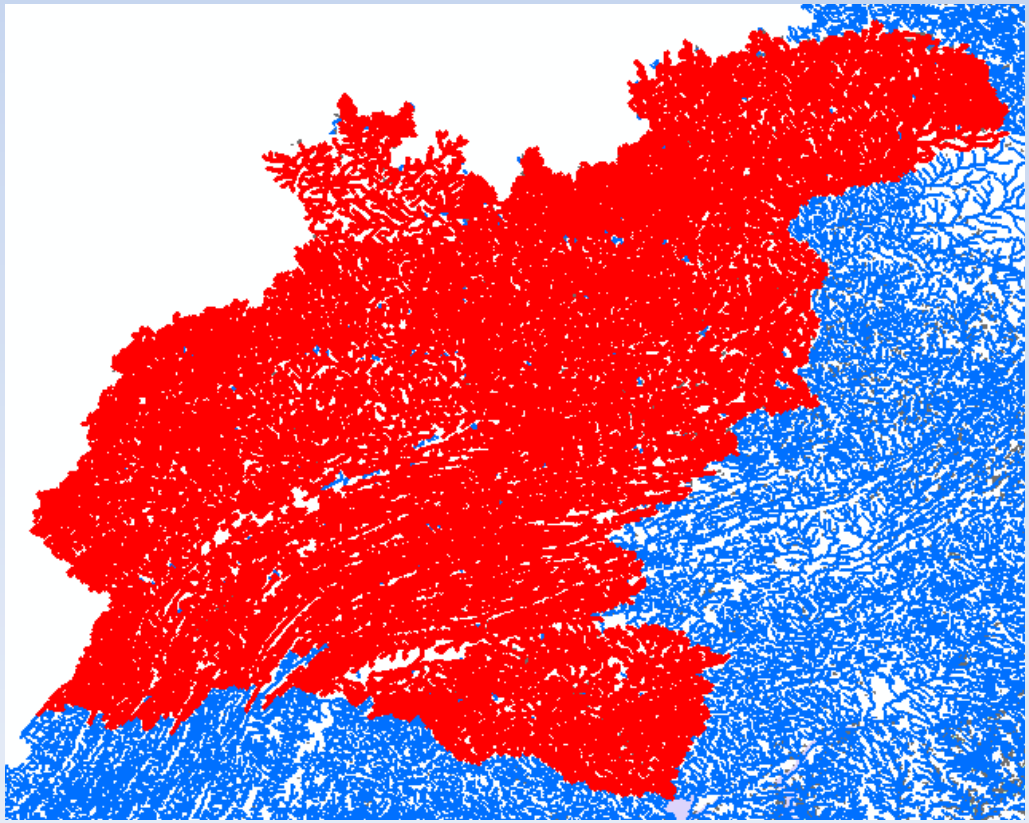


NHDPlus Concepts: Navigation of the Linear Surface Water Network



Susquehanna River Main Stem

Susquehanna River Drainage Basin



NHDPlus Ver 2.0: Content

- NHD Snapshot
  - More Names
  - More Lakes
  - More than 7500 Isolated Networks Connected
- NED Snapshot
  - Nearly Wall-to-Wall 10 Meter Source Data
- WBD Snapshot
  - Nationally Complete

NHDPlus Ver 2.0: Content

- USGS NWIS Streamflow Gage Network Locations – 23,000 in V01 – 30,000 in V02
- Major Divergence Fractions – % of flow down divergent paths
- Major Water Flow Additions, Removals & Inter-basin Transfers
- TBD – NID Dam Network Locations

NHDPlus Ver 2.0: Content

- 2001 National Land Cover
  - Land Cover
  - Impervious Surface
  - Canopy
  - 1992-2001 Change
- PRISM – Temperature (1971-2000)
- PRISM – Precipitation (1971-2000)

NHDPlus Ver 2.0: Tools (Enhanced and New)

- Network Navigators
- Basin Delineator
- Catchment Attribute Allocation and Accumulation
- Network/Catchment/Attribute Generalization

NHDPlus Ver 2.0: Flow Estimation

- Version 2.0 – Mean Flows – Monthly & Annual
    - Divergence Fraction
    - Runoff Estimate
    - Flow Additions and Removals
    - Evapotranspiration
    - Streamflow Gage Adjustments

NHDPlus Ver 2.0:

Questions?

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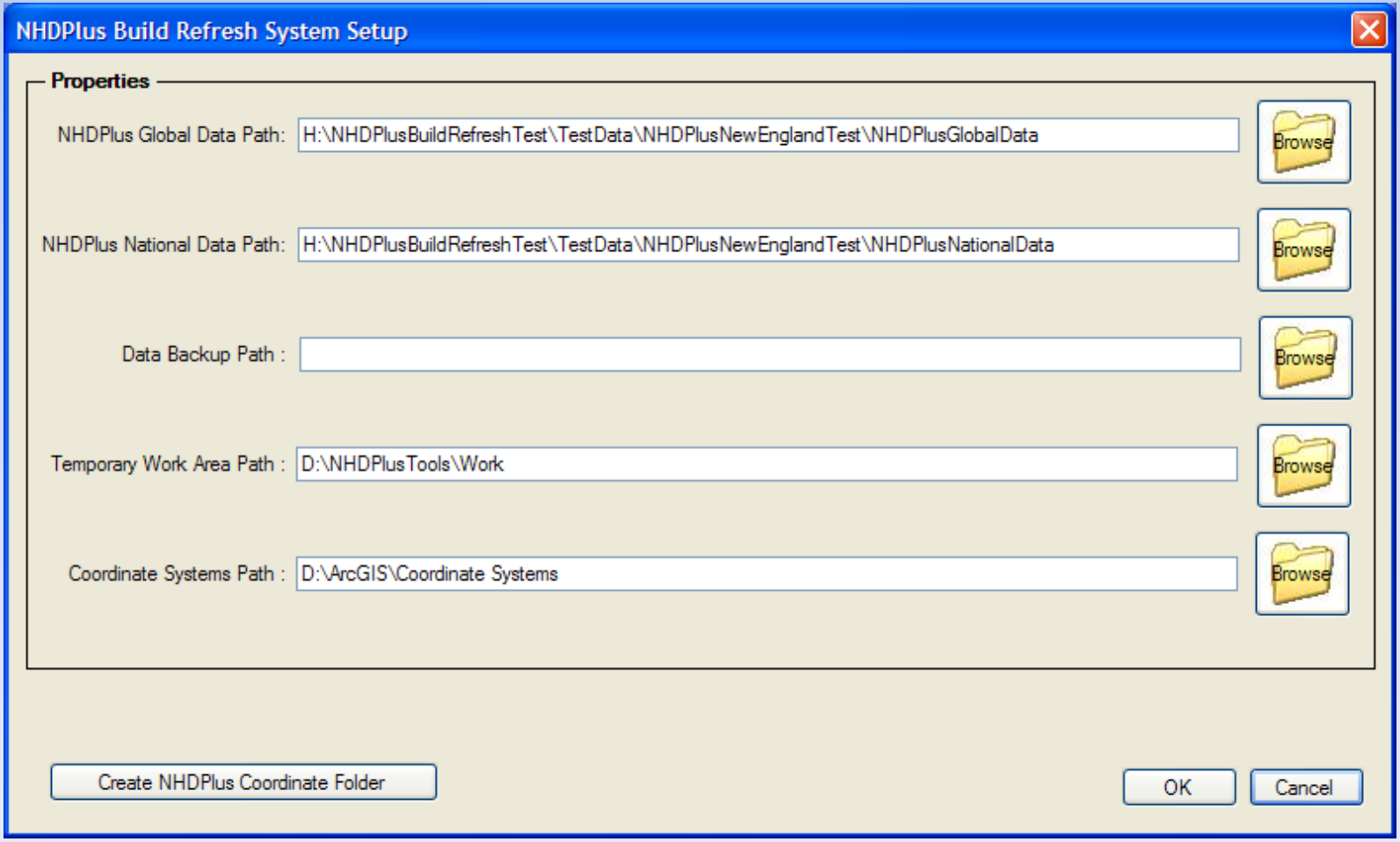
NHDPlus@hscnet.com

NHDPlus Ver 2.0: Build \Refresh Tools



NHDPlus Ver 2.0: Content

- Hydro-Enforcement Components
  - Flow lines – NHD Flowlines and Additional Lines
  - Waterbodies – NHD and Additional Waterbodies
  - Walls – WBD Walls
  - Sinks – Ends of Isolated Networks, Closed Basins, International Boundaries,
- Elevation-derived Catchments
- Flow Accumulation Grid
- Flow Direction Grid
- Elevation and Slope for Network Segments

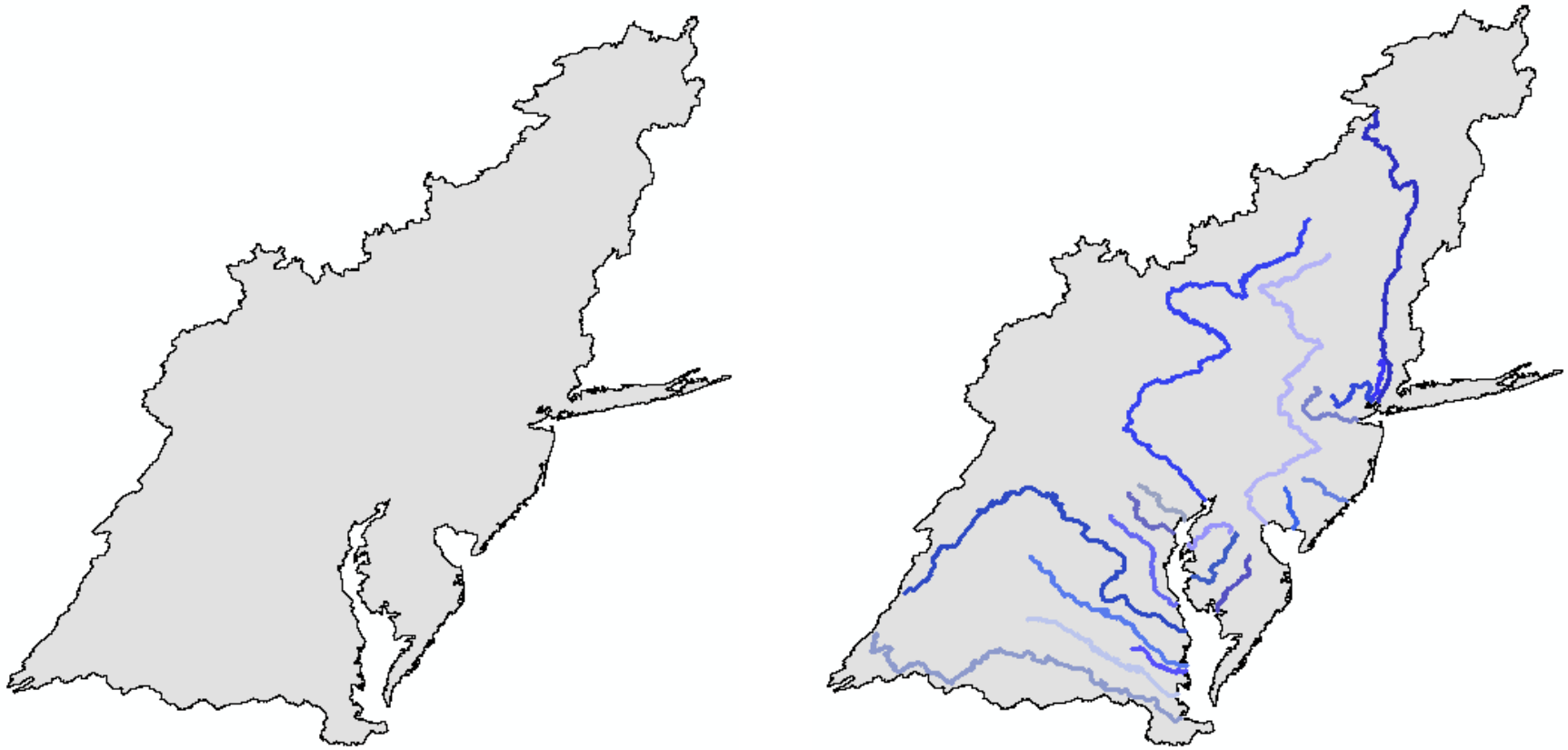
NHDPlus Ver 2.0: Content

- Enhanced Navigation Attributes
- Many Useful Network Attributes
  (stream order, stream level, level path id, terminal path id)
- Catchment Landscape and Climate Characteristics
- Cumulative (Total Upstream) Landscape and Climate Characteristics
- Stream Flow Estimates for Every Ungaged Segment
  - Mean Annual

NHDPlus Ver 2.0: Structure

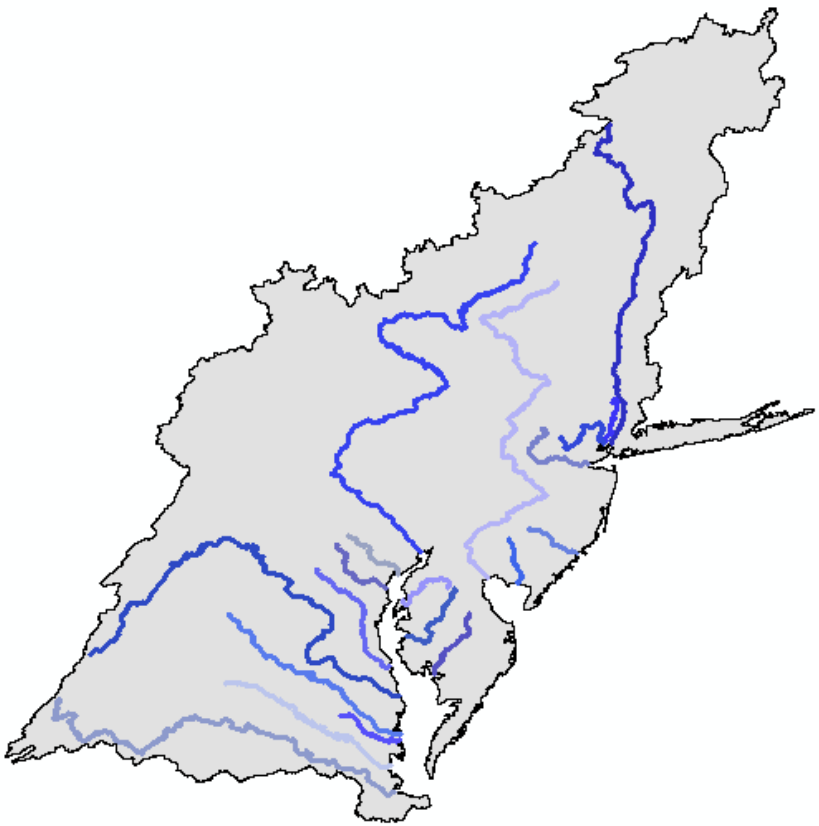
- Shapefiles and Grids
- TBD – File Geodatabase
- Distribution Packages: Drainage Areas
- Global Data – Metadata, Processing Boundaries
- National Data – Stream Gage locations and flow statistics, National Catchment Grid

NHDPlus Ver 2.0: Structure



Drainage Area: Mid-Atlantic Major Rivers

NHDPlus Ver 2.0: Structure



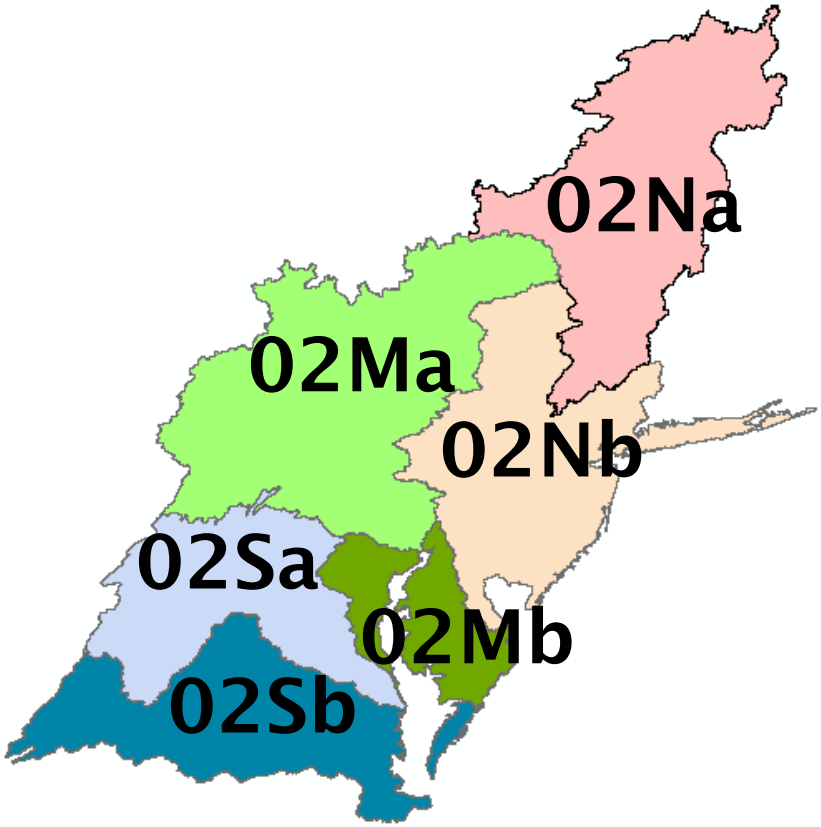
Major Rivers

HUC8s – Subbasins

NHDPlus Ver 2.0: Structure

HUC8s – SubbasinsVector Processing Un

NHDPlus Ver 2.0: Structure



Vector Processing Unit

Raster Processing Un

NHDPlus Ver 2.0: Structure

- Folder Structure
  - \NHDPlusDD (Drainage Area)
    - \NHDPlusVPU (Vector Processing Unit)
      - \NHDSnapshot
      - \NEDSnapshot
      - \WBDSnapshot
      - \NHDPlusAttributes
      - \NHDPlusBurnComponents
        - <channels,waterbodies,walls,si

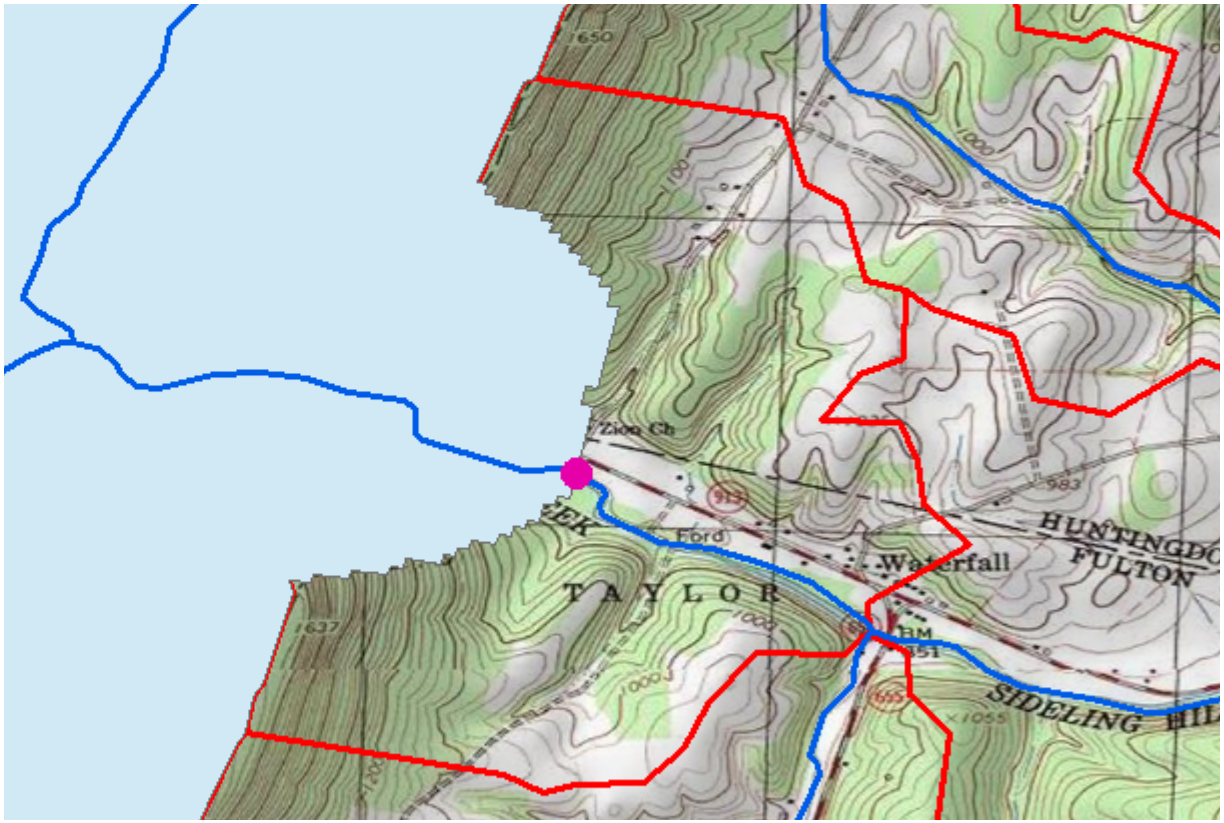
NHDPlus Ver 2.0: Structure

- Folder Structure (Continued)
  - \NHDPlusDD (Drainage Area – continued)
    - \NHDPlusVPU (VPU – continued)
      - \NHDPlusCatchment
        - Catchment.shp
        - \cat
      - \NHDPlusRPU (Raster Processing Unit)
        - \fac
        - \fdr
      - \NHDPlusUROM
      - \NHDPlusVogel

NHDPlus Ver 2.0: Capabilities

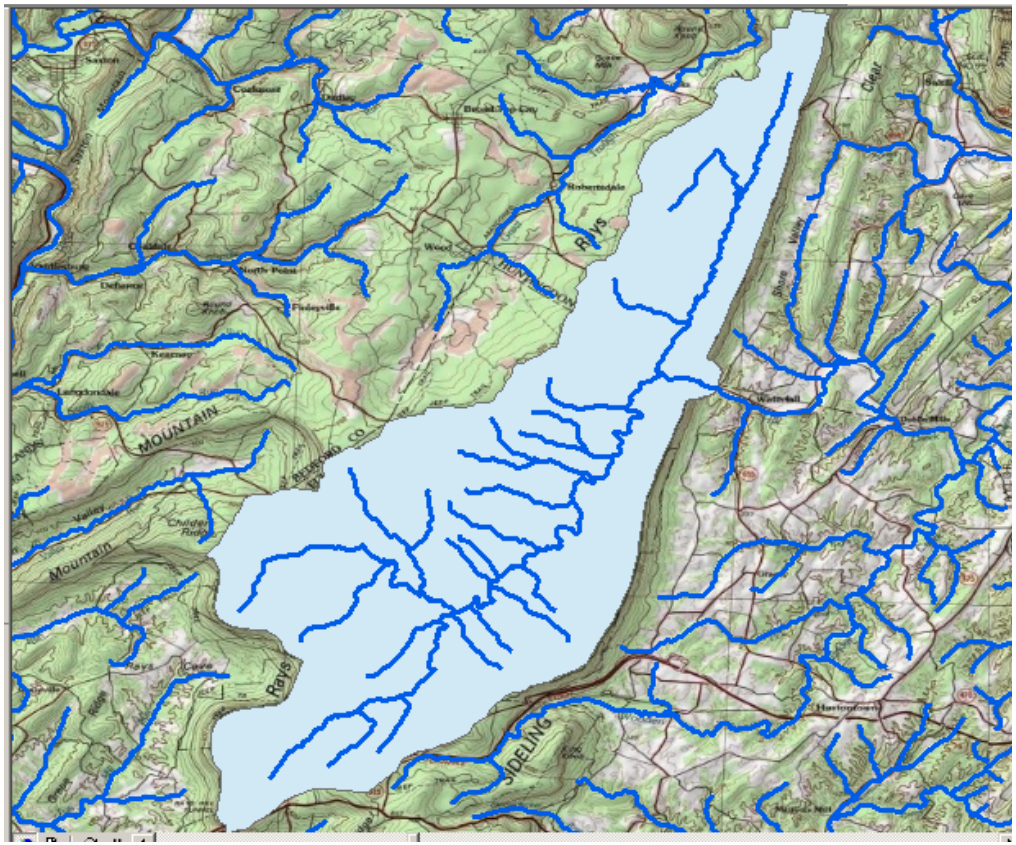
- Basin Delineation
- Basin Characterization
- Impact Analysis
- Impairment Source Discovery
- Fate/Transport Modeling
- Dilution Modeling
- Many More …

NHDPlus Ver 2.0: Capabilities



Basin Delineation: From Any Point on the NHDPlus Stream Network

NHDPlus Ver 2.0: Capabilities



Basin Delineation: From Any Point on the NHDPlus Stream Network

NHDPlus Ver 2.0: Capabilities

Main Stem Name: Huntsville Spring Branch
Stream Order: 3 Stream Level: 4
Area weighted precipitation 1431.2 mm
Area weighted temperature 15.3 °C
Land Use

Residential	28%
Commercial/Ind/Trans	9%
Forest	33%
Pasture/Hay	5%
Row Crops	12%
Urban/Rec Grasses	5%
Wetlands	5%
Other	3%

Drainage area 180.5 km^2
Mean Annual Flow (USGS) 1486 cfs

Drainage Area Characterization: From NHDPlus Cumulative Network Attributes

NHDPlus Ver 2.0: Build \Refresh Tools

"24" Steps (Two 12-step Programs)

Setup NHD WBD

S1 -> S2 -> S3 <Vector Processing> S12

S13 <Raster Processing><Attr Processing

NED

NHDPlus V0

NHDPlus Ver 2.0: Build \Refresh Tools

NHDPlusBuildRefresh 1.0.0
National Hydrography Dataset Plus
NHDPlus BuildRefresh
About
System Setup
Create Metadata
Run BuildRefresh
Delete Main Log
Help
Quit
NHDPlus BuildRefresh
Developed for
The U.S. Environmental Protection Agency
Office of Water
http://www.epa.gov/ow/
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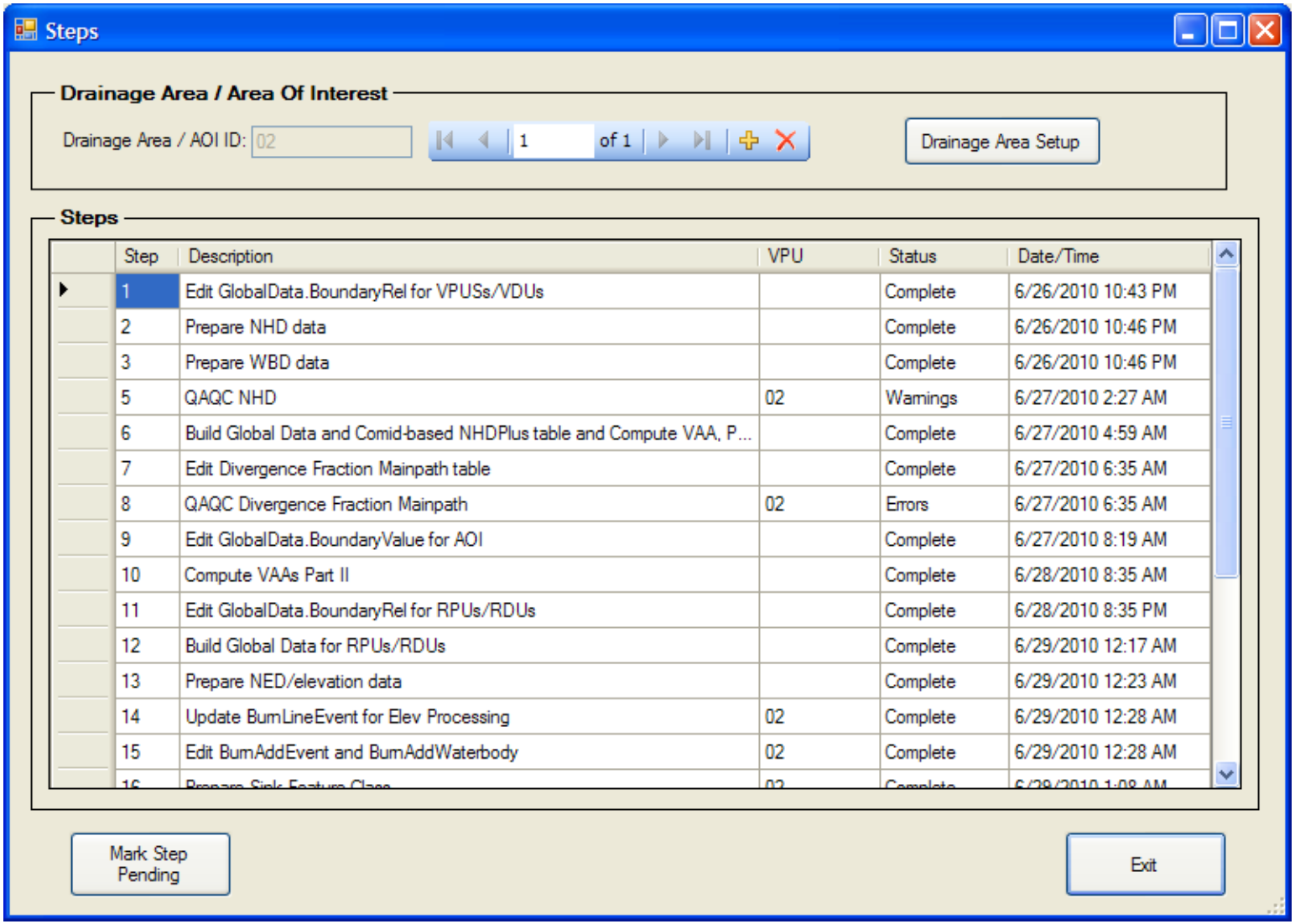
NHDPlus Ver 2.0: Build \Refresh Tools



Step	Description	VPU	Status	Date/Time
1	Edit GlobalData.BoundaryRel for VPUSs/VDUs		Complete	6/26/2010 10:43 PM
2	Prepare NHD data		Complete	6/26/2010 10:46 PM
3	Prepare WBD data		Complete	6/26/2010 10:46 PM
5	QAQC NHD	02	Warnings	6/27/2010 2:27 AM
6	Build Global Data and Comid-based NHDPlus table and Compute VAA, P...		Complete	6/27/2010 4:59 AM
7	Edit Divergence Fraction Mainpath table		Complete	6/27/2010 6:35 AM
8	QAQC Divergence Fraction Mainpath	02	Errors	6/27/2010 6:35 AM
9	Edit GlobalData.BoundaryValue for AOI		Complete	6/27/2010 8:19 AM
10	Compute VAAs Part II		Complete	6/28/2010 8:35 AM
11	Edit GlobalData.BoundaryRel for RPUs/RDUs		Complete	6/28/2010 8:35 PM
12	Build Global Data for RPUs/RDUs		Complete	6/29/2010 12:17 AM
13	Prepare NED/elevation data		Complete	6/29/2010 12:23 AM
14	Update BumLineEvent for Elev Processing	02	Complete	6/29/2010 12:28 AM
15	Edit BumAddEvent and BumAddWaterbody	02	Complete	6/29/2010 12:28 AM
16	Prepare Sink Feature Class	02	Complete	6/29/2010 1:08 AM

NHDPlus Ver 2.0: Build \Refresh Public Release (Continued)

- Summer 2011
  - South Atlantic (Hydrologic Region 03)
  - Colorado Drainage (Hydrologic Regions 14, 15)
  - Rio Grande (Hydrologic Region 13)
  - Great Basin (Hydrologic Region 16)
  - California (Hydrologic Region 18)
  - Hawaii (Hydrologic Region 20)
  - Puerto Rico & US VI (Hydrologic Region 21)
- TBD – High Resolution NHDPlus

NHDPlus Ver 2.0: Build \Refresh Public Release

- Early 2011
  - Great Lakes Drainage (Hydrologic Region 04)
  - Mississippi Drainage (Hydrologic Regions 05, 06, 07, 08, 10, 11)
  - Pacific Northwest (Hydrologic Region 17)
  - Sauris-Red Rainy (Hydrologic Region 09)
- Spring 2011
  - New England (Hydrologic Region 01)

NHDPlus Ver 2.0
Where to Learn More

NHDPlus Website and FTPsite:

www.EPA.Waters (link on upper right side of page)

or

www.Horizon-Systems.com\NHDPlus

On the "Documentation" tab:

- NHDPlus Ver 2.0 Database Design
- NHDPlus Ver 2.0 Build\Refresh Tools Functional Design