



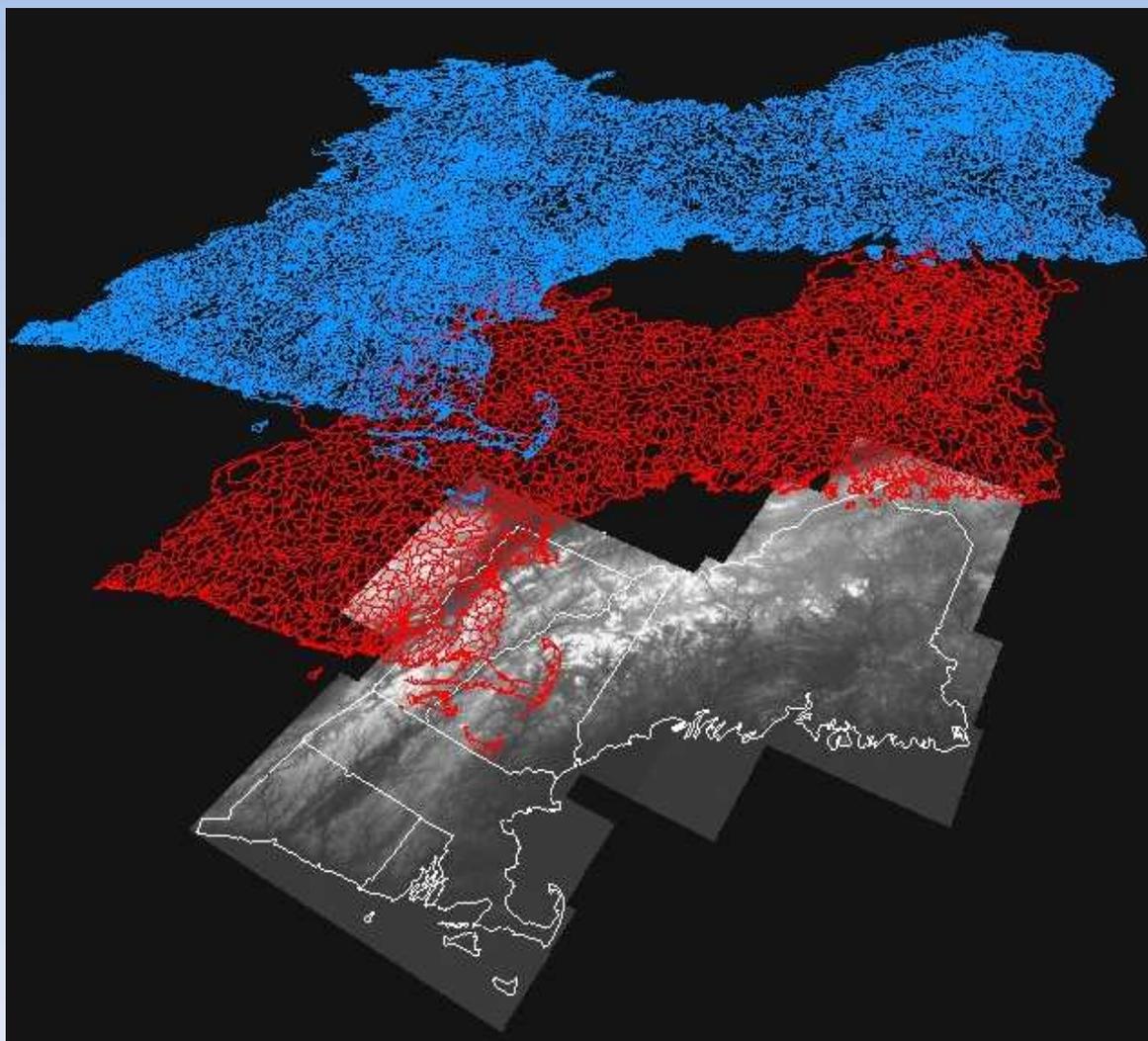
**Applying NHDPlus to Support
The National Lake Assessment
and
The National Rivers & Streams Assessment**

**Presented by:
Cindy McKay, Horizon Systems Corp.**

**Sponsored by:
U.S. EPA, Office of Water**

**NWQM Conference
May 2012**

NHDPlus Concepts: Integration of NHD, WBD, and NED



**National
Hydrography
Dataset (NHD)**

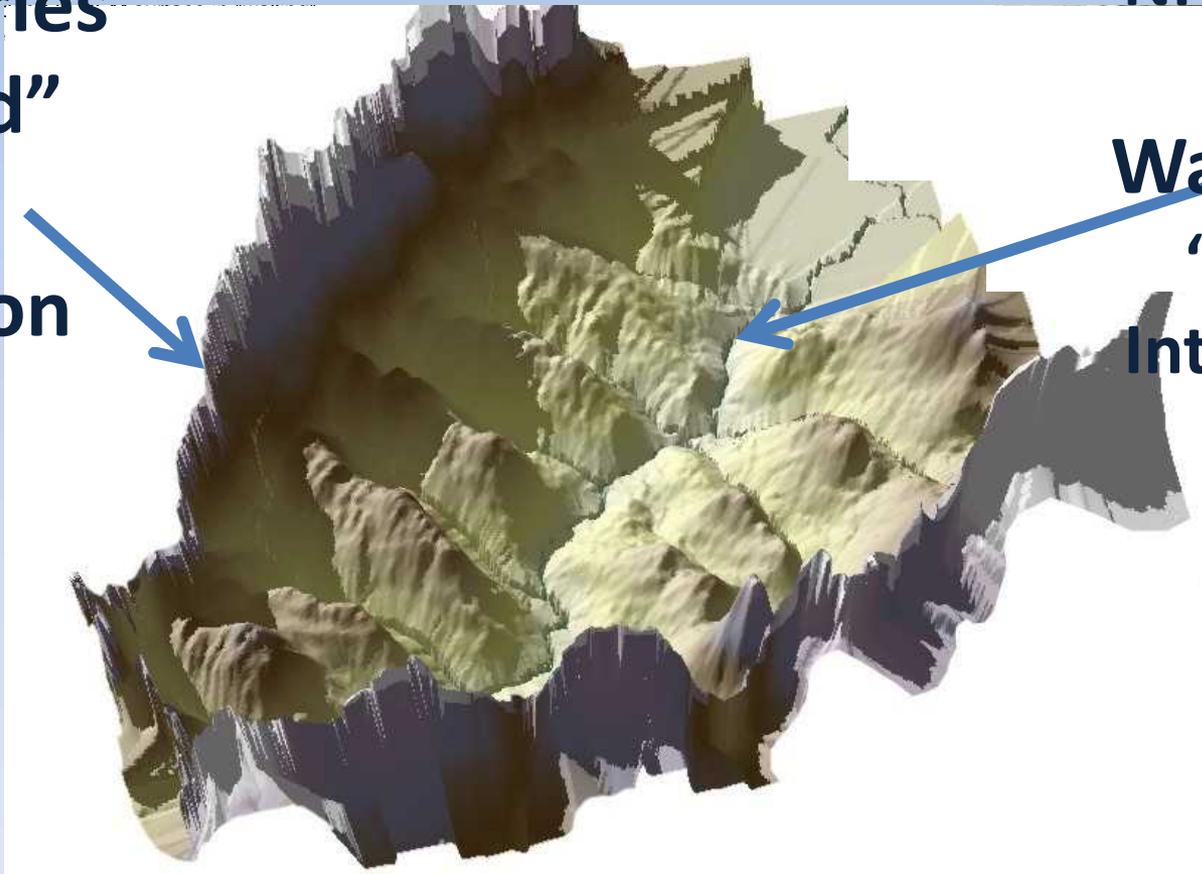
**Watershed
Boundary
Dataset (WBD)**

**National
Elevation
Dataset (NED)**

NHDPlus Concepts: Integration of NHD, WBD, and NED

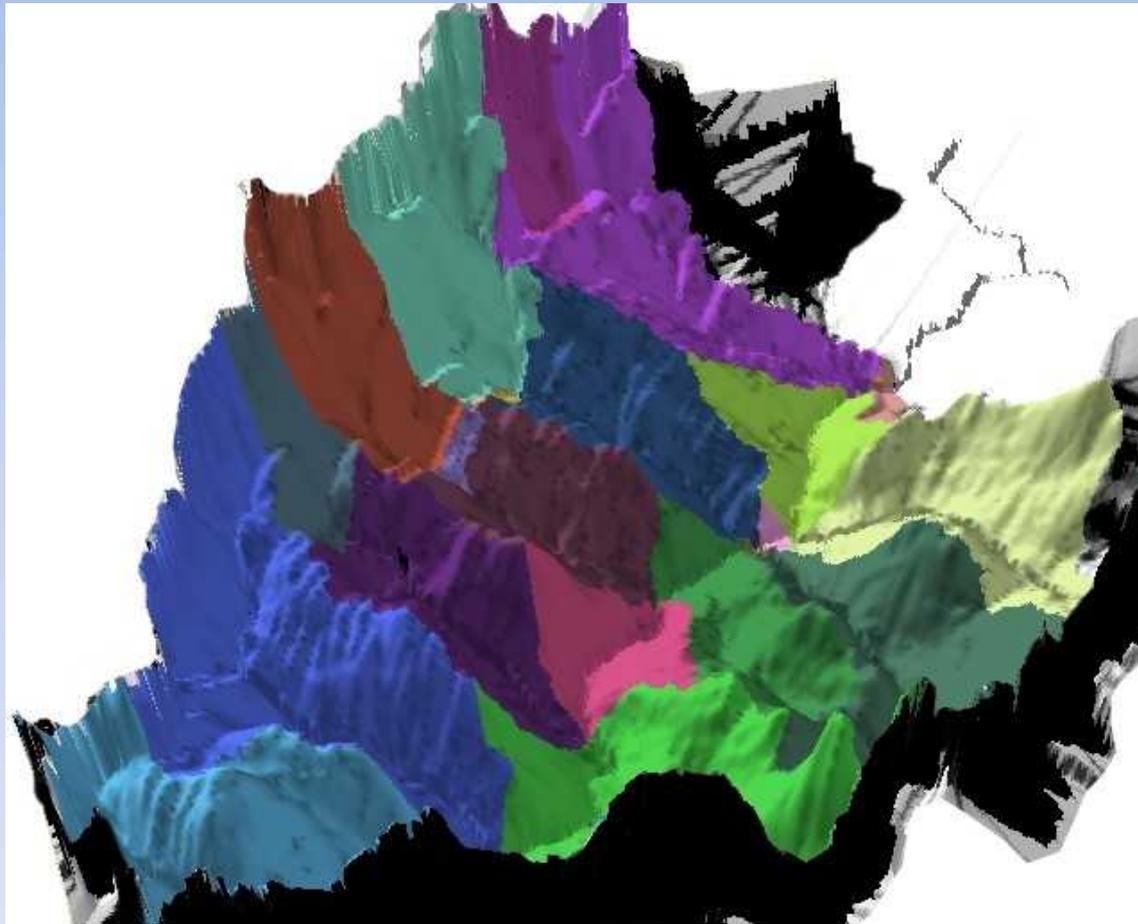
WBD

**Boundaries
“walled”
Into
Elevation**



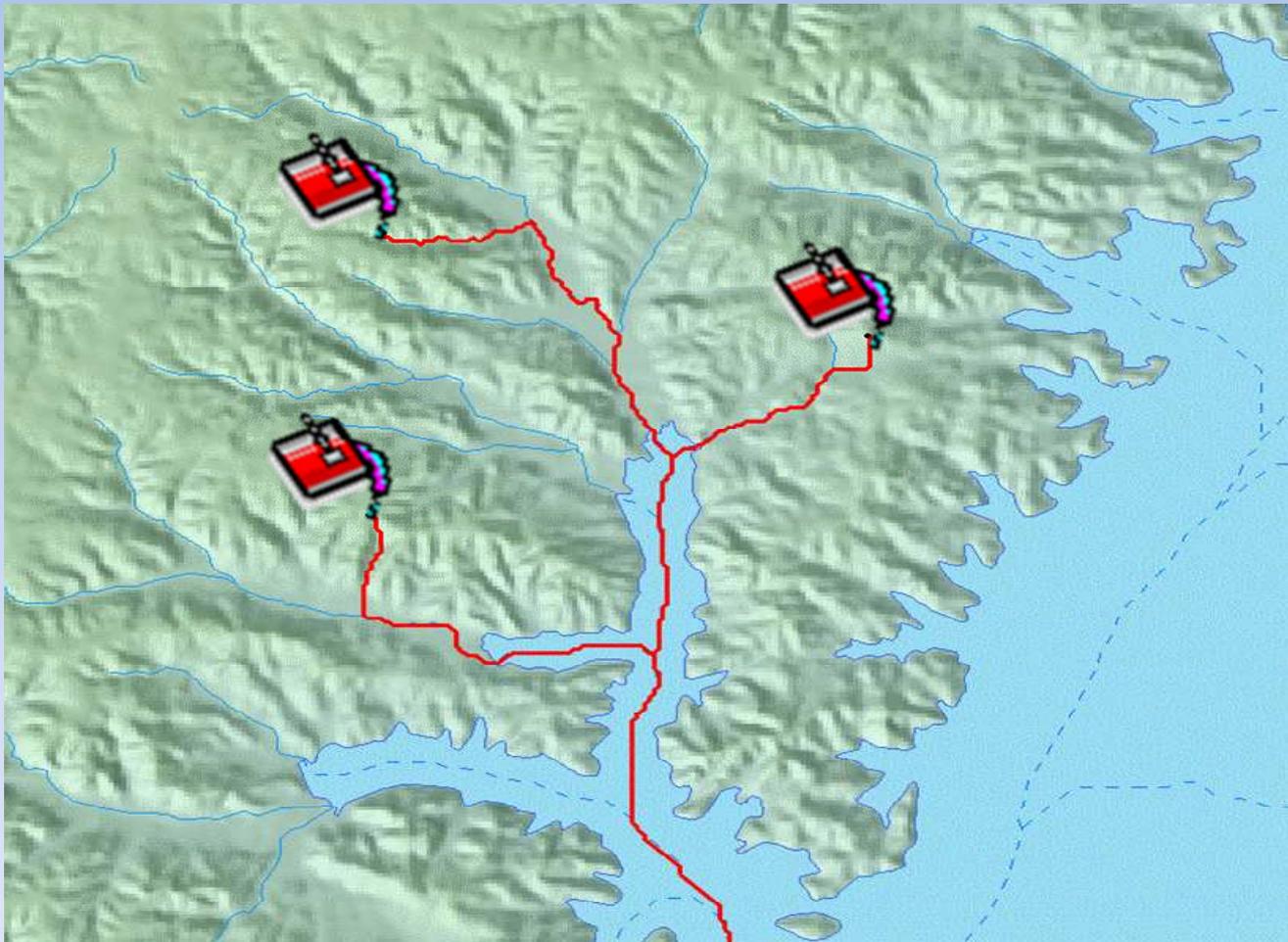
**NHD Streams
and
Waterbodies
“burned”
Into Elevation**

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



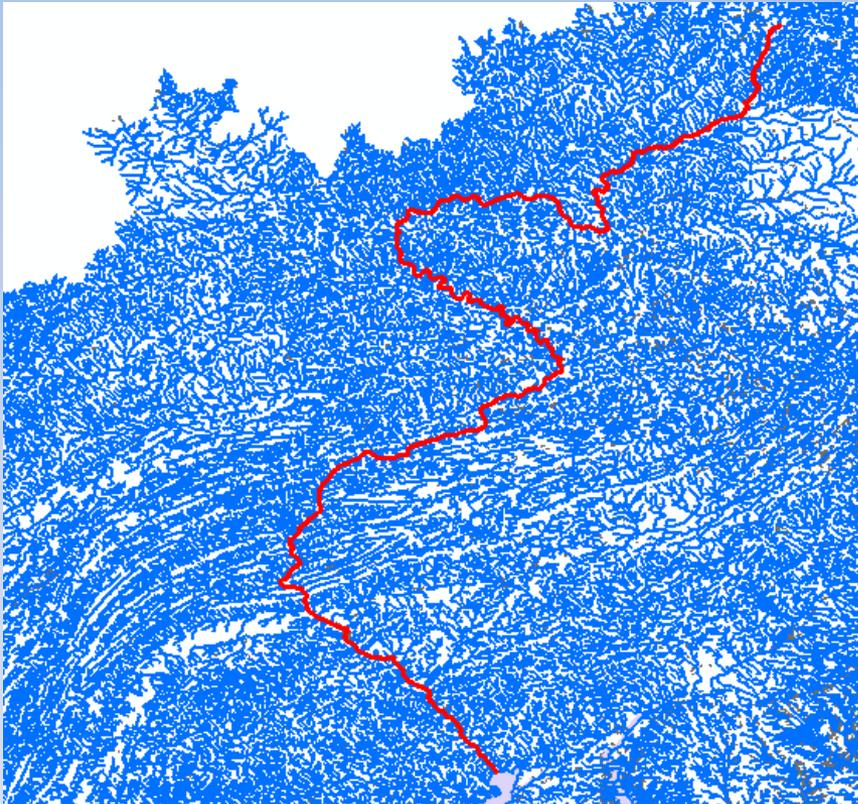
Land Surface that Drains to Each Stream Segment

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

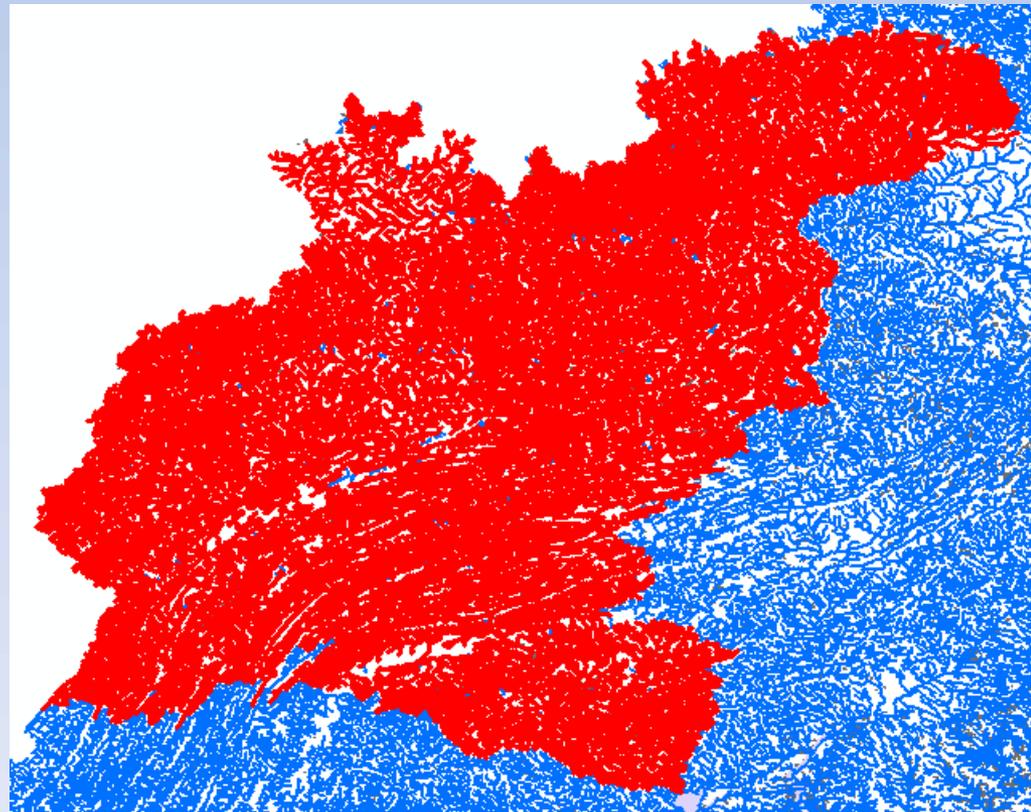


NHDPlus Concepts: Navigation of the Linear Surface Water Network

Susquehanna River Drainage Basin



Susquehanna River
Main Stem

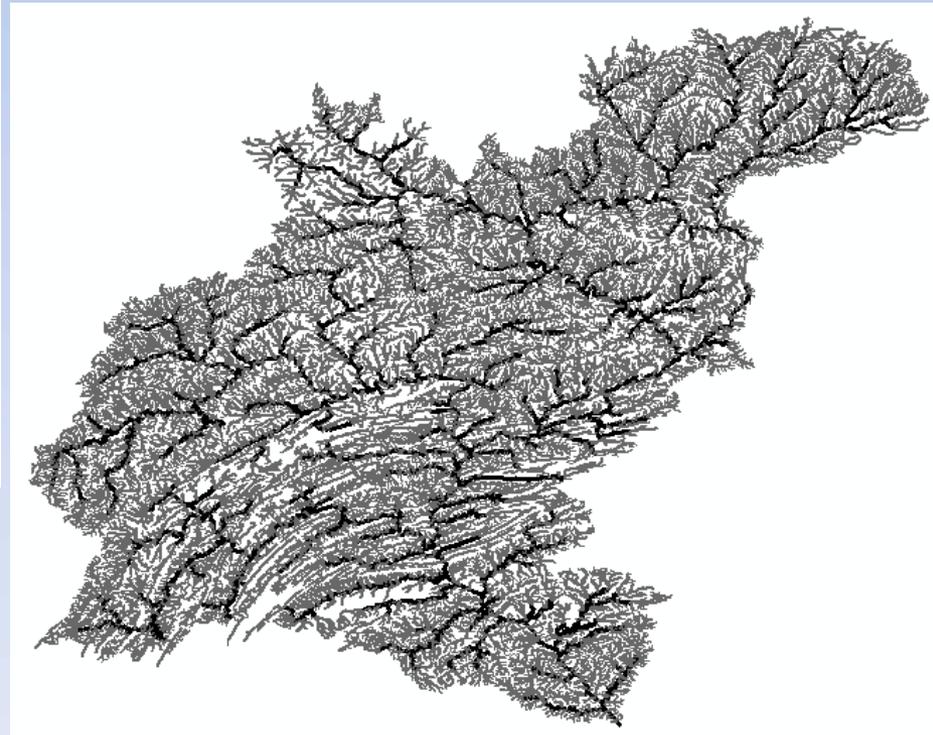


NHDPlus Concepts: Accumulated Characteristics using the Stream Network

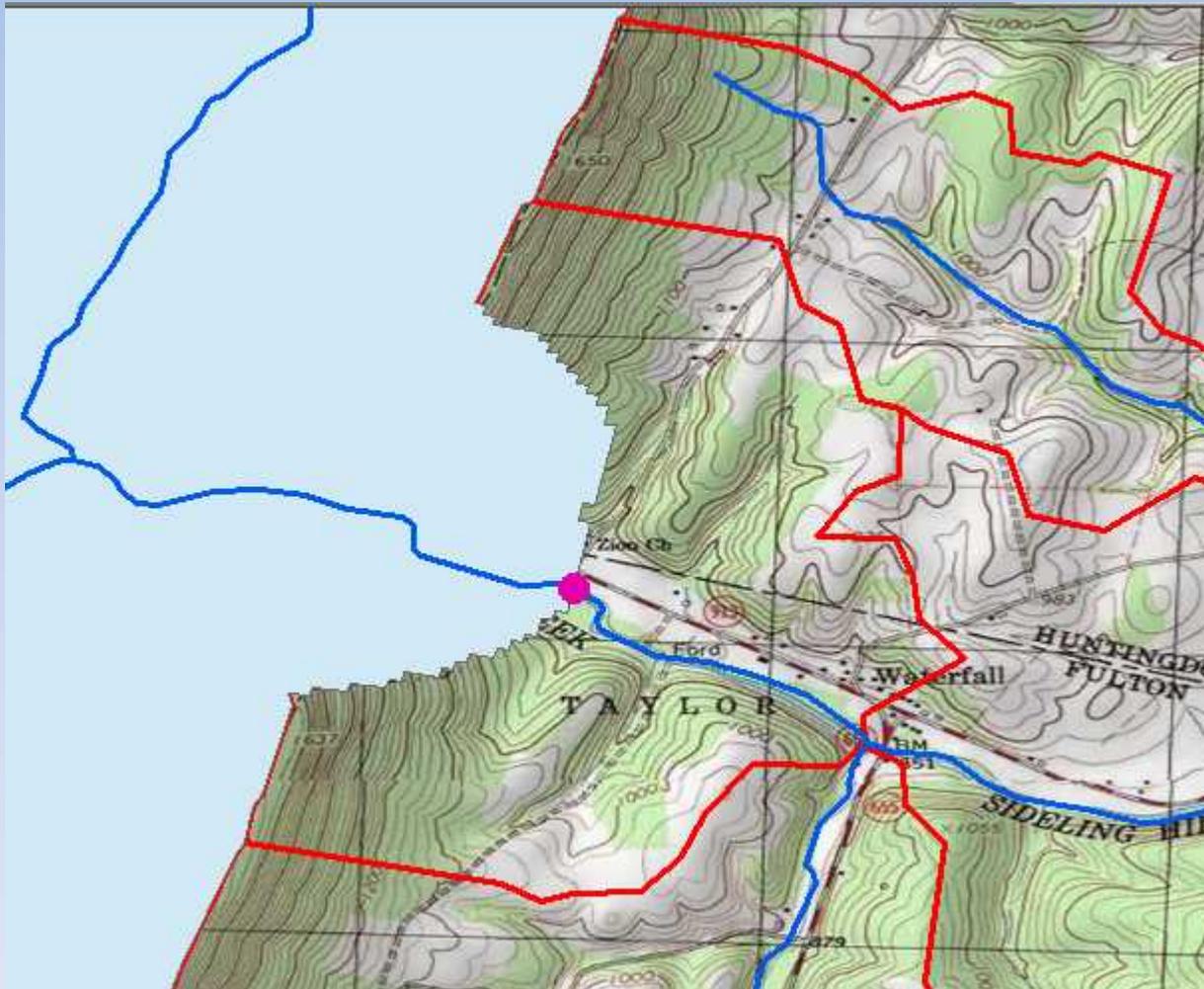


**Cumulative
Drainage Area**

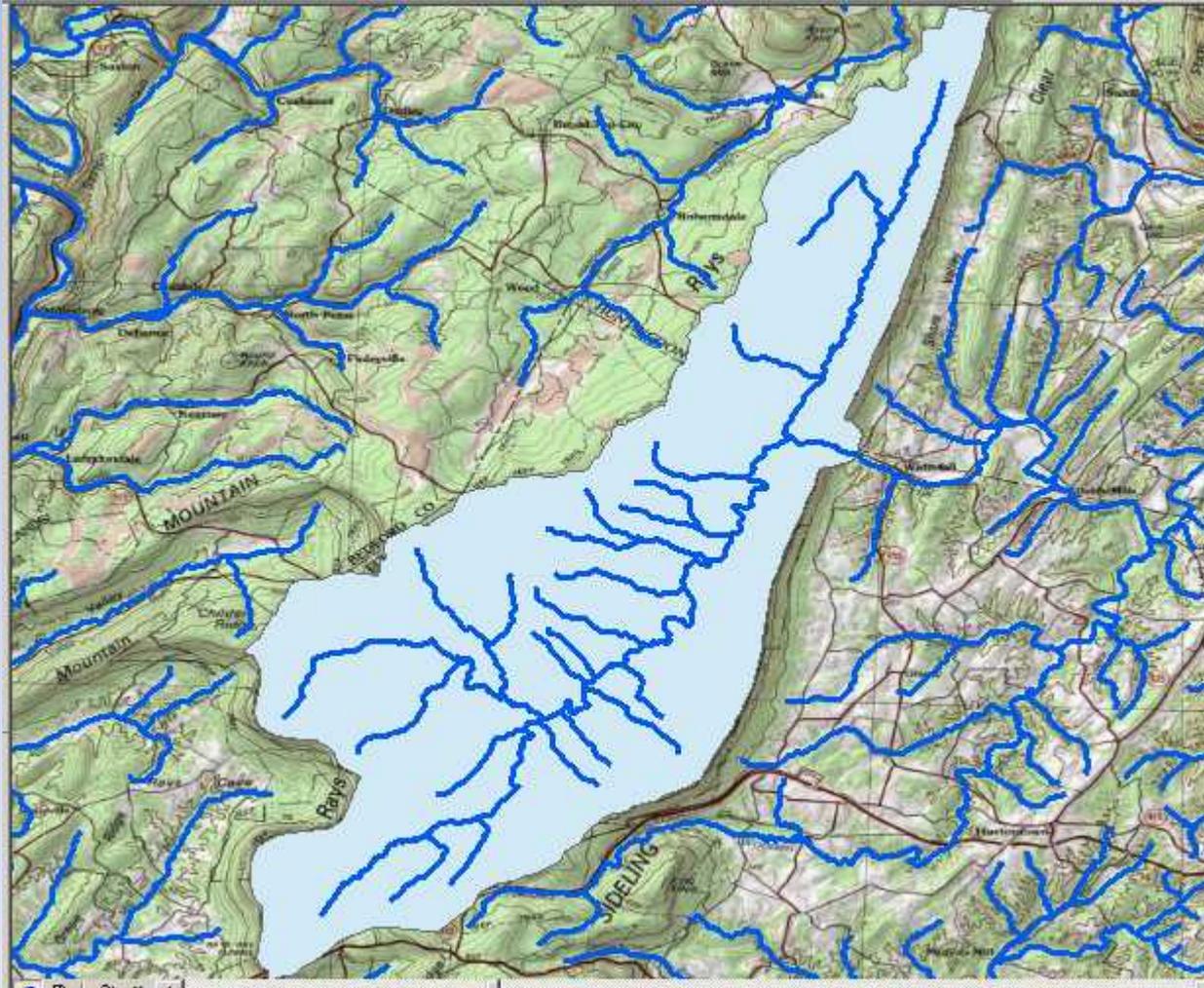
Stream Flow



NHDPlus Concepts: *Watershed Delineation From any Network Point*

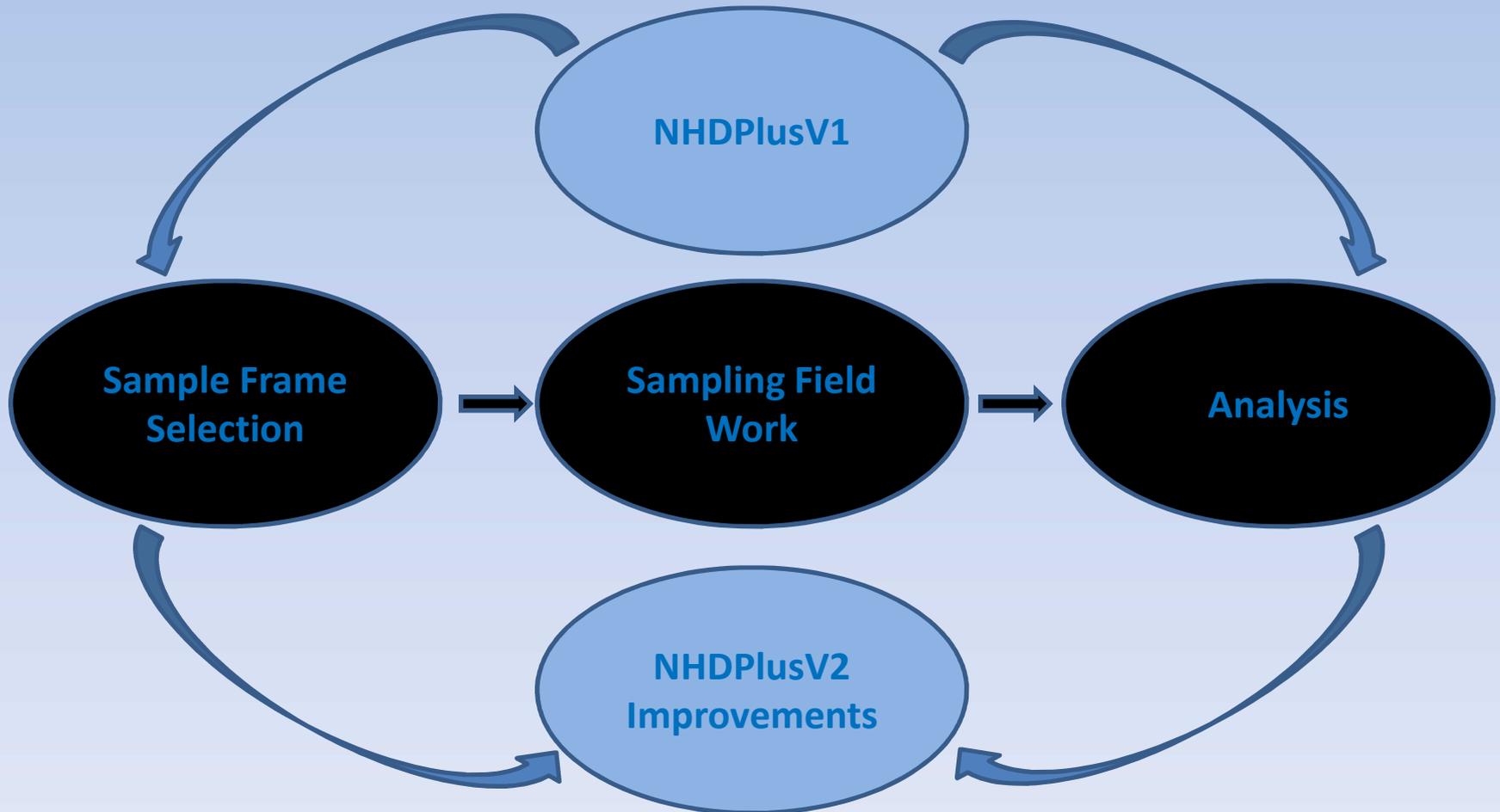


NHDPlus Concepts: *Watershed Delineation From any Network Point*

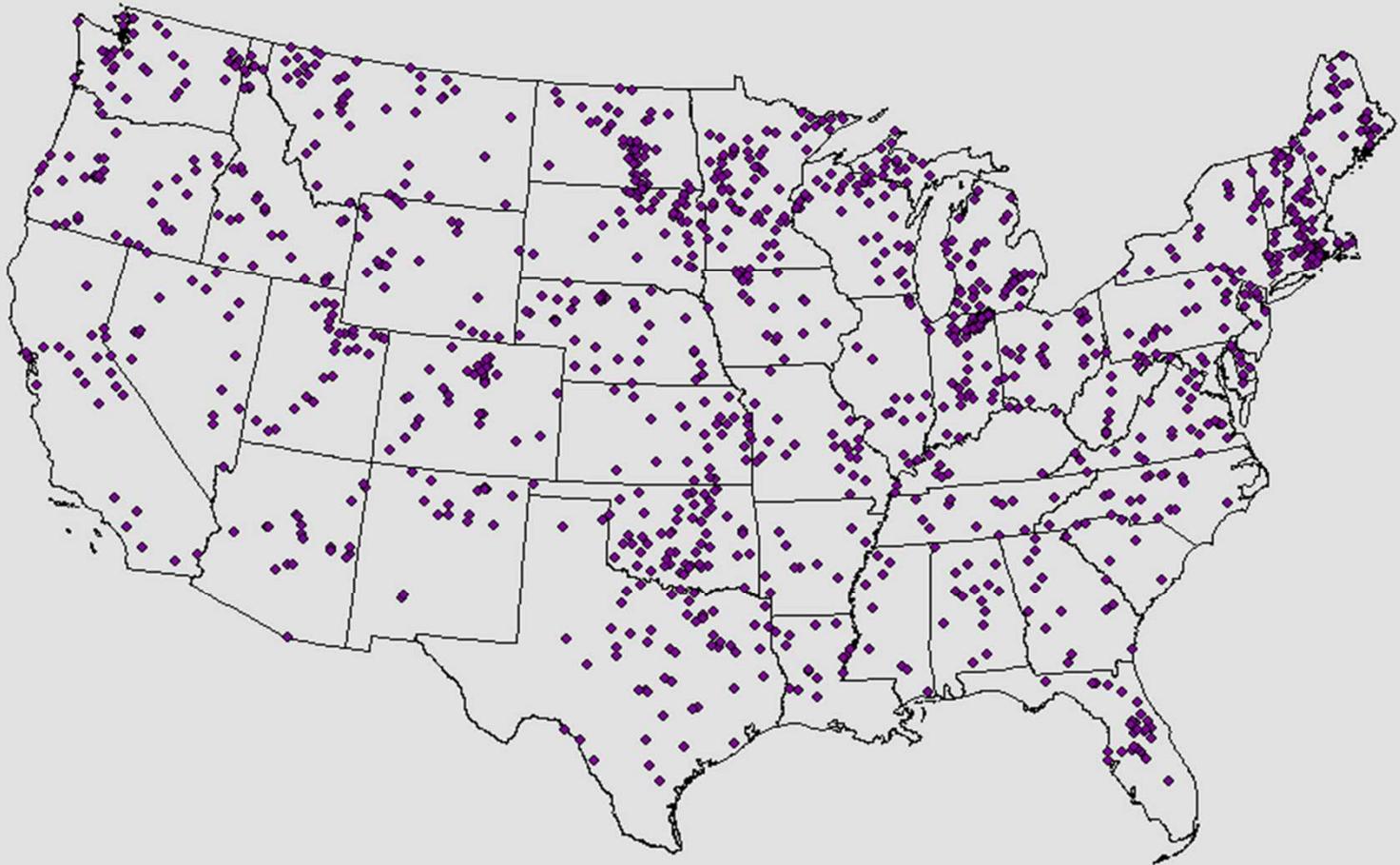


NARS and NHDPlus

NARS and NHDPlus: A Mutually Beneficial Relationship



NHDPlus Support to NLA

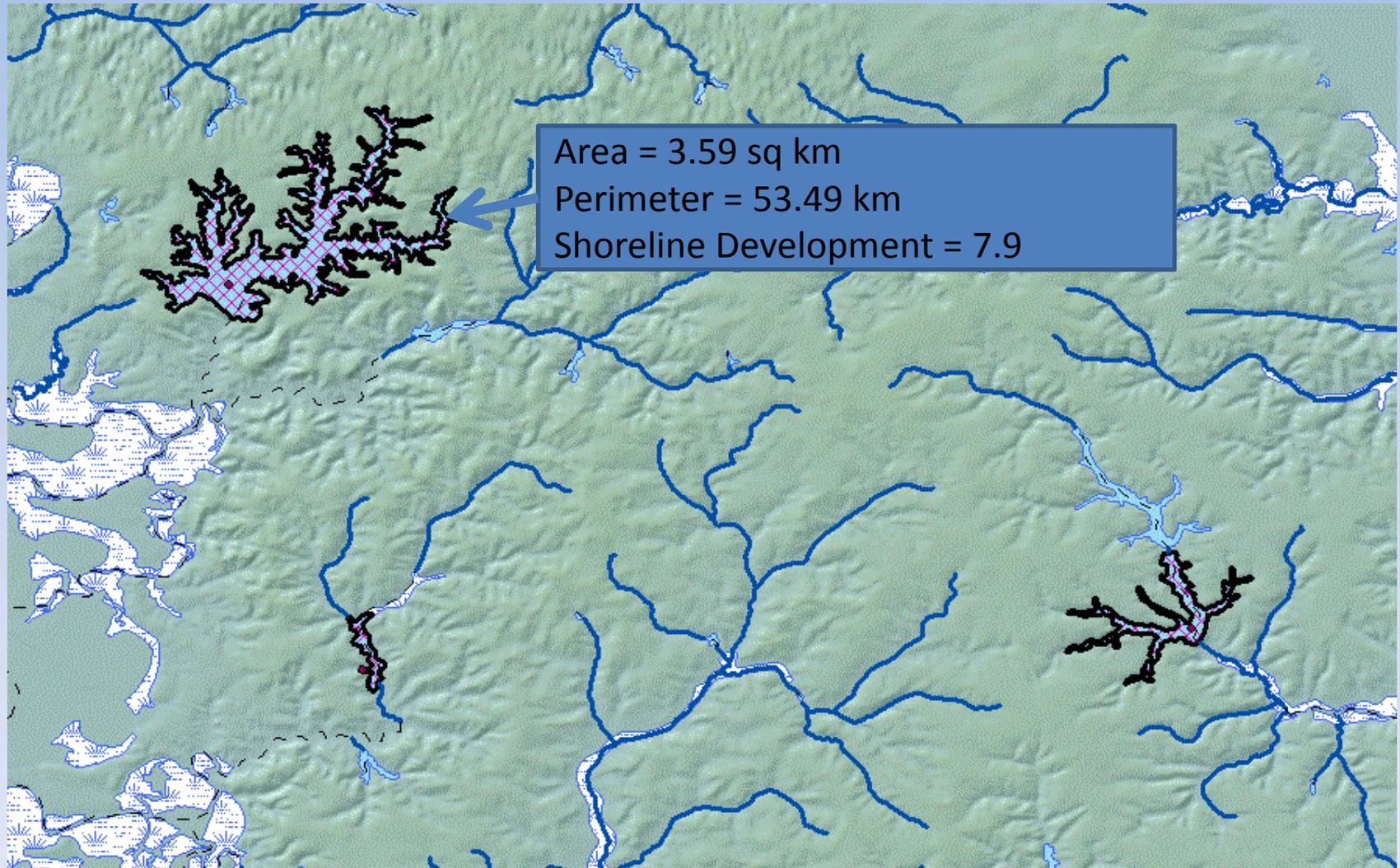




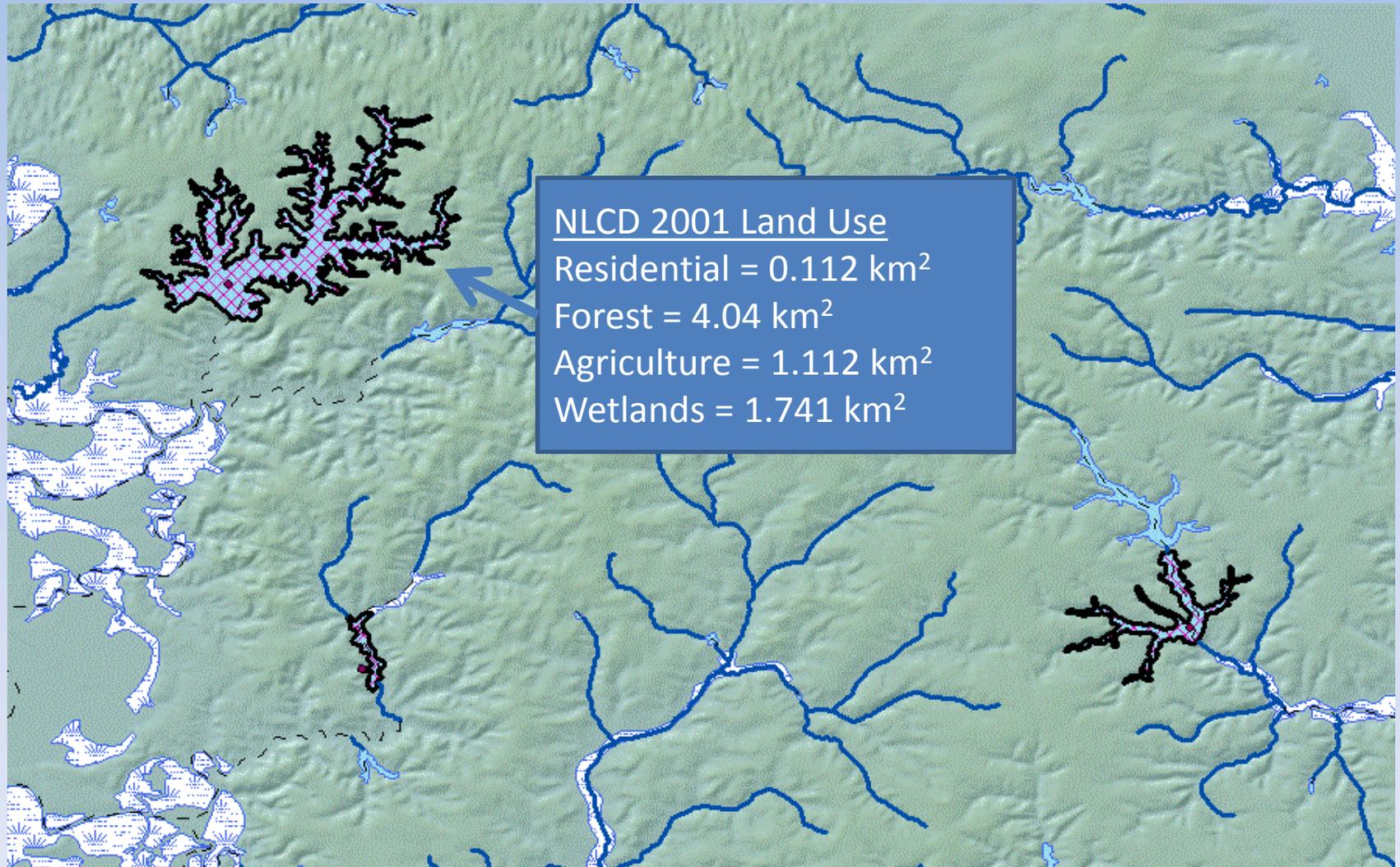
NHDPlus Support to NLA

- Lake Polygon Dataset – area, perimeter, and lake shoreline development
- Buffered lake landscape characteristics – NLCD land use classifications allocated to 100m lake buffer
- Watershed Delineation – drainage area
- Watershed Characteristics – NLCD land use classifications allocated to basin

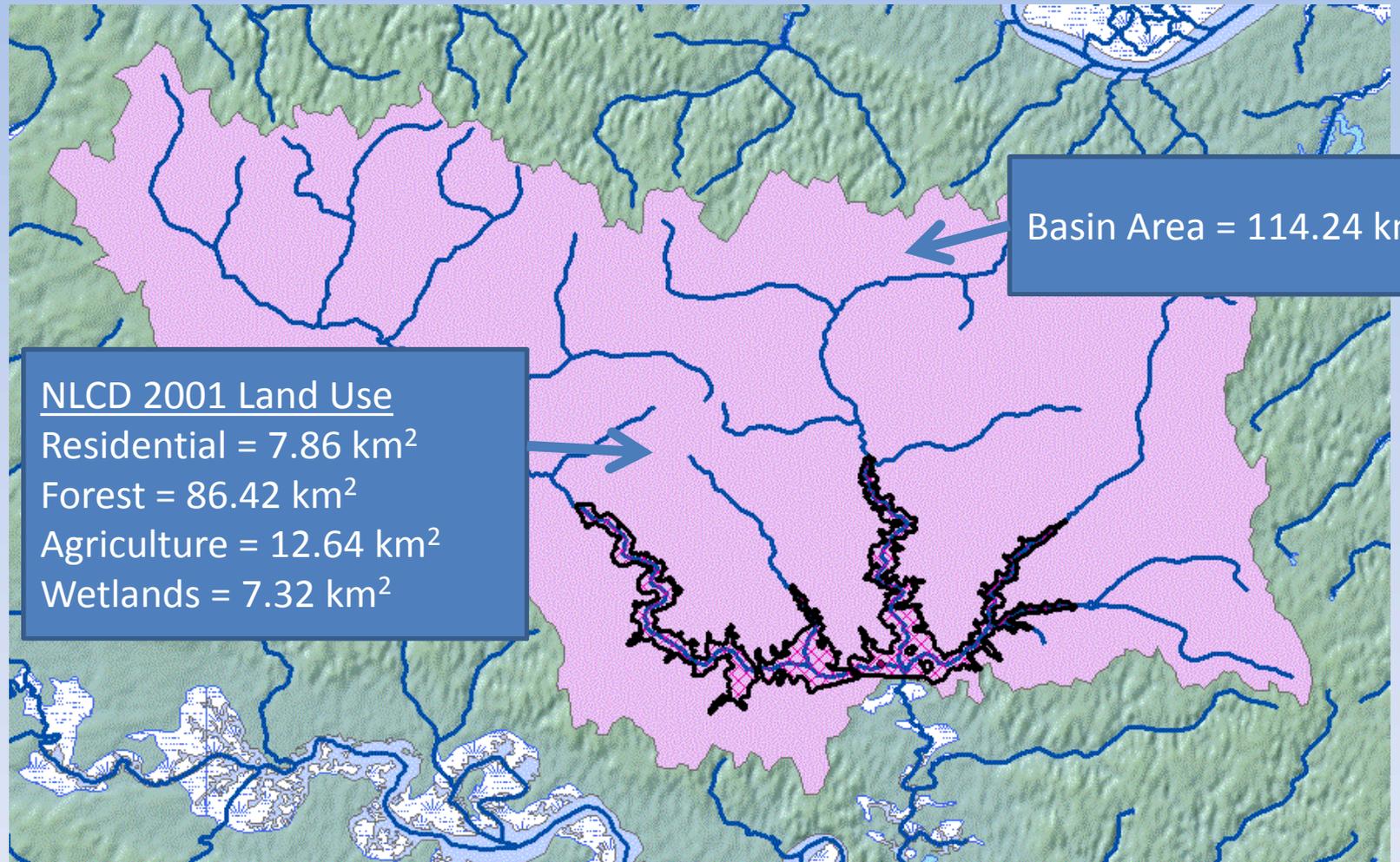
NHDPlus Support to NLA



NHDPlus Support to NLA



NHDPlus Support to NLA



An aerial photograph showing a large body of water, likely a lake or reservoir, surrounded by green trees and some residential or commercial buildings. The sky is clear and blue.

NLA Contributions to NHDPlus

- Lake/pond feature additions, geometry edits, “not a lake” feature type corrections
- National Lake Fish Tissue Study - “Not A Lake” feature type corrections

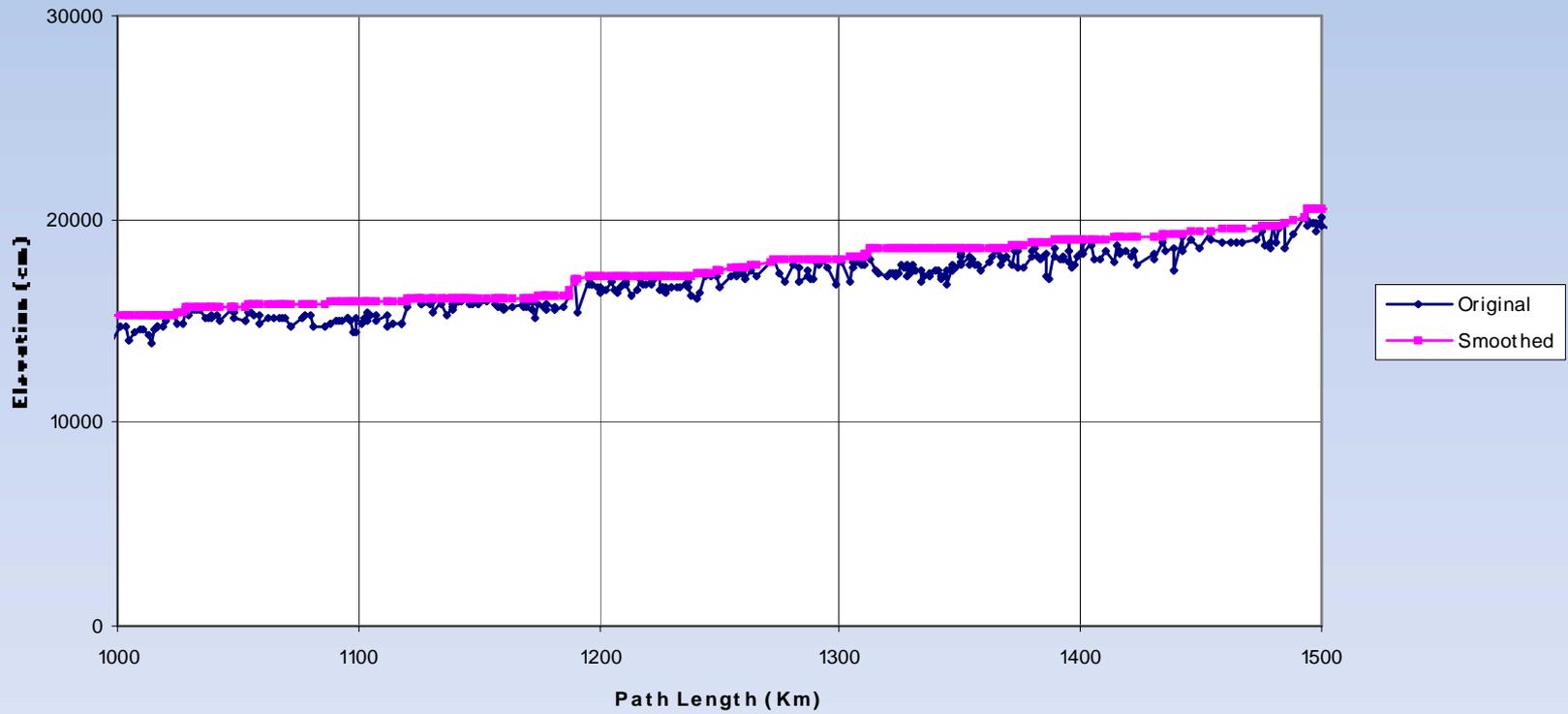


NHDPlus Support to NRSA

- Sinuosity – Using NHDPlus geometry
- Slope – Using NHDPlus stream segment lengths, elevations and slopes

NHDPlus Support to NRSA

NHDPlus Smoothed Elevation Stream Profile



NHDPlus Support to NRSA

Computing Survey Reach Slopes and Sinuosity from NHDPlus



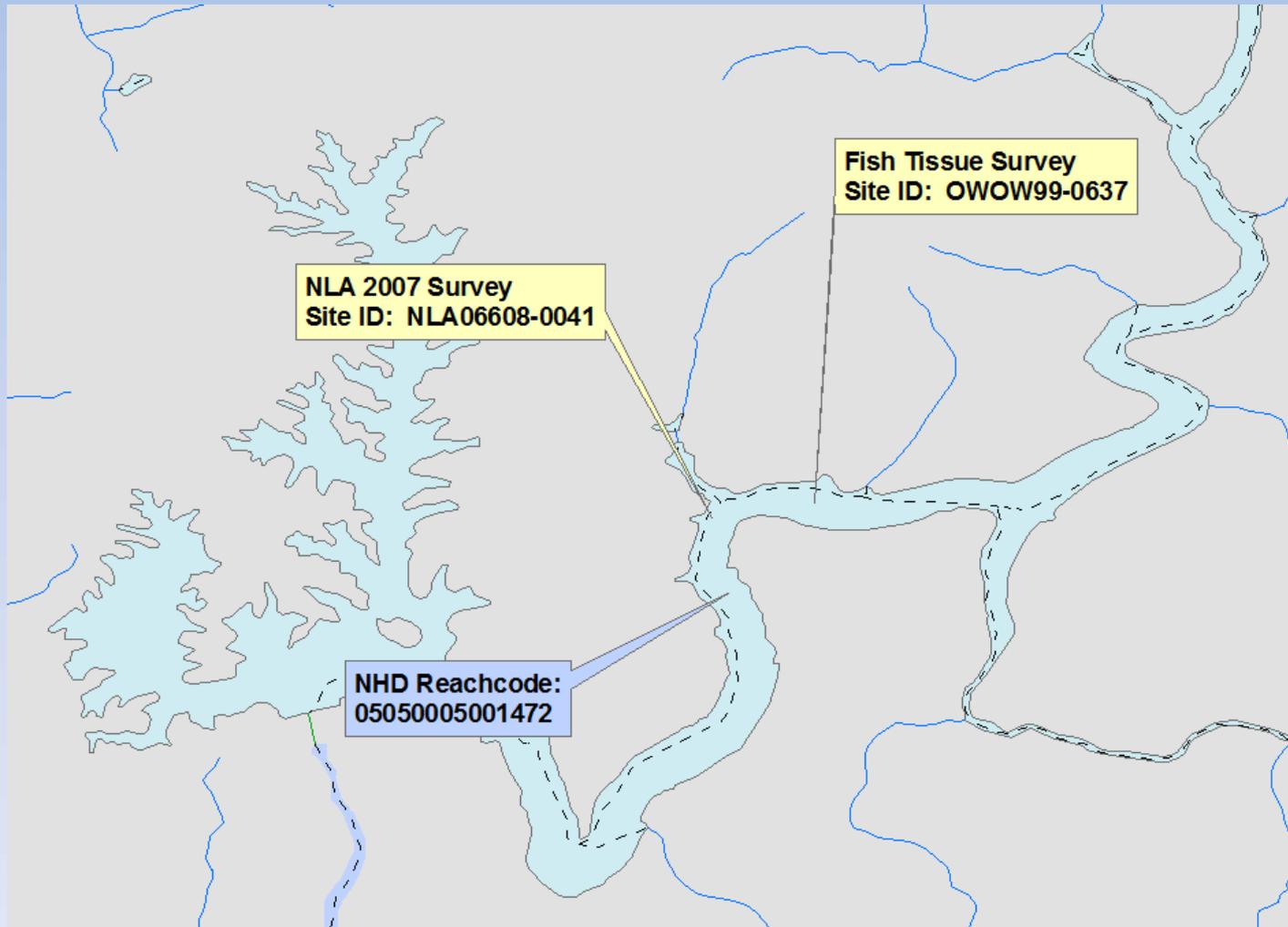
- Site Latitude/Longitude, Reach Length
- Bottom Lat/lon = site lat/lon - $\frac{1}{2}$ reachlength
- Top lat/lon = site lat/lon + $\frac{1}{2}$ reachlength



NRSA Contributions to NHDPlus

- Enhancement to stream order algorithm
- Correction of flow direction
- Connection of isolated stream networks
- Linear names Corrections

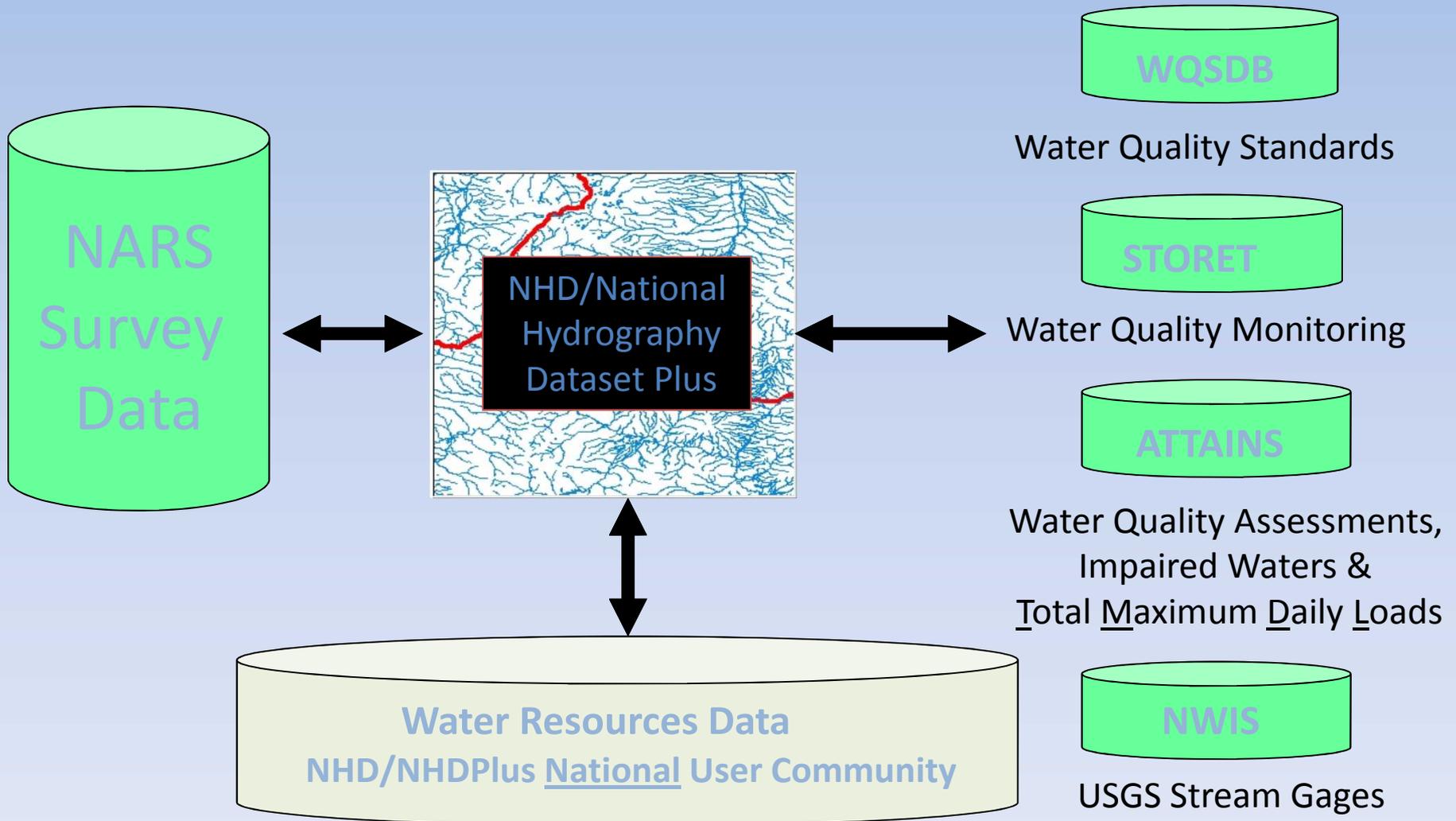
NHDPlus Links NARS Surveys to Each Other



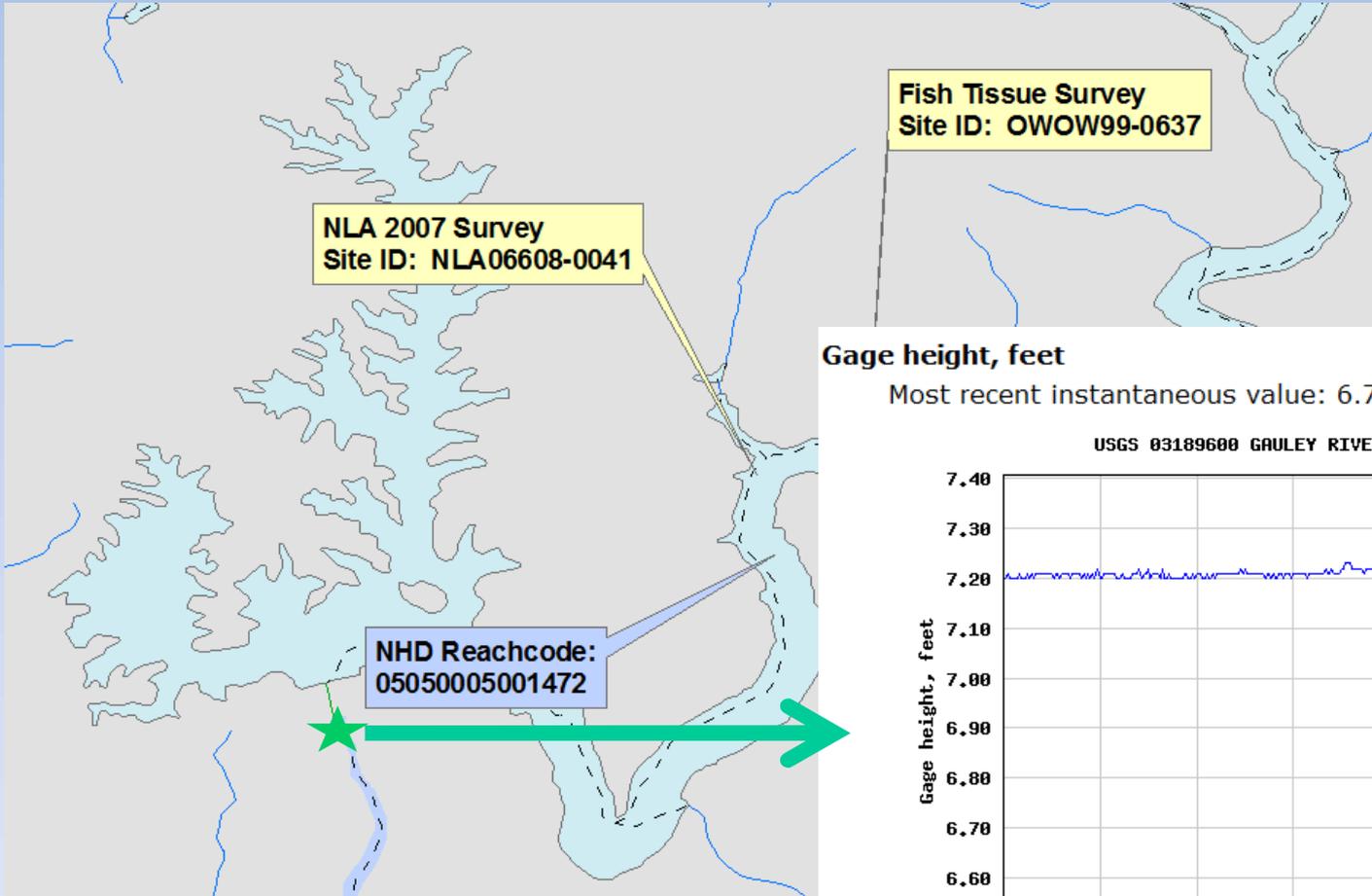
NHDPlus Links NARS Surveys Spatially and Hydrologically



NHDPlus Links NARS Surveys to Water Resources Community



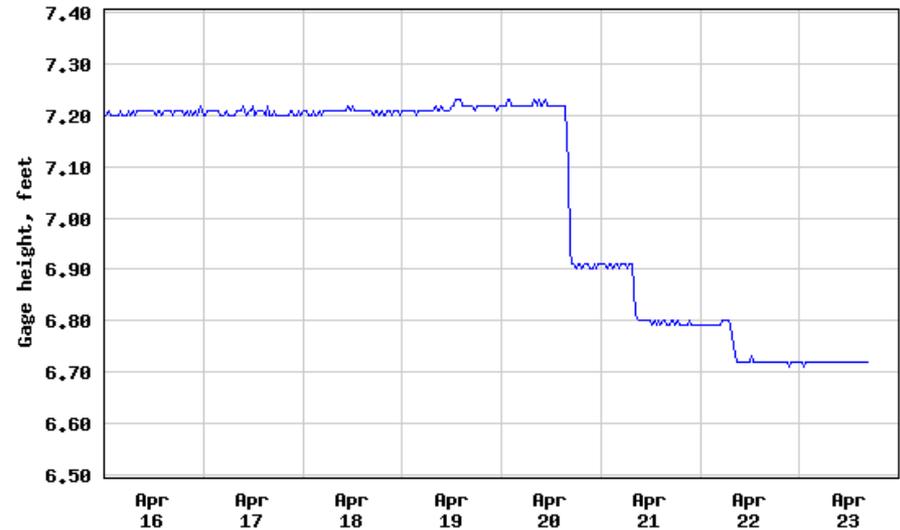
NHDPlus Links NARS Surveys to Water Resources Community



Gage height, feet

Most recent instantaneous value: 6.72 04-23-2010 16:30 EDT

USGS 03189600 GAULEY RIVER BELOW SUMMERSVILLE DAM, WV





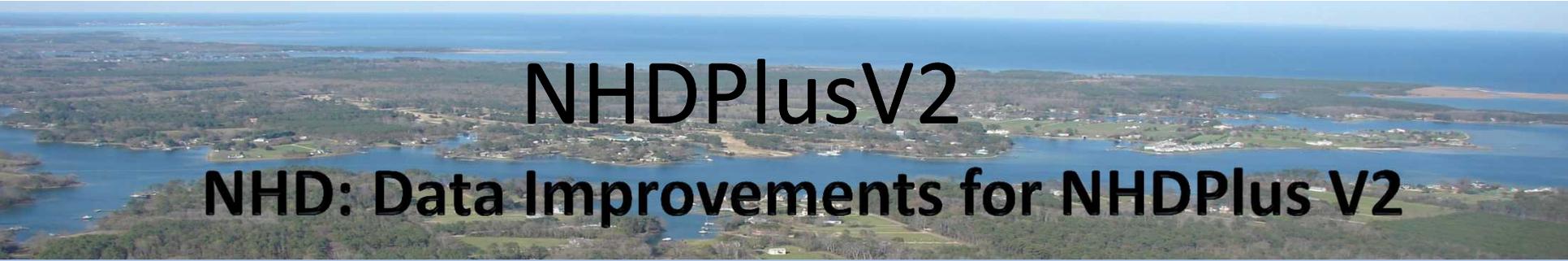
NHDPlus & NARS Lessons Learned

- **Importance of Geo-referenced Survey Data**
 - **Sample point locations**
 - **Sampled Reach Extent**
- **Use of NHDPlus**
 - **Stream Network Connectivity**
 - **Resolution of DEM**
 - **Drainage Area Delineation**



NARS and NHDPlusV2

- **Greatly Improved Data Inputs:
NHD, NED, and WBD**
- **Better Spatial Integration Process**
- **More Data Layers and Attributes**
- **In-sync with the February 2012 WBD**



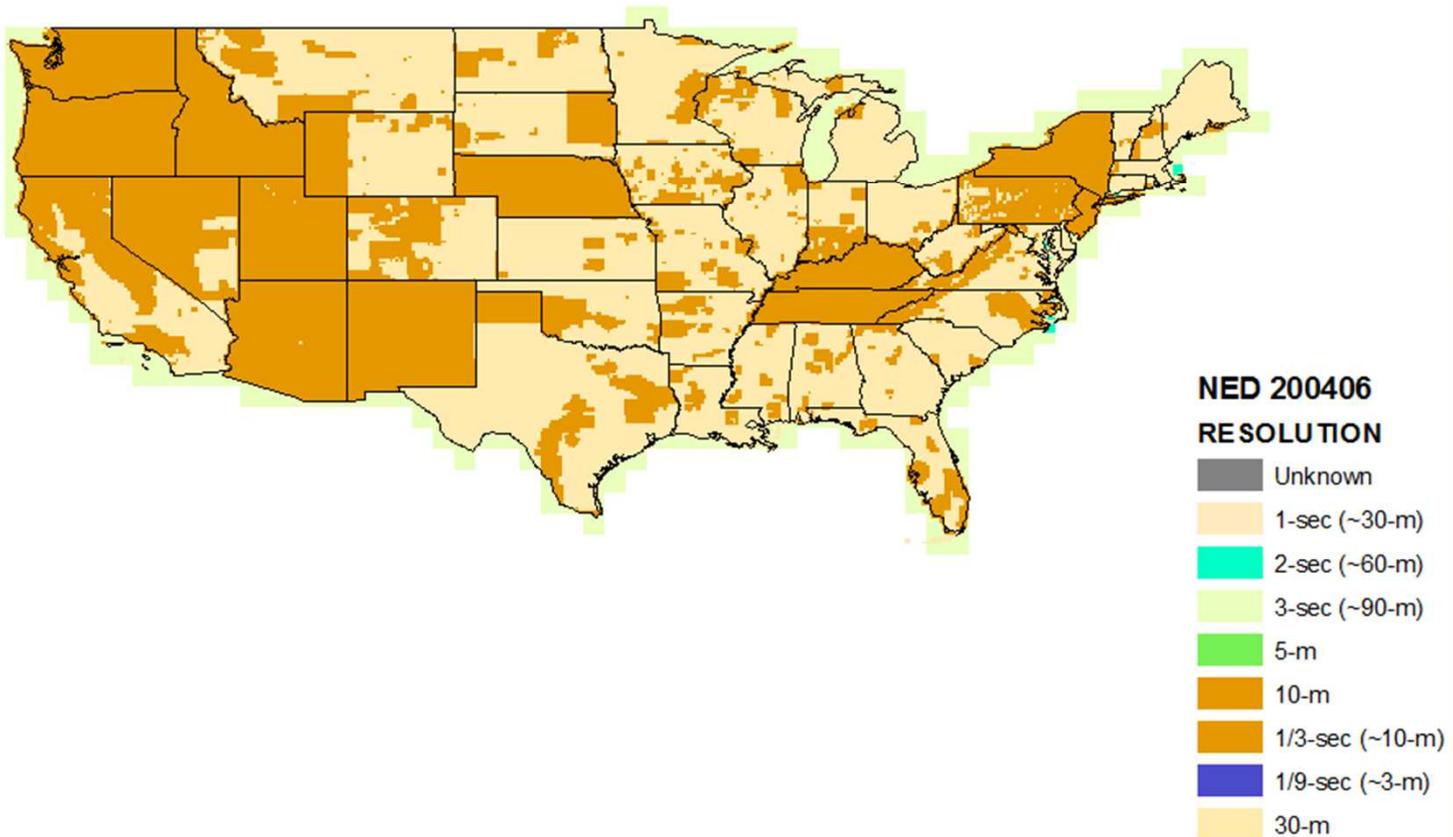
NHDPlusV2

NHD: Data Improvements for NHDPlus V2

- More names, corrected placement
- More lakes
- Lakes split by quad lines merged
- Disconnected networks connected
- Real sinks (non-contributing areas and networks that drain into the ground) identified
- Duplicate geometry removed
- Micro and small network gaps closed
- Great Lakes drainage connected
- Reachcodes migrated to the February 2012 WBD

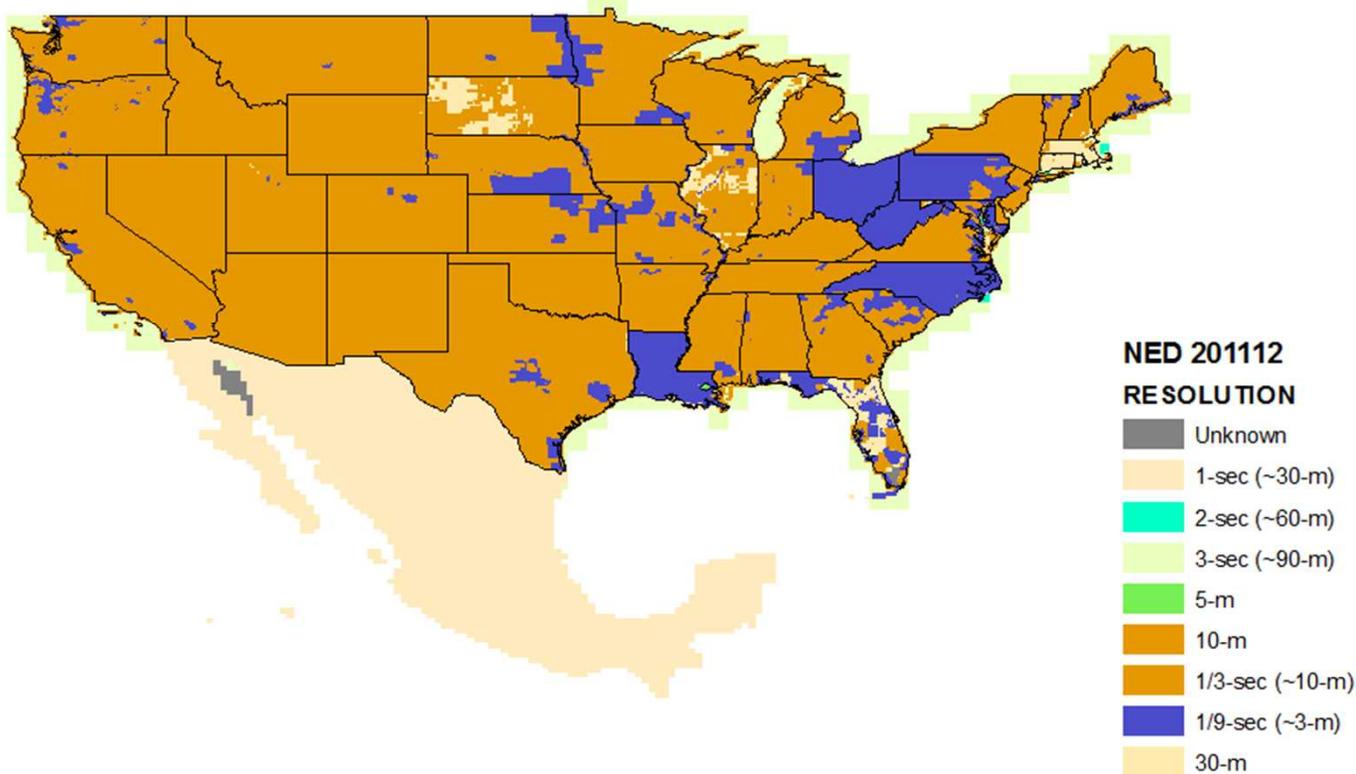
NHDPlusV1 - NED June 2004

June 2004 NED Resolution



NHDPlusV2 – NED 2011-12 (ned.usgs.gov)

December 2011 NED
Resolution



30m
re-sampled
from
10m

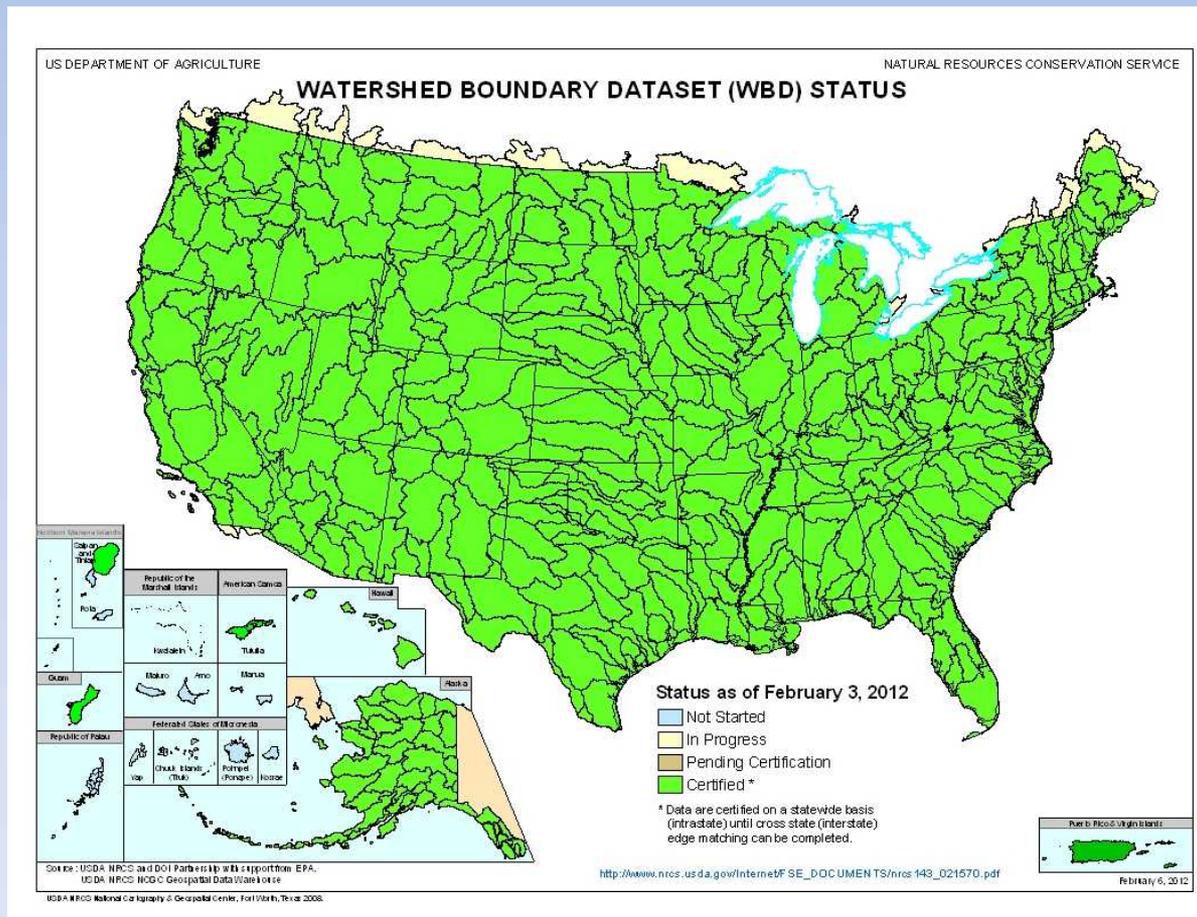
NHDPlusV1 – WBD 2005

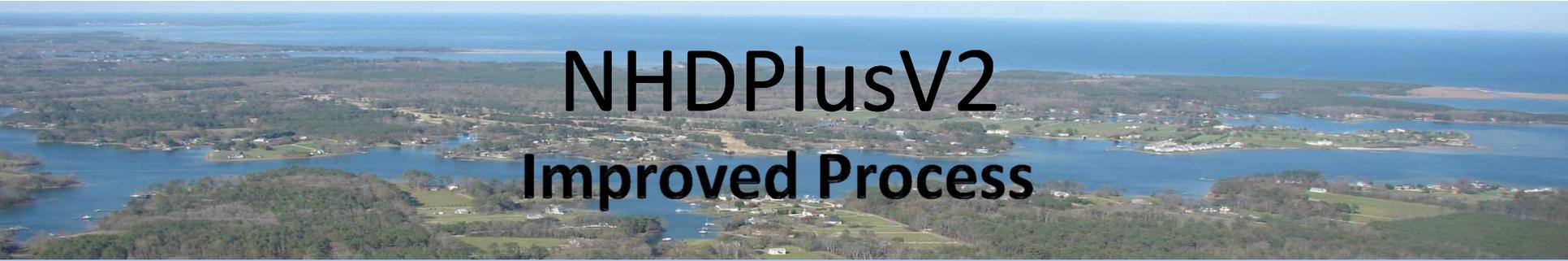


Only Eleven States

NHDPlusV2 – WBD 2011-12

(nracs.usda.gov)

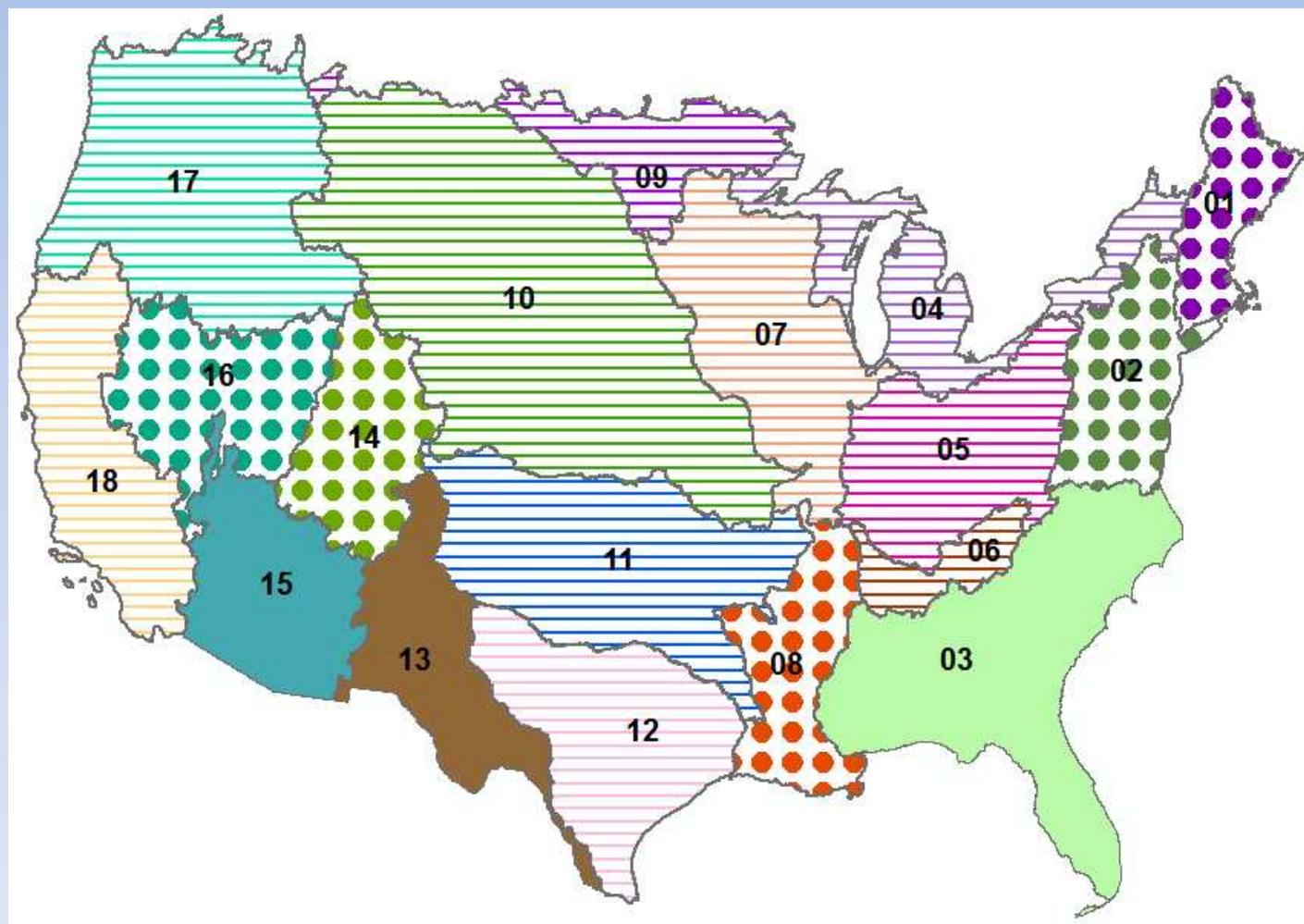




NHDPlusV2 Improved Process

- **Build/Refresh Tools**
 - Built-in QAQC
 - More Consistent Processing Across the U.S.
 - More Frequent Refreshes
- **Greatly Improved Hydro-enforcement of DEM**
- **Inclusion of International Stream and Elevation Data**
- **Enhance Stream Flow Estimation Techniques**

NHDPlusV2 Status by Hydrologic Region (HUC2)



- 01 – New England
- 02 – Mid-Atlantic
- 03 – South Atlantic
- 04 – Great Lakes
- 05 – Ohio
- 06 – Tennessee
- 07 – Upper Mississippi
- 08 – Lower Mississippi
- 09 – Souris, Red, Rainy
- 10 – Missouri
- 11 – Arkansas, Red, White
- 12 – Texas
- 13 – Rio Grande
- 14 – Upper Colorado
- 15 – Lower Colorado
- 16 – Great Basin
- 17 – Pacific Northwest
- 18 – California



NHDPlusV2 Access

<http://www.epa.gov/waters/>

NHDPlus.com

Google “NHDPlus”

NHDPlus@hscnet.com



NHDPlus Version 2

Questions?

LDM@Horizon-Systems.com