

Applying the National Hydrography Dataset Plus (NHDPlus) to Water Quality Assessments

Presented by:

Cindy McKay

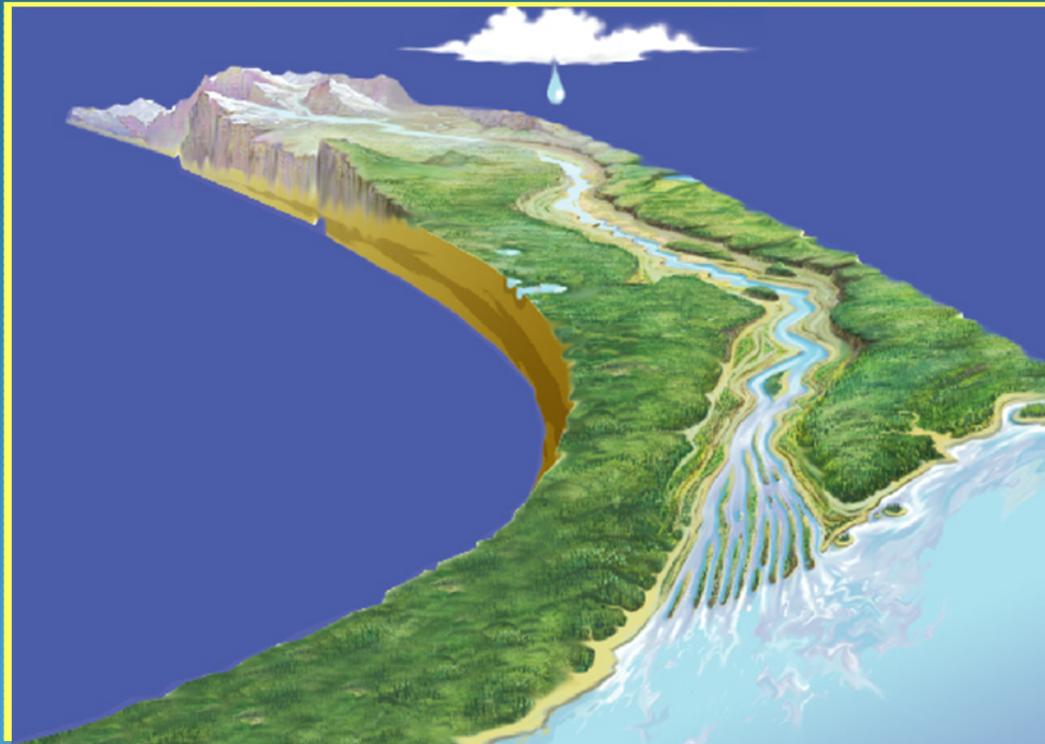
Horizon Systems Corporation

Sponsored by:

U.S. Environmental Protection Agency

Office of Water

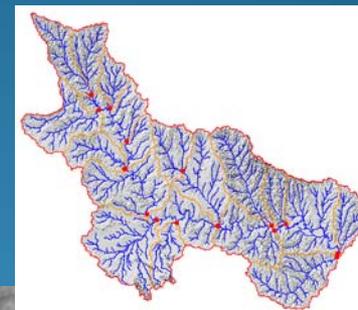
NHDPlus: A Geospatial Surface Water Framework



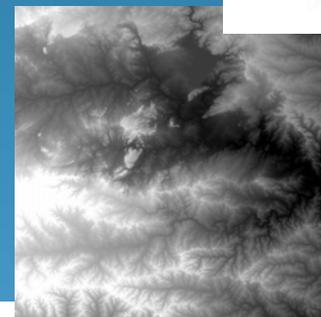
NHDPlus

- An set of application-ready, geospatial, surface water data products
- Spatial and functional integration of NHD, NED, and WBD
- The first national integration of these datasets

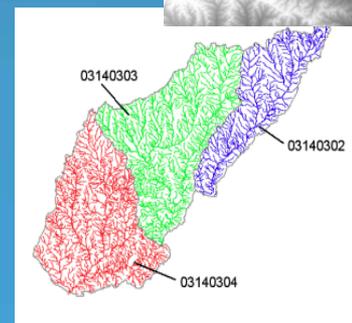
**National
Hydrography
Dataset
(NHD)**



**National
Elevation
Dataset
(NED)**



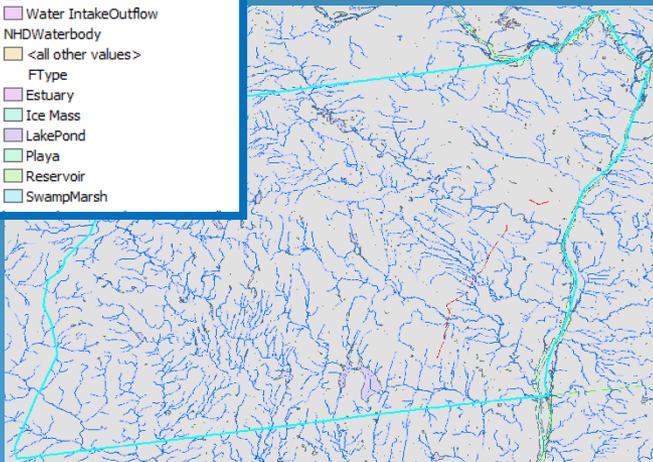
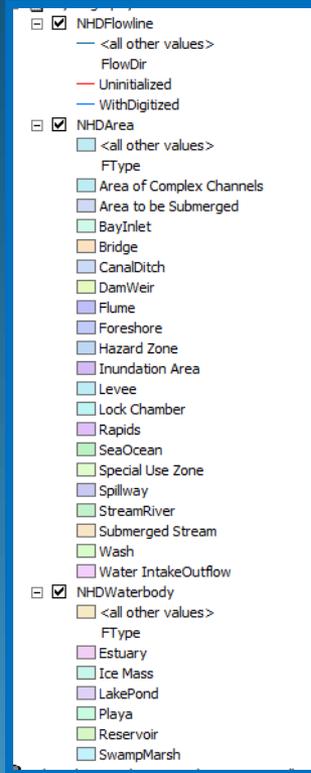
**Watershed
Boundary
Dataset
(WBD)**



National Hydrography Dataset (NHD)

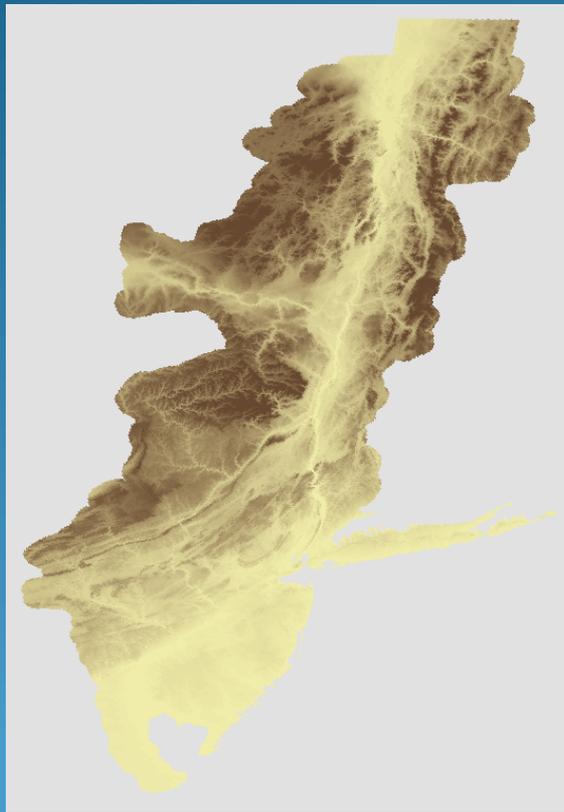
A national framework dataset that includes:

- Hydrographic features for making maps
- A national stream addressing system for linking information to the surface water
- A surface water network for navigating upstream/downstream
- Multi-resolution – 1:100K, 1:24K and better
- Maintenance Infrastructure – User updates



National Elevation Dataset (NED)

A national framework dataset that includes:



- Seamless elevation data for the US
- Sources - Primarily map contours
- Multi-resolution - 30, 10, and 3 meter
- All resolutions built by re-sampling from best available data

Watershed Boundary Dataset (WBD)

A national framework dataset that includes:

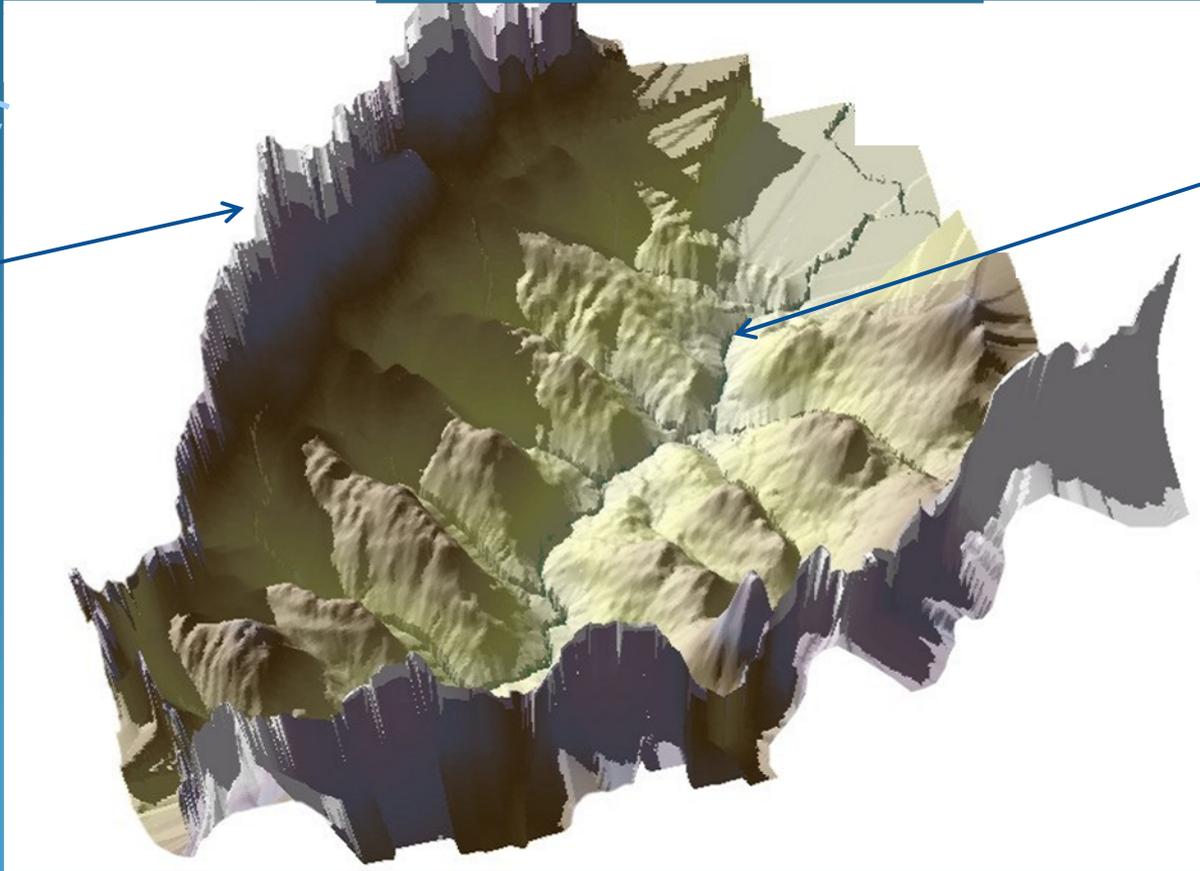
- Standardized hydrologic divisions of the landscape
- Six levels of nested divisions called hydrologic units
- Region, Subregion, Basin, Subbasin, Watershed, Subwatershed
- Hierarchical coding system – 2, 4, 6, 8, 10, and 12 digits

Watershed Definitions

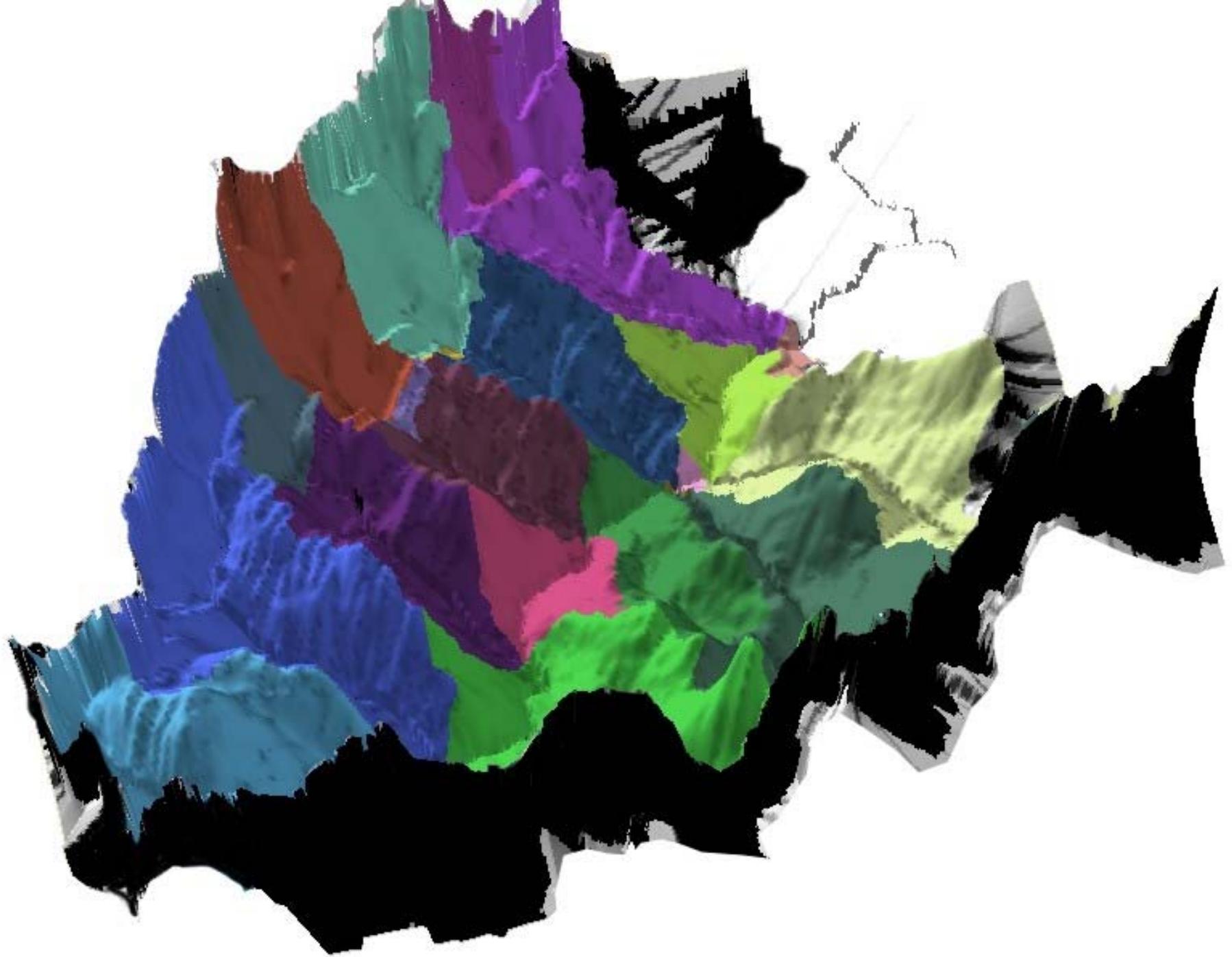
Name	Level	Digit	Number of HUCs
Region	1	2	21
Subregion	2	4	222
Basin	3	6	352
Subbasin	4	8	2,149
Watershed	5	10	22,000
Subwatershed	6	12	160,000

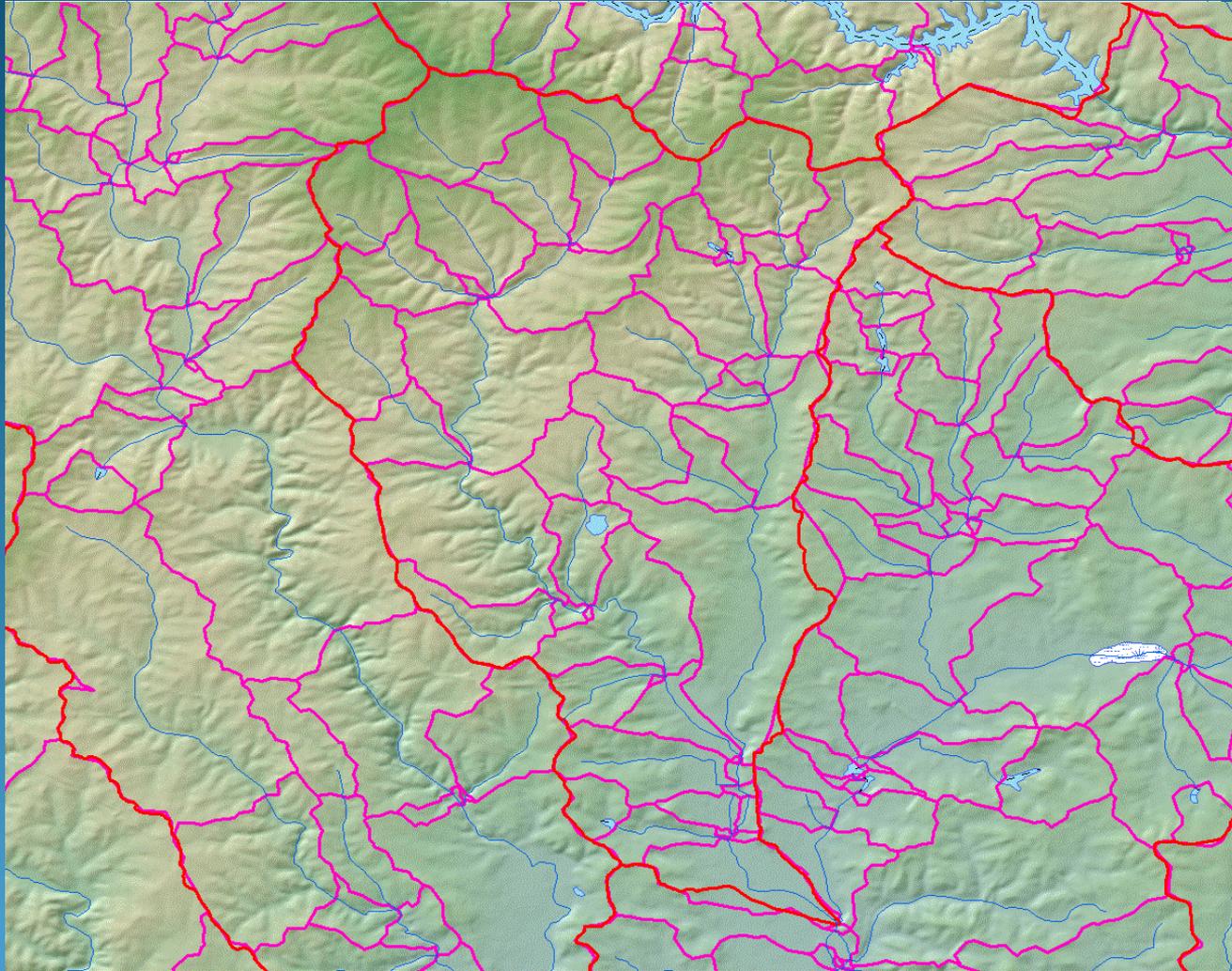
NHD and WBD Hydrologically Condition the NED

WBD Boundary
Cells "walled"
Into Elevation



NHD Stream Cells
"burned" into
Elevation





NHDPlus

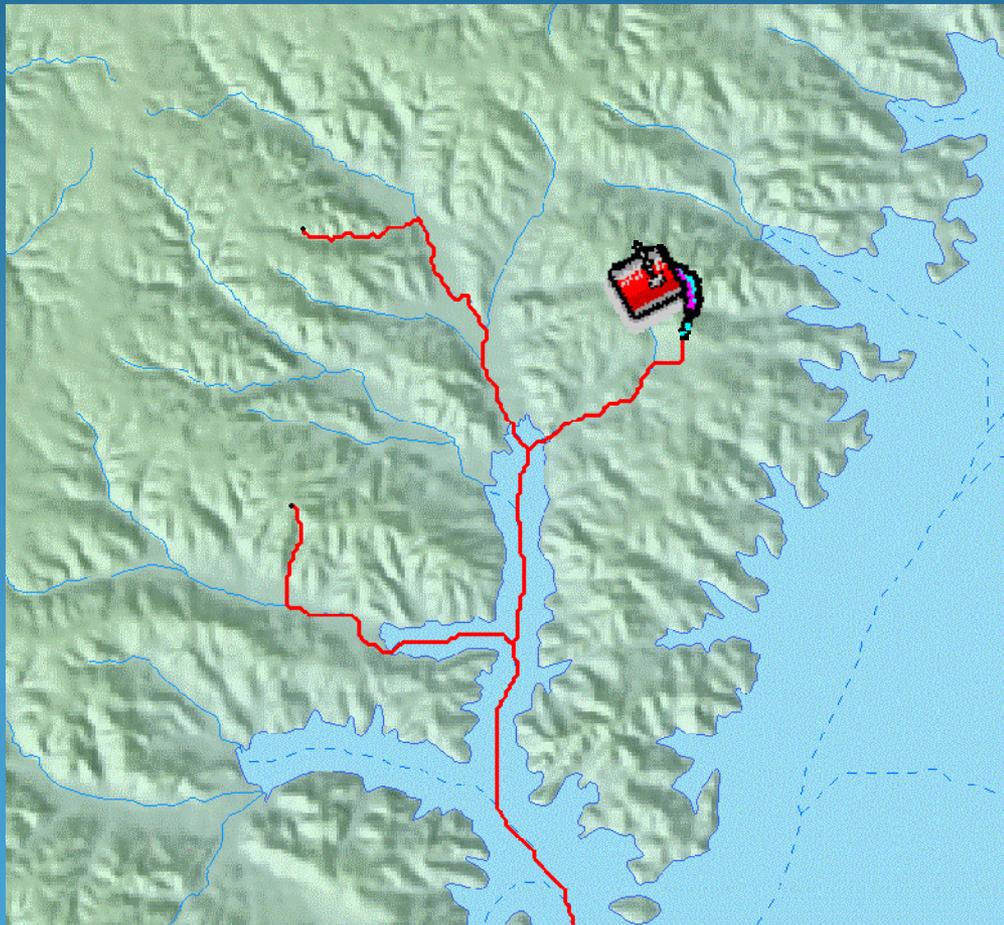
WBD

NED

NHD

NHDPlus

Links the Mapped Stream Network to the Landscape



NARS and NHD/NHDPlus: *A Symbiotic Relationship*



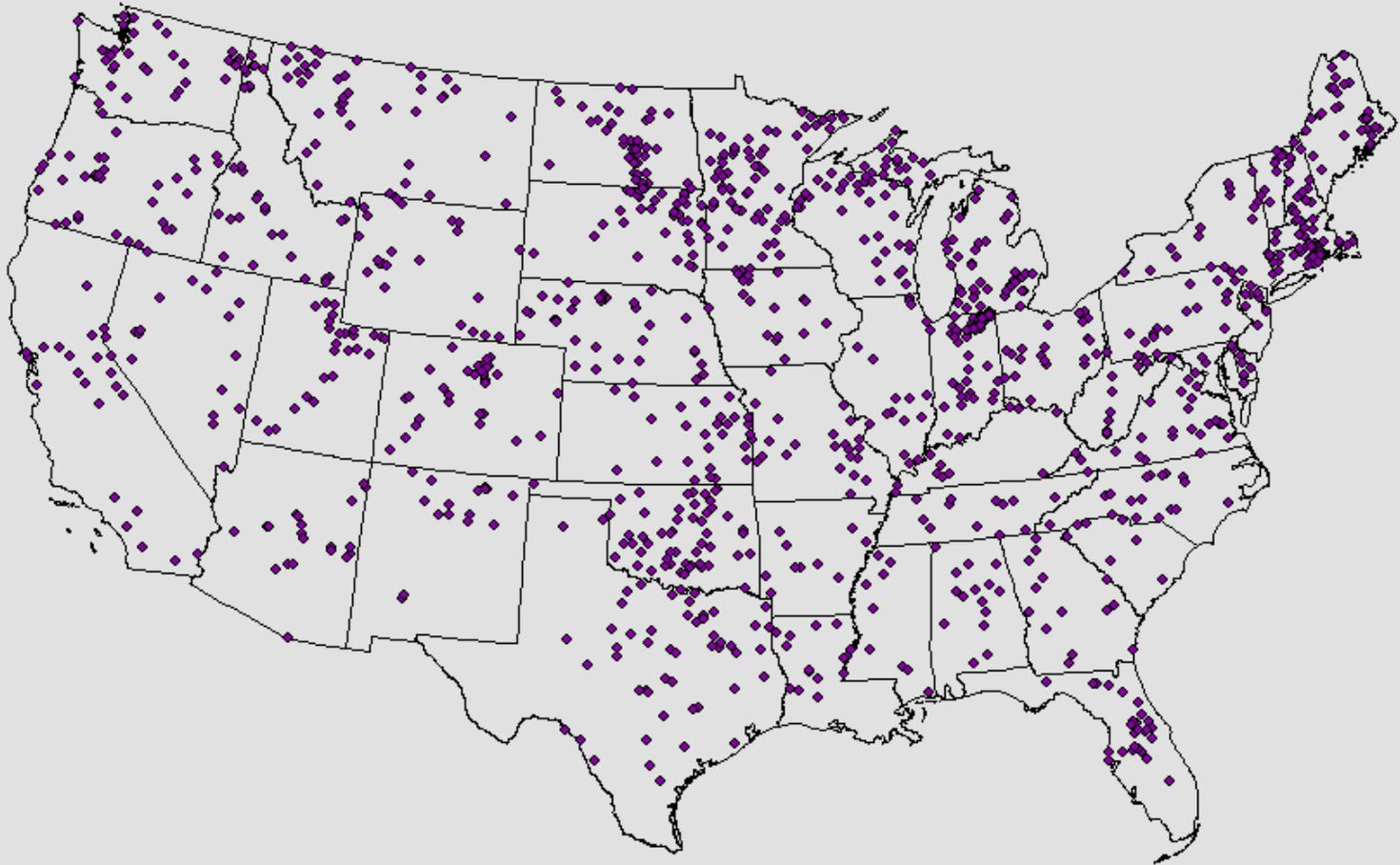
NHD Updates to Support 2007/2012 NLA Survey

- 2007 NLA updates from lake frame design efforts
- 2007 NLA updates from survey field work - lake/pond additions, geometry edits, “not a lake” feature type errors
- National Lake Fish Tissue Study - “Not A Lake” feature type errors
- NHD Lost lake polygons

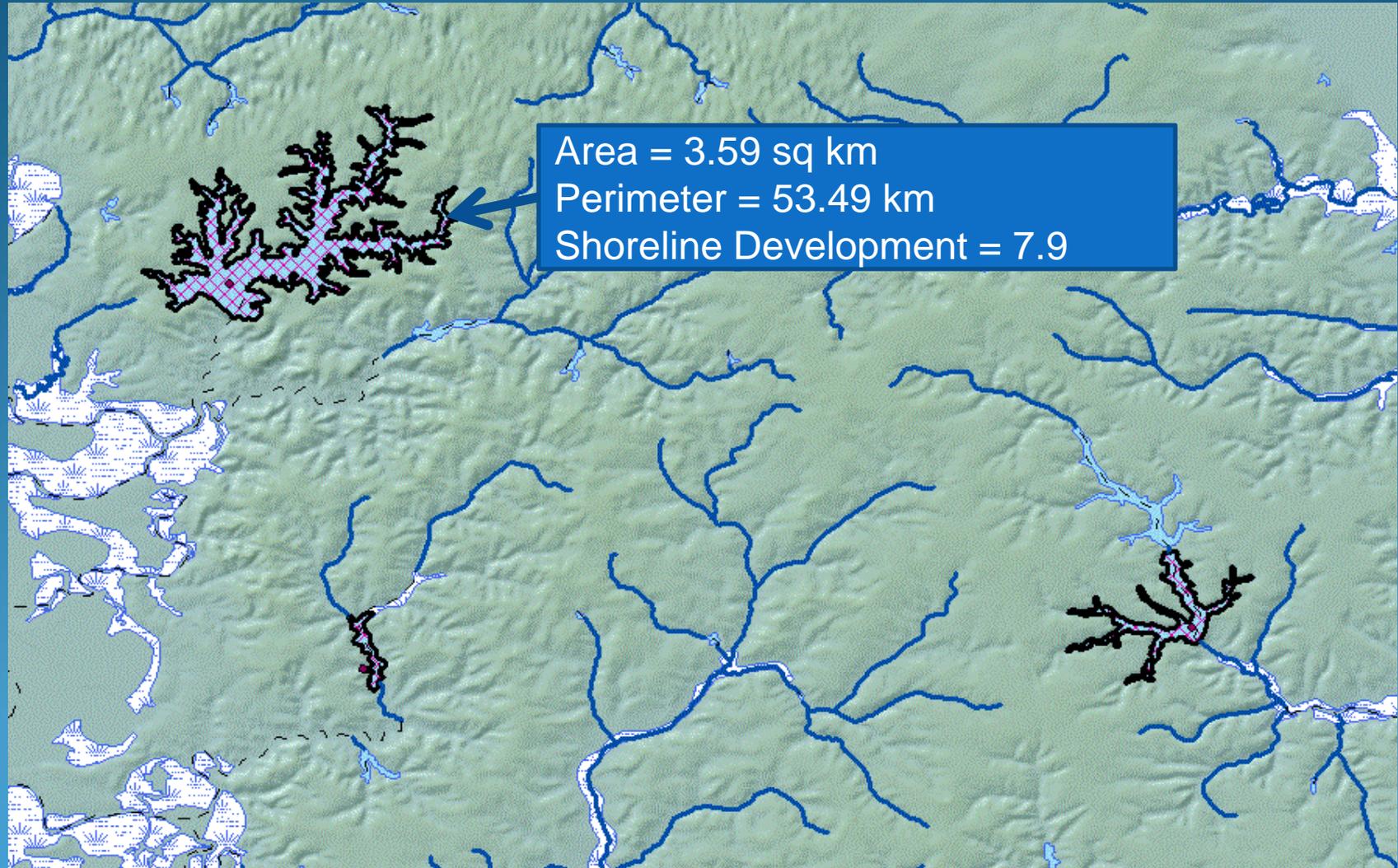
NHDPlus Analysis to Support Lake Surveys

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

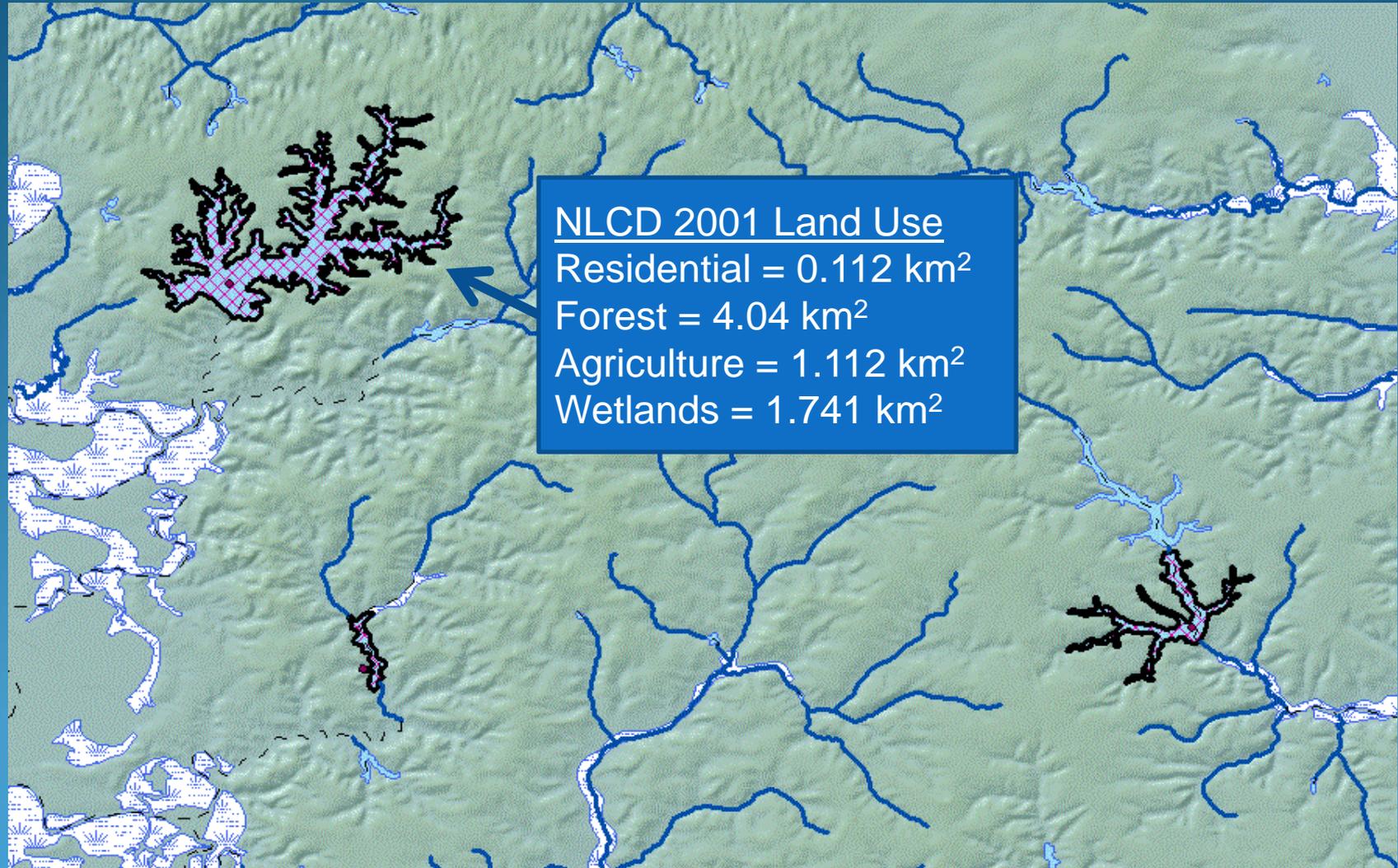
2007 NLA Sampled Lake Points



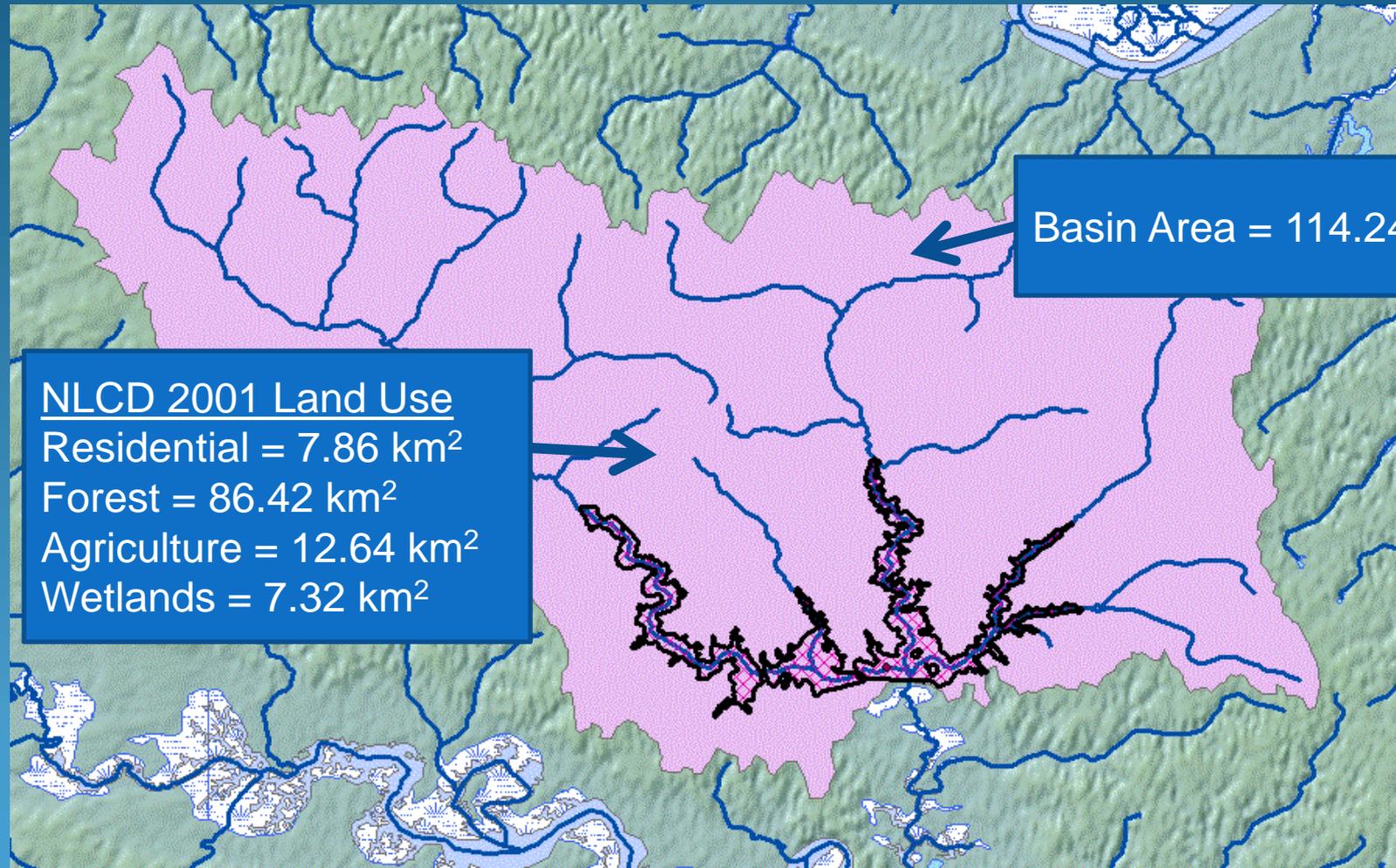
2007 NLA Sampled Lake Polygons



2007 NLA Sampled Lake Buffer Attributes



2007 NLA Sampled Lake Basins



NLCD 2001 Land Use
Residential = 7.86 km²
Forest = 86.42 km²
Agriculture = 12.64 km²
Wetlands = 7.32 km²

Basin Area = 114.24 km²

NHD/NHDPlus Updates to Support Rivers and Streams Surveys

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

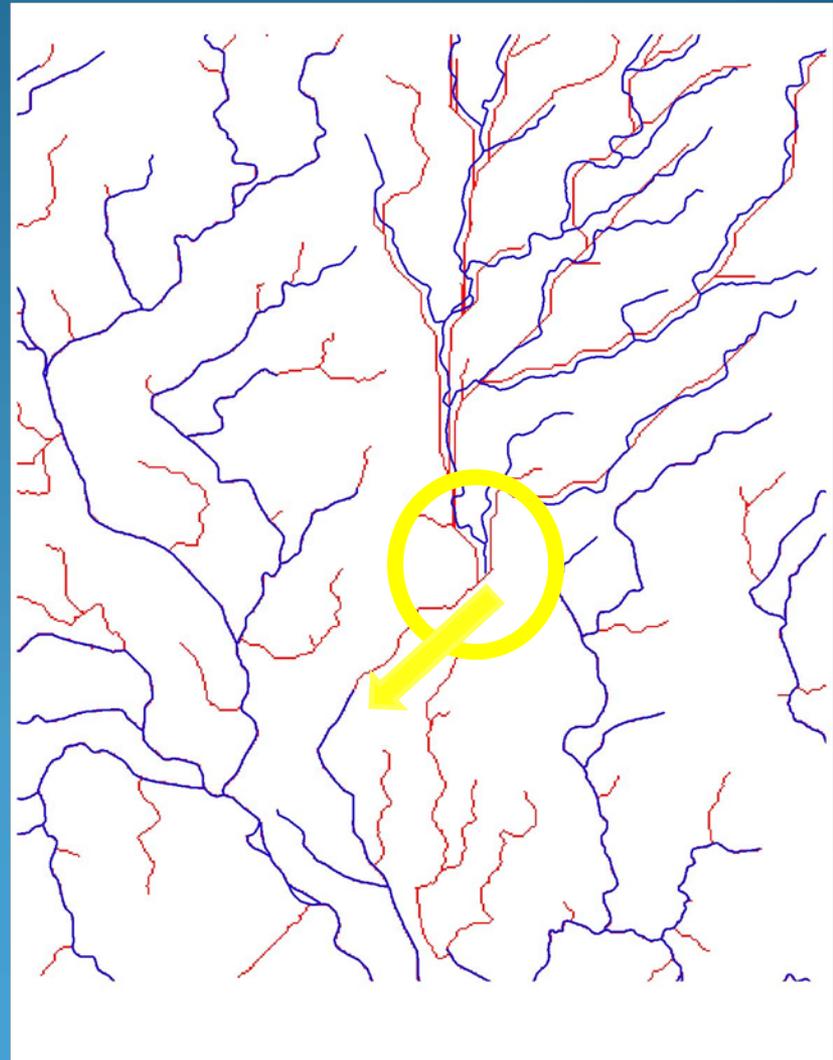
NHDPLUS Improved Strahler Stream Order



Using Flow Accumulation Grid to Connect Isolated Networks

Blue lines are NHD flowlines

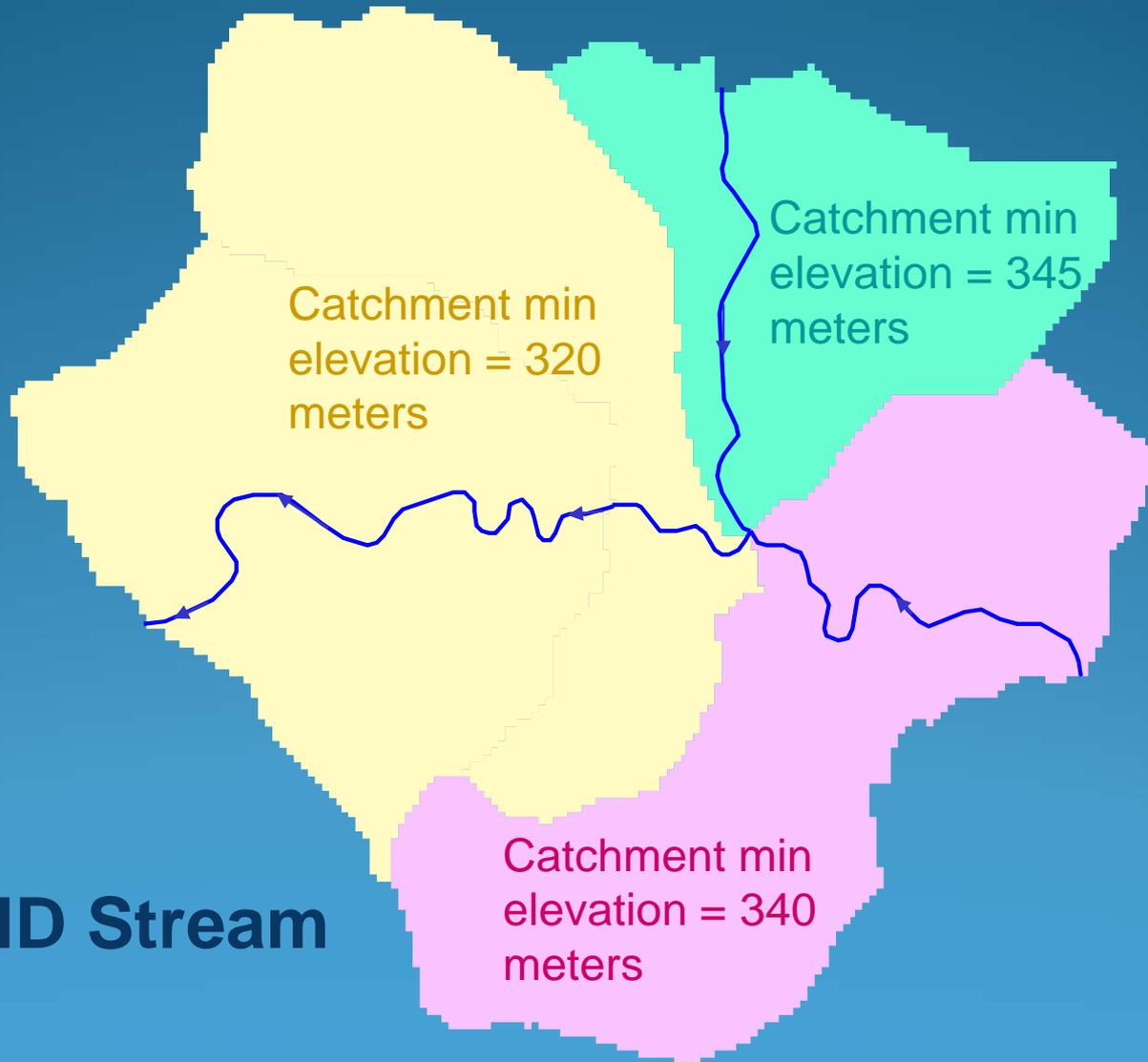
Red lines are cells with high values in the flow accumulation grid



NHDPlus Analysis to Support Rivers and Streams Survey

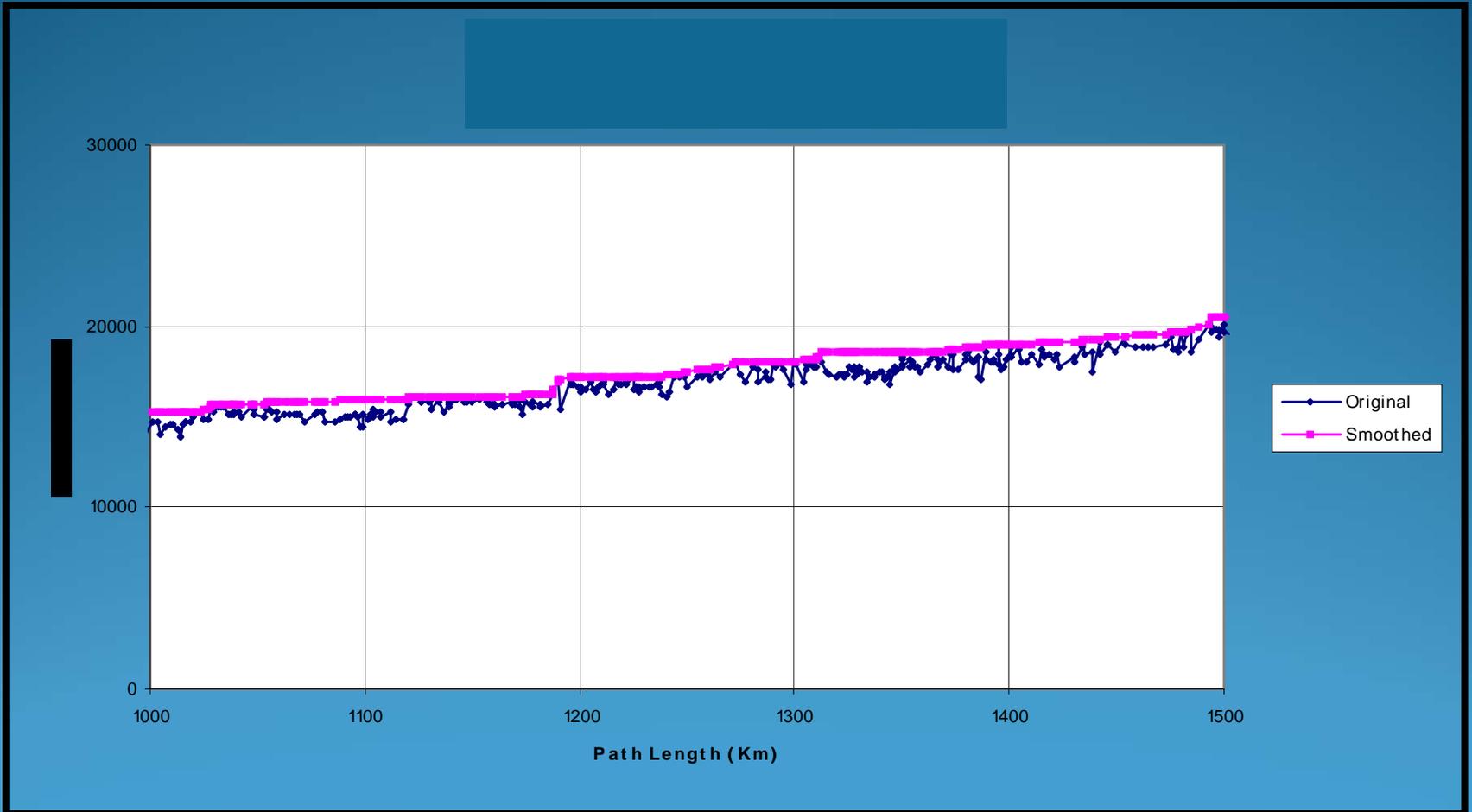
- Slope – Using NHDPlus stream segment lengths, elevations and slopes
- Sinuosity – Using NHDPlus geometry

NHDPlus “RAW” Stream Segment Elevations



— NHD Stream

NHDPlus Smoothed Elevation Stream Profile



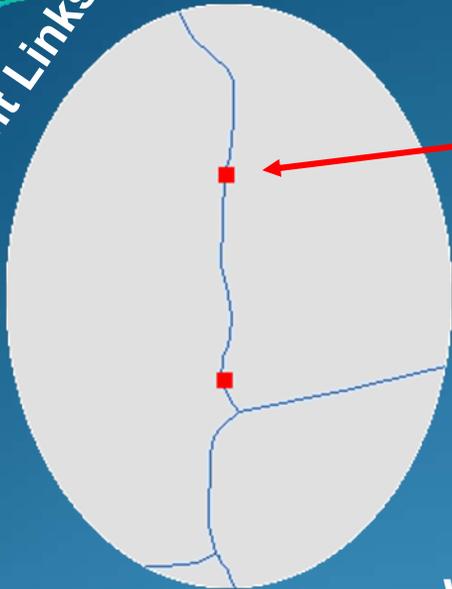
Computing Survey Reach Slopes from NHDPlus



- 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
- Elevations at T and B = prorated NHDPlus elevations

Linking Data to the NHD/NHDPlus

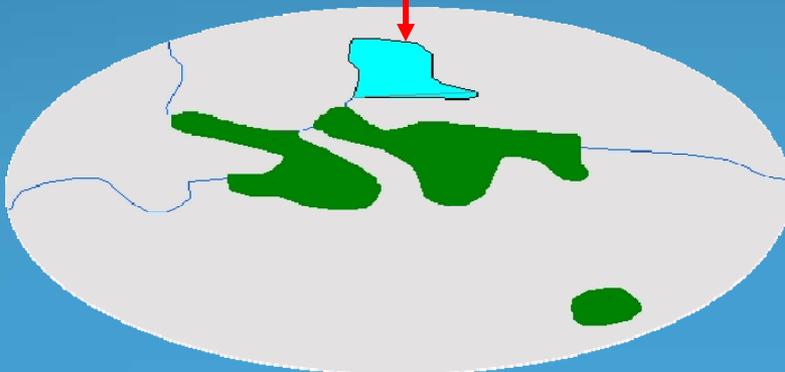
Point Links



Linear Reach: 02020005000375
Measure: 48.247

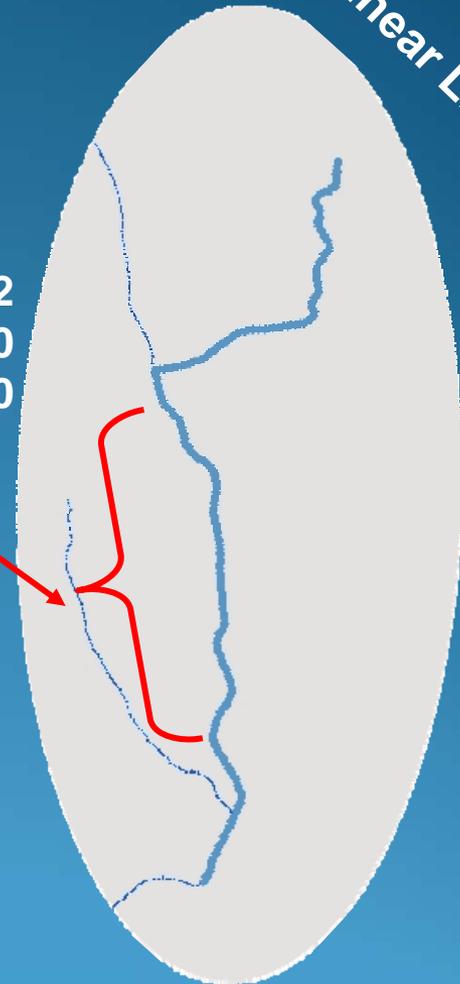
Linear Reach: 05030204004722
From Measure: 15.0
To Measure: 90.00

Waterbody Reach:
06030102002785 + shape

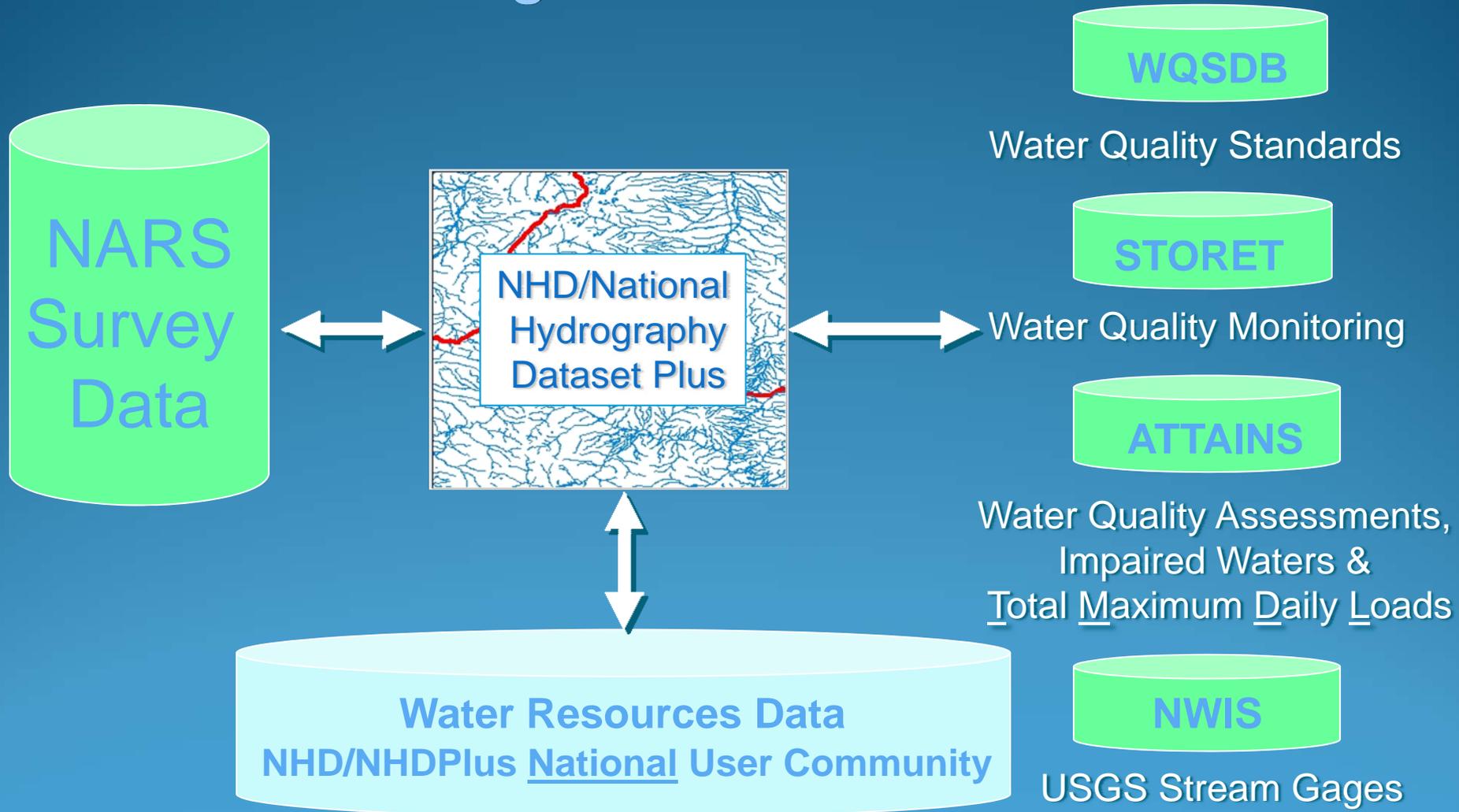


Area Links

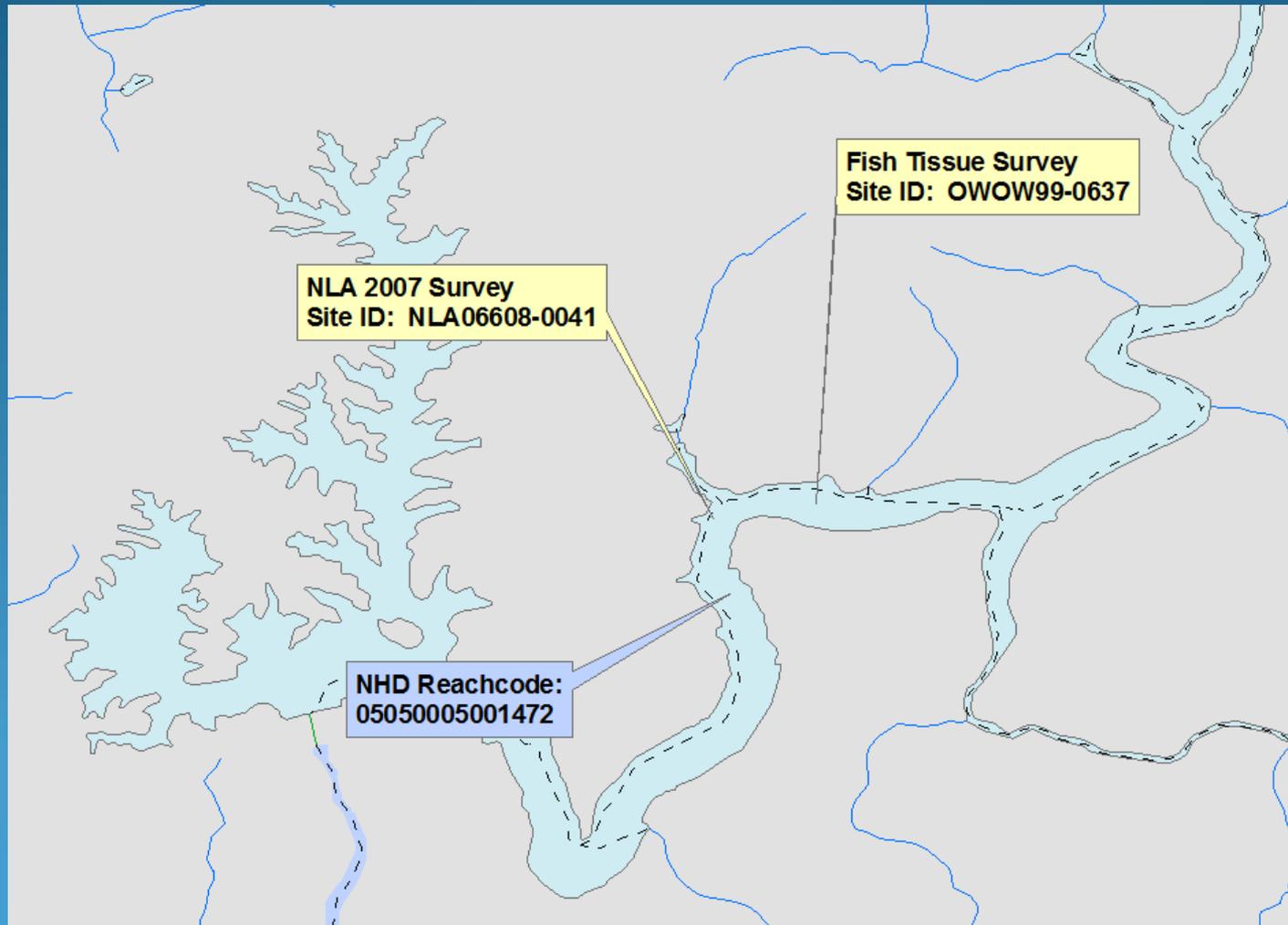
Linear Links



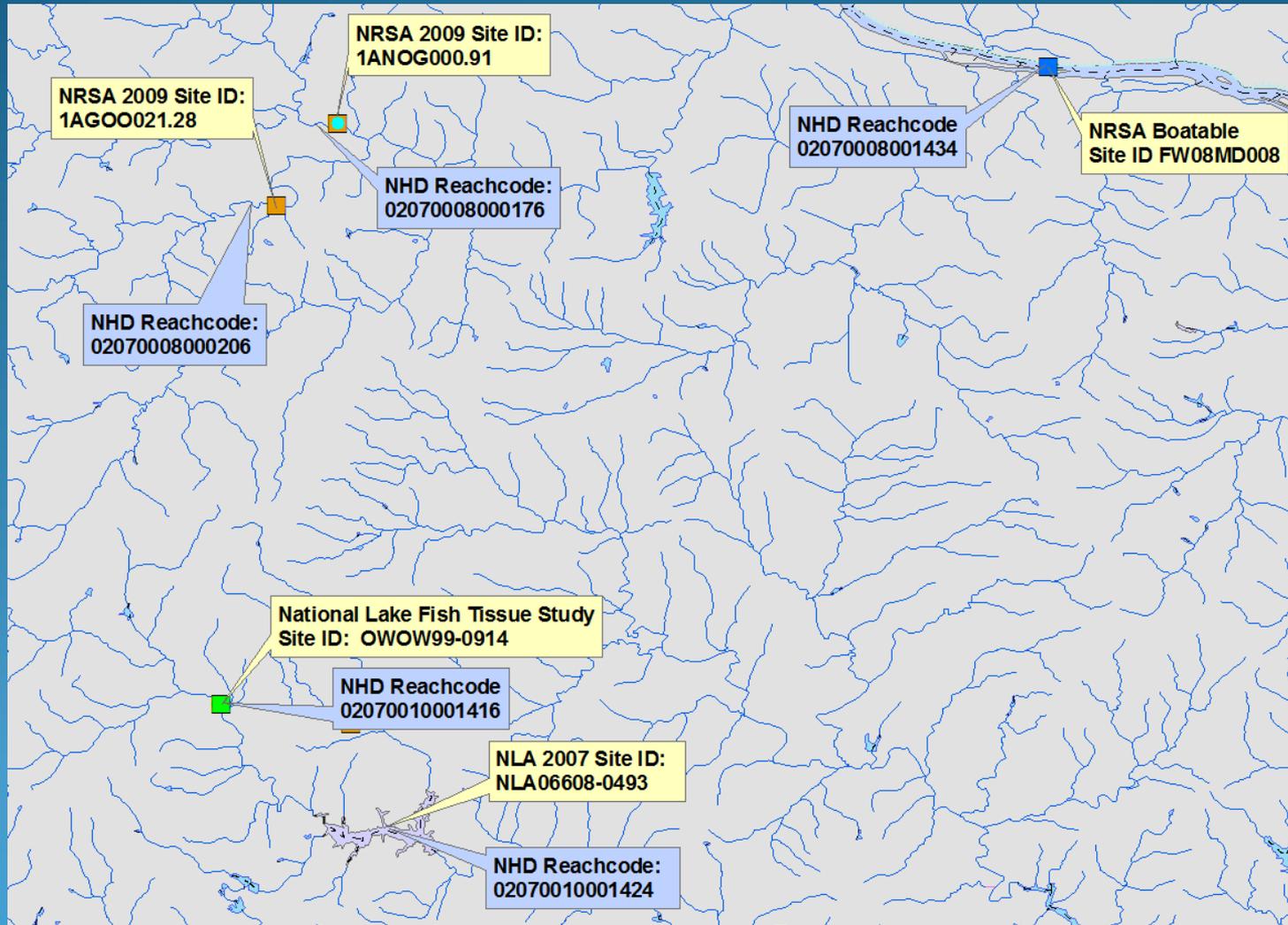
Linking NARS to the Water Resources Community Through NHD Reachcodes



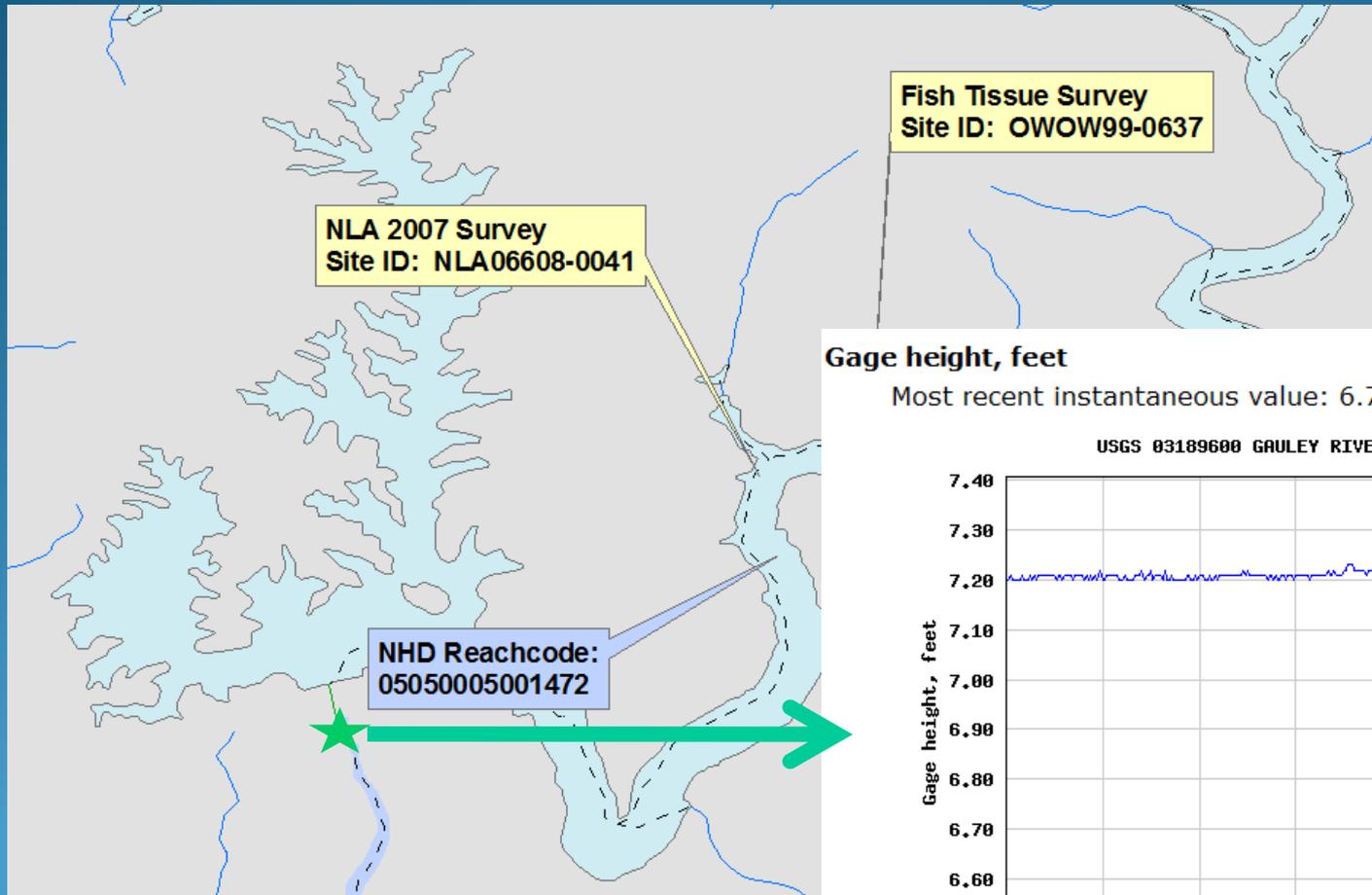
Linking NARS Surveys to Each Other



Linking NARS Surveys Spatially or Hydrologically



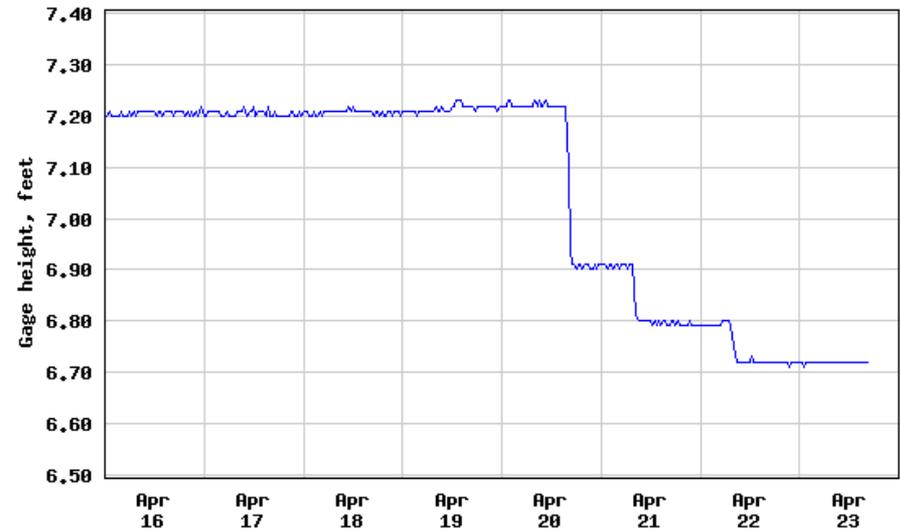
Linking NARS to Water Resources Community



Gage height, feet

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

USGS 03189600 GAULEY RIVER BELOW SUMMERSVILLE DAM, WV



NARS \leftrightarrow NHD/NHDPlus
a work in progress



Questions?