The Nature Conservancy
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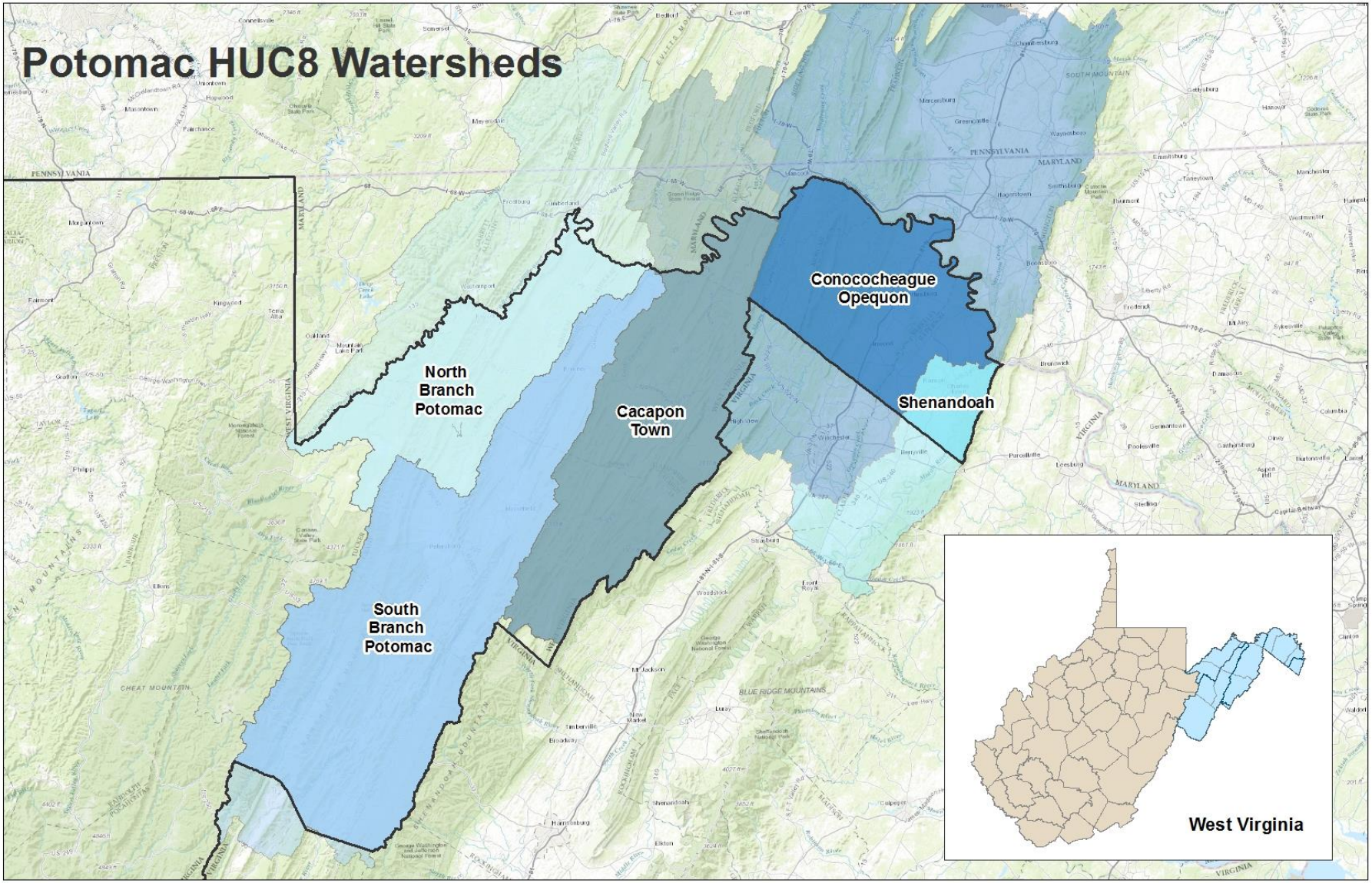
# Healthy Watersheds Assessment

## Potomac Watersheds in West Virginia

# Watershed Assessment - Goals

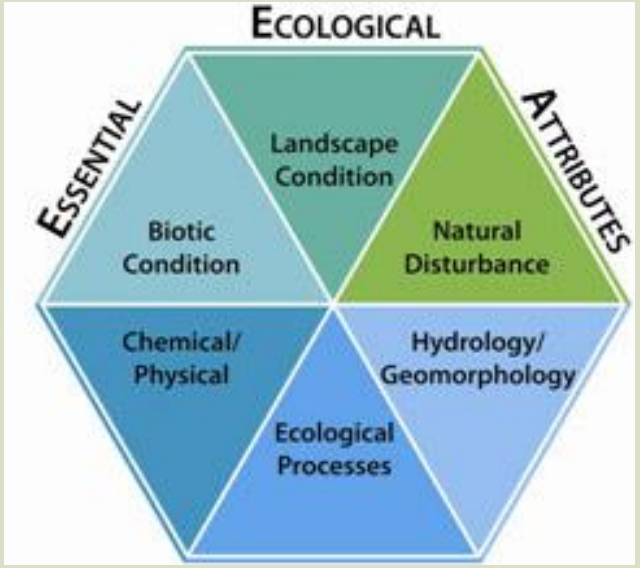
- Develop metrics to measure current **condition/function** & threats
- Rank watersheds for **restoration & protection** priorities
- Provide **science-based decision support** to assist partners, stakeholders & regulatory staff with management of water resources
- Identify data gaps & data needs

# Potomac HUC8 Watersheds



# Healthy Watersheds - Methods

**EPA Healthy Watersheds Initiative**




**Landscape Condition**
Patterns of natural land cover, natural disturbance regimes, lateral and longitudinal connectivity of the aquatic environment, and continuity of landscape processes.

**Geomorphology**
Stream channels with natural geomorphic dynamics.

**Habitat**
Aquatic, wetland, riparian, floodplain, lake, and shoreline habitat. Hydrologic connectivity.

**Water Quality**
Chemical and physical characteristics of water.

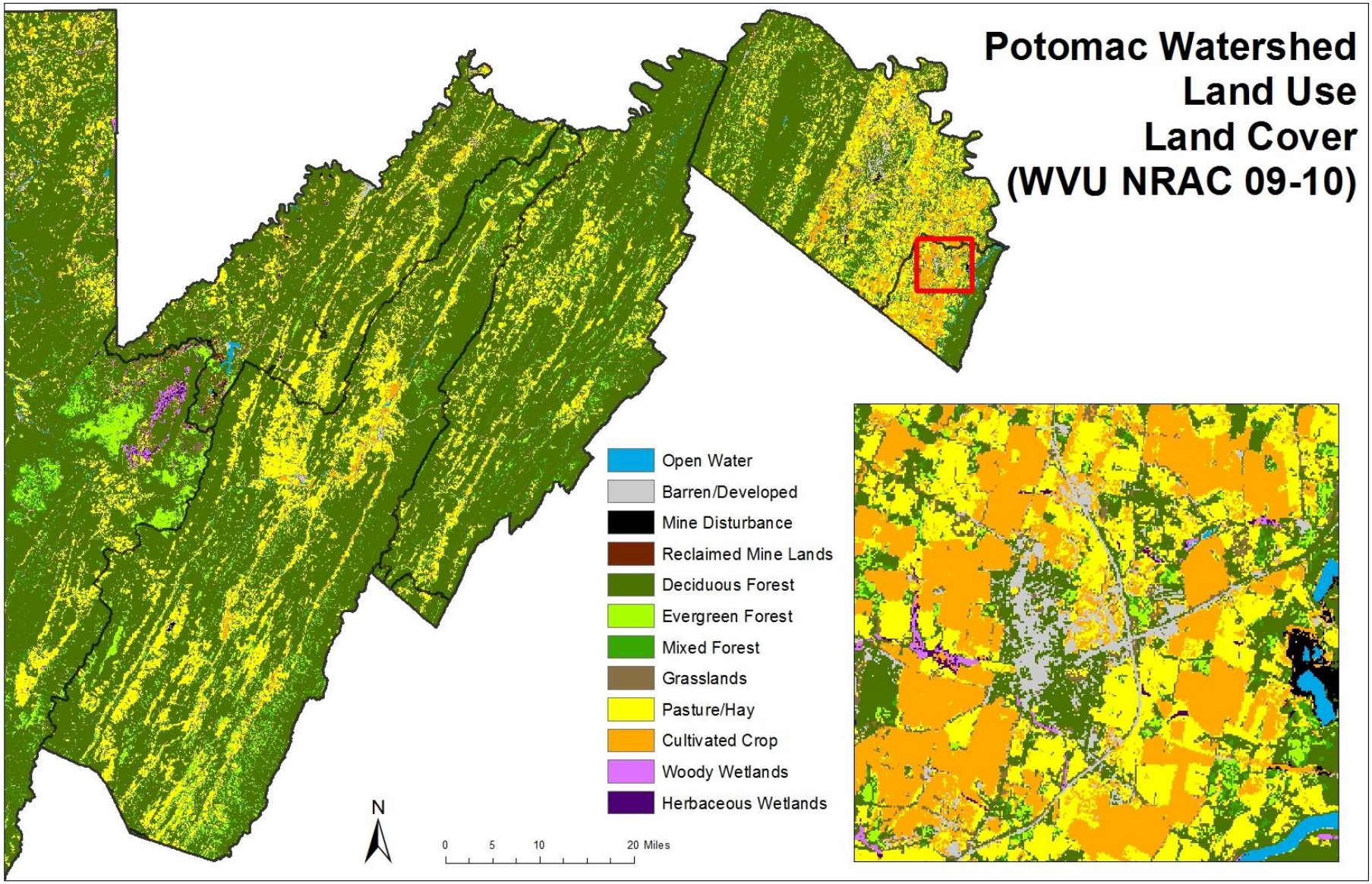
**Hydrology**
Hydrologic regime: Quantity and timing of flow or water level fluctuation. Highly dependent on the natural flow (disturbance) regime and hydrologic connectivity, including surface-ground water interactions.

**Biological Condition**
Biological community diversity, composition, relative abundance, trophic structure, condition, and sensitive species.

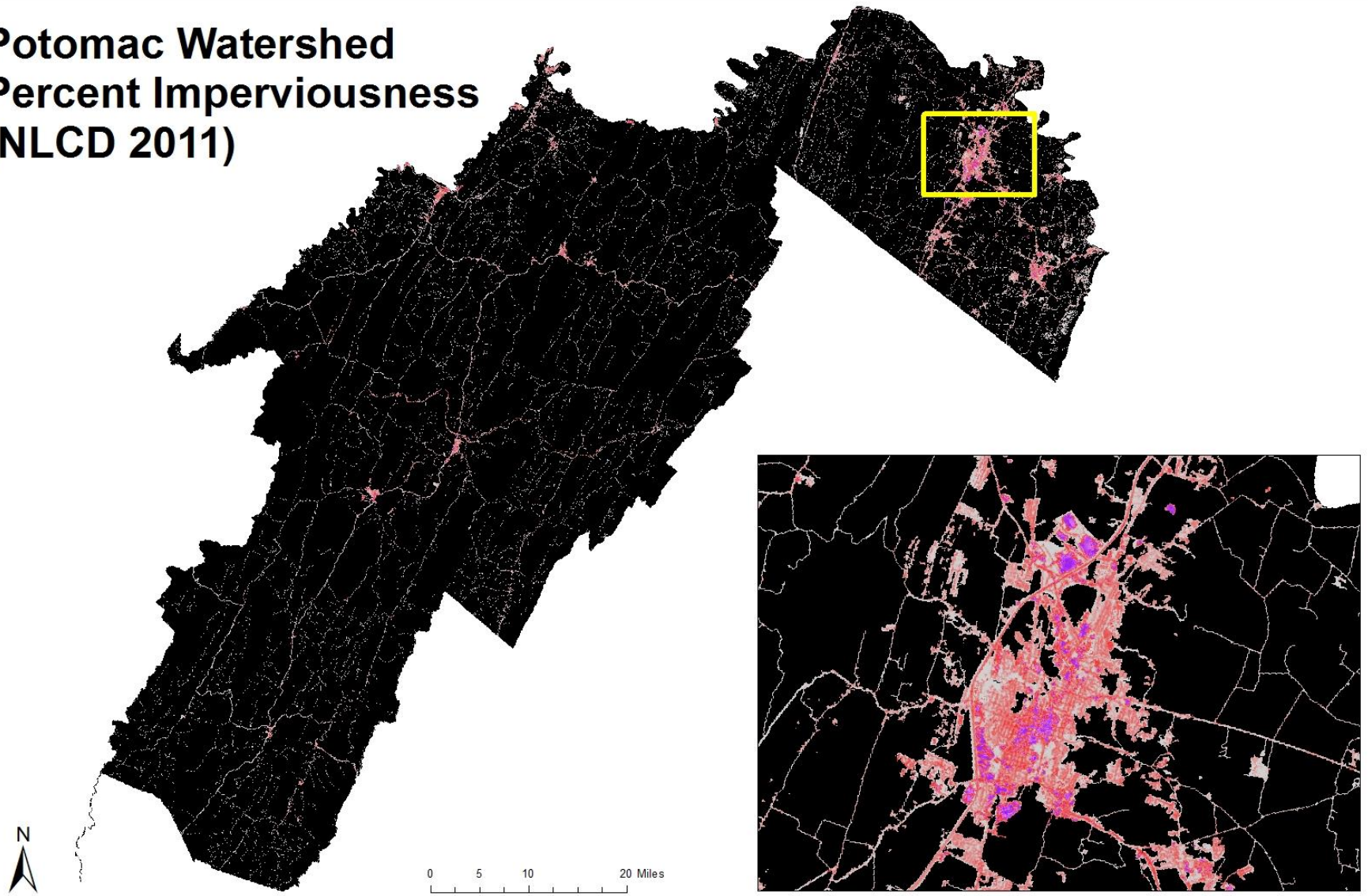
# Landscape Condition

- Land use in riparian area & in entire planning unit (natural cover, agriculture, grazing, development)
- Mean percent imperviousness
- Surface mining
- Underground mining
- Timber harvesting operations
- Oil & gas wells
- Roads & railroads

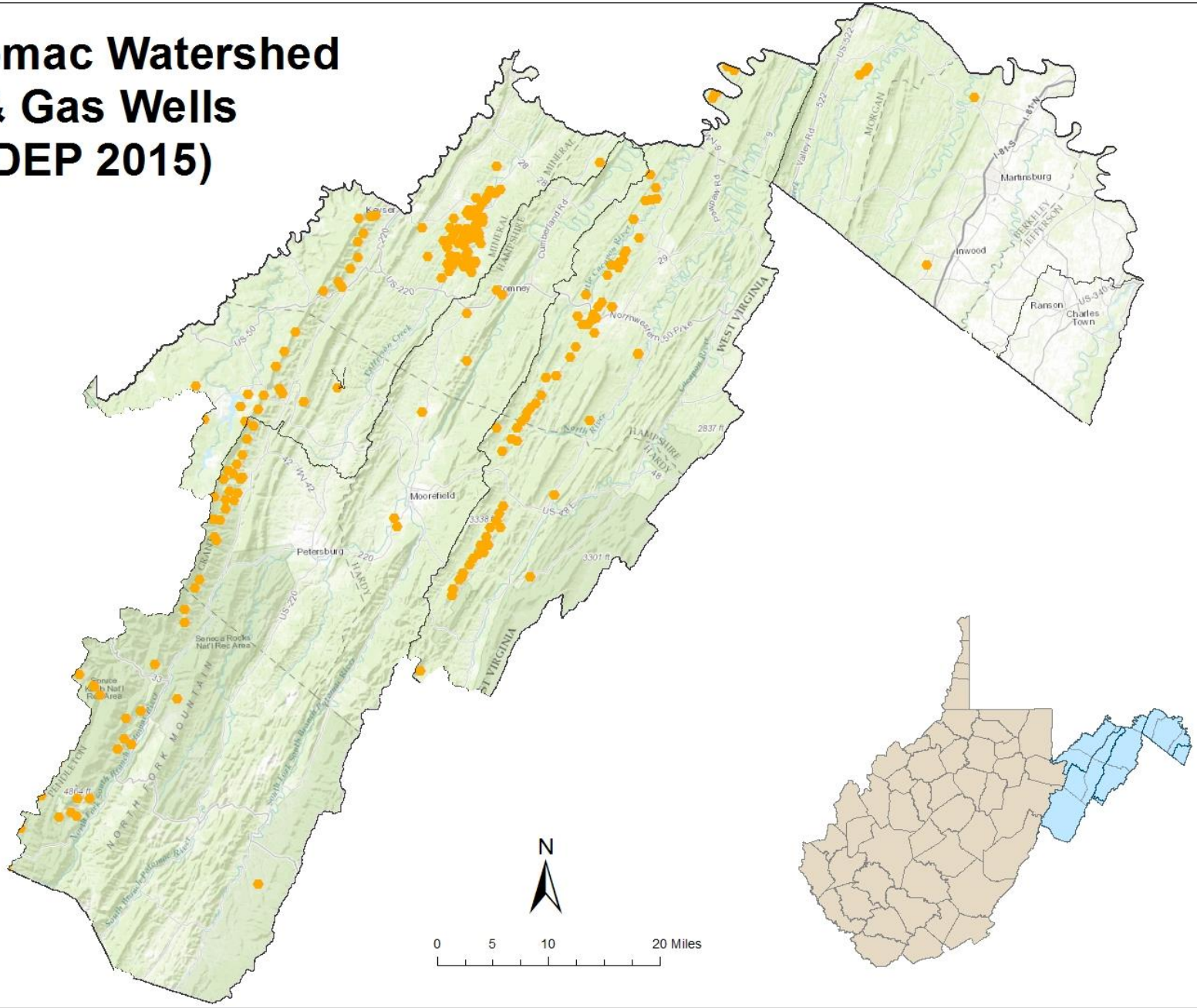
# Potomac Watershed
# Land Use
# Land Cover
# (WVU NRAC 09-10)



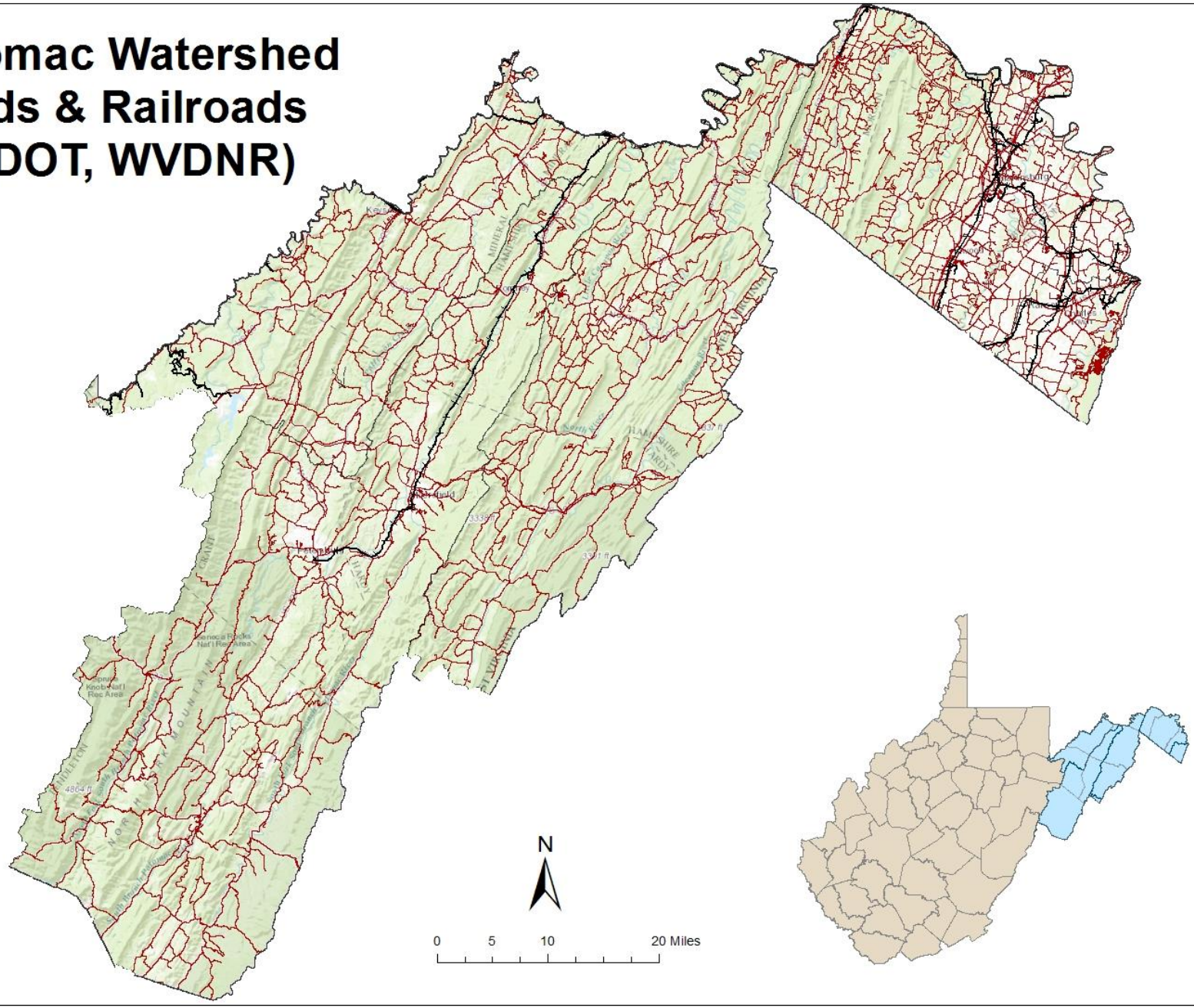
# Potomac Watershed Percent Imperviousness (NLCD 2011)



# Potomac Watershed Oil & Gas Wells (WVDEP 2015)



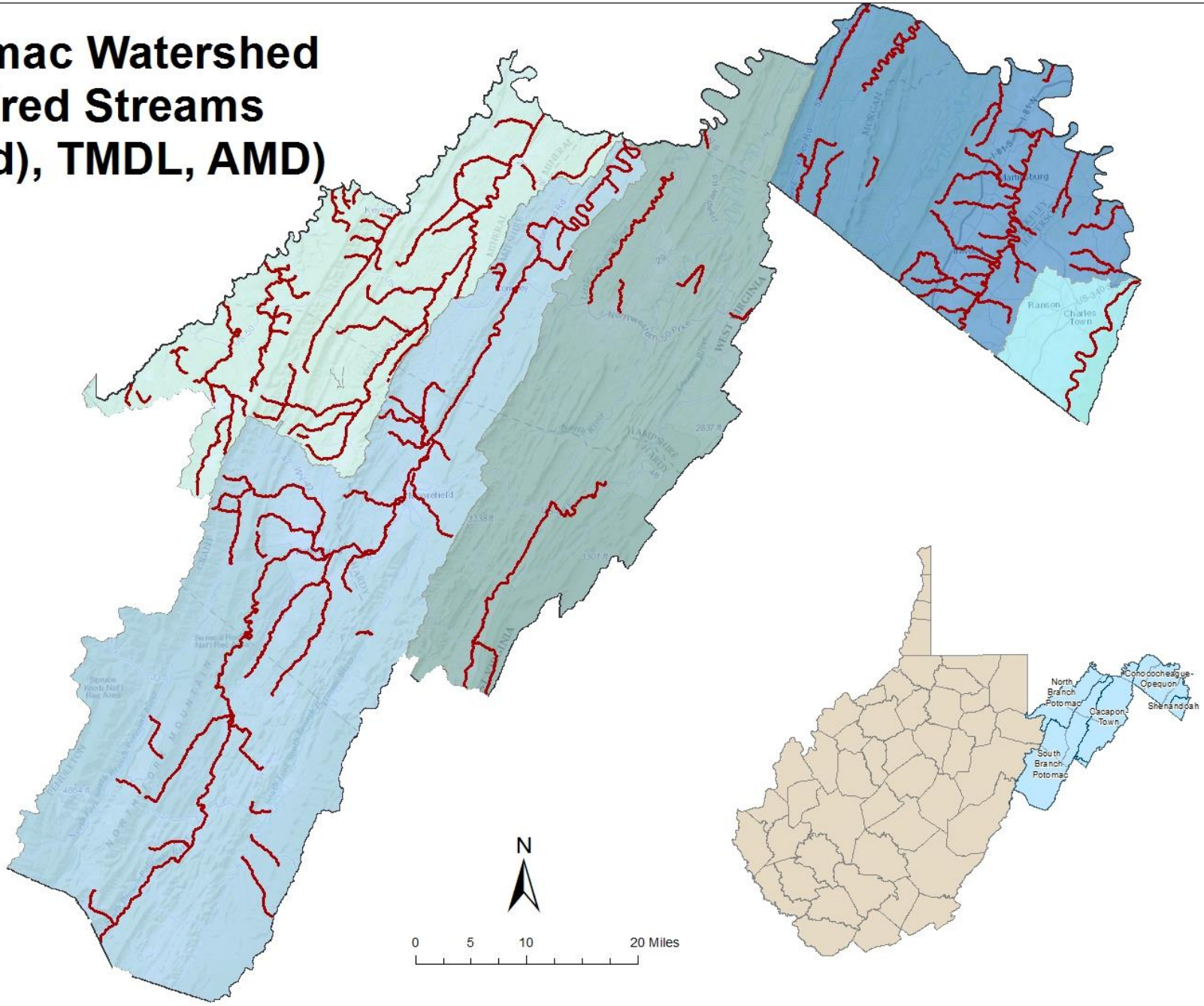
# Potomac Watershed Roads & Railroads (WVDOT, WVDNR)



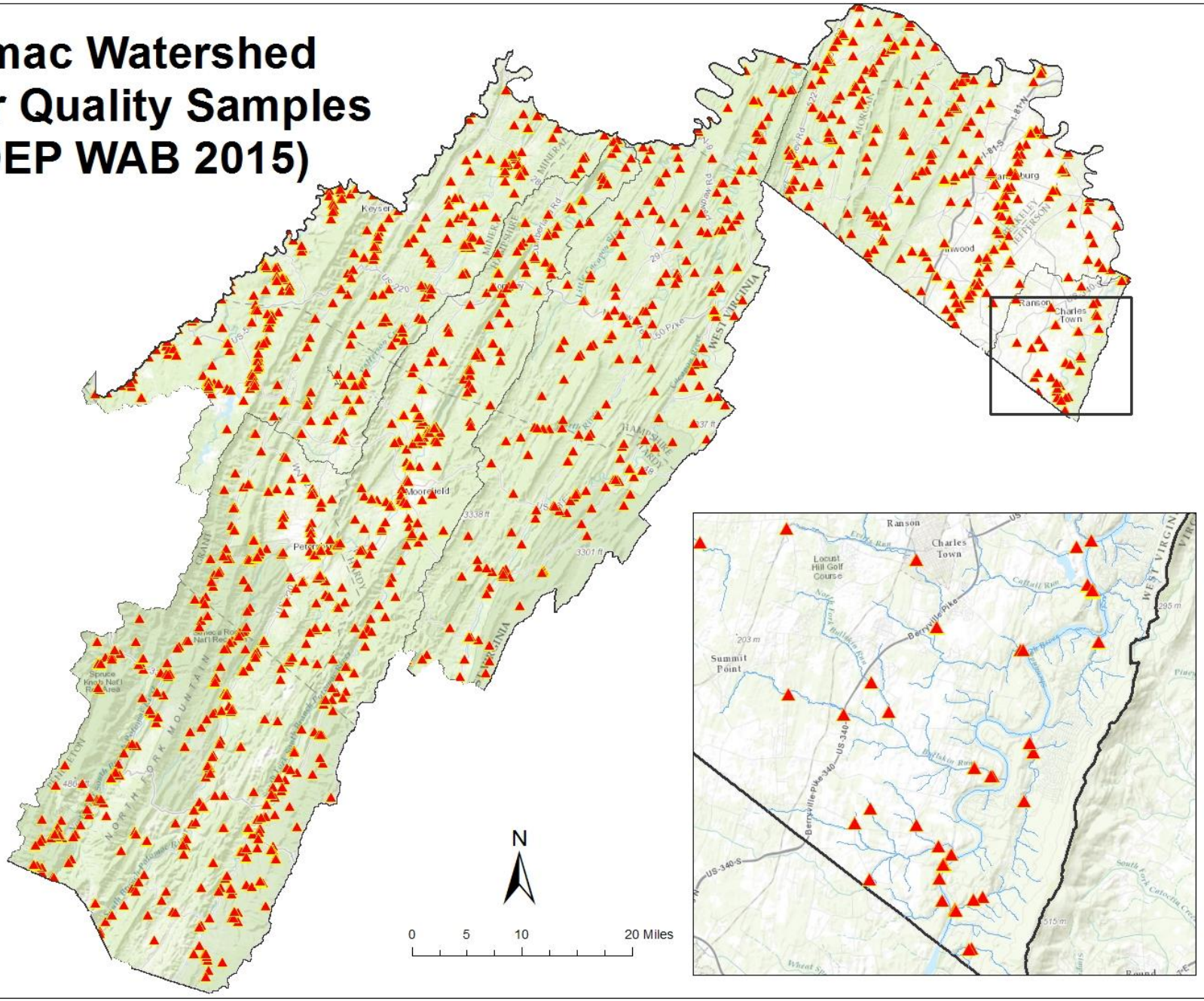
# Water Quality

- Impaired Streams (303(d), TMDL)
- Median pH values
- Median specific conductivity values
- Median sulfate values
- Median GLIMPSS values (benthic macroinvertebrates)
- Mean percent imperviousness
- Surface mining
- Underground mining
- Natural cover in riparian area

# Potomac Watershed Impaired Streams (303(d), TMDL, AMD)



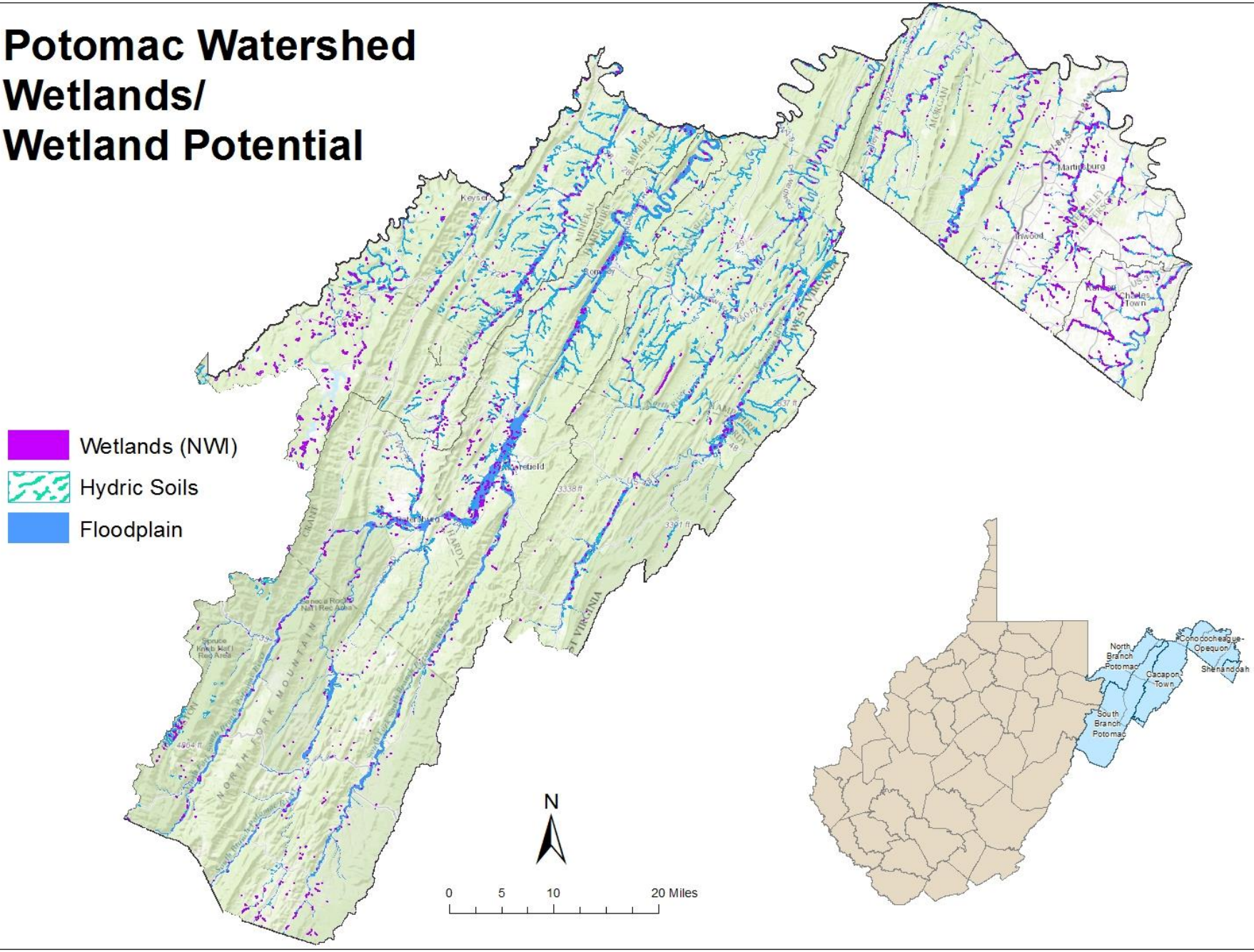
# Potomac Watershed Water Quality Samples (WVDEP WAB 2015)



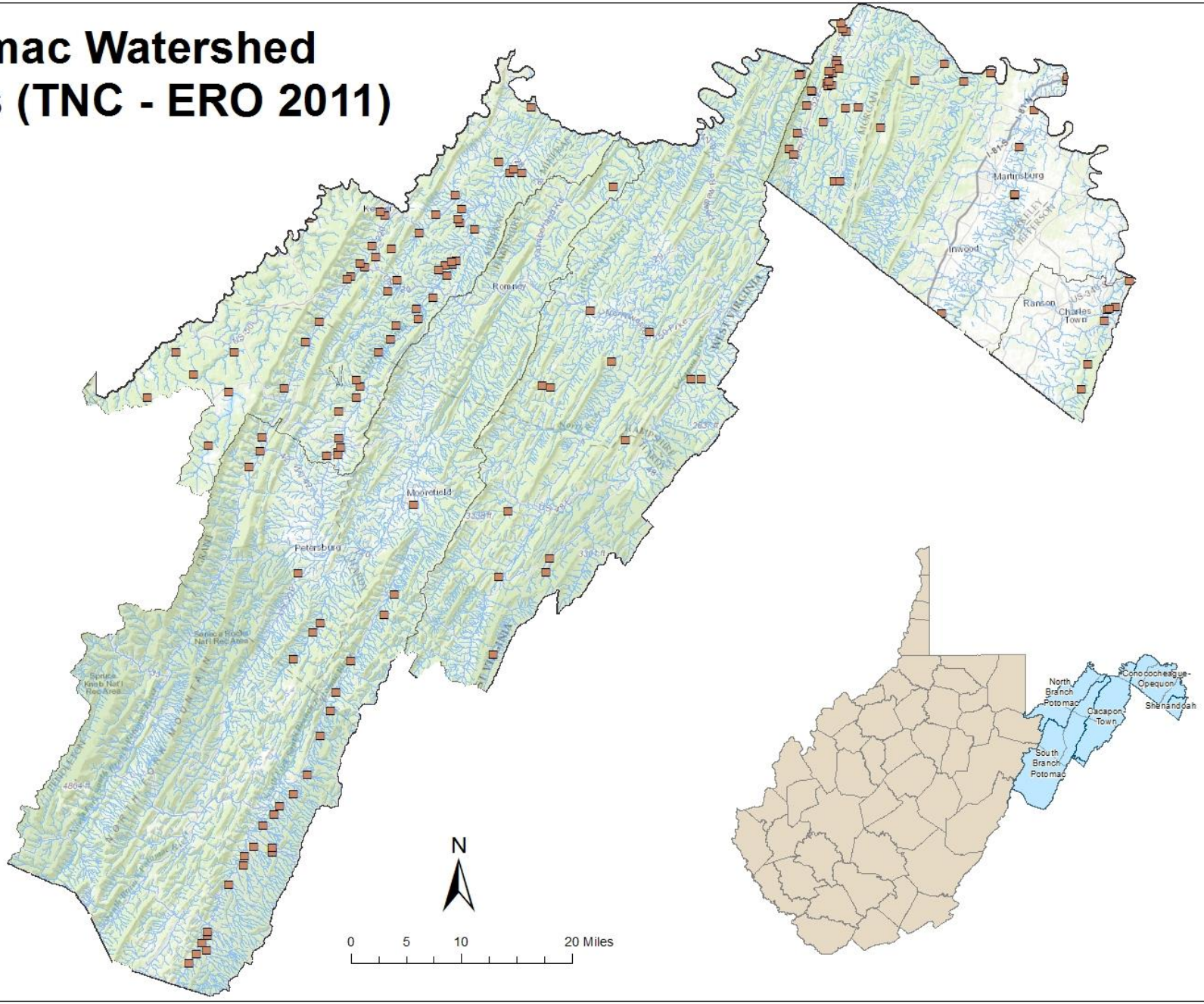
# Hydrologic Connectivity

- Headwater streams
- Wetlands
- Hydric soils
- Floodplain
- Floodplain forested wetlands
- Forested headwater wetlands
- Forested riparian area
- Local integrity
- Dams
- Roads and rail in riparian area

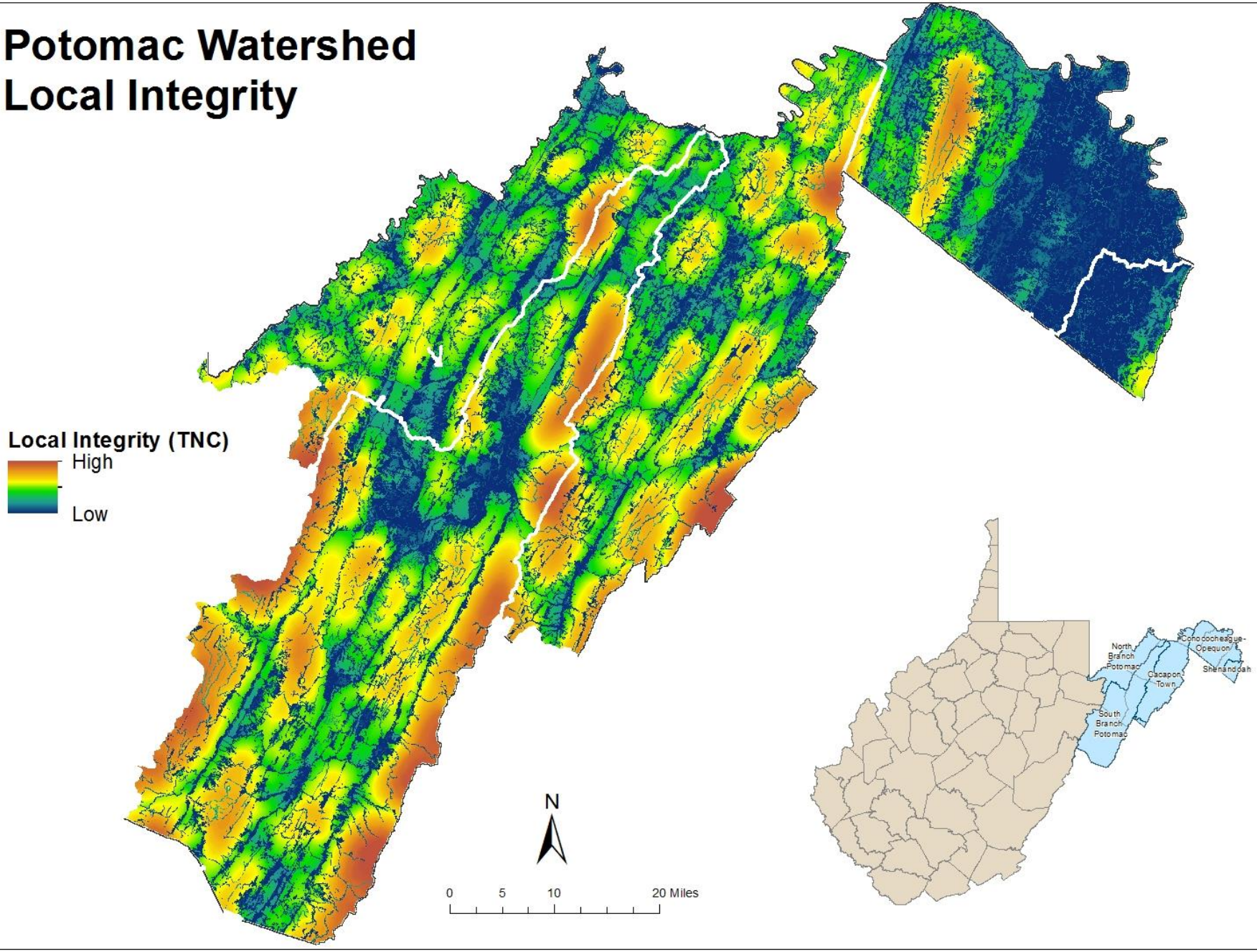
# Potomac Watershed Wetlands/ Wetland Potential



# Potomac Watershed Dams (TNC - ERO 2011)



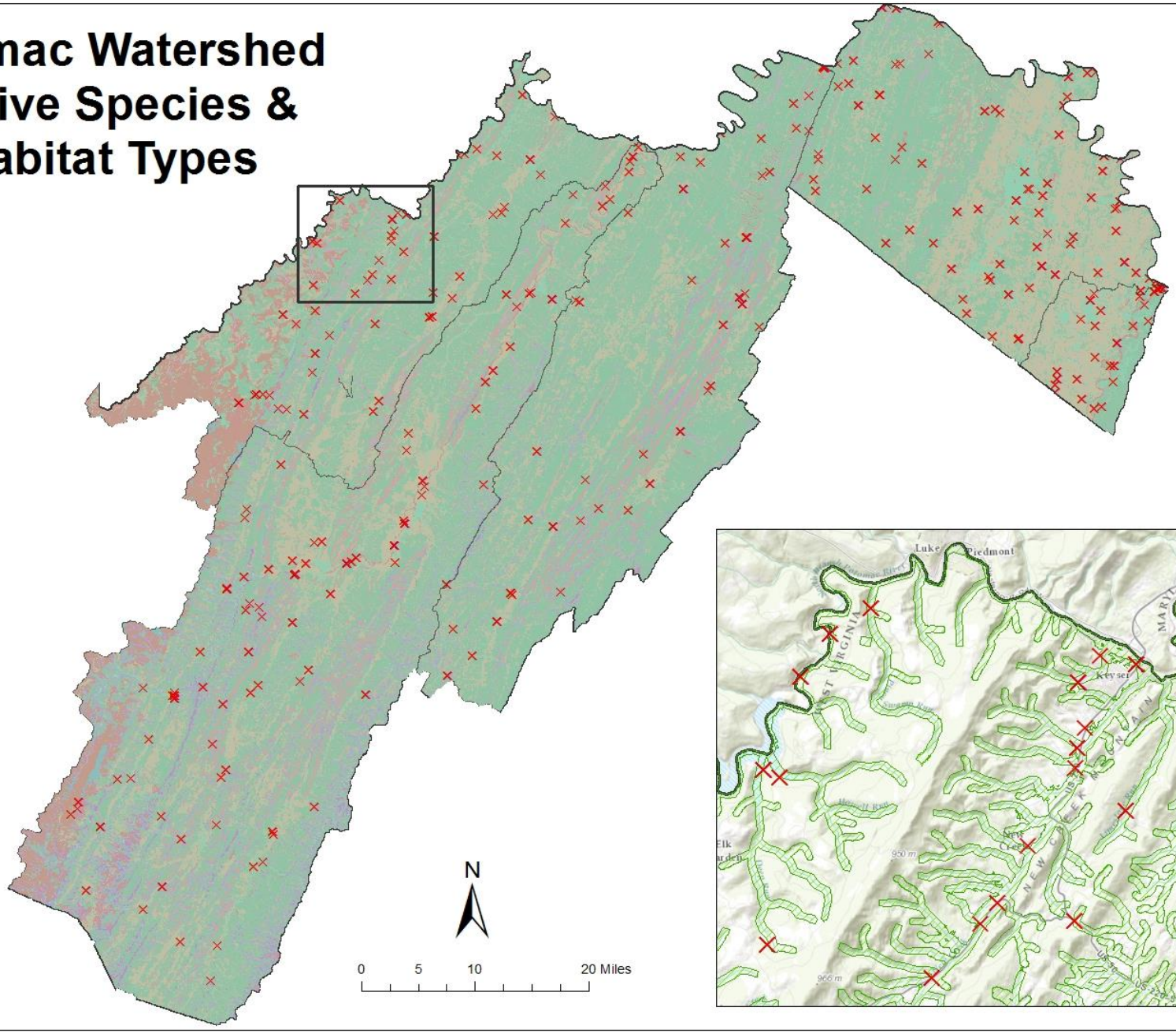
# Potomac Watershed
# Local Integrity



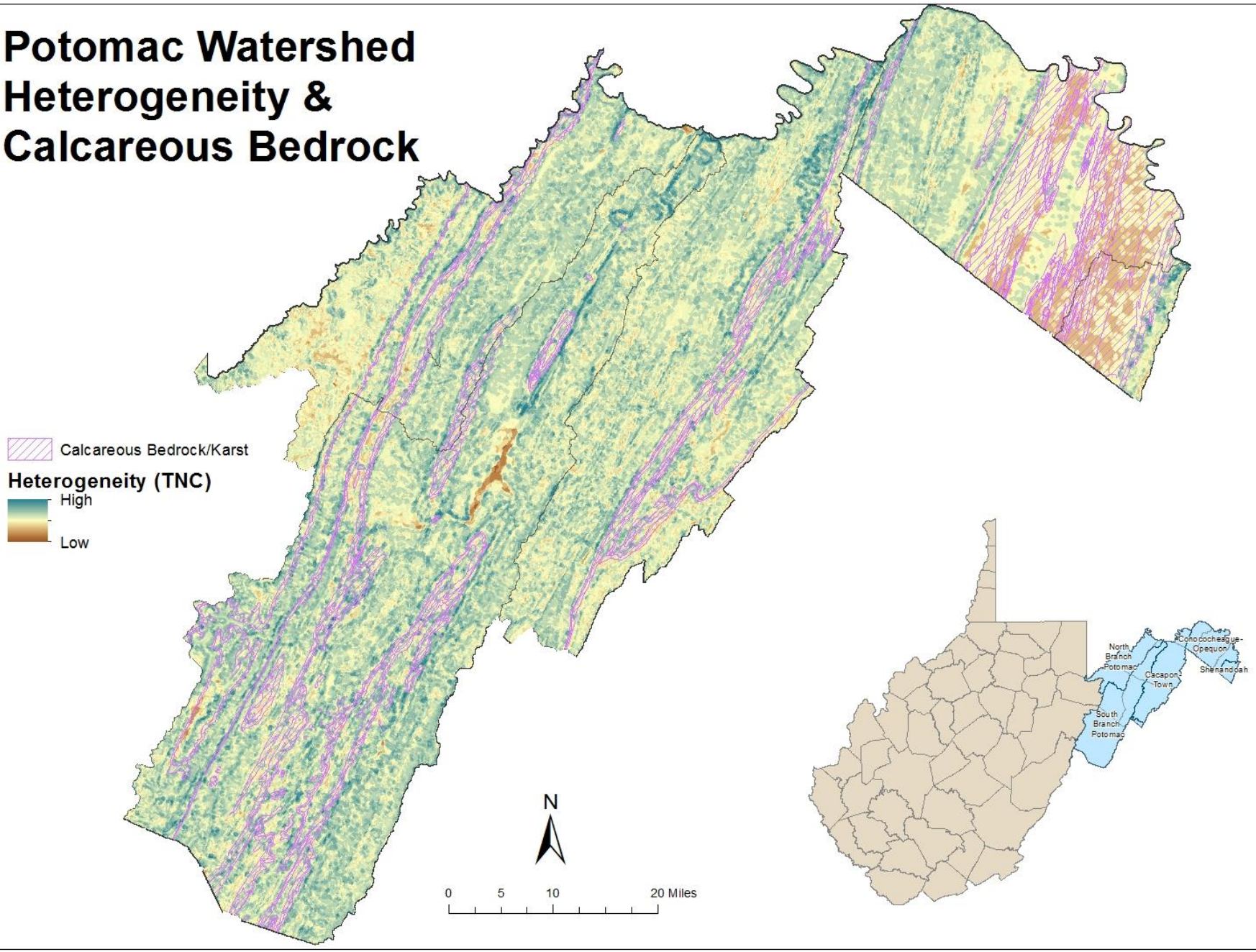
# Biology/Habitat

- Rare species
- Non-native invasive species
- Northeast habitat types
- Calcareous bedrock
- Heterogeneity
- Percent tree basal area loss

# Potomac Watershed Invasive Species & NE Habitat Types

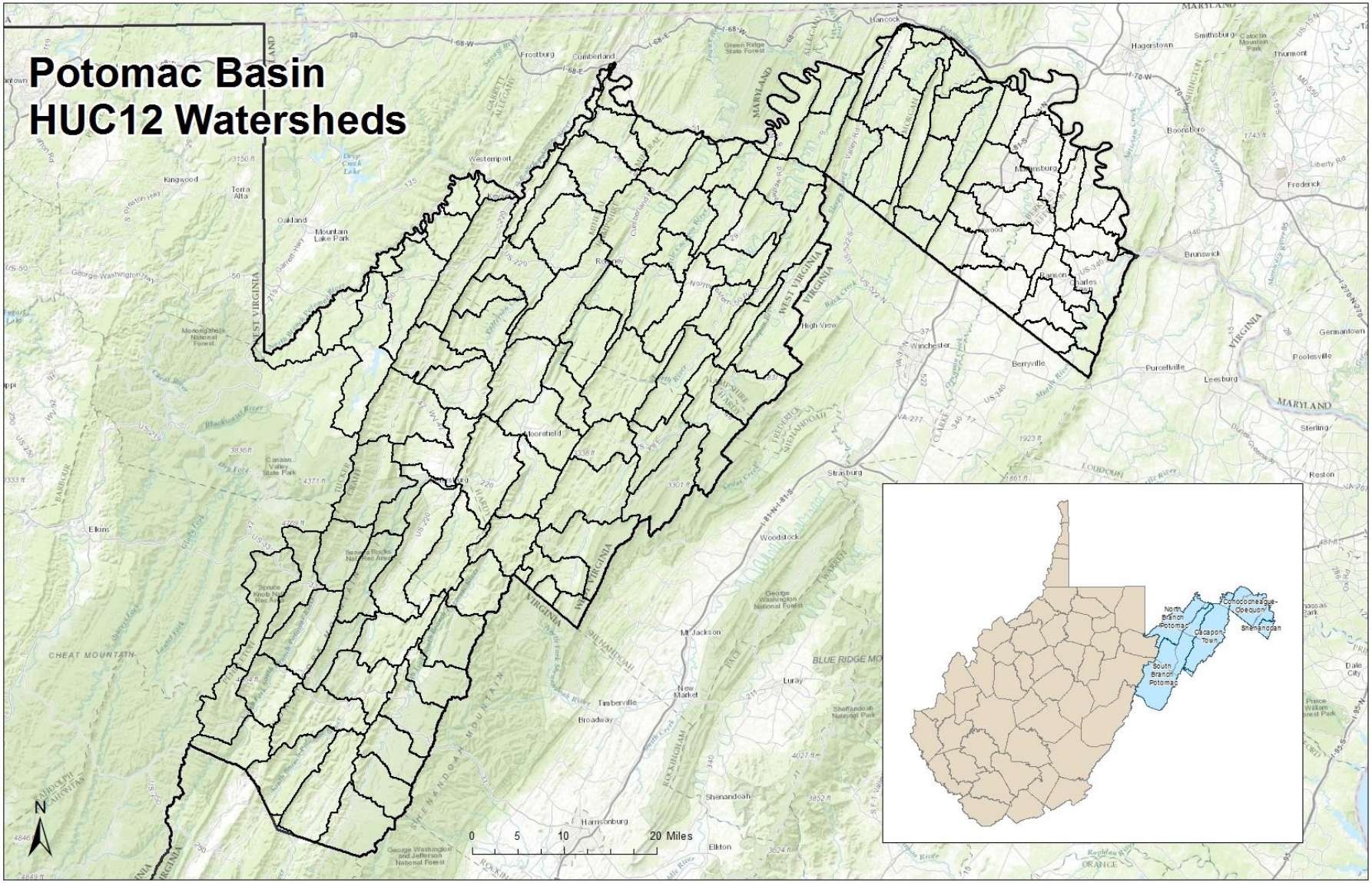


# Potomac Watershed Heterogeneity & Calcareous Bedrock

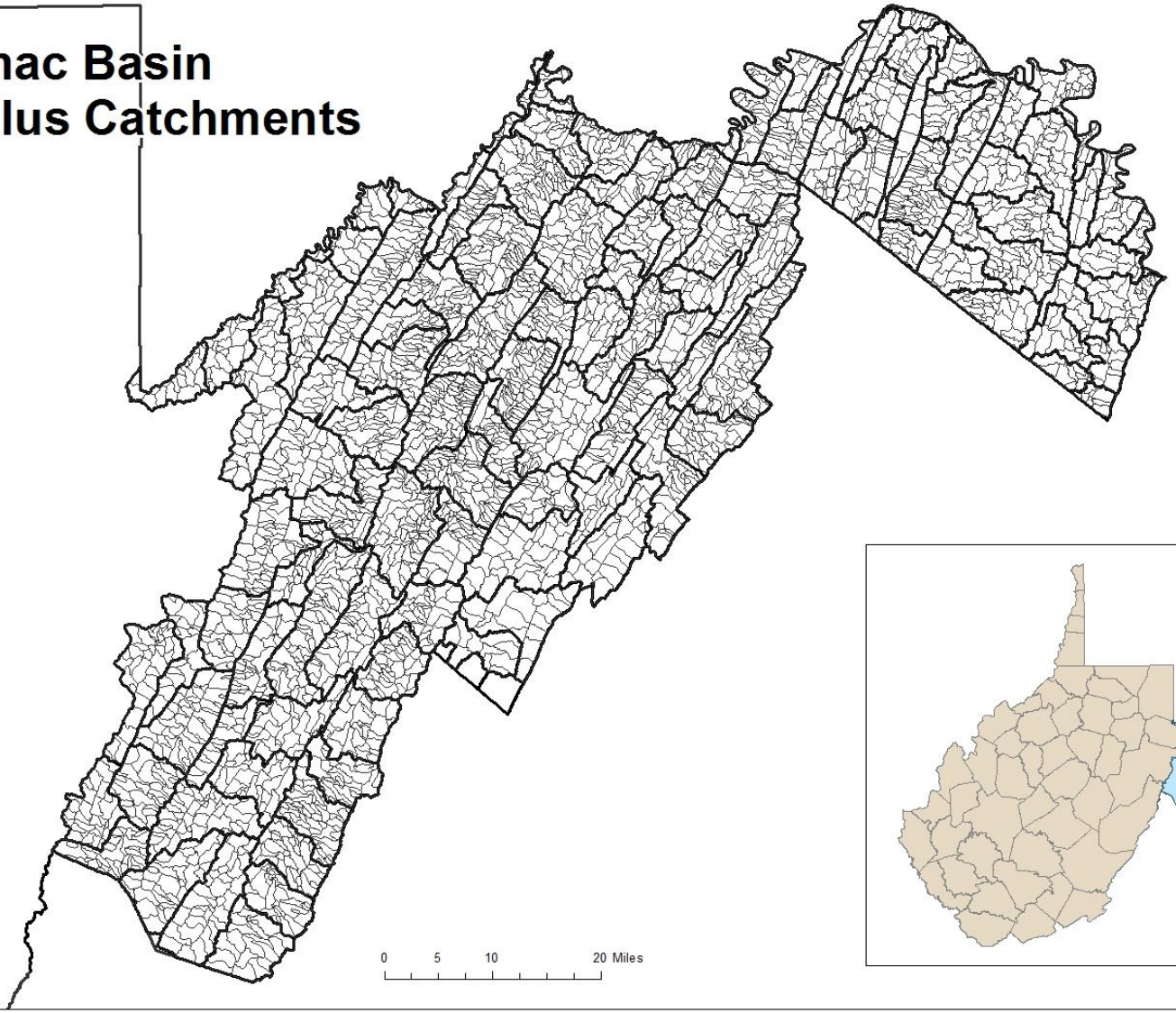


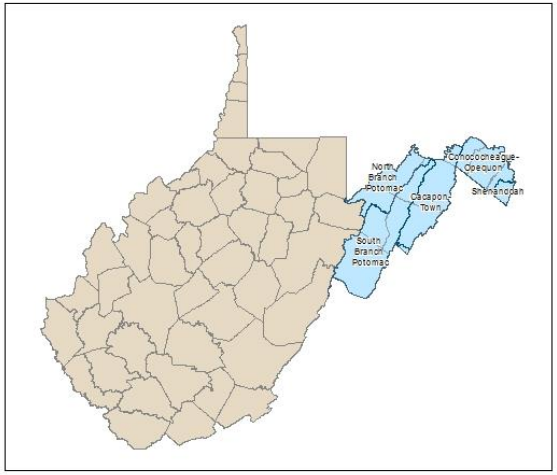
# Healthy Watersheds - Results

- Entire Potomac watershed in WV
- HUC12 & Catchment level results
- Objective & relative methods, both scales


Potomac Basin
HUC12 Watersheds
N
0 5 10 20 Miles
North Branch Potomac
Conococheague-Opequon
Cacapon-Town
Shenandoah
South Branch Potomac

# Potomac Basin
# NHDPlus Catchments



# Objective Method

- Very Good: Ecologically desirable status; requires little intervention for maintenance
- Good: Indicator within acceptable range of variation; some intervention required for maintenance

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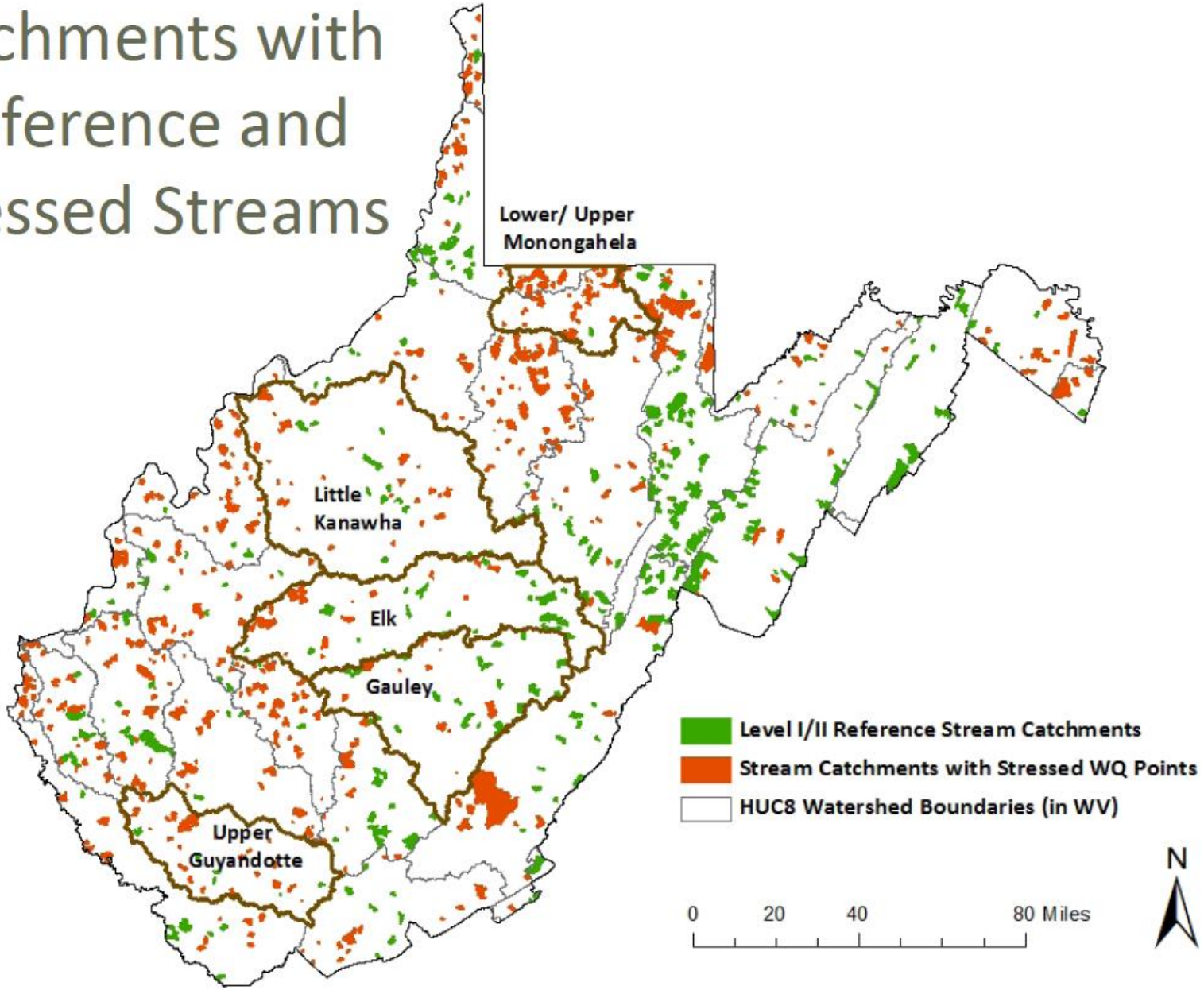
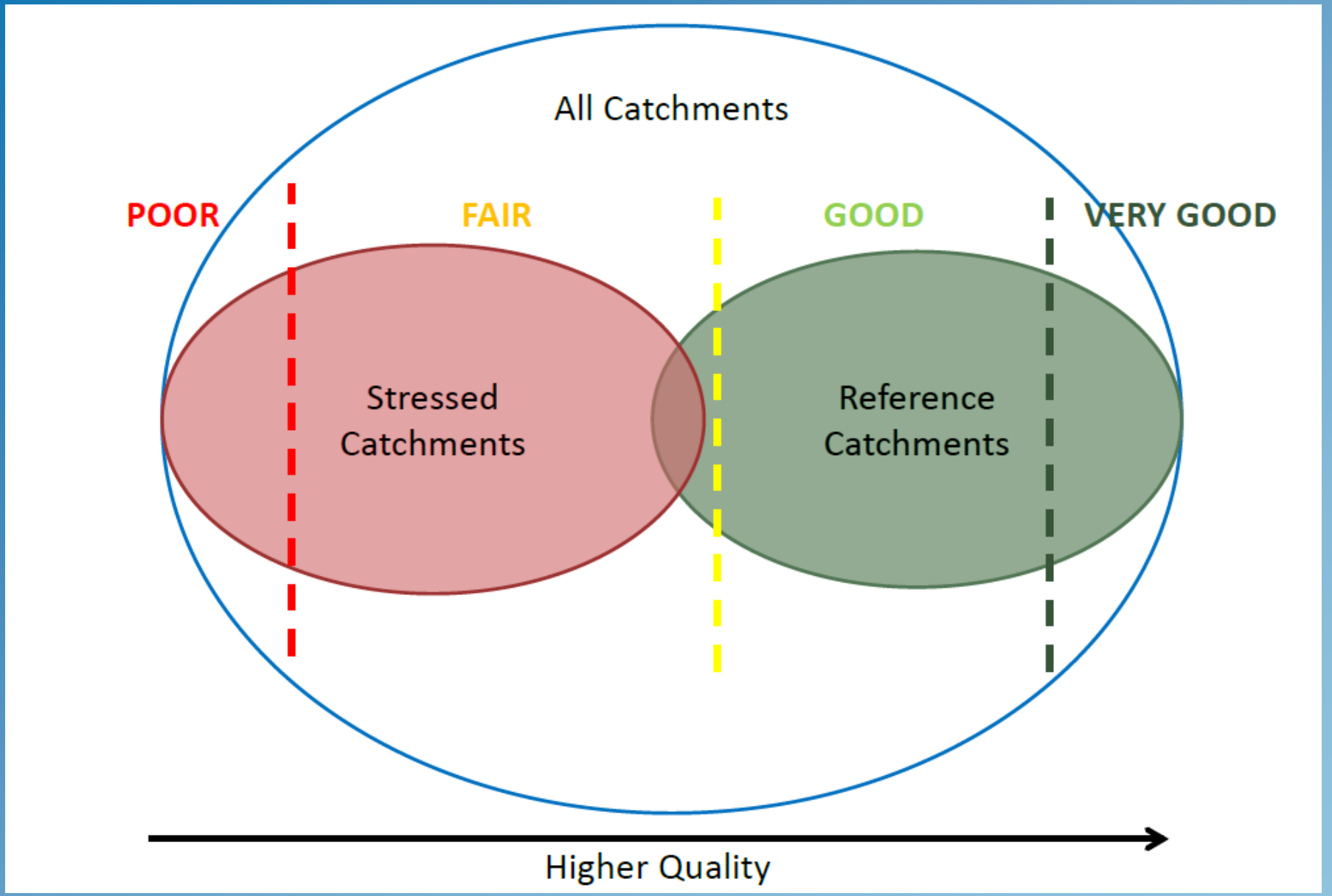
Restoration Threshold

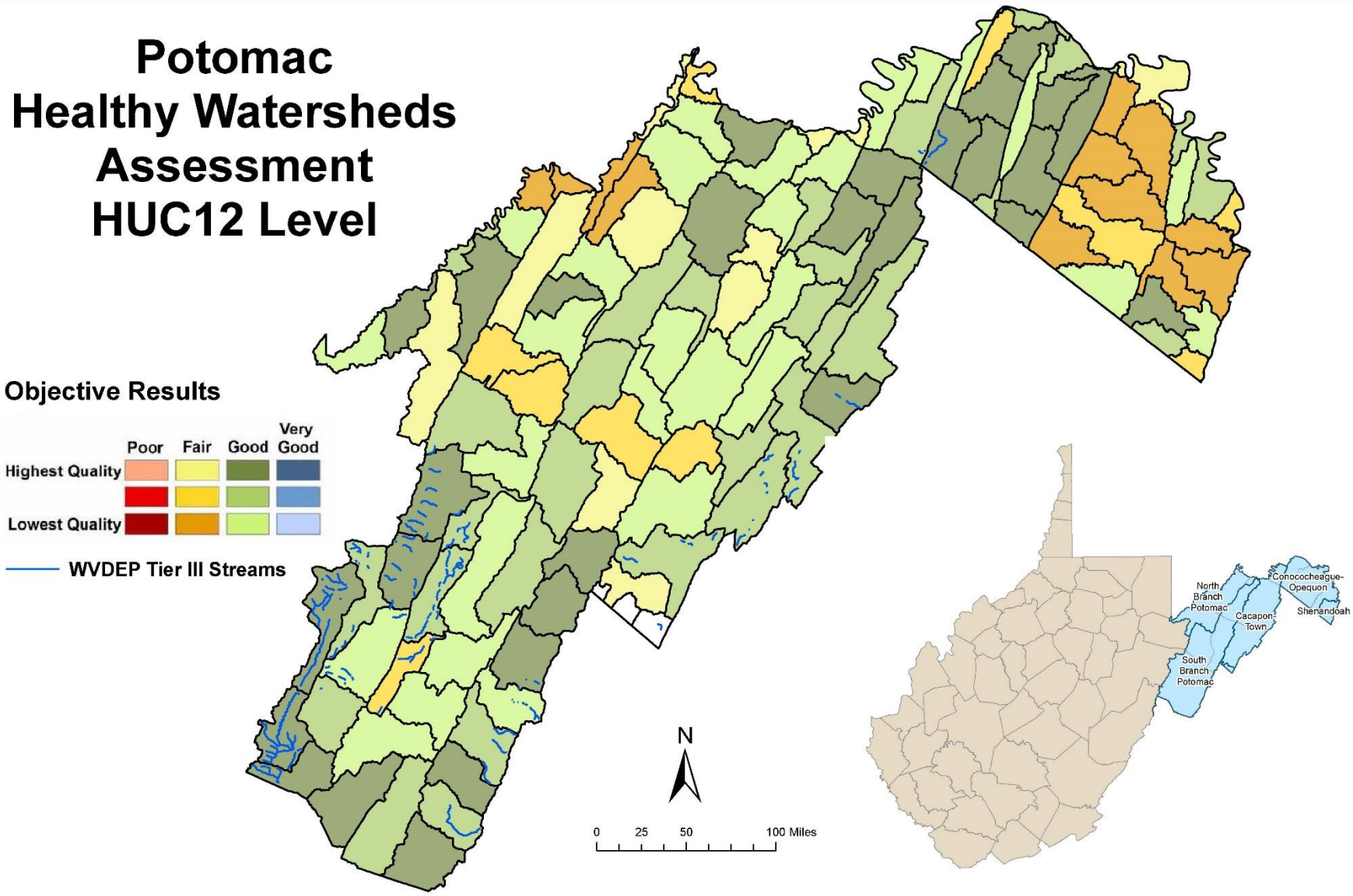
- Fair: Outside acceptable range of variation; requires human intervention
- Poor: Restoration increasingly difficult; may result in extirpation of target

# Catchments with Reference and Stressed Streams

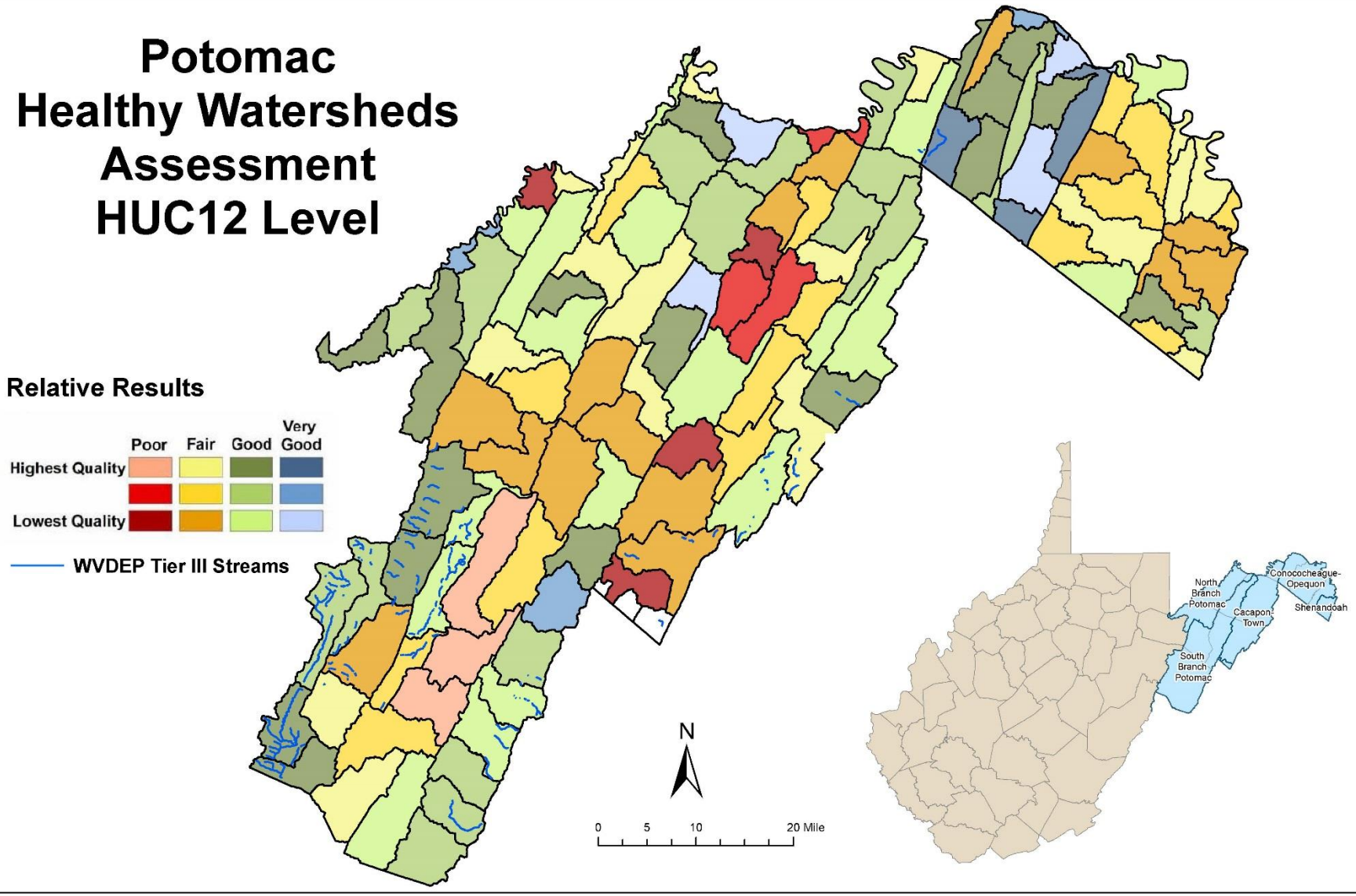



All Catchments
POOR
FAIR
GOOD
VERY GOOD
Stressed Catchments
Reference Catchments
Higher Quality

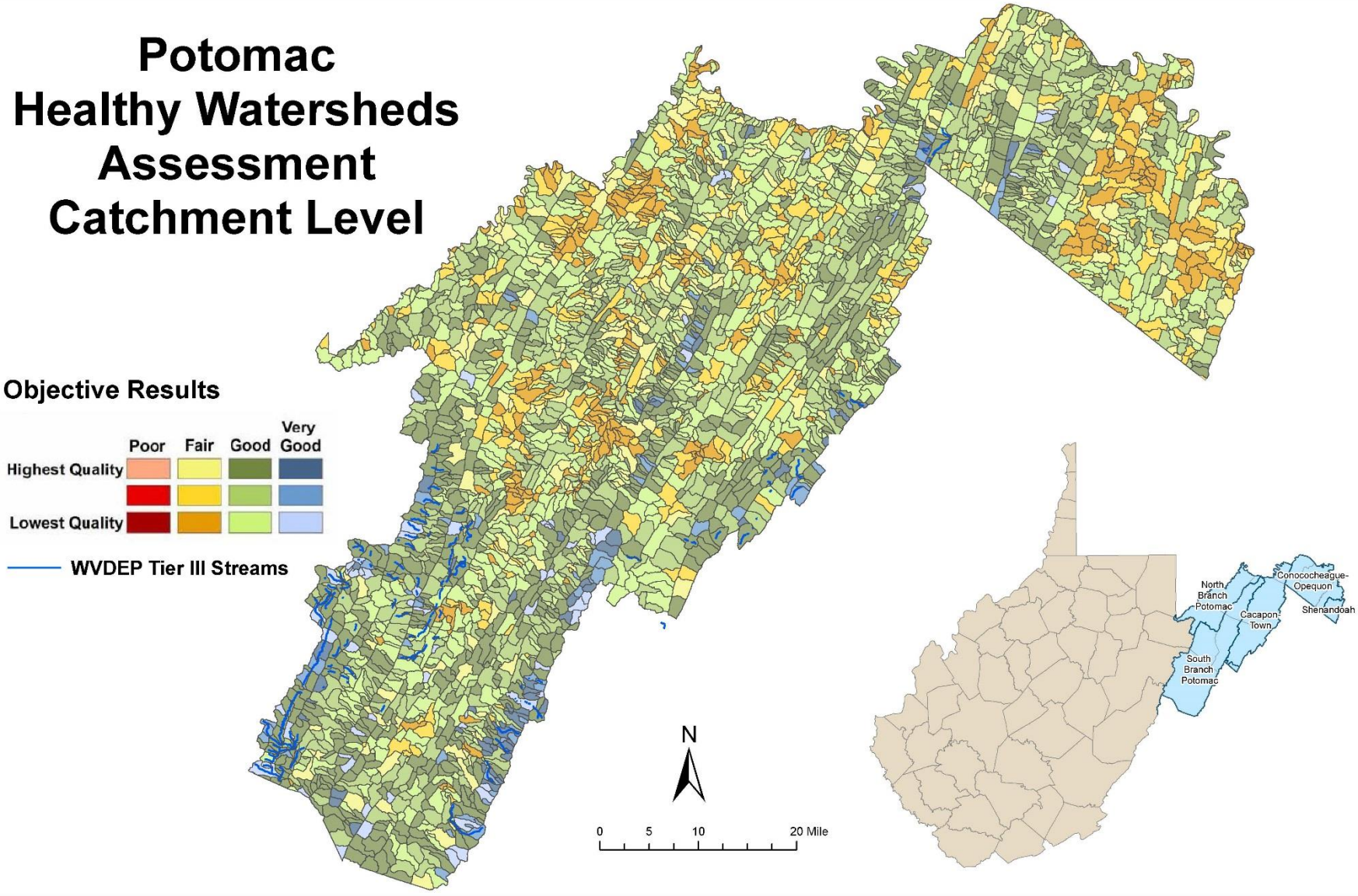
# Potomac Healthy Watersheds Assessment HUC12 Level



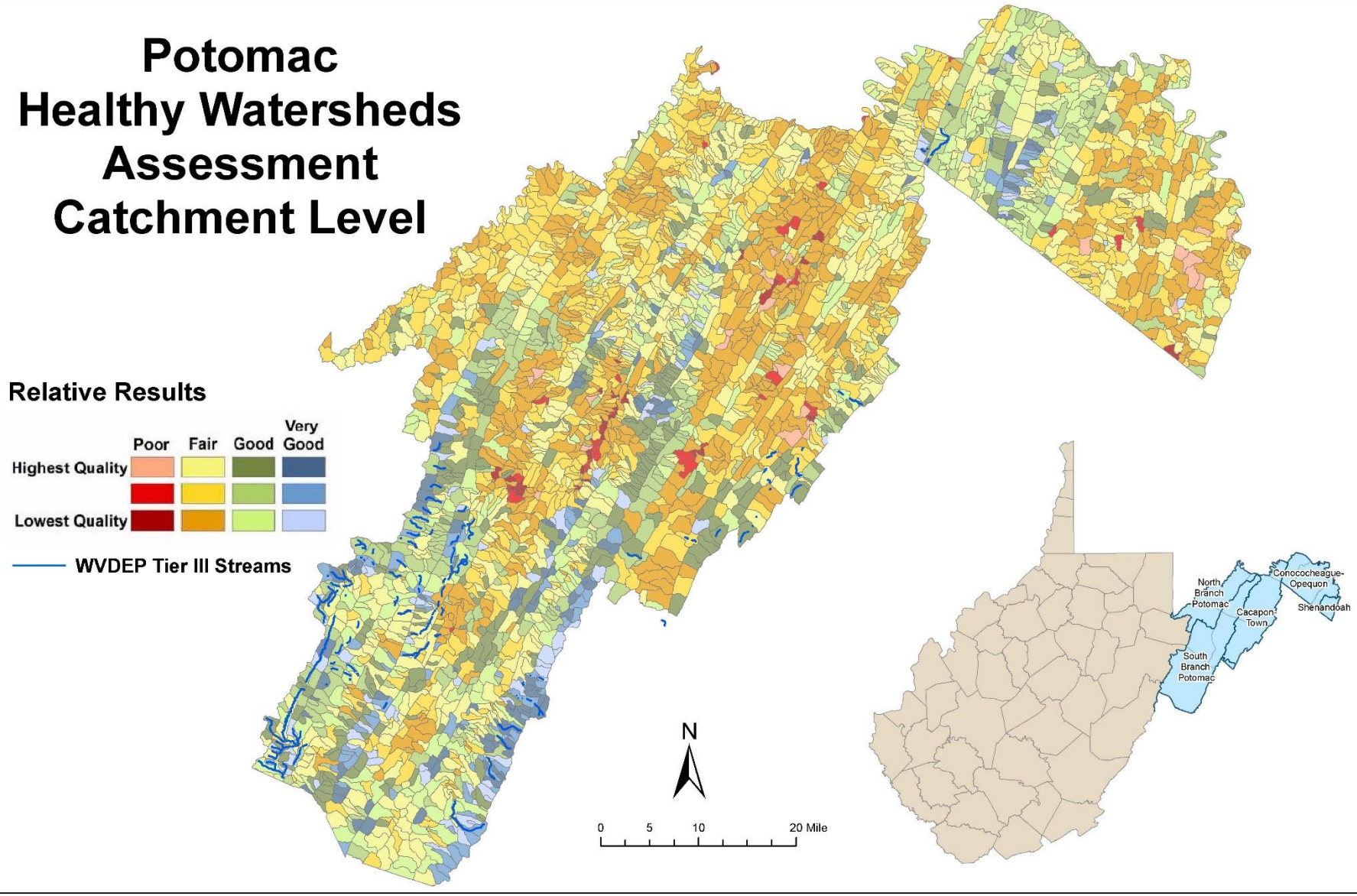
# Potomac Healthy Watersheds Assessment HUC12 Level



# Potomac Healthy Watersheds Assessment Catchment Level



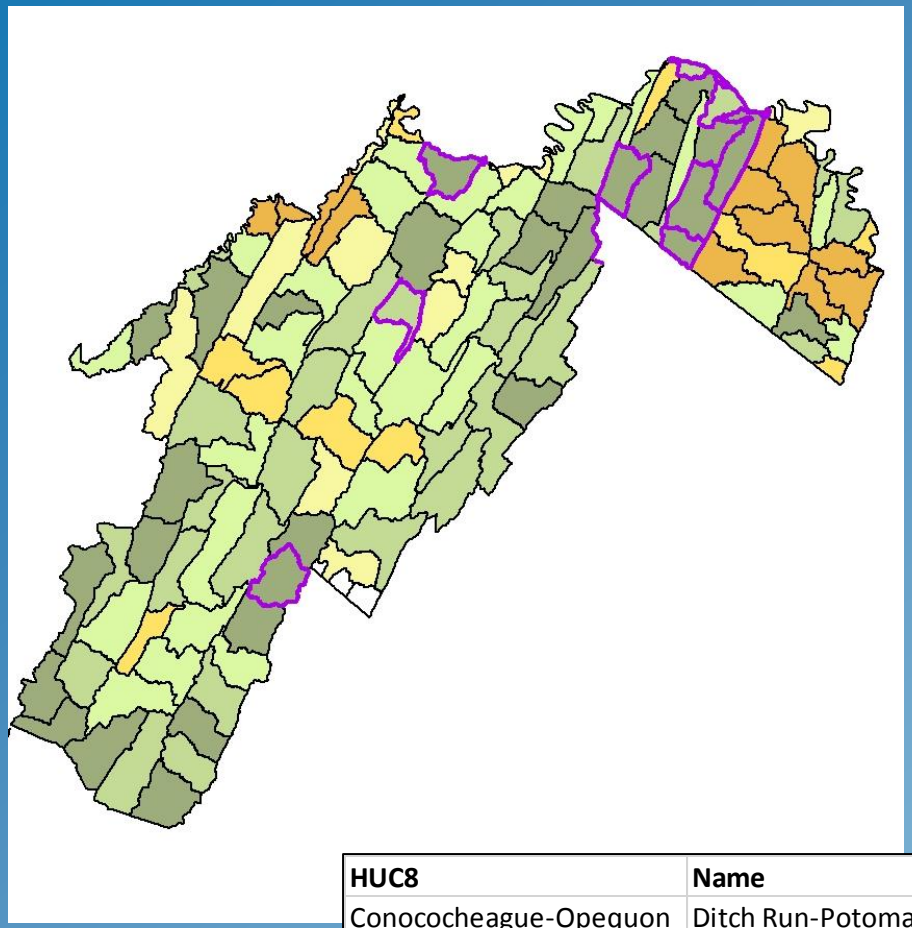
# Potomac Healthy Watersheds Assessment Catchment Level

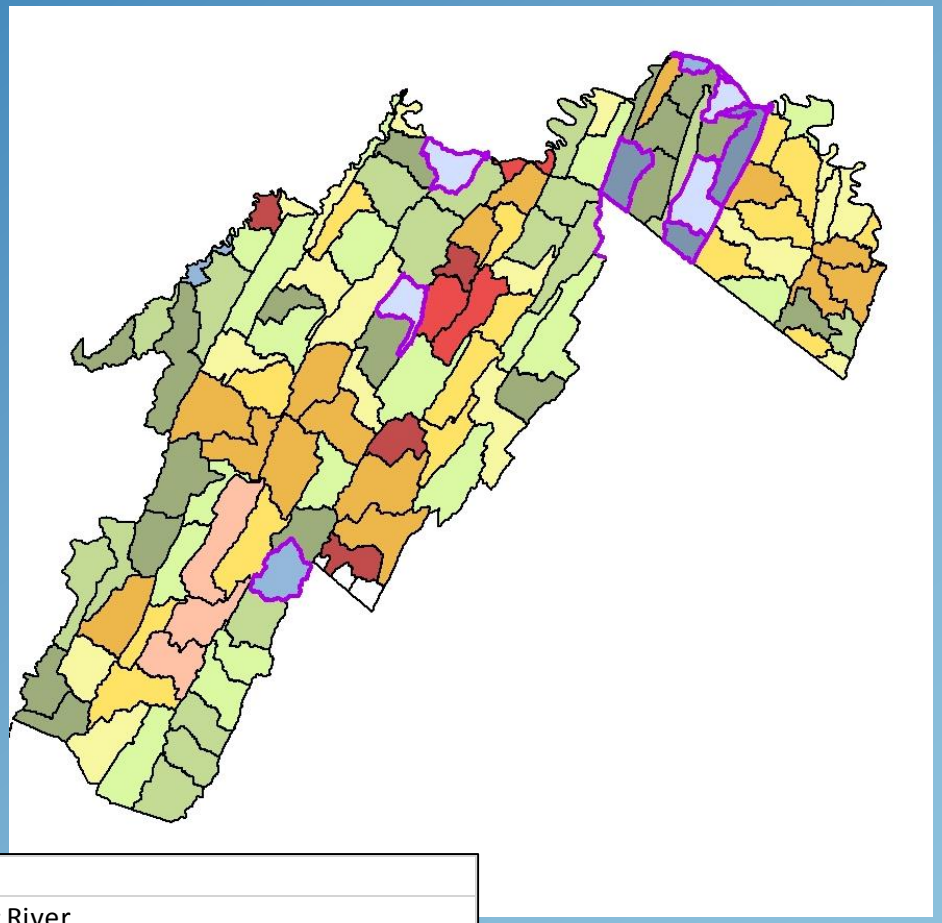


# Healthy Watersheds - Interpret

- Review objective HUC12 results
- Compare to relative HUC12 results
- Identify those in Very Good or high Good categories
- Compare to catchment level objective and relative results; refine as needed
- Review metrics data to evaluate drivers
- Note trends and patterns
- Align with protection and restoration priorities

# Objective - Good & Relative – Very Good

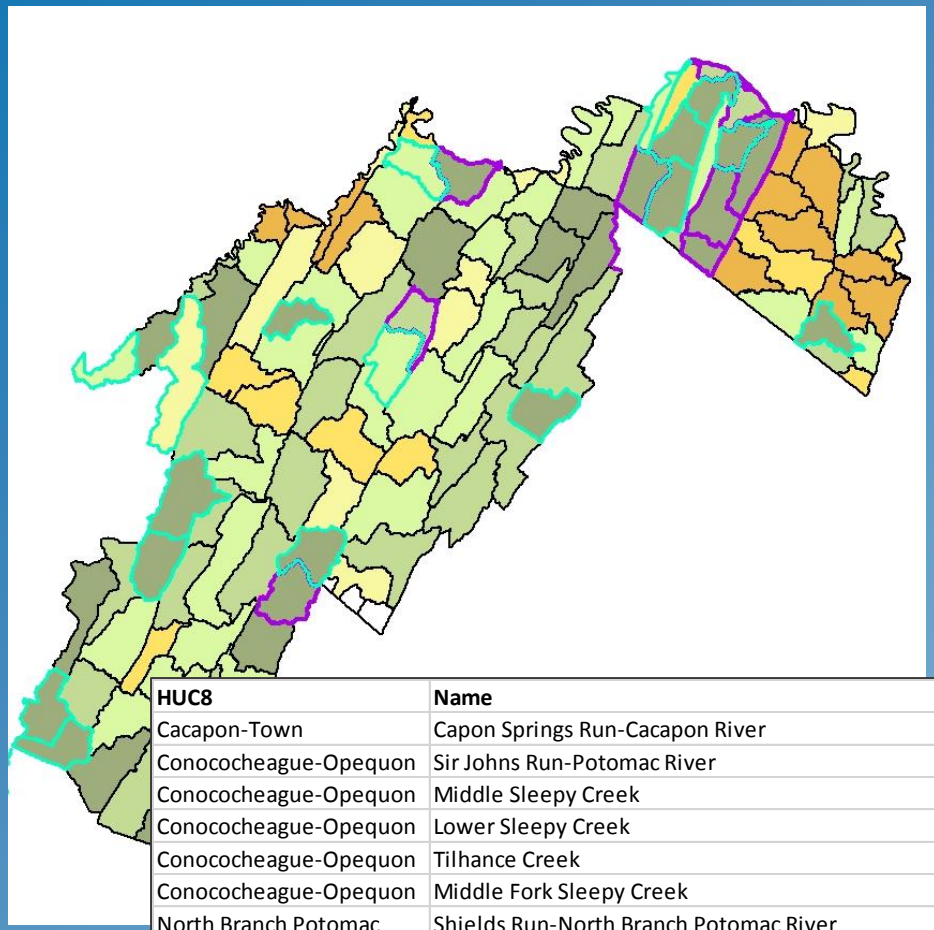


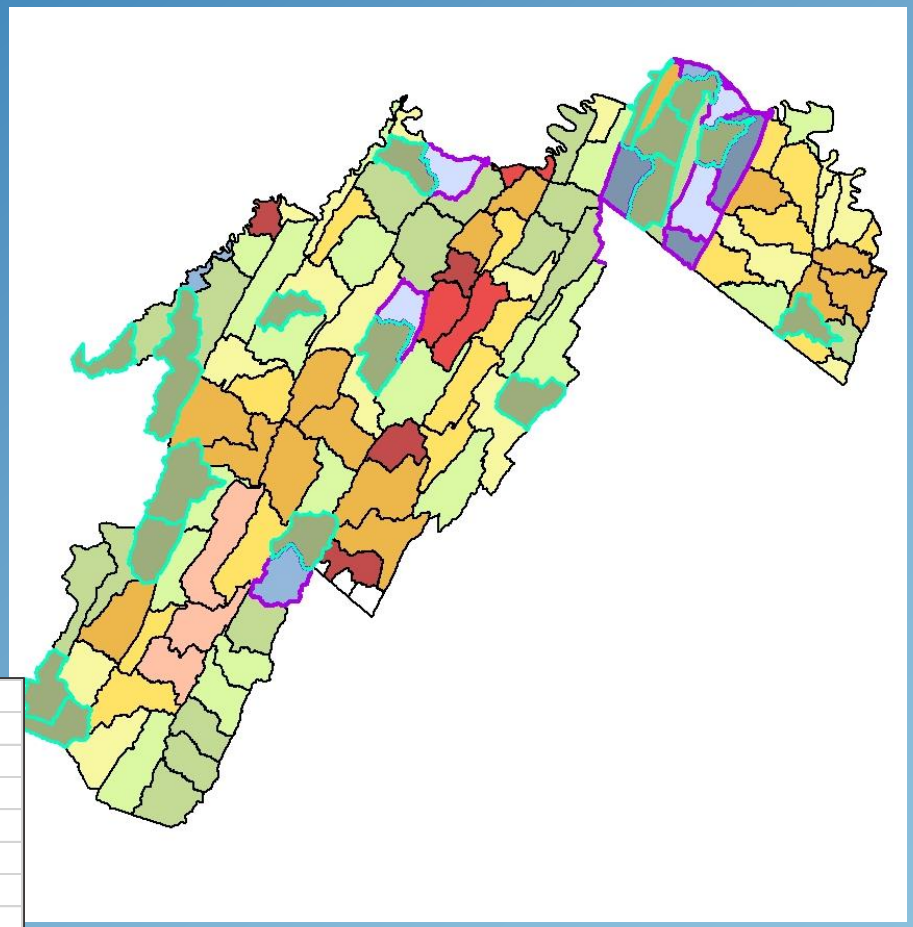


| HUC8 | Name |
|---|---|
| Conococheague-Opequon | Ditch Run-Potomac River |
| Conococheague-Opequon | Cherry Run-Potomac River |
| Conococheague-Opequon | Elk Branch-Back Creek |
| Conococheague-Opequon | Outlet Back Creek |
| Conococheague-Opequon | Upper Sleepy Creek |
| Conococheague-Opequon | Warm Springs Hollow-Back Creek |
| North Branch Potomac | Green Spring Run-North Branch Potomac River |
| South Branch Potomac | Rohrbaugh Run-South Fork South Branch Potomac River |
| South Branch Potomac | McDowell Run-South Branch Potomac River |

Tier I – Healthiest

# Objective - Good & Relative – (high) Good

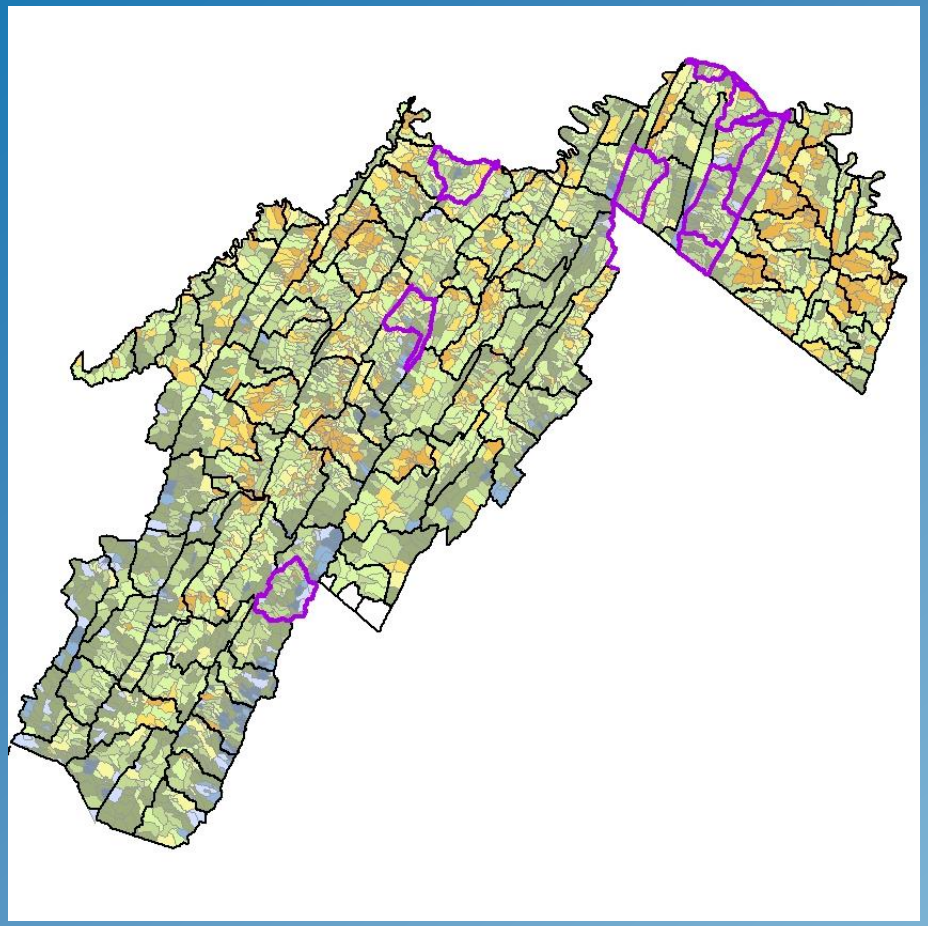


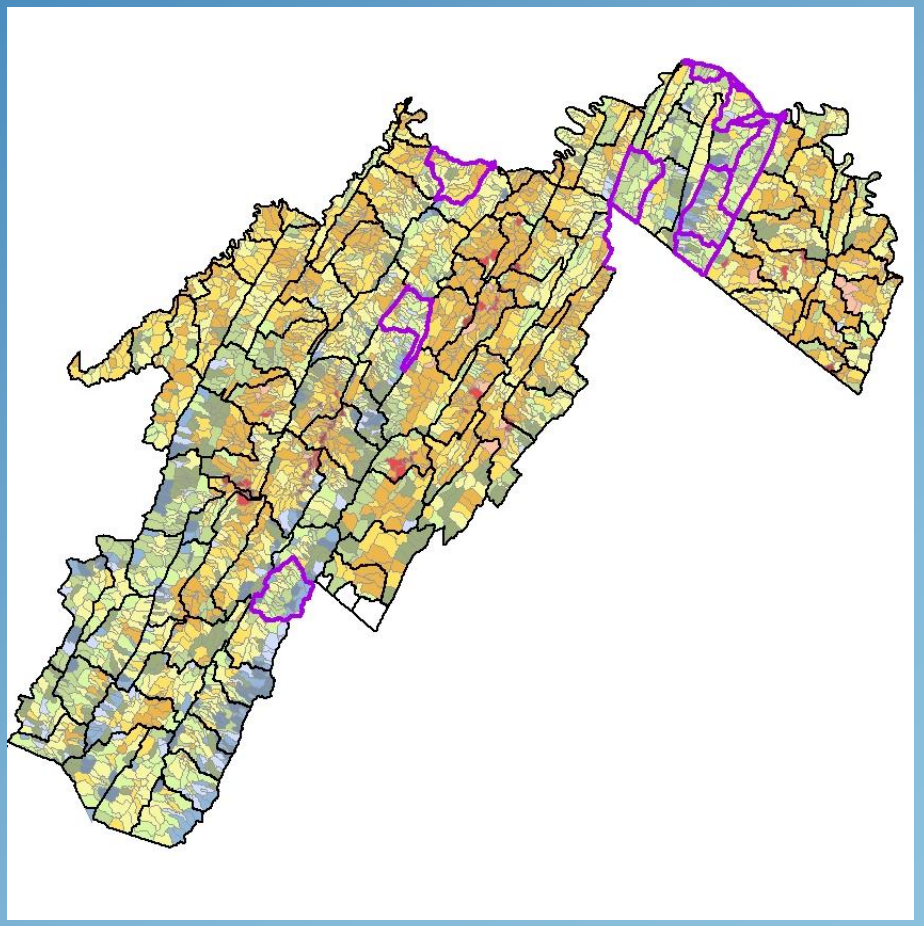


| HUC8 | Name |
|---|---|
| Cacapon-Town | Capon Springs Run-Cacapon River |
| Conococheague-Opequon | Sir Johns Run-Potomac River |
| Conococheague-Opequon | Middle Sleepy Creek |
| Conococheague-Opequon | Lower Sleepy Creek |
| Conococheague-Opequon | Tilhance Creek |
| Conococheague-Opequon | Middle Fork Sleepy Creek |
| North Branch Potomac | Shields Run-North Branch Potomac River |
| North Branch Potomac | Mount Storm Lake-Stony River |
| North Branch Potomac | Mikes Run |
| North Branch Potomac | Keller Run-Patterson Creek |
| Shenandoah | Bullskin Run |
| South Branch Potomac | Big Run |
| South Branch Potomac | Zeke Run-North Fork South Branch Potomac River |
| South Branch Potomac | Jordan Run-North Fork South Branch Potomac River |
| South Branch Potomac | Stump Run-South Fork South Branch Potomac River |
| South Branch Potomac | Sawmill Run-South Branch Potomac River |
| South Branch Potomac | Laurel Fork-North Fork South Branch Potomac River |

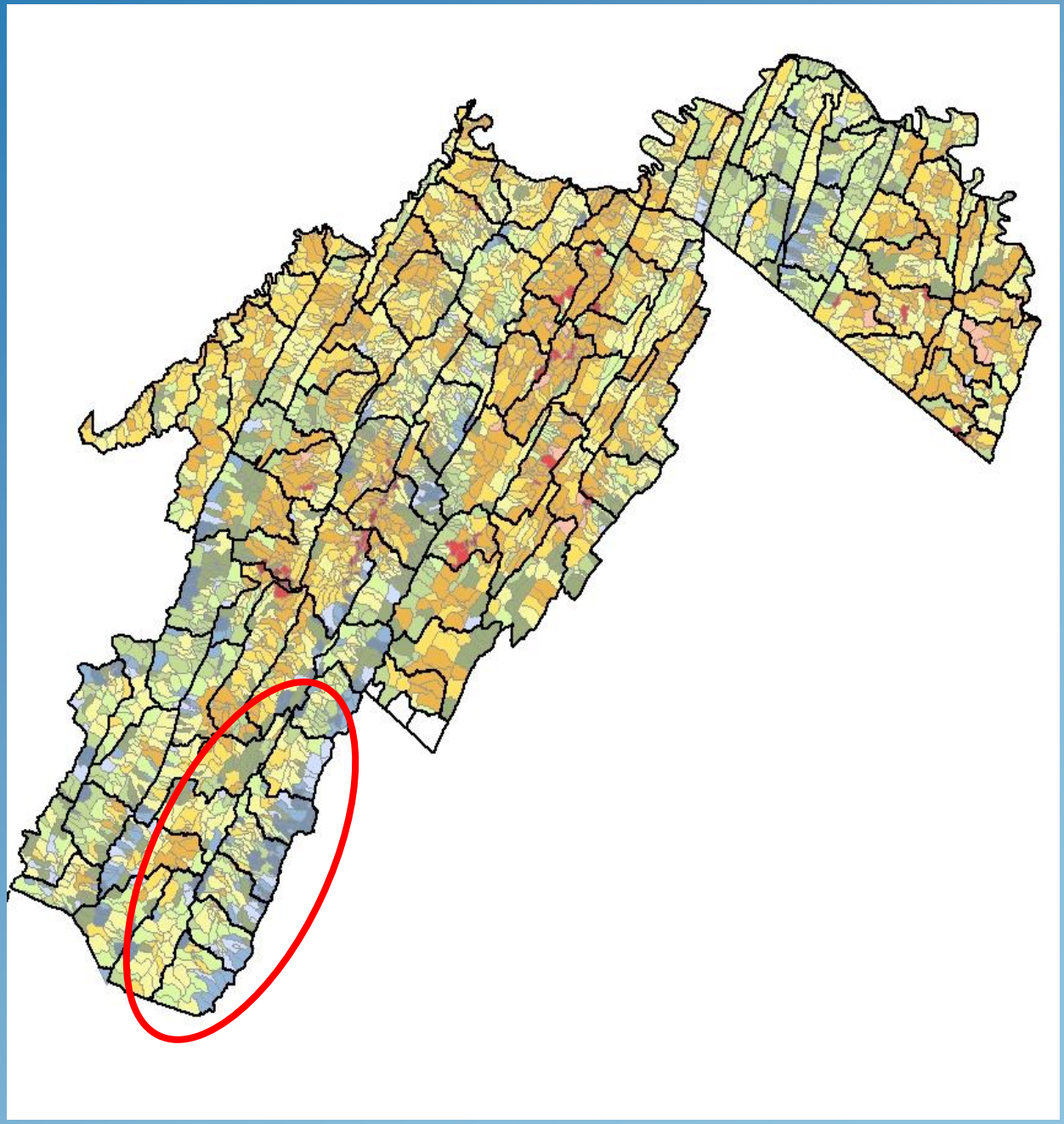
Tier II – Healthy

# Catchments - Objective & Relative

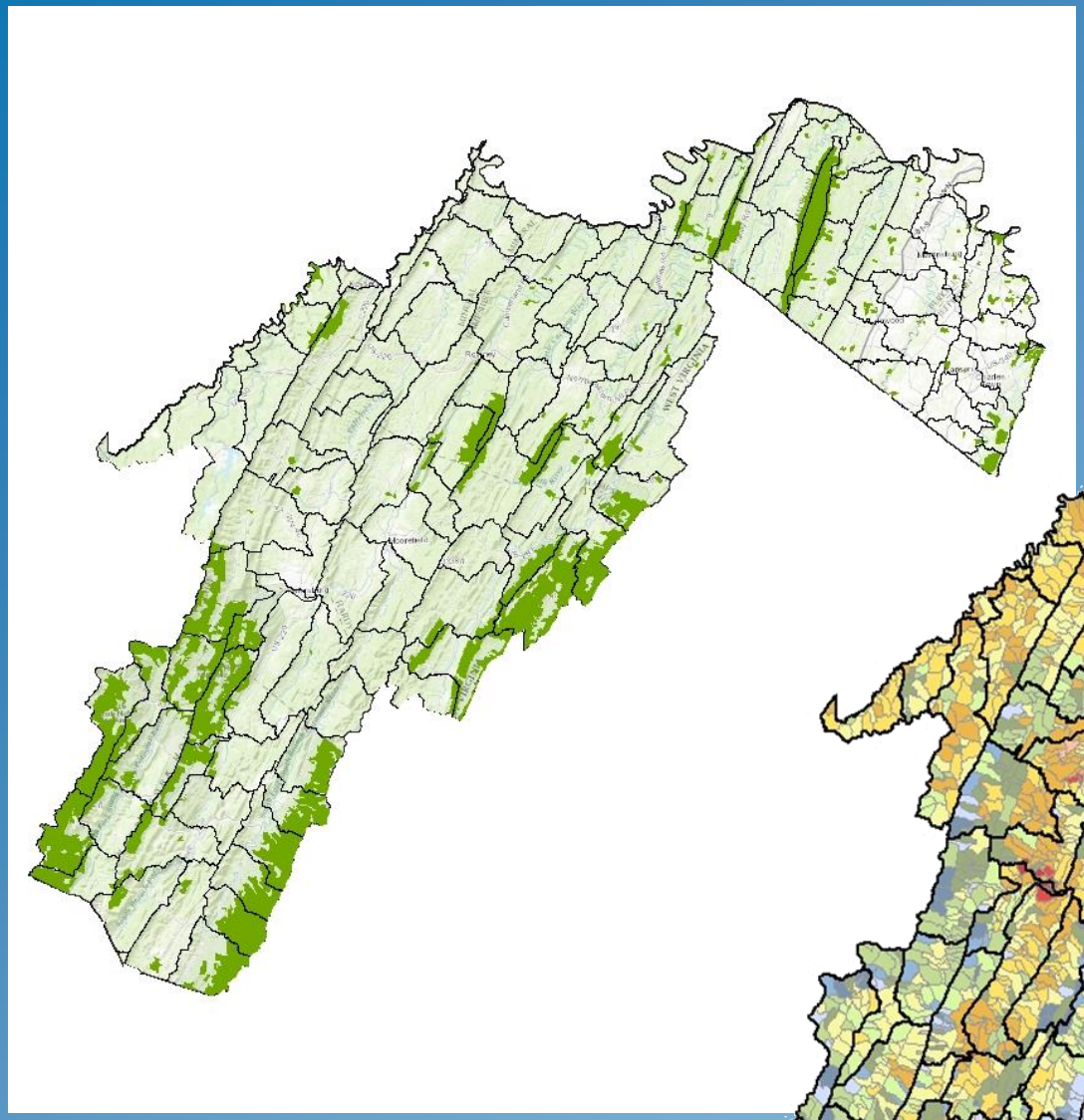


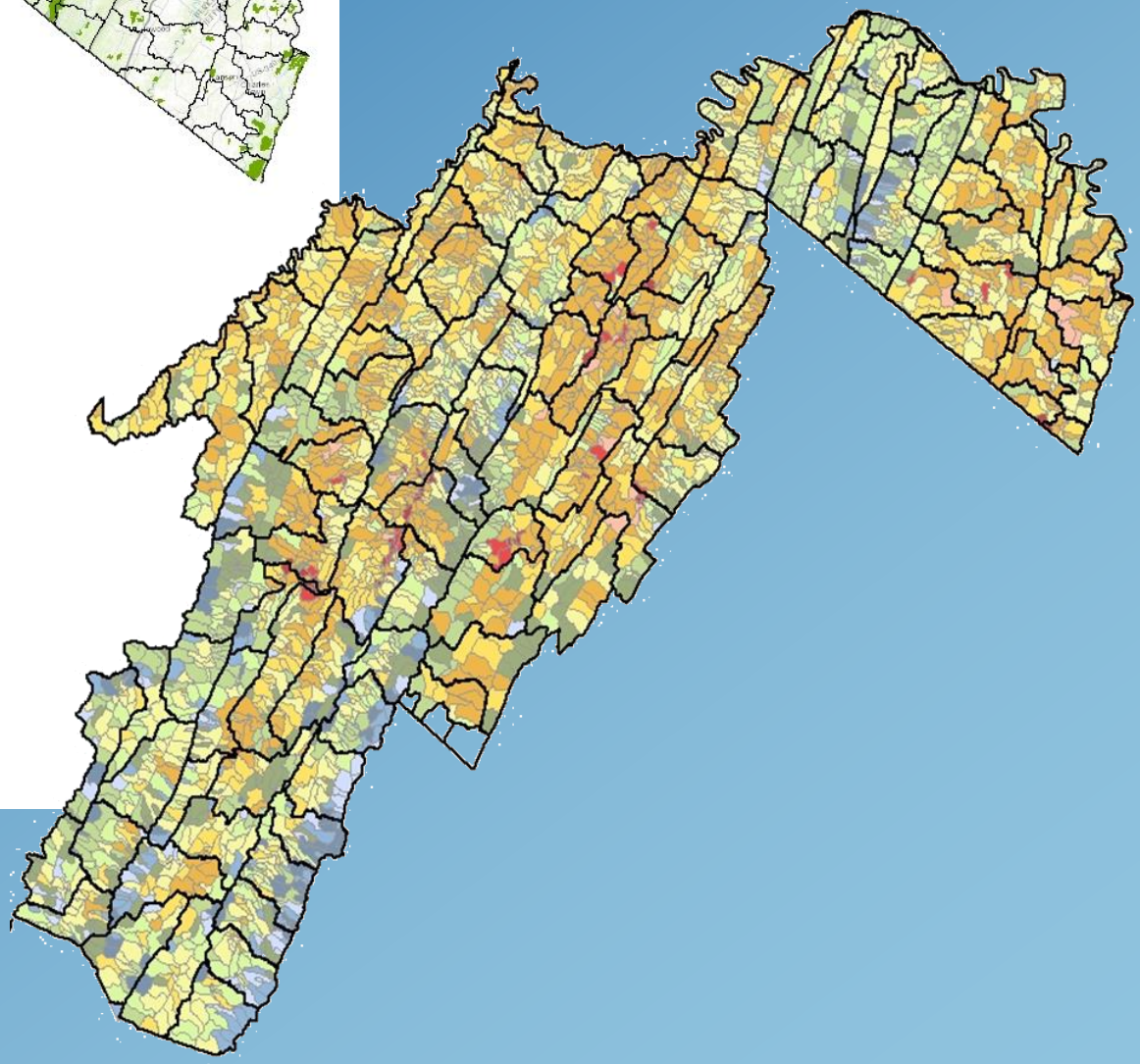


- Mostly natural cover
- Good water quality
- Good connectivity
- Few fragmenting features

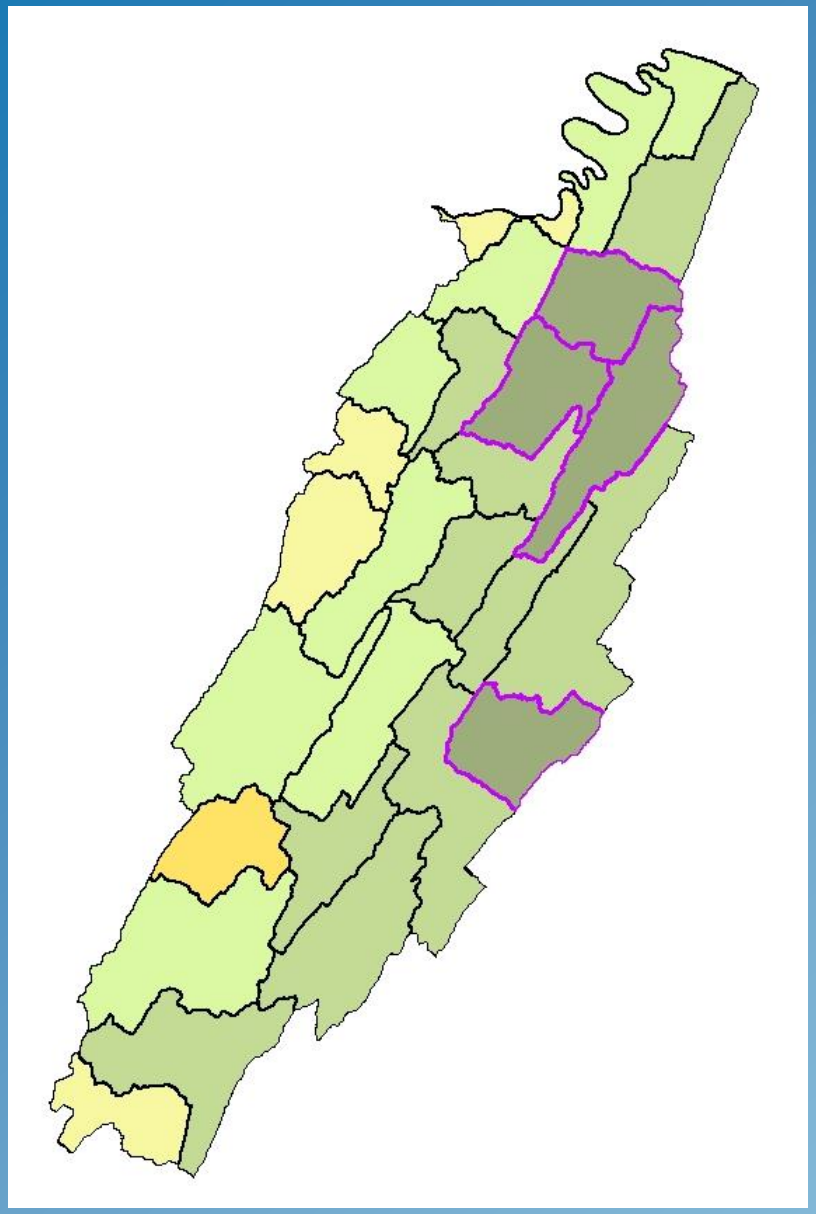


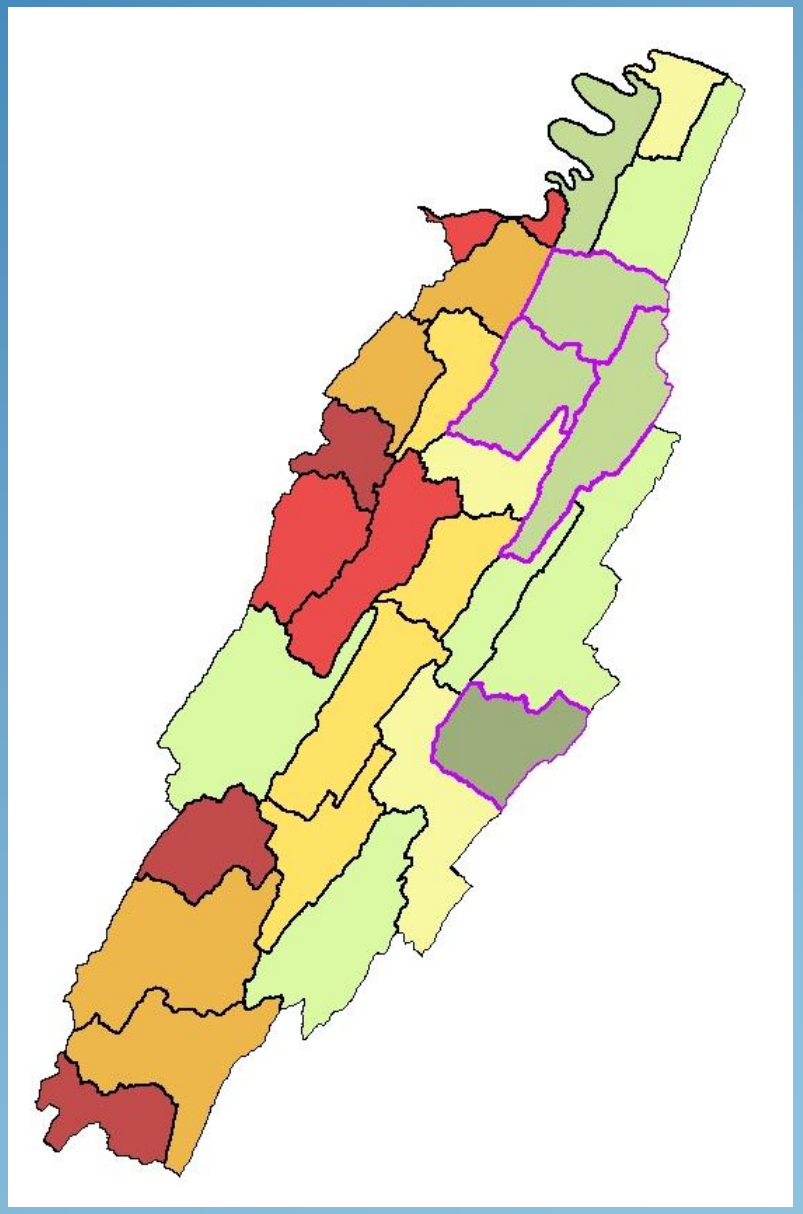
# Existing protected lands



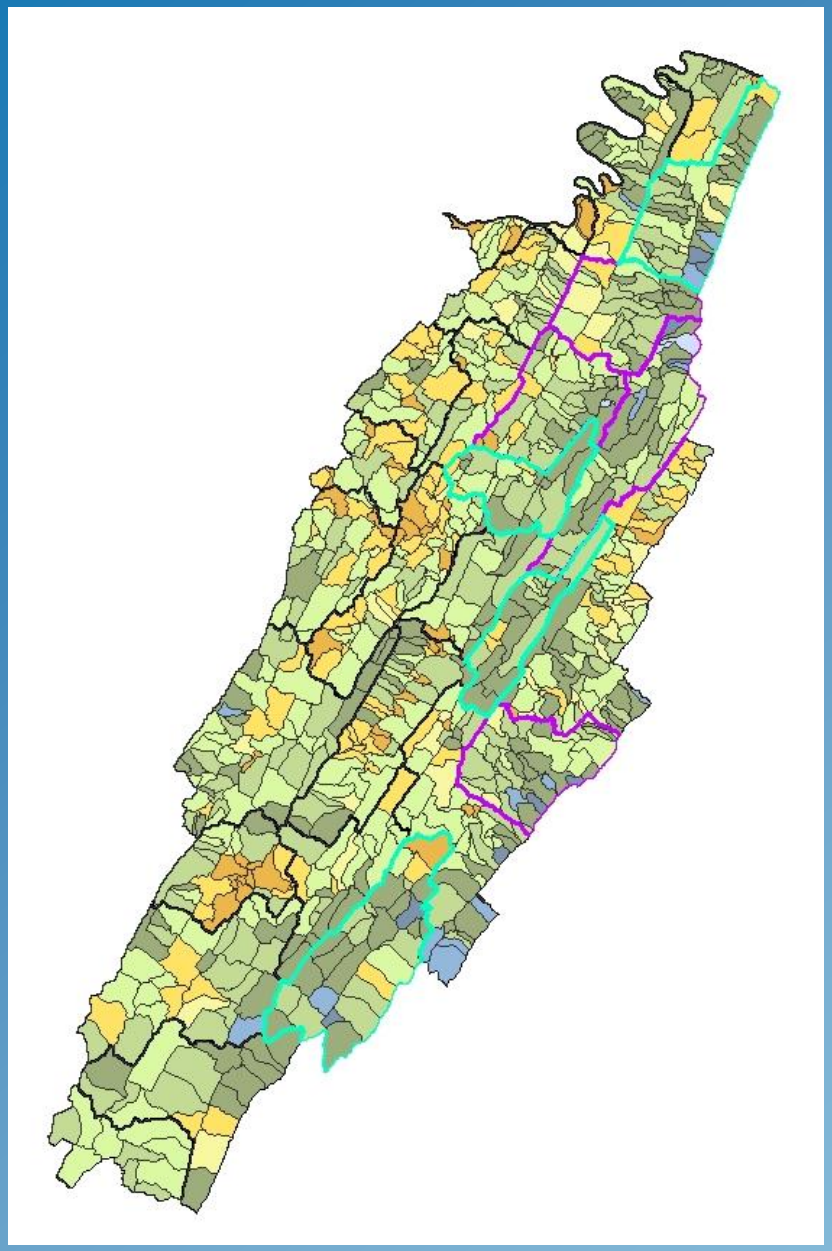


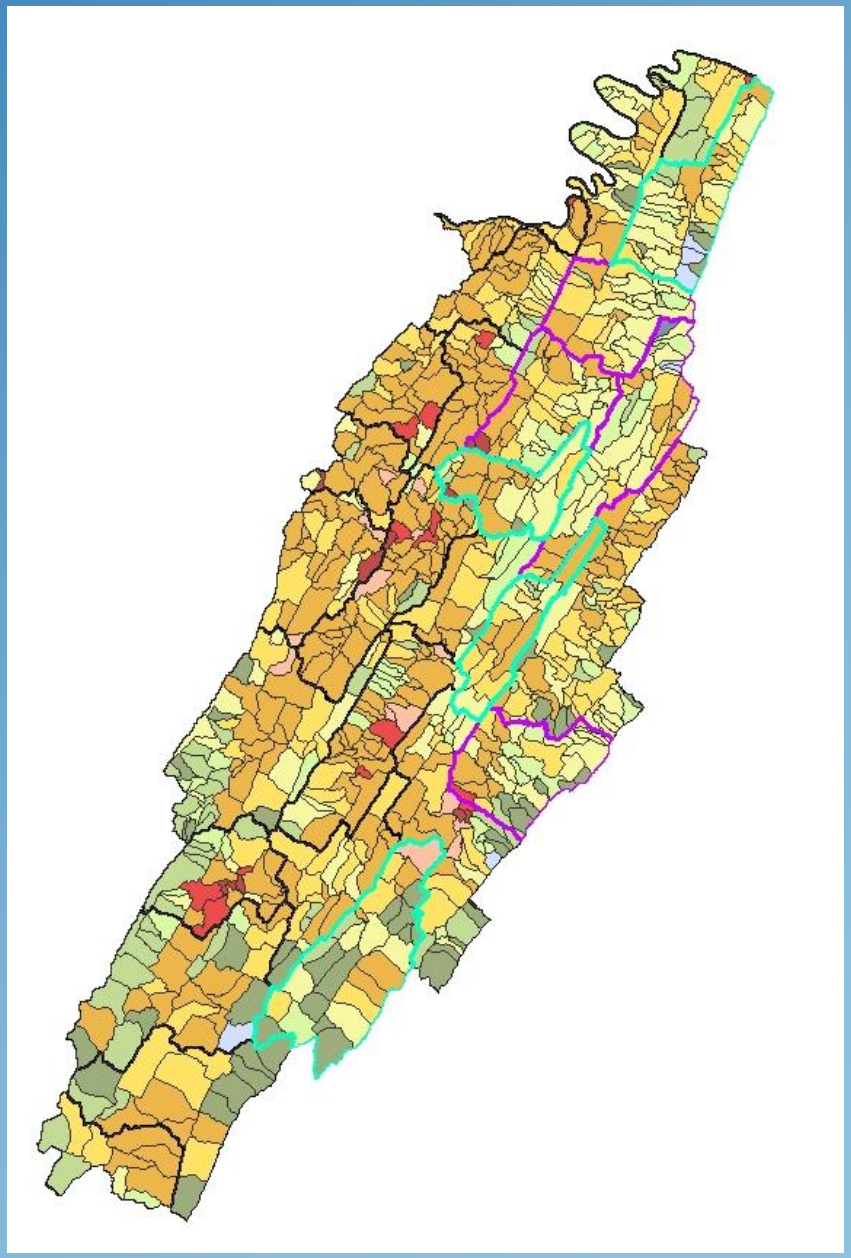
# Cacapon-Town – HUC12 Objective & Relative



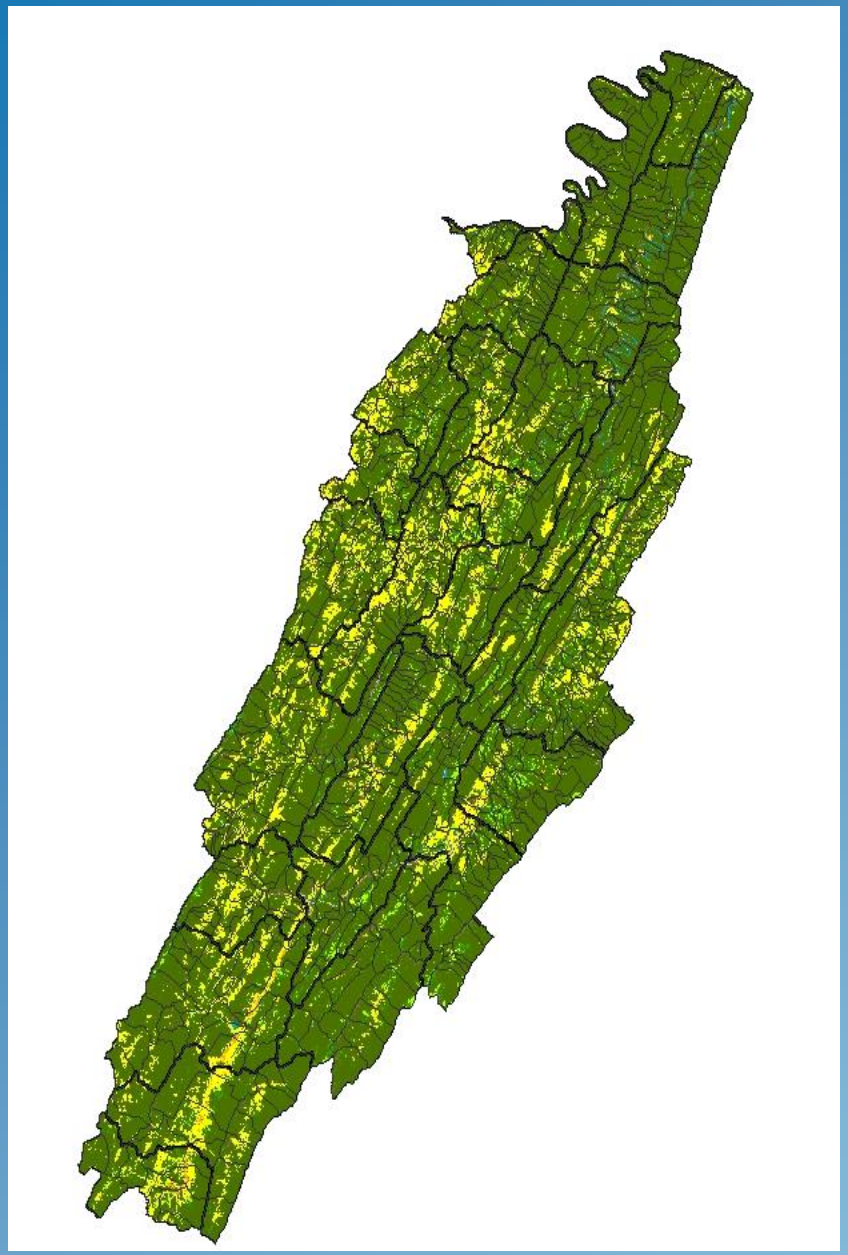


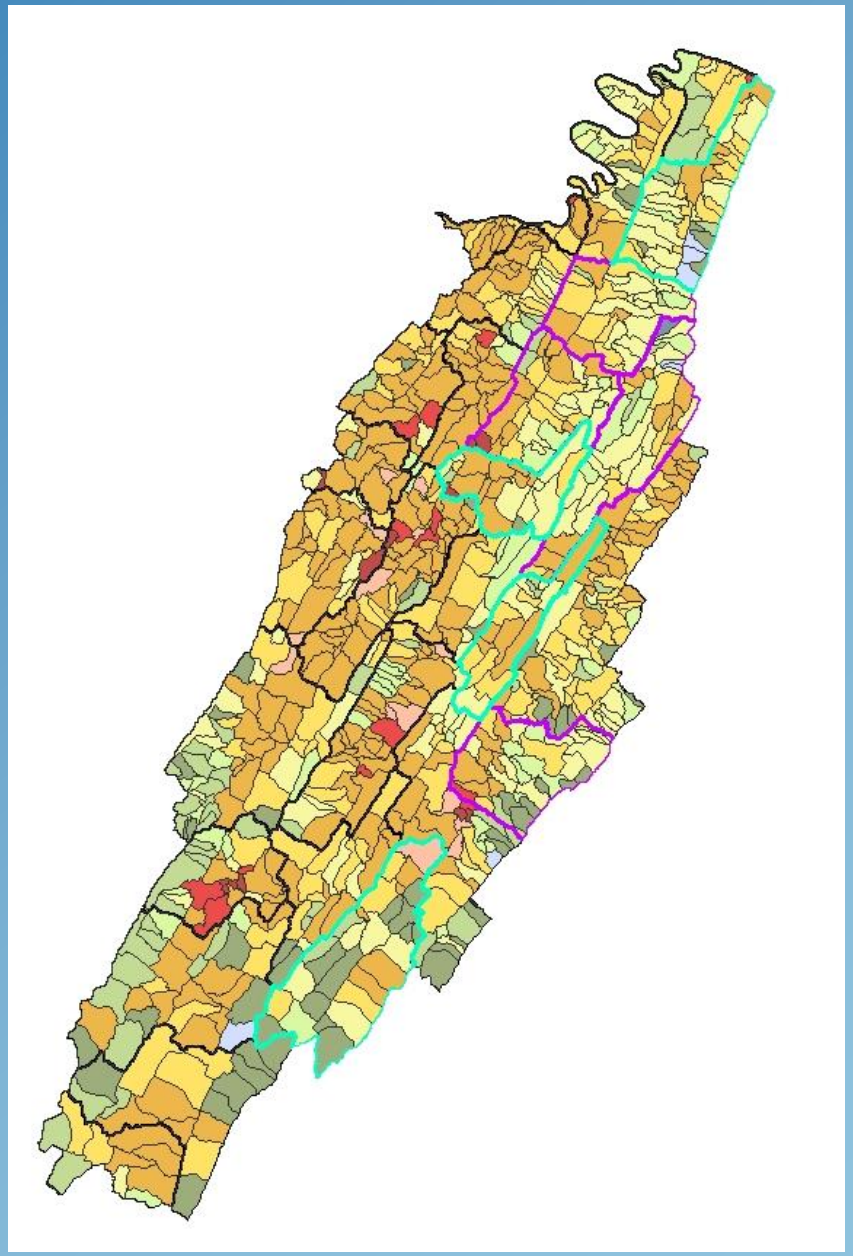
# Cacapon-Town – Catchment Objective & Relative





# Cacapon-Town – Land Use Land Cover





# Healthy Watersheds - Caveats

- Know your **priorities** (e.g., preservation vs restoration)
- **Know the data** and its limitations
- Consider both **scales** carefully (HUC12 and catchment level)
- Be mindful of **hydrologic function** (e.g., pristine headwaters reaches may drain to agricultural lands, which degrade WQ)
- Make note of which metrics are most and least important to you (e.g., resource extraction may be of less concern in NE WV)

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# Thank you!


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