WEST VIRGINIA WATERSHED ASSESSMENT PILOT PROJECT

Gauley River ©Kent Mason

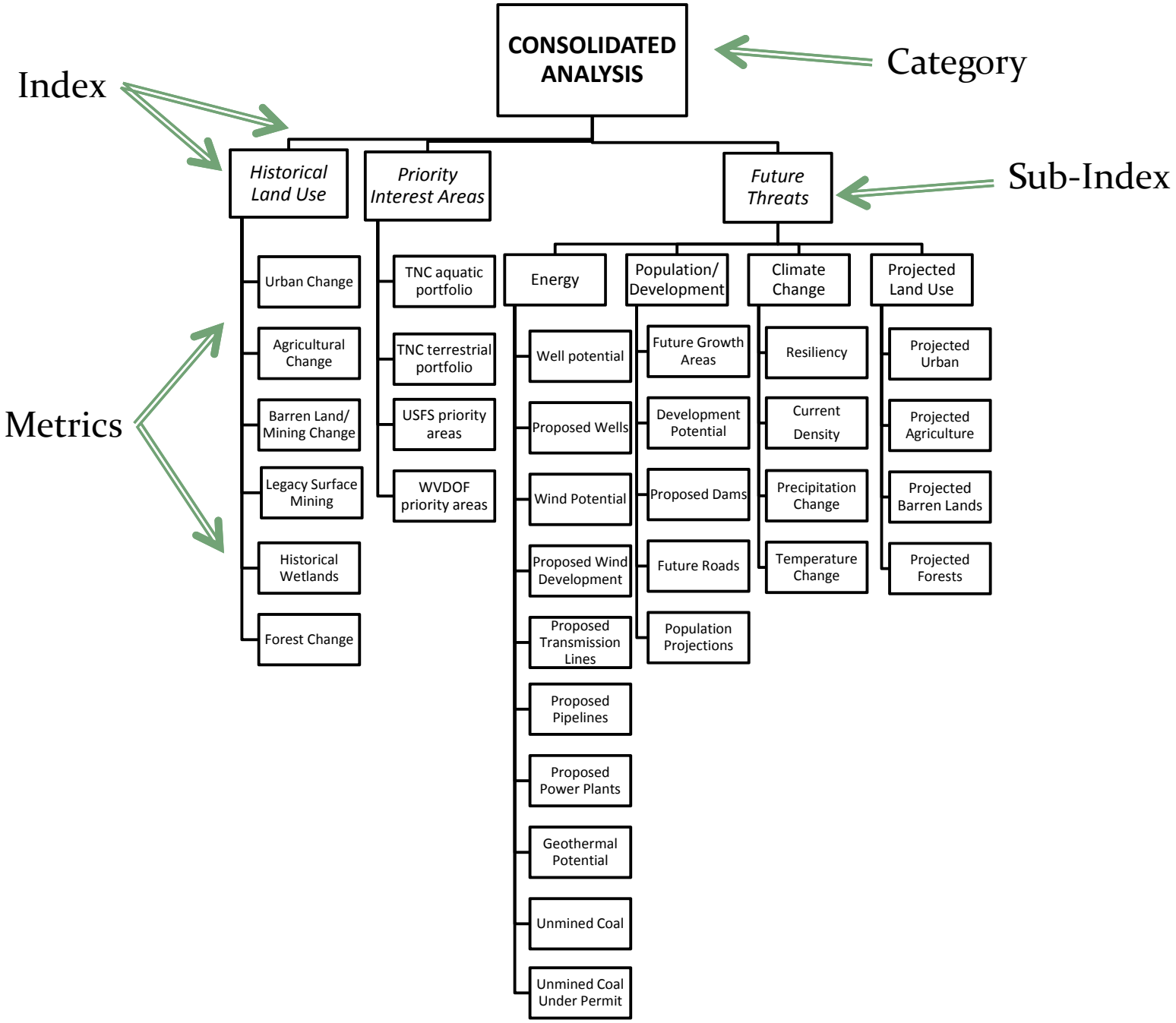
Second Expert Workshop, Jan. 31st, 2012

Presentation Outline

- Consolidated Analysis
- Methodology and Metrics
- Preliminary Phase II Results
- HUC12 and Catchment Prioritization
- Final Product Overview

Consolidated Analysis

1. Future Threats
2. Priority Interest Areas
3. Future Threats


CONSOLIDATED ANALYSIS
Category
Index
Sub-Index
Metrics
Historical Land Use
Priority Interest Areas
Future Threats
Urban Change
Agricultural Change
Barren Land/ Mining Change
Legacy Surface Mining
Historical Wetlands
Forest Change
TNC aquatic portfolio
TNC terrestrial portfolio
USFS priority areas
WVDOF priority areas
Energy
Population/ Development
Climate Change
Projected Land Use
Well potential
Proposed Wells
Wind Potential
Proposed Wind Development
Proposed Transmission Lines
Proposed Pipelines
Proposed Power Plants
Geothermal Potential
Unmined Coal
Unmined Coal Under Permit
Future Growth Areas
Development Potential
Proposed Dams
Future Roads
Population Projections
Resiliency
Current Density
Precipitation Change
Temperature Change
Projected Urban
Projected Agriculture
Projected Barren Lands
Projected Forests

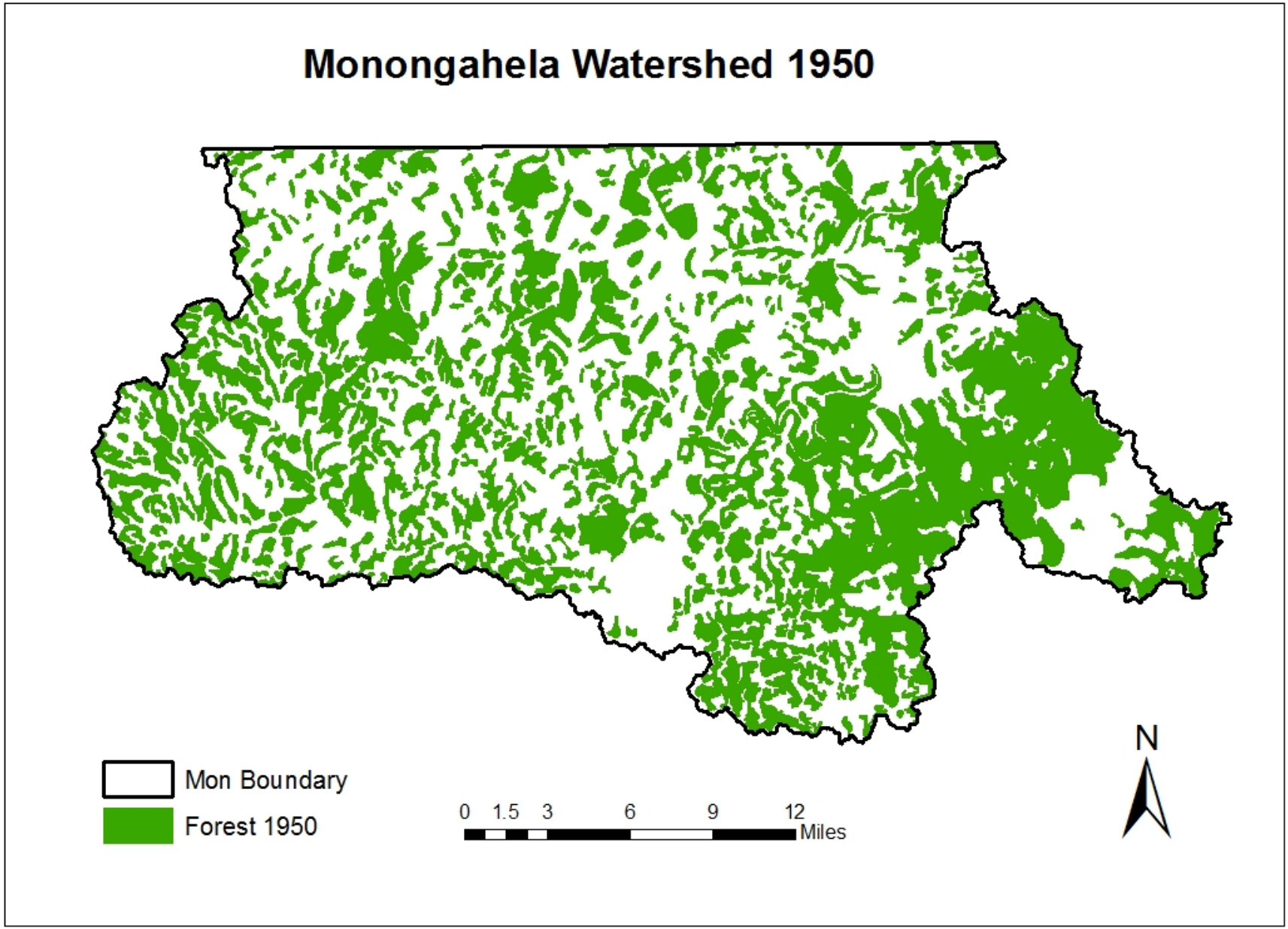
Historical Land Use

Historical Land use

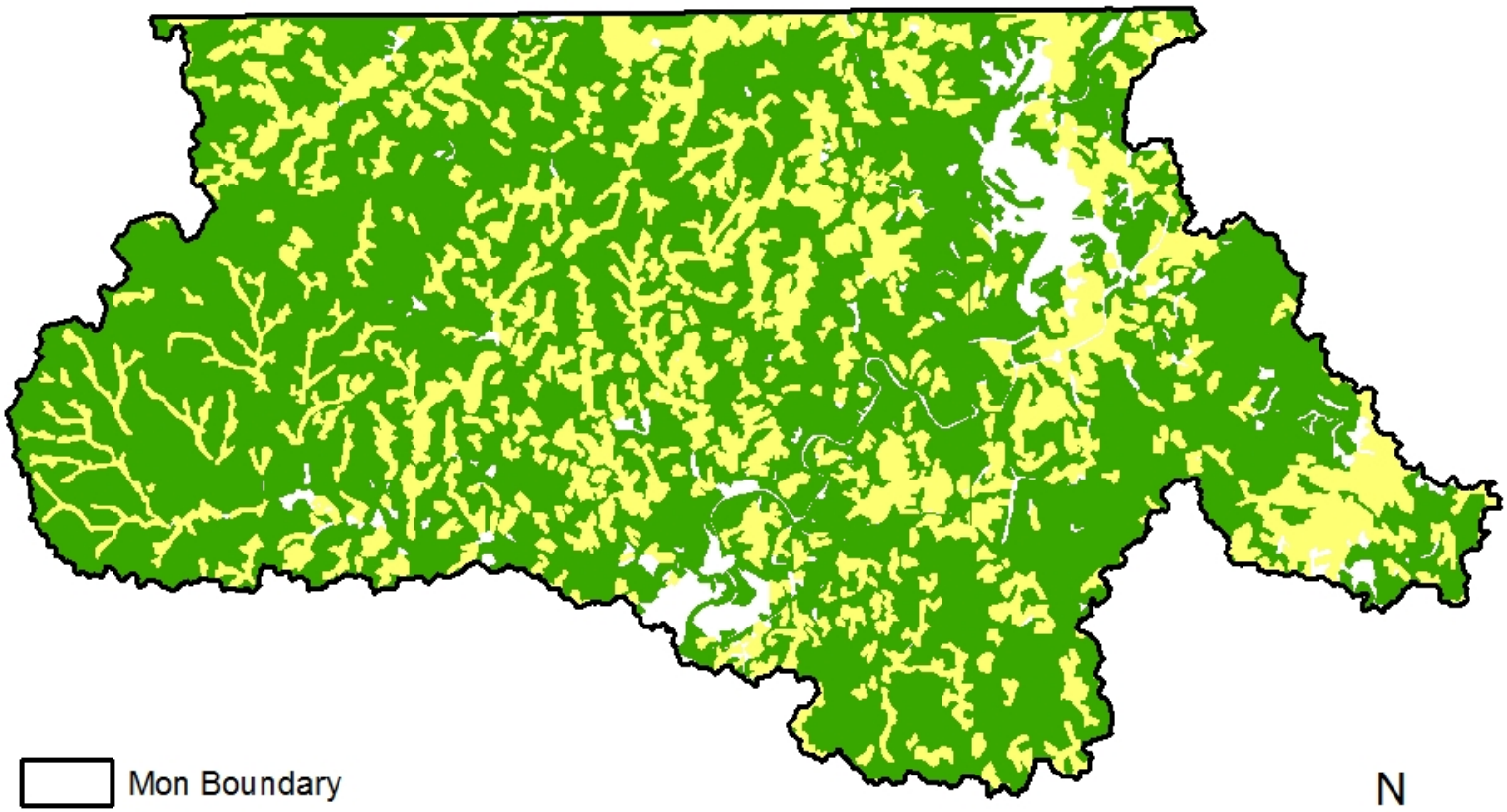
- Analysis of Change:
  - Urban
  - Agriculture & Grazing
  - Forest
  - Barren Land/Mining
- Legacy Surface mining
- Historical Wetlands

Monongahela Watershed

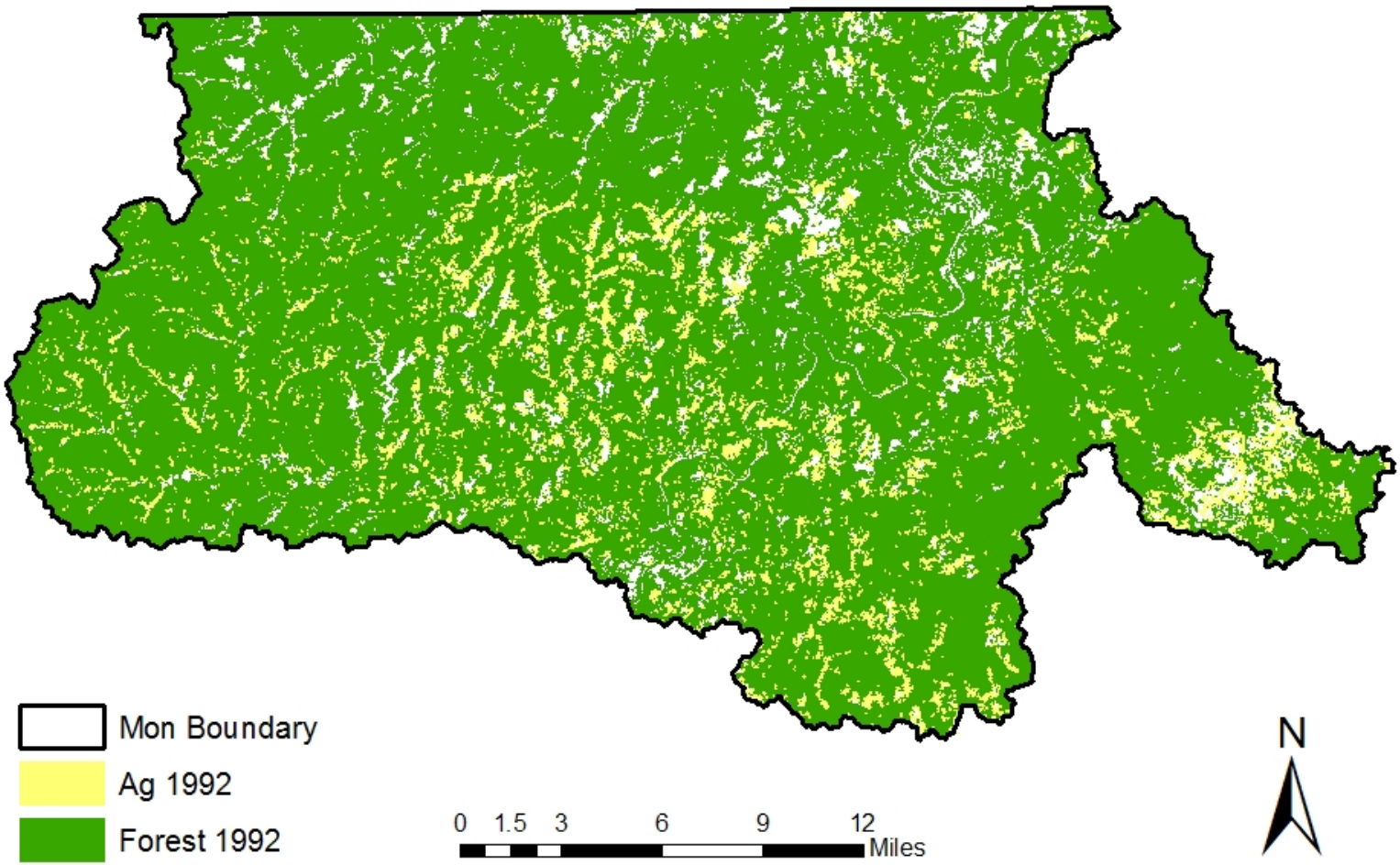
Changes in Forest Cover and Agriculture


Monongahela Watershed 1950
Mon Boundary
Forest 1950
0 1.5 3 6 9 12
Miles
N

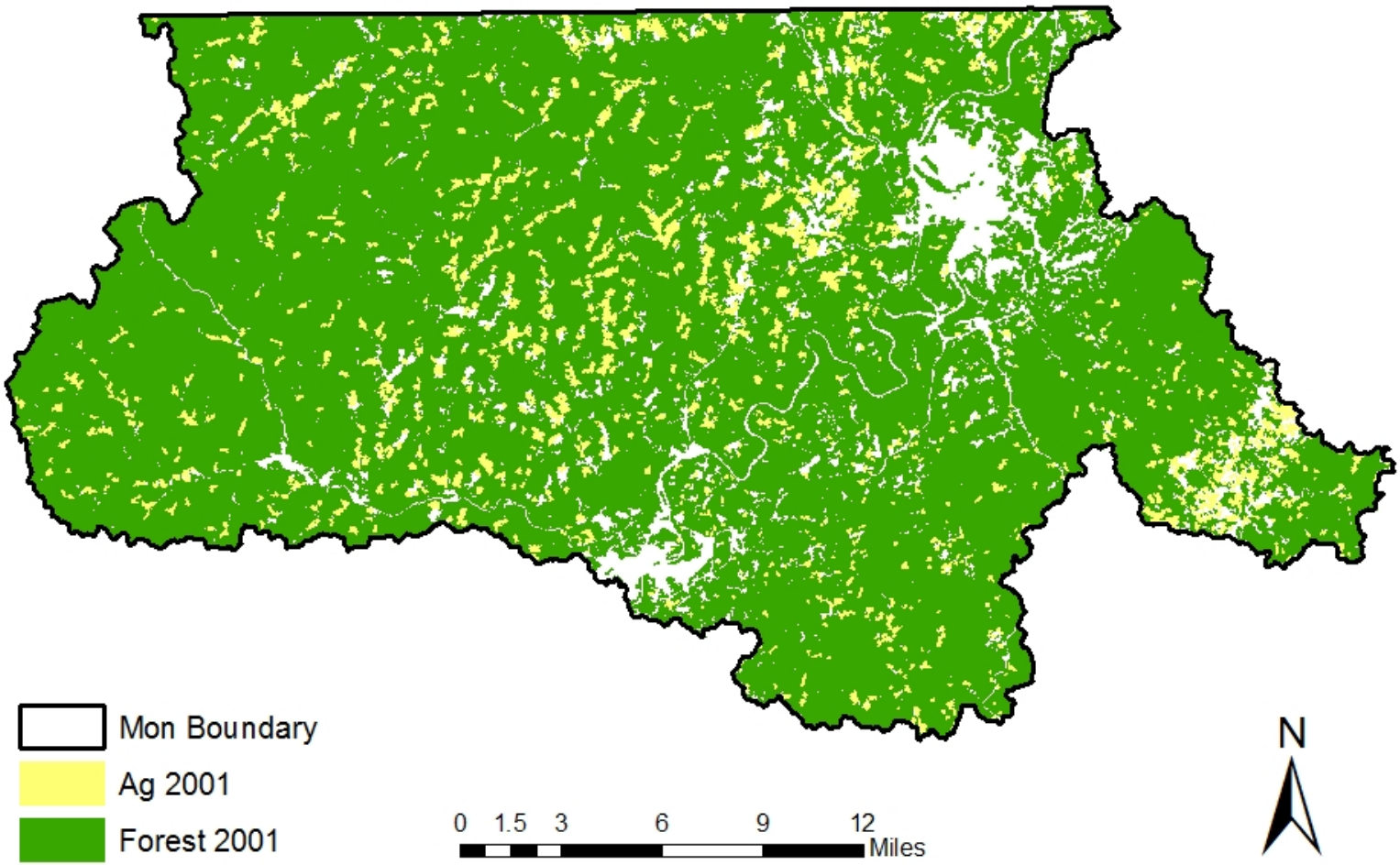
Monongahela Watershed 1976



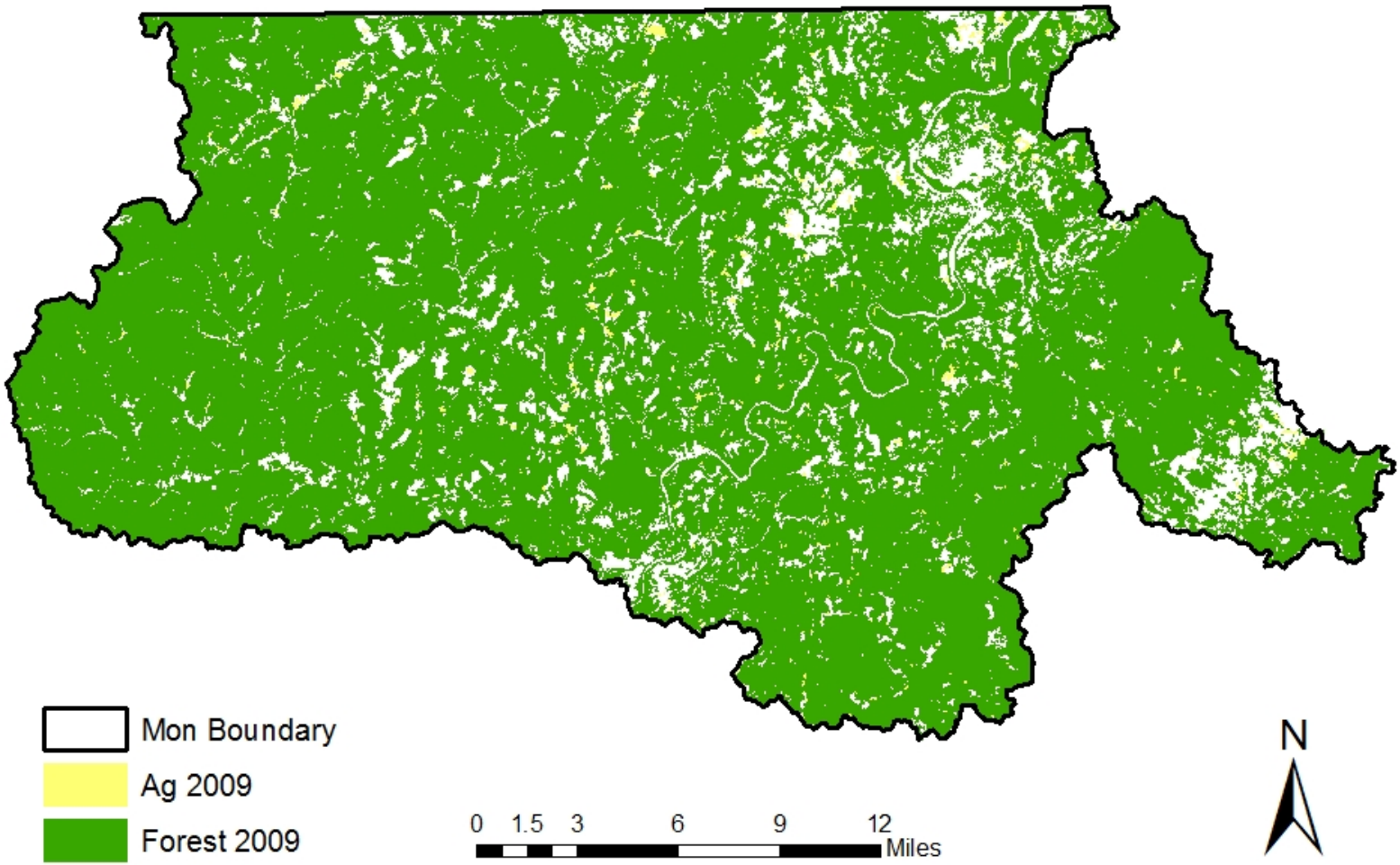
Monongahela Watershed 1992



Monongahela Watershed 2001



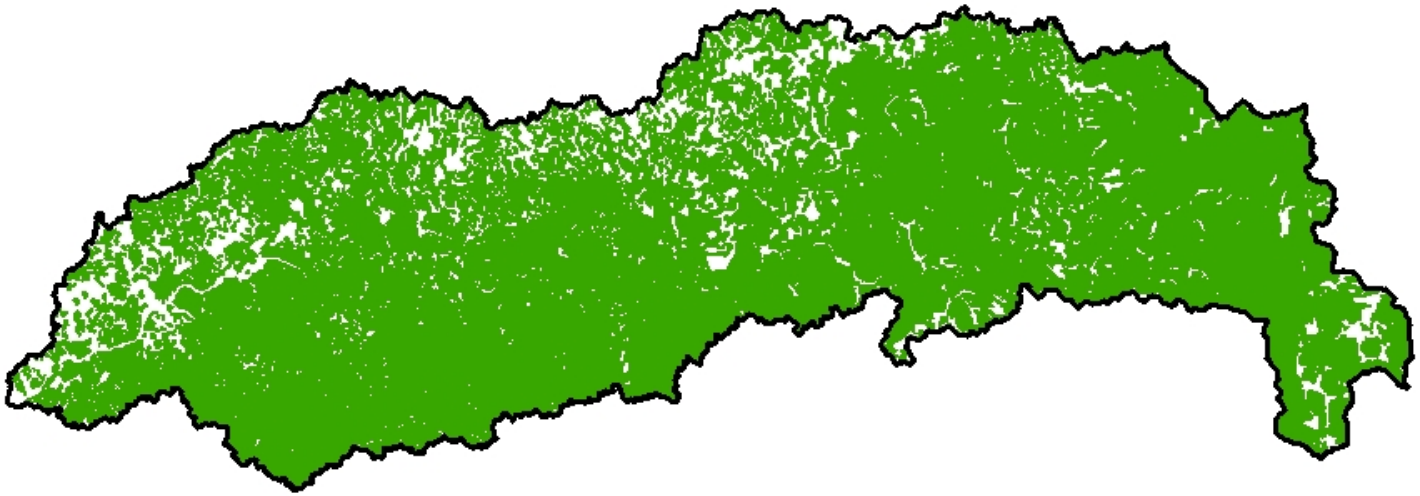
Monongahela Watershed 2009



Elk Watershed

Changes in Forest Cover and Barren Lands/Mining

Elk Watershed Forest Cover 1950



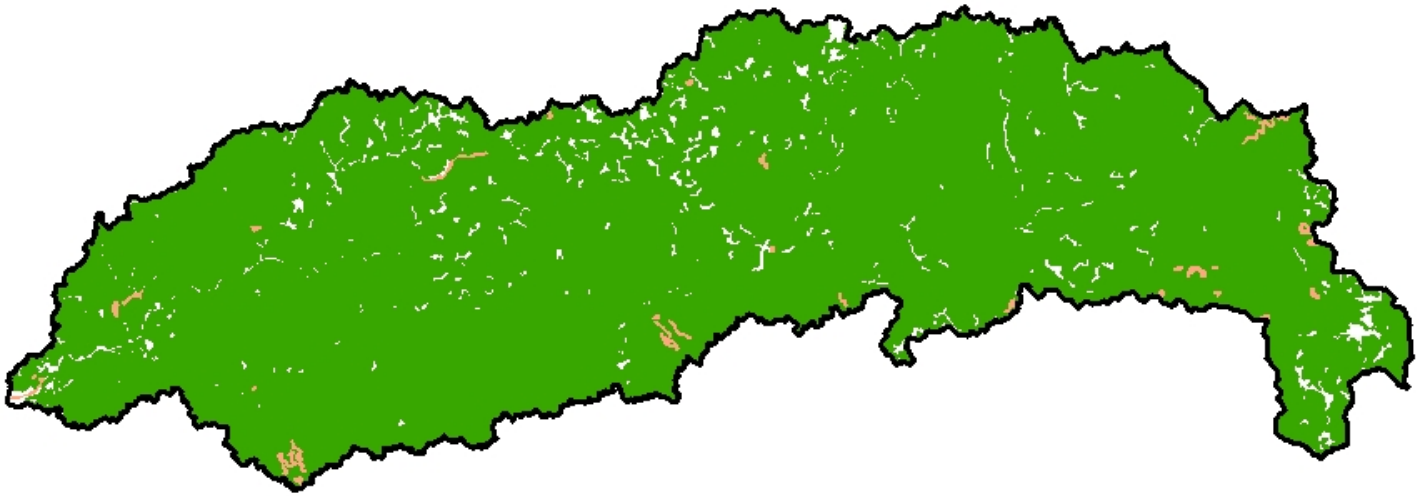
Elk boundary

Forest 1950

0 4.5 9 18 27 36 Miles

N

Elk Watershed Forest Cover 1976



Elk boundary

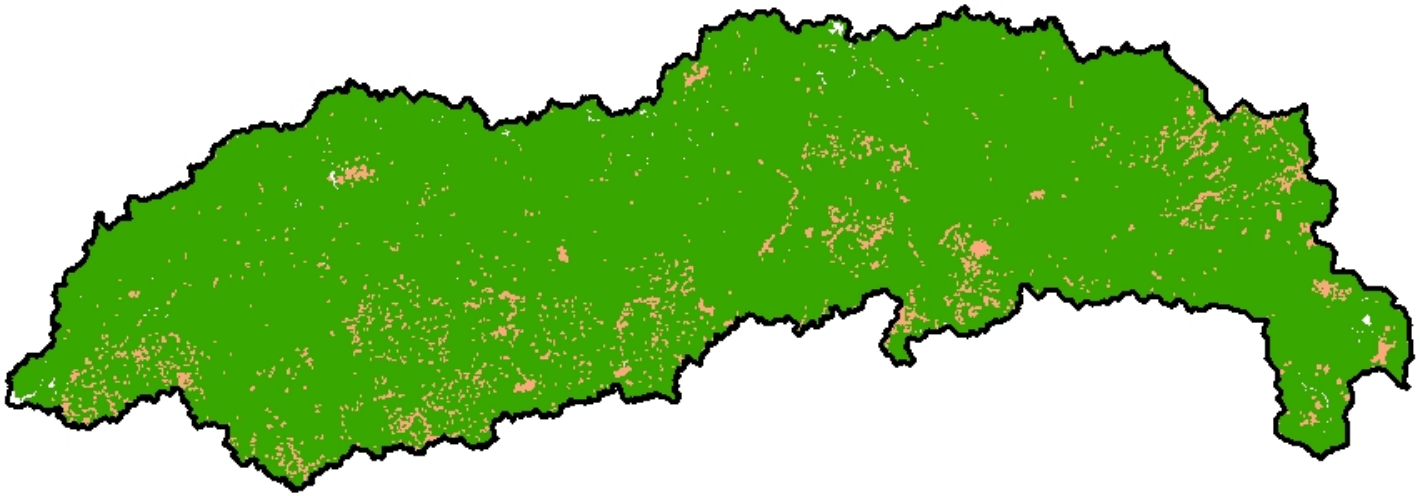
Barren 1976

Forest 1976

0 4.5 9 18 27 36 Miles

N

Elk Watershed Forest Cover 1992



Elk boundary

Barren 1992

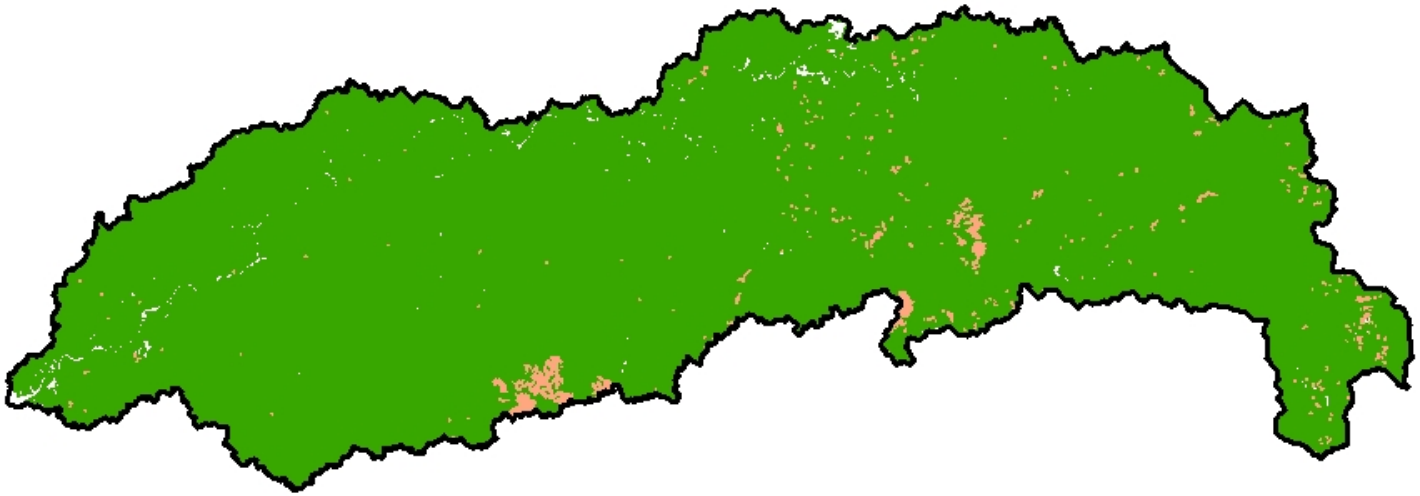
Forest 1992

0 4.5 9 18 27 36

Miles

N

Elk Watershed Forest Cover 2001



Elk boundary

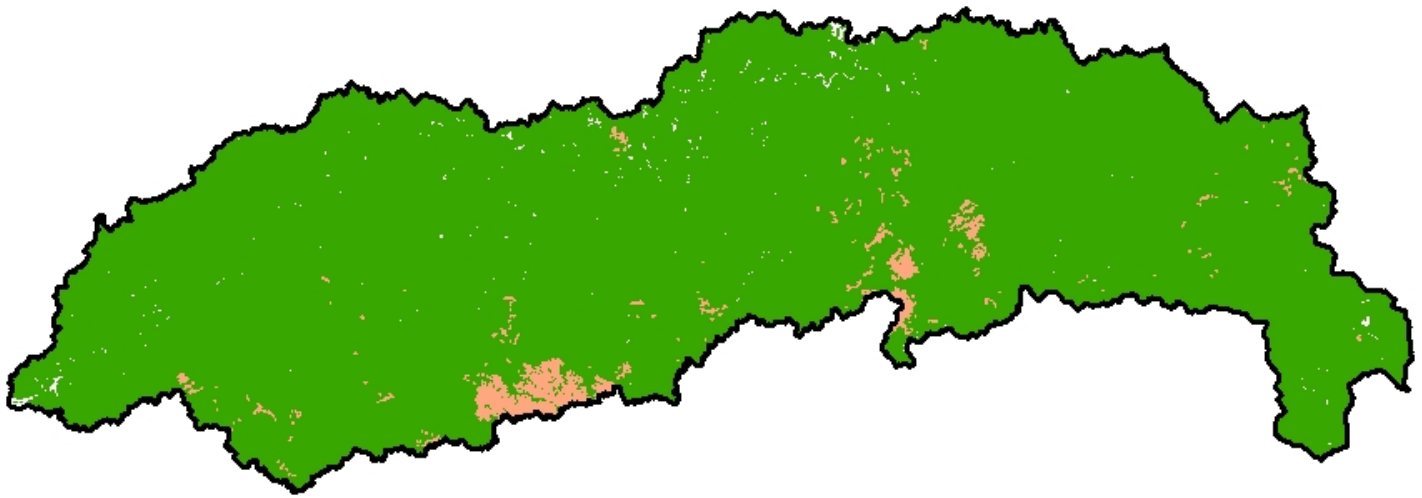
Barren 2001

Forest 2001

0 4.5 9 18 27 36 Miles

N

Elk Watershed Forest Cover 2009



Elk boundary

Barren 2009

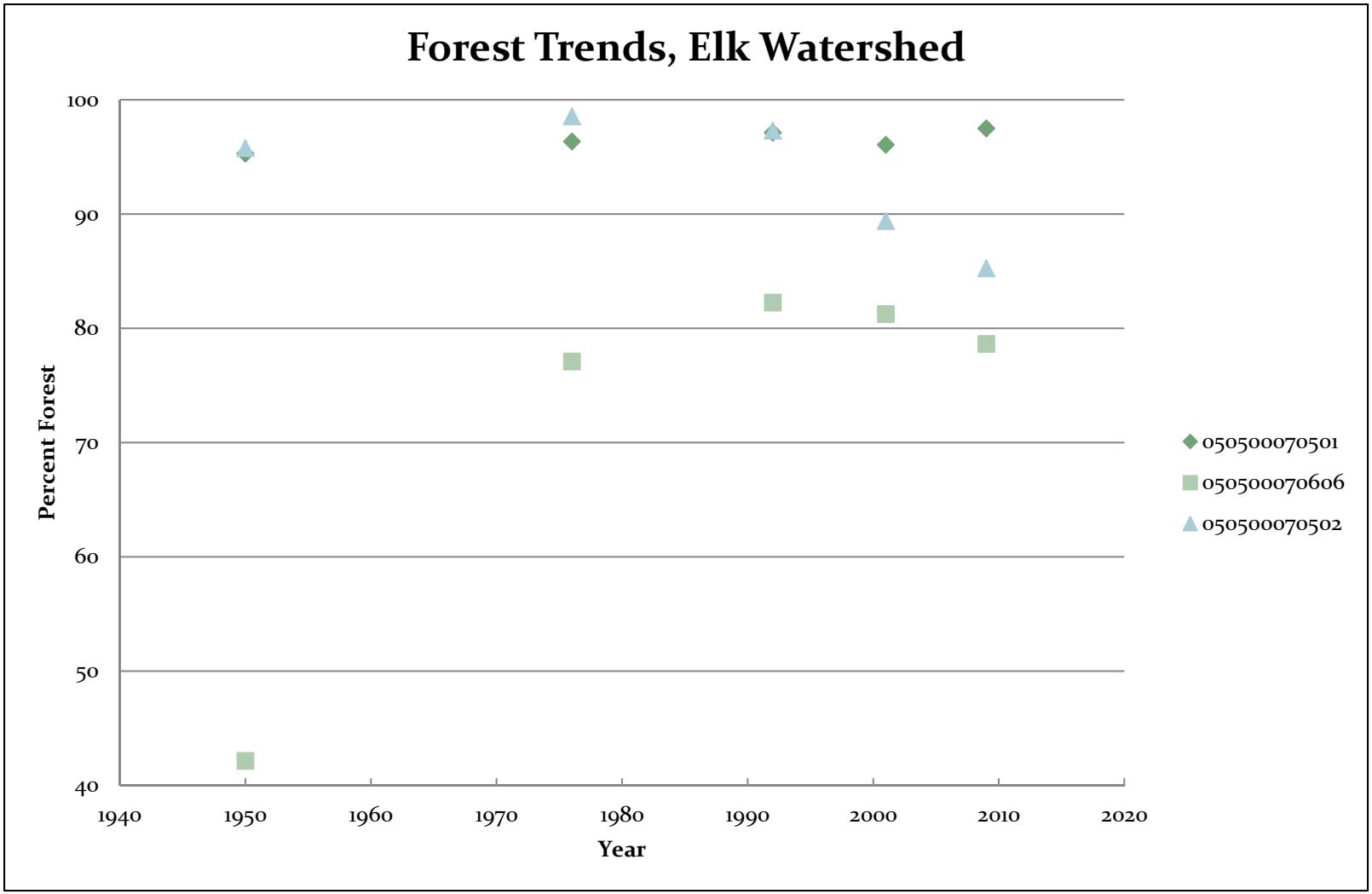
Forest 2009

0 4.5 9 18 27 36

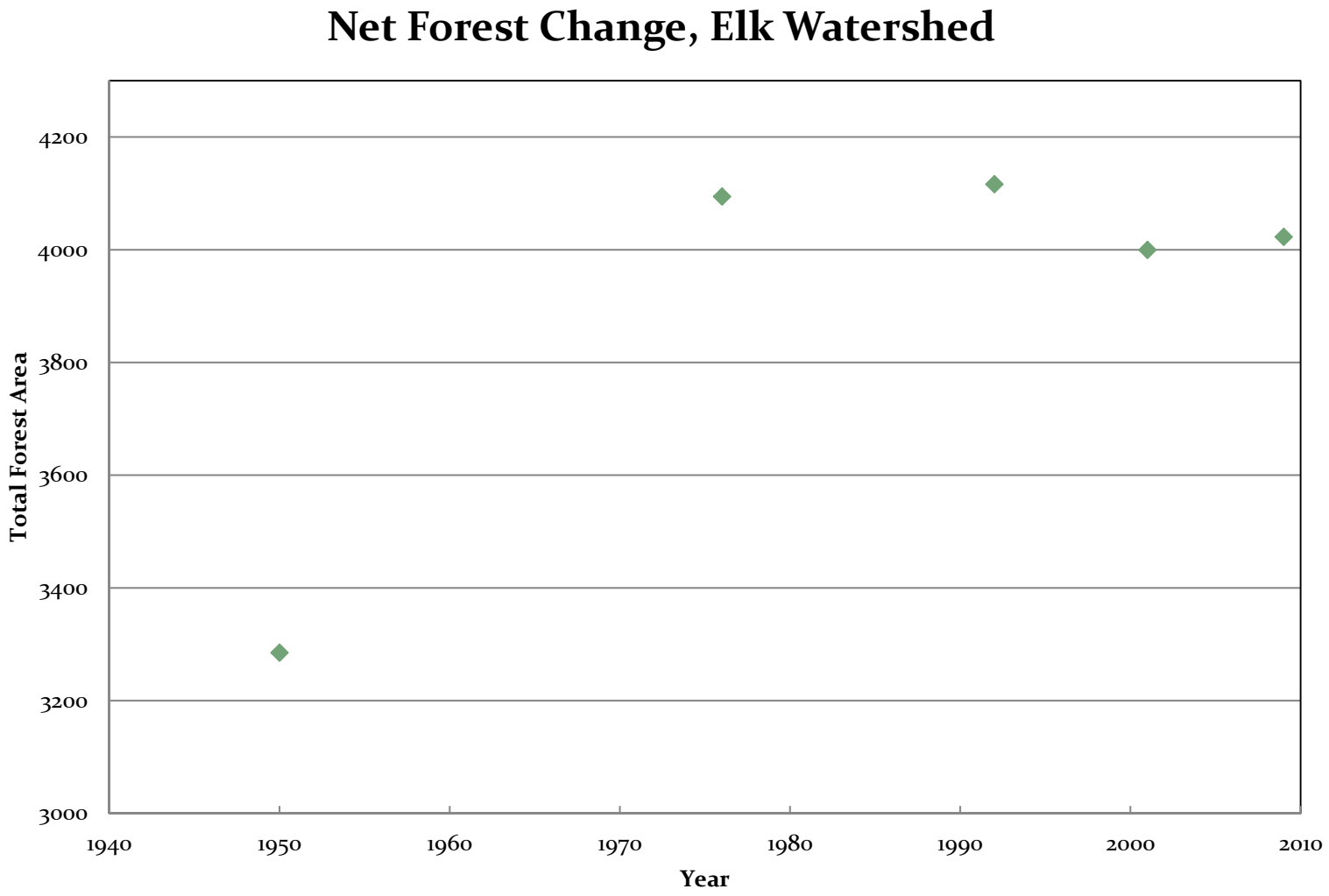
Miles

N

Elk: Forest Change Trends



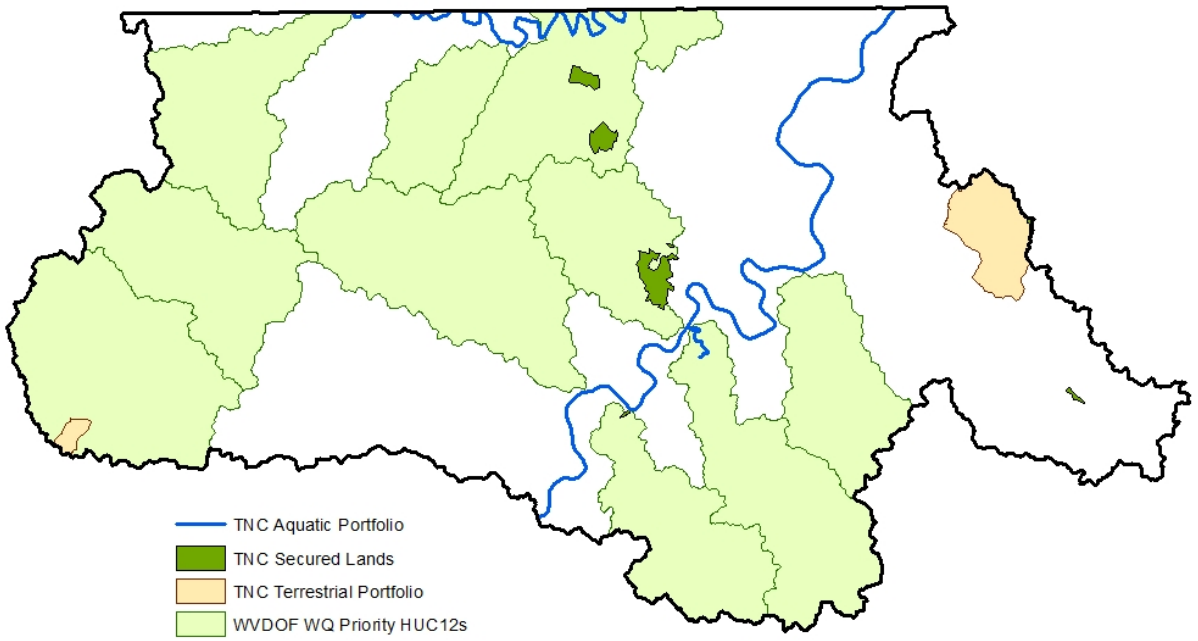
Elk: Forest Change Trends



Priority Interest Areas

Priority Interest Areas

- USFS Forest Proclamation Boundary
- WV Division of Forestry priority areas
- TNC aquatic and terrestrial portfolios



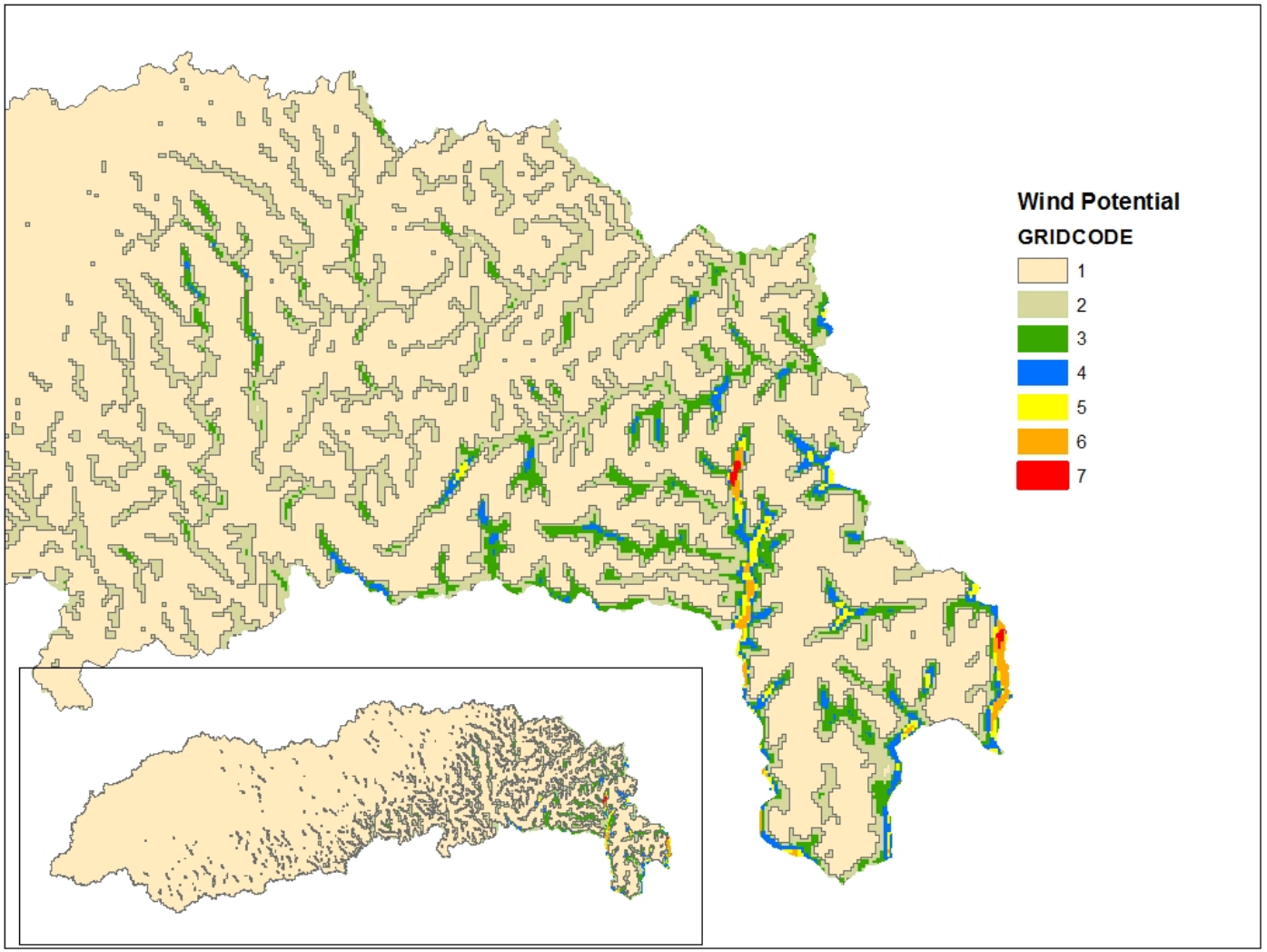
Future Threats Analysis

1. Energy
2. Population/Development
3. Climate Change
4. Projected Land Use

Energy Metrics

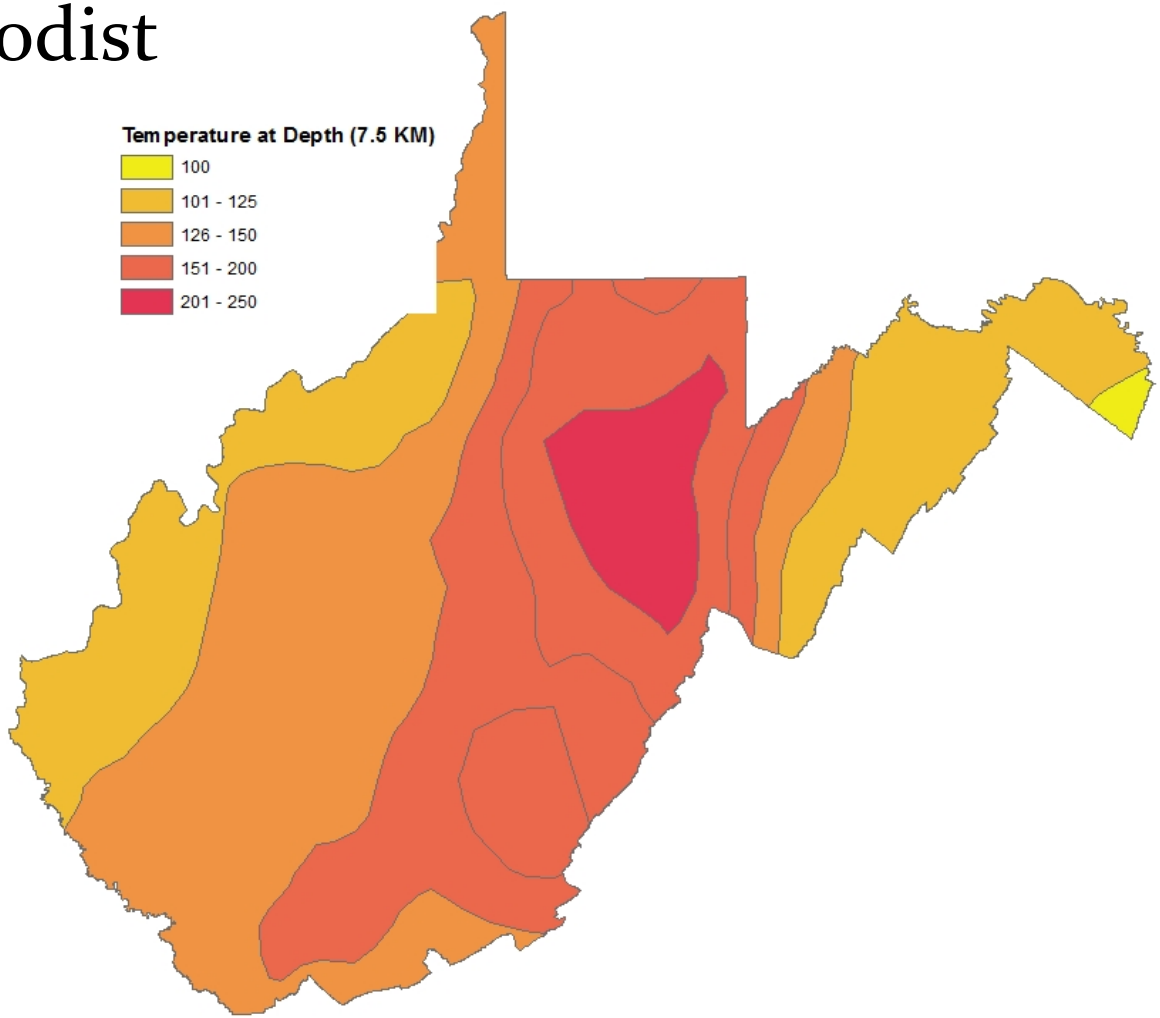
- Oil and Gas wells: well potential, proposed wells
- Coal: unmined coal, unmined coal under permit
- Proposed transmission lines, pipelines, power plants

Energy Metric: Wind Potential



Energy Metric: Geothermal

- Southern Methodist University (SMU) Geothermal Potential

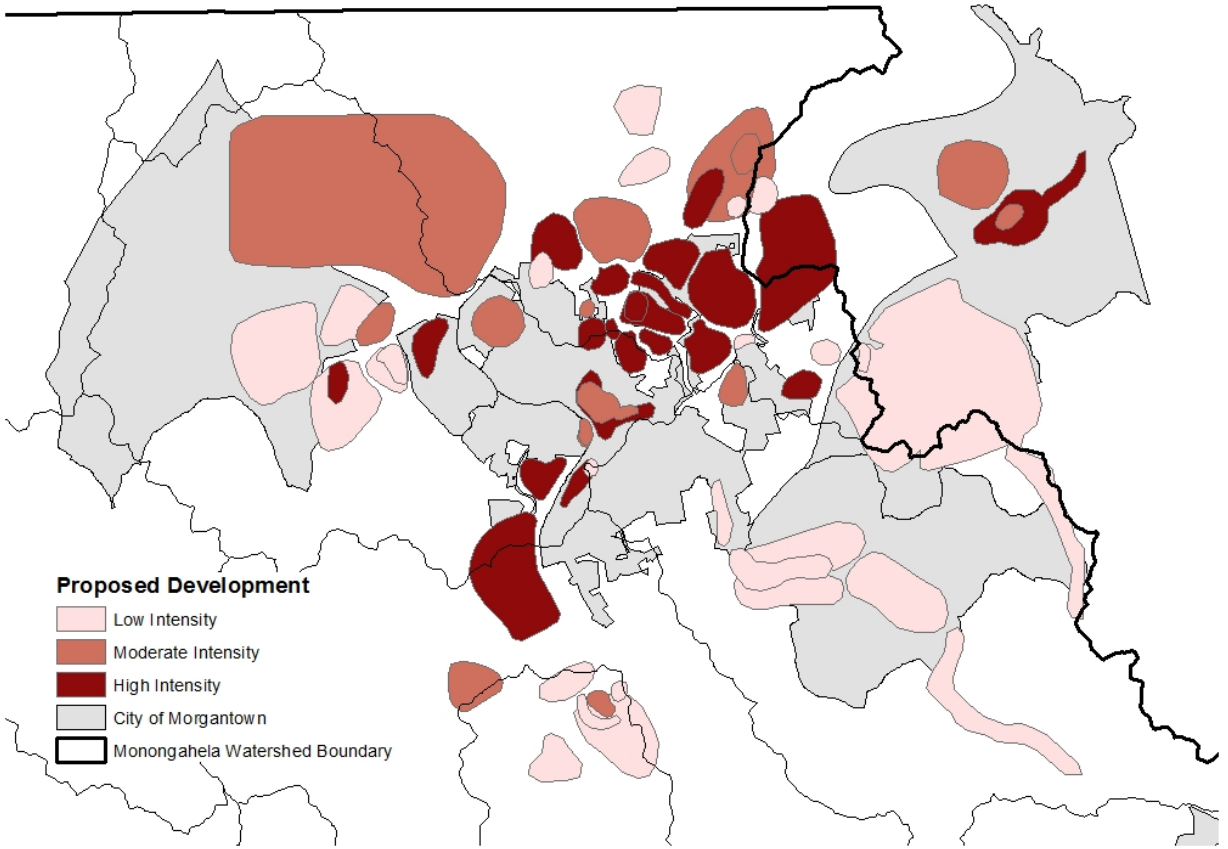


Population/Development Metrics

- Future growth areas
- Development potential
- Proposed dams
- Future roads
- Population projections

Metric: Proposed zoning/ economic development

- Data from Greater Morgantown Regional Transportation Plan (2000-2030)



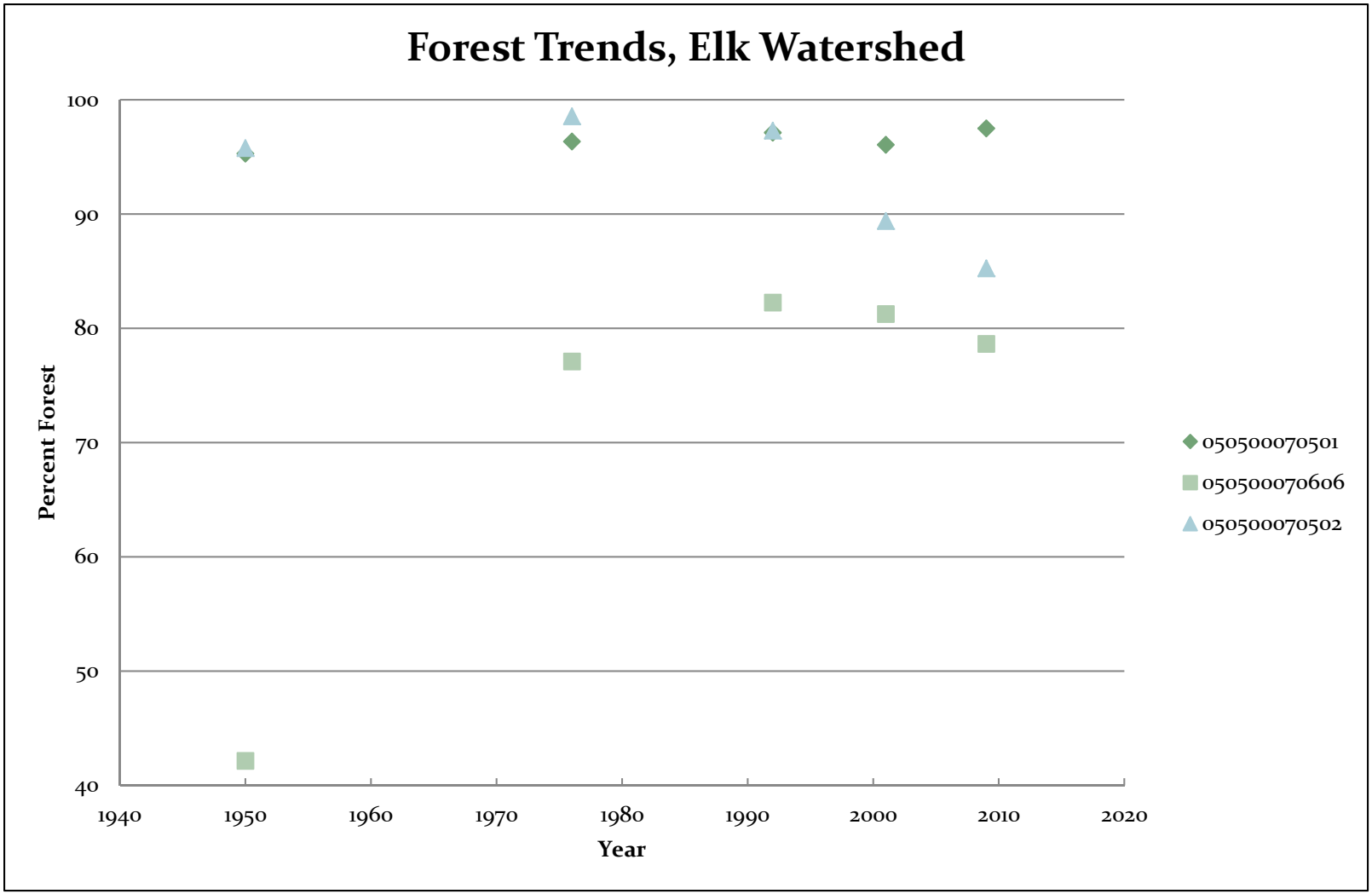
Climate Change Metrics

- Resiliency and Current Density: TNC-generated datasets
- Projected Temperature Change
- Projected Precipitation Change

Projected Land Use Metrics

- Projected Urban Development
- Projected Agriculture
- Projected Barren Lands/Mining
- Projected Forests

Elk: Forest Change Trends



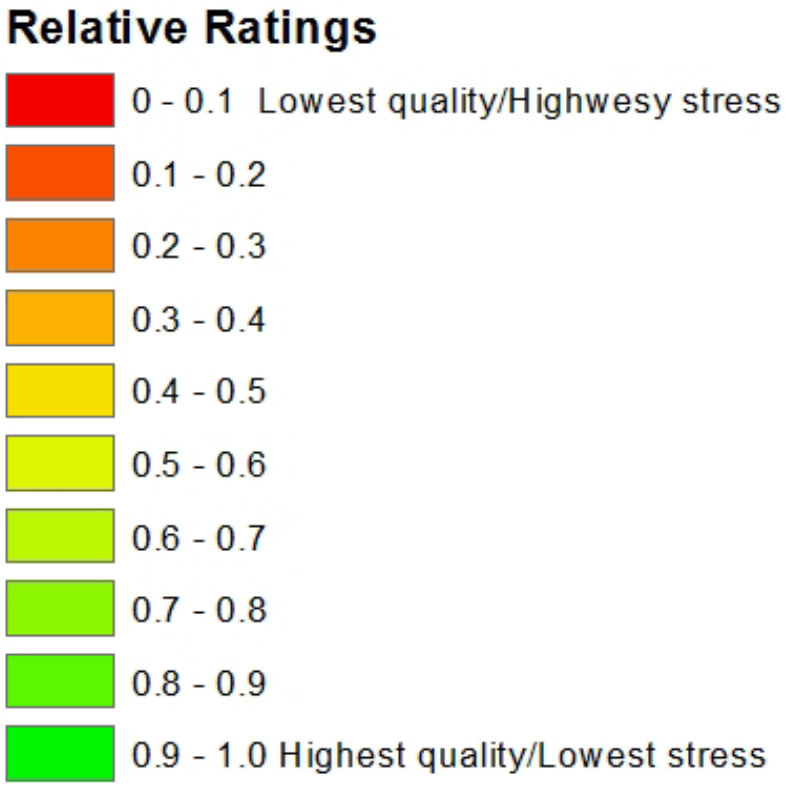
Metrics under Development

- Baker's Tool: maps buffer areas for individual sources of pollution
- Cumulative watershed effects: downstream effects of water quality stressors

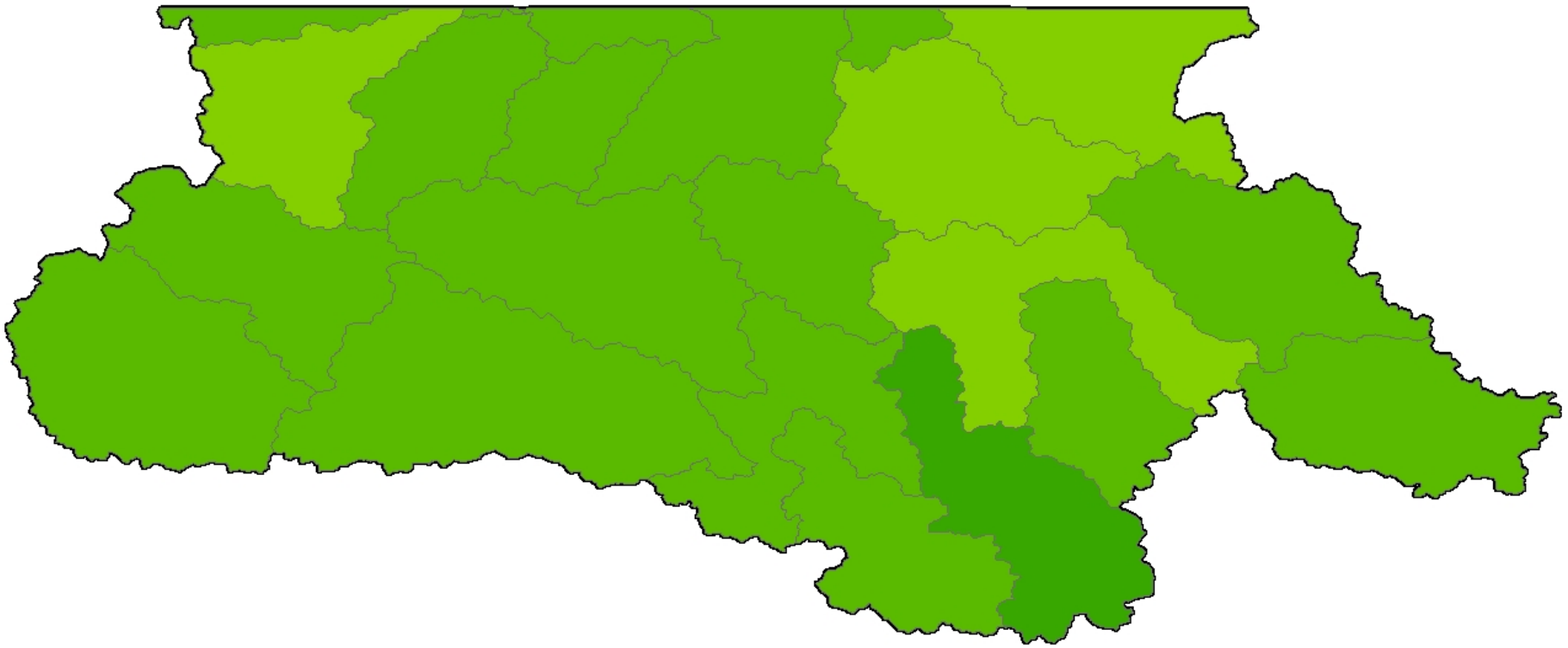
Monongahela Watershed

Preliminary Results: Relative Rankings

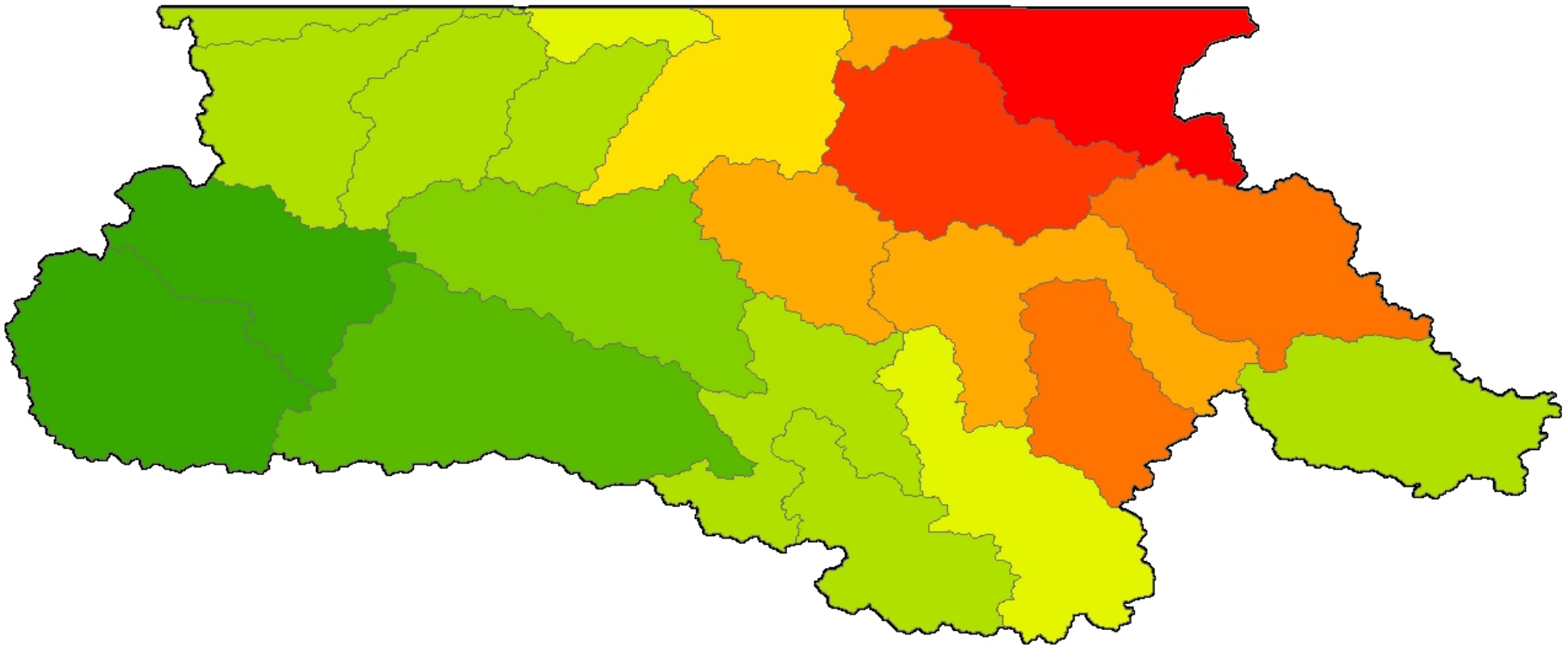
Standard Legend



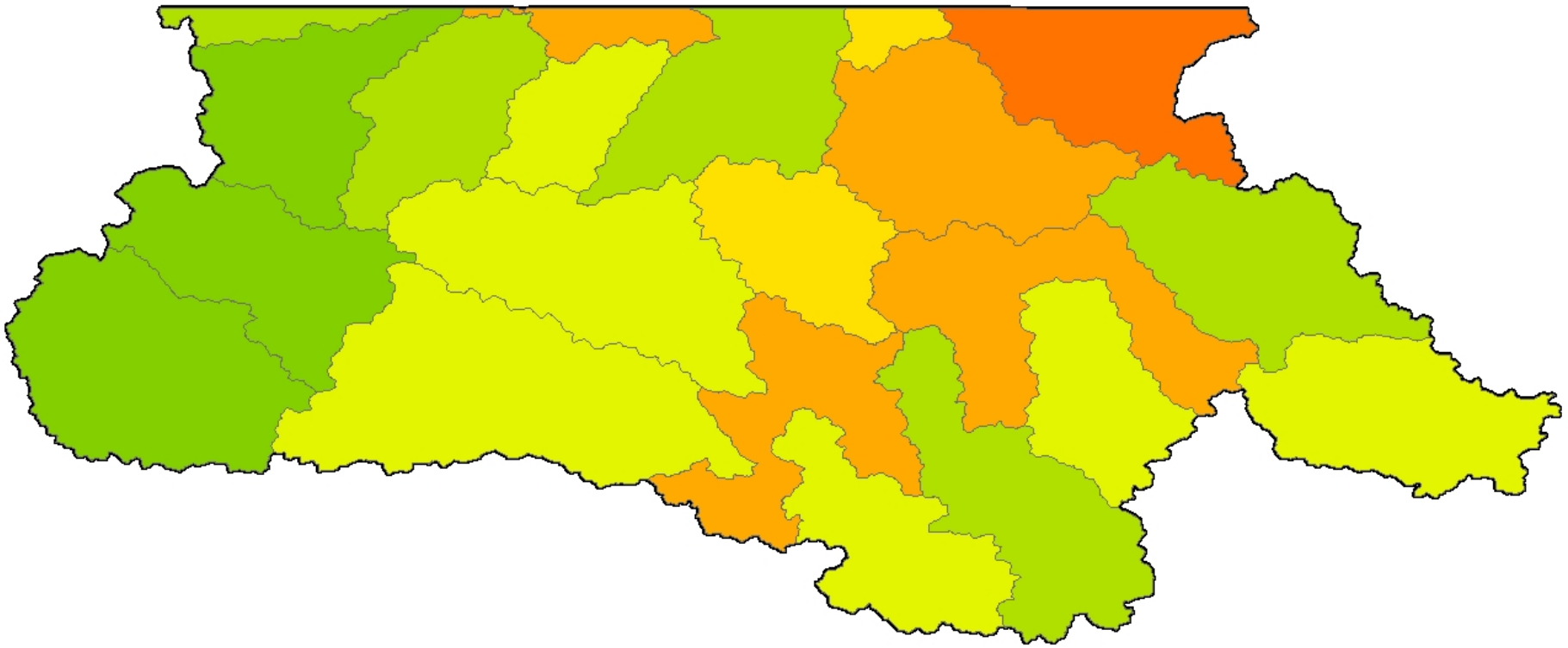
Potential Future Energy Threat



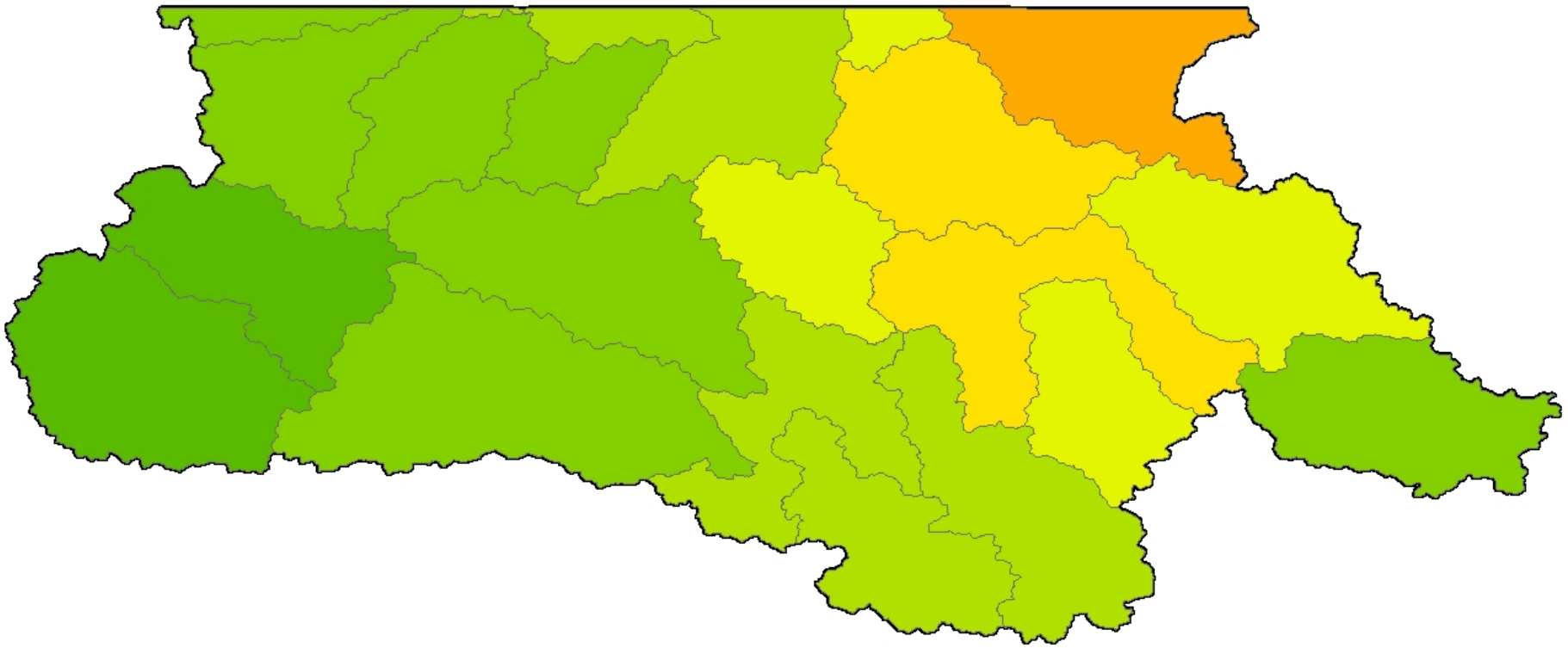
Potential Future Population/ Development Threat



Potential Future Climate Threat



Overall Potential
FutureThreats



GROUP DISCUSSION 3

Please split up into assigned Groups to discuss the Preliminary Consolidated Analysis Methodology.

Questions to consider:

- Do the Indices and Sub-indices describe the Consolidated Analysis adequately?
- Are we missing important indices/metrics/datasets?
- Which metrics are most important in describing each index?
- How should they be weighted?
- Should the scores for Phase I and Phase II be rolled up into one overall score?

Within-Catchment Prioritization

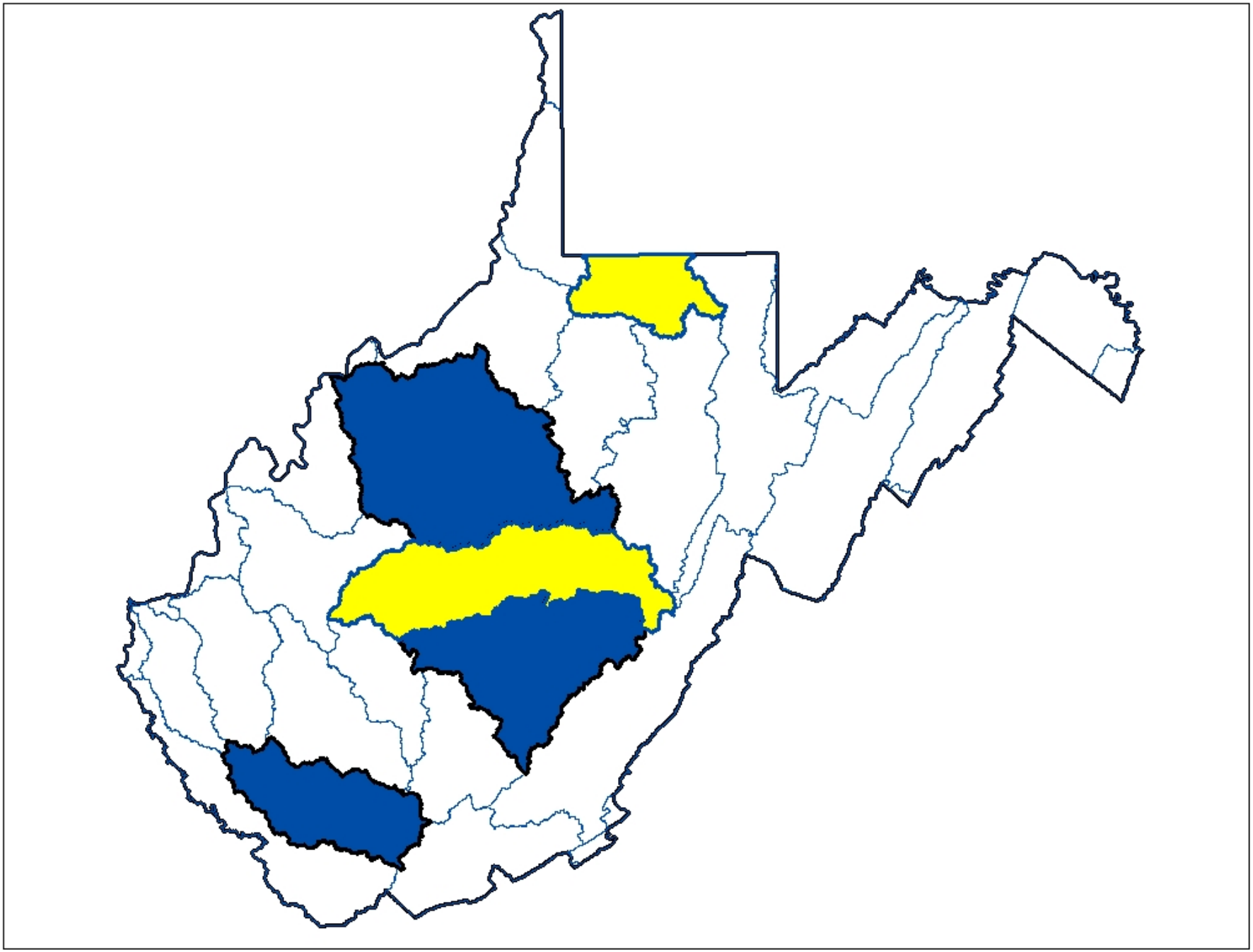
1. Prioritizing Catchments within HUC12 Areas of Interest

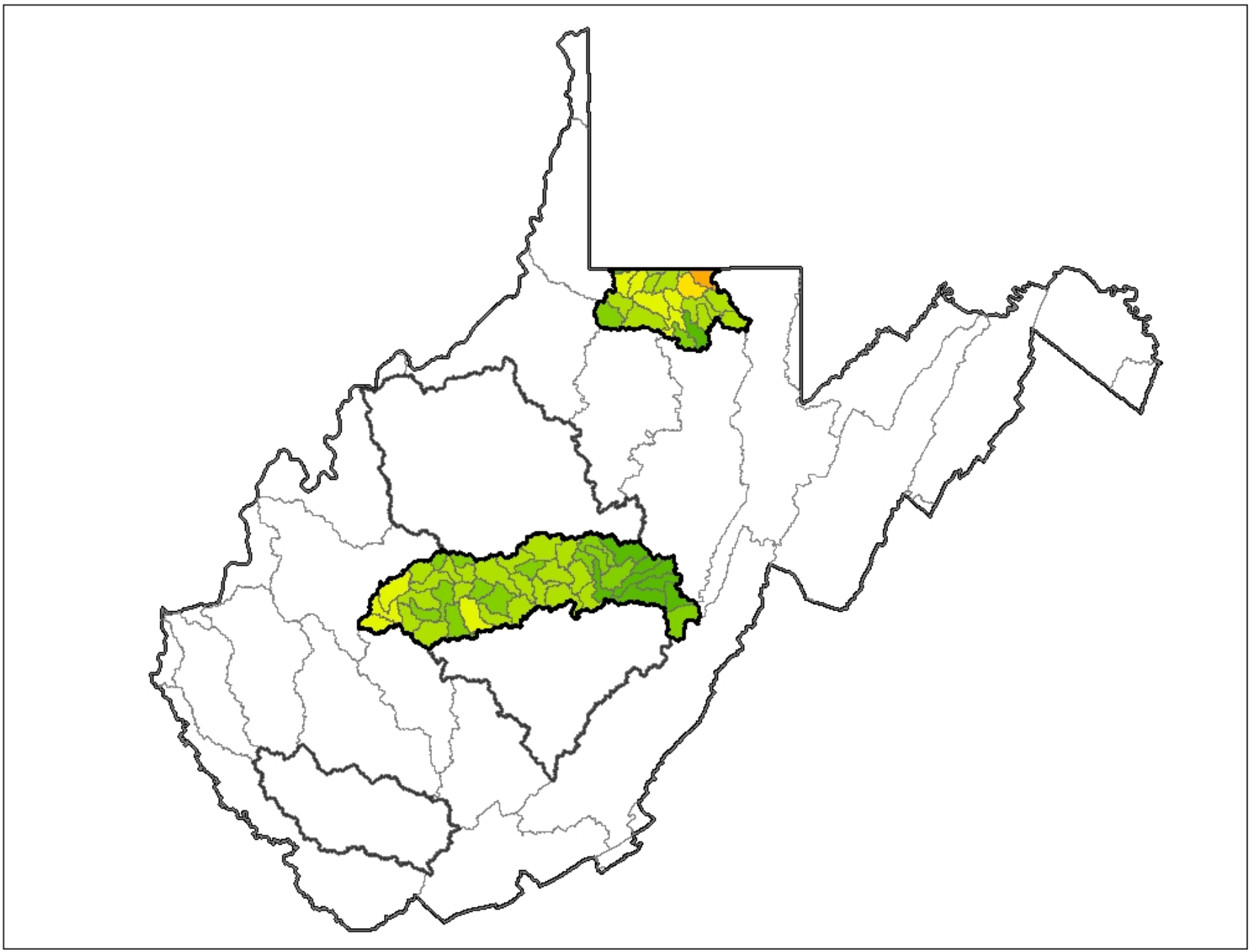
Catchment Prioritization

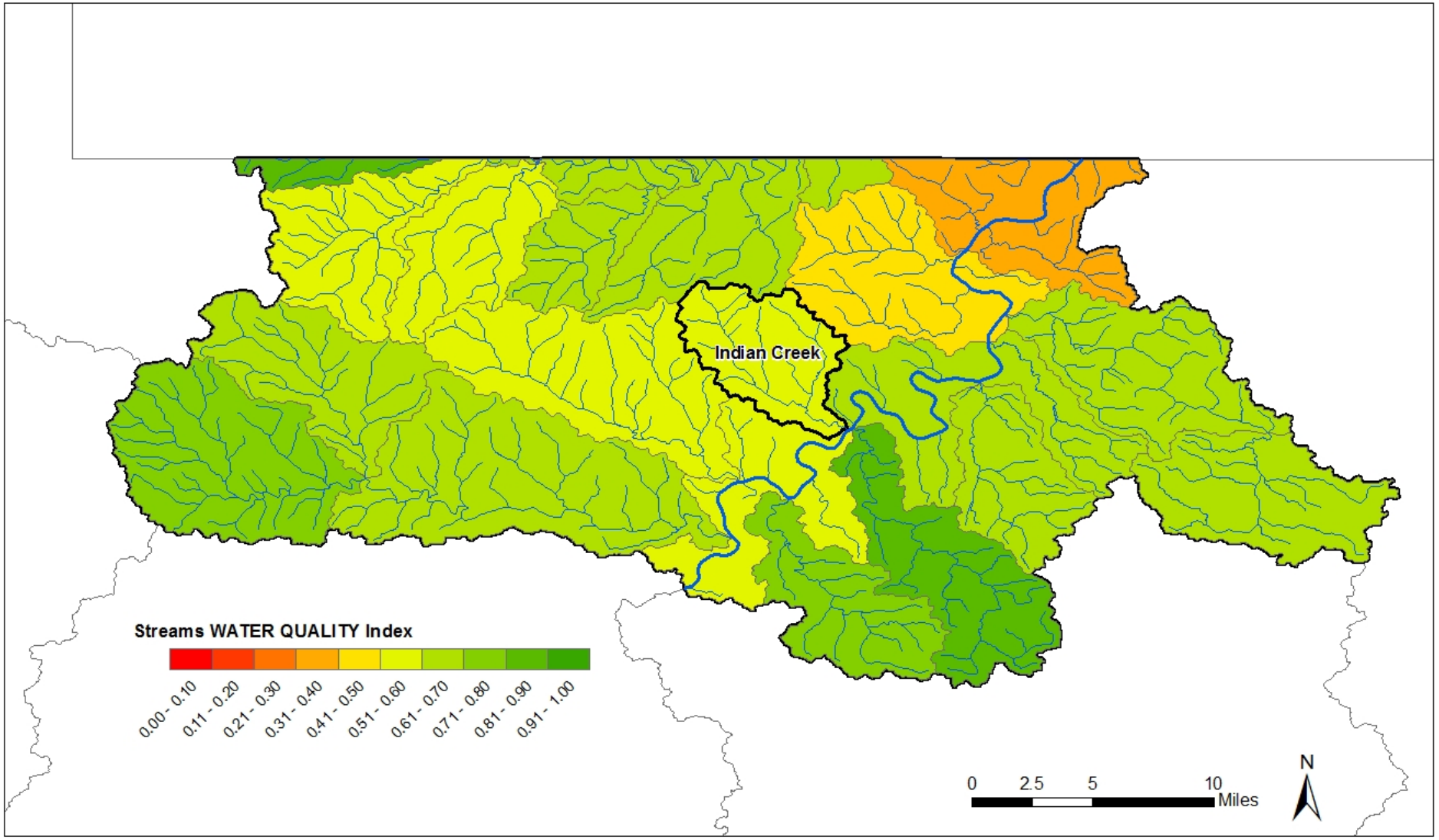
- Catchments will be ranked using the same indices and metrics as HUC12s
- Will allow users to zoom in first on HUC12s of interest, then smaller Catchment areas
- Analyze areas within catchments to determine appropriate restoration/protection sites

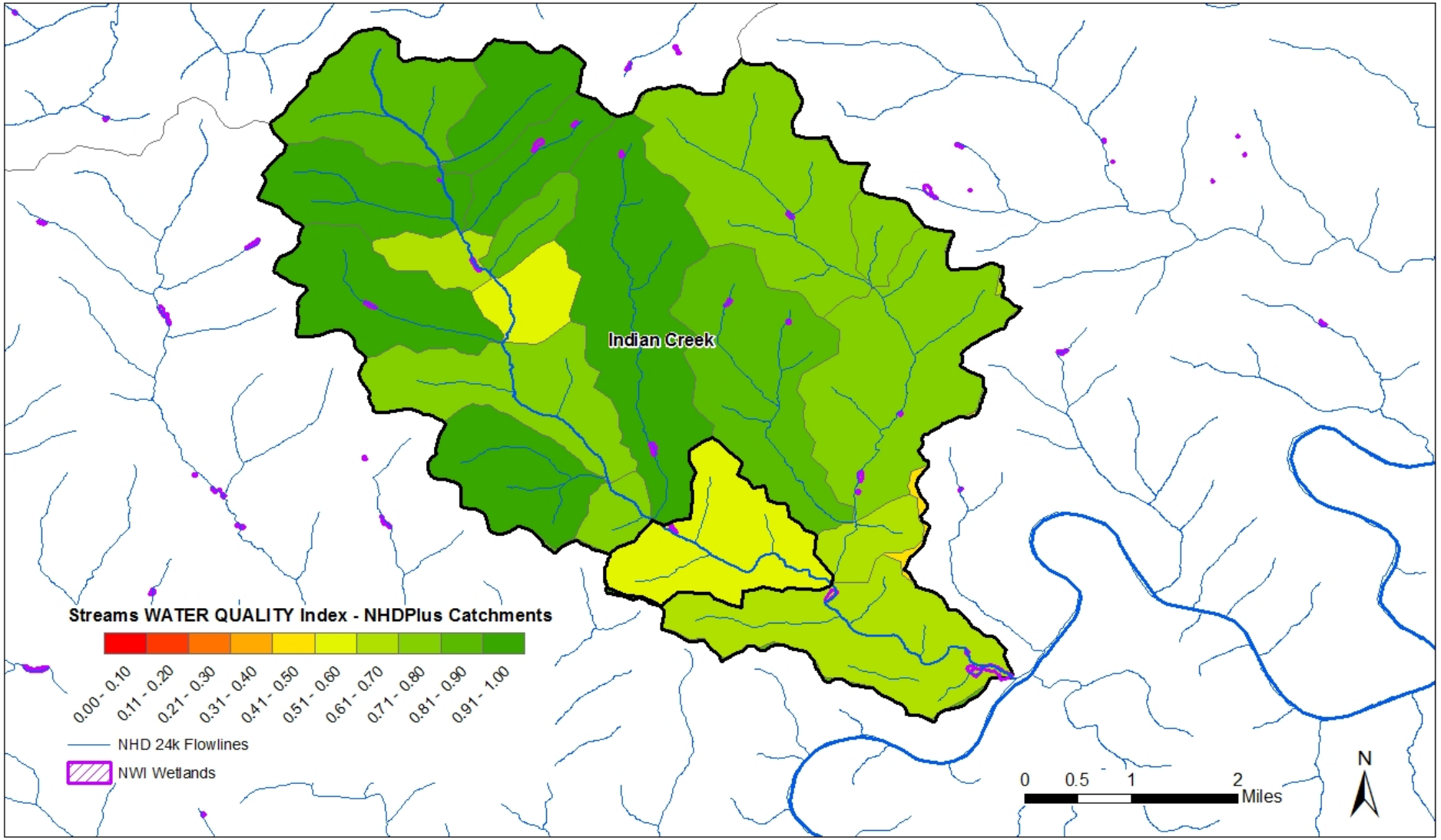
Example 1: Restoration

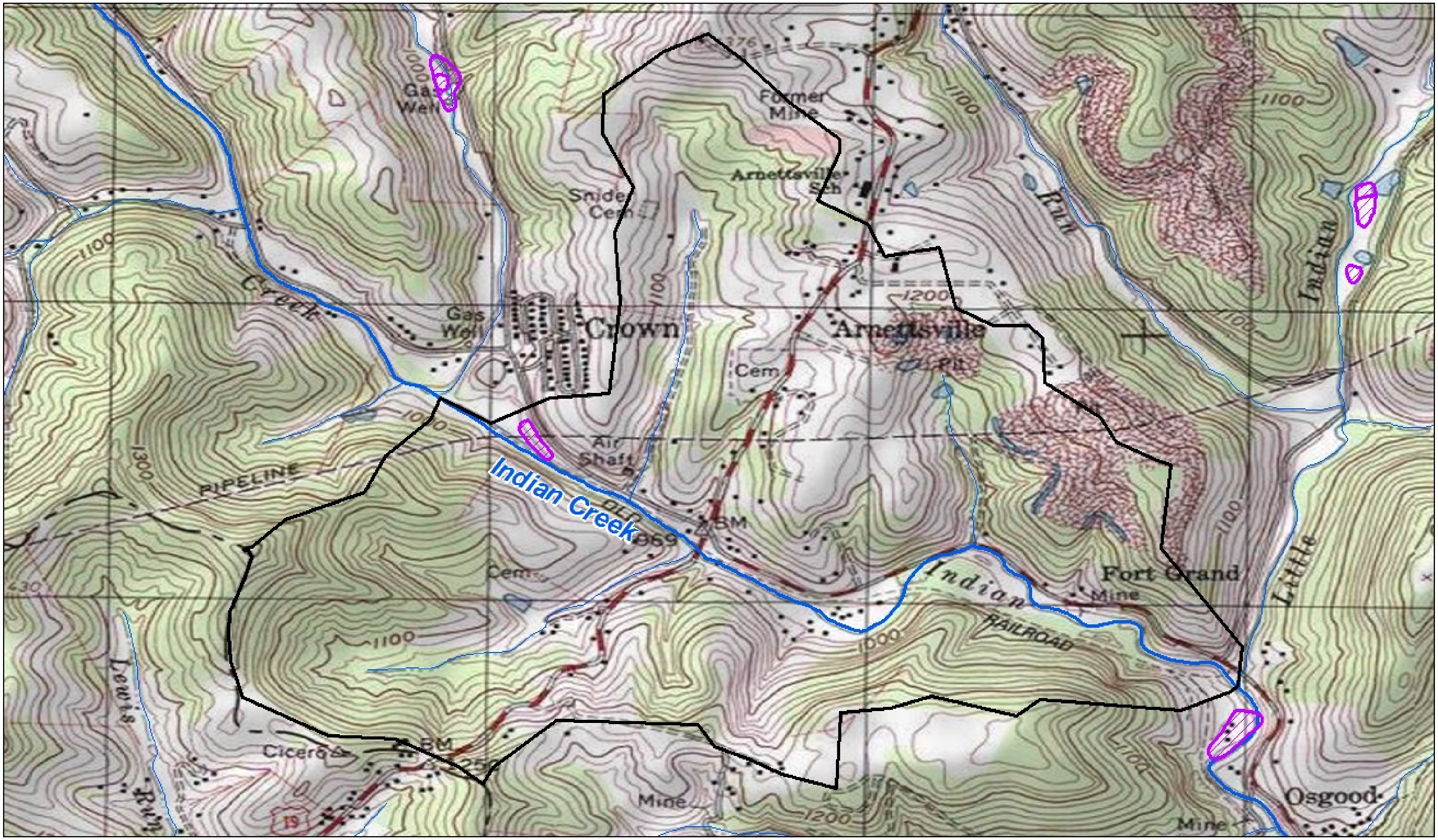
1. Finding a restoration site within the Monongahela Watershed



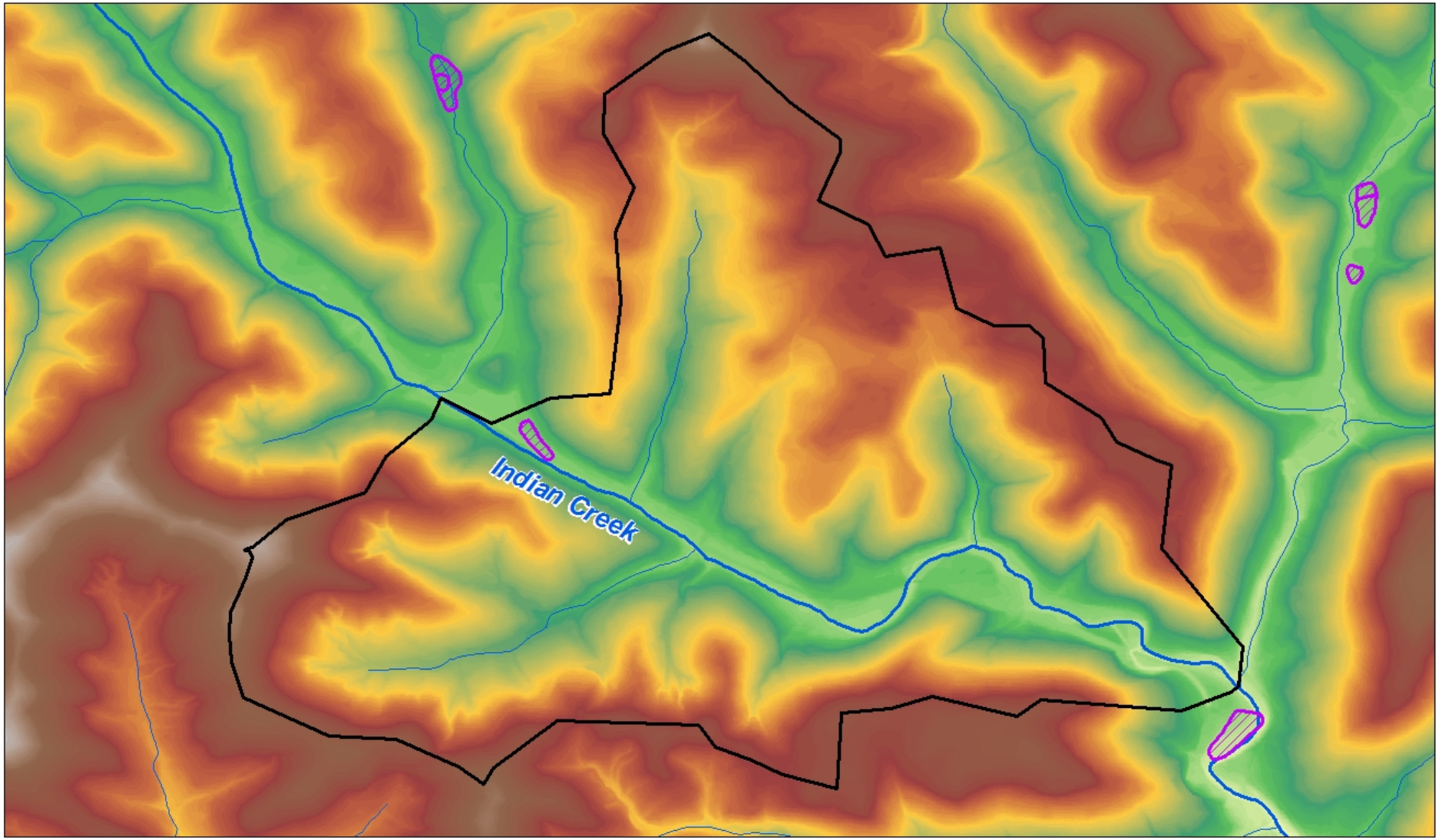


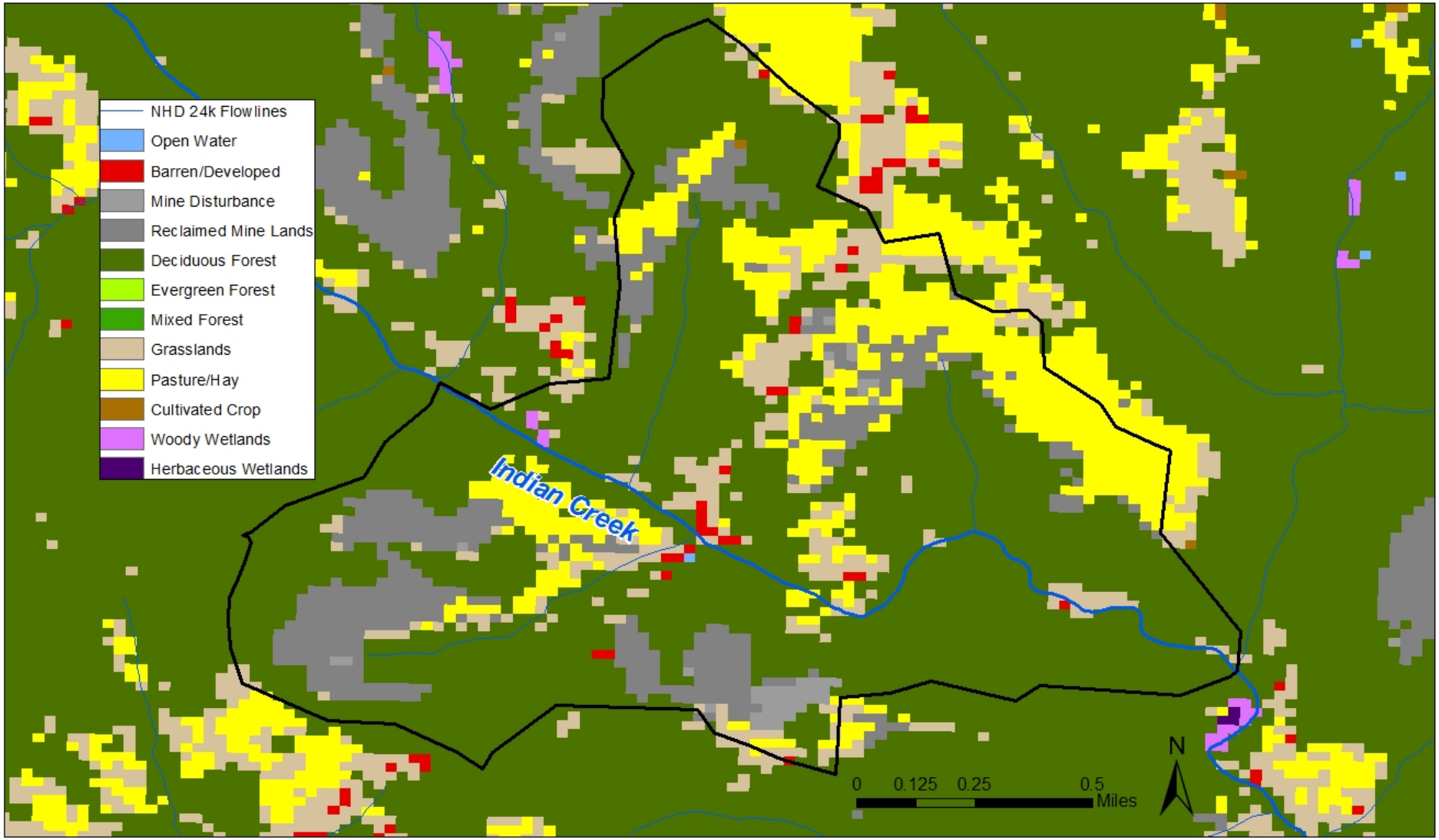

Indian Creek
Streams WATER QUALITY Index
0.00 - 0.10
0.11 - 0.20
0.21 - 0.30
0.31 - 0.40
0.41 - 0.50
0.51 - 0.60
0.61 - 0.70
0.71 - 0.80
0.81 - 0.90
0.91 - 1.00
0
2.5
5
10
Miles
N

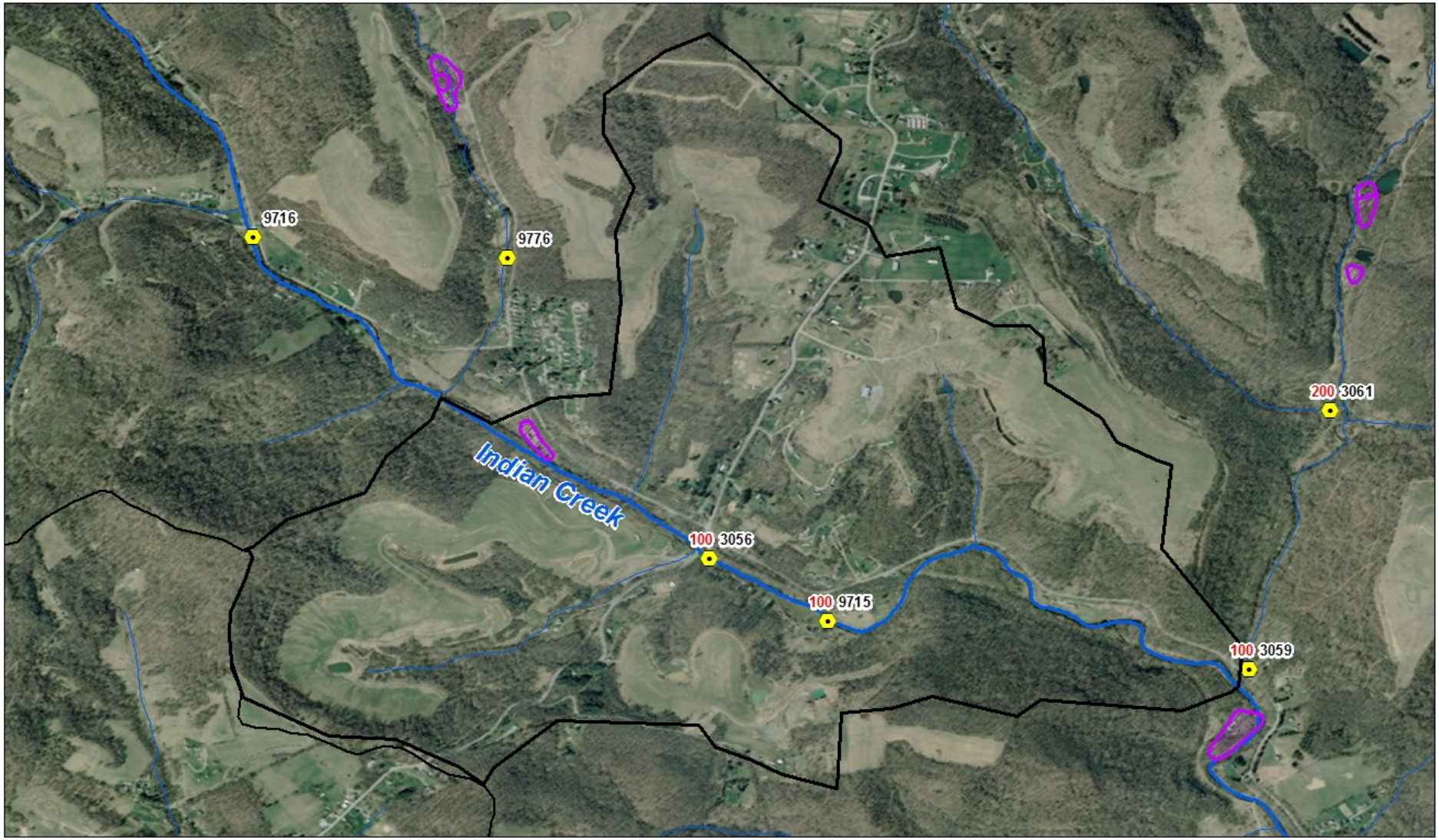

Indian Creek
Streams WATER QUALITY Index - NHDPlus Catchments
0.00 - 0.10
0.11 - 0.20
0.21 - 0.30
0.31 - 0.40
0.41 - 0.50
0.51 - 0.60
0.61 - 0.70
0.71 - 0.80
0.81 - 0.90
0.91 - 1.00
NHD 24k Flowlines
NWI Wetlands
0 0.5 1 2
Miles
N

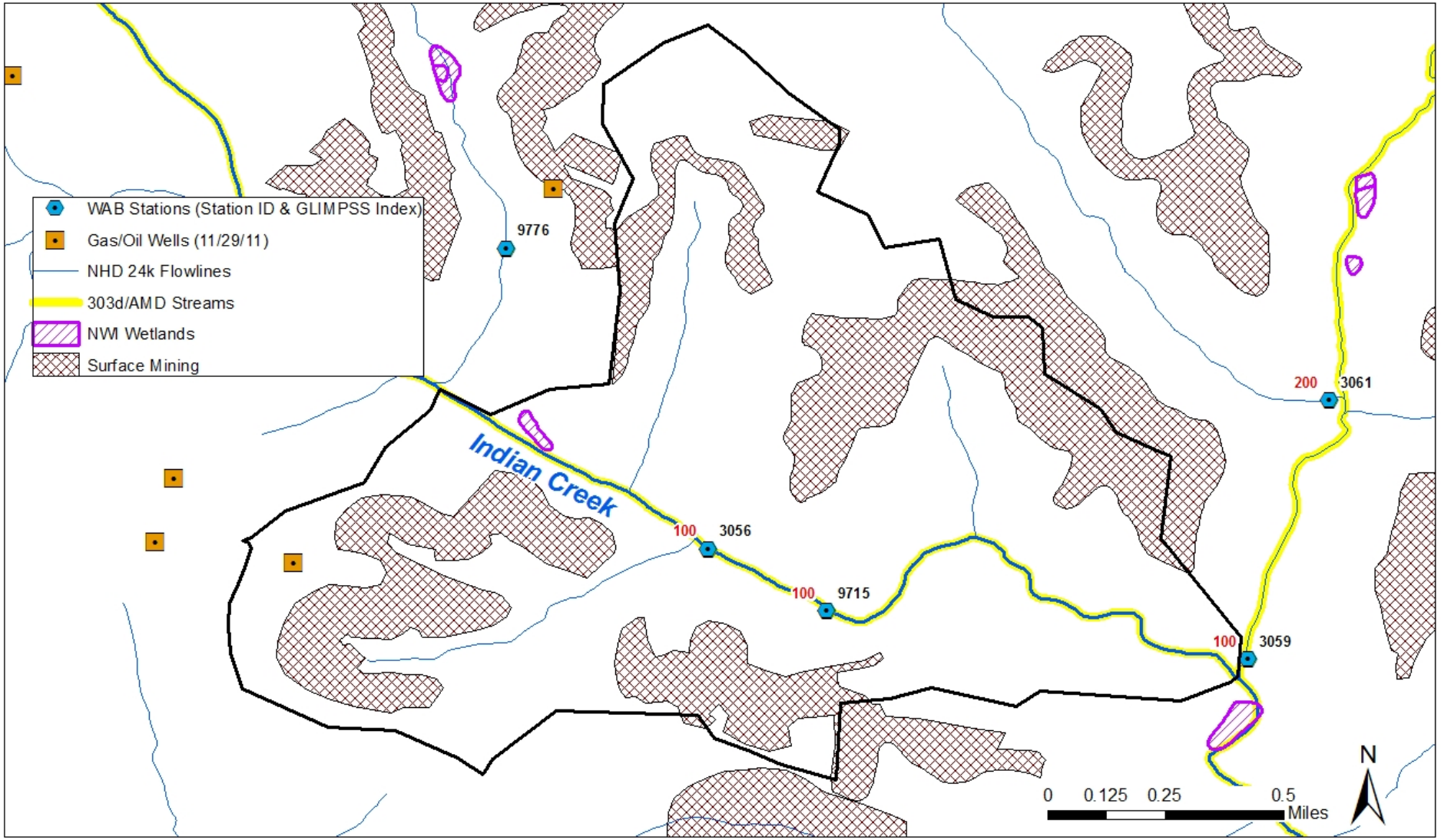


Indian Creek
Crown
Arnettsville
Arnettsville Sch
Former Mine
Snider Cem
Gas Well
Gas Well
Cem
Pit
Air Shaft
BM
869
PIPELINE
Creek
Indian
Run
Indian
Little
Fort Grand
Mine
RAILROAD
Cem
Cicero
BM
Lewis
Run
Mine
Osgood
Mine
1100
1200
1000
1300
19


Indian Creek

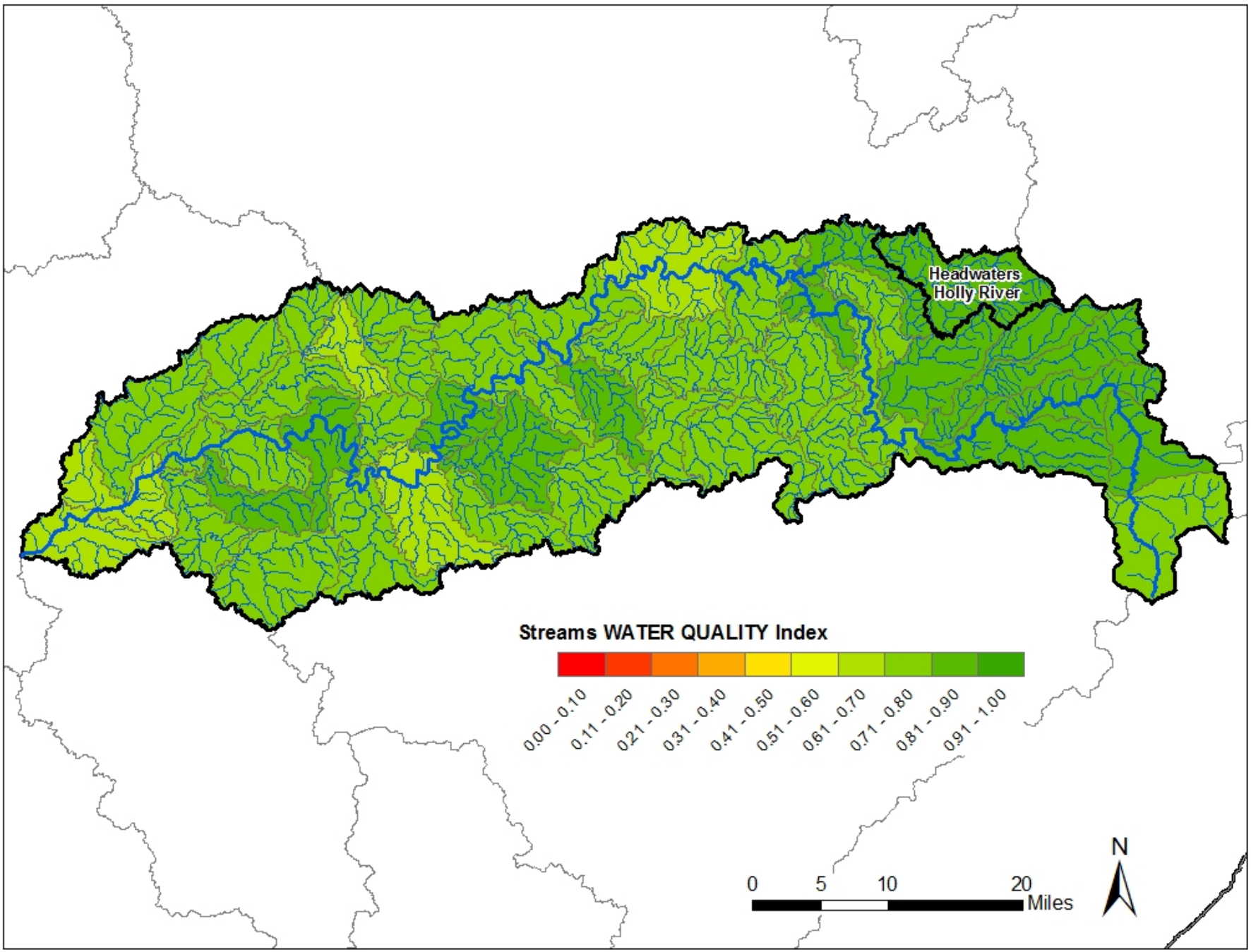

NHD 24k Flowlines
Open Water
Barren/Developed
Mine Disturbance
Reclaimed Mine Lands
Deciduous Forest
Evergreen Forest
Mixed Forest
Grasslands
Pasture/Hay
Cultivated Crop
Woody Wetlands
Herbaceous Wetlands
Indian Creek
N
0 0.125 0.25 0.5
Miles

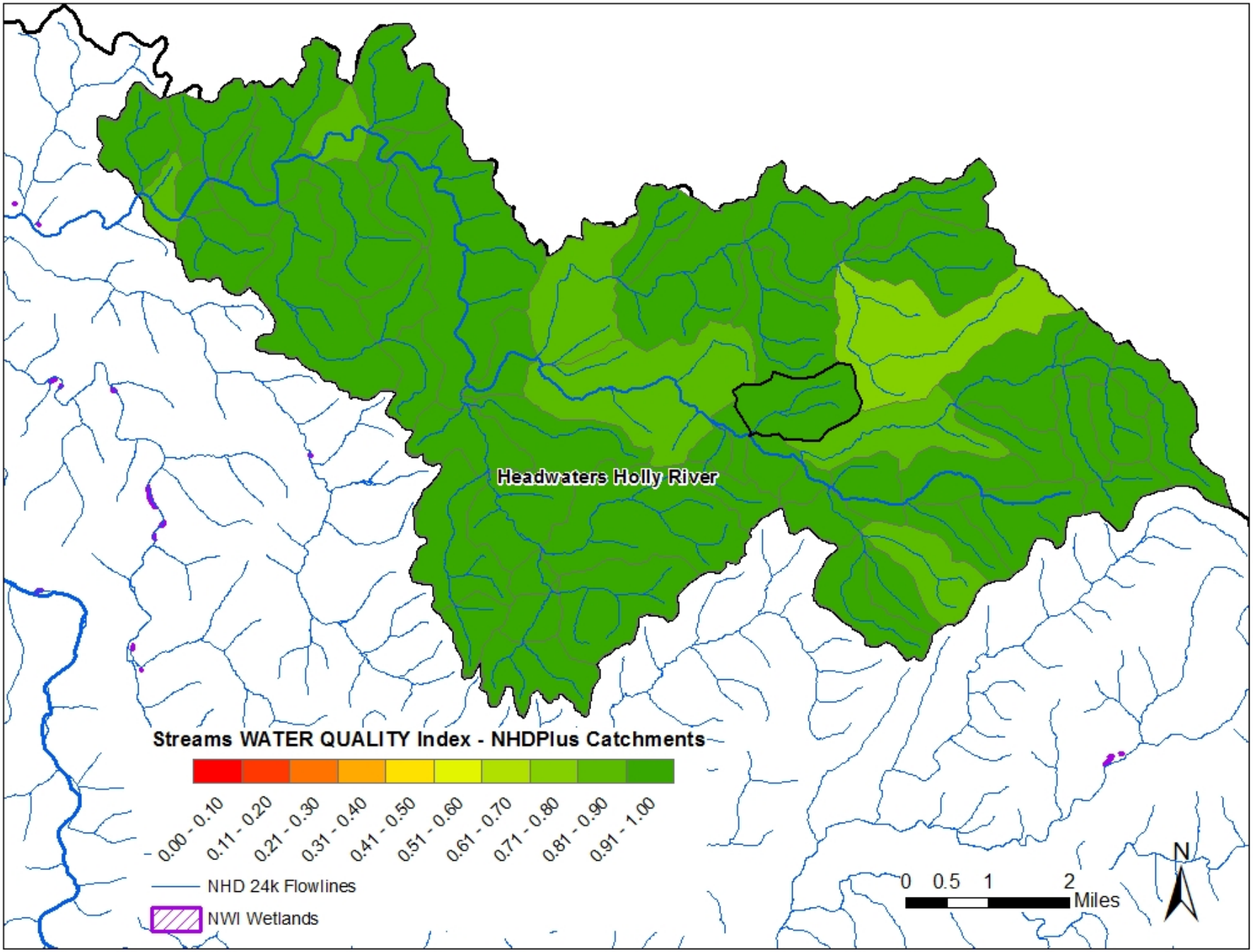

9716
9776
Indian Creek
100 3056
100 9715
100 3059
200 3061

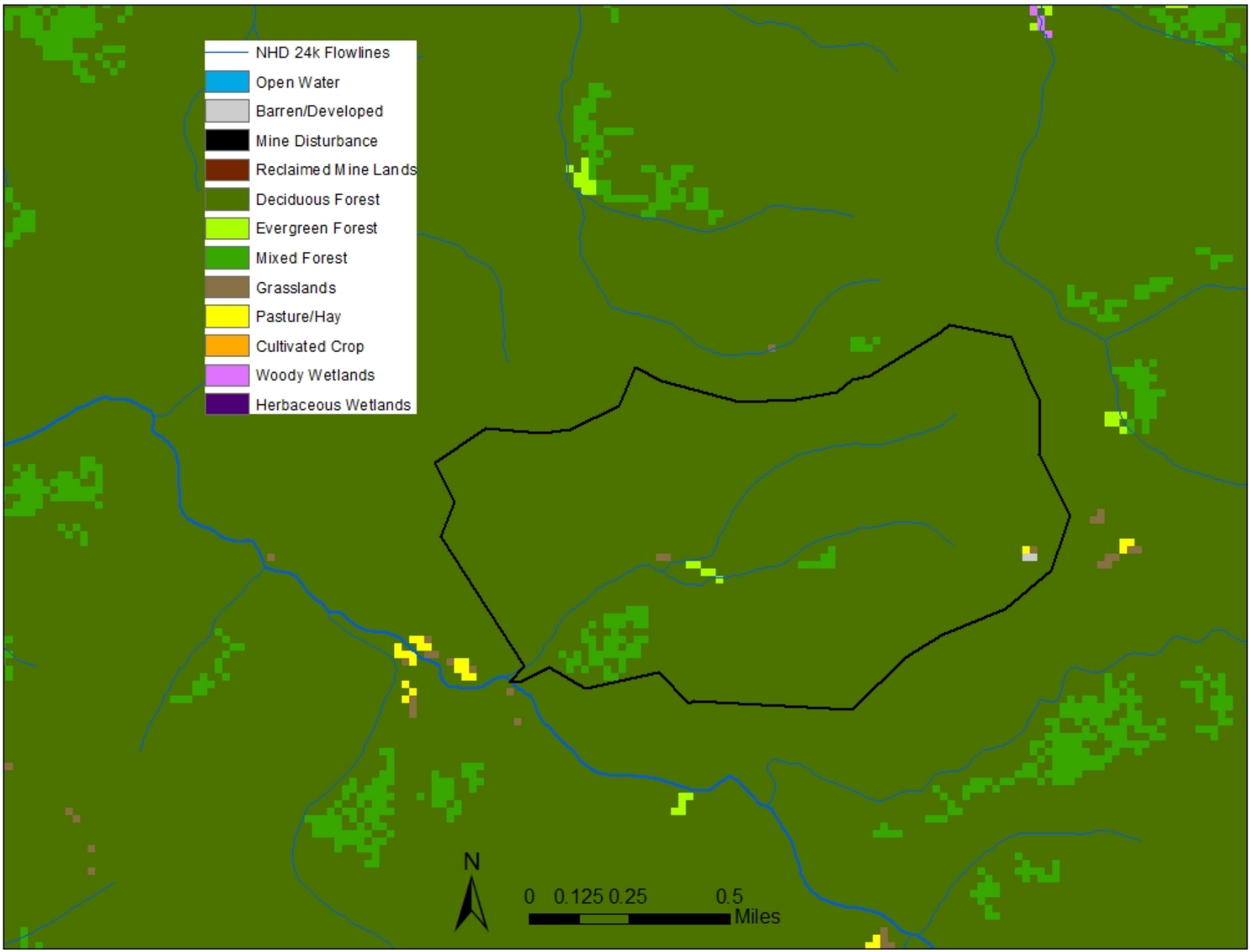

WAB Stations (Station ID & GLIMPSS Index)
Gas/Oil Wells (11/29/11)
NHD 24k Flowlines
303d/AMD Streams
NWI Wetlands
Surface Mining
9776
Indian Creek
100
3056
100
9715
200
3061
100
3059
0 0.125 0.25 0.5
Miles
N

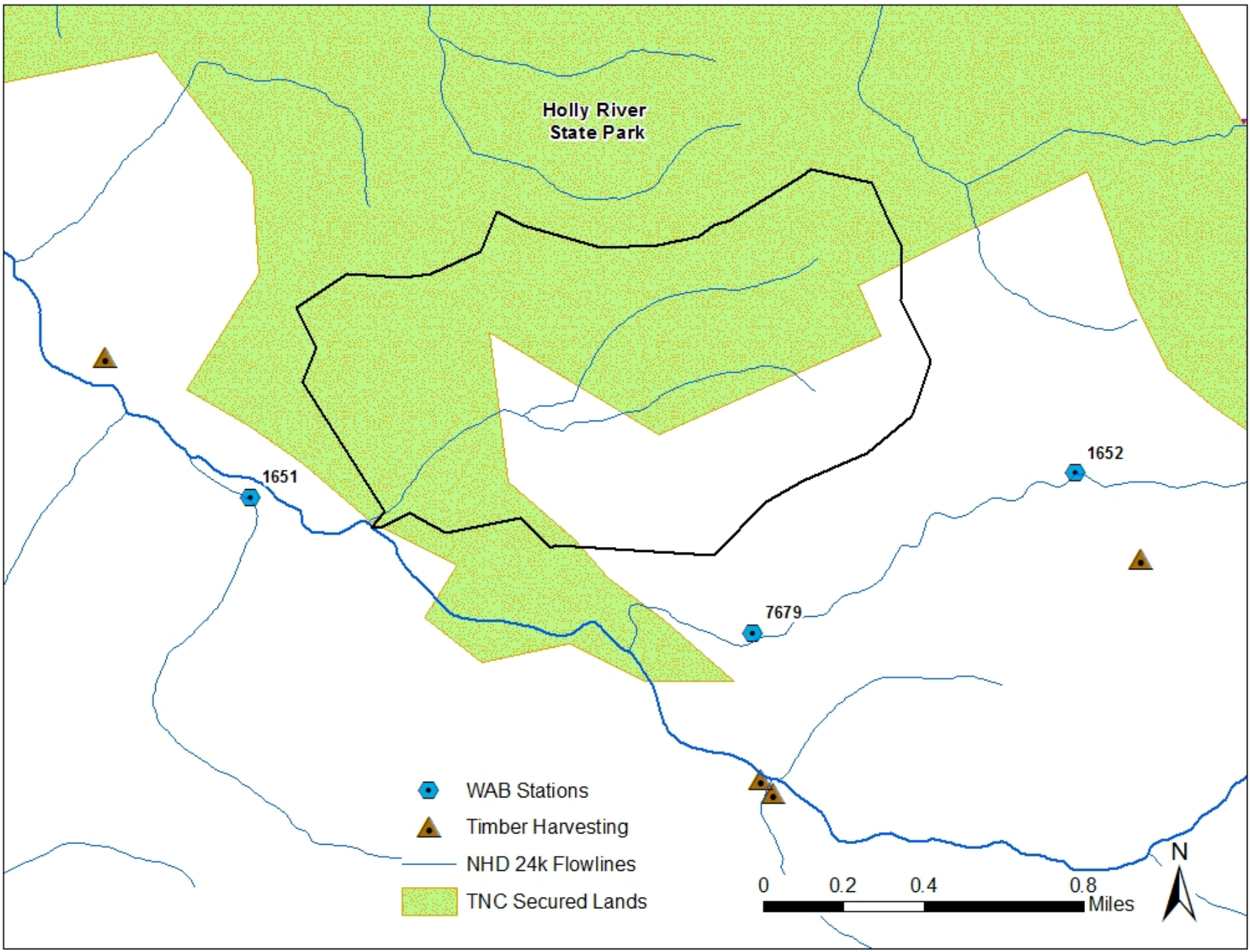
Example 2: Protection

1. Finding a site to protect within the Elk Watershed


Headwaters
Holly River
Streams WATER QUALITY Index
0.00 - 0.10
0.11 - 0.20
0.21 - 0.30
0.31 - 0.40
0.41 - 0.50
0.51 - 0.60
0.61 - 0.70
0.71 - 0.80
0.81 - 0.90
0.91 - 1.00
0
5
10
20
Miles
N


Headwaters Holly River
Streams WATER QUALITY Index - NHDPlus Catchments
0.00 - 0.10
0.11 - 0.20
0.21 - 0.30
0.31 - 0.40
0.41 - 0.50
0.51 - 0.60
0.61 - 0.70
0.71 - 0.80
0.81 - 0.90
0.91 - 1.00
NHD 24k Flowlines
NWI Wetlands
0 0.5 1 2
Miles
N


NHD 24k Flowlines
Open Water
Barren/Developed
Mine Disturbance
Reclaimed Mine Lands
Deciduous Forest
Evergreen Forest
Mixed Forest
Grasslands
Pasture/Hay
Cultivated Crop
Woody Wetlands
Herbaceous Wetlands
N
0 0.125 0.25 0.5
Miles


Holly River
State Park
1651
1652
7679
WAB Stations
Timber Harvesting
NHD 24k Flowlines
TNC Secured Lands
0
0.2
0.4
0.8
Miles
N

Group Discussion 4

Please split into assigned groups to discuss within-catchment prioritization

Key Questions to consider:

- Which datasets are important to incorporate in interactive web tool?
- What are the most important questions we need to answer about each watershed?
- What other data/metrics need to be incorporated?
- Are we on the right track to answer these questions?
- Is our methodology sufficient to answer these questions?

Final Product Overview

Intended Results

- Develop a watershed assessment methodology that can be implemented in the remaining WV watersheds
- Rank areas of high conservation value
- Rank restoration needs, opportunities and probabilities of success
- Develop strategies/actions to address issues identified during assessment process
- Develop metrics to measure success/ improvement
- Suggest protocols for monitoring and assessment of aquatic resources as an adaptive feedback loop for resource management
- Identify data gaps & data needs

Project Outputs

- **Five watershed assessment reports**

Will include specific priorities and strategies, as well as detailed methodology, references and lessons learned

- **Interactive web mapping application**

A spatial decision support tool to assist stakeholders in identifying target areas, strategies and actions

Interactive Web Mapping Application

Desktop tool that will allow users to:

- View the various datasets in one application
- Develop customized scenarios to rank target areas for restoration and/or protection projects according to their priorities
- Manipulate weighting of different factors


Elk River at Birch Run, WV ©www.over-land.com

FEEDBACK/QUESTIONS?

NEXT STEPS

- Incorporate Workshop Feedback
- Complete Objective Categorization
- Complete Catchment Prioritization
- Complete Consolidated Analysis
- Design Draft Interactive Web Application
- Partner/Stakeholder Workshop

THANK YOU FOR YOUR HELP!