



# WEST VIRGINIA WATERSHED ASSESSMENT PILOT PROJECT

Stakeholder Workshop: Tygart Valley Watershed  
November 13, 2013

# Tygart Valley River Watershed

1. Watershed Overview
2. Current Condition Results  
Streams, Wetlands, Uplands
3. Consolidated Analysis Results  
Threats, Opportunities
4. Web Map Tool Demo  
Potential Use Scenario

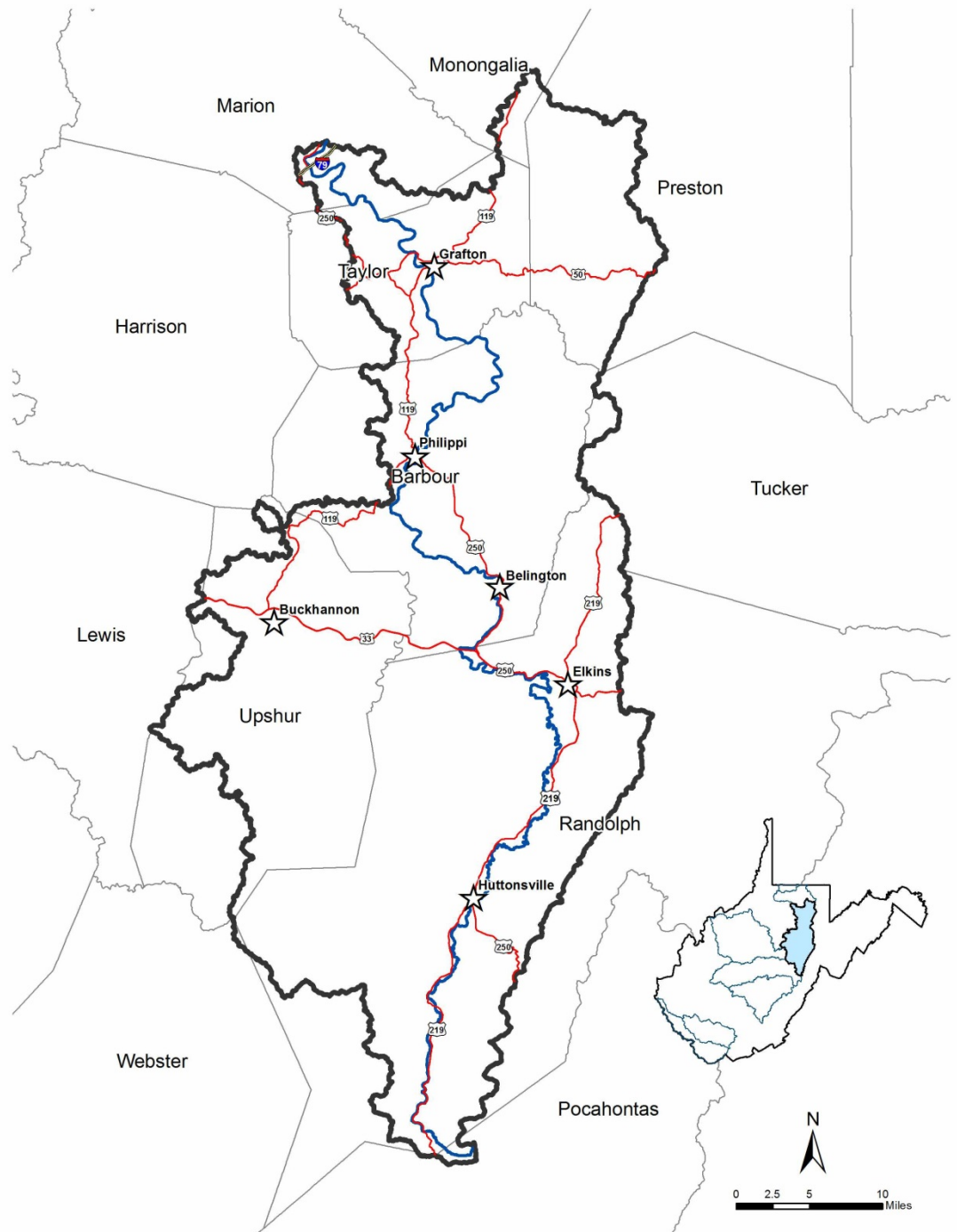
# Tygart Valley Watershed

Watershed  
Overview:

Counties

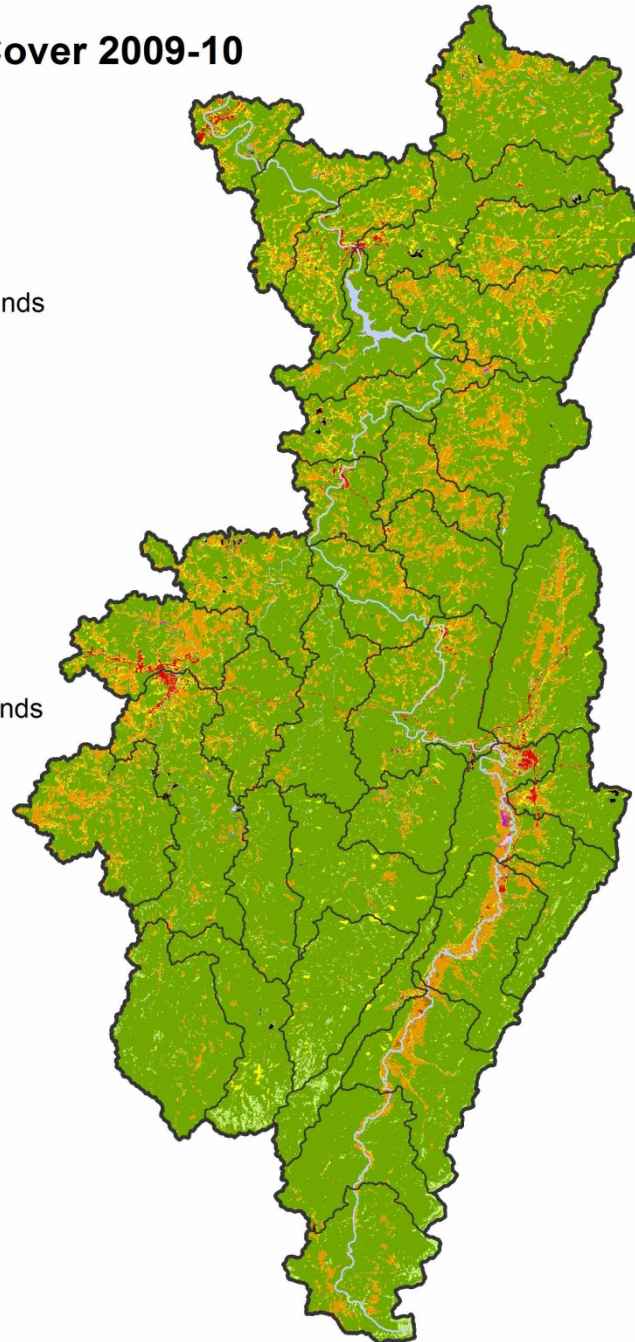
Towns

Major  
Roads



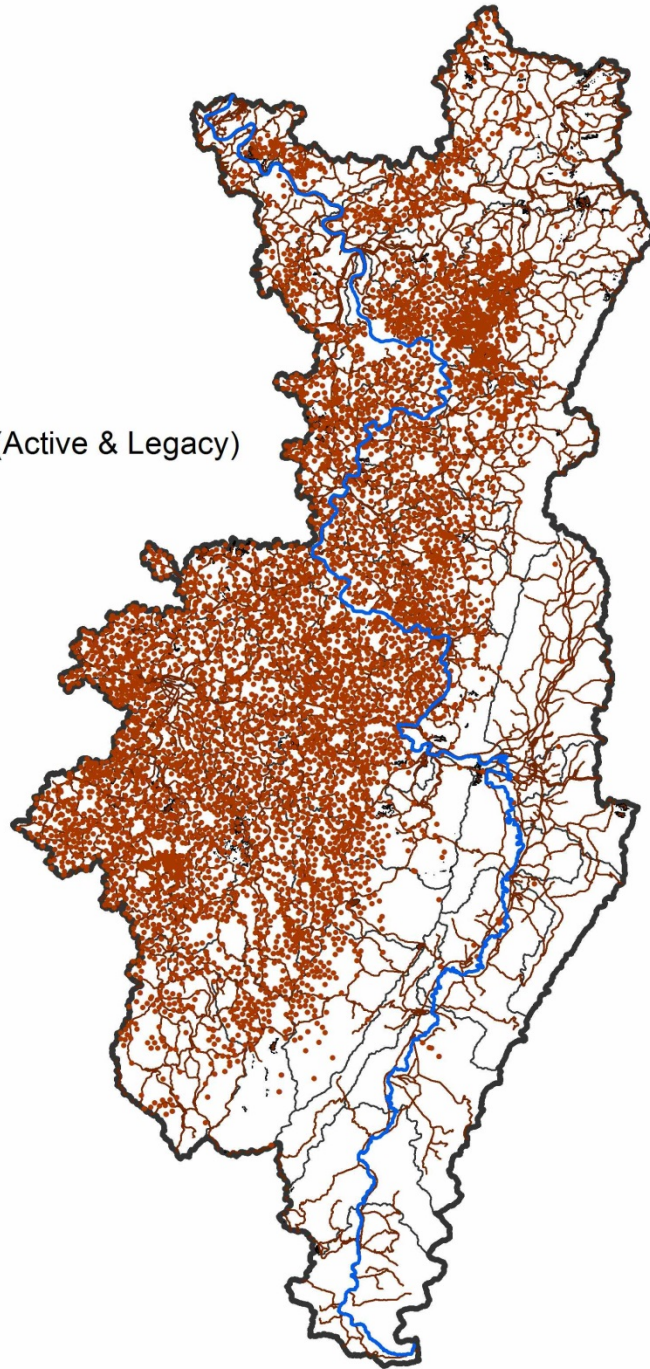


## Land Use/Land Cover 2009-10 (WVU-NRAC)

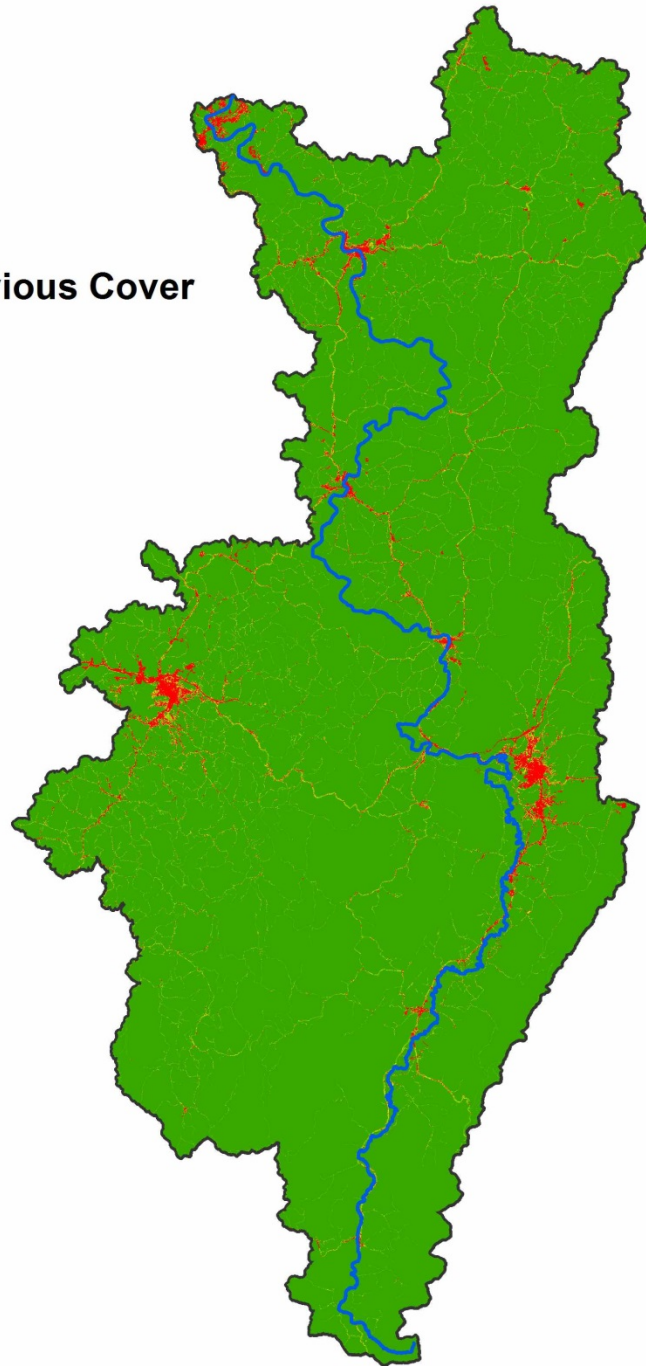
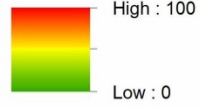




- Oil & Gas Wells
- Roads & Rail
- Surface Mining (Active & Legacy)



## NLCD 2006 Impervious Cover

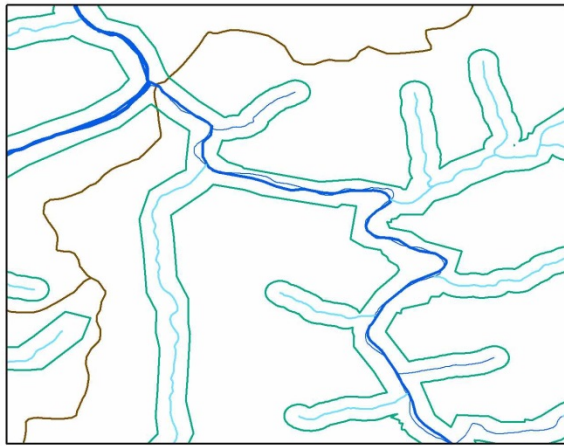


# Tygart Valley Watershed: Streams

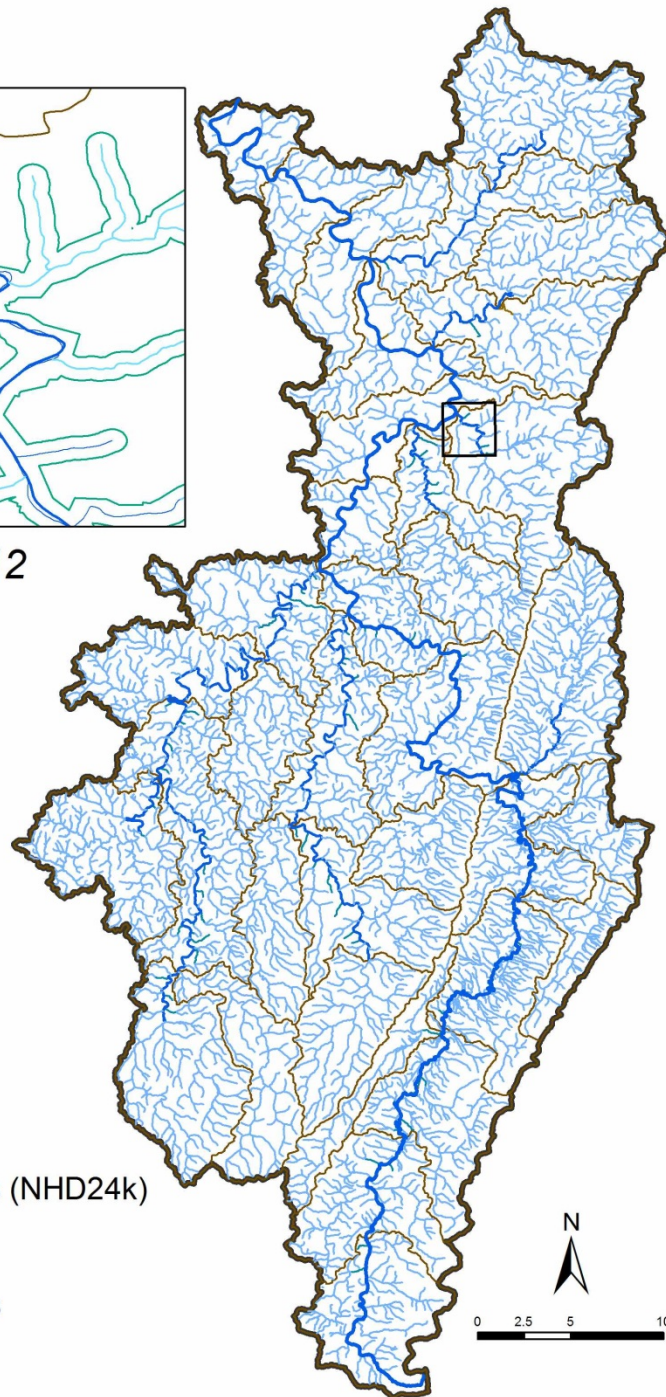


Tunnelton, WV © landingaday.wordpress.com

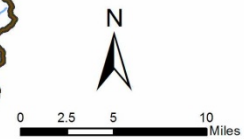




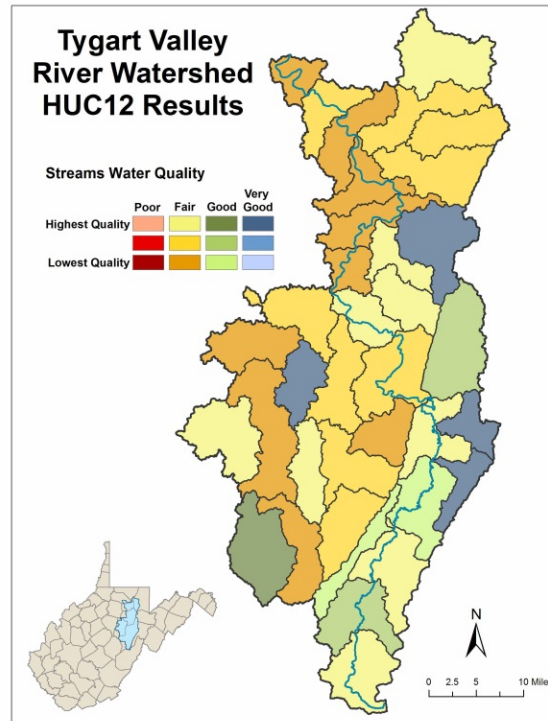
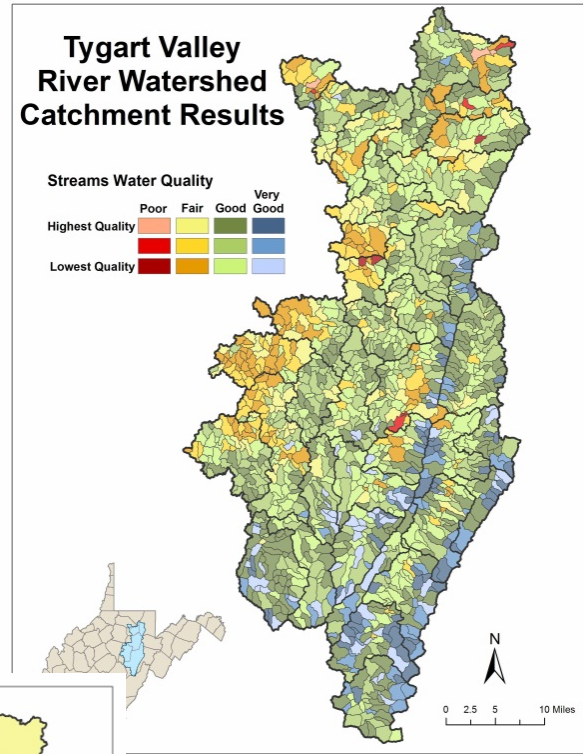
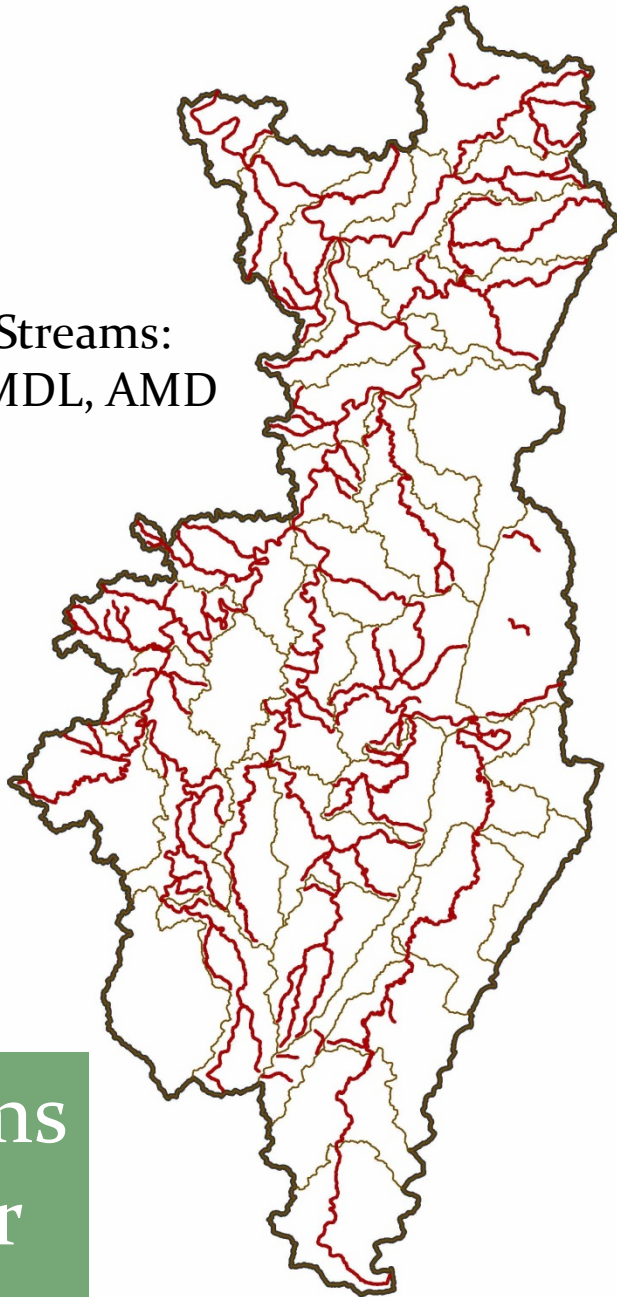
*Teter Creek HUC12*



- Major Tributaries
- Headwater Streams (NHD24k)
- Riparian Area
- HUC12 Watersheds



Impaired Streams:  
303(d), TMDL, AMD

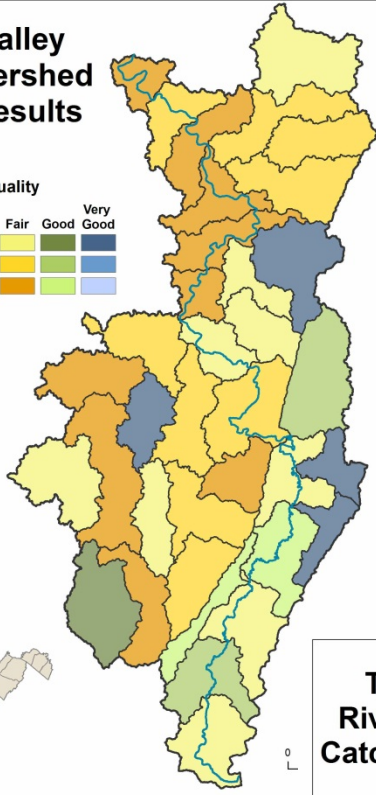


Streams  
Water  
Quality

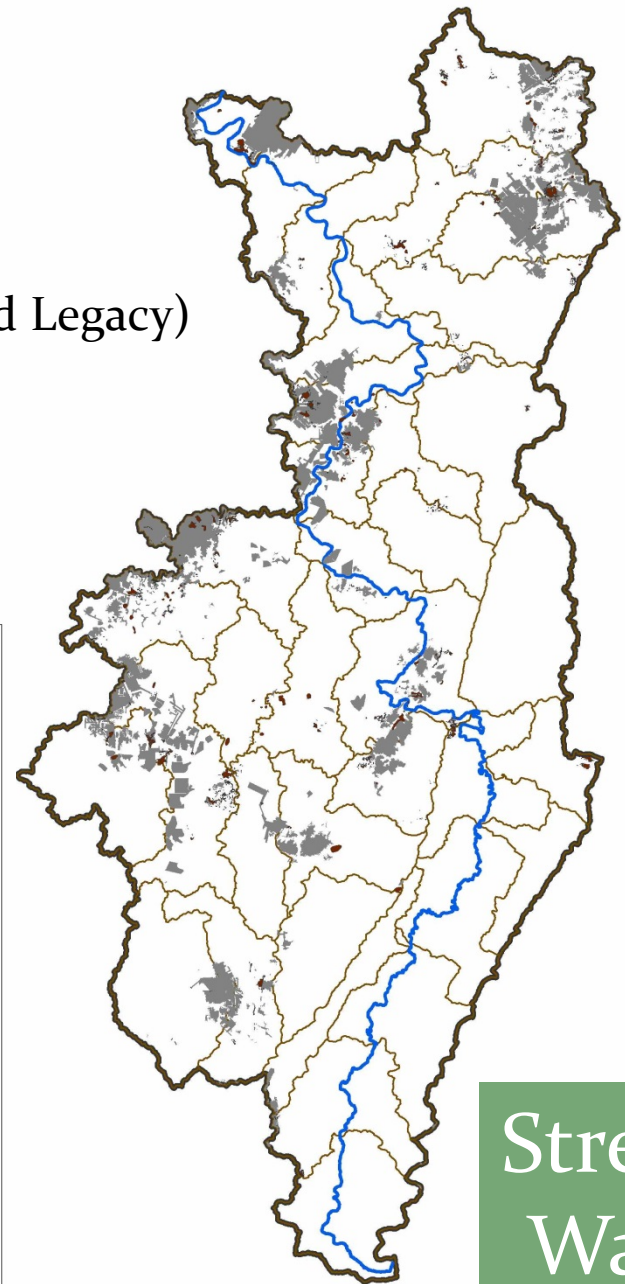


# Tygart Valley River Watershed HUC12 Results

## Streams Water Quality

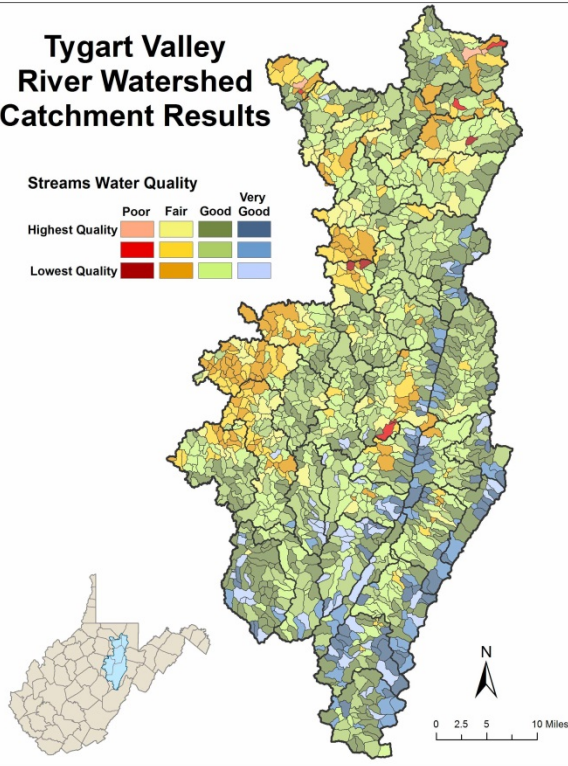


Mining Activity:  
Surface (Active and Legacy)  
Underground



# Tygart Valley River Watershed Catchment Results

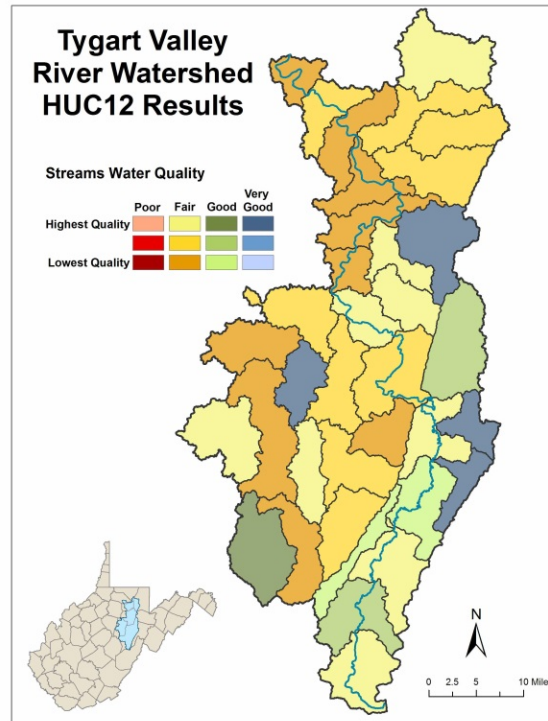
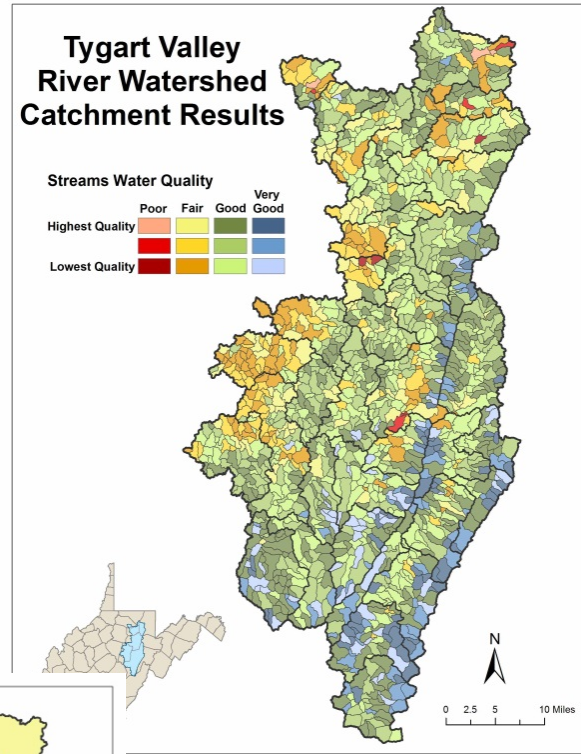
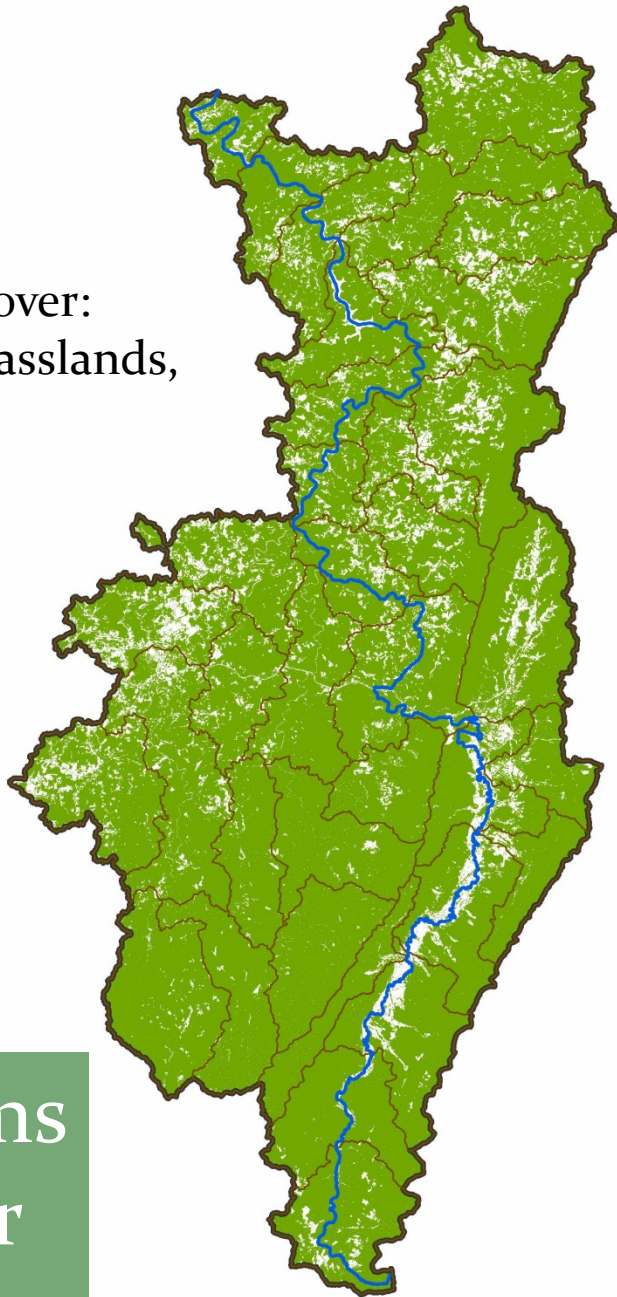
## Streams Water Quality



Streams  
Water  
Quality



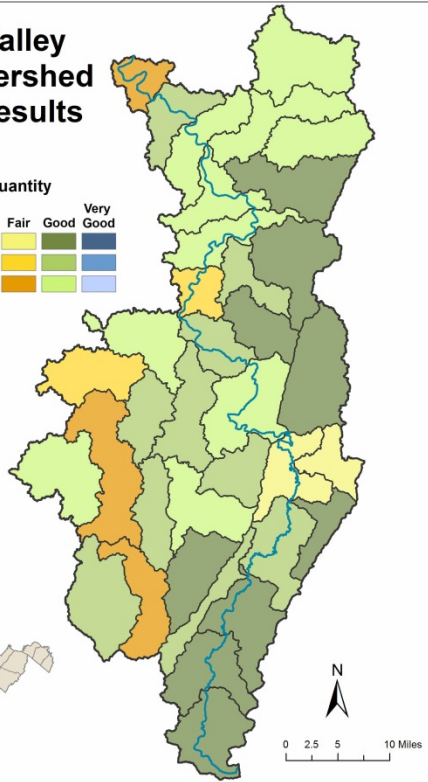
Natural Cover:  
Forest, Grasslands,  
Wetlands



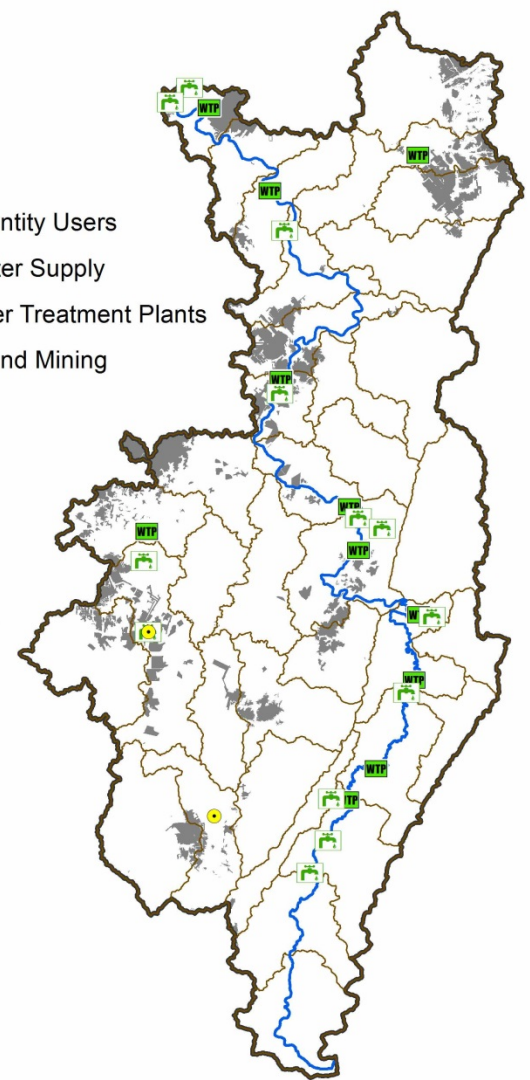
Streams  
Water  
Quality

# Tygart Valley River Watershed HUC12 Results

## Streams Water Quantity

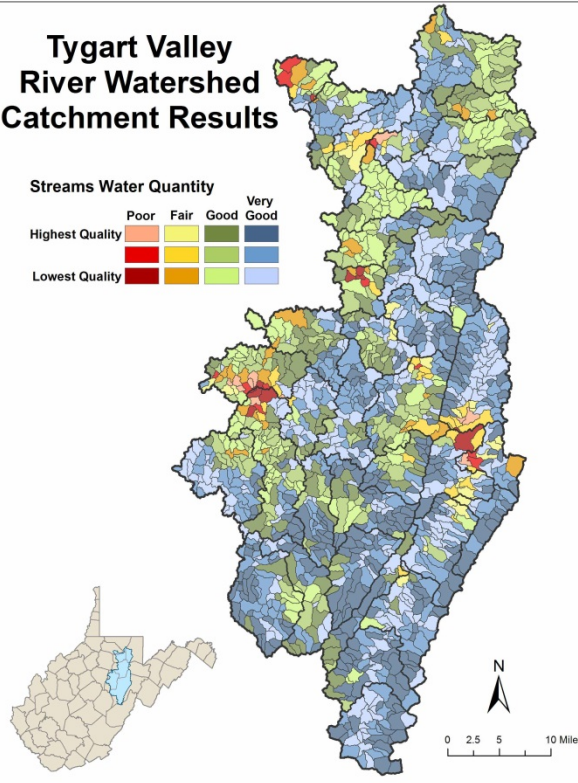
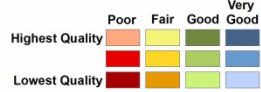


- Large Quantity Users
- Public Water Supply
- Wastewater Treatment Plants
- Underground Mining



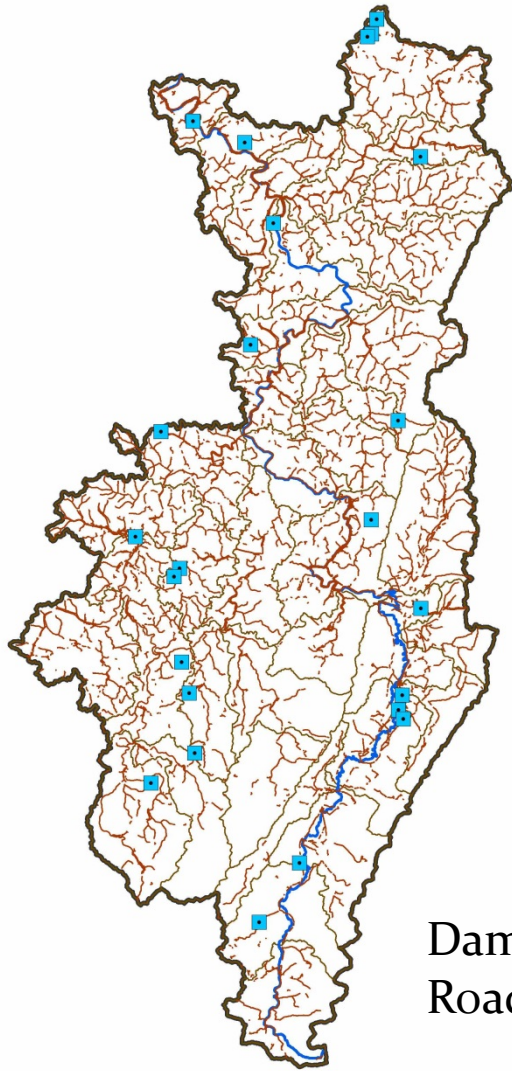
# Tygart Valley River Watershed Catchment Results

## Streams Water Quantity



Streams  
Water  
Quantity

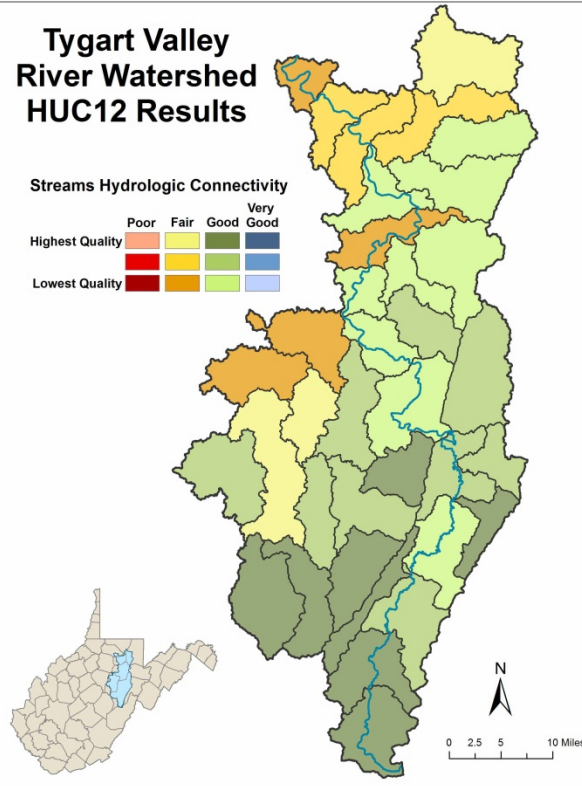




Dams  
Roads & Rail in riparian area

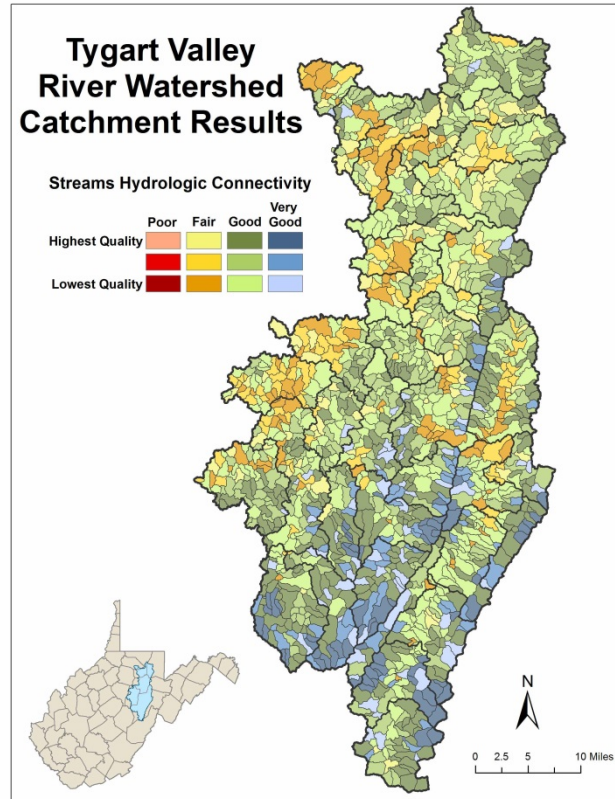
### Tygart Valley River Watershed HUC12 Results

#### Streams Hydrologic Connectivity



### Tygart Valley River Watershed Catchment Results

#### Streams Hydrologic Connectivity

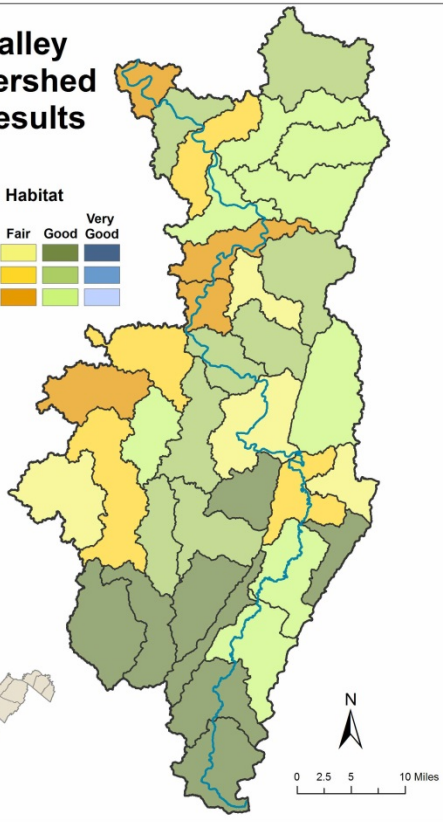


Streams  
Hydrologic  
Connectivity

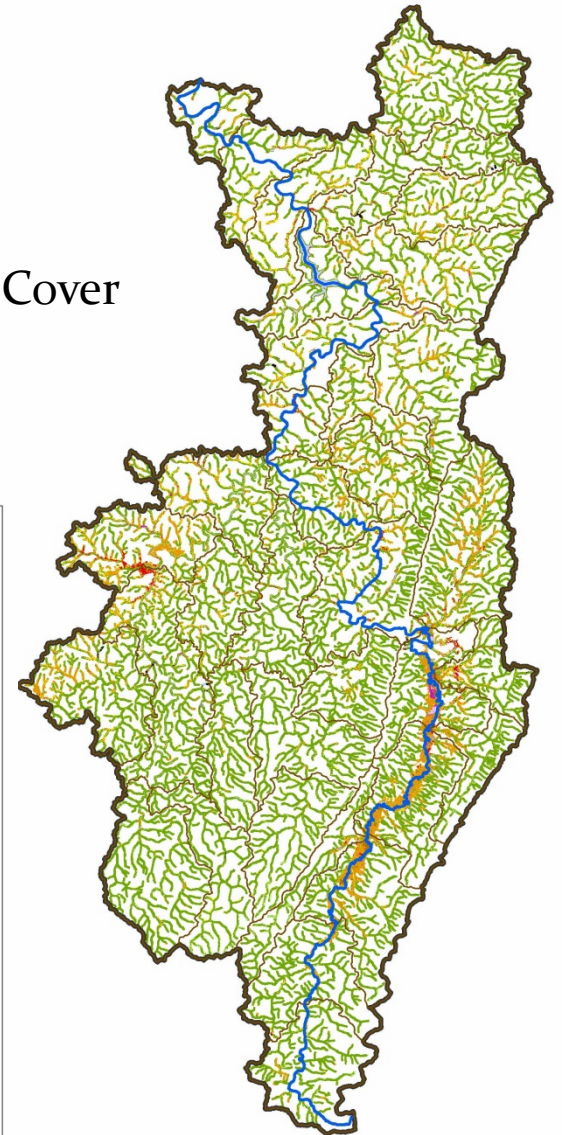


# Tygart Valley River Watershed HUC12 Results

## Streams Riparian Habitat

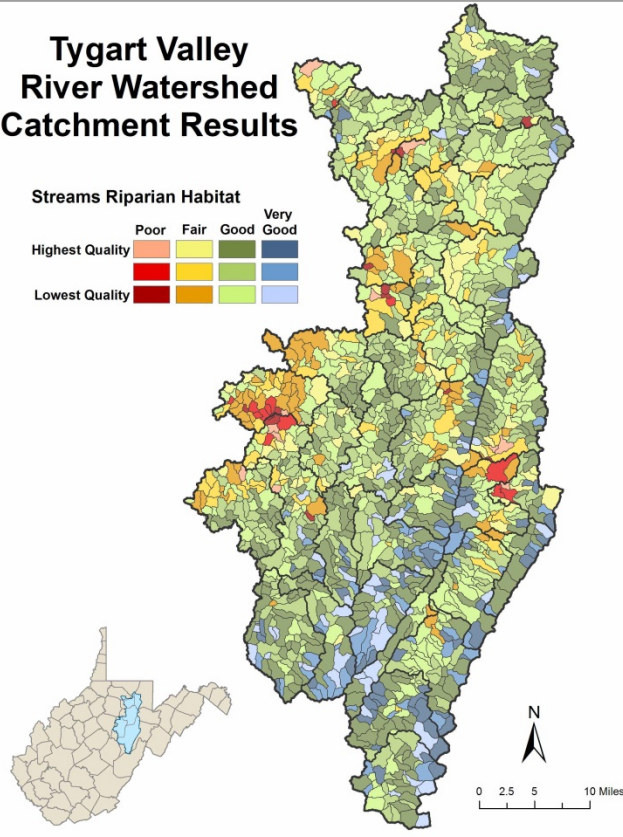


# Riparian Area Land Use/Land Cover



# Tygart Valley River Watershed Catchment Results

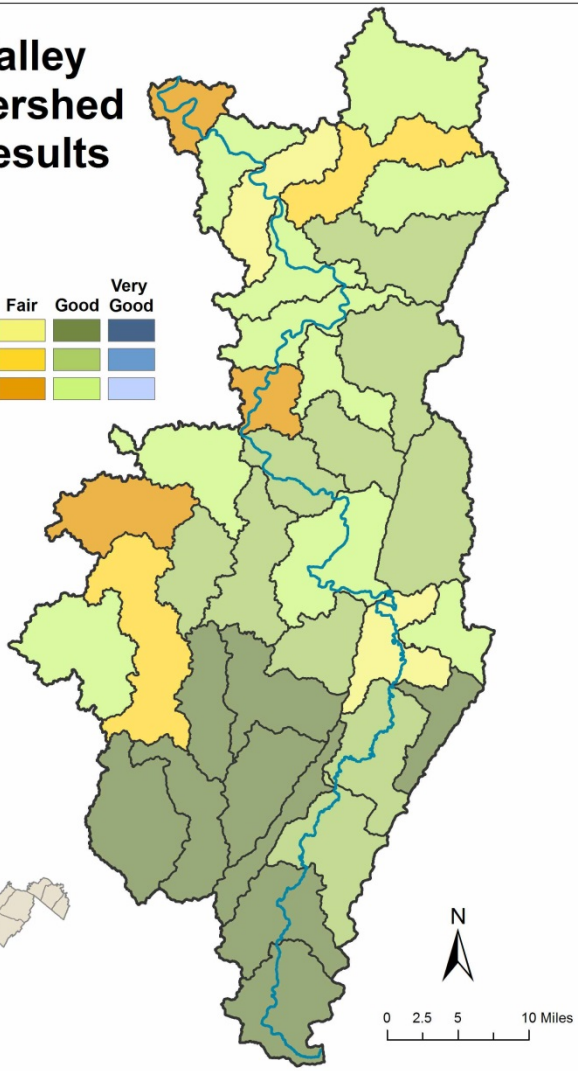
## Streams Riparian Habitat



Streams  
Riparian  
Habitat

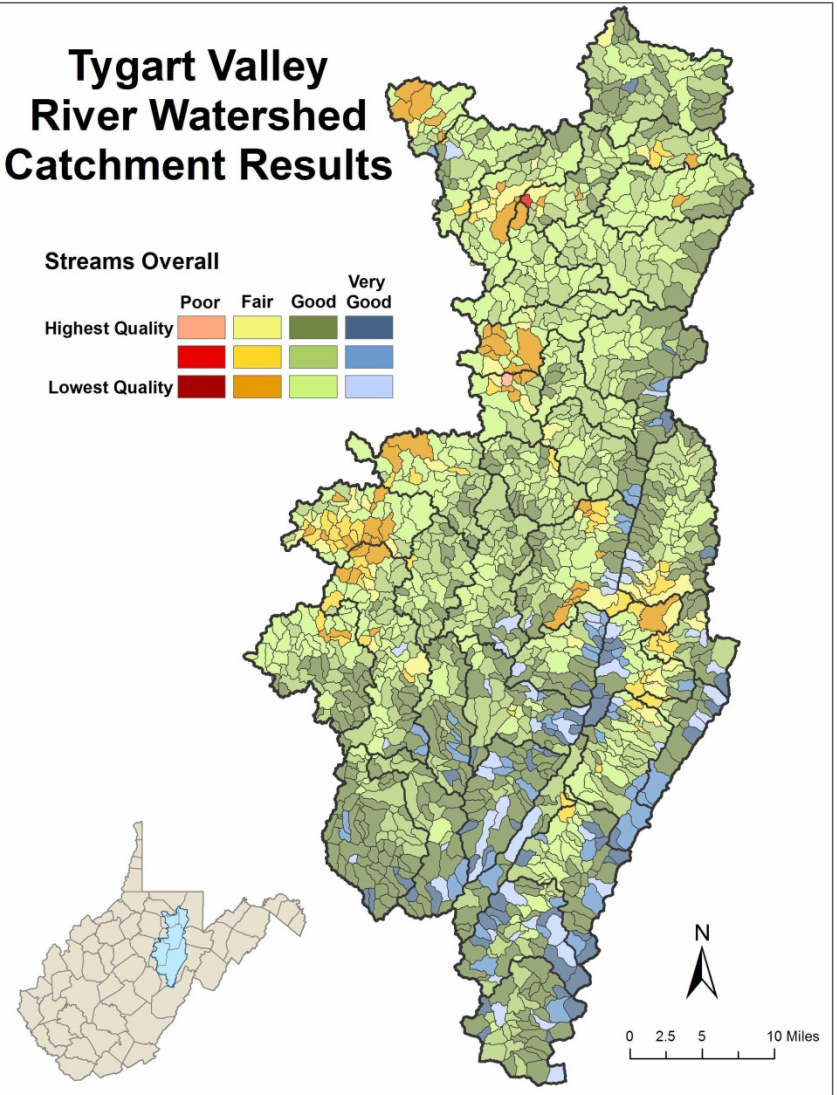
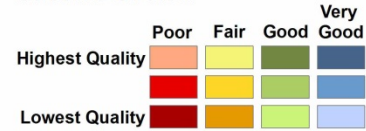
# Tygart Valley River Watershed HUC12 Results

## Streams Overall



# Tygart Valley River Watershed Catchment Results

## Streams Overall



Streams  
Model  
Overall

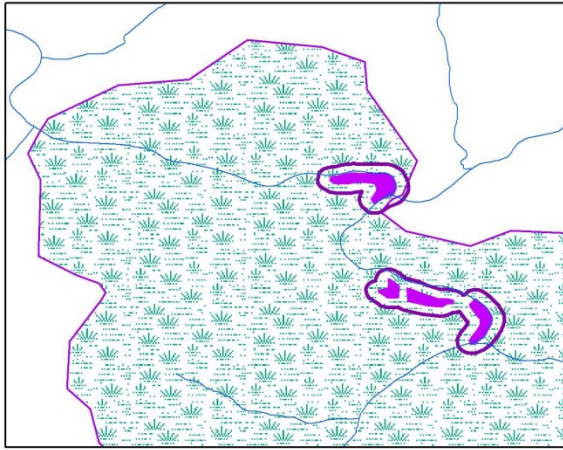


# Tygart Valley Watershed: Wetlands

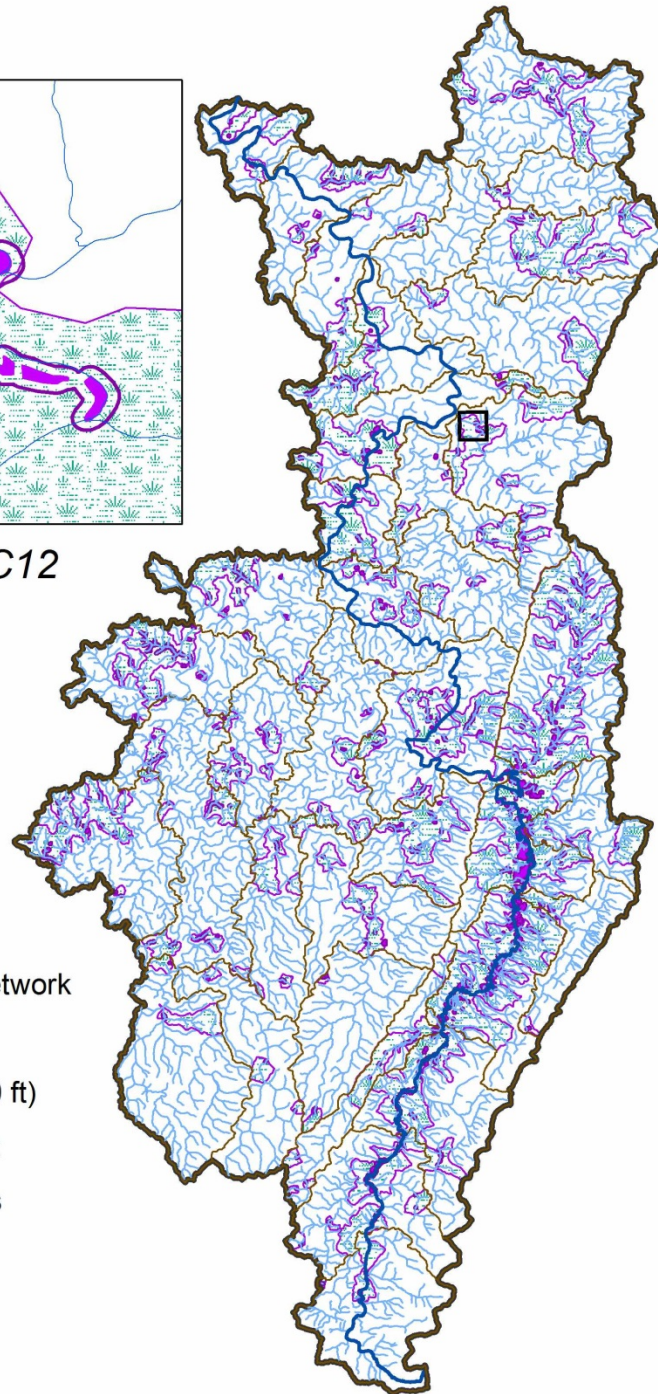


Philippi, WV © boonstoon.wordpress.com





*Teter Creek HUC12*

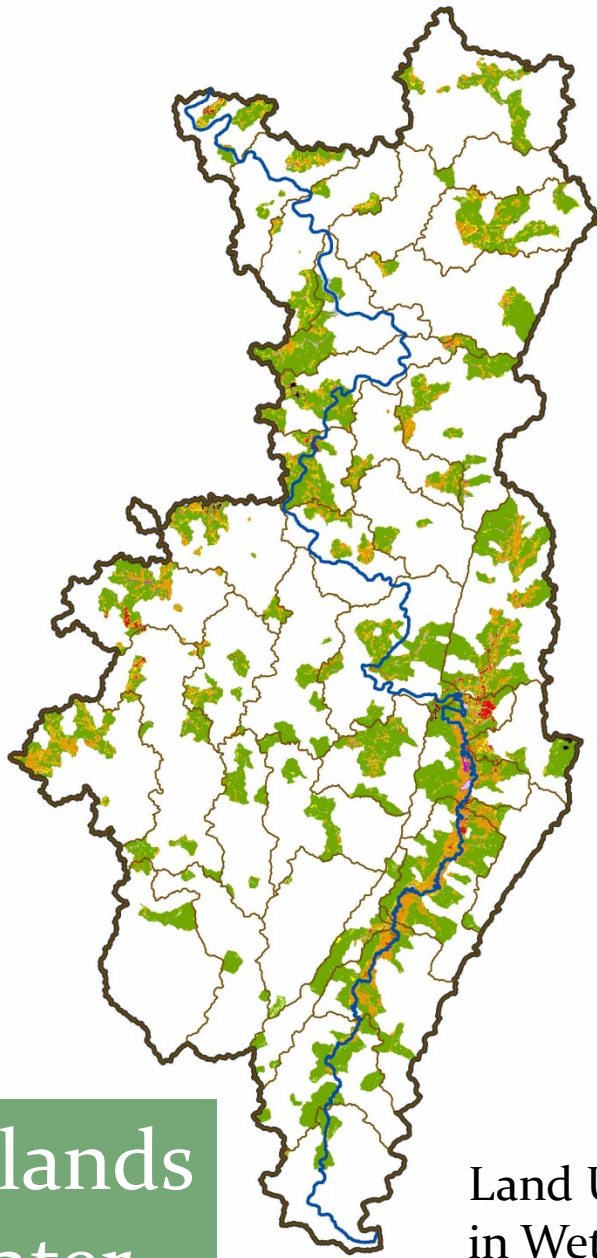
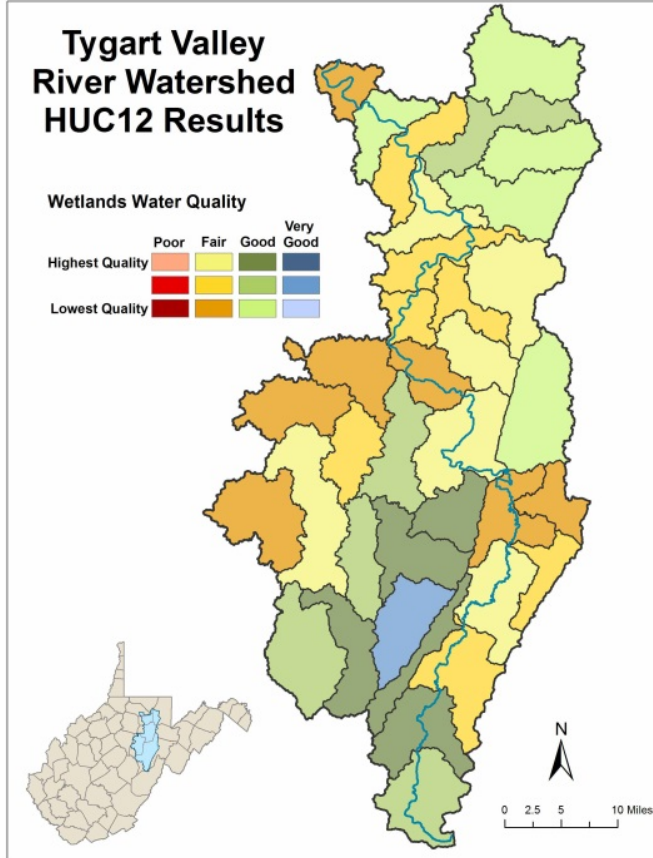


# Tygart Valley Watershed: Wetlands

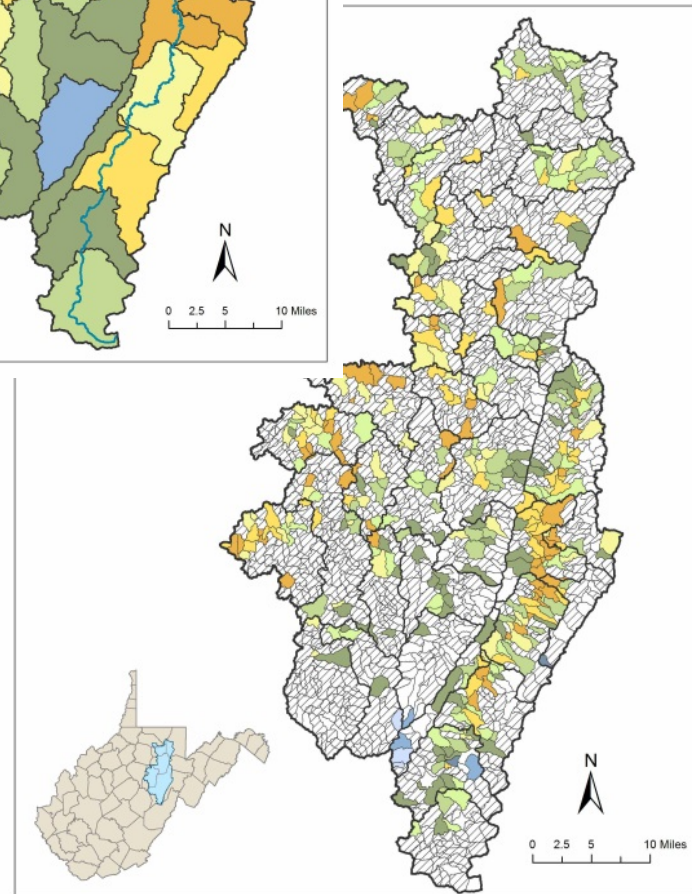
-  NHD24k Stream Network
-  NWI Wetlands
-  Wetland Buffer (150 ft)
-  Wetland Catchment
-  HUC12 Watersheds

# Tygart Valley River Watershed HUC12 Results

## Wetlands Water Quality



Land Use/Land Cover  
in Wetland Catchment

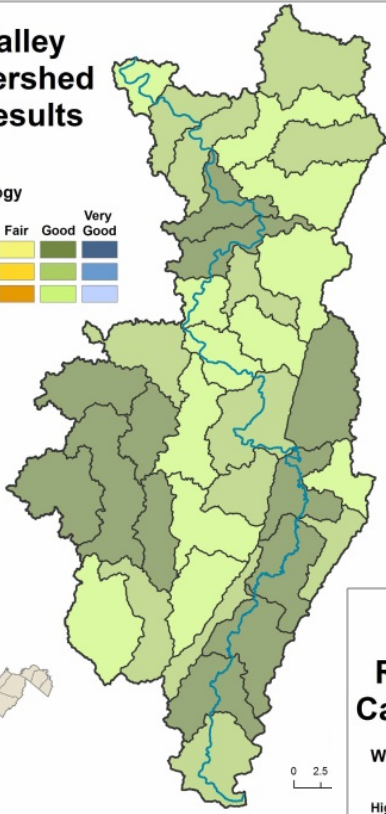


Wetlands  
Water  
Quality

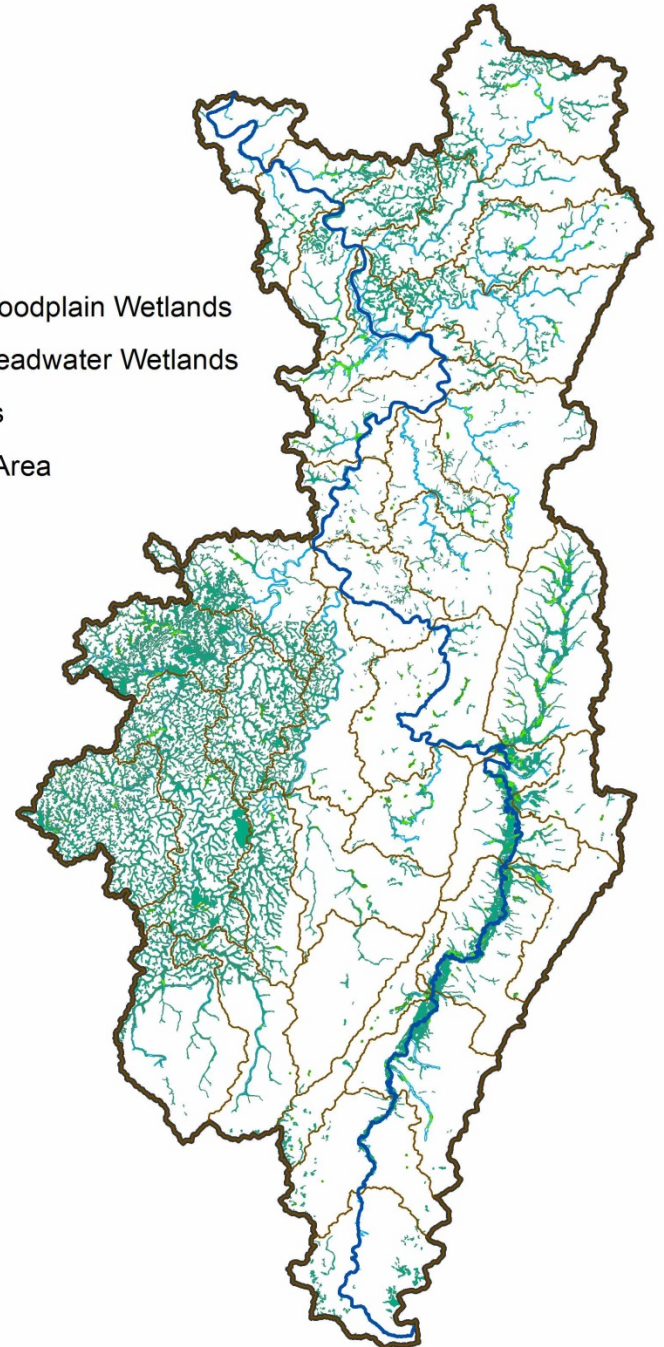


# Tygart Valley River Watershed HUC12 Results

## Wetlands Hydrology

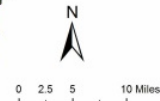
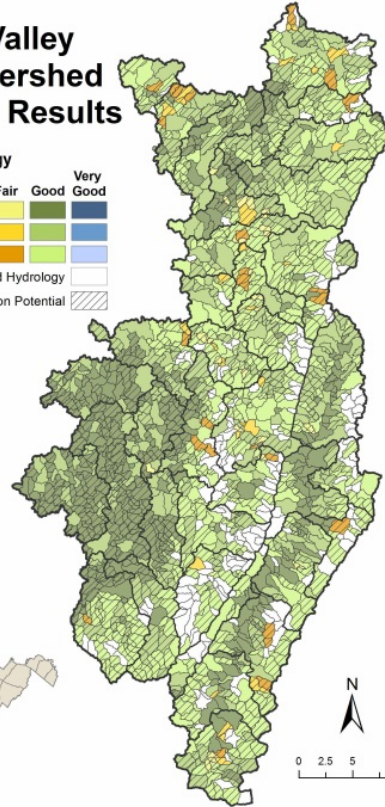


- Forested Floodplain Wetlands
- Forested Headwater Wetlands
- Hydric Soils
- Floodplain Area



# Tygart Valley River Watershed Catchment Results

## Wetlands Hydrology

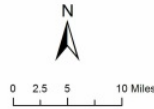
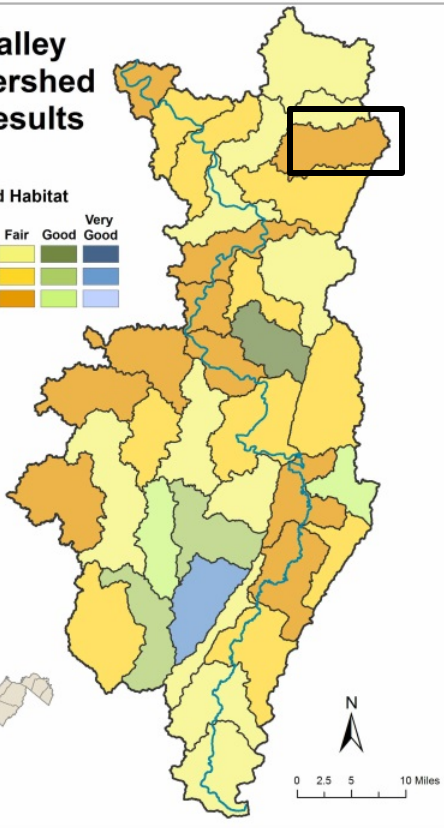


Wetlands Hydrology



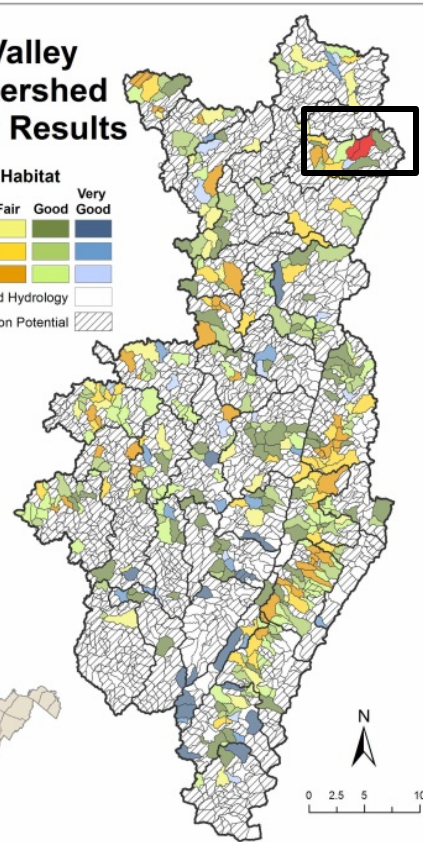
# Tygart Valley River Watershed HUC12 Results

## Wetlands Wetland Habitat

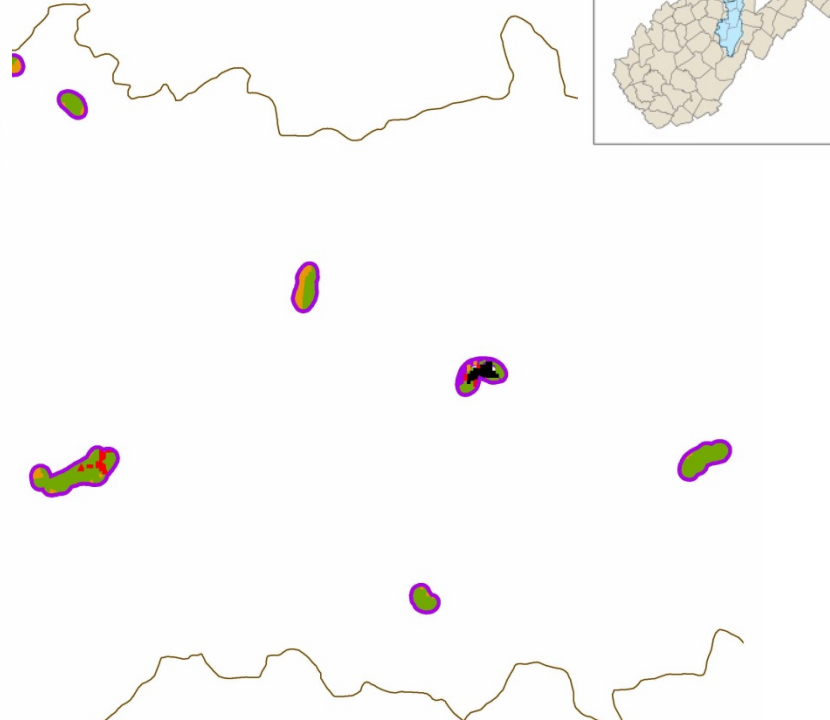


# Tygart Valley River Watershed Catchment Results

## Wetlands Wetland Habitat



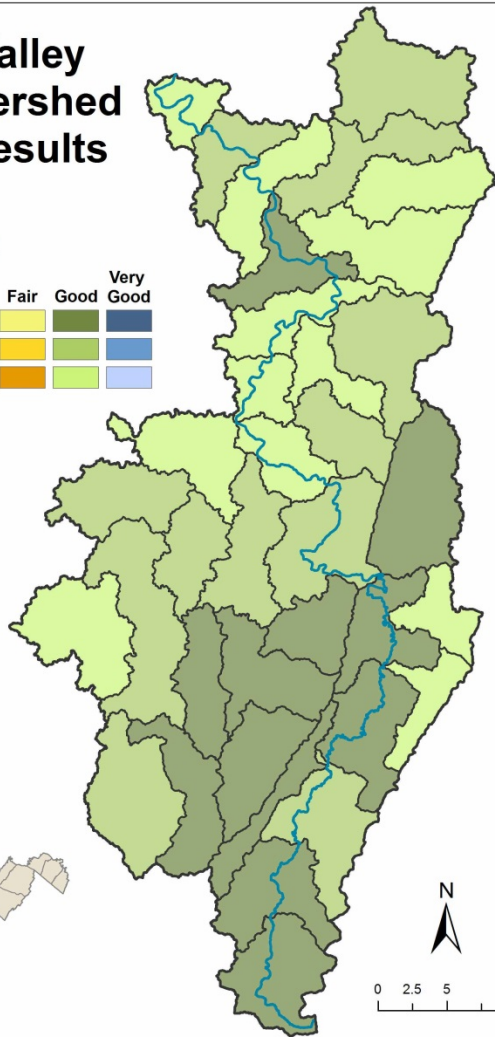
- Ag/Grazing in Wetland Buffer
- Development in Wetland Buffer
- Active Mining in Wetland Buffer
- Natural Cover in Wetland Buffer
- Wetland Buffer



Wetlands  
Wetland  
Habitat

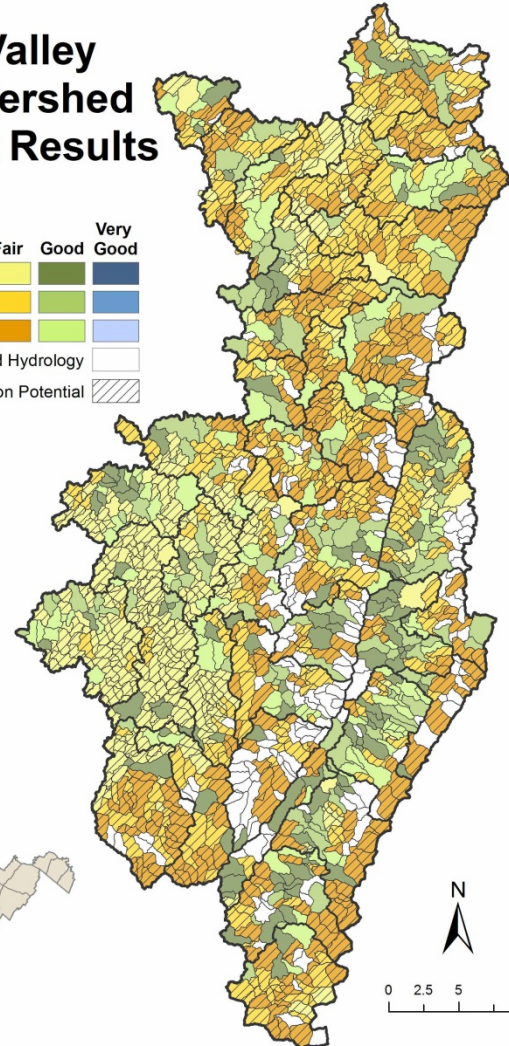
# Tygart Valley River Watershed HUC12 Results

## Wetlands Overall



# Tygart Valley River Watershed Catchment Results

## Wetlands Overall



Wetlands  
Model  
Overall

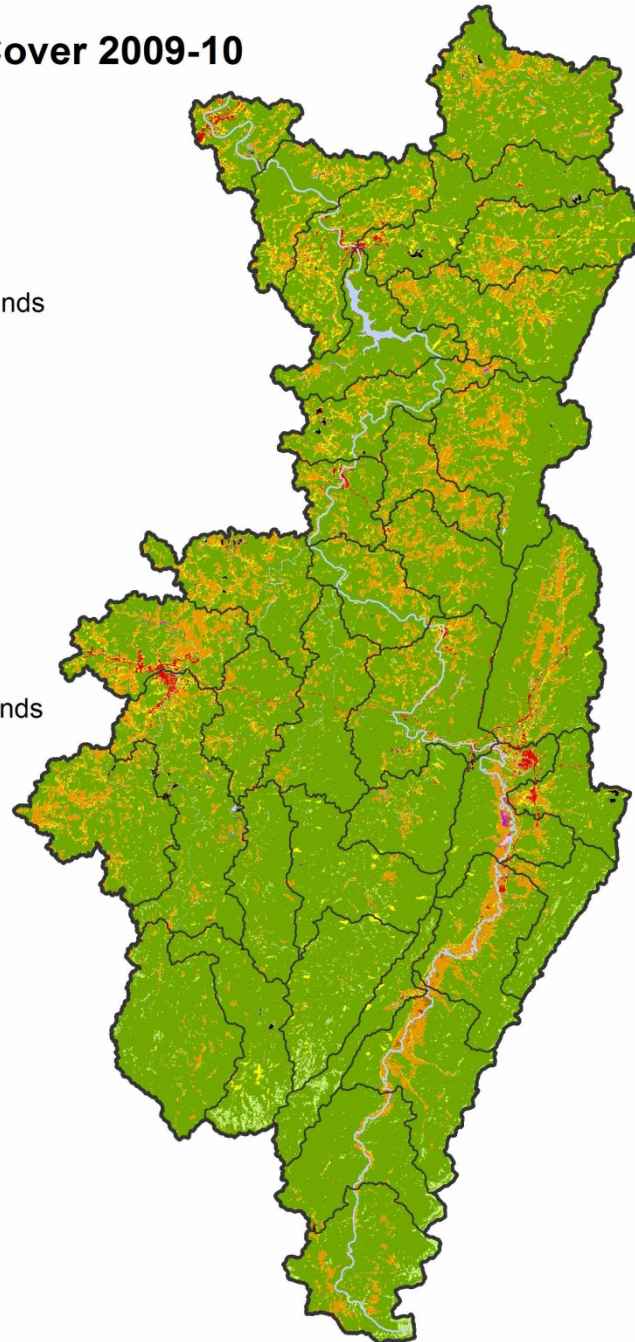
# Tygart Valley Watershed: Uplands



Photo by Mark William Branciaroli

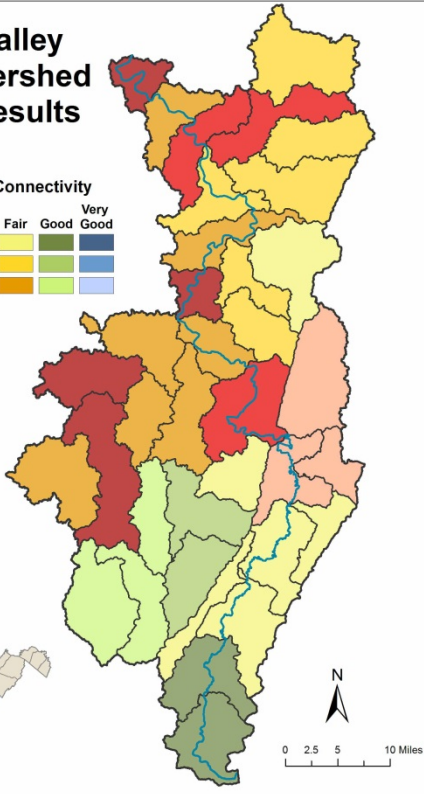


## Land Use/Land Cover 2009-10 (WVU-NRAC)

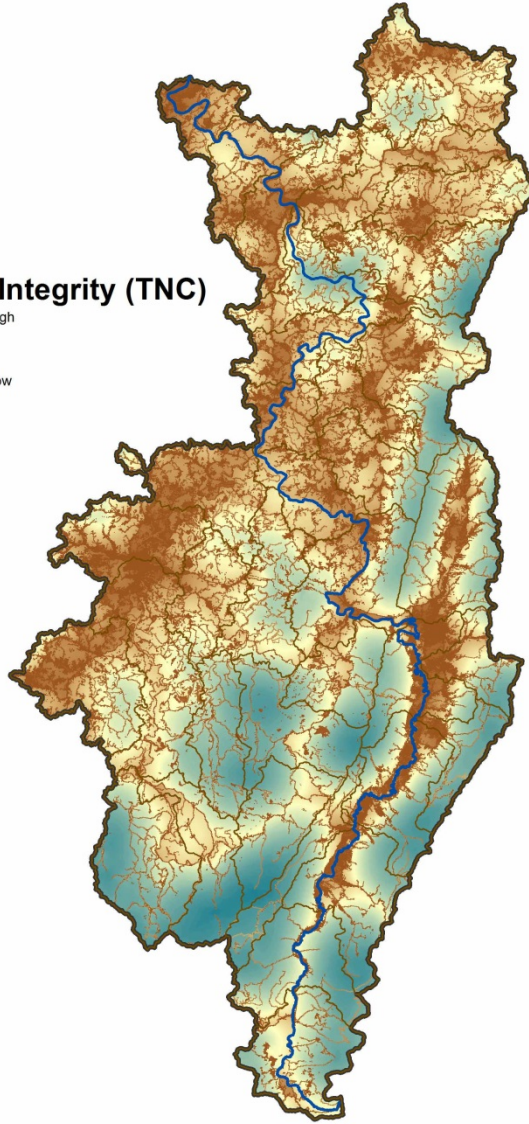
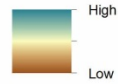


# Tygart Valley River Watershed HUC12 Results

## Uplands Habitat Connectivity

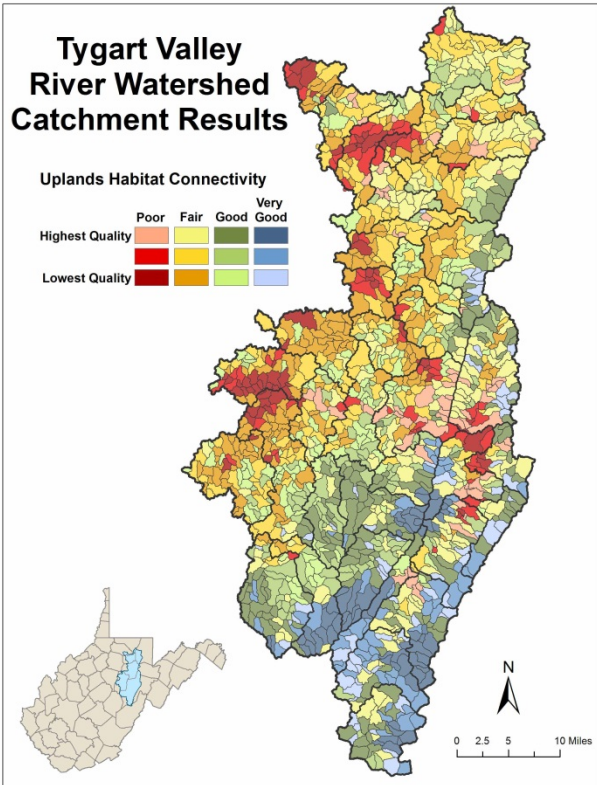


## Local Integrity (TNC)



# Tygart Valley River Watershed Catchment Results

## Uplands Habitat Connectivity

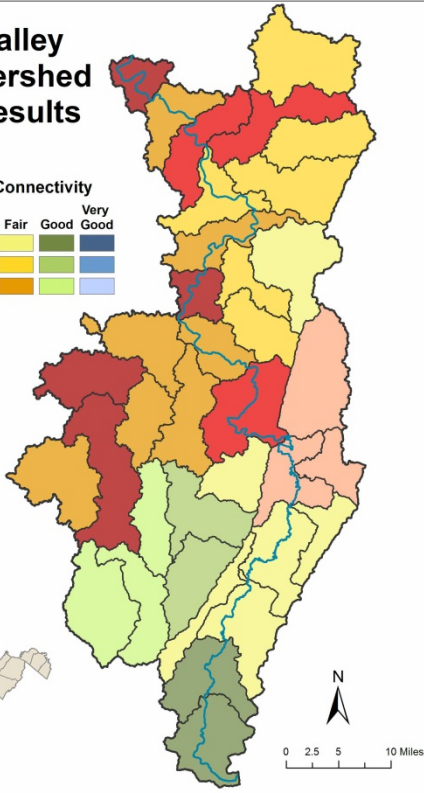


Uplands  
Habitat  
Connectivity



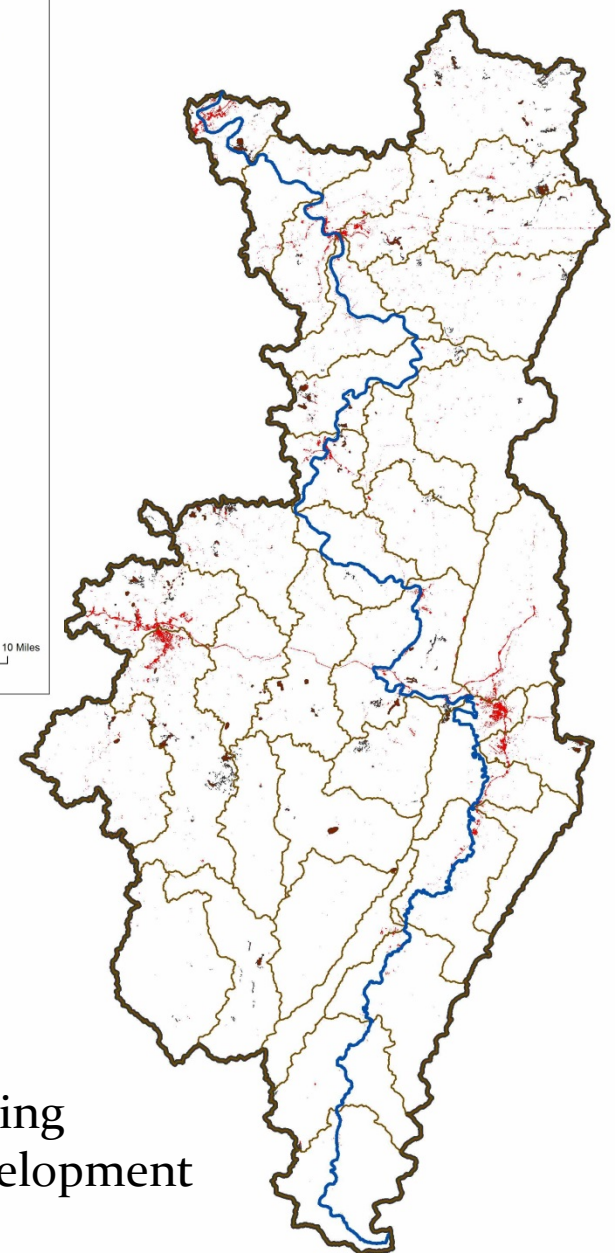
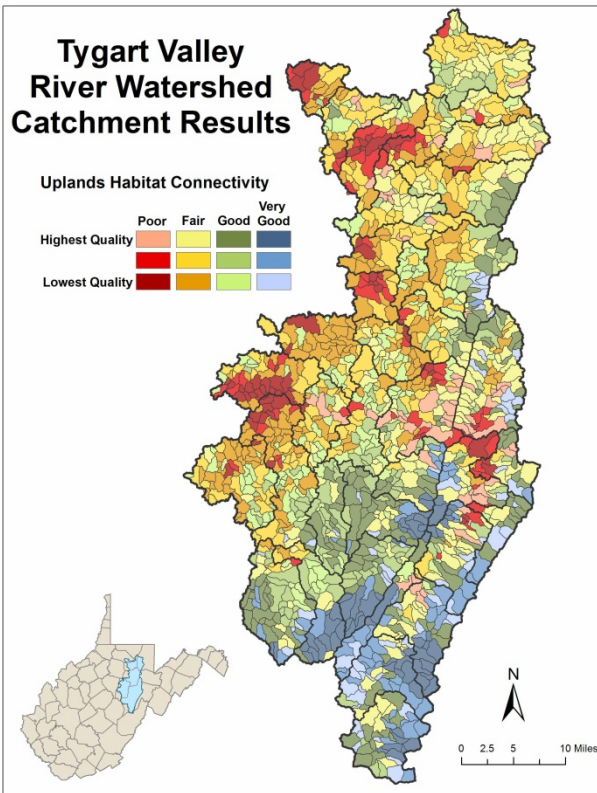
# Tygart Valley River Watershed HUC12 Results

## Uplands Habitat Connectivity



# Tygart Valley River Watershed Catchment Results

## Uplands Habitat Connectivity

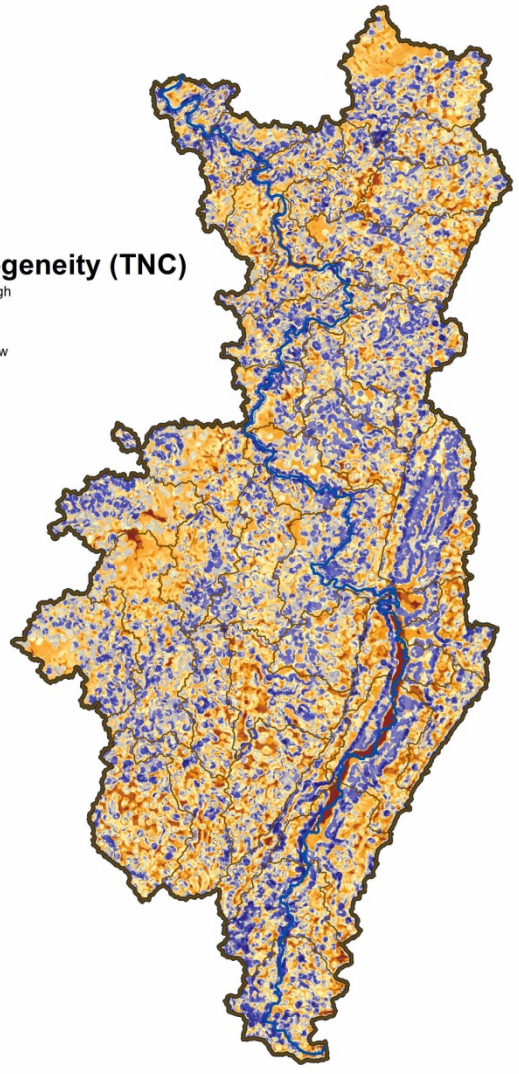
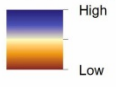


Uplands  
Habitat  
Connectivity

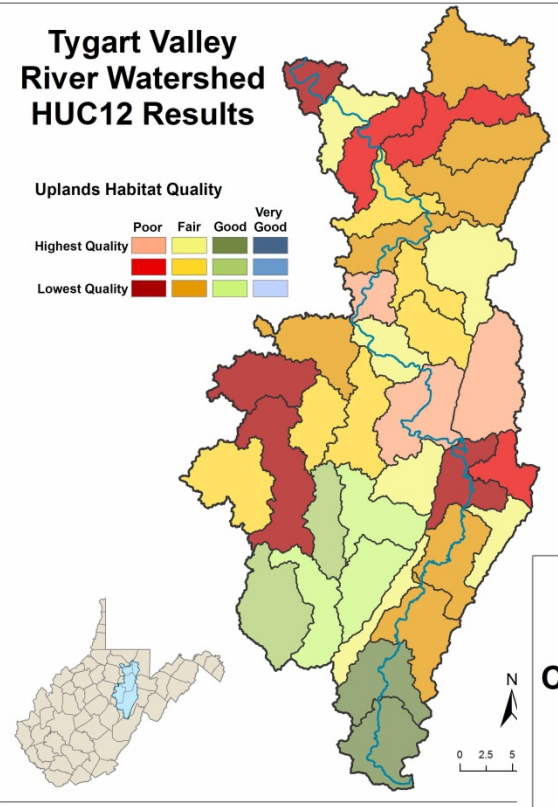
Mining  
Development



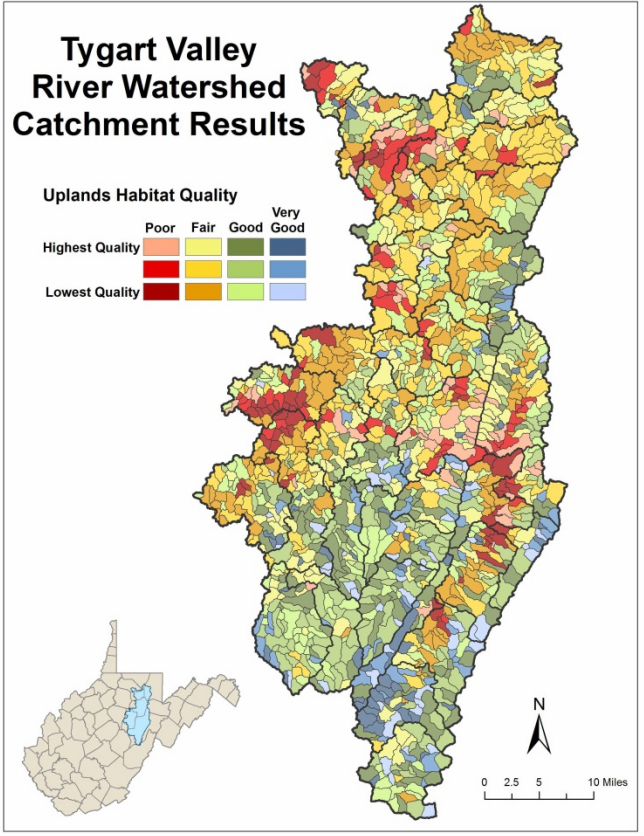
### Heterogeneity (TNC)



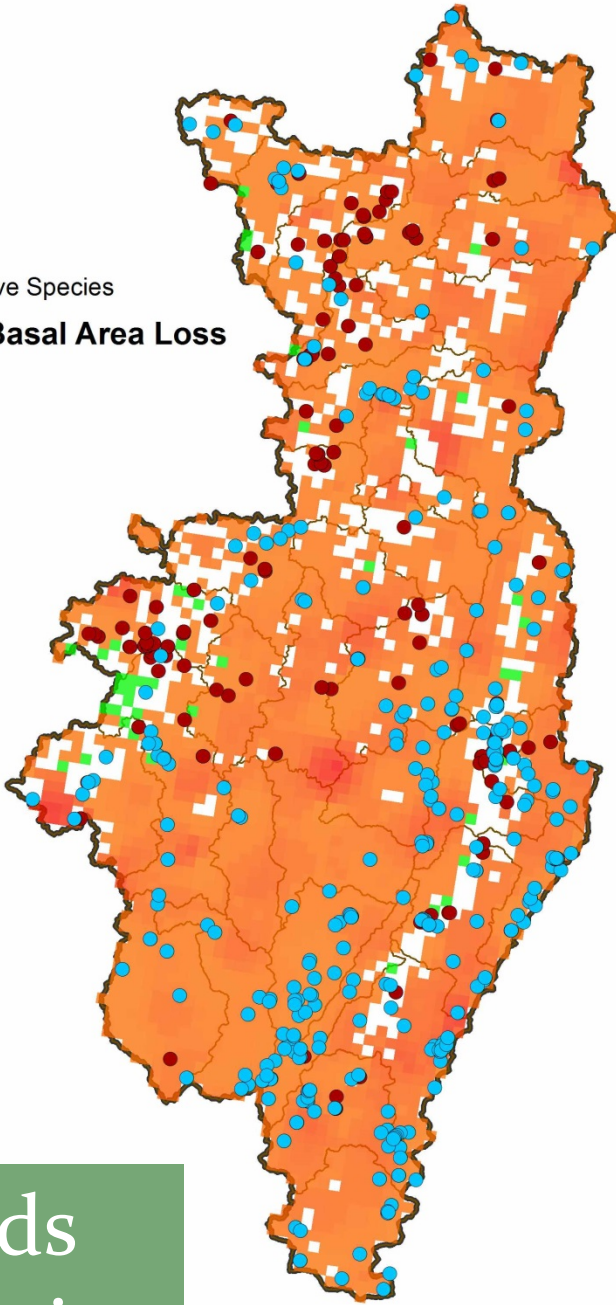
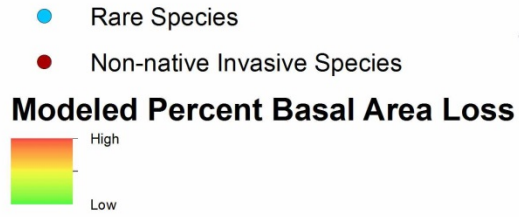
### Tygart Valley River Watershed HUC12 Results



### Tygart Valley River Watershed Catchment Results

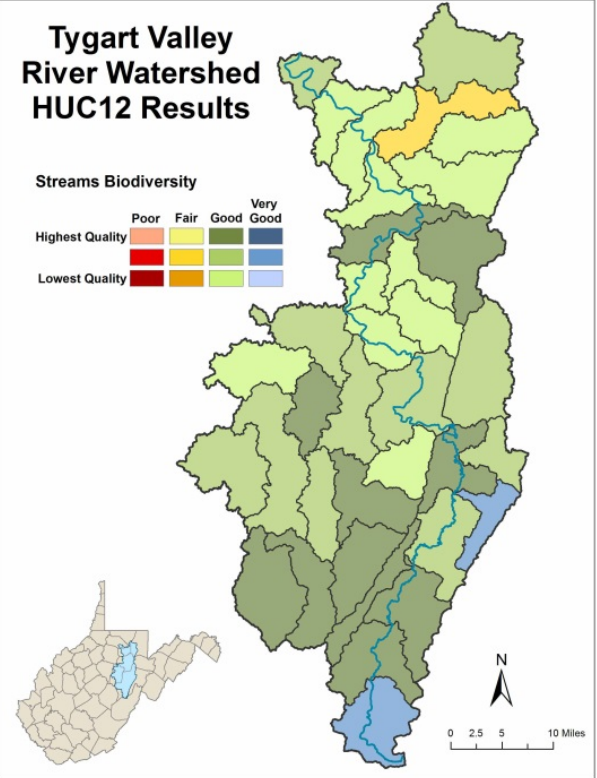


Uplands  
Habitat  
Quality

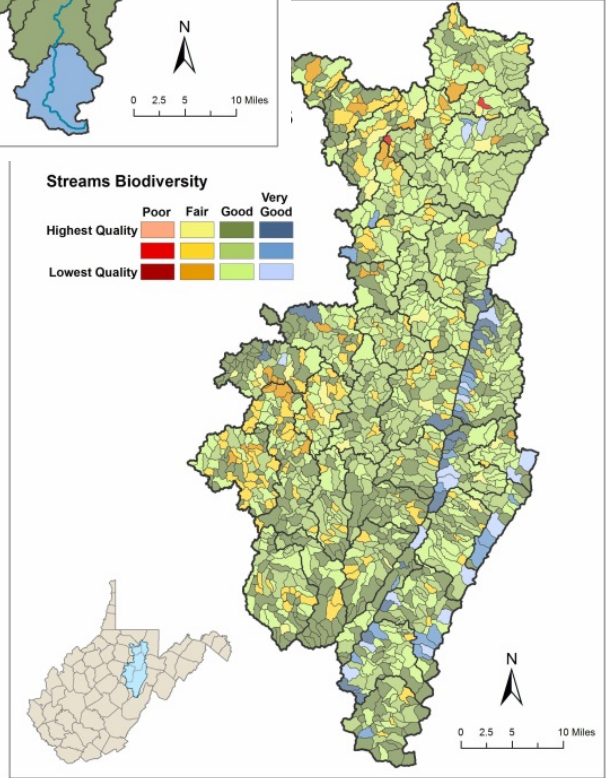


**Tygart Valley River Watershed HUC12 Results**

**Streams Biodiversity**



**Streams Biodiversity**

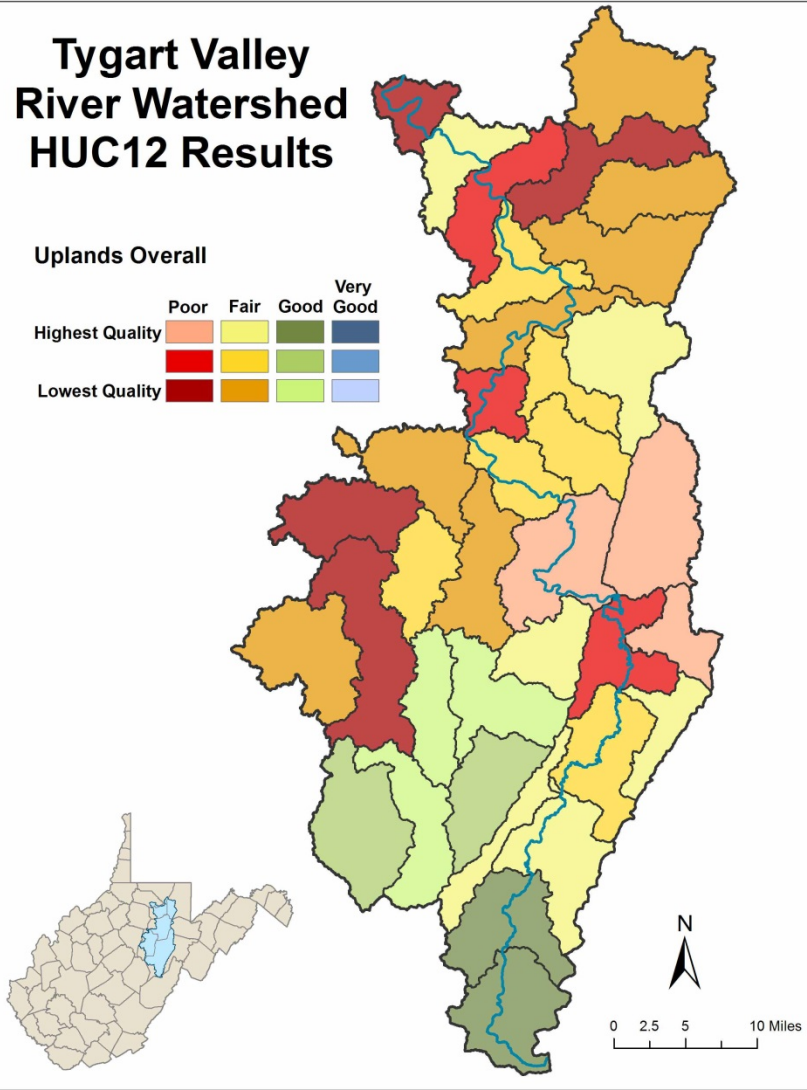
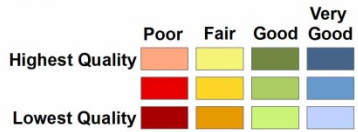


Uplands Biodiversity



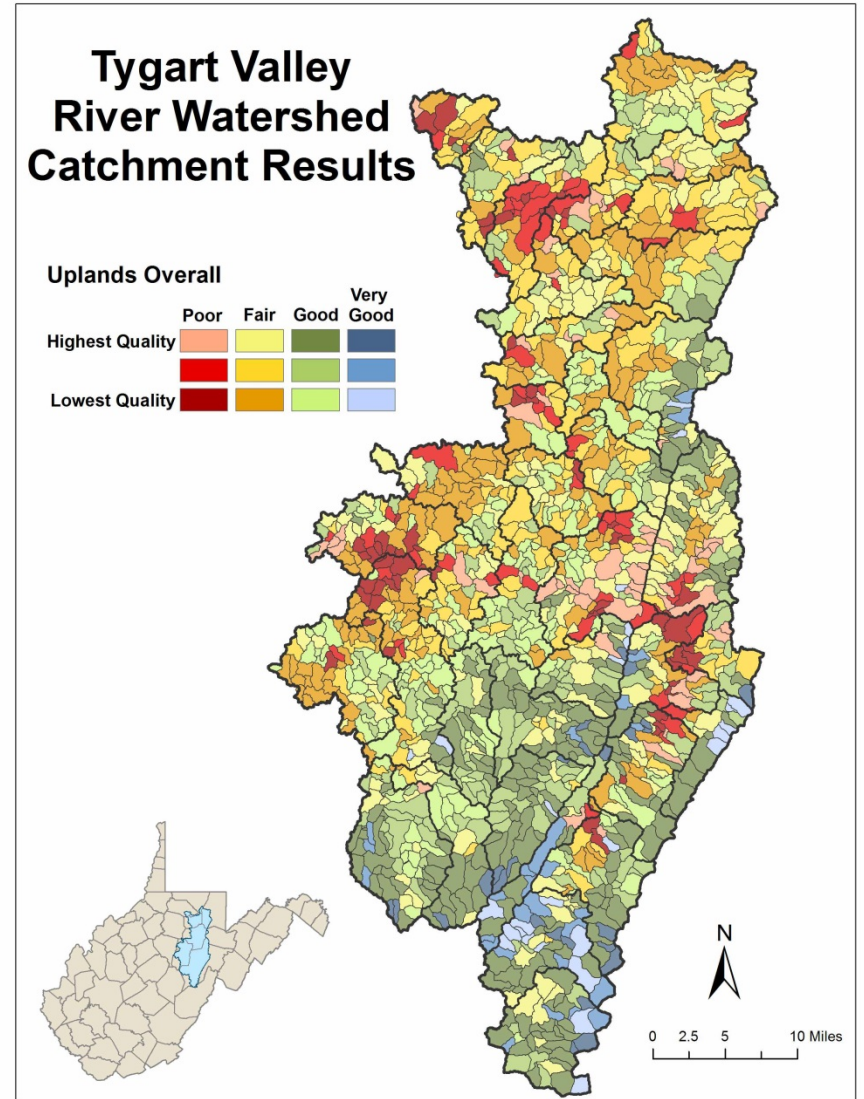
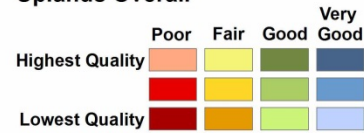
# Tygart Valley River Watershed HUC12 Results

## Uplands Overall



# Tygart Valley River Watershed Catchment Results

## Uplands Overall



Uplands  
Model  
Overall



COMMENTS/QUESTIONS?



# Tygart Valley Watershed: Consolidated Analysis



**Energy:**

Unmined coal

Marcellus shale thickness

Wind development potential

Proposed transmission lines

Geothermal development potential

**Population/Development:**

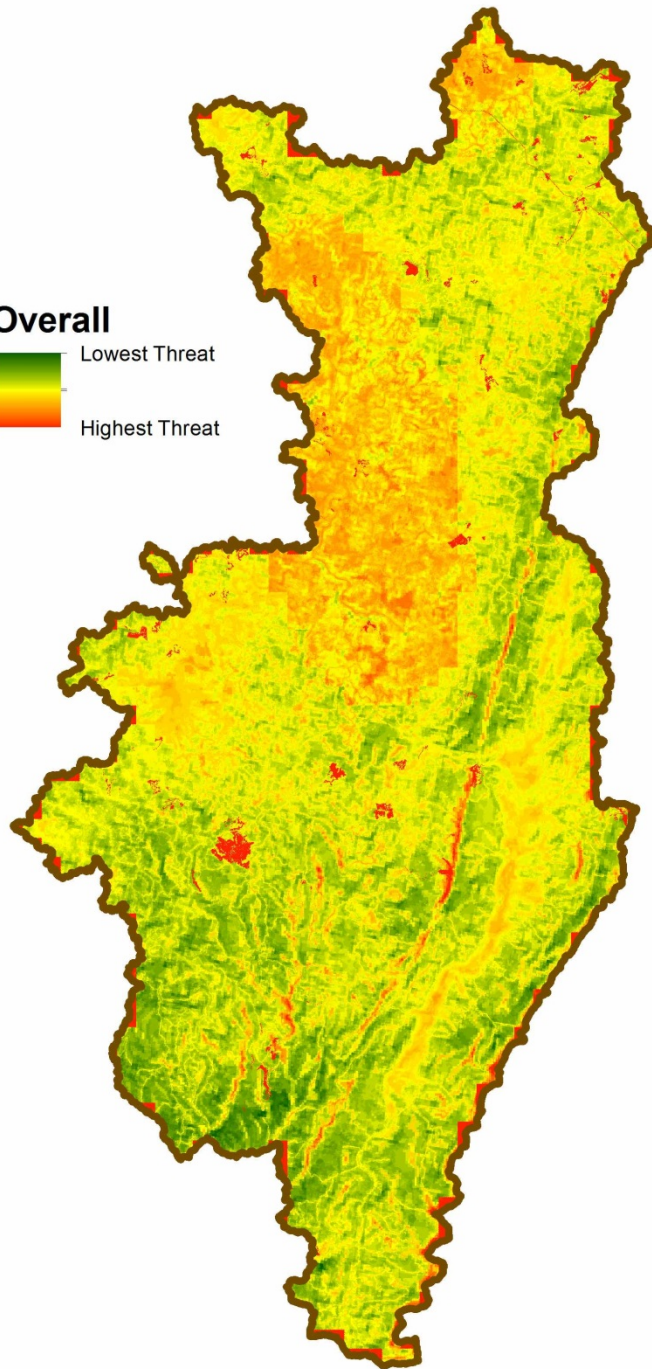
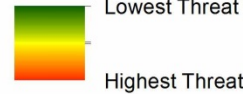
Population projections

**Climate Change:**

TNC Resiliency model

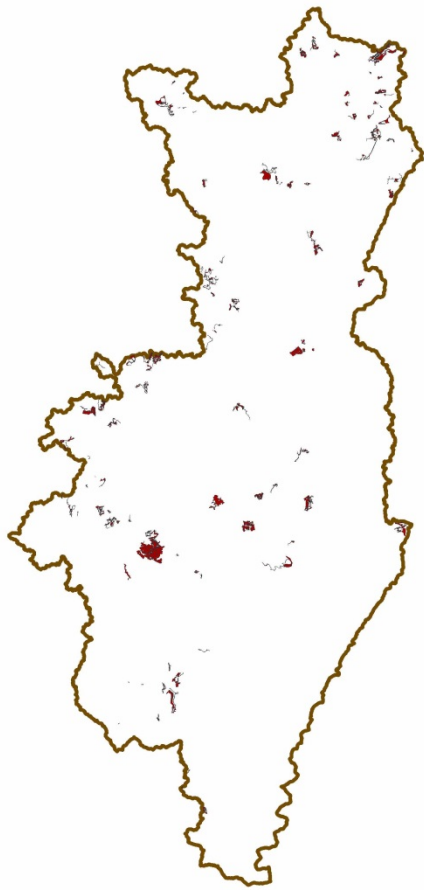
TNC Regional flow model

**Overall**

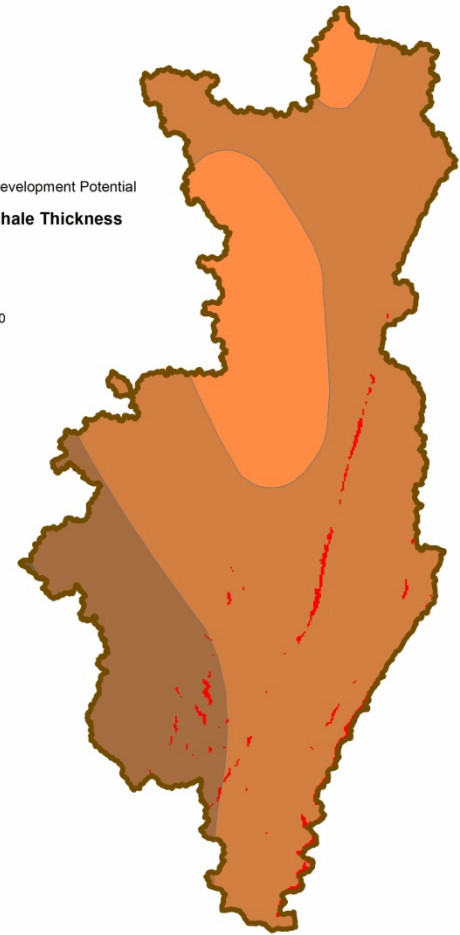
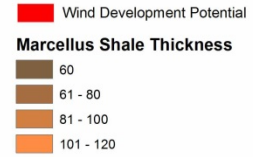
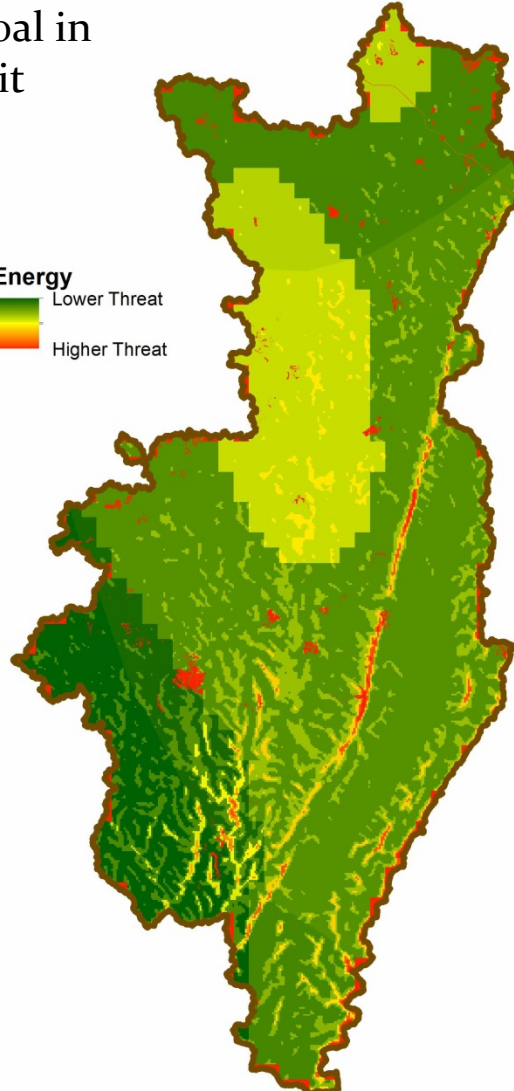
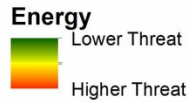


Consolidated  
Analysis  
Overall



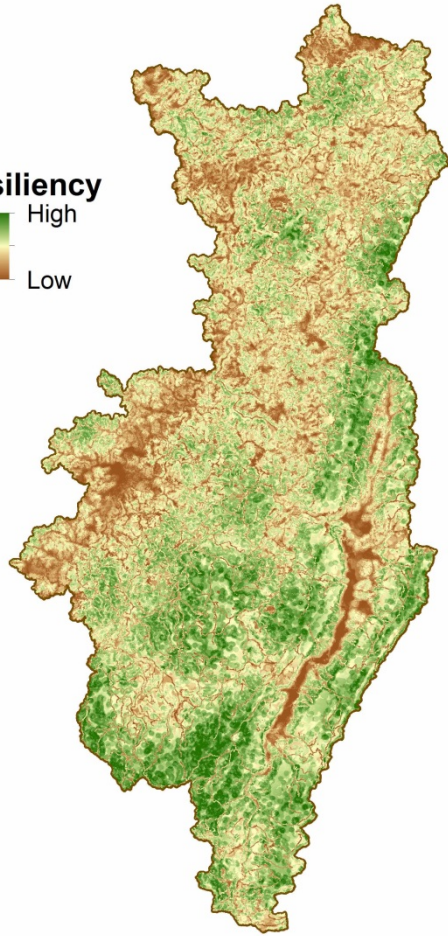
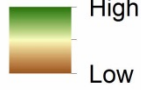


Unmined Coal in  
Active Permit  
Boundary

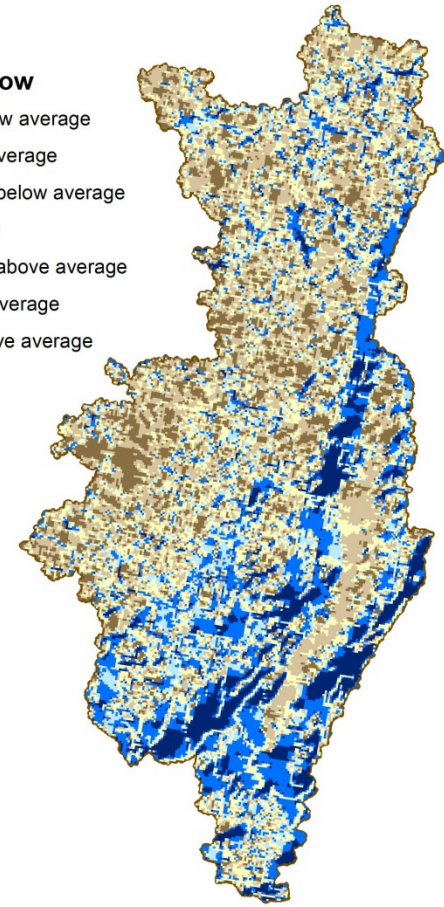
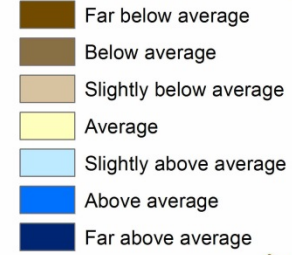


Consolidated  
Analysis  
Energy

**Resiliency**



**Regional Flow**

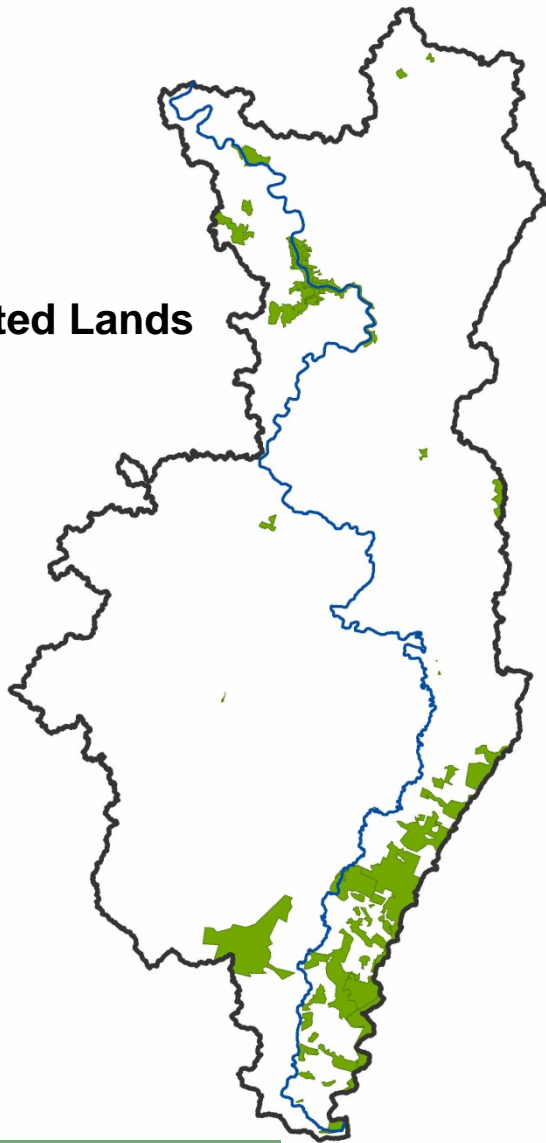


Consolidated  
Analysis  
Climate Change

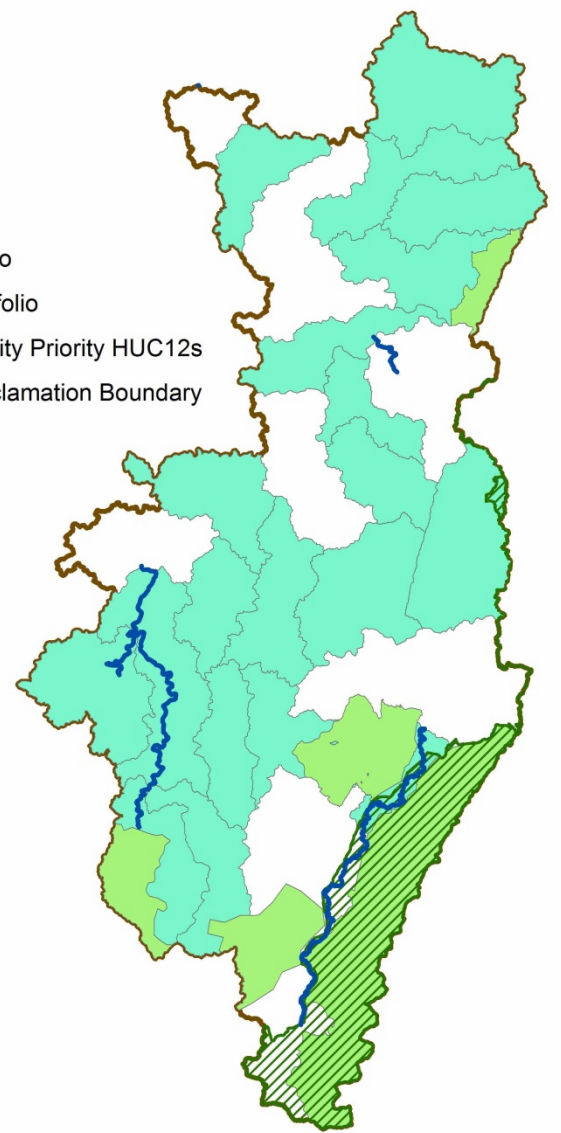
**Tygart Valley  
Climate Change Results**



## Protected Lands



- TNC Aquatic Portfolio
- TNC Terrestrial Portfolio
- WDOF Water Quality Priority HUC12s
- National Forest Proclamation Boundary



Consolidated  
Analysis  
Opportunities

# Web Map Tool Demo



Valley Falls SP ©vanslider



# Web Map Base Layers

1. Aerial imagery
2. Hydrography
3. Political boundaries/street maps
4. Topographic maps
5. Elevation/Shaded relief

# West Virginia Watershed Assessment Pilot Project

Change Transparency Change Basemap

## Table of Contents - Hide

- Results
- Supporting Data
- ▶ Elk Results
- ▶ Monongahela Results

### West Virginia Watershed Assessment Pilot Project

Welcome to the West Virginia Watershed Assessment Pilot Project (WWWAPP) interactive web map, designed to help decision-makers and stakeholders prioritize watershed areas for protection and restoration activities.

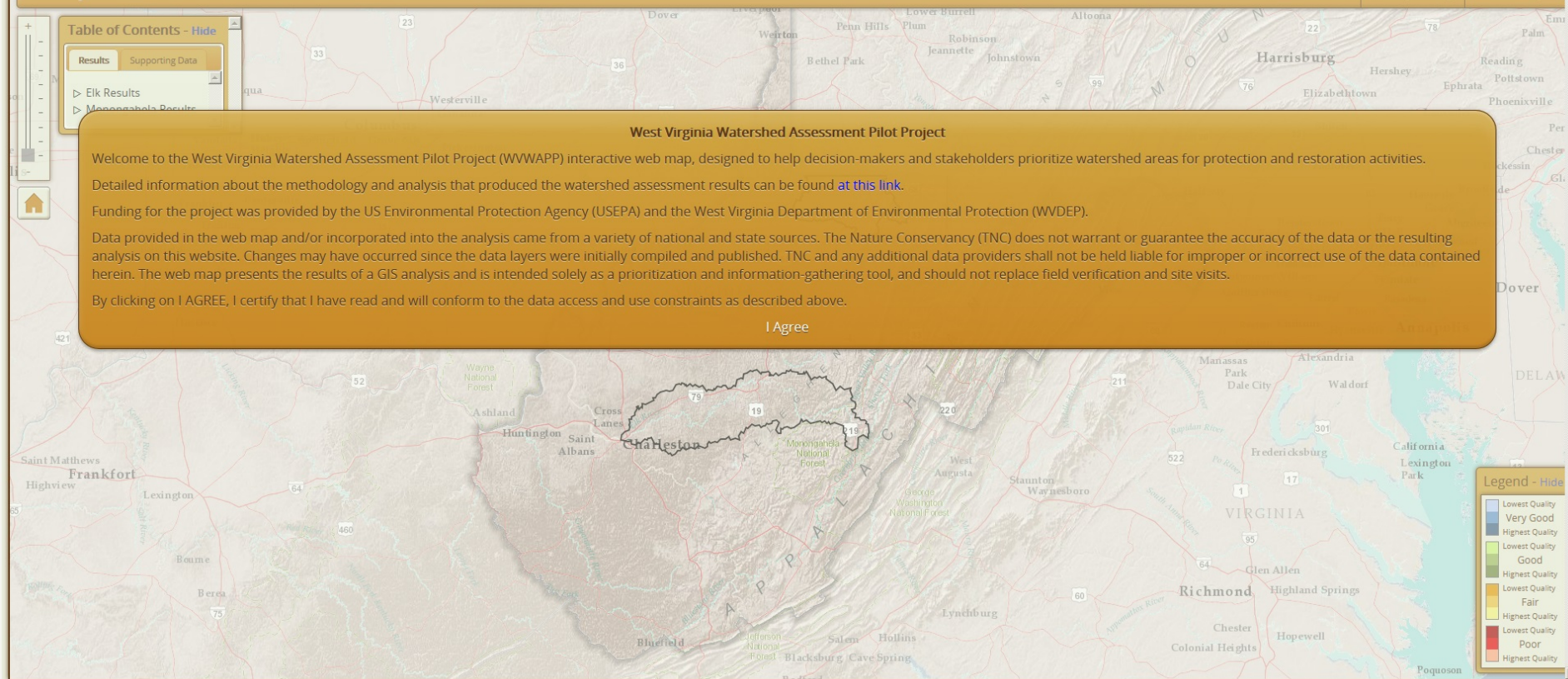
Detailed information about the methodology and analysis that produced the watershed assessment results can be found [at this link](#).

Funding for the project was provided by the US Environmental Protection Agency (USEPA) and the West Virginia Department of Environmental Protection (WVDEP).

Data provided in the web map and/or incorporated into the analysis came from a variety of national and state sources. The Nature Conservancy (TNC) does not warrant or guarantee the accuracy of the data or the resulting analysis on this website. Changes may have occurred since the data layers were initially compiled and published. TNC and any additional data providers shall not be held liable for improper or incorrect use of the data contained herein. The web map presents the results of a GIS analysis and is intended solely as a prioritization and information-gathering tool, and should not replace field verification and site visits.

By clicking on I AGREE, I certify that I have read and will conform to the data access and use constraints as described above.

I Agree



**Legend - Hide**

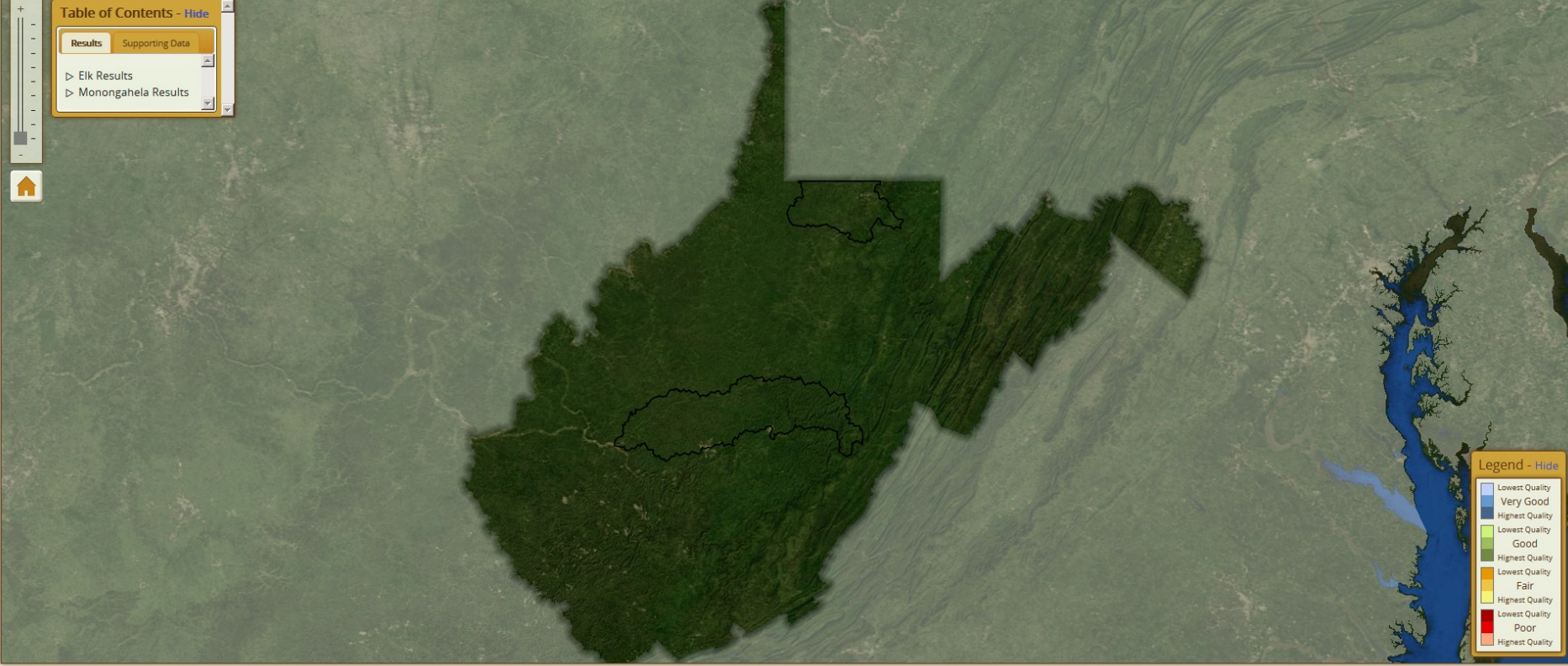
- Very Good (Blue)
- Highest Quality (Dark Blue)
- Lowest Quality (Light Green)
- Good (Green)
- Highest Quality (Dark Green)
- Fair (Yellow)
- Lowest Quality (Light Yellow)
- Poor (Red)
- Highest Quality (Dark Red)



Change Transparency Change Basemap

Table of Contents - Hide

Results	Supporting Data
▶ Elk Results	
▶ Monongahela Results	



Legend - Hide

Lowest Quality	Very Good
Highest Quality	Highest Quality
Lowest Quality	Good
Highest Quality	Good
Lowest Quality	Fair
Highest Quality	Fair
Lowest Quality	Poor
Highest Quality	Poor

Map navigation controls: a vertical zoom slider with '+' and '-' buttons, a home button (house icon), and a full-screen button (square icon).



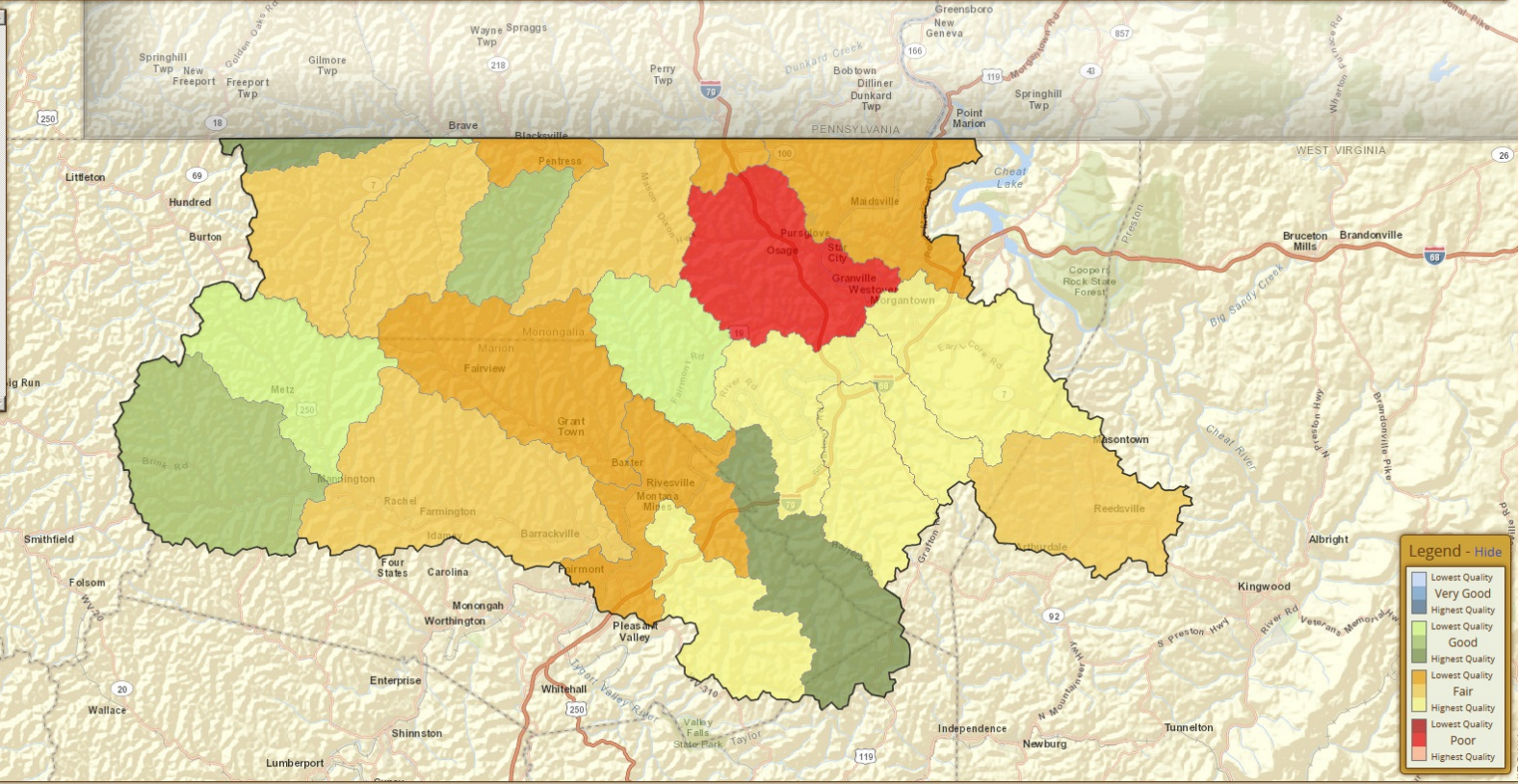
# West Virginia Watershed Assessment Pilot Project

Change Transparency Change Basemap

**Table of Contents - Hide**

Results Supporting Data

- ▶ Elk Results
- ▼ Monongahela Results
  - ▼ HUC12 Level
    - ▶ HUC12s
    - ▼ Streams
      - ▶ Overall
      - ▶ Water Quality
      - ▶ Water Quantity
      - ▶ Hydrologic Connectivity
      - ▶ Biodiversity
      - Riparian Habitat
        - [Zoom](#)
    - ▶ Wetlands
    - ▶ Uplands
    - ▶ Catchment Level





# West Virginia Watershed Assessment Pilot Project

Change Transparency Change Basemap

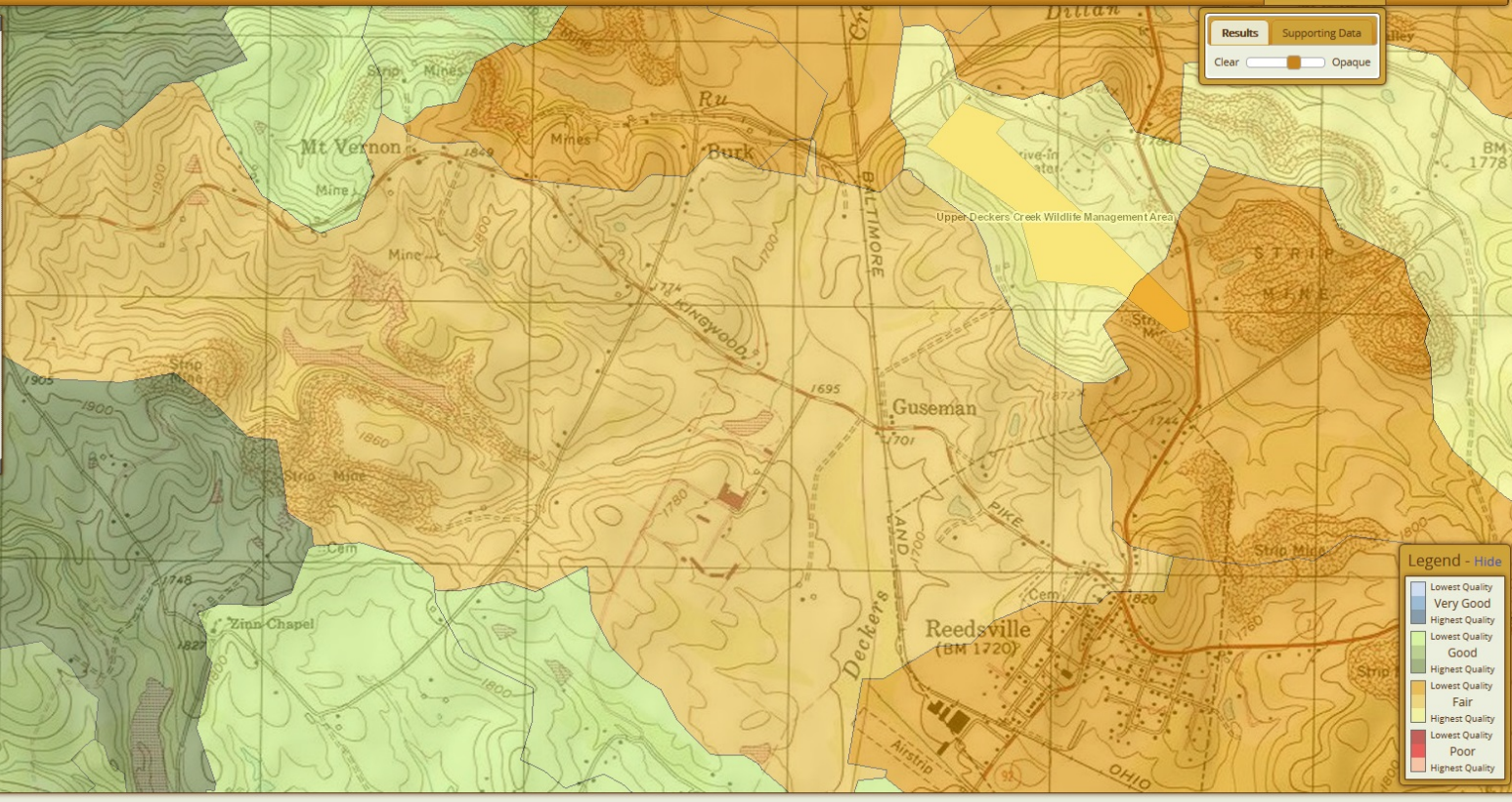


**Table of Contents - Hide**

Results Supporting Data

- Mining Data
- Project Data
- Protected Lands
  - National Wilderness Area
  - National Forest
  - National River
  - National Recreation Area
  - National Park Service Land
  - National Wildlife Refuge
  - Other Federal Land
  - State Park
  - State Forest
  - Wildlife Management Area
  - Nature Preserve - TNC
  - Nature Preserve
  - Easement - TNC
  - Easement
  - County Park

Zoom



**Results** Supporting Data

Clear   Opaque

**Legend - Hide**

- Lowest Quality
- Very Good
- Highest Quality
- Lowest Quality
- Good
- Highest Quality
- Lowest Quality
- Fair
- Highest Quality
- Lowest Quality
- Poor
- Highest Quality

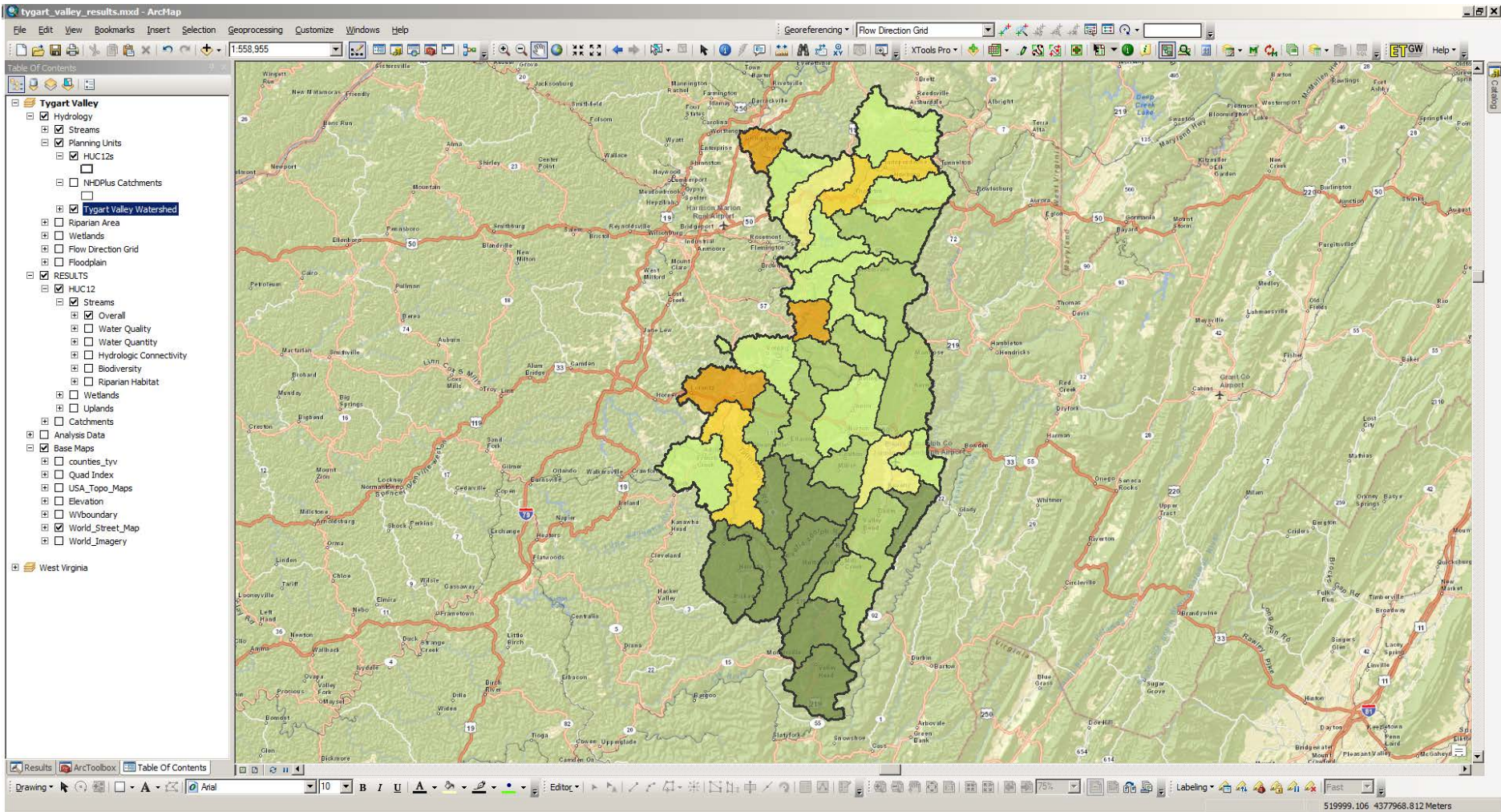
# Potential Use Scenario

## Tygart Valley River Watershed Streams Protection



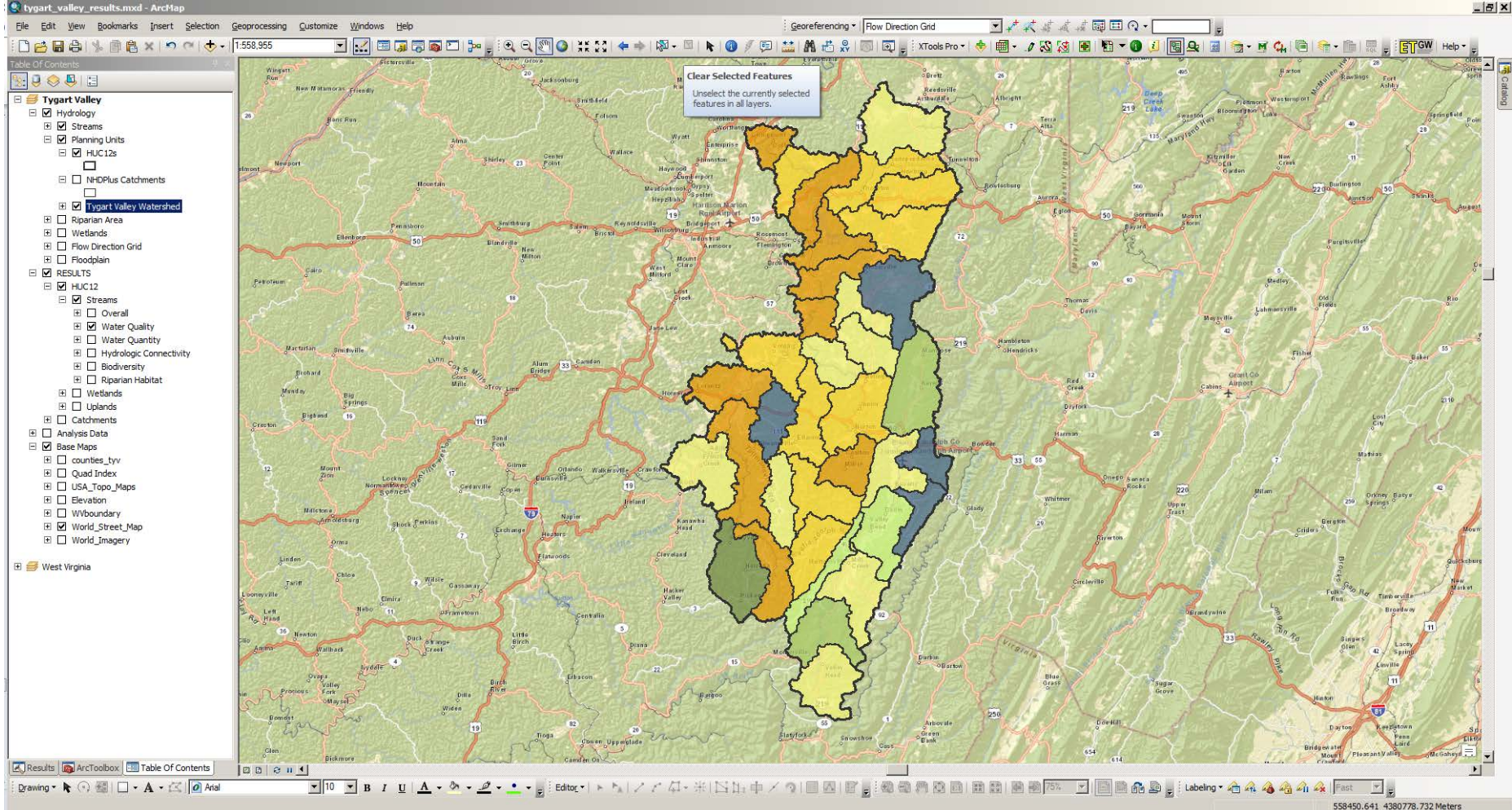
Arden, WV © panoramio.com





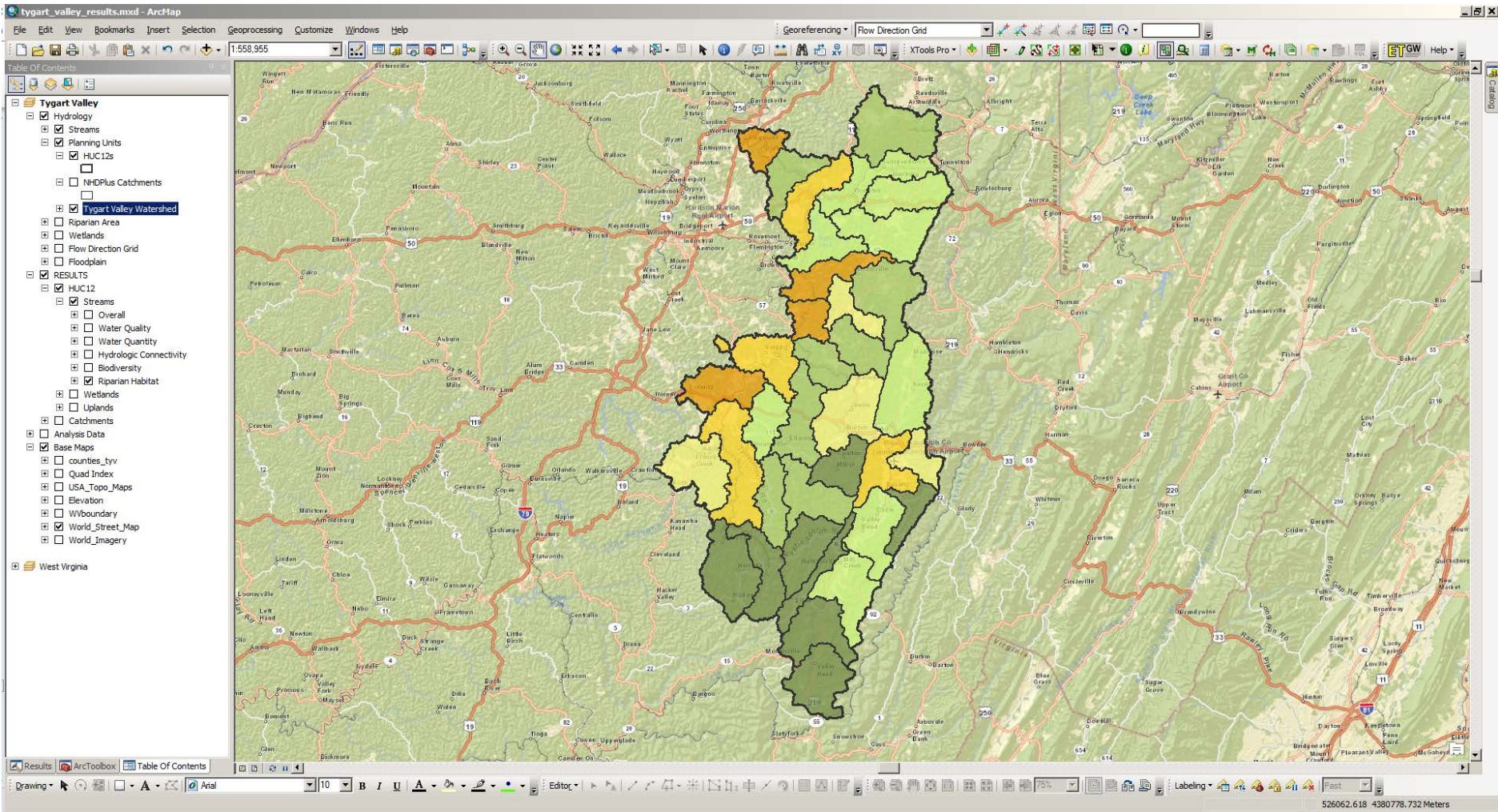
Tygart Valley – HUC12 Level  
Streams Overall Results





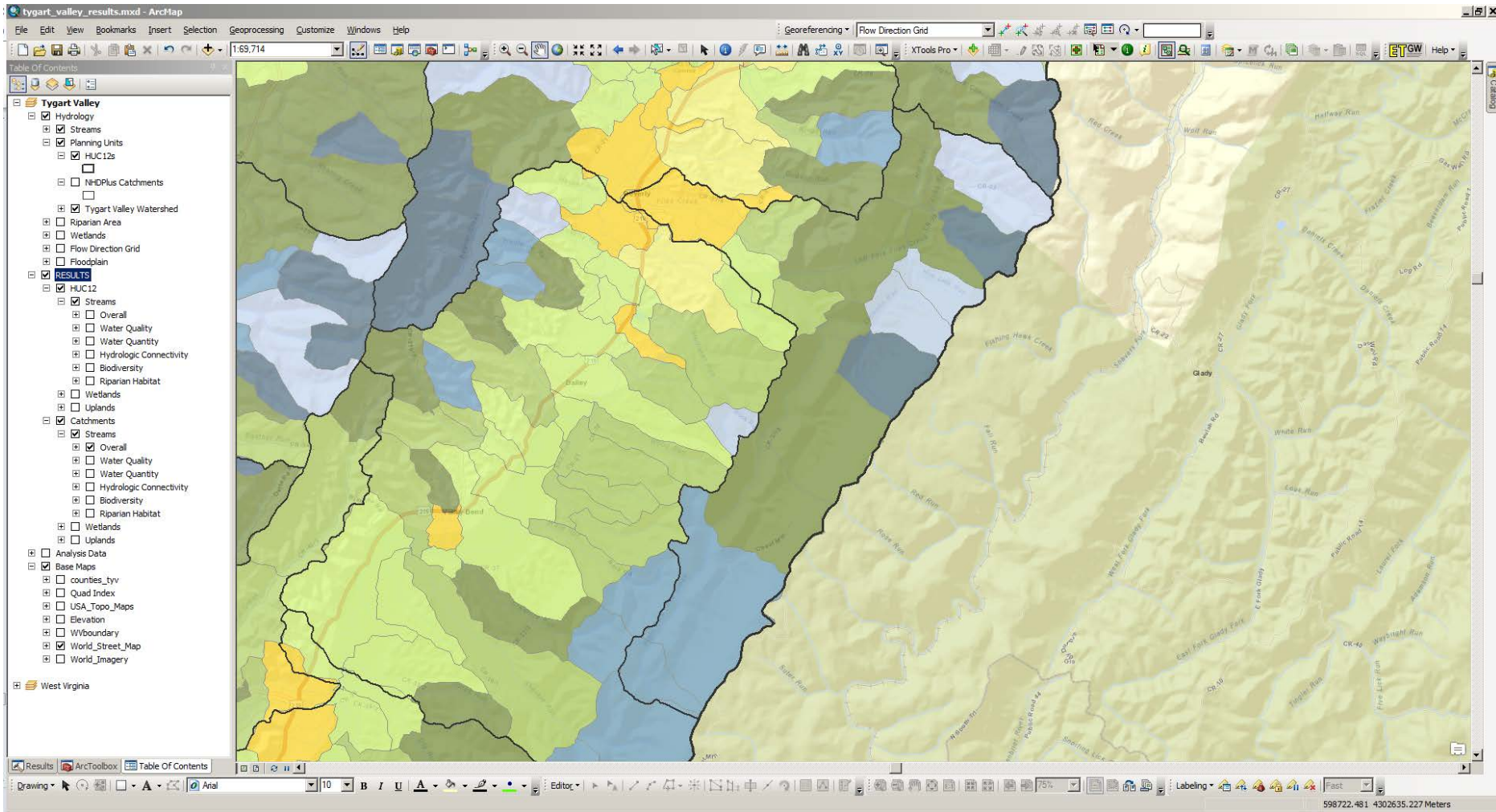
Tygart Valley – HUC12 Level  
Streams Water Quality Results





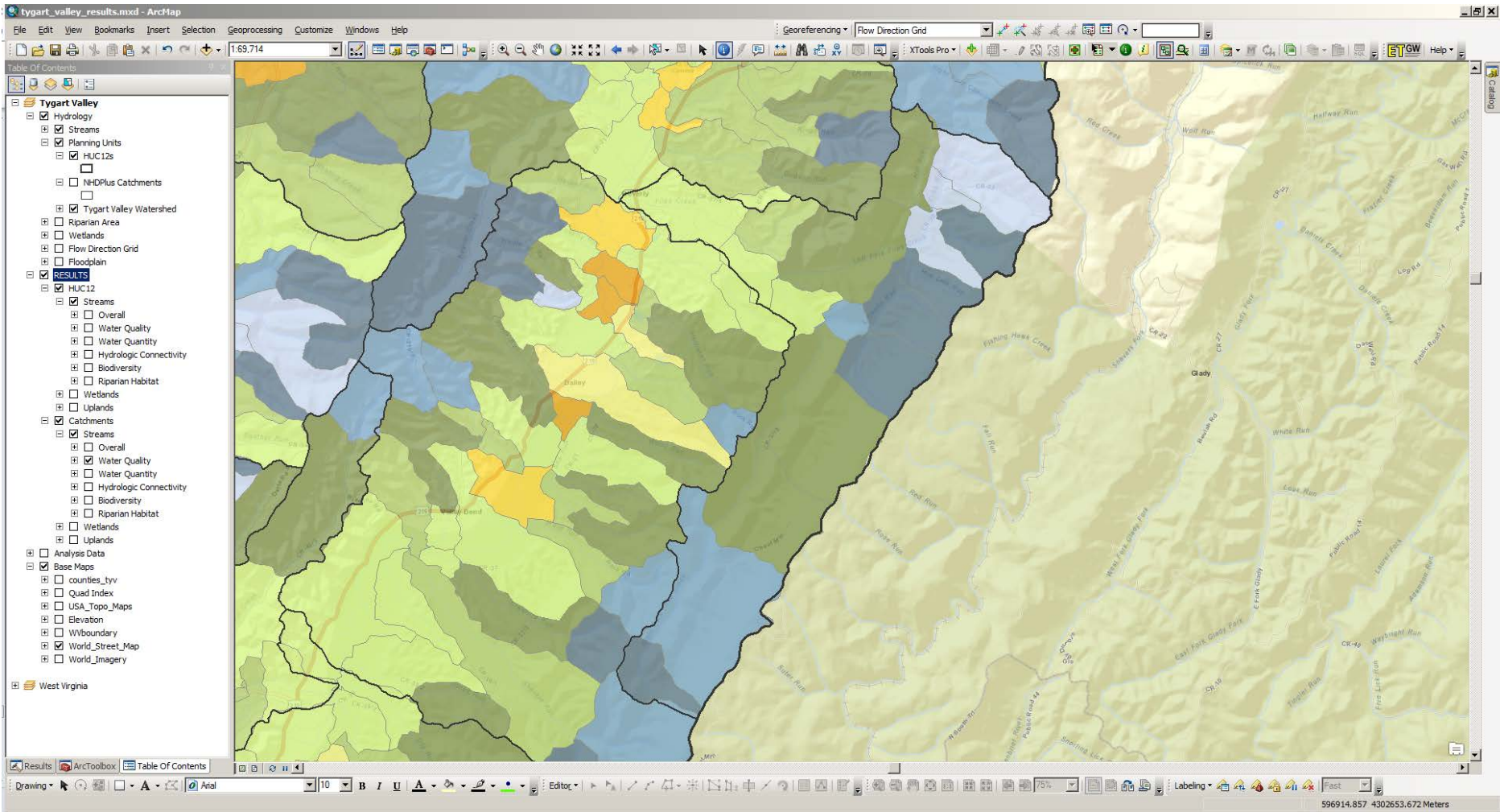
## Tygart Valley – HUC12 Level Streams Riparian Habitat Results



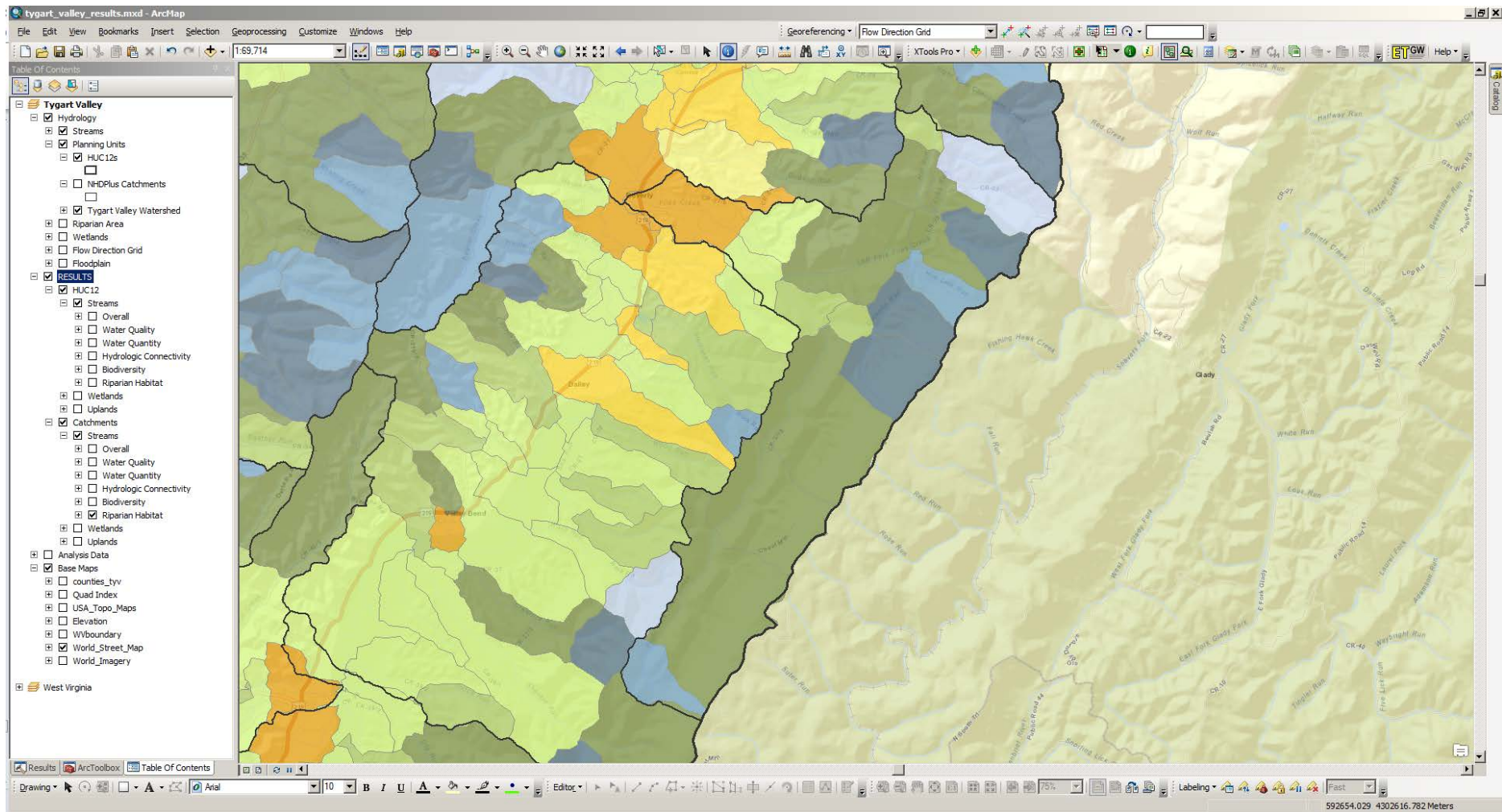


Files Creek – Catchment Level  
Streams Overall Results





## Files Creek – Catchment Level Streams Water Quality Results



## Files Creek– Catchment Level Streams Riparian Habitat Results



tygart\_valley\_results.mxd - ArcMap

File Edit View Bookmarks Insert Selection Geoprocessing Customize Windows Help

Georeferencing Flow Direction Grid

1:12,478

XTTools Pro

Identify

Identify from: <Top-most layer>

WAB\_Stations\_201305\_tsv  
MT-00080-0

Location: 604,590.937 4,298,993.660 Meters

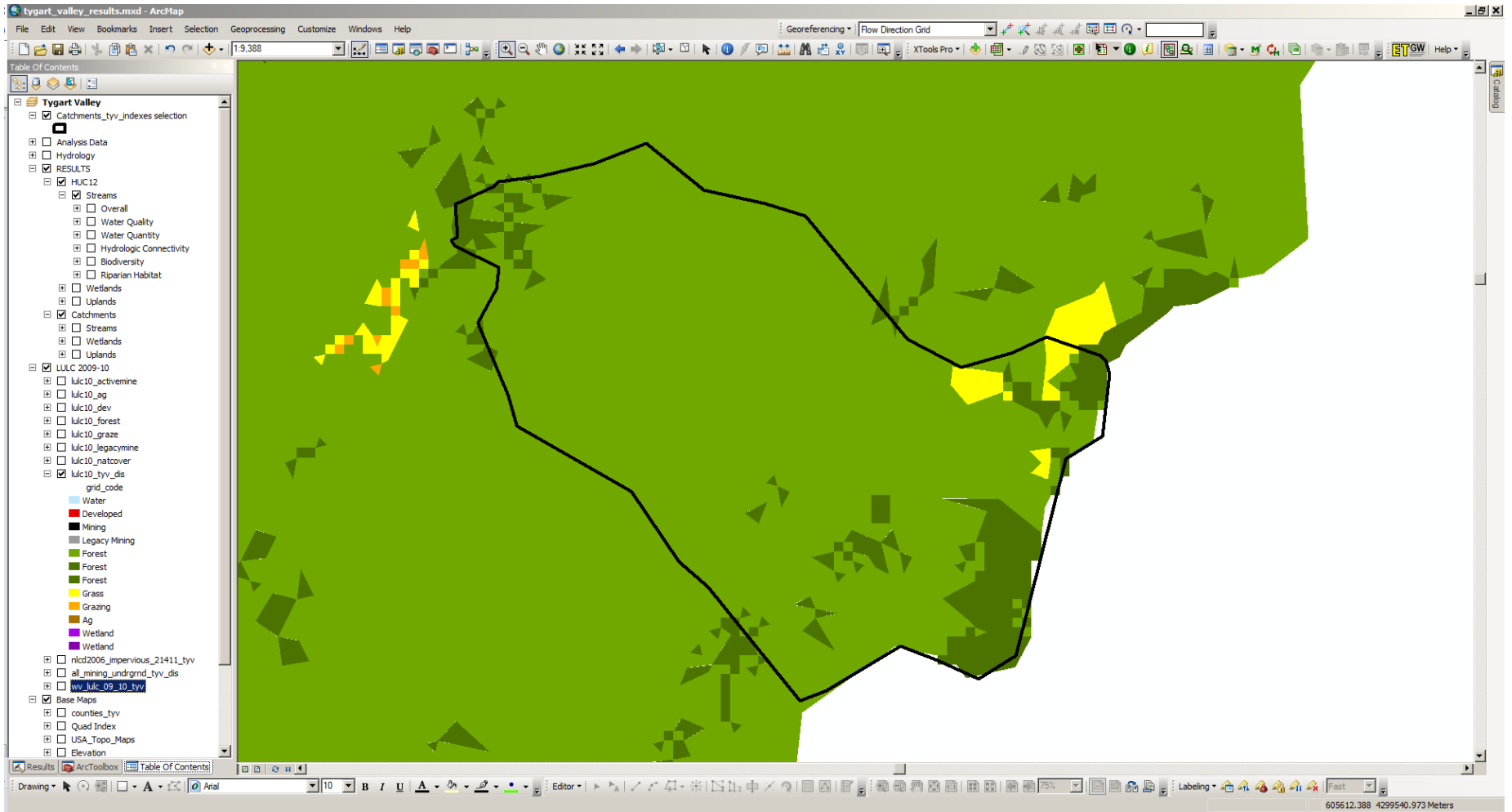
Field	Value
OBJECTID	126
Shape	Point
STATION_ID	3795
STATION_CO	MT-00080-0
STREAM_ID	MT-00080
ANCODE	WVMT-50-B-3
MILE_POINT	0
DESCRIPTOR	Hill Run
STREAM_NAM	Hill Run
POR_LON_DD	-79.795897
POR_LAT_DD	38.83455
POR_UTME	604509.41844
POR_UTMN	4299105.364629
POR_COUNT	1
DATE_ADDED	

Identified 1 feature

604967.297 4300261.4 Meters

The screenshot displays the ArcMap interface for a project named 'tygart\_valley\_results.mxd'. The main map area shows a landscape with green and blue areas, overlaid with a grid and stream network. A yellow circle on the map indicates the location of a water quality sample station. The left-hand 'Table of Contents' pane lists several layers, including 'Analysis Data', 'Water Quality', 'Hydrology', and 'RESULTS'. The 'Identify' window on the right shows the details for the selected station, including its ID, coordinates, and stream information.

Files Creek – Catchment Level  
Streams Water Quality Results  
Aerial Imagery, WAB Water Quality Sample Stations



Files Creek – Catchment Level  
 WVU-NRAC LULC 2009-10





Mouth of Buckhannon River ©wikipedia.com

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COMMENTS/QUESTIONS?