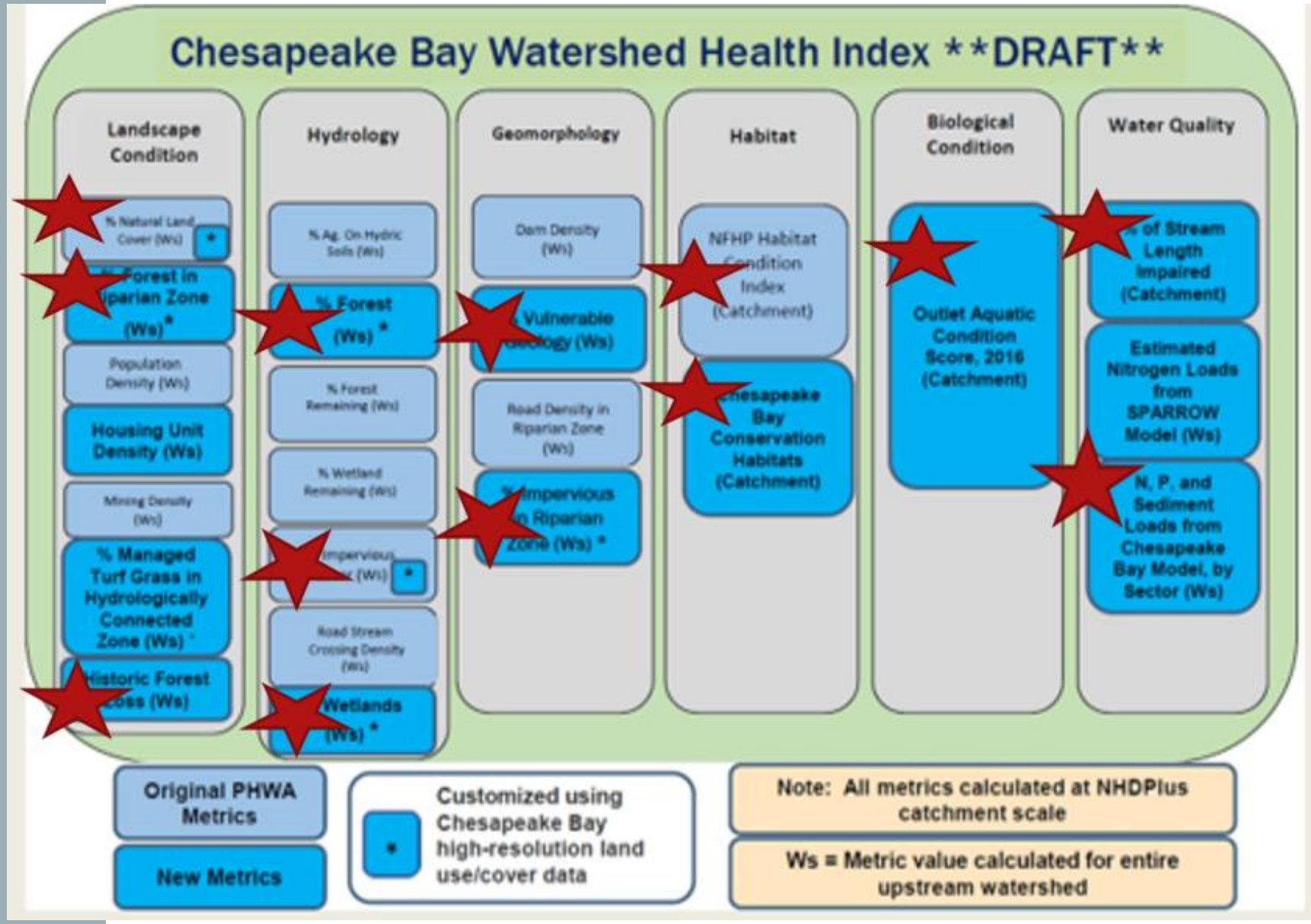
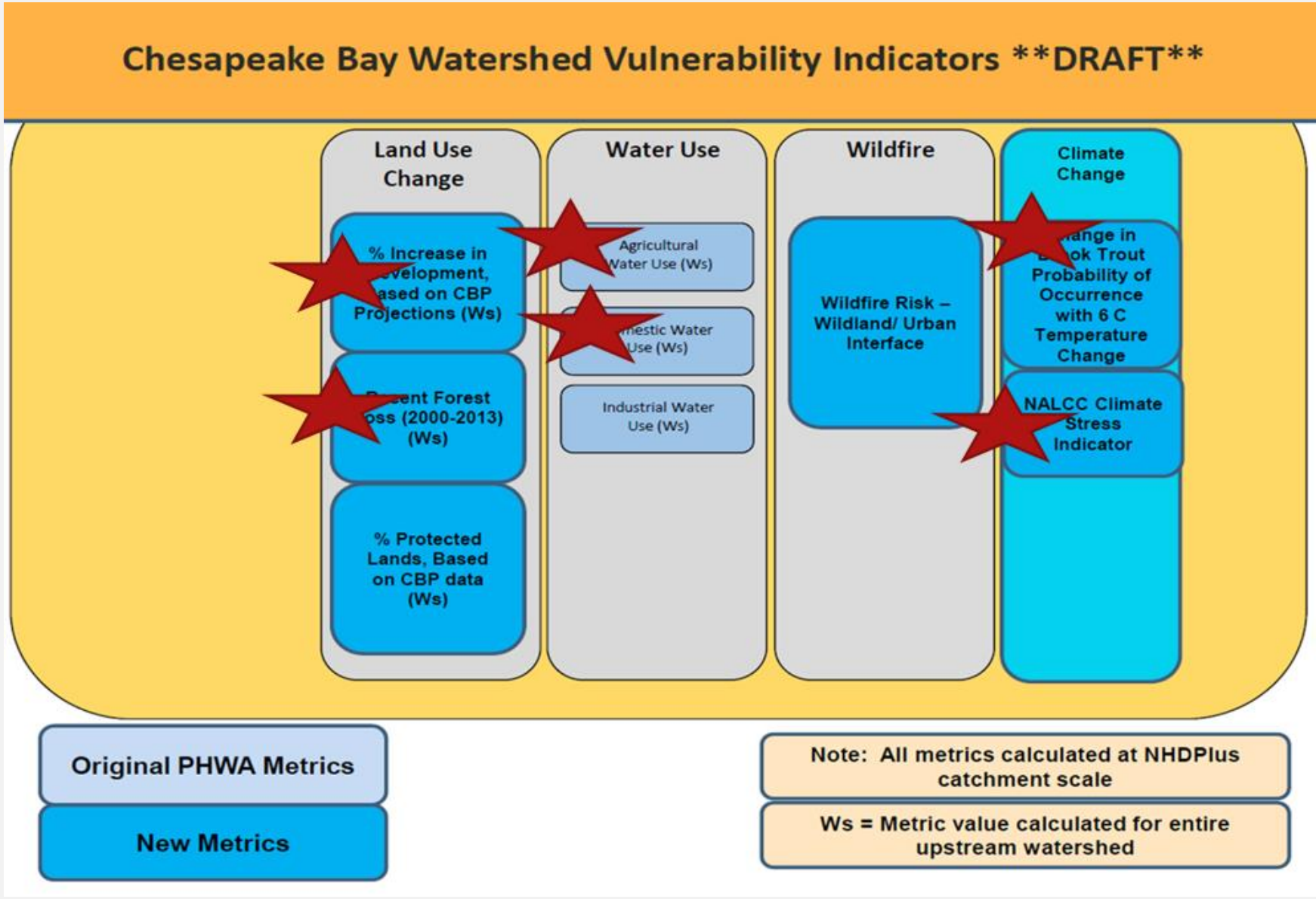
CHESAPEAKE HEALTHY WATERSHED ASSESSMENT

Where can we protect or restore climate resilient brook trout habitat?

OCT 2019 GIT CHAIRS MEETING RECAP



OCT 2019 GIT CHAIRS MEETING RECAP



WHAT ELSE SHOULD BE INCLUDED?

Sea level rise impact on forests and tidal marches	EJ screen	Recent grassland/wetland loss
Percent working forests	Human health index	Shoreline hardening
Change in precipitation	Endangered fish species	Recreational impairments

WHAT ELSE SHOULD BE INCLUDED?

Sea level rise impact on forests and tidal marches

Change in precipitation

CHESAPEAKE BAY WATERSHED VULNERABILITY INDEX

Land Use Change

Water Use

Wildfire

Climate Change

CHWA CLIMATE METRICS

Metric	Data Source
• Change in Probability of Brook Trout Occurrence, Current Conditions v. Future Conditions (Future increase of stream temperature of 6 degrees C)	• North Atlantic Landscape Conservation Cooperative (NALCC), Nature's Network, USGS Conte Lab, 2017
• Climate Stress indicator (estimated magnitude of climate stress that may be exerted on habitats (ecosystem types) in 2080, where 2080 climate conditions depart substantially from conditions where the underlying ecosystem type currently occurs are considered to be stressed).	• North Atlantic Landscape Conservation Cooperative (NALCC), Nature's Network, 2017

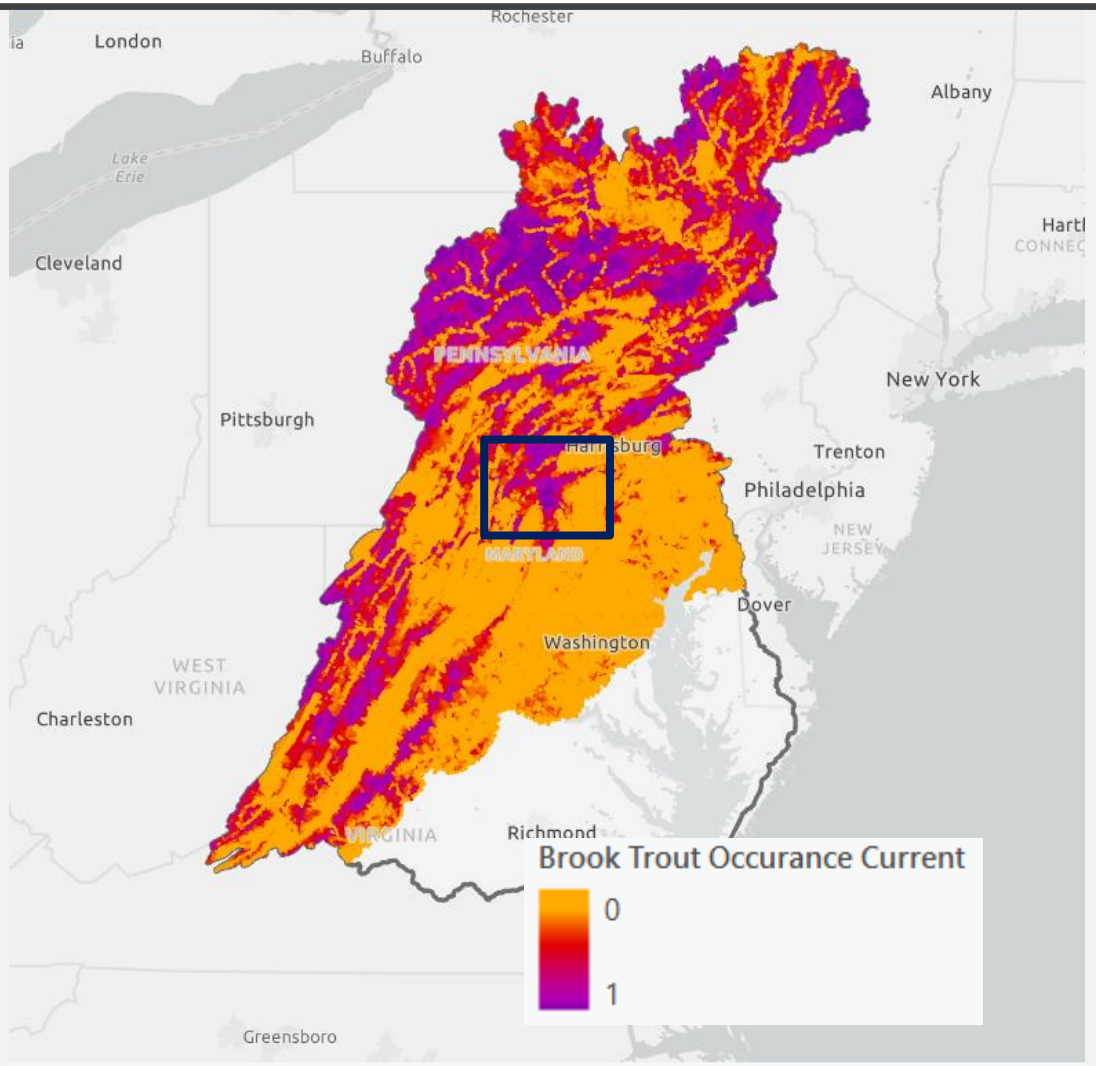
CLIMATE INDICATOR FRAMEWORK

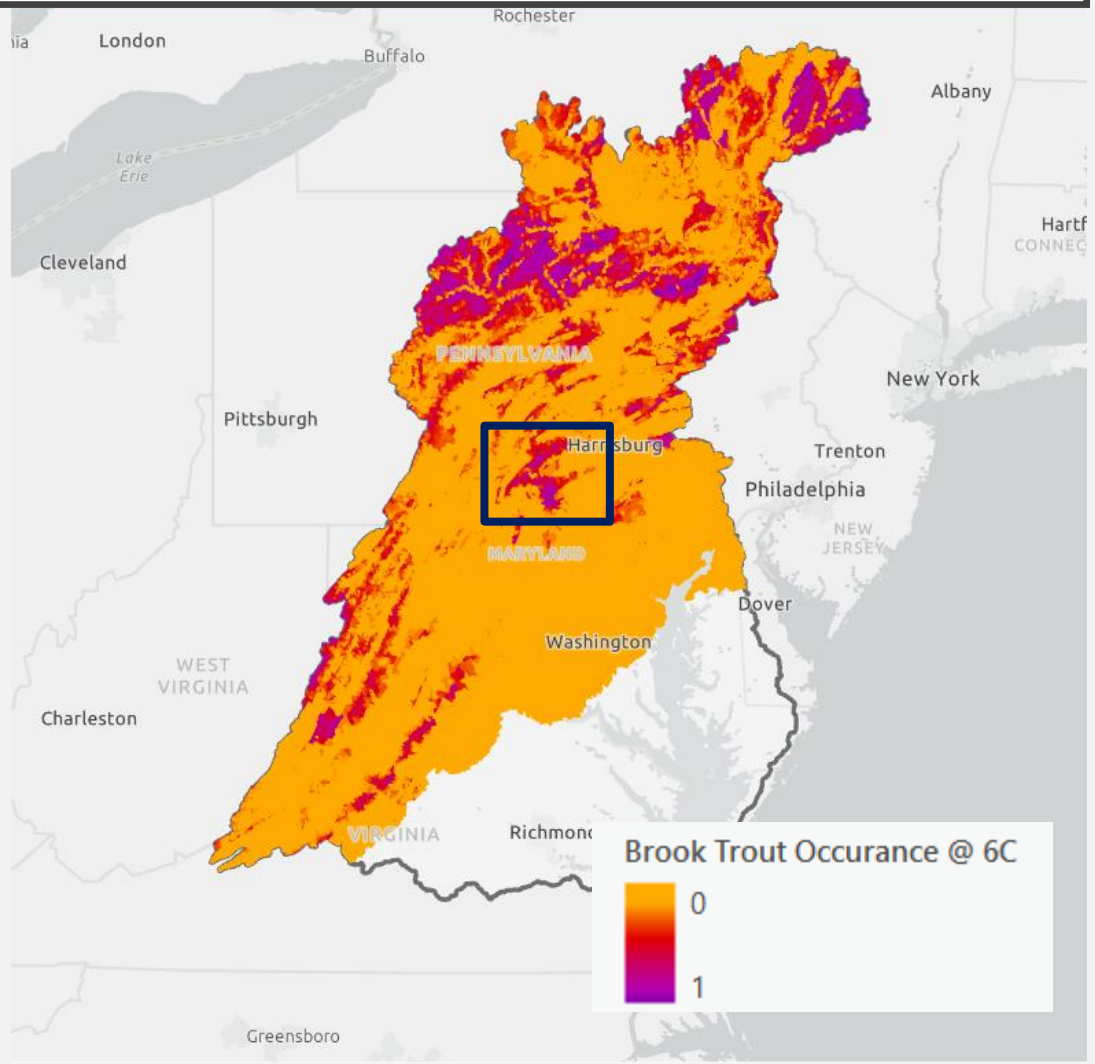
Physical Indicators (Signals of Change) ⇨ Impact Indicators (Ecological and Community Threats) ⇨ Resilience Indicators (Readiness)

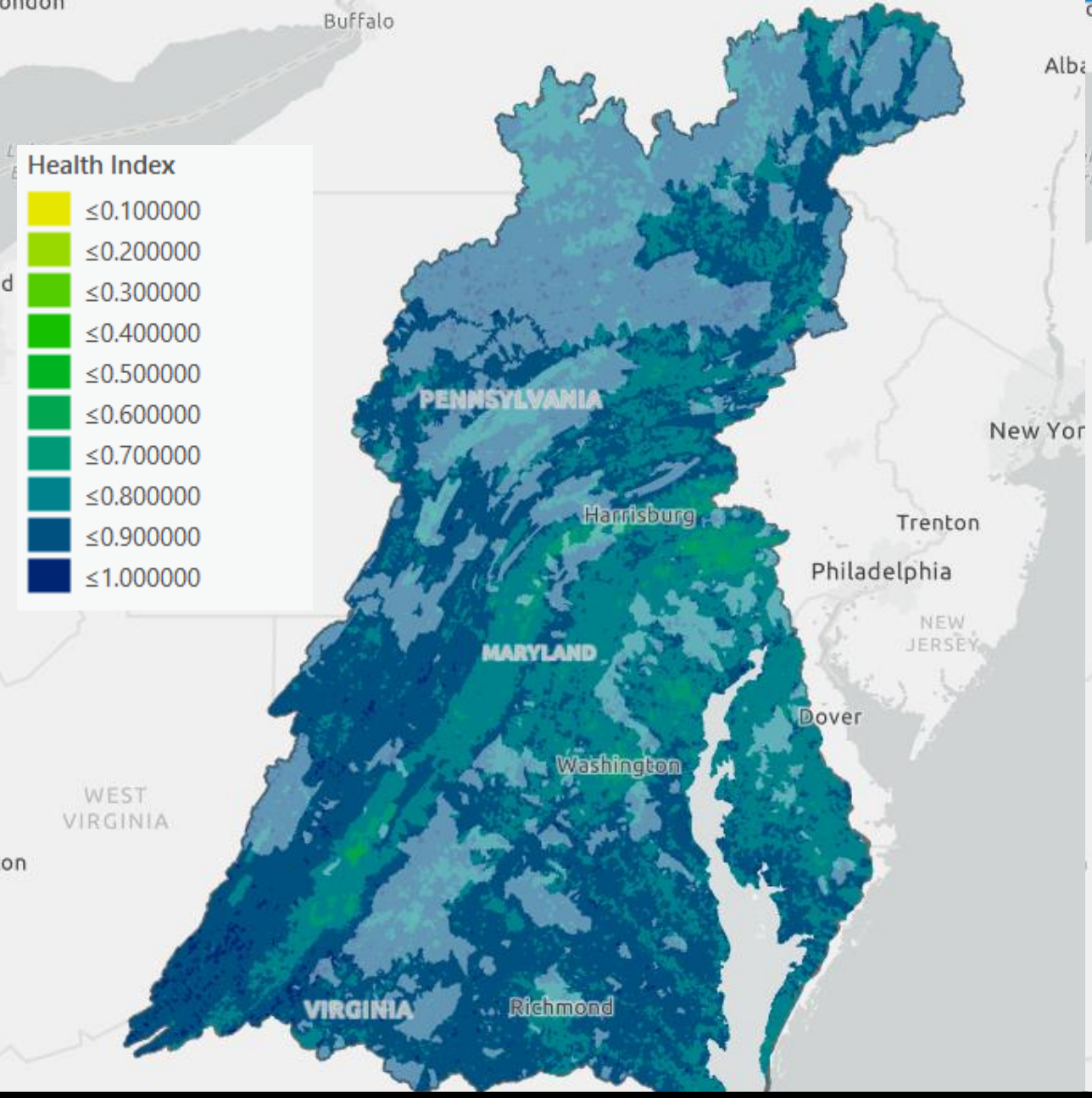
Example

Change in stream Temperature (Signals of Change) ⇨ Change in Brook Trout Habitat (Ecological and Community Threats) ⇨ Where to restore/protect brook trout habitat to increase climate *resilient* occupied habitat? (Readiness)

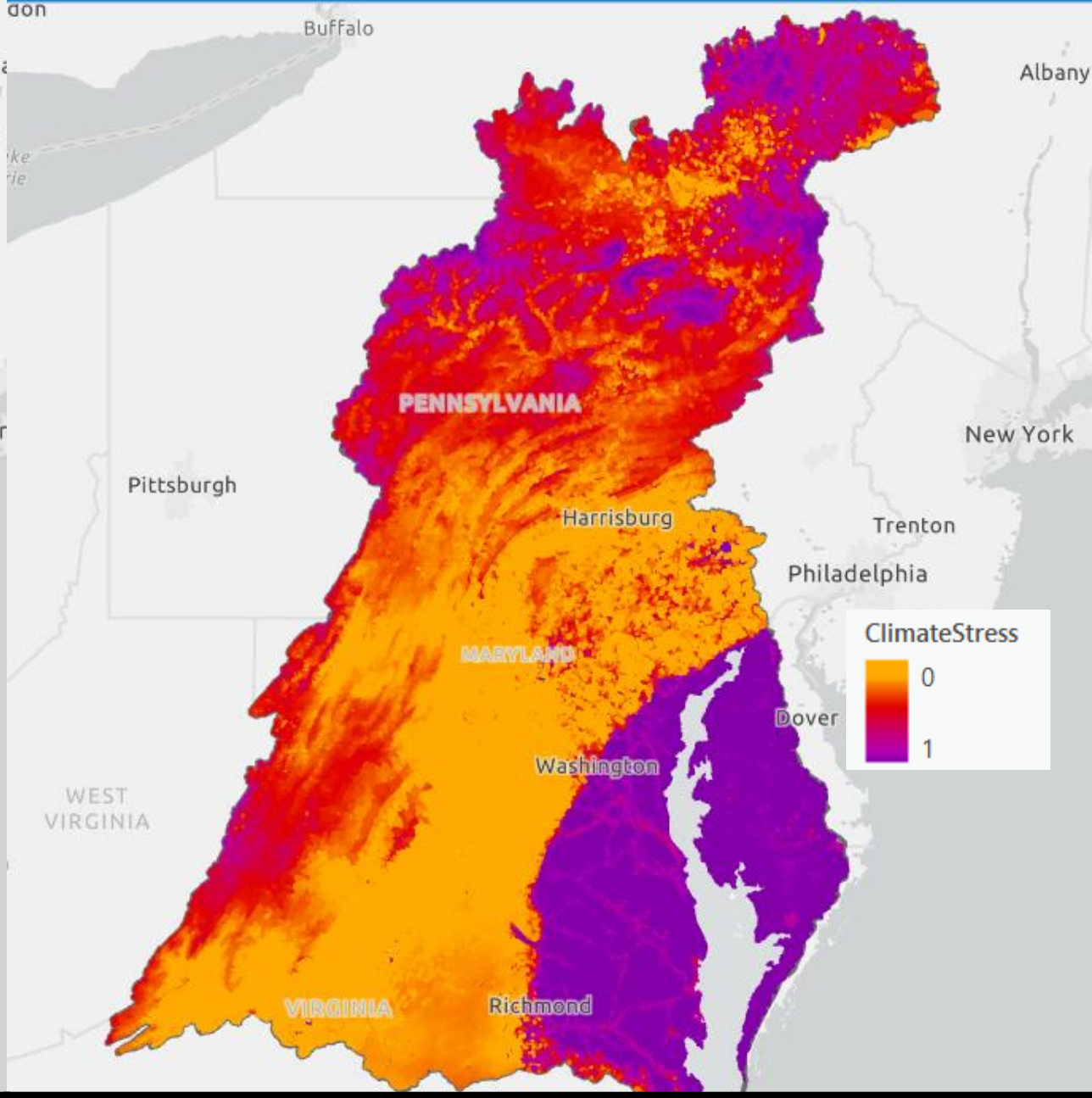
CURRENT BROOK TROUT VS. BROOK TROUT 6 DEG C. INCREASE



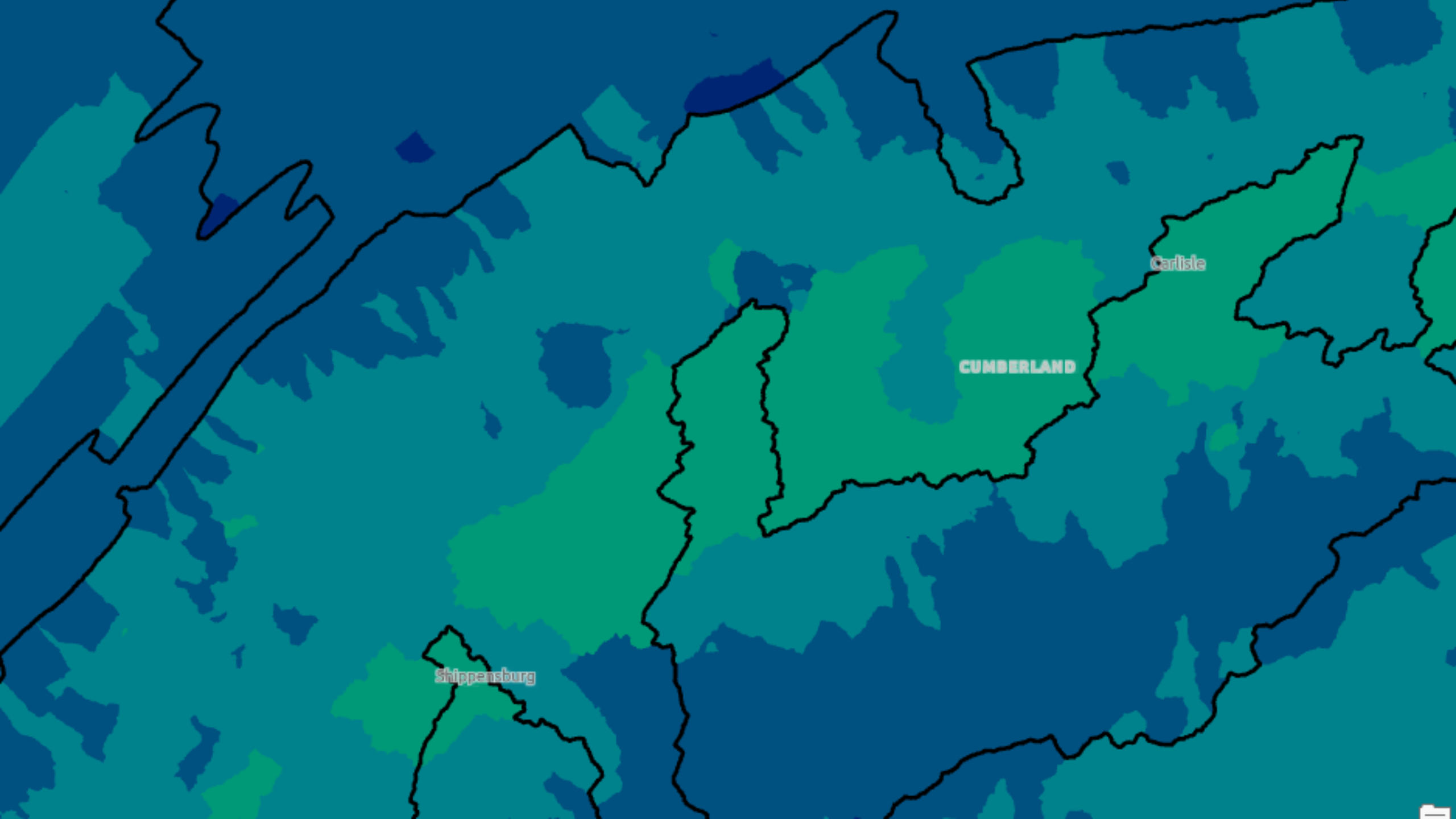


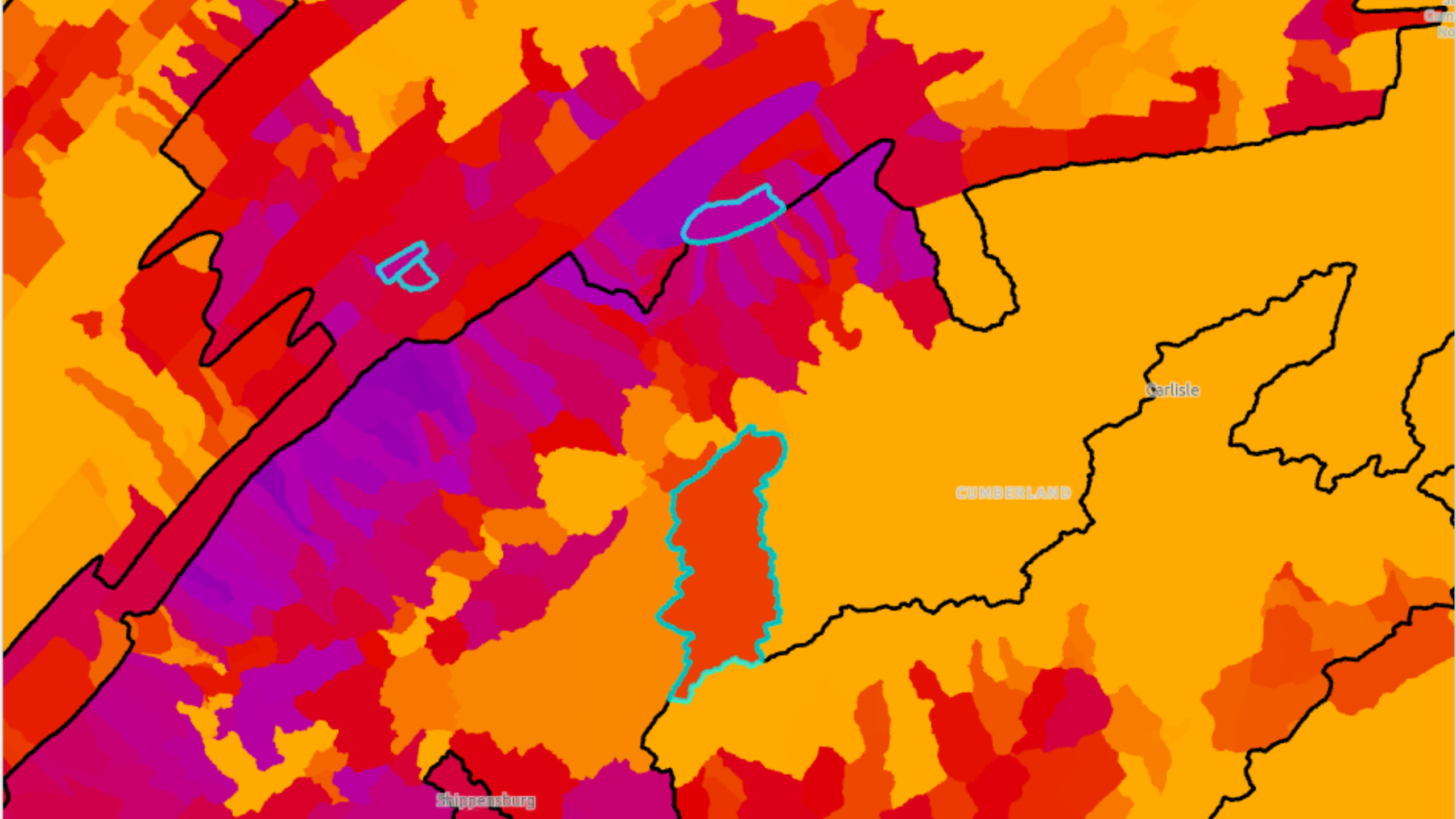


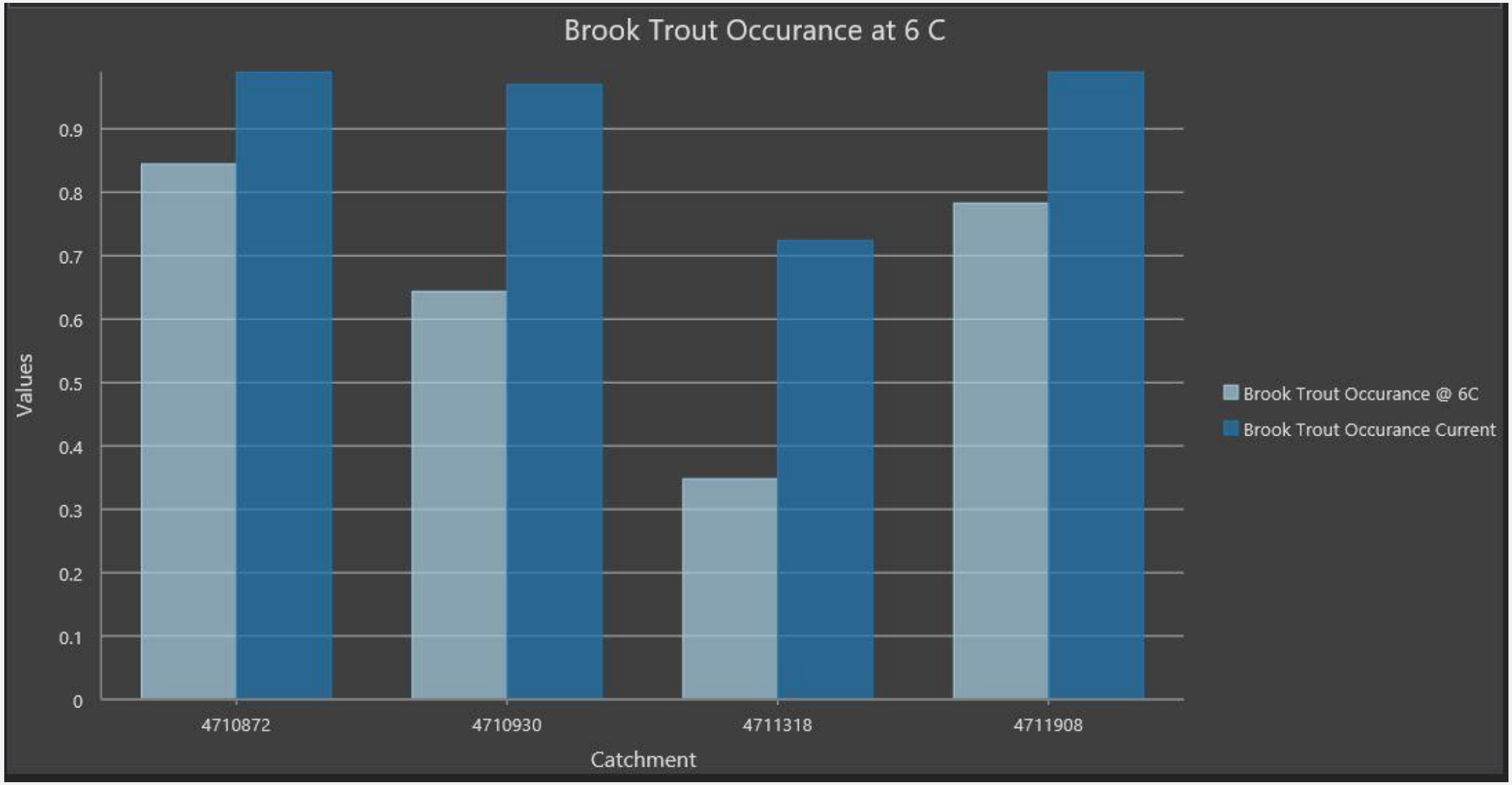
STATE ID' HEALTHY WATERSHEDS (HEALTH INDEX)

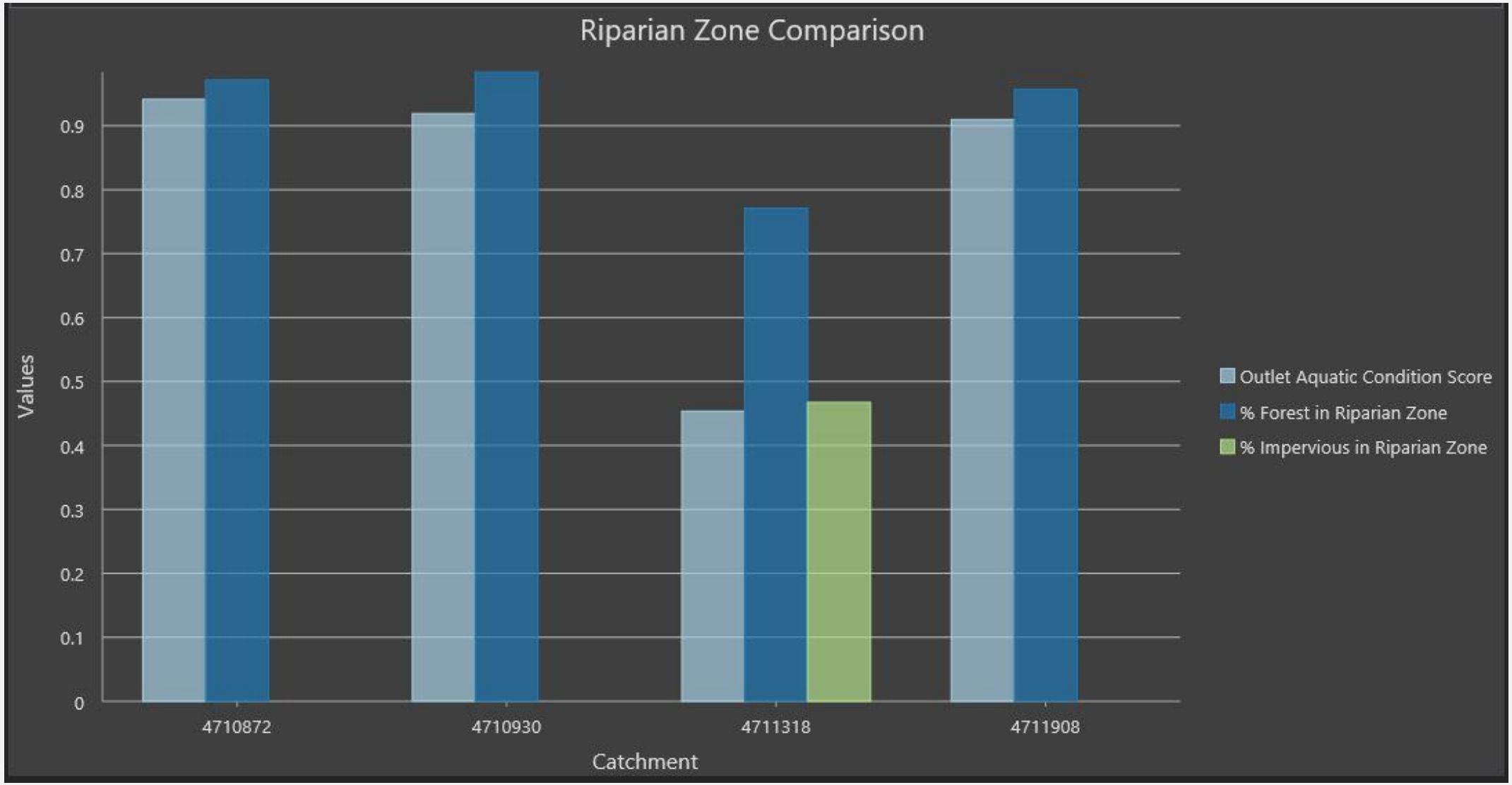


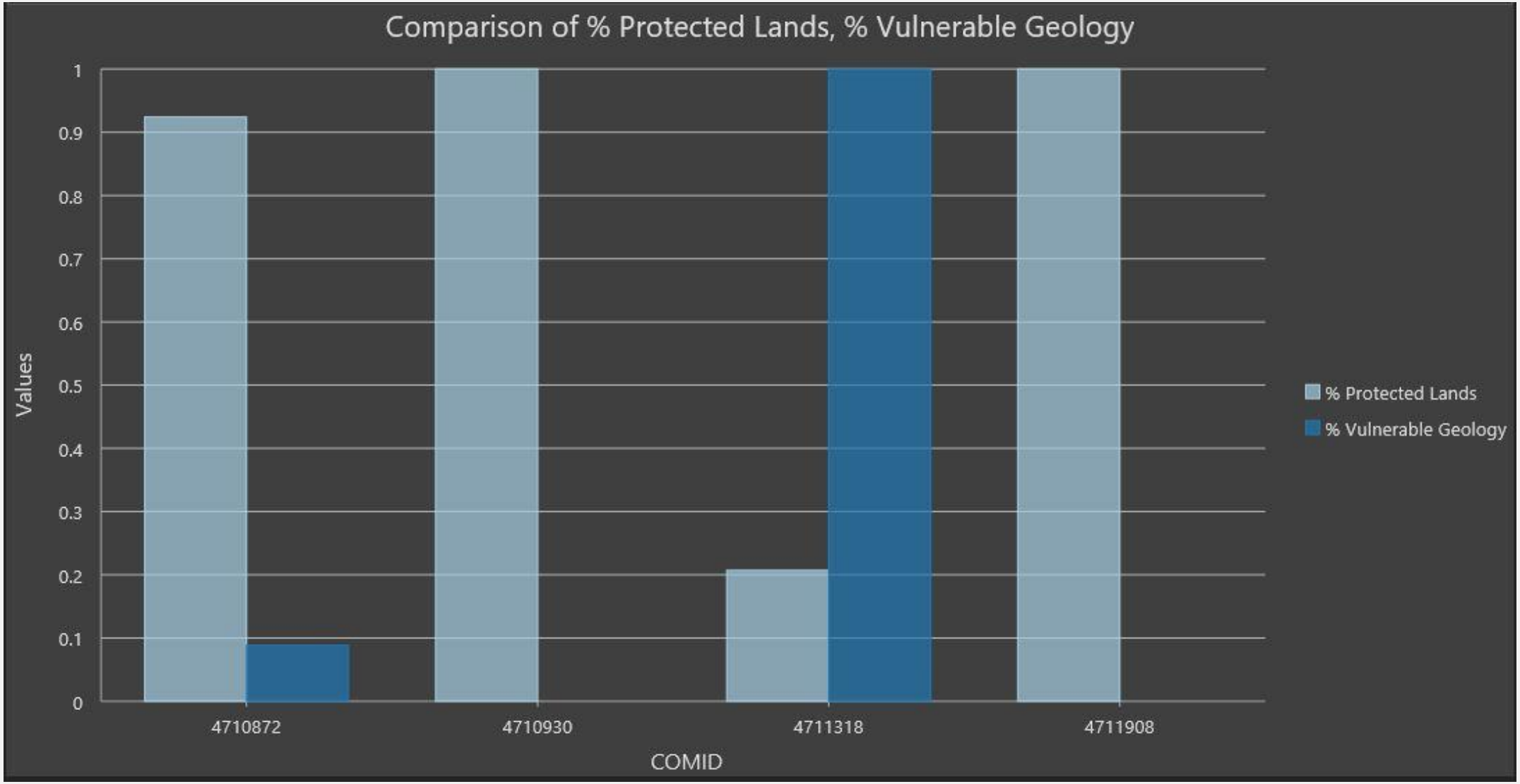
CLIMATE STRESS METRIC

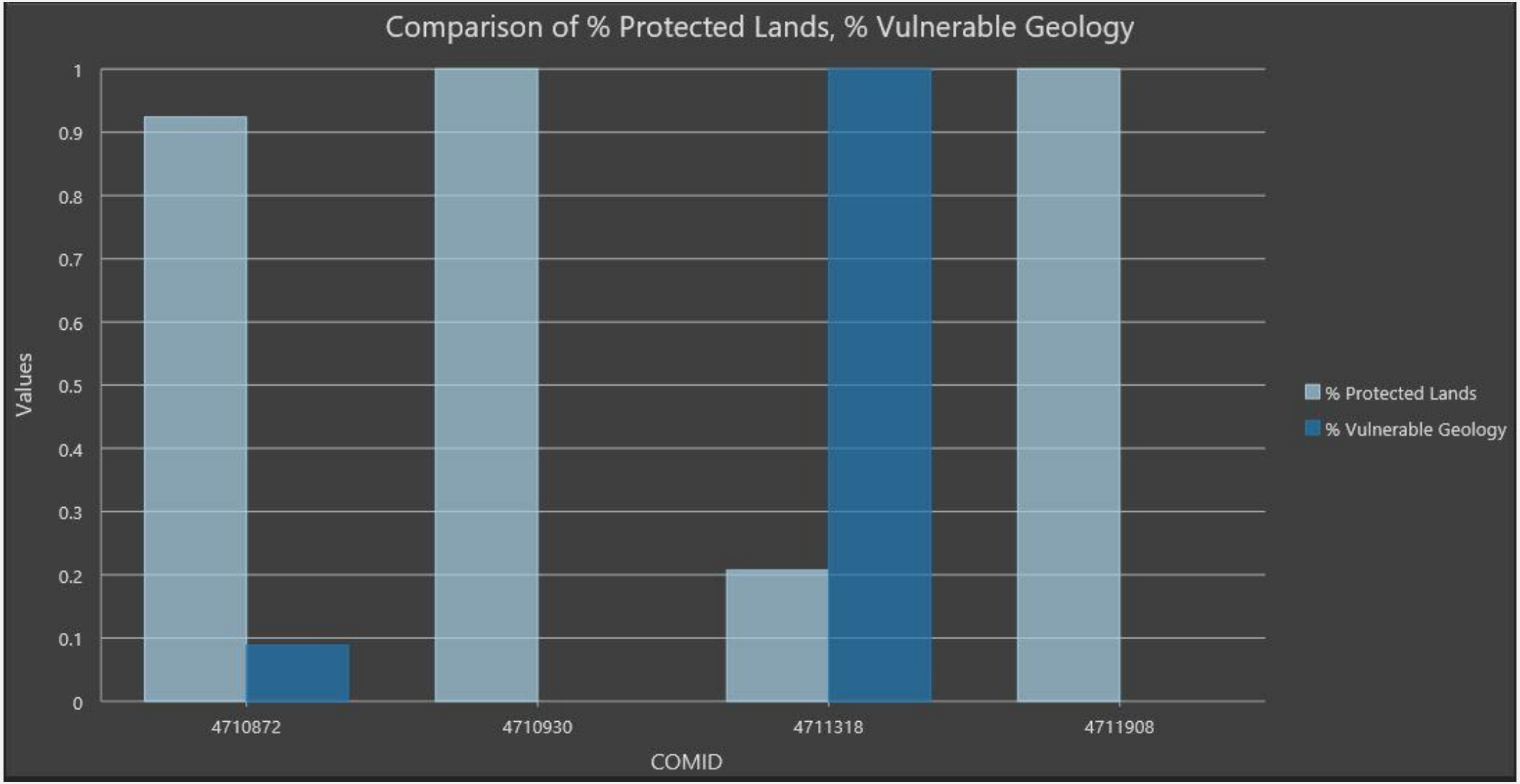

Carlisle
CUMBERLAND
Shippensburg

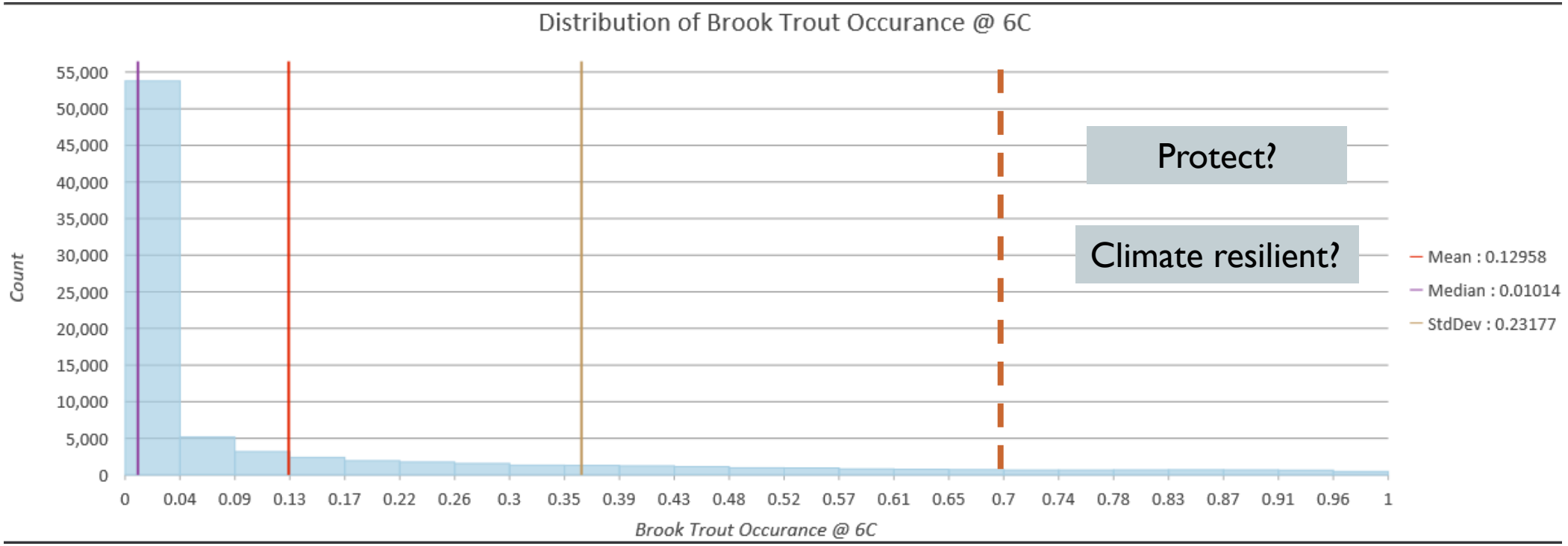

Carlisle
CUMBERLAND
Shippensburg


Brook Trout Occurance at 6 C
Values
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4710872
4710930
4711318
4711908
Catchment
Brook Trout Occurance @ 6C
Brook Trout Occurance Current

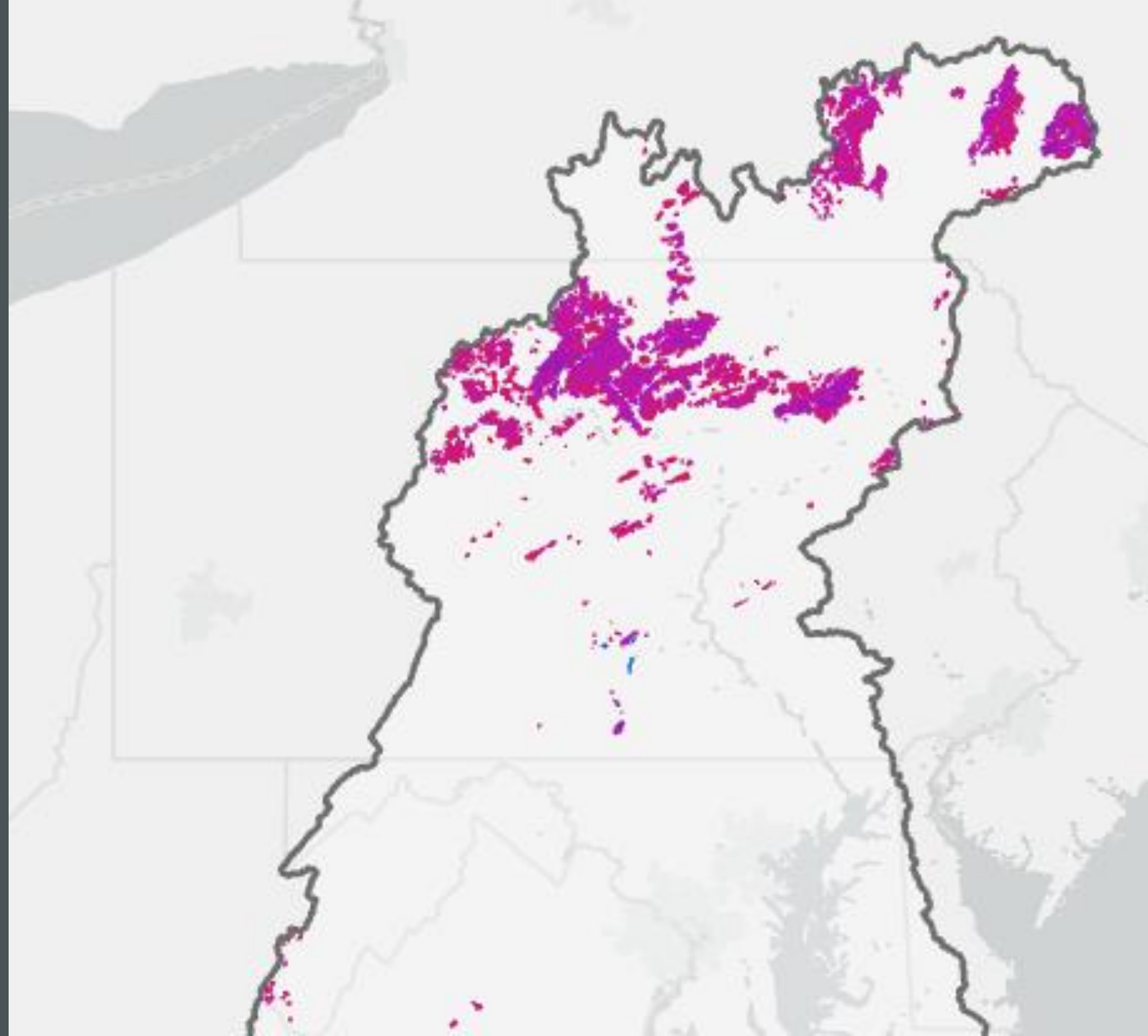

Riparian Zone Comparison
Values
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4710872
4710930
4711318
4711908
Catchment
Outlet Aquatic Condition Score
% Forest in Riparian Zone
% Impervious in Riparian Zone


Comparison of % Protected Lands, % Vulnerable Geology
Values
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4710872
4710930
4711318
4711908
COMID
% Protected Lands
% Vulnerable Geology

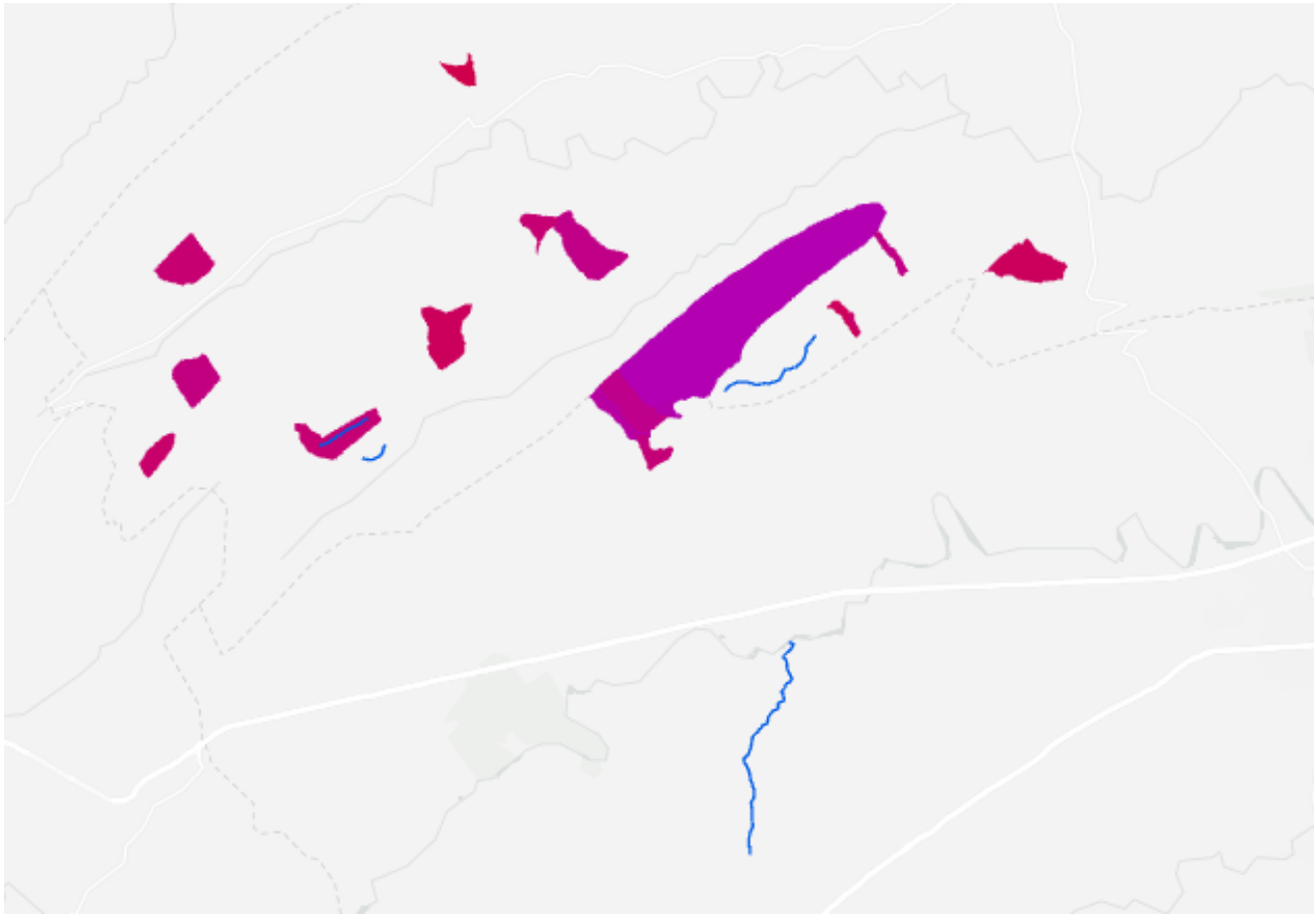

Comparison of % Protected Lands, % Vulnerable Geology
Values
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
4710872
4710930
4711318
4711908
COMID
% Protected Lands
% Vulnerable Geology


Distribution of Brook Trout Occurance @ 6C
Count
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
0.04
0.09
0.13
0.17
0.22
0.26
0.3
0.35
0.39
0.43
0.48
0.52
0.57
0.61
0.65
0.7
0.74
0.78
0.83
0.87
0.91
0.96
1
Brook Trout Occurance @ 6C
Protect?
Climate resilient?
Mean : 0.12958
Median : 0.01014
StdDev : 0.23177

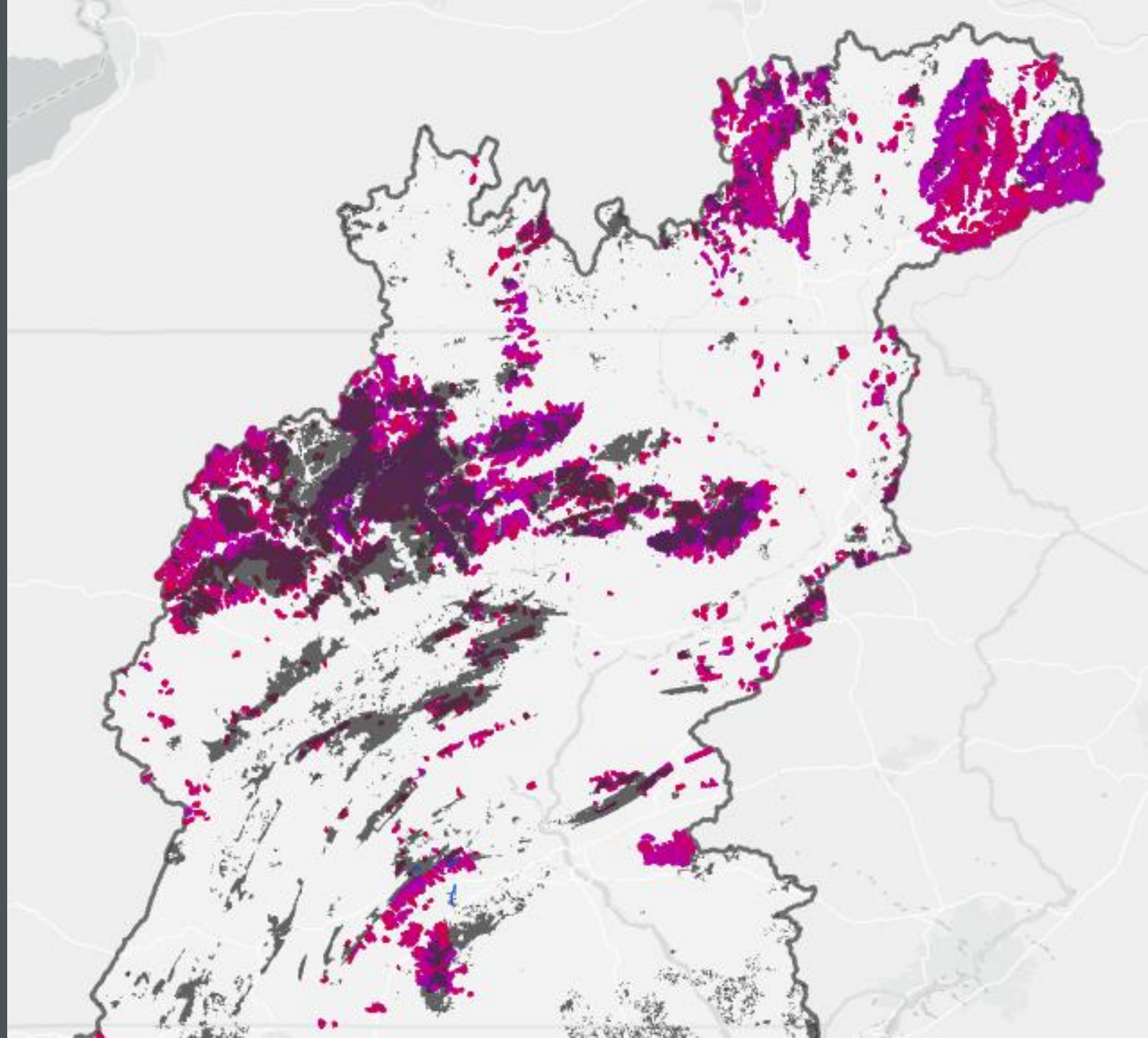
CATCHMENTS WITH 0.7 OR HIGHER BROOK TROUT PROBABILITY OF OCCURRENCE IN STATE IDENTIFIED HEALTHY WATERSHEDS

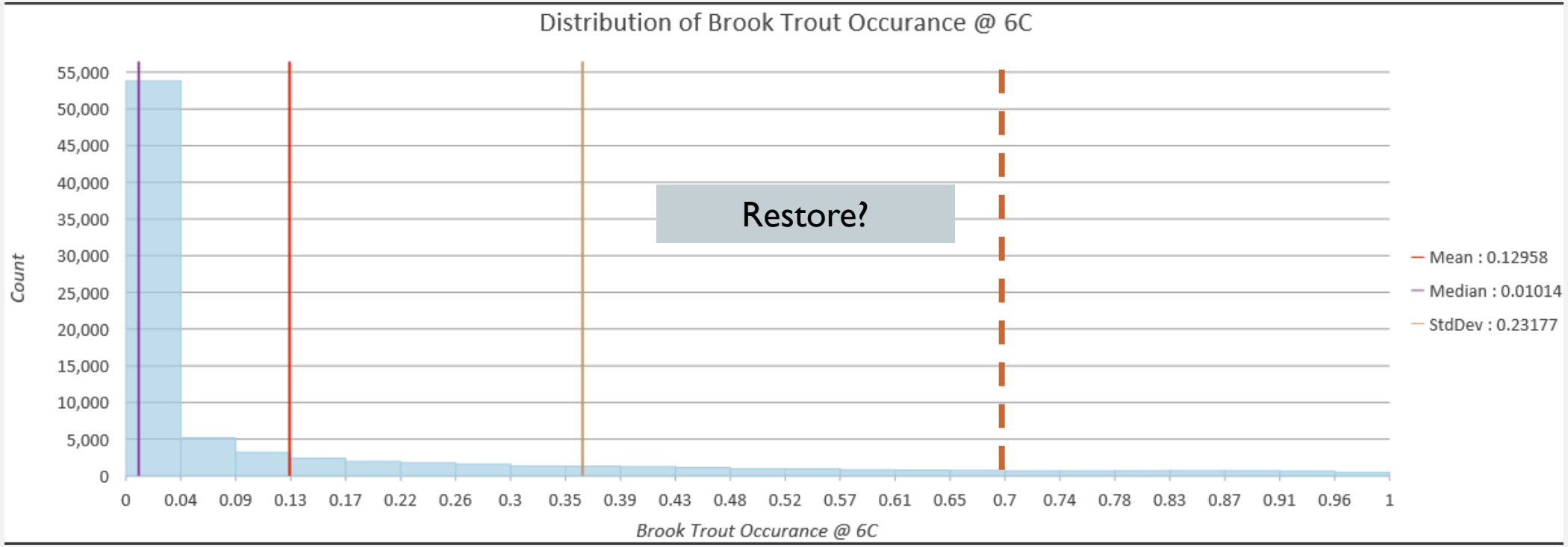


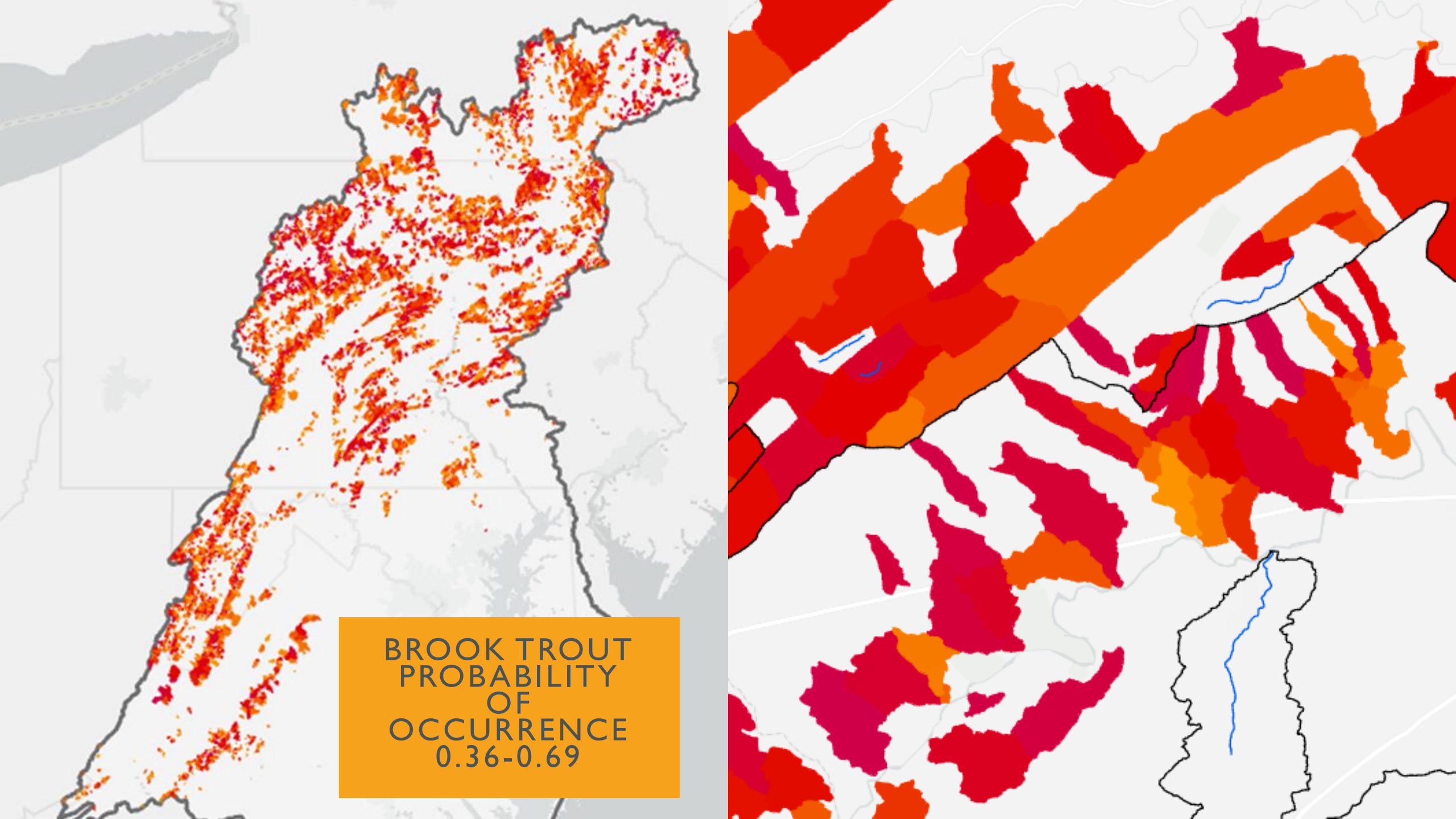
CATCHMENTS WITH 0.7 OR HIGHER BROOK TROUT PROBABILITY OF OCCURRENCE IN STATE IDENTIFIED HEALTHY WATERSHEDS



WHAT IS ALREADY PROTECTED?




Distribution of Brook Trout Occurance @ 6C
Count
55,000
50,000
45,000
40,000
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
0
0.04
0.09
0.13
0.17
0.22
0.26
0.3
0.35
0.39
0.43
0.48
0.52
0.57
0.61
0.65
0.7
0.74
0.78
0.83
0.87
0.91
0.96
1
Brook Trout Occurance @ 6C
Restore?
Mean : 0.12958
Median : 0.01014
StdDev : 0.23177


BROOK TROUT
PROBABILITY
OF
OCCURRENCE
0.36-0.69

QUESTIONS?