HEALTHY WATERS, WATERSHEDS AND CLIMATE

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PRESENTATION TO THE CRWG JANUARY 18, 2023

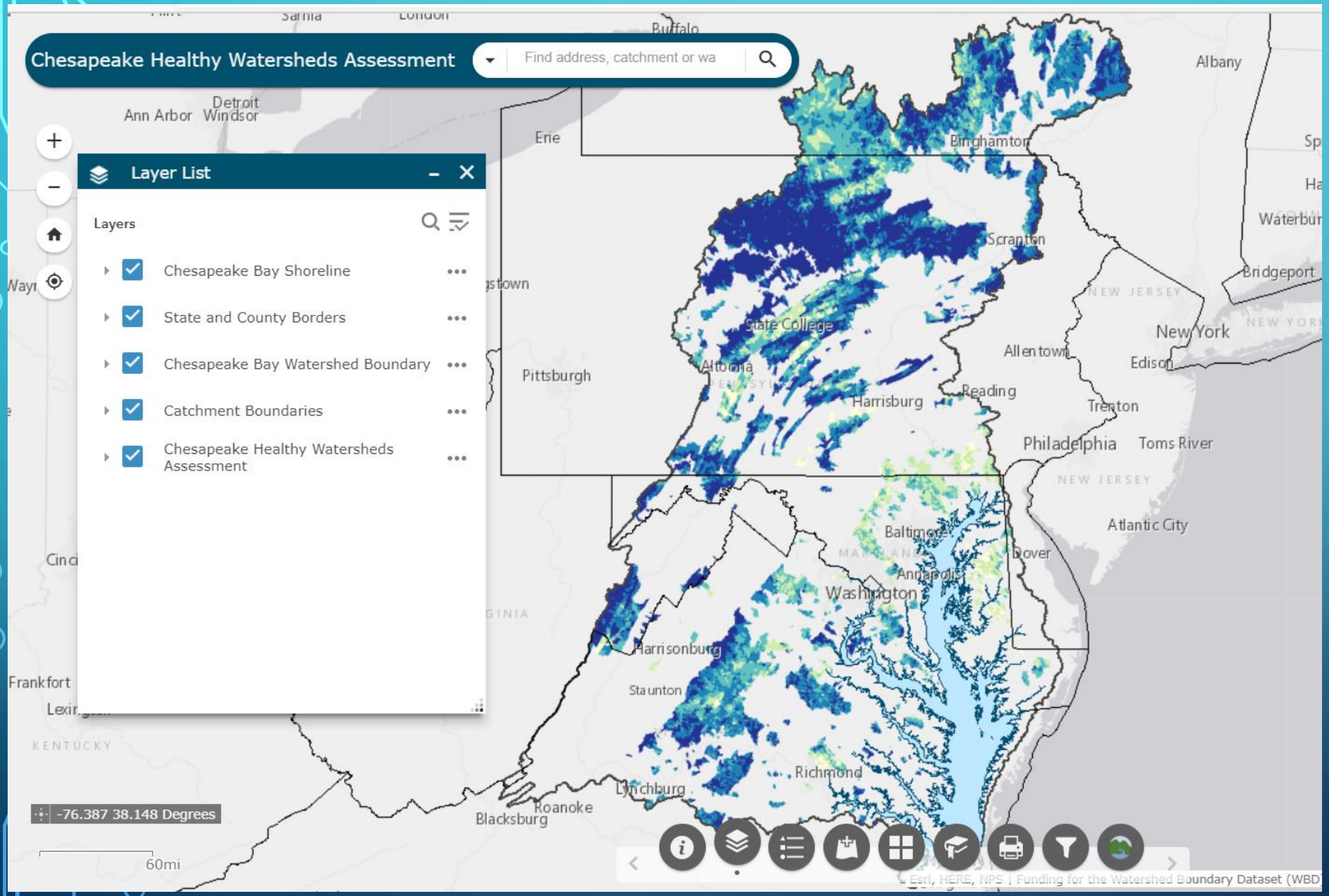
Through the Chesapeake Bay Watershed Agreement, *the Chesapeake Bay Program has committed to…*

Healthy Watersheds Goal:

Potapsco Valley State Park
Photo by Will Parson

Goal: *Sustain state-identified healthy waters and watersheds recognized for their high quality and/or high ecological value*

Outcome: *100 percent of state-identified healthy waters and watersheds remain healthy.*



CHESAPEAKE HEALTHY WATERSHEDS ASSESSMENT

CHESAPEAKE HEALTHY WATERSHEDS ASSESSMENT

- CONDITION METRICS

Landscape Condition

Subindex score:

Metric values

- % Natural Land Cover (Ws)*
- **% Forest in Riparian Zone (Ws)**
- Population Density (Ws)
- **Housing Unit Density (Ws)**
- Mining Density (Ws)
- **% Managed Turf Grass in Hydrologically Connected Zone (Ws)***
- **Historic Forest Loss (Ws)**

Hydrology

Subindex score:

Metric values

- % Agriculture on Hydric Soil (Ws)
- **% Forest (Ws)***
- % Forest Remaining (Ws)
- % Wetlands Remaining (Ws)
- % Imperviousness Cover (Ws)*
- Road Stream Crossing Density (Ws)
- **% Wetlands (Ws)***

Habitat

Subindex Score:

Metric values

- National Fish Habitat Partnership (NFHP) Habitat Condition Index (Catchment)
- **% Natural Connectivity (Catchment)**
  - **Habitat Condition Index – Local**
  - **Habitat Condition Index – Network**
  - **Habitat Condition Index – Cumulative**

Geomorphology

Subindex Score:

Metric values

- Dam Density (Ws)
- % Vulnerable Geology (Ws)
- Road Density in Riparian Zone (Ws)
- % Impervious in Riparian Zone (Ws)*

Water Quality

Subindex score:

Metric values

- **% of Stream Length Impaired (Catchment)**
- **Estimated Nitrogen Load from SPARROW Model (lbs/acre/yr) (Ws)**
- **Nitrogen, Phosphorus, and Sediment Load from Chesapeake Bay Model, by Sector (Ws)**

Biological Condition

Subindex score:

Metric values

- **Outlet Aquatic Condition Score (Catchment)**

CHESAPEAKE HEALTHY WATERSHEDS ASSESSMENT

VULNERABILITY METRICS

Land Use Change

Metric values

- % Increase in Development (Catchment)
- Recent Forest Loss (Ws)
- % Protected Lands (Ws)

Wildfire

Metric value

- % Wildland Urban Interface (Ws)

Water Use

Metric values

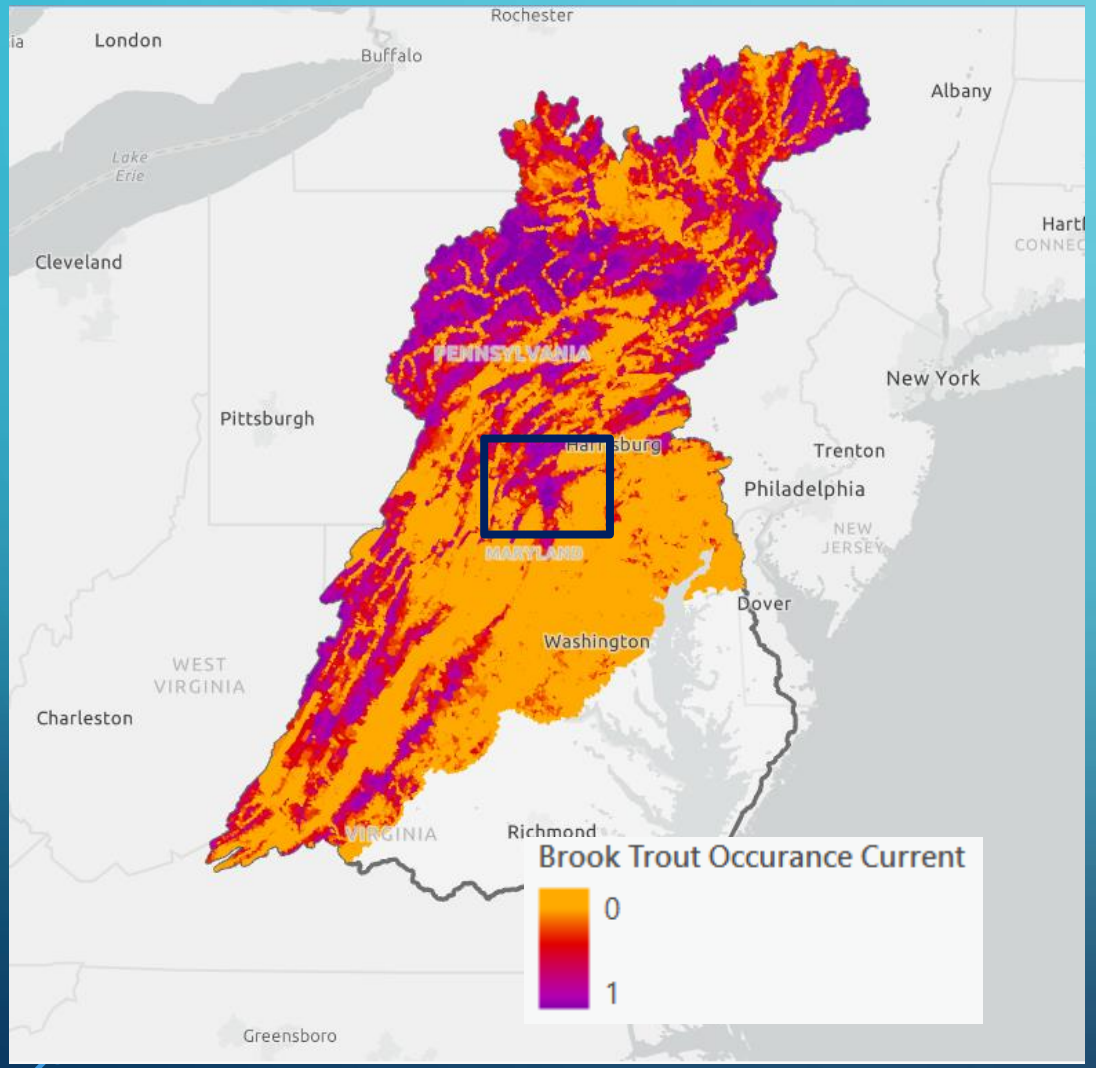
- Agricultural Water Use (Catchment)
- Domestic Water Use (Catchment)
- Industrial Water Use (Catchment)

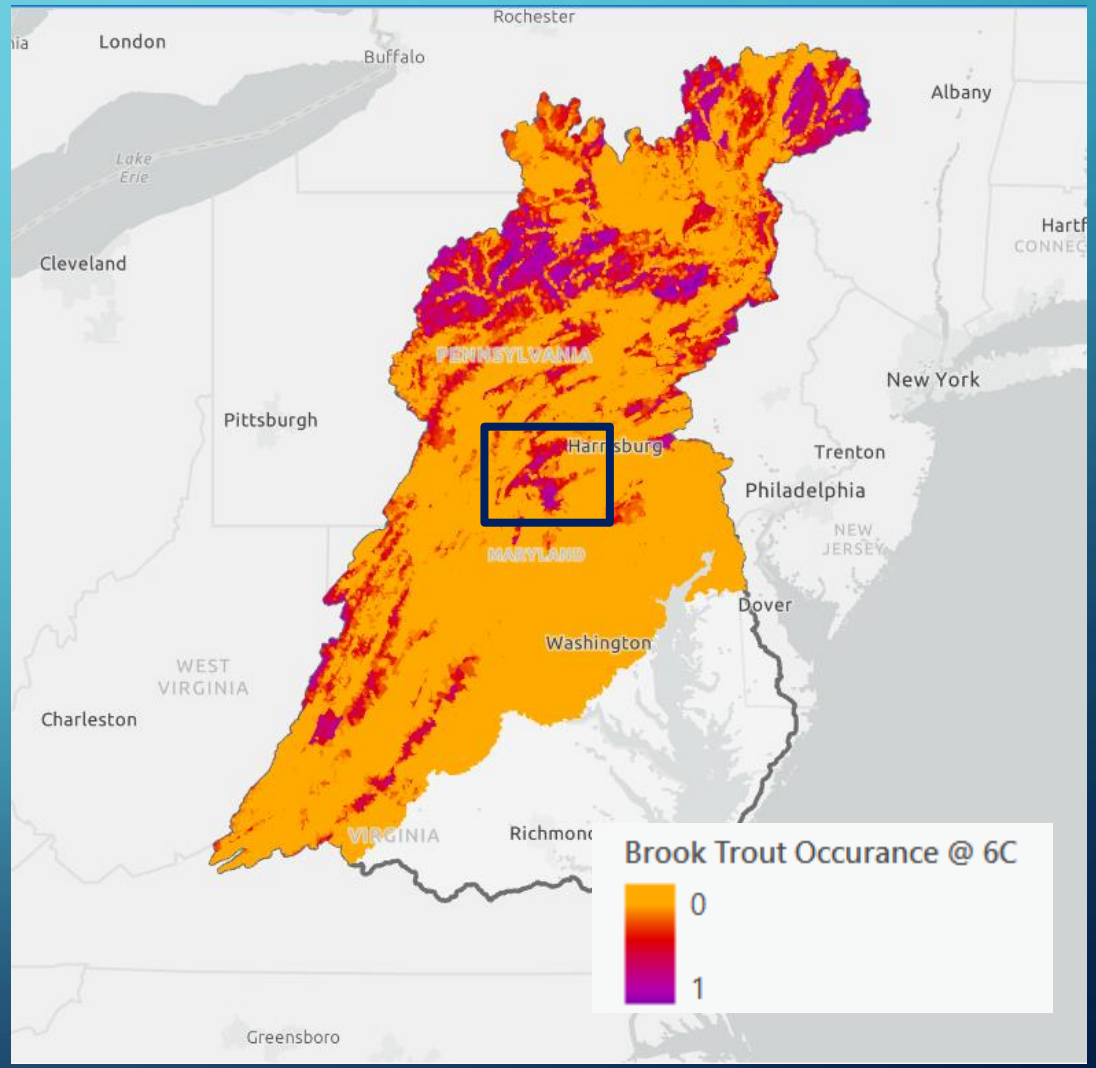
Climate Change

Metric values

- Brook Trout Occurrence – current (Catchment)
- Change in Probability of Brook Trout Occurrence with 6 C Temperature change (Catchment)
- NALCC Climate Stress Indicator (Catchment)

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





ADDITIONAL CLIMATE METRICS 2022-2023

Four scenarios: Brook Trout Probability of Occurrence under

- current condition
- plus 2 degrees C
- plus 4 degrees C
- plus 6 degrees C (Northeast Atlantic Landscape Conservation Cooperative, Nature Network Project)

USGS - Stream Temperature Model

- Mean Summer Temp. (degrees C)
- Mean Summer Temp. (degrees C) w/ Air Temp +2 degrees C

- Mean Summer Temp. (degrees C) w/ Air Temp +4 degrees C
- Mean Summer Temp. (degrees C) w/ Air Temp +6 degrees C

Days/Year Temp. > 18 degrees C

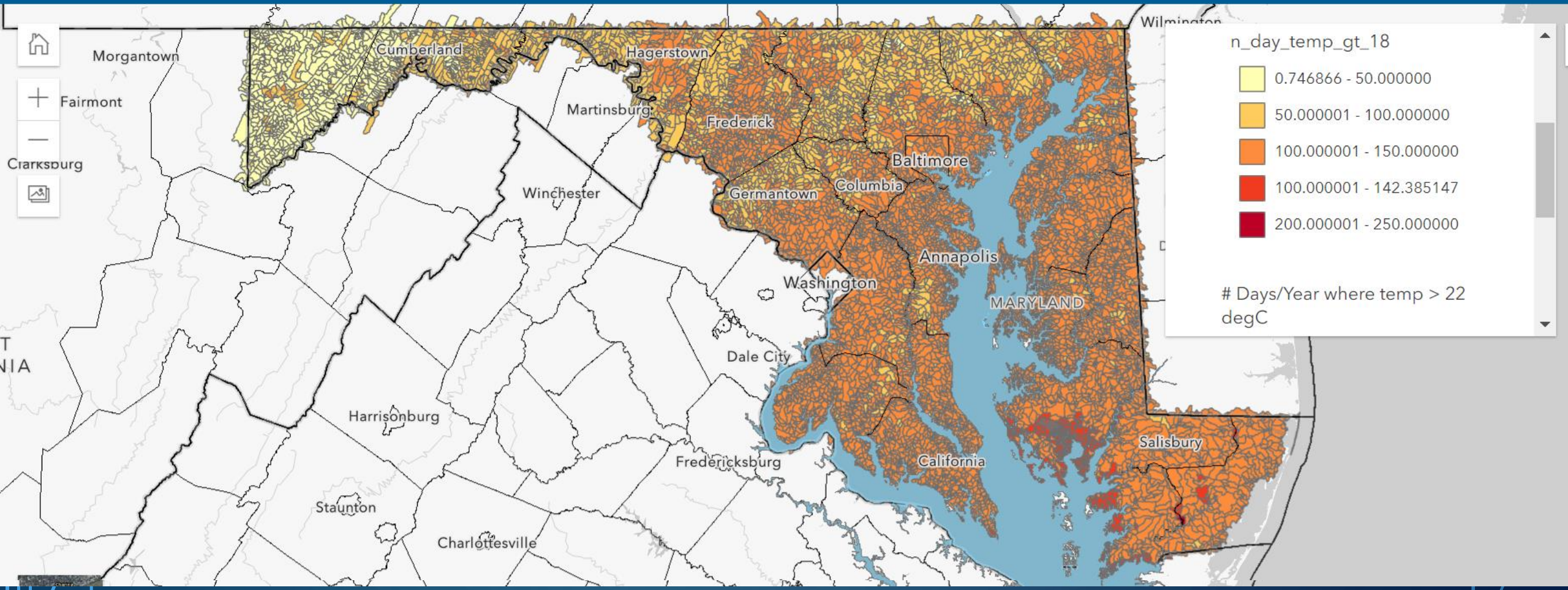
Days/Year **Temp. > 22 degrees** C

The Nature Conservancy – Resilient Lands

Northeast Atlantic Landscape Conservation Cooperative, Nature Network Project

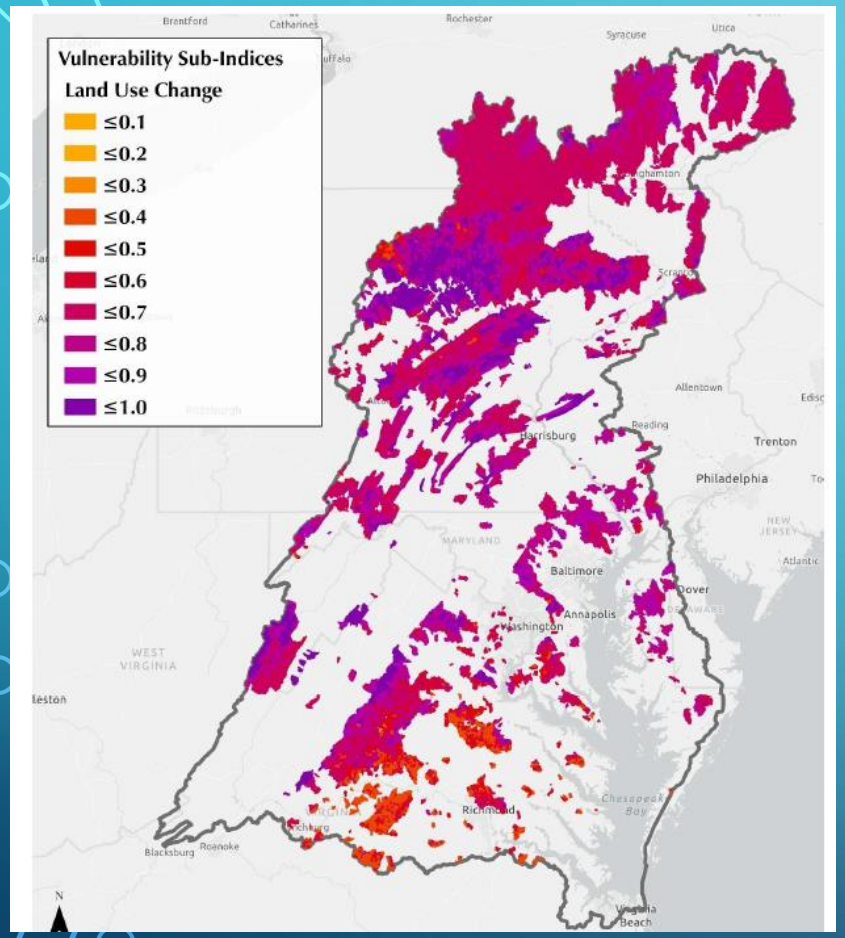
- Climate Stress

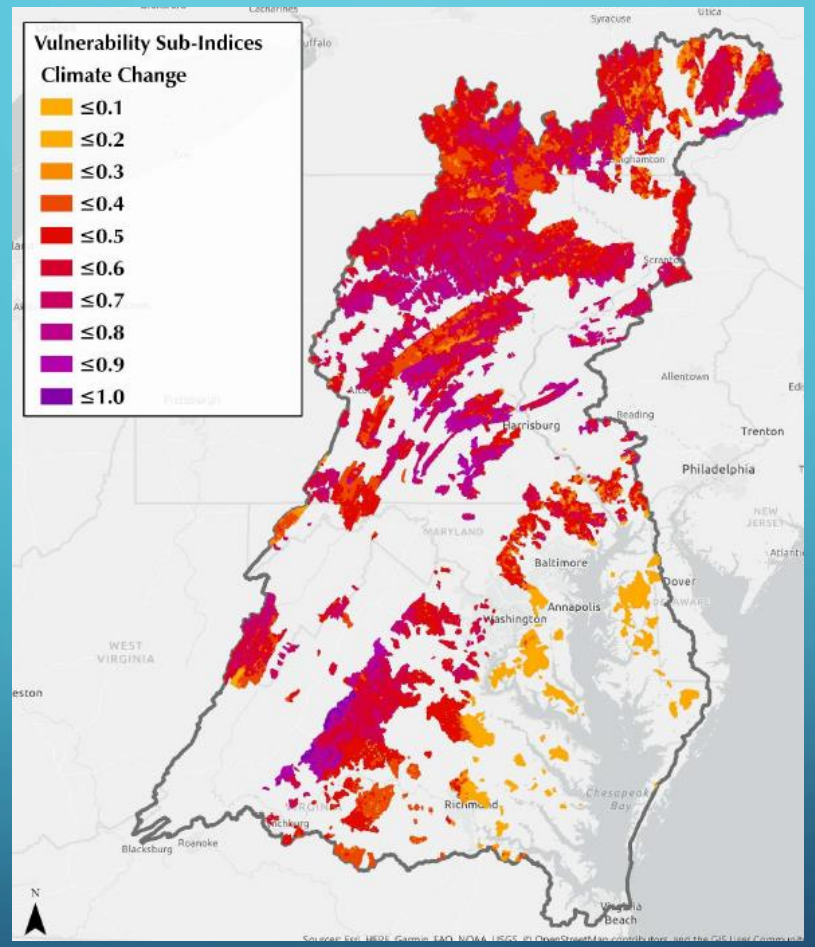
Maryland Healthy Watersheds Assessment Catchment Metrics



LAND USE CHANGE AND CLIMATE CHANGE

VULNERABILITY METRICS





Chesapeake Bay State-Identified Healthy Watersheds

0 25 50 100 Kilometers

0 25 50 100 Miles

TETRA TECH

STREAM HEALTH WG CONNECTIONS

- climate change may greatly impact stream health

  Influenced by:
- rising water temperatures
- changing IDF precipitation patterns.

How will these changes affect the biological communities and how will the Chessie BIBI scores will change throughout the watershed?

What trends are expected to occur and how to maintain or improve the ability of streams to acclimate to these changes?

The stressors project can guide us to the most appropriate practices to focus on to mitigate the effects of climate change and our additional future indicators may help to capture those changes on a more frequent scale and address them more quickly than the Bay-wide BIBI metrics.