THE CHESAPEAKE HEALTHY WATERSHEDS ASSESSMENT

What exactly is it and how can it help other Chesapeake Bay Program Outcomes?

HEALTHY WATERSHEDS GOAL

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.

Sustain watershed health where it is ***high, exceptional and/or outstanding…***

to ***increase the number of healthy watersheds*** in the future…

Provide the forum for mutual shared learning…

Develop information resources…
and
Promote the science

HEALTHY WATERSHEDS VISION

WHAT IS A STATE-IDENTIFIED HEALTHY WATERSHED?

How are they defined, and what information is missing?

STATE METRICS

Pennsylvania

- Benthic macroinvertebrate community
- Located in designated state or national protected, owned, or managed areas
- Designated wilderness trout stream by the Fish and Boat commission
- Chemical data such as DO, toxics, pH

Virginia

- INSTAR-Interactive stream assessment resource, index of biotic integrity
- Data on fish and macroinvertebrate communities, instream and riparian habitat
- High numbers of native/broad diversity of species, few or no non-native aquatic species, few generalist species

STATE METRICS

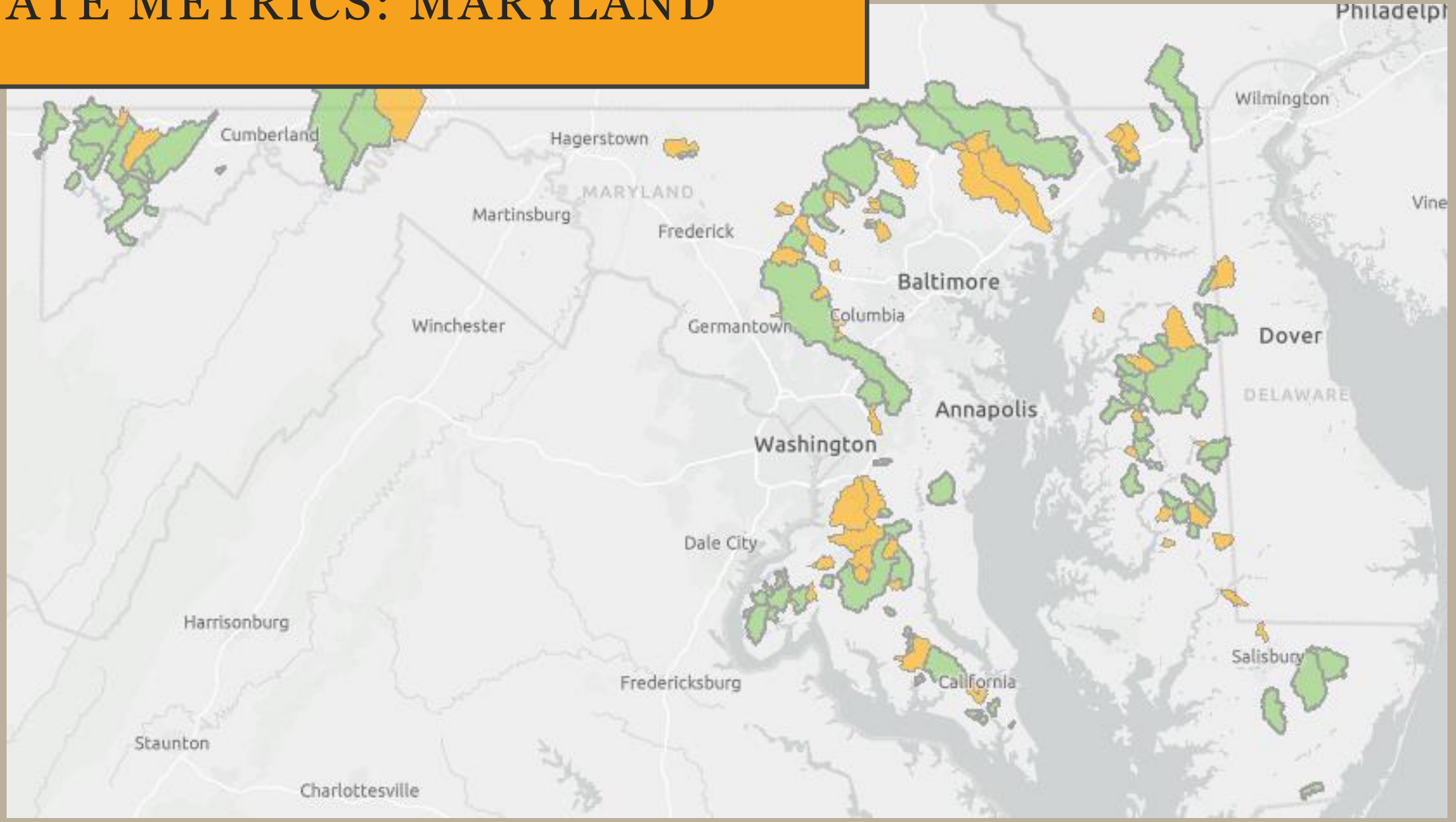
Maryland

- Tier II streams are identified according to fish and benthic indices of biotic integrity
- Based on data collection and analysis from Maryland Biological Stream Survey (MBSS) Protocols
- Tier II streams are grouped into catchments and those with Assimilative Capacity, or the natural capacity of a water body to dilute and absorb pollutants

West Virginia

- No state-defined “healthy watersheds”
- Known as Tier 3: “outstanding national resource waters”
- Have exceptionally high benthic macroinvertebrate communities
- Located in Federal Wilderness areas, state and national parks, national forests, and protected by the Wild and Scenic Rivers Act
- Naturally reproducing trout streams

STATE METRICS: MARYLAND



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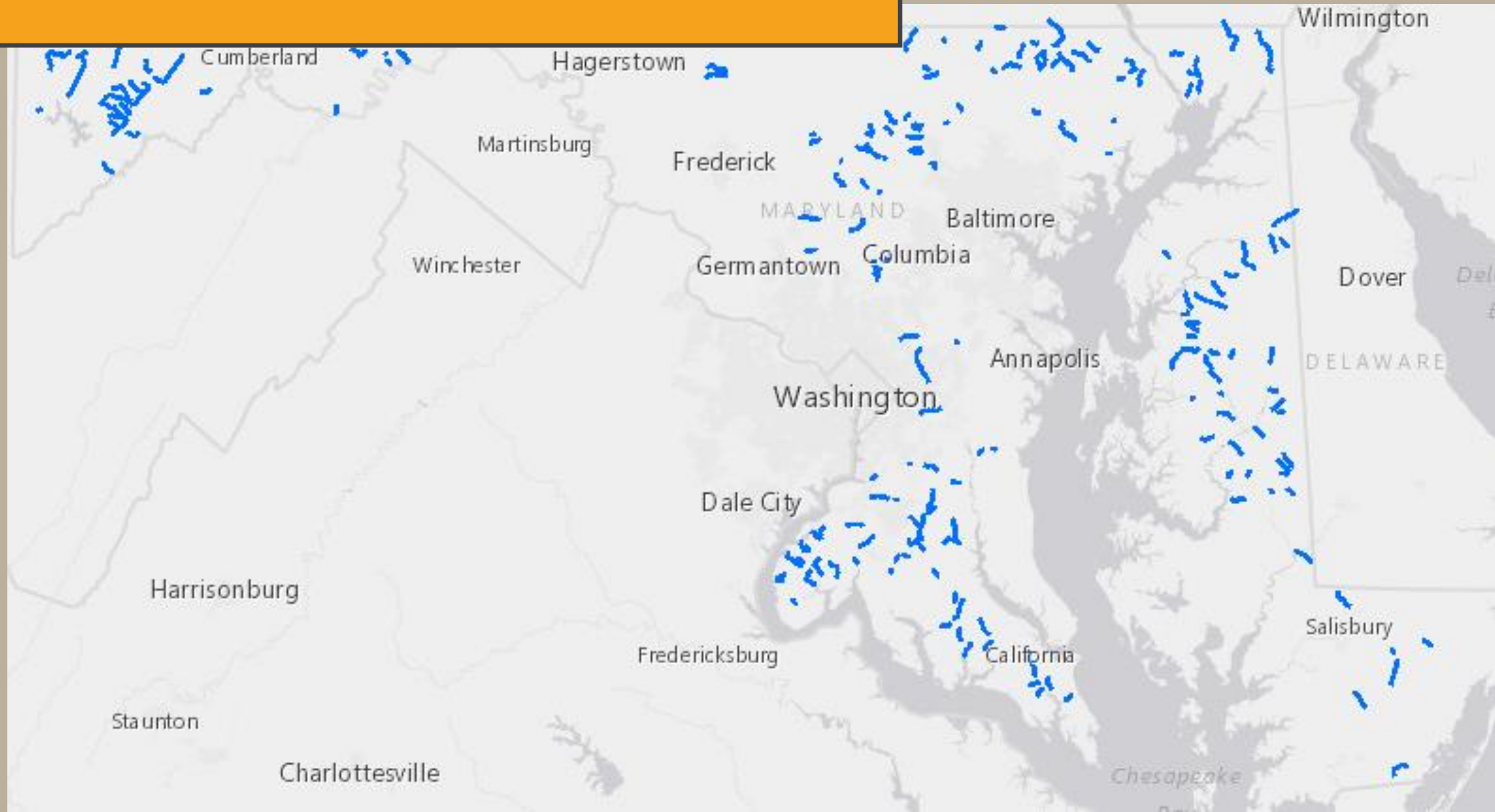

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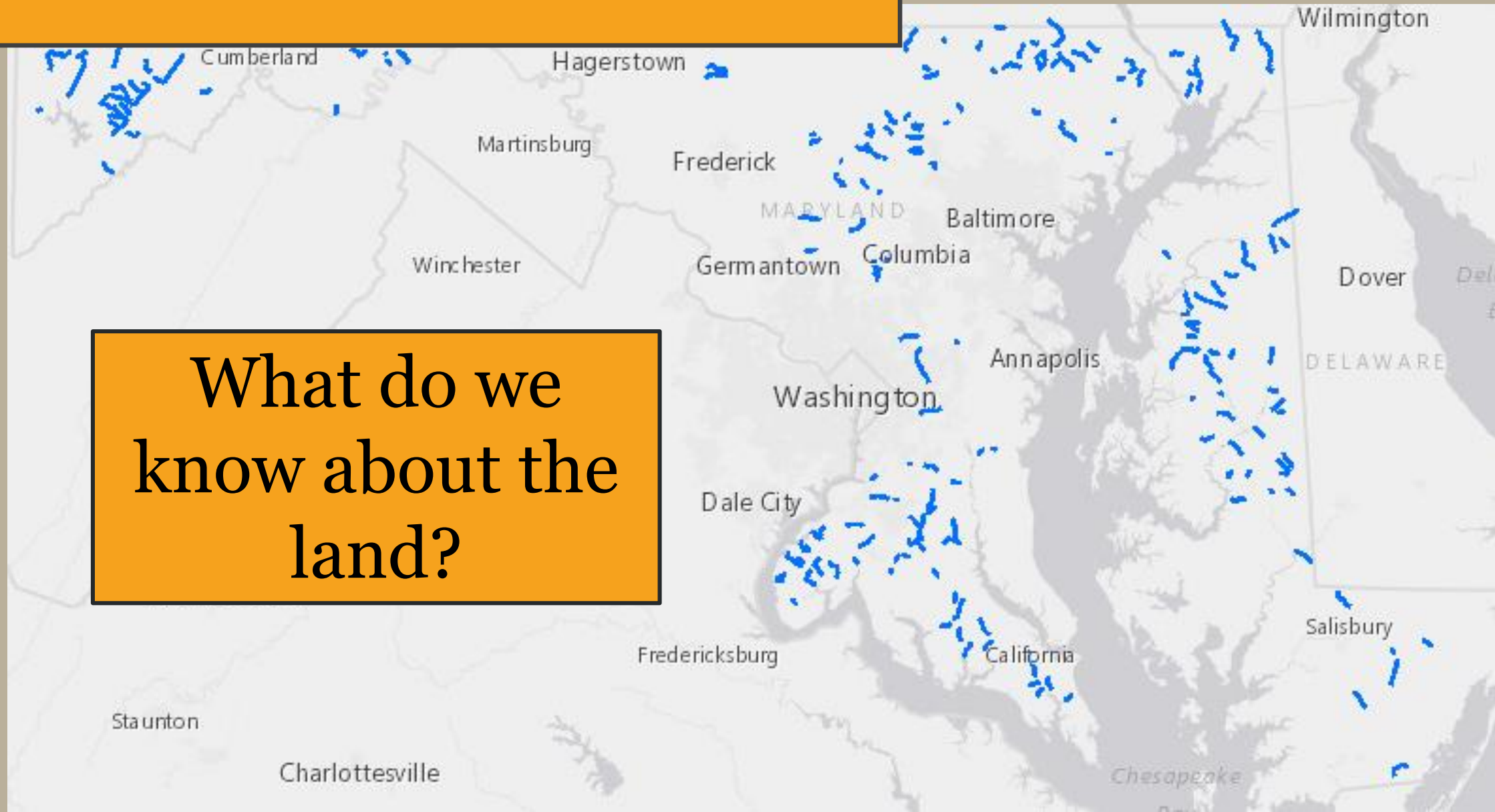


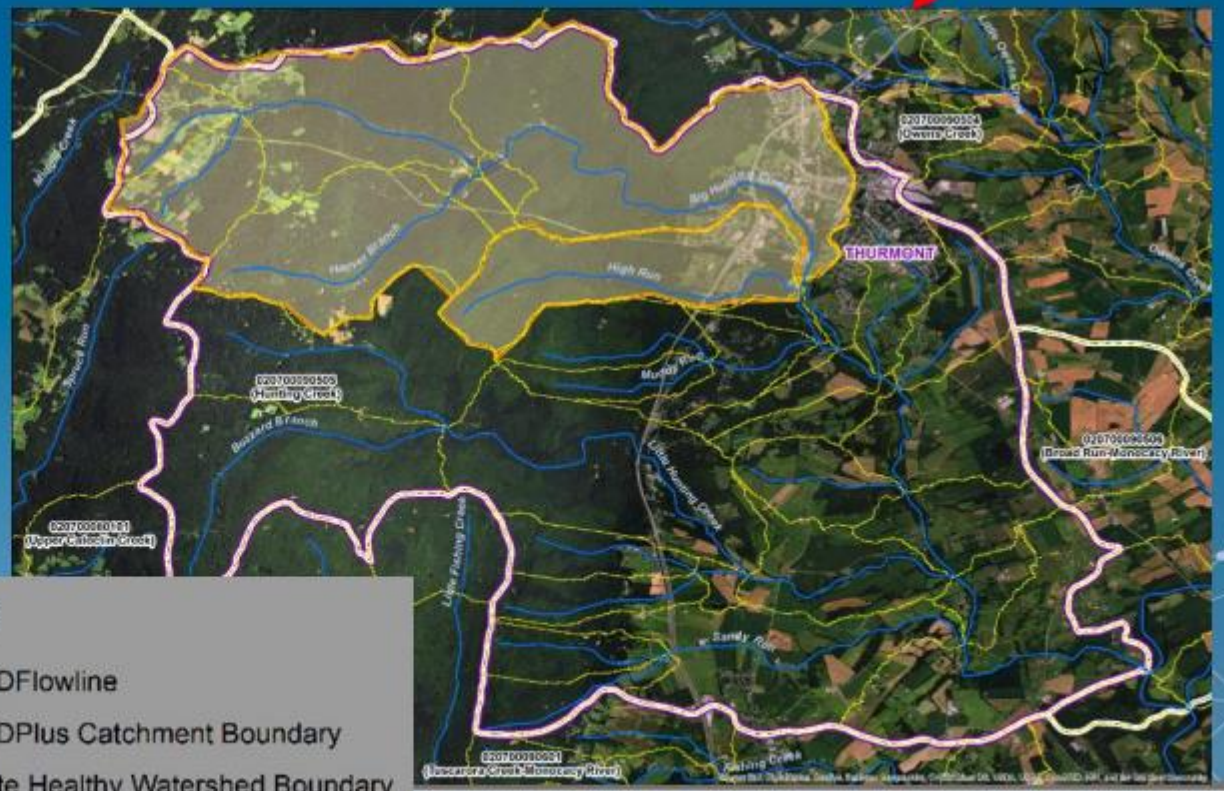
What do we know about the land?

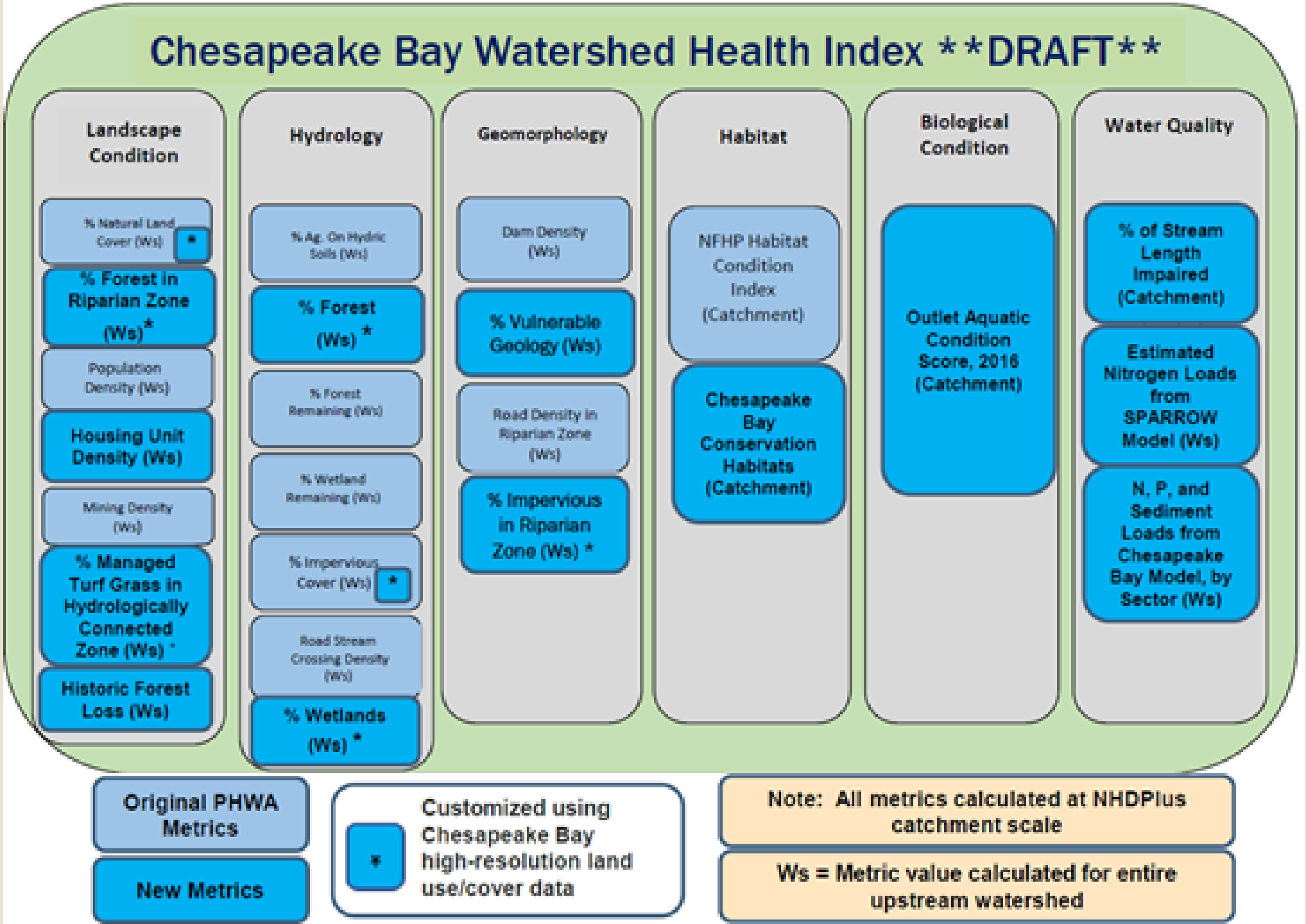
CHESAPEAKE BAY WATERSHED HEALTH INDEX

- Landscape Condition
- Hydrology
- Geomorphology
- Habitat
- Biological Condition
- Water Quality

Addressing Watershed Scale

- PHWA developed nationally to provide data at HUC12 scale; this regional application required finer scale
- Developed metrics at NHDPlus catchment scale
- Calculated for all 83,623 catchments in Chesapeake watershed (average area ~2 km^2)




Chesapeake Bay Watershed Health Index **DRAFT**
Landscape Condition
% 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
% Ag. On Hydric Soils (Ws)
% Forest (Ws) *
% Forest Remaining (Ws)
% Wetland Remaining (Ws)
% Impervious Cover (Ws) *
Road Stream Crossing Density (Ws)
% Wetlands (Ws) *
Geomorphology
Dam Density (Ws)
% Vulnerable Geology (Ws)
Road Density in Riparian Zone (Ws)
% Impervious in Riparian Zone (Ws) *
Habitat
NFHP Habitat Condition Index (Catchment)
Chesapeake Bay Conservation Habitats (Catchment)
Biological Condition
Outlet Aquatic Condition Score, 2016 (Catchment)
Water Quality
% of Stream Length Impaired (Catchment)
Estimated Nitrogen Loads from SPARROW Model (Ws)
N, P, and Sediment Loads from Chesapeake Bay Model, by Sector (Ws)
Original PHWA Metrics
New Metrics
* Customized using Chesapeake Bay high-resolution land use/cover data
Note: All metrics calculated at NHDPlus catchment scale
Ws = Metric value calculated for entire upstream watershed

CHESAPEAKE BAY WATERSHED VULNERABILITY INDEX

CHESAPEAKE BAY WATERSHED VULNERABILITY INDEX

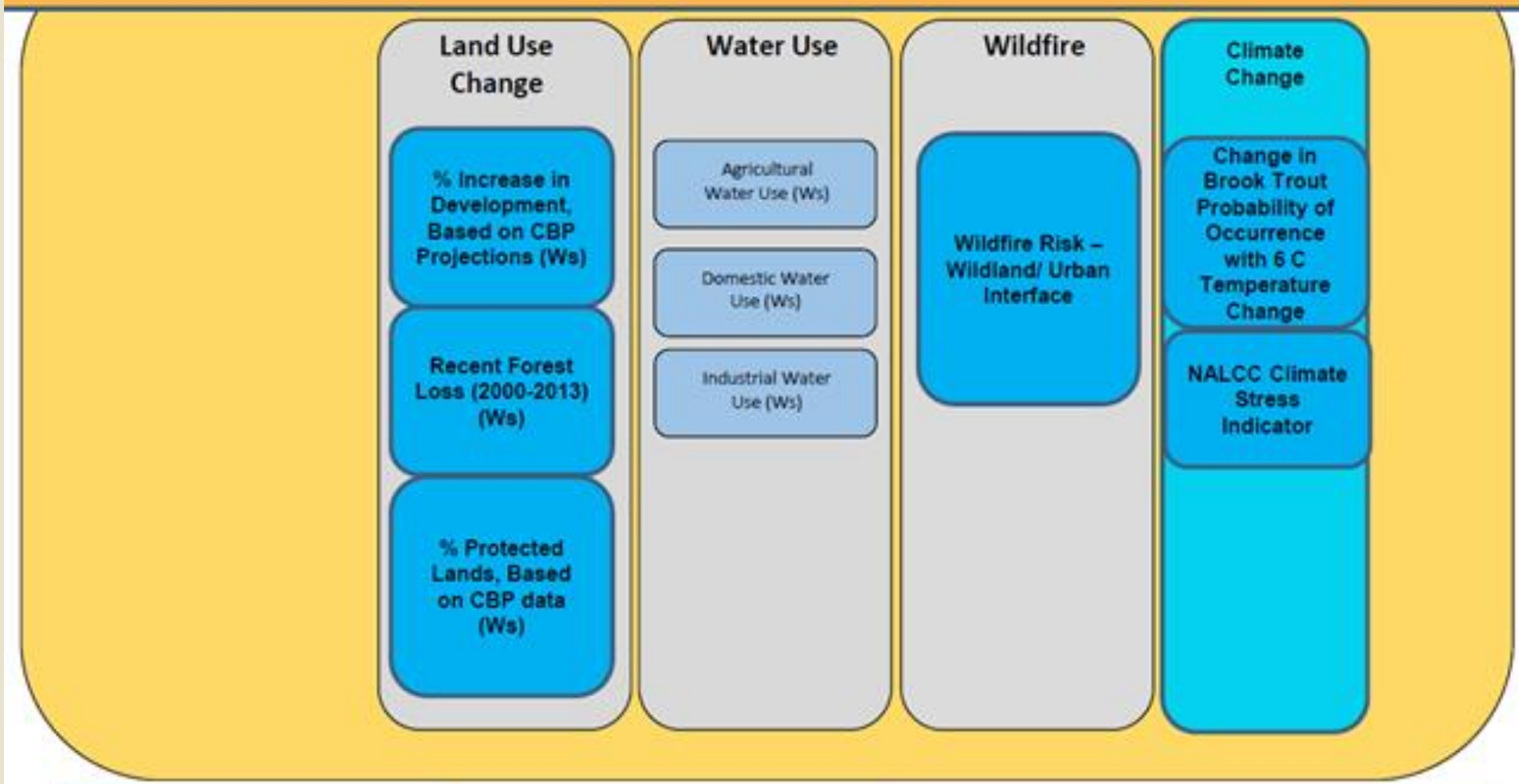
Land Use Change

Water Use

Wildfire

Climate Change

Chesapeake Bay Watershed Vulnerability Indicators **DRAFT**



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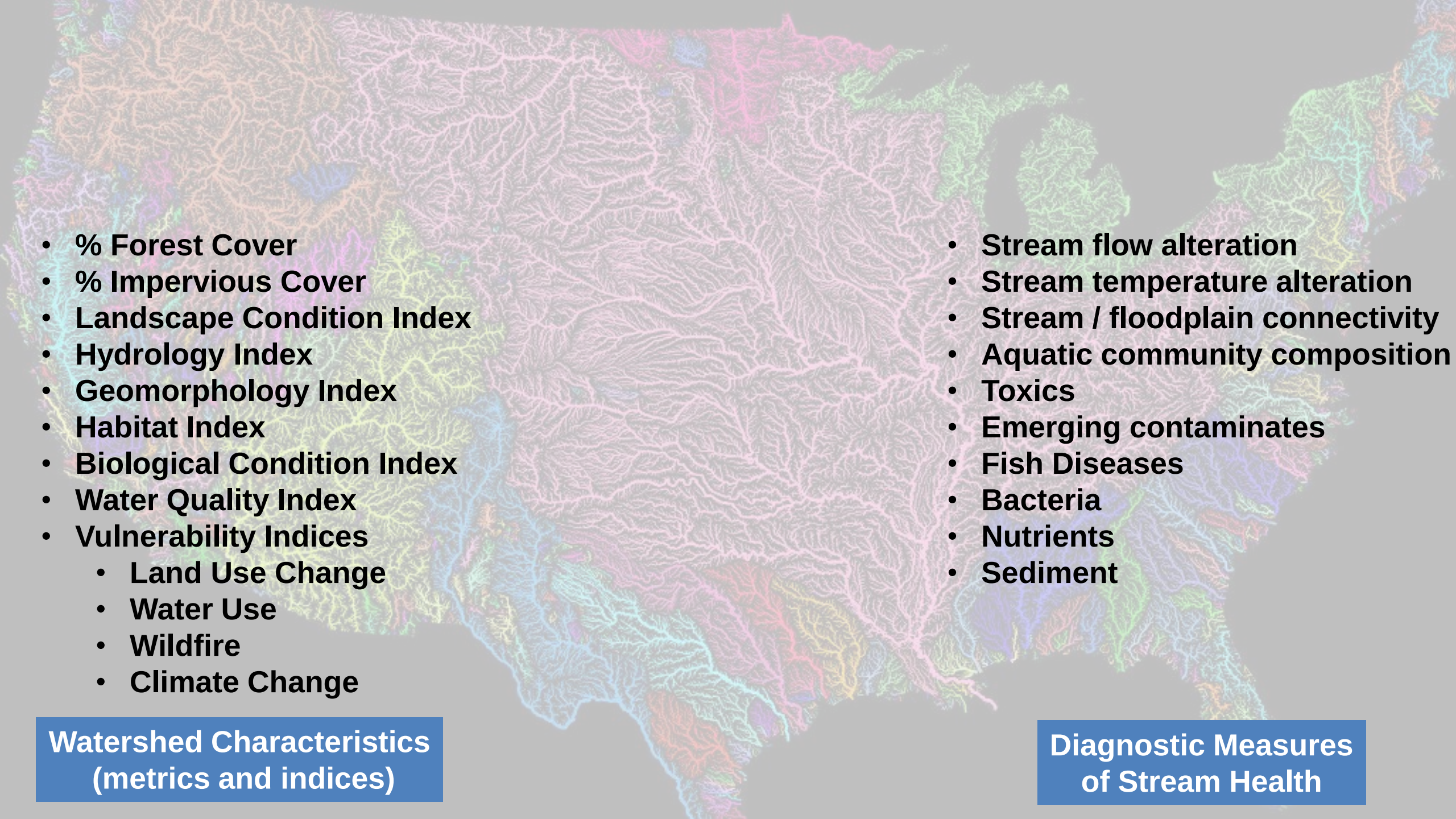
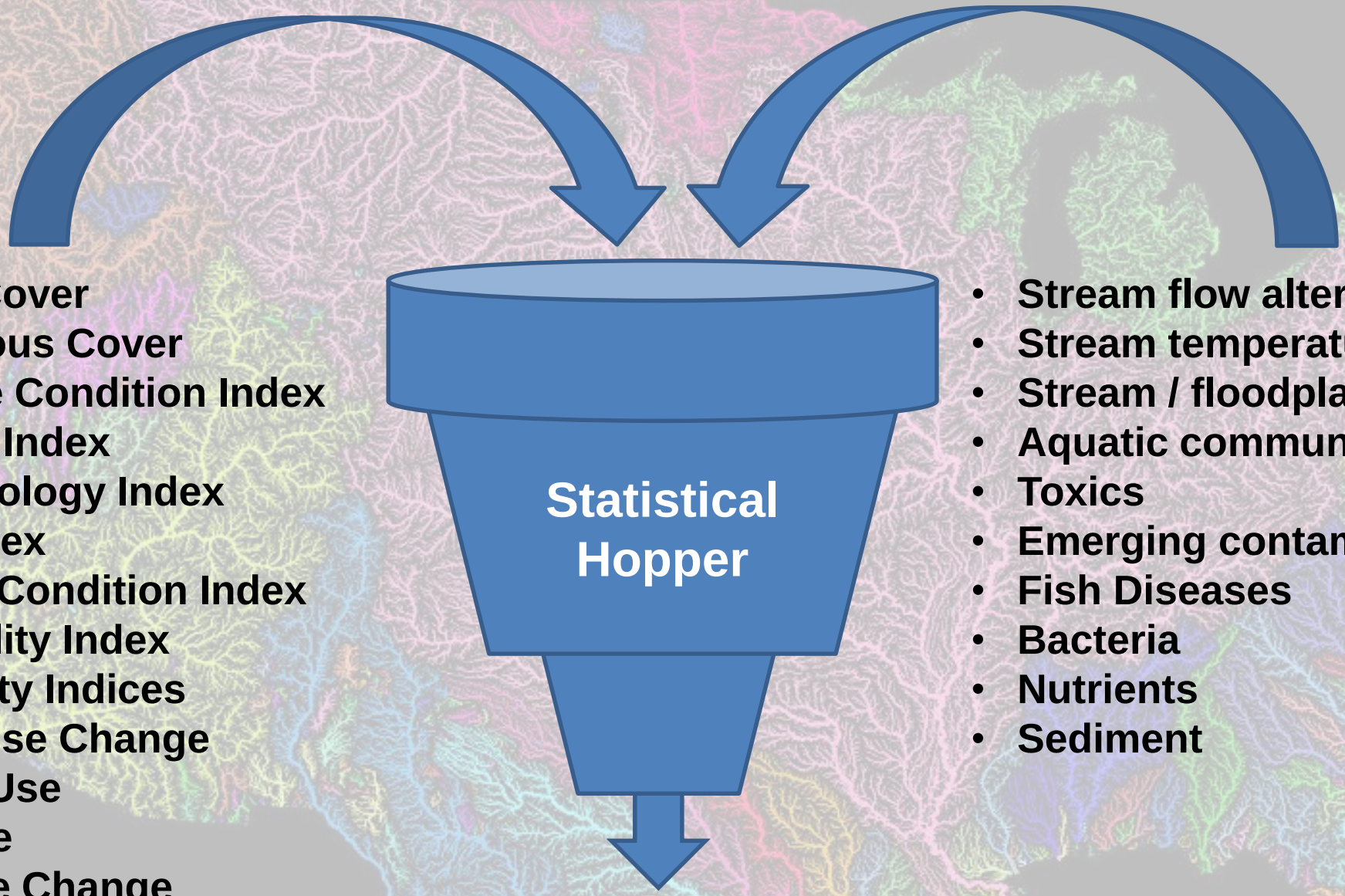


- % Forest Cover
- % Impervious Cover
- Landscape Condition Index
- Hydrology Index
- Geomorphology Index
- Habitat Index
- Biological Condition Index
- Water Quality Index
- Vulnerability Indices
  - Land Use Change
  - Water Use
  - Wildfire
  - Climate Change

Watershed Characteristics (metrics and indices)

- Stream flow alteration
- Stream temperature alteration
- Stream / floodplain connectivity
- Aquatic community composition
- Toxics
- Emerging contaminates
- Fish Diseases
- Bacteria
- Nutrients
- Sediment

Diagnostic Measures of Stream Health



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Diagnostic Measures of Stream Health

Indicators of Watershed Health

HOW DOES THIS HELP OTHER OUTCOMES?

CLIMATE RESILIENCY GOAL

- Increase the resiliency of the Chesapeake Bay watershed, including its living resources, habitats, public infrastructure and communities, to withstand adverse impacts from changing environmental and climate conditions.

CLIMATE RESILIENCY OUTCOMES

- *Monitoring and Assessment Outcome :*
- Continually monitor and assess the trends and likely impacts of changing climatic and sea level conditions on the Chesapeake Bay ecosystem, including the effectiveness of restoration and protection policies, programs and projects.

CLIMATE RESILIENCY OUTCOMES

- *Adaptation Outcome:*
- Continually pursue, design and construct restoration and protection projects to enhance the resiliency of Bay and aquatic ecosystems from the impacts of coastal erosion, coastal flooding, more intense and more frequent storms and sea level rise

HOW CAN CLIMATE RESILIENCY AND HEALTHY WATERSHEDS WORK TOGETHER?

- Lack of Collaboration
- Promoting the utilization of “climate-smart” decisions making tools and products
- Lack of capacity to monitor long term the success of climate resiliency indicators

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- Lack of capacity to monitor long term the success of climate resiliency indicators

- Introducing a new management activity focused on collaboration
- Apply Chesapeake Bay Climate Smart Framework in coordination with new GITs
- Tracking indicators as a measure of progress

Collaboration, Cooperation, and Integration