Defining "Healthy Populations" of Brook Trout in the Chesapeake Bay Program's Brook Trout Outcome.

Chesapeake Bay Program
Science. Restoration. Partnership.

Background and Context

As per direction of the Chesapeake Bay Program's December 2024 Executive Charge the Brook Trout Workgroup has revised the 2014 Brook Trout outcome of "Restore and sustain naturally reproducing brook trout populations in Chesapeake headwater streams with an eight percent increase in occupied habitat by 2025" to a new outcome with three targets:

Protect and enhance brook trout within the Chesapeake Bay watershed by increasing occupancy, abundance and resilience to changing environmental conditions.

- By 2040, increase brook trout occupancy by 1.5% (233 miles) in **watersheds supporting healthy populations** while achieving no net loss in other watersheds.
- By 2040, increase abundance at 10 long-term monitoring sites.
- By 2040, reduce identified threats by 15% to increase brook trout resilience in **watersheds supporting healthy populations**.

The new outcome attempts to focus conservation and restoration activities in areas supporting **healthy populations of brook trout**.

How does the Chesapeake Bay Program's Brook Trout Workgroup Classify Healthy Brook Trout Watersheds?

The Chesapeake Bay Program's Brook Trout Workgroup (BTWG) defines healthy watersheds based on Trout Unlimited's (TU) Eastern Brook Trout Conservation Portfolio highest priority conservation areas. For the brook trout outcome goal beyond 2025, BTWG will prioritize and direct land conservation and habitat restoration practices in the top two classifications, stronghold and persistent populations (i.e. healthy brook trout watersheds). This will ensure conservation funding is spent in the "best of the best" watersheds and have the greatest benefit to brook trout and their habitats. BTWG's new focus also aligns with the conservation tenets held by Eastern Brook Trout Joint Venture (EBTJV), TU and other conservation funding entities.

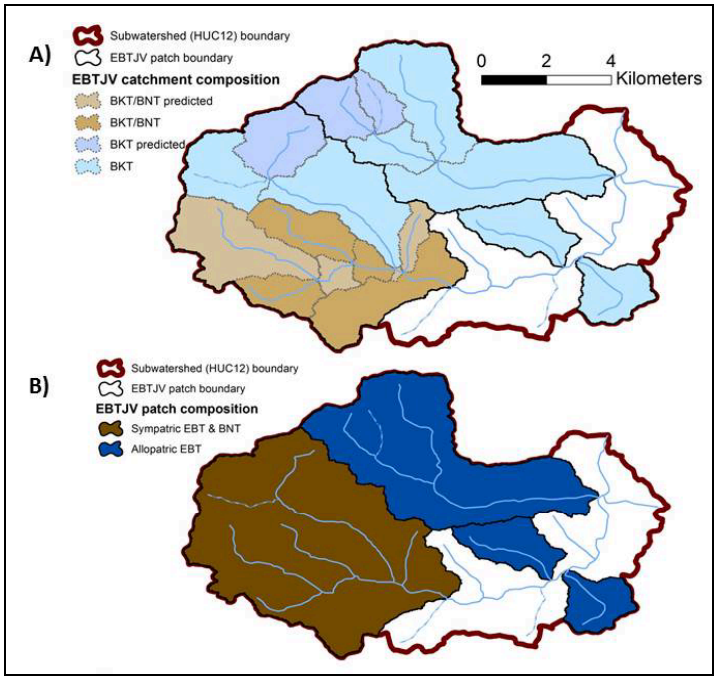

Figure 1. From (Fesenmyer et al., 2017) Visual representation of how multiple brook trout catchments translates into a brook trout patch of varying classifications.

Eastern Brook Trout Catchment & Patch Assessments

Access the Assessment | View EBTJV Information Here

The most recent EBTJV assessment assigns brook trout, brown trout, and rainbow trout occupancy to "catchments" – watersheds of stream reaches approximately 2-5 km long. Since field data exist for only about 20-30% of these small reaches, the EBTJV assessment employs a rule set in GIS that predicts trout

occupancy. A classification code is derived from field data and then is assigned upstream until a barrier, different sample, or stream end is encountered. The algorithm is described further here. Catchments with the same classification are combined into patches, or groups of contiguous catchments occupied by wild brook trout. Patches are not connected physically to each other, and are assumed to be genetically isolated populations.

Sympatric refers to brook trout occupying a watershed alongside other salmonid species (i.e., brown and/or rainbow trout); allopatric refers to brook trout as the only salmonid in the watershed.

Trout Unlimited Conservation Portfolio (Fesenmyer et al., 2017)

View Website | Access ArcGIS Tool

Trout Unlimited's (TU) Brook Trout Conservation Portfolio applies the 3-R framework (***Resiliency***, ***Redundancy***, and ***Representation***) to evaluate each EBTJV patch and assigns a conservation strategy, which plots 3-R Portfolio classes against habitat integrity. ***Resiliency*** is the capacity for populations to recover from environmental disturbances, and is associated with larger population patches with diverse stream habitats and fewer non-native trout species. Resilient populations are also referred to as 'Strongholds'. ***Redundancy*** relates to the occurrence of multiple populations that can be considered persistent, or having the demographic capacity to resist genetic bottlenecks through sufficient population size. ***Representation*** relates to maintaining genetic, life history, and geographic diversity by preserving populations throughout their geographical range and across varied habitat types.

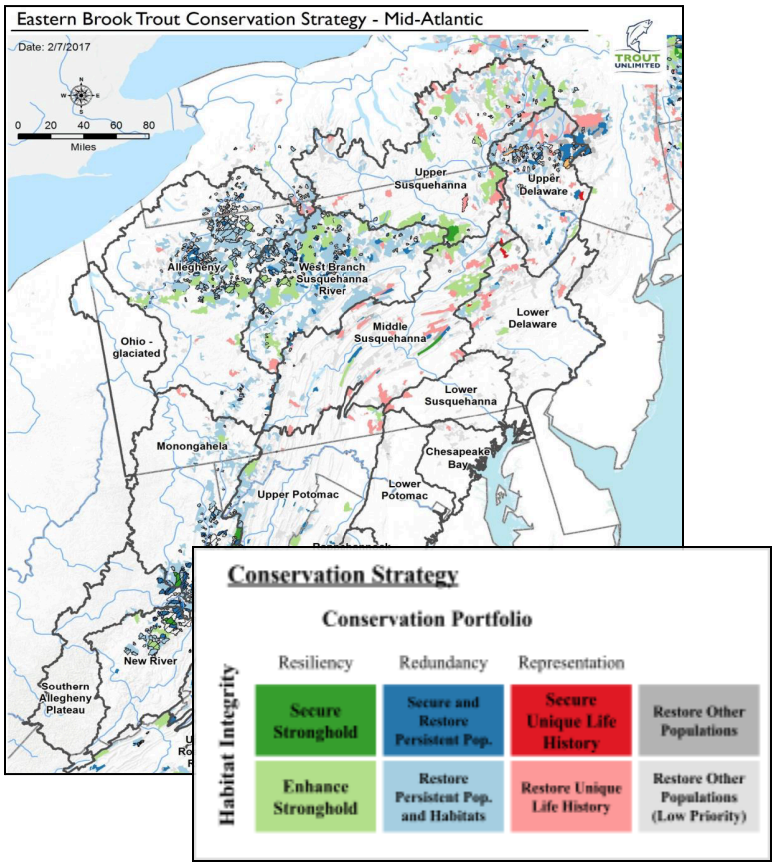

Figure 2. From (Fesenmyer et al., 2017) Color coded map and legend of Trout Unlimited's Brook Trout Conservation Portfolio's strategies.

TU's ***Secure Stronghold*** strategy includes 'resilient' patches with high habitat integrity that have relatively few stressors present. ***Secure and Restore Persistent Population*** strategy is assigned to 'Redundant' patches with high habitat integrity scores that have relatively few stressors present. Resilient, or stronghold patches have at least 25km of brook trout-only stream habitat and at least one occupied large stream. TU's ***Restore Other Populations*** strategy is assigned to populations that "do not meet the resiliency or redundancy criteria. These populations do still contribute to representation." For more details see Trout Unlimited's Conservation Portfolio Documentation.

References

Fesenmyer, K., Haak, A., Rummel, S., Mayfield, M., Mcfall, S., & Williams, J. (2017). *Eastern Brook Trout Conservation Portfolio, Range-wide Habitat Integrity and Future Security Assessment, and Focal Area Risk and Opportunity Analysis*. https://doi.org/10.13140/RG.2.2.33170.76487

Maloney, L. A., Rash, J. M., & Simard, L. G. (2025). Eastern Brook Trout Joint Venture: Helping Brook Trout for over 20 years as a National Fish Habitat Partnership. *Fisheries*, *50*(12), 548–554. https://doi.org/10.1093/fshmag/vuaf070