Brook Trout Outcome, Resiliency Target:

By 2040, reduce identified threats by 15% to increase brook trout resilience in watersheds supporting healthy populations.

Identified Threats:

Note: This breakdown shows the numeric association for each threat category with the larger target's 15% threat reduction, but the partnership can overperform in one category to offset underperformance in another and still will be able to reach the resiliency target goal. All numeric values reflect the work should be done **exclusively in watersheds supporting healthy brook trout populations.**

Averaging all categories: [**15%** + **15%** + **12%** + **30%** + **1.5%**] ÷ 5 = **~15% for 2040**

1 Reduce Threat of Acid Mine Drainage: Treat AMD

Miles of AMD impaired within watershed supporting healthy brook trout populations is 394 miles (333(PA) + 43(MD) + 18 (WV))

- Applying 15% (the same as the fish habitat target) our goal would be **60 miles by 2040**

Note: The Fish Habitat Outcome AMD target is to improve 270 (15%) miles of AMD-impaired waters by 2040.

Data Sources:

- AMD Impairment: EPA Integrated Water Quality Reports and the EPA Assessment, Total Maximum Daily Load (TMDL) Tracking and Implementation System (ATTAINS) dataset.
- Watersheds supporting healthy brook trout populations: Trout Unlimited's Eastern Brook Trout Conservation Portfolio.

Methodology: The 303d listings within EPA Integrated Reports were used for the jurisdictions (Pennsylvania and Maryland) that explicitly address acid mine drainage as a source of impairment. While the ATTAINS dataset was used for the jurisdictions where the source of impairment due to acid mine drainage is not identified. In this case, impaired streams with low pH in addition to the presence of metals other than mercury, were used. Impaired streams from the datasets by state were brought into the GIS environment and clipped to the extent of Trout Unlimited's Eastern Brook Trout Conservation Portfolio's conservation strategy of stronghold and persistent patches. The extent of impairment by AMD was then calculated in miles from these characterizations.

2 Reduce Threat of Unforested Land Cover: Plant Buffers

Stream miles & acres without intact buffer (35ft buffer) = 2,376.6 miles or 33,498.4 acres

- 15% of mileage and acreage = **360 miles / 5000 acres by 2040**

Note: The "Healthy Forests and Trees" Outcome's "Forest Buffers" target is to plant and maintain 7,500 acres of forest buffers annually.

Data Sources:

- Land Use / Land Cover: Chesapeake Bay Land Use/Land Cover (LULC) Database 2024 Edition - ScienceBase-Catalog
- Buffer extent: Chesapeake Bay Watershed 1:24k 10, 30 and 90-meter Riparian Buffer Zones - ScienceBase-Catalog

- Watersheds supporting healthy brook trout populations: Trout Unlimited's Eastern Brook Trout Conservation Portfolio.

Methodology: The buffer zone for this analysis was defined by the Chesapeake Bay Watershed 1:24,000 resolution 35-foot riparian buffer (McDonald et al., 2024). All stream reaches with greater than 65% (Hudy et al., 2008) (Wagner et al., 2013) forest cover were defined as having an intact buffer. Streams that were deemed as not having an intact buffer were counted towards the mileage (2,376.6 miles) and acreage (33,498.4 acres) calculation for the overall restoration potential.

To approximate a realistic goal, the percentage of land area of watersheds supporting healthy brook trout populations to total Chesapeake Bay Watershed land area (~13%) was applied to "Healthy Forests and Trees" Outcome's Draft "Forest Buffers" Target of 75,000 acres by 2035. This showed that 9750 acres by 2035 would be realistic assuming the same resources applied to the whole watershed were applied to watersheds supporting healthy brook trout populations. However, being more conservative the restoration goal was set at 15% restoration (360 miles / 5000 acres) of zones without intact buffers by 2040.

3 Reduce Threat of Sediment Runoff from Dirt and Gravel Roads: Improve Unpaved Roads

Miles of Unpaved Roads within watershed supporting healthy brook trout populations in 2025 = 2,265.

- 12% of 2,265 miles = **270 miles by 2040**

Note: The "Reducing Excess Nitrogen, Phosphorus and Sediment" Outcome is: "Implement and maintain practices and controls that will reduce excess [...] sediment to support living resources".

Data Sources:

- Mileage of unpaved roads: _____
- Watersheds supporting healthy brook trout populations: Trout Unlimited's Eastern Brook Trout Conservation Portfolio.

Methodology: The majority of unpaved roads affecting watersheds supporting healthy brook trout populations are within the state of Pennsylvania. Utilizing the dataset _____ maintained by Penn State Center of Dirt and Gravel Roads, the amount of unpaved roads that were improved in the past 10 years within healthy brook trout watersheds were calculated. This number (8%) was used as the rate that we strive to maintain for the next 10 years and was extrapolated out for 2040 to get 12%. This rate was then applied to the number of unpaved roads as of 2025 within healthy brook trout watersheds (2,265 miles) to yield 270 miles by 2040.

4 Reduce Threat of Fragmented Habitat: Improve Culverts

Focusing on just assessed culverts, there are 500 structures associated with 740 miles of potential habitat reconnected in watersheds supporting healthy brook trout populations.

- 30% of 740 miles/500 culverts = **222 miles / 150 culverts by 2040**

Note: The "Fish Passage" Outcome is 150 miles bi-annually.

Data Sources:

- Barriers and associated habitat reconnection potential: Chesapeake Fish Passage Prioritization Tool.
- Watersheds supporting healthy brook trout populations: Trout Unlimited's Eastern Brook Trout Conservation Portfolio.

Methodology: Barrier data were obtained from the Chesapeake Fish Passage Prioritization Tool (version 3.4.0), which included removal feasibility ratings and upstream functional network miles for each barrier. Barriers were filtered to include only those within watersheds supporting healthy brook trout populations. 500 assessed culverts and 6 feasibly removable assessed dams matched these criteria; scope was limited to only assessed culverts. Upstream functional miles were then summed for each removal feasibility rating. Further information about the calculation of upstream functional network miles are described in the 2023 Chesapeake Fish Passage Prioritization report.

5 Reduce Threat of Development: Protect Land

Acres of natural lands (Includes forest cover, terrene and riverine wetlands, and natural succession) that aren't protected in watersheds supporting healthy brook trout populations is 2,065,676 acres.

- 1.5% of 2,065,676.8 acres = **~30,000 acres by 2040**

Note: The "Protected Lands" target is an additional 1.5 - 2 million acres by 2040 or 100,000 to ~130,000 annually.

Data Sources:

- Protected Lands in the Chesapeake Bay Watershed: **The CBP Protected Lands Indicator dataset**.
- Watersheds supporting healthy brook trout populations: **Trout Unlimited's Eastern Brook Trout Conservation Portfolio**.

Methodology: The protected lands indicator dataset was used to calculate the percent (~43%) and acreage (~2,065,676 acres) of not-protected natural lands (includes forest cover, terrene and riverine wetlands, and natural succession) within watersheds supporting healthy brook trout populations. The proposed goal would be 30,000 (1.5%) acres of newly protected natural lands by 2040. For more information on the dataset, its sources, and the Bay Program accepted definition of protected lands see the Protected Lands Indicator Analysis and Methods Document.

References

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