

Brook Trout Outcome Sub-Chapter

Brook Trout Outcome: 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.

Baseline and Current Condition

Wild (stream born) brook trout populations occupy approximately 30% of their historic range. Within the Chesapeake Bay watershed, most wild brook trout are found in headwater streams where human disturbance is minimal and forest cover is greater than 68-75% (Hudy et al. 2008, Wagner et al. 2013).

The 2016 Eastern Brook Trout Joint Venture (EBTJV) assessment, established as a baseline, indicated 1,713 wild brook trout patches in the Chesapeake Bay watershed, covering 33,250 square kilometers. The 2024 CBP Brook Trout Workgroup *Facilitating Brook Trout Outcome Attainability* report documented a 0.5% net increase in occupancy from 2016–2023. This net increase, combined with newly discovered populations, brings the total area of allopatric (i.e., brook trout only) occupied habitat to 15,305 square kilometers.

Population Category	2016 Baseline Area (km ²)	2024 Apparent Total Area (km ²)	Apparent Net Gain (km ²)	Adjusted Net Gain (km ²)	Confirmed True Net Gain (km ²)
Total Occupied Brook Trout	33,213	36,168	+2,955	+742	+167
Allopatric (Brook trout only)	19,402	15,305	-4,097	Unknown	Unknown
Sympatric (With brown/rainbow trout)	13,811	20,863	+7,052	Unknown	Unknown

Table 1. 2024 changes in brook trout occupancy in the Chesapeake Bay Watershed (Rummel et al. 2024)

Explanation of Net Gain Categories:

- Apparent Net Gain (+2,955 km²): The raw difference in total area between the 2016 and 2024 assessments, representing an 8.9% increase.
- Adjusted Net Gain (+742 km²): The recalculated gain after removing 2,212 km² of newly sampled "unassessed waters". State biologists noted that these areas were likely already occupied by brook trout in 2016, but simply hadn't been sampled yet, making this an estimated 2.2% "true" increase rather than an 8.9% increase.

- **Confirmed True Net Gain (+167 km²):** The most accurate, verified estimate of newly occupied habitat. This is calculated by taking the adjusted net gain and additionally removing any catchments where brook trout presence was only assumed through modeling rather than verified by direct sampling, resulting in a 0.5% confirmed true gain.

Specific Area Shifts for Allopatric and Sympatric Populations: The final assessment does not provide the exact final net gain totals for the allopatric and sympatric sub-categories, but instead details the following specific spatial changes between 2016 and 2024:

- **+3,114 km²:** Catchments that had no brook trout in 2016 became **allopatric** in 2024.
- **+1,739 km²:** Catchments that were **sympatric** in 2016 shifted to **allopatric** in 2024.
- **-1,347 km²:** Catchments that were **allopatric** in 2016 shifted to **sympatric** in 2024.
- **-665 km²:** Catchments that were **allopatric** in 2016 shifted to having no brook trout present in 2024.

Monitoring Progress and Indicators

Indicator: Brook Trout Occupancy.

Progress is assessed using the EBTJV's 3–5 year range-wide assessment. Jurisdictions report annual habitat gains and losses (km²) to the EBTJV using a standardized occupancy reporting protocol for integration into their range-wide assessment reports. Progress will be assessed relative to percentage gains in [healthy watersheds](#) and no net loss in other watersheds.

Indicator: Abundance Monitoring.

Jurisdictions conduct annual monitoring at 10 long-term Brook Trout Abundance Monitoring Sites (BTAMS), and report population census data to the Brook Trout Workgroup (BTWG).

Indicator: Reducing Identified Threats.

The BTWG uses the [Habitat Tracker](#) to document restoration projects (e.g., forested riparian buffers, [aquatic organism passage](#), acid mine drainage, dirt and gravel road improvements) and land conservation projects to monitor progress toward this outcome.

Challenges	Within CBP Sphere of Influence	Outside CBP Sphere of Influence
Land development and habitat fragmentation	X	
Climate change: Increased water temperature, droughts, flashier storms*		X
Changes in water chemistry (e.g., 6PPD-q, fracking water)	X	X
Legacy Acid Mine Drainage (AMD)	X	
Undersized/blocking culverts (fish passage)	X	
Livestock access to streams	X	
Increasing human population strain		X
Consistency in interjurisdictional funding		X

Data consistency in eDNA/occupancy monitoring	X	
---	---	--

Snapshot of Signatory Programs

All signatory states with historic wild brook trout populations list Brook Trout as a Species of “Greatest Conservation Need” in Wildlife Action Plans.

Maryland (DNR):

- Operates under a statewide Brook Trout Fisheries Management Plan; focuses on western Maryland mining impact mitigation and county DOT partnerships for aquatic organism passage (AOP).

New York (DEC):

- Focuses on Chemung and Susquehanna watersheds; habitat enhancement (e.g., Wylie Brook) and trout stream surveys.

Pennsylvania (PFBC):

- Statewide trout management plan, annual sampling plans, and unassessed waters initiative to monitor population trends and identify new brook trout patches.

Virginia (DWR):

- Maintains a statewide Coldwater Stream Database.

West Virginia (DNR):

- Chesapeake Bay Heritage Strain breeding and reintroduction program; maintains a comprehensive Stream Fish Database.

Federal/NGO Partners (USGS, USFWS, NPS, USFS, NRCS, TU, EBTJV):

- Provide decision support tools (e.g., ecoSHEDS, Trout Unlimited’s Range-Wide Assessment and Conservation Portfolio Analysis), technical/financial assistance for riparian buffers and other water quality improvements, and scientific research on groundwater/climate resiliency.

Management Approaches for Outcome 2: Brook Trout

Management Approach 1.2.1: Identify and Communicate Priority Focal Areas.

Use Trout Unlimited’s Conservation Portfolio and Management strategy to identify restoration priorities in watersheds supporting healthy populations (i.e. stronghold and persistent patches).

Management Approach 1.2.2: Refine and Apply Decision Support Tools.

Educate managers on the use of [Trout Unlimited’s Eastern Brook Trout Conservation Portfolio](#), the [Chesapeake Bay Fish Passage Prioritization Tool](#), [NAACC](#), and the [USGS ecoSHEDS](#) website to adapt to changing environmental conditions.

Management Approach 1.2.3: Continue and Expand Monitoring.

Jurisdictions will continue annual assessment reporting to EBTJV to track occupancy. A minimum of two BTAMS will be identified in each jurisdiction in 2026 to establish a new long-term monitoring network to track abundance of brook trout (10 total). Expand the use of eDNA to complement ongoing monitoring efforts to better inform brook trout losses and track occupancy progress.

Management Approach 1.2.4: Targeted Restoration of Strongholds.

Implement priority restoration practices that address aquatic organism passage, AMD, dirt and gravel road runoff, riparian forest buffers, livestock exclusion, and unprotected lands to expand occupancy and increase resiliency in priority watersheds. Use the [Habitat Tracker](#) to track progress.

Management Approach 1.2.5: Address Emerging Stressors.

Coordinate with academic and federal partners to model groundwater influence on stream temperatures, emerging water quality threats, and assess the impacts of land use and climate change on population dynamics.

Management Approach 1.2.6: Coordinate with other CBP workgroups.

Work collaboratively with other workgroups to identify overlapping outcome priorities.

Management Approach 1.2.7: Implement recommendations of 2026 STAC Report, as funding and partner interest allows.

Establish and maintain Brook Trout Collaborative with State, Federal, County, and NGO partners. Work with partners to share conservation grant opportunities and coordinate project tracking.

Participating Partners

The following partners participated in the creation of this Management Strategy and expressed their intention to collaborate on Management Strategy implementation over the next six years. Per the Chesapeake Bay Watershed Agreement, “participation in developing Management Strategies or in the achievement of Outcomes varies by signatory based on differing priorities across the watershed. This participation may include commitments such as sharing knowledge, data or information, educating the public, working on future legislation and developing or implementing programs or verified practices” (2025). Signatory partners may join implementation efforts at any time. Partners also recognize that Signatory participation is voluntary and may vary accordingly.

- **Signatory Partners:**
 - TBD, will need to be added after November by signatory partners
- **Other Partners:**
 - U.S. Fish and Wildlife Service
 - U.S. Geological Survey
 - National Park Service
 - USDA Forest Service
 - USDA Natural Resource Conservation Service
 - EBTJV
 - Trout Unlimited
 - Western Pennsylvania Conservancy
 - West Virginia University
 - Eastern and Western Pennsylvania’s Coalitions for Abandoned Mine Reclamation
 - Various county governments/DOTs.
 - Maryland
 - New York
 - Pennsylvania
 - Virginia
 - West Virginia.

Appendix 1. Signatory Statutory Authorities Driving Outcome Attainment

The law and regulation of signatory partners may support, justify or motivate their participation in the collaborative work of the Chesapeake Bay Program related to the attainment of specific Outcomes and Targets of the Watershed Agreement.

The following documentation identifies core statutory authorities that provide part of the impetus for the attainment of Chesapeake Bay Watershed Agreement Outcomes and their related Targets. While Chesapeake Bay Program partners acknowledge that the Chesapeake Bay Watershed Agreement is voluntary, subject to the availability of appropriated funds, and does not preempt, supersede or override any other law or regulation applicable to each signatory, they also acknowledge that the law or regulation of individual signatories can support each partner’s participation in outcome attainment. The table below is not an exhaustive list of all relevant laws and regulations. Rather, this appendix identifies the driving motivators that can bring about signatory partner engagement in efforts described in this Strategic Plan, associated Management Strategies, and Workplans.

Goal 1: Thriving Habitats, Fisheries, and Wildlife

Outcome: Brook Trout	
Signatory	Statutory Authority
Maryland	📄 File
New York	📄 File
Pennsylvania	📄 File
Virginia	📄 File
West Virginia	📄 File

Literature Cited

Hudy, M., Thieling, T. M., Gillespie, N., & Smith, E. P. (2008). Distribution, status, and land use characteristics of subwatersheds within the native range of brook trout in the eastern United States. *North American Journal of Fisheries Management*, 28(4), 1069-1085.

Rummel, S. M., M. Mayfield, L. A. Maloney, H. C. Smith, and O. H. Devereux. 2024. Facilitating Brook Trout Outcome Attainability through Coordination with CBP Jurisdictions and Partners. Final Report to the Chesapeake Bay Trust. Trout Unlimited, Arlington, Virginia.

STAC 2026. Blueprint for Building Partnerships and Recommendations for Scaling Brook Trout Restoration in Stronghold and Persistent Patches.

Wagner, T., Deweber, J. T., Detar, J., & Sweka, J. A. (2013). Landscape-scale evaluation of asymmetric interactions between Brown Trout and Brook Trout using two-species occupancy models. *Transactions of the American Fisheries Society*, 142(2), 353-361.