



STREAM HEALTH OUTCOME  
VITAL HABITATS/STREAM HEALTH WORKGROUP

2014 WATERSHED AGREEMENT: GOAL & OUTCOME LANGUAGE

**STREAM HEALTH OUTCOME:**

Continually improve stream health and function throughout the watershed. Improve health and function of ten percent of stream miles above the 2008 baseline for the watershed.

**VITAL HABITATS GOAL:**

Restore, enhance, and protect a network of land and water habitats to support fish and wildlife and to afford other public benefits, including water quality, recreational uses and scenic value across the watershed.

OUTCOME DISPOSITION ADVICE TO MANAGEMENT BOARD: **UPDATE**

**RECOMMENDATION:**

**The Stream Health workgroup (SHWG) recommends updating the outcome to reflect a more holistic approach to improving ecological integrity of stream systems and stream corridors based on sound science, coupled with land management, planning, and protection to improve and sustain stream health.** To determine additional indicators or metrics of stream health is part of the final phase of the *Data Review and Development of Multi-Metric Stream Health Indicators – Physicochemical Metric Analysis* project. This project will identify existing datasets and the feasibility of using them to measure stream health. The Stream Health Outcome is specific, measurable, and time-bound. Outcome language revisions will incorporate SMART metrics to the best available science.

**RELATIONSHIPS TO OTHER OUTCOMES:**

The Stream Health outcome measures the complex, long-term effects of changes throughout the watershed and in stream corridors, and the outcome is best viewed as overall trends. This outcome correlates with many other outcomes within the Bay Agreement, including wetlands, forest buffers, brook trout, fish passage, water quality, toxic contaminants, climate, and healthy watersheds.

**VALUE OF THE OUTCOME AND OF THE BAY PROGRAM INVOLVEMENT:**

The Chesapeake Bay has over [100,000 streams feeding into it](#)<sup>1</sup> across six states and the District of Columbia. With [more than 18 million people](#)<sup>2</sup> living across the watershed, the vast majority live closer to freshwater streams and rivers than they do to the Bay itself. Stream health is a key outcome to achieving fishable, swimmable, drinkable water. While these streams do not stop at state lines, the separate jurisdictions in the Bay watershed can have vastly different priorities, programs, and ecological landscapes. Including Stream Health in the Chesapeake Bay Agreement incentivizes these jurisdictions to coordinate policies across the watershed, which may not otherwise take place at the same scale. The CBP's [2023 CESR report](#)<sup>3</sup> advises more focus on shallow waters and living resources: the Stream Health outcome is fully based in both areas. Over the past decade, this outcome has driven more focused attention towards local waters and small watersheds by supporting significant research into causes of impairments of streams. This research has supported the creation of new policies, programs and funding sources for holistic watershed resource management.

Currently, the outcome metric is tracked via improvements in the Chesapeake Basin-wide Index of Biotic Integrity (Chessie BIBI). The Chessie BIBI is derived using individual federal, state, county and volunteer

benthic macroinvertebrate datasets collected with similar procedures and analyzed with a common method agreed to by CBP's Stream Health Workgroup. The adoption of the Chessie BIBI as the indicator of overall Bay watershed stream health led to more uniform data collection procedures and more consistent measures across jurisdictions. However, there are still differences in data acquisition (e.g., monitoring design, timing, and coverage, and sample enumeration) that can make analysis difficult. Continued support from the Bay Program will allow us to coordinate and consolidate efforts across jurisdictions and our related Bay Program outcome workgroups.

## CHALLENGES AND OPPORTUNITIES

The Stream Health outcome is on track to meet the original goal set in the 2014 Chesapeake Bay Watershed Agreement. In our endeavor to attain this goal, SHWG has encountered some challenges. Stream health is an incredibly complex, interdisciplinary subject. The success of our strategy recognizes an inherent connection to actions under other outcomes, such as wetlands, forest buffers, brook trout, healthy watersheds, toxic contaminants and water quality. The Stream Health Workgroup has been working through one of our biggest challenges: measuring stream health in a way that can be used by resource managers to effect change within the watershed.

While the Chessie BIBI is an excellent indicator of the overall biotic community, the data necessary for analyses are collected in 5-year increments throughout the watershed. The Chessie BIBI does not necessarily reflect Best Management Practice-driven changes in hydraulics, geomorphology, or physicochemical qualities, and the Chessie BIBI metric can miss important changes in non-biological conditions. For example, there are new emerging contaminants of concern (ex. PFAS) that may have unintended impacts on the benthic communities and therefore impact BIBI metric scores, but floodplain and stream corridor improvements are nonetheless important in these areas. The SHWG is exploring additional non-biological indicators of stream health to augment the Chessie BIBI. These metrics can measure changes in certain stream functions to assess regional changes and trends, as well as provide insight into specific ecological stressors within a sub-watershed, without omitting consideration of biological improvements. These considerations should be included as metrics in the revised outcome language or as indicators.

The Stream Health Workgroup has identified several additional opportunities to expand and enhance the work being done throughout the Chesapeake Bay watershed. These opportunities will allow us to leverage work already being done by related goal and outcome teams to advance our objectives, and cross-walk with them to consolidate data management and analysis. Moving beyond 2025, we need to better integrate resource conservation into our management strategy, highlighting its importance for maintaining and improving stream health. We also need to incorporate future climate scenarios into the outcome, asking ourselves "What's Achievable and Relevant in a world with a changing climate?" There are opportunities to incorporate the findings from the 2023 CESR report as it relates to Stream Health: 1) Existing implementation actions to reduce nonpoint sources of nutrients are insufficient to achieve the TMDL and 2) Significant enhancement of living resources can be achieved through additional management actions without complete achievement of water quality standards across all habitats. These two points coincide with our lessons learned from our [2023 STAC workshop, The State of the Science of Stream Restoration](#)<sup>4</sup>: Ecological uplift is most likely to be achieved if it is planned for as a goal in a project, and we need greater consideration to ecological tradeoffs with all of our actions.

Therefore, with all these considerations in mind, **the Stream Health workgroup (SHWG) recommends updating the stream health outcome in the 2025 revisions to the Chesapeake Bay Watershed Agreement.**

## REFERENCES

1. Phillips, Scott, and Blomquist, Joel, eds., 2015, U.S. Geological Survey Chesapeake science strategy, 2015–2025. Informing ecosystem management of America’s largest estuary: U.S. Geological Survey Open-File Report 2015–1162, 43 p., <http://dx.doi.org/10.3133/ofr20151162>.
2. NOAA Fisheries. *Chesapeake Bay*. U. S. Department of Commerce, National Oceanic and Atmospheric Administration. Retrieved February 3, 2025 from <https://www.fisheries.noaa.gov/topic/chesapeake-bay>
3. Scientific and Technical Advisory Committee (STAC). (2023). *Achieving water quality goals in the Chesapeake Bay: A comprehensive evaluation of system response* (K. Stephenson & D. Wardrop, Eds.). STAC Publication Number 23-006, Chesapeake Bay Program Scientific and Technical Advisory Committee (STAC), Edgewater, MD. 129 pp.
4. Noe, G., N. Law, J. Berg, S. Filoso, S. Drescher, L. Fraley-McNeal, B. Hayes, P. Mayer, C. Ruck, B. Stack, R. Starr, S. Stranko, and T. Thompson. 2024. The State of the Science and Practice of Stream Restoration in the Chesapeake: Lessons Learned to Inform Better Implementation, Assessment, and Outcomes. STAC Publication Number 24-006, Edgewater, MD. 96 pp. [https://www.chesapeake.org/stac/wp-content/uploads/2024/11/STAC-Report\\_Stream-Restoration\\_24-006-1.pdf](https://www.chesapeake.org/stac/wp-content/uploads/2024/11/STAC-Report_Stream-Restoration_24-006-1.pdf)