

Stream Health Outcome Sub-Chapter

Stream Health Outcome: Improve and protect local stream health and function, including their living resources and ecosystem services throughout the watershed, using the best available science to inform land management, planning and conservation.

- Improve the health and the ecological integrity of at least an additional 4,340 (approximately 3%) nontidal stream miles every six years.

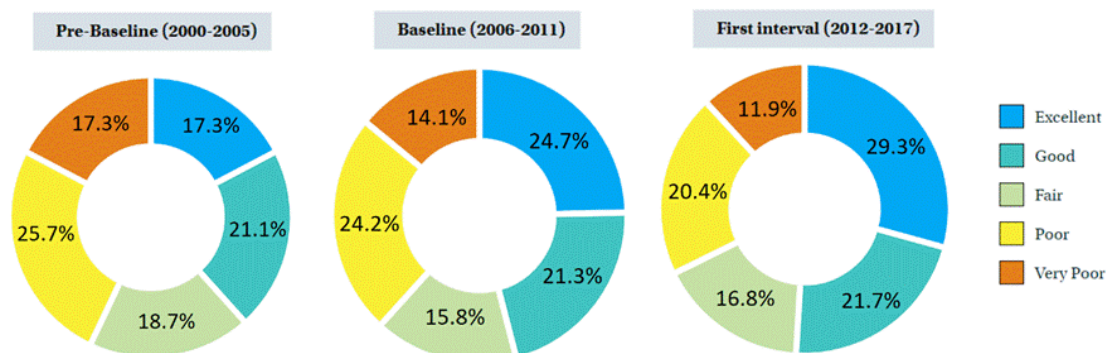
Baseline and Current Condition

Stream Health Outcome

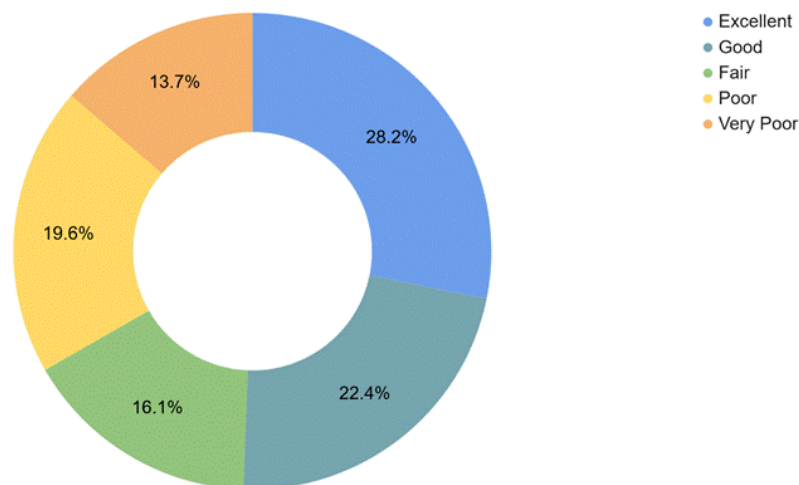
This outcome is currently tracked via improvements in the Chesapeake Basin-wide Index of Biotic Integrity (Chessie BIBI). See the Monitoring Progress and Indicators section for more information about the Chessie BIBI.

The Stream Health Workgroup analyzed the Chessie BIBI scores for stream health between 2000 and 2023 in four distinct intervals for the 2014 Chesapeake Bay Agreement progress. For purposes of CBP reporting, scores that rate Excellent, Good, and Fair indicate “healthy” stream macroinvertebrate populations.

Chessie BIBI Ratings for the Watershed



Chessie BIBI Ratings for the Watershed, Second Interval (2018 - 2023)



The most recent interval, 2018 - 2023, will be used as the new baseline for tracking the Stream Health indicator outcome for the next six year interval.

Monitoring Progress and Indicators

[Monitoring: Stream Health Outcome](#)

CBP uses the Chessie BIBI as the primary stream health indicator. The Chessie BIBI is a multi-metric index of biological health from benthic macroinvertebrate data.

Benthic macroinvertebrate indices are a biological endpoint which will reflect overall improvements in stream health. The data comes from individual federal, state, county and volunteer benthic macroinvertebrate datasets which are collected with similar procedures. The CBP Data Center acquires this raw data every six years, along with additional physical habitat and water quality data collected by program partners. The Interstate Commission on the Potomac River Basin (ICPRB) calculates and reports the index with a common method agreed to by the Stream Health Workgroup.

Additional information on the Chessie BIBI and the most recent interval analysis can be found in the ICPRB reports [Stream Biological Health in the Chesapeake Bay Watershed](#) and the [2018 - 2023 Update](#).

Currently, the Chessie BIBI (Chesapeake Basin-wide Indicator of Biological Integrity) is the sole indicator of stream health utilized by the Stream Health Workgroup (SHWG). While it is an excellent indicator of the overall biotic community, the data necessary for analyses are collected in 6-year increments throughout the watershed. The Chessie BIBI does not necessarily reflect Best Management Practice (BMP)-driven improvements in hydraulics, geomorphology, and physicochemical qualities because the site-specific scores are averaged by location and time periods. However, hydraulics, geomorphology and physicochemical parameters are also components of stream health and must be in good condition to support biological communities. The workgroup is exploring additional metrics for a variety of environmental stressors to help future investigations characterize Chesapeake watershed health and assess the reasons for the current trends.

Stream Health Situation Analysis

The following table identifies challenges that will impact progress towards attaining this outcome and its targets. This analysis considers scientific, environmental, fiscal or policy-related developments that have already or may influence work during the upcoming six-year Management Strategy cycle. Consideration is given to which challenges are within and outside of CBP's ability to influence. Challenges associated with Changing Environmental Conditions are denoted with an asterisk (*). Challenges listed in bold font have been identified by the Goal Team and its Workgroups as being priorities for the Workgroup to seek to address or make progress against through the development and implementation of Management Approaches.

Challenges	Within CBPs ability to influence	Outside of CBP's ability to influence
Pressures Directly Influencing Stream Health		

Excessive sediments in-stream		X
Excessive nutrients in-stream (eg.: from untreated runoff, leaky wastewater infrastructure; etc)		X
Loss of forested riparian and wetland areas	X	
Significant changes in watershed hydrology* (eg: overland flow increases in impervious cover; inadequate stormwater management controls)		X
Toxicity of effluent from resource extraction activities (i.e., acid mine drainage, fracking).		X
Increased in-stream temperatures*		X
Increased salts in streams* (Road de-icing practices)	X	
Invasive species*		X
Alterations to channel flow* (eg.: Higher and lower discharges than expected in stream channels; “flashy” flow)		X
Alterations to channel form (eg.: Piped and channelized streams; undersized culverts;		X
Endocrine disrupting chemicals and other contaminants		X
Degraded soils in riparian area		X
Physical and chemical barriers to connectivity increase stream fragmentation*	X	
Limited availability of land to retrofit and implement upland BMPs in urban areas)		X
Challenges to Improving Stream Health		
Lack of common watershed, stressor and stream assessment and restoration guidelines.	X	
Limited integration of water quality and living resource goals during WIP BMP implementation.	X	
Stormwater and other NPDES permits focus on specific aspects of water quality, which may or may not be the only stressors for stream aquatic life.	X	
Inadequate financial resources to support local implementation efforts.	X	
Inadequate infrastructure to communicate newest research and technical guidance to jurisdictions.	X	

Current lack of Chesapeake Bay TMDL crediting for stream health beyond modeled nutrient and sediment reductions	X	
Limited research into resource tradeoffs for BMP implementation	X	
Public perception of stream restoration	X	
Need additional biological stressor identification and prioritization procedures.	X	
Need additional monitored metrics that correlate with priority stressors identified for measurement.	X	
Need to examine the differences between observed and modeled trends in stream health metrics.	X	
Need more robust stream restoration monitoring to evaluate the potential improvement in stream functions and resource trade-offs from BMP implementation.	X	
More research is needed to guide the selection of achievable reference conditions/design approaches based on watershed and stream functions to include an urban reference continuum.	X	
Need BMP site prioritization tools, such as identifying nutrient hotspots in stream valleys where erodible geologic materials and soils contain excess nutrients, or to increase habitat connectivity.	X	

Snapshot of Signatory Programs

Managing a large and difficult restoration and conservation program with “no assurance about the level of funds that may be available beyond the short term” (GAO, 2028) is a challenging undertaking that requires individual and collaborative action from signatory partners, as well as the many communities and individuals who live, work, play and learn in our region. This “Snapshot of Signatory Resources” seeks to better recognize the significant contribution that individual signatory partners and federal agencies make towards outcome attainment. The existing programs and funding spotlighted below are not intended to represent the full range of resources available or required to support progress towards outcome attainment; only the “biggest ticket” programs are included for each outcome and signatory partner. It is important to note that funding is reported from a single point in time (fiscal year 2025) and is not representative of future investments. Identifying the most critical programs and resources that exist at a particular moment in time can help the partnership focus its collaborative efforts on activities that have the greatest impact, and which don’t duplicate the work of existing programs.

U.S. Geological Survey

- [USGS Chesapeake Bay Activities](#) ([Appropriations for Fiscal Year 2025]) The USGS works with Federal, State, local, and academic partners to provide research and monitoring and to communicate results to inform management for the Chesapeake Bay watershed.

[Signatory Name]

- [\[Featured Program with hyperlink\]](#) ([Appropriations for Fiscal Year 2025]) [one sentence max description of how program relates to Outcome attainment]

[Signatory Name]

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Management Approaches for Outcome 6: Stream Health

Management Approach 1.6.1: The definition of stream health and ecological integrity for this outcome uses a watershed-wide metric, the Chessie BIBI, to measure the changes in stream health and function over time. This Management Strategy proposes a definition of stream health that provides a common framework for additional reporting and tracking incremental improvements in stream health using multi-metric indicators.

Identify an appropriate suite of metrics to measure the multiple facets of stream health to complement, but not replace, the Bay-wide Chessie BIBI.

- Develop metrics/composite indices from routinely collected, non-biological data to measure changes in certain stream functions to assess regional changes and trends.
- Collaborate with the Healthy Landscapes Goal Team to identify marginal streams where restoration activity in-stream or in the watershed may improve stream functions and health. Once identified, work with the partnership and funders to develop incentives to build on existing efforts to target beneficial restoration activity.
- Bring together jurisdictional biological stressor identification approaches and thresholds for comparison. Identify overlaps between the approaches and explore the possibility of Chesapeake Watershed-wide BSID.
- Investigate use of eDNA as an additional biological indicator of stream health.

Management Approach 1.6.2: The provision of adequate funding and technical resources for watershed management practice implementation is necessary to support comprehensive ecosystem and biological improvements, in addition to nutrient and sediment reductions.

- Explore partnerships to provide training to jurisdictions and other entities related to improving stream health and habitat, including BMP design, implementation and cost-effectiveness analysis.
- Continue collaborating with the Chesapeake Bay Trust's Pooled Monitoring program, and partner with other organizations such as the Chesapeake Monitoring Cooperative, for researchers to inform watershed best management practices that demonstrate stream and riparian ecosystem improvement.
- Establish an on-going stream restoration monitoring consortium and data clearinghouse within the CBP to share project data.
- Develop monitoring guidance for stream restoration projects to standardize pre-and post-restoration data collection and reporting.
- Support the continued scientific research and analysis of key topics, including:
 - Information on the co-benefits of BMPs
 - How much upland retrofit implementation is needed to optimize stream functional improvement when stream restoration and stormwater retrofits are installed as part of an integrated restoration plan
 - Investigate the effects and implications of changing environmental conditions, population growth and continued landscape development on stream health, including various metrics associated with healthy streams and future potential.
 - Effects and trade-offs of stream restoration BMPs

Management Approach 1.6.3: Active and engaged participation by local communities with federal and state partners is central to Bay watershed restoration. Improvements to stream health and function will rely upon significant investments by local communities, municipal, county governments and watershed groups, to implement restoration and conservation actions. Ongoing coordination with stream health stakeholders (e.g., state and federal stream and wetland regulatory authorities, natural resource agencies, local governments, non-profit organizations, watershed BMP practitioners, researchers and local communities) needs to be improved to identify and remove barriers to improving stream health.

The SHWG should work with CBP partners, including the Engaged Communities Goal Team, to enhance the information available for local governments, organizations and landowners to support beneficial watershed best management practices to improve local stream health.

- Engage with local governments and other entities to inform landowners, as well as the general public, of beneficial stream and riparian best management practices and maintenance practices.
 - This includes individual homeowner practices (e.g. rain barrels, lawn care) and their impact on the community, the streams in their own backyards and public places.
- Provide research or documentation that identifies the nexus between improving stream health and broader public welfare.

Management Approach 1.6.4: Develop and promote holistic Stream Restoration Best Management Practice design guidelines that identify the level of degradation and improvement of stream biology and key stressors/factors limiting potential biological improvement.

- Develop case studies to document biological response in stream with various management interventions, and include consideration of watershed influences, such as where in the watershed the project is located, source of stressors, and nearness to donor reaches.

- Discuss with other CBP Goal Teams how to recognize stream biological function improvement or maintenance of high quality aquatic life as credits towards meeting the Bay TMDL and other agreement outcomes.
- Develop improved stream restoration guidance for biological improvements or maintenance of higher quality systems.
- Develop design guidelines to include greater consideration of resource tradeoffs and other Chesapeake Bay Agreement goals and outcomes.

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**
 -
- **Other Partners**
 - U.S. Geological Survey
 - Interstate Commission on the Potomac River Basin

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: Stream Health	
Signatory	Statutory Authority
[Signatory Name]	

[illegible]