

Table of Contents

Purpose Statement	1
Stream Health Workgroup Product Timeline	2
Key Terms	4
References	6

Purpose Statement

The purpose of this document is to provide a brief history of the Chesapeake Bay Program Stream Health Workgroup’s watershed-scale publications, as well as provide context to some important terms used in the work within the Stream Health Workgroup.




The timeline begins with the development of the Chesapeake Basin-wide Index of Biotic Integrity for stream benthic macroinvertebrates, the Chessie BIBI, which is an excellent indicator of the biotic community. However, it does not necessarily capture local improvements in hydraulics, geomorphology, or physicochemical qualities ([Southerland et al., 2023](#)) that drive the level of ecological uplift of stream restoration projects and other watershed Best Management Practices (BMPs). The Chessie BIBI is derived from comprehensive data collected at distinct points throughout the watershed over six year increments; it misses more rapid changes in stream conditions. Additionally, the Chessie BIBI alone cannot identify the cause of impairments to the stream biotic communities that may be addressed with targeted BMPs to improve the overall health of the stream ecology.

As such, the Stream Health Workgroup is exploring additional stream corridor metrics through their Stream Health Indicator Projects to allow analysis at a whole watershed-scale, a more rapid reporting timeframe and the ability to attribute causes of biological impairment. The main project outcome is the identification of additional non-biological metrics to complement the Chessie BIBI. These additional metrics will help us better understand the trajectory of stream health (e.g. improving or declining) throughout the Chesapeake Bay watershed. Ultimately the completed projects will provide a robust means to characterize local stream health, identify biological stressors at a local level, and inform future management actions.




The SHWG is also exploring ways to incorporate Biological Stressor ID data into this project. The EPA has developed a system to identify impairments to stream biota with a weight-of-evidence approach to prioritize stressors called the Causal Analysis/Diagnosis Decision Information System, or CADDIS, that is being considered in future phases of the Stream Health Workgroup’s products to maximize effectiveness of watershed best management practices throughout the Chesapeake Bay Watershed.

Stream Health Workgroup Product Timeline


Development of Chessie BIBI and Defining Baseline Stream Health within the Watershed

Product	Status	Related files	Entity
2011 Chessie BIBI Indicator Development	Complete ▾	 Publication Link	ICPRB
2017 Refinement of Chessie BIBI	Complete ▾	 Publication Link	ICPRB
2023 Chessie BIBI 2008 Baseline Calculation and Current-State	Complete ▾	 Publication Link	ICPRB

Understanding Why Biological Uplift is Limited After Stream Restoration Practices

Product	Status	Related files	Entity
2022 Identifying Key Stressors Driving Biological Impairment in Freshwater Streams within the Chesapeake Bay Watershed	Complete ▾	 Publication Link	USGS
2022 Management Approaches to Reduce Stressors of Stream Health	Complete ▾	 Publication Link	Center for Watershed Protection; Chesapeake Bay Trust
2023 Lessons Learned from the Science and Practice of Stream Restoration in the Chesapeake	Complete ▾	 Publication Link	STAC

Exploring a Suite of Metrics and Associated Data Sources to Inform Management Actions to Maximize Biological Uplift

Product	Status	Related files	Entity
2023 Stream Health Indicators Project: Recommendations for Developing Hydromorphology Indicators with GIS Data	Complete ▾	 Publication Link	TetraTech; Ecosystem Planning & Restoration
2025 Stream Health Indicators Project: Recommendations for Developing Physicochemical Indicators and Identification of Existing Data Sources	In progress ▾		
Potential Product Exploring a Chesapeake Bay-Wide Biological Stressor Identification and Mitigation Framework	Potential Product ▾		

Key Terms

Chessie BIBI:

First developed in 2011, the Chesapeake Basin-wide Index of Biological Integrity (Chessie BIBI) was established to provide a regional-scale assessment of the non-tidal benthic macroinvertebrate community health in a uniform manner. This provided a way for the Chesapeake Bay Program to track their [2014 Chesapeake Agreement](#)'s Stream Health Outcome: Improve health and function of 10 percent of stream miles above the 2008 baseline for the Chesapeake Bay watershed.

305(b) Report:

The 305(b) Report is a report submitted to EPA every two years from each jurisdiction within the Chesapeake Bay Watershed. The Report details the water resources within the jurisdiction and their status in supporting their recreation, commercial, and other uses. ([New York Department of Environmental Conservation, n.d.](#))

303(d) List of Impaired Waters:

The 303(d) List is a list of surface waters that do not meet water quality standards, do not support their potential recreation, commercial and other uses, and require the development of a TMDL. The list is submitted to EPA every two years from each jurisdiction within the Chesapeake Bay Watershed. ([New York Department of Environmental Conservation, n.d.](#))

Integrated Water Quality Report:

A report that contains both 303(d) List and 305(b) within a single report, known as the Integrated Report.

Total Maximum Daily Load (TMDL):

A TMDL or a "pollution diet" is a limit on the amount of a single pollutant that is allowed to enter the water system to restore water quality standards. Waterbodies on the 303(d) List are required to develop a TMDL with a goal to be de-listed from the 303(d) List.

Aquatic Life Use (ALU):

One of the waterbody uses reported by the Watershed jurisdictions to EPA in their 305(b) Reports. This use is measured throughout the watershed in multiple ways, but is standardized and analyzed by the Chesapeake Bay Program and at a regional-scale through the Chesapeake Bay basin-wide Benthic Index of Biological Integrity (Chessie BIBI).

Biological Stressor Identification (BSID):

In December 2000, the US EPA published [the Stressor Identification Guidance Document](#) to help practitioners through a process that identifies stressors causing biological impairments. While the EPA has this document, jurisdictions within the Chesapeake Bay Watershed often have their own methods for BSID. Examples include:

- West Virginia's "[Aquatic Life Use Assessment and Biological Stressor Identification Procedures](#)"
- Virginia's "[2024 Water Quality Assessment Guidance Manual](#)"
- Pennsylvania's "[Water Quality Assessment Methodology for Surface Waters](#)"
- Maryland's "[Maryland biological stressor identification process](#)"

Causal Analysis/Diagnosis Decision Information System (CADDIS):

CADDIS or the Casual Analysis/Diagnosis Decision Information System, is a tool to assist water quality managers and other stakeholders in identifying the cause of biological impairments in any type of water body.

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