
ENVIRONMENTAL Fact Sheet



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NHDES' Biomonitoring Program

What is the Biomonitoring Program?

The New Hampshire Department of Environmental Services' Biomonitoring Program assesses the biological health and integrity of aquatic ecosystems throughout the state, focusing on wadeable streams. The results of these assessments are used to establish reference locations for "least disturbed" conditions in the state, and to identify areas that are biologically impaired. Information is 1) reported to USEPA as part of the 305(b) report every two years and 2) Assists NHDES' Watershed Management Bureau in prioritizing watersheds needing management, restoration, or preservation.

Why Use Biological Measurements?

Stream ecosystems can be divided into three aspects: chemical, physical and biological. Historically, the incorporation of biological measurements in water resources management has lagged behind the others. In 1987, the US Environmental Protection Agency issued guidance and monitoring strategies to encourage states to develop biomonitoring programs as part of their assessments of surface waters. Biological sampling is an important supplement to physical and chemical data and can best indicate cumulative impacts or the effects of successive disturbances on a living community, such as macroinvertebrates or fish.

Goals of the Program

The Federal Clean Water Act encourages states to implement a plan to develop numeric biological standards. The narrative biological standard reads as follows:

Env-Wq 1703.19 Biological and Aquatic Community Integrity.

(a) The surface waters shall support and maintain a balanced, integrated and adaptive community of organisms having species composition, diversity and functional organization comparable to that of similar natural habitats of a region.

(b) Differences from naturally occurring conditions shall be limited to non-detrimental differences in community structure and function.

One of the goals of the program is to determine which measurements best quantify statements in the narrative standards. These measurements, called "metrics" may be viewed individually or grouped together to generate a "multi metric index". The Biomonitoring Program has developed several multimetric indices, also referred to as indices of biological integrity, to assist with interpreting the narrative biological standard. These include:

- Macroinvertebrates
- Fish, coldwater community type
- Fish, transitional water community type

A fourth multimetric index for warmwater fish community types is currently under development.

Biological Assessments

Monitoring activities taking place at most sites include:

- Collection and identification of aquatic macroinvertebrates.
- Collection and identification of the resident fish community.
- Assessment of riparian and in-stream habitats.
- Physical and chemical measurements for assessing water quality.

Since it began in 1995, the program has continually expanded its assessment capabilities. The primary focus has been and remains on wadeable streams. Consistency in data collection is vital when analyzing and comparing community health. Therefore, even though the program continues to incorporate new methodologies, a single established method is used when generating data for the purposes of biocriteria development. For macroinvertebrates, the established method is rock baskets, placed in the stream for eight weeks. Kick-net sampling is done on specific projects where rapid turnaround is warranted. Fish are collected by single-pass backpack electroshocking for 150 meters or 20 times the stream width, whichever is greater.

The Biomonitoring Program aims to gain knowledge of and expertise in sampling other types of habitats, such as deep-water rivers, wetlands and impounded areas. NHDES has developed and tested the D-net sweep protocol, primarily for slower backwaters and wetlands, and the Hester-Dendy multi-plate sampling device for deep-water benthic assessments.

Which Streams and Rivers Are Surveyed?

Since the program began in 1995, there have been more than 900 macroinvertebrate and 500 fish surveys completed in New Hampshire for state and national surveys, index development and aquatic life use assessments. Most surveys for wadeable streams are completed for sites with watersheds between two and 85 square miles (1st to 4th order) largely depending on flow conditions. Fish surveys are also completed on larger systems (5th to 7th order) as part of the National Rivers and Streams Assessment, every five years.

What Happens to the Data?

Data is entered into an ecological database designed as a repository for all the program data, but more importantly, allows for the calculation of metrics and aquatic life use assessments. Data is available to the public through the NHDES website and the USEPA Water Quality Portal. If you are interested in specific waterbody or site information, please contact the NHDES Biomonitoring Program at (603) 271-5334. Biological monitoring reports, protocols and support materials can be found on NHDES River Monitoring page on the [NHDES website](#).