

## West Virginia Department of Environmental Protection- Watershed Monitoring Program

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### Tags

WADEABLE STREAMS, Habitat, Watersheds, Streams, BENTHOS, WATER QUALITY, biota, environment, Biology, Ecology, Ecosystem, Environment, Indicator, Marine, Monitoring, Quality, Surface Water, Water, Benthos, Macro Invertebrates, Water Quality

### Summary

The West Virginia Department of Environmental Protection (DEP), Division of Water and Waste Management's (DWWM), Watershed Assessment Branch (WAB) primary function is to collect waterbody (i.e., streams, rivers, and lakes) data in order to determine their quality in WV according to the Federal Clean Water Act. This is accomplished by visiting hundreds of streams and lakes throughout the state collecting water and biological samples (e.g., fish, benthic macroinvertebrates, and periphyton) and assessing the quality of the instream and streamside habitat. The data collected is used to determine which streams and lakes are in violation of water quality standards or impaired biologically. All of the streams and lakes in the state are divided into 32 watersheds based on the USGS 8-digit HUCs (Hydrologic Unit Codes). These watersheds are sampled on a five-year rotation (aka the rotating Watershed Basin Schedule) so that any given year approximately one-fifth of the watersheds are being intensively sampled and assessed. The data produced by the sampling efforts of WAB provides information regarding the severity of pollution, the potential for cleanup, and supports the implementation of management and control measures.

### Description

WAB consists of many different sampling programs that are each unique in their sampling methods, protocols, and intensities of habitat assessment. The sampling programs include: Wadeable Streams Monitoring occurs on streams that are considered to be wadeable (i.e., easily traversed without having to use a boat). This applies to almost all 1st-4th order streams, but may include some smaller 5th and 6th order streams. The components of sampling include water quality and biological assemblage samples (mainly benthic macroinvertebrates and periphyton, but sometimes fish) as well as an intensive habitat assessment. Two differing strategies of wadeable stream monitoring are as follows: Random (Probabilistic) Sampling is a sampling subset within the Watershed Assessment Branch designed to allow unbiased, statistical interpretations of water quality using water chemistry, biological, and habitat data. The state is further subdivided into Level III Ecoregions statewide and examined on a 100k scale. The sample stations include 1-4th order streams (based on the NHD Plus stream coverage-100k scale) and are weighted based on the relative abundance of those orders in WV. Sampling does not coincide with the rotating Watershed Basin Schedule and occurs primarily in the Spring/Early Summer (April-Early June). Fish surveys to monitor populations & communities will be conducted on stations that are target and have watershed drainages greater than 2000 acres (+/- 10%). The fish surveys will occur later in the summer during a fish index period. Targeted Sampling 1. Streams that have no previous data collected, is designed to investigate: 2. Streams that have only outdated data collected, 3. Streams with data previously collected that rendered inconclusive results (e.g., gray WVSCI stream, streams with prior collections), 4. Streams that have known impairments (i.e., legacy 303(d), AMD, Biological impairments), 5. Streams of particular public interest (i.e., high-quality streams, trout streams, streams undergoing restoration projects). This targeted sampling is driven by the rotating

Watershed Basin Schedule and sampling is a one-time event that occurs mainly in the Summer/early fall (June-October). Fish surveys occur on a limited number of select larger streams. TMDL stands for Total Maximum Daily Load. A targeted sampling strategy is used to gather information about the full extent of pollution impairments (i.e., which streams are problem areas or not and what are the sources of pollution). The resultant data is used to develop and calibrate TMDL models for streams listed on the 303(d) list. Candidate streams for TMDL development coincide with the rotating Watershed Basin Schedule and sampling occurs monthly for one year. The components of sampling include water quality samples and a limited habitat assessment. At streams with biological impairments sampling includes a one-time biological sample and intensive habitat assessment. Lake Monitoring uses the rotating Watershed Basin Schedule much like TMDL sampling and the targeted Wadeable Stream Monitoring. Sampling occurs on targeted lakes (within the watershed group for that year) four times during the summer months (June - September or May - August). The number of stations per lake varies and is generally proportional to the size of the lake. The components of sampling include a vertical water chemistry profile and some limited habitat observations. Ambient Network is a bimonthly statewide trend monitoring program at 26 targeted stations on major rivers and streams for water quality constituents. The ambient network is perhaps the oldest program within the Watershed Assessment Branch with data existing as far back as the 1960s. The components of sampling include water quality samples and limited habitat observations. Long Term Monitoring Stations, also called LTMS, are designed to develop long-term biological trend data at targeted wadeable streams scattered throughout the state. Stations are selected to represent a wide array of unique and varying impairments (Acid Mine Drainage, Acid Rain, Sediment, etc.) as well as represent best attainable or reference conditions. Some Ambient Network stations are included. Sampling occurs once per year and includes biological, intensive habitat, and water quality components. Some selected stations may also be surveyed for fish. Special Surveys or Projects are temporary targeted sampling designs conducted on request from internal West Virginia Department of Environmental Protection (WVDEP) programs, external agencies, private industries, or public groups/individuals that are concerned about the water quality of particular streams or segments of streams and require additional data to supplement their own data. These surveys or projects are often done in association with land transactions, spills, pending legal actions/litigation, permit applications/renewals, emerging pollution issues, or as a part of larger studies. Special Surveys are more limited in scope in that they concentrate on a very specific area and the stations are only visited once or twice. Special Projects are more long term and widespread. They may involve monthly sampling at a large number of sites over the course of a year or two. The components of sampling vary greatly depending on the survey or project needs and may include any combination of the following: simple habitat observations, water quality samples, deployable sondes, biological samples, limited habitat assessments, or intensive habitat assessments. Deployable Sondes are often used to provide continuous water quality data (time-series) in support of other sampling programs (e.g., TMDL, Special Projects). Deployment and retrieval of the sonde may be accompanied by a water quality sample and habitat observations at targeted locations.

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