

Wisconsin's DRAFT Water Monitoring Strategy 2015 to 2020

Section 3.5 Monitoring Strategy for Water Quality Standards

Table 24: Water Quality Standards Monitoring Needs

Study	Purpose	Supports	
Water Quality Standards (WQS) Development, Revision, or Evaluation	<p>Waterbody Use Designation Waters are monitored to determine use designations. In the absence of field data and a full assessment, rivers and streams are classified as default - fish and aquatic life communities. Warm or Cold Default Waters may be used (more discussion needed).</p>	WQS Attainment, WPDES Permits, CWA Reporting, WQM Planning	
	<p>Natural Community Validation Monitoring fish assemblage to validate or identify correct stream natural community which influences assessment and water quality standards programs.</p>		WQS Attainment, WPDES Permits, CWA Reporting, WQM Planning
	<p>Standards Attainment Monitoring to determine if the waterbody is meeting designated uses as well as quantitative ambient water quality standards, such as phosphorus. Waters in non-attainment are listed as "impaired".</p>		WQS Attainment, WPDES Permits, CWA Reporting, WQM Planning
	<p>Use Attainability Analysis To be developed. Monitoring and guidance for Use Attainability Analysis will be needed.</p>		WQS Attainment, WPDES Permits, CWA Reporting, WQM Planning
	<p>Bioassessment Criteria Development This area is under development but additional indicators are in evaluation. Desktop analysis and possible additional data collection are being used to develop biocriteria tools for water quality standards.</p>		WQS Attainment, WPDES Permits, CWA Reporting, WQM Planning

Study Descriptions

WQS Development, Revision, or Evaluation

Monitoring objectives

- Update waterbody use designations** using new protocols. (See Next Section; priority given to receiving waters of existing WWTPs) These protocols incorporate bioassessment techniques and involve the verification of stream natural communities, a step necessary before applying the fish Index of biological integrity). (This involves **verifying the Natural Community model determinations**). Natural communities are not synonymous with designated uses.
- Evaluate Standards Attainment** for existing qualitative and quantitative standards; those waters not meeting standards are listed as "impaired" under Clean Water Act Section 303(d).

Monitoring design

Updated guidance and rule promulgation are needed for using the natural communities as designated uses or water quality standards use categories. However, monitoring is needed to verify modeled stream natural communities both to apply the fish IBI to evaluate water quality standards attainment and to advance the use of the streams natural community data layer for the state's use designations. This work is in progress. WDNR is automating the data analysis steps for the natural community verification process. The monitoring work for waterbody use designations, evaluation of standards attainment, and special studies work is prioritized based on existing data age, likelihood for change, permit expiration or new permits coming online, and existing funding.

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Water quality indicators

- Bioassessment tools are the primary driver for characterizing receiving water designated uses, validating natural communities, and determining if standards are met. Bioassessment metrics for assessing overall community health for streams include the fish index of biological integrity (FIBI) and the macroinvertebrate index of biological integrity (mIBI). Bioassessment metrics for lakes are currently under development and are likely to include macrophytes and possibly other metrics such as phytoplankton.
- WDNR is in the process of developing a suite of metrics that will be used as Phosphorus Response Indicators, to help determine whether a waterbody is experiencing degradation due to ambient phosphorus concentrations. For flowing waters, these will likely include measures of primary productivity, macroinvertebrates, and dissolved oxygen. For lakes, they will likely include chlorophyll a, specific plant and or algae taxa, and dissolved oxygen.
- Chemistry or background monitoring for specific parameters involves analysis of concentrations and/or mass loading depending on the unit of study.
- For permit-specific or outfall-specific questions, site-specific concentrations of the pollutant of interest would be the water quality indicator.
- In addition potential WET testing (acute or chronic toxicity testing) may be used for the water quality indicator.

Quality Assurance

As new staff is hired into water quality biologist positions, they will receive training for the variety of monitoring studies described in this paper. In addition, biologists will work closely with wastewater staff to identify specific locations and make determinations for WPDES specific studies.

All use designation decisions are documented in the SWIMS system as well as in the WATERS database. The use designation, attainable use, current use and use support are updated in WATERS and shared on the Surface Water Data Viewer. Generally, central office staffs create electronic records documenting the decision made by regional biologists; these electronic records are reviewed during the watershed planning process and through special project monitoring.

Reporting

Summary assessment data are shared on the DNR website on the Surface Water Data Viewer, as well as on various online pages:

- Surface Water Data Viewer (<http://dnr.wi.gov/topic/surfacewater/swdv/>)
- Explore Wisconsin Waters! (<http://dnr.wi.gov/water/>)
- Wisconsin Surface waters Water Quality Report to Congress: <http://dnr.wi.gov/topic/surfacewater/IR2014.html>

Programmatic evaluation

Through the Triennial Standards Review process, the Wisconsin DNR identifies areas for significant work. This public input process is a significant source of feedback and program evaluation and guides work planning for staff and management in the Standards Program. In addition, the Permits Section and Wastewater Section have oversight Policy and Management Team activities that help guide and evaluate work conducted on an ongoing basis.

Waterbody Use Designation

This program was established in the 1970s to meet EPA requirements. An effort is currently underway to promulgate changes to ch. NR102, Wis. Adm. Code to utilize key features of each waterbody type to define "natural communities" to describe use designations and drive assessment protocols for Wisconsin's surface water communities. Any revisions promoted by WDNR in the coming years will be focused on improving the public understanding of water quality

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standards, increasing consistency in evaluation of water condition, and efficiently deploying staff and fiscal resources to maximize monitoring efforts statewide.

Monitoring Objectives

Clean Water Act Objectives

1. Establishing, reviewing and revising water quality standards
2. Determining water quality standards attainment
3. Identifying impaired waters
4. Identifying causes and sources of water quality impairments
5. Supporting the implementation of water management programs
6. Supporting the evaluation of program effectiveness

Specific objectives

Objectives of the Use Designation program are:

1. Collect information on the water quality of Wisconsin waterbodies
2. Appropriately designate use(s) of waterbodies in order to accurately assign WPDES effluent limits
3. Appropriately designate potential use of surface waters to protect water quality under the Clean Water Act.
4. Monitor to assess water quality conditions in relation to nonpoint source management projects.
5. Monitor water quality to support Wisconsin's Impaired Waters Program and the integrated 303(d)/305(b) Report.
6. Determine Use Designations to be used in the construction of accurate stream classifications.
7. Systematically identify candidate waters for special designation as Outstanding or Exceptional Resource Waters.

Monitoring Design

Water bodies throughout Wisconsin are monitored on an as-needed basis to determine their use designations. In the absence of field data and a full assessment, rivers and streams are classified as full fish and aquatic life communities by default. In years past, Wisconsin default designations were used to protect for a balanced warm water fish community. However, a decision is now made to protect for a cold water community if a given water body is actively being managed as a trout community.

Reviews of classifications are completed on a priority basis, most often focused on streams with a WPDES permitted discharger discharging to the waterbody. Within this category of streams with permitted discharges, monitoring and assessment work is prioritized by activities such as WWTP facility planning/upgrade, 303(d) listing, waters with sensitive species (endangered/threatened), etc. Over time, it is anticipated that Baseline Tier 1 efforts will allow for a more rapid and complete establishment of use designations throughout the state regardless of whether or not a point source is located on or planned for any given water body.

Water Quality Indicators

Core and Supplemental Water Quality Indicators

Core indicators of this program consist primarily of Fish and Aquatic Life parameters, including biological community condition (fish and macroinvertebrates), dissolved oxygen (DO), temperature, flow, and even habitat. More extensive data are collected if necessary, often in order to clarify a classification or to answer a site-specific question. Metrics vary by waterbody type.

- Fish community: assessed to gain an understanding of what fish species and community composition are found in a waterbody, and to aid in the decision process of assigning a use designation to a stream segment.

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- Macroinvertebrate community: assessed when a robust fish population is not present in a waterbody (or often even when a robust community is present). The types of macroinvertebrates found can indicate the quality of the water at a specific site.
- Habitat characteristics, including stream width, depth, and flow, are assessed to help in determining the potential aquatic community a surface water could support.
- Water quality assessments are conducted to determine possible characteristics that may be limiting aquatic populations, as well as to help determine the type of aquatic life that could be attained in a specific water body. Water quality parameters that are routinely collected are dissolved oxygen and temperature. Parameters such as suspended solids, ammonia and other toxic substances can also impact aquatic communities, and may be sampled as necessary.
- Additional assessments that may be conducted include, but are not limited to, sediment chemistry, ambient water chemistry, and effluent toxicity tests.

Quality Assurance

Sample Protocols

Chemical, biological and physical sampling/assessment, as well as analytical procedures are to follow established protocols. These protocols are the following:

Database Quality Protocols

Many of the historical surveys are stored as PDFs in the WATERS system on the actual waterbody extent or stream "segment" on which the old survey was conducted.

Analytic Methods Quality Protocols

Most of the data collected historically have been fish surveys. Fish survey methods are described in the appendix.

Data Management

Data collected are analyzed collectively to determine the appropriate use designation of surface waters. Fish data are utilized for the Index of Biotic Integrity (IBI) to evaluate the environmental quality of the water body. Macroinvertebrate data analyzed uses the macroinvertebrate Index of Biological Integrity (MIBI) for wadeable streams. A large river MIBI is also available for large river systems. Historically, analysts used the Hilsenhoff Biotic Index (HBI) value, which gives an idea of the pollution tolerance of the organisms found. Chemical, physical and biological data are analyzed according to the WDNR Field Procedures Manual and/or standard operating procedures at laboratories. Guidance on how to interpret data to assign a use designation is found in the Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters, Wisconsin Department of Natural Resources, and December, 2004. As noted above, an effort is underway to implement the use of natural communities with a code revision and new procedures (to be developed).

Reporting

Collected data are summarized in the form of a Stream Classification Report. These data are referred to in 303(d)/305(b) Report as well as water quality plans for each water basin in Wisconsin. As needed, use designations are also promulgated in Chapter NR 104 of the Wisconsin Administrative Code. Summary assessment data are shared on the DNR website on the Surface Water Data Viewer, as well as on various online pages:

- Surface Water Data Viewer (<http://dnr.wi.gov/topic/surfacewater/swdv/>)
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Programmatic Evaluation

Redirection of this program has occurred when needed to account for changes. As noted above, an effort is currently underway to determine if changes in the uses and the assessment techniques should be recommended.

Figure 23 Stream Natural Communities

