

ATTACHMENT B

2008 Methodology for Placing Waters on the Impaired Waters List



Wisconsin Department of Natural Resources

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Impaired waters are those waters that are not meeting state water quality standards as defined by Section 303(d) of the federal Clean Water Act. Every two years, states are required to submit a list of impaired waters to the United States Environmental Protection Agency (U.S. EPA) for approval. The Wisconsin Department of Natural Resources (the Department) previously submitted lists to the U.S. EPA in 1998, 2002, 2004, and 2006. U.S. EPA did not require and the Department did not submit a list in 2000.

U.S. EPA requires that each state document the methodology used to add or delete waters from the existing “303(d) List.” A waterbody or segment of a waterbody is added to the list because it is not meeting water quality standards or because water quality is threatened. Waters that are removed from the list (“de-listed”) must have data to support the fact that they are now meeting water quality standards. The same data standard is used to de-list a waterbody as was used to list it originally.

Chapter 281 of the Wisconsin Statutes authorized the Department to establish water quality standards that are consistent with the Federal Clean Water Act (Public Law 92-500). These water quality standards are explained in detail in Chapters NR 102, NR 103, NR 104, and NR 207 of the Wisconsin Administrative Code. Water quality standards are the foundation of Wisconsin’s water quality management program and they serve to define the goals for a waterbody by designating its uses, setting criteria to protect those uses, and establishing provisions to protect water quality from pollutants.

Three Elements of Wisconsin Water Quality Standards

The water quality standards described in the Wisconsin Administrative Code all rely on three elements to collectively meet the goal of protecting and enhancing the state’s surface waters: designated uses, water quality criteria and anti-degradation.

Designated Uses

Designated uses are goals or intended uses for surface waterbodies in Wisconsin which are classified into the categories of recreation, public health and welfare, wildlife, and fish and aquatic life. The following designated uses are described in Chapter NR102 (Wisc. Adm. Code)

- **Recreational Use** – All surface waters are considered appropriate for recreational use unless a sanitary survey has been completed to show that humans are unlikely to participate in activities requiring full body immersion.
- **Public Health and Welfare** – All surface waters are considered appropriate to protect for incidental contact by humans. Some are even protected further since they serve as a drinking water supply to nearby communities.
- **Wildlife** – All surface waters are considered appropriate for the protection of wildlife that rely directly on the water to exist or rely on it to provide food for existence.
- **Fish and Aquatic Life** – All surface waters are considered appropriate for the protection of fish and other aquatic life. Surface waters vary naturally with respect to factors like temperature, flow, habitat, and water chemistry. This variation allows different types of fish and aquatic life communities to be supported.

Currently, Wisconsin recognizes the following sub-categories of the fish and aquatic life use designation:

- *Coldwater Community*: Streams capable of supporting a cold water sport fishery, or serving as a spawning area for salmonids and other cold water fish species. Representative aquatic life communities associated with these waters generally require cold temperatures and concentrations of dissolved oxygen that remain above 6 mg/L. Since these waters are capable of supporting natural reproduction, a minimum dissolved oxygen concentration of 7 mg/L is required during times of active spawning and support of early life stages of newly-hatched fish.
- *Warmwater Sport Fish Community*: Streams capable of supporting a warm water-dependent sport fishery. Representative aquatic life communities associated with these waters generally require cool or warm temperatures and concentrations of dissolved oxygen that do not drop below 5 mg/L.
- *Warmwater Forage Fish Community*: Streams capable of supporting a warm water-dependent forage fishery. Representative aquatic life communities associated with these waters generally require cool or warm temperatures and concentrations of dissolved oxygen that do not drop below 5 mg/L.
- *Limited Forage Fish Community*: Streams capable of supporting small populations of forage fish or tolerant macro-invertebrates that are tolerant of organic pollution. Typically limited due to naturally poor water quality or habitat deficiencies. Representative aquatic life communities associated with these waters generally require warm temperatures and concentrations of dissolved oxygen that remain above 3 mg/L.
- *Limited Aquatic Life Community*: Streams capable of supporting macro-invertebrates or occasionally fish that are tolerant of organic pollution. Typically small streams with very low-flow and very limited habitat. Certain marshy ditches, concrete line-drainage channels, and other intermittent streams. Representative aquatic life communities associated with these waters are tolerant of many extreme conditions, but typically require concentrations of dissolved oxygen that remain about 1 mg/L.

Water Quality Criteria

These are specified numeric or narrative requirements relating to each of the use designations recognized by Wisconsin. Each designated use has its own set requirements that must be met to protect the intended use. Some of these requirements relate to the amount of a pollutant that can exist without causing harm. Other requirements relate to the minimum concentration of a chemical compound or a species of bacteria. Yet others are set so that physical measurements like temperature or pH are not allowed to reach a level that cause problems.

These requirements are expressed as water quality criteria. They must be narrative in nature and describe in a qualitative manner the conditions that should be achieved, such as no floating debris or scum that interferes with public rights. Alternatively, criteria may be quantitative and be expressed as a particular concentration of a substance or an acceptable range for a substance. For example, the concentration of copper shall not exceed 19 ug/L, or pH shall be from 6-9 standard units. Wisconsin's water quality criteria are found in Chapters NR 102 and NR 105 of the Wisconsin Administrative Code.

Antidegradation

This policy is intended to maintain and protect existing uses and high quality waters. This part of a water quality standard is intended to prevent water quality from slipping backwards and becoming poorer without cause, especially when reasonable control measures are available. The antidegradation policy in Wisconsin is stated in NR 102.05(1) of the Wisconsin Administrative Code:

“No waters of the state shall be lowered in quality unless it has been affirmatively demonstrated to the Department that such a change is justified as a result of necessary economic and social development, provided that no new or increased effluent interferes with or becomes injurious to any assigned uses made of or presently possible in such waters.”

Waters to Be Included on the 303(d) List

Waters can be added to the 303(d) list for two reasons: 1) when water quality standards are not being met or 2) when designated uses are not being achieved.

Waters Not Meeting Water Quality Standards

Waters not meeting water quality standards are to be included on the impaired waters list. A water quality standard is not met under two conditions—either the current water quality does not meet the numeric or narrative criteria or the designated use that is described in the Wisconsin Administrative Code is not being achieved.

Excursions from Numeric or Narrative Water Quality Criteria:

A waterbody may be considered impaired if a numeric or narrative water quality criterion is not met. These criteria are specified in NR 102, 103, and 105 of the Wisconsin Administrative Code for water quality indicators and/or several pollutants. For example, Wisconsin’s numeric water quality criteria state that a waterbody that supports a warm water sport fish community should be able to maintain a minimum dissolved oxygen concentration of 5.0 mg/L. In contrast, a stream that supports a cold water community may not be able to tolerate anything less than 7.0 mg/L during times of spawning or during the egg incubation period for many species of fish.

In this example, dissolved oxygen is not a pollutant, rather an indicator value that changes when the level of pollution in a stream changes. In the case of dissolved oxygen, a lower number or concentration generally indicates stress and infers that there is less oxygen available to fish and other aquatic life that live in the stream.

Except where alternative procedures are specified in administrative rules, Department staff review all available data relating to numeric and narrative criteria to determine if those criteria are not being met. Staff takes into account the following:

- The applicability of data to critical periods. For example, data collected during the summer months are most appropriate for lakes with severe algae conditions.
- The frequency and duration of a criteria violation. In some cases, there is a natural variability that occurs that may cause criteria not to be met for a short period of time. In

- other cases, an “event” such as a large amount of runoff during a rainfall or snowmelt may cause a periodic excursion from a criterion.
- The likelihood of stress on aquatic communities, including fish, insects, mussels, snail, plants or other biota

Dissolved oxygen again provides a good way of describing how the factors of frequency, duration and magnitude may result in a decision about whether or not to include a waterbody on the impaired waters list. In waterbodies where measured dissolved oxygen is very low (magnitude) and data are available to indicate this occurs often (frequency), the Department would be inclined to recommend a water as “impaired.” In some cases, the time in which the dissolved oxygen actually falls below the criterion may be measured in minutes (duration) while at others, it could occur for hours at a time. This is not uncommon for those streams that exhibit what is known as a “diel” fluctuation. This occurs in streams where higher densities of plants and algae create very high concentrations of dissolved oxygen during the day when photosynthesis is active, but the concentrations drop to very low levels at night into dawn when respiration is consuming oxygen instead of producing it. Diel fluctuations may occur regularly during a summer—especially in waters where there may be excessive nutrients. Such diel fluctuations coupled with exceedances of high magnitude may cause stress on the aquatic community and resulting the Department recommending the water as “impaired.” In contrast, the Department may not recommend a water for listing when data indicate dissolved oxygen concentrations below the criterion occur very infrequently and only last for a short period of time; this is not uncommon when a stream receives stormwater runoff during a rainfall or snowmelt event. In these cases, the stress to aquatic life may be minimal.

In all cases, Department staff will look for corroborating information, such as the various biological indices that can be used to measure stress within a fish and aquatic life community. Data indicating the type and number of species of fish, macroinvertebrates (such as insects or snails), plants, or algae are evaluated. The state has available a number of databases, including fish assessment data (IBI), habitat assessment data (QBI), and invertebrate assessment data (HBI). These databases provide a quantitative approach to be used when determining whether a waterbody should be listed.

In addition, staff have access to water chemistry databases that include such parameters as dissolved oxygen, phosphorus, pH, temperature, or toxic substances. If the suite of available data does not strongly suggest an impairment, then the waterbody will not be listed, but will be recommended for additional monitoring as resources allow. The Department will provide a rationale for those cases where data are available that a water quality criterion has been exceeded, but the waterbody has not been recommending for the impaired waters list. In most cases, the criterion has not reached the magnitude, duration or frequency to warrant placing a waterbody on the list. In the future, as assessment methodology report will provide a more definitive approach for placing waters on the list.

Designated Uses Not Being Achieved

The use designation of a lake or stream is identified by a specific citation in Chapter NR 102 or 104 (Wisconsin Administrative Code). In some cases, the specific waterbody is named, particularly for the waterbodies listed in ch. NR 104. In other cases, it may be *codified by reference* especially for coldwater communities that are referenced in what is commonly referred to as the 1980 Trout Book (Wisconsin Trout Streams – Publication 6-3600(80)). Finally, those waterbodies with no reference are considered to be “default” waters and are assumed to support

either a coldwater community, a warmwater sport fish community, or a warmwater forage fish community, depending on waterbody specific temperature and habitat limitations.

For purposes of the 2008 303(d) list, where a “default” fish and aquatic life use designation is applicable, the particular sub-category will be determined as follows:

- For waters identified by the Department after the publication of the 1980 Trout Book as Class I or Class II trout streams, a sub-category of “coldwater community” will be used as the designated uses.
- All other waters, including those waters listed as Class III trout streams after the publication of the 1980 Trout Book, will be considered the equivalent of a warmwater sport fish community.
- The most current list of trout streams is included in a Department publication entitled, “Wisconsin Trout Streams (WDNR Publication FH-806-2002). This publication is also available for viewing on the Department website:
<http://dnr.wi.gov/fish/species/trout/streamclassification.html>

Assignment of designated use for the protection of fish and aquatic life has been an iterative process dating back to the late 1960’s. While the Department strives to maintain a contemporary list of designated uses, it cannot visit each stream, river or lake very often. In fact, many of the designated uses that are included in the Wisconsin Administrative Code date back to the 1980s. The Department is in the process of developing a new classification system as part of its new Assessment Methodology.

To facilitate the determination of a designated use to reflect the most current understanding of stream/river ecology, the Department published updated guidance in 2004. The guidance is included in a document entitled, “Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters” (WDNR PUBL- WT-807-04). The guidance is used by biologists who monitor Wisconsin’s stream and river communities. It provides a framework for the collection and assessment of field data to recommend which fish and aquatic life category or sub-category a particular waterbody or segment best fits. Some of the community features that are used in making these recommendations are included in Table 1, which is adapted from Appendix 2 of the Use Designation Guidelines. The guidance suggests that new names for fish and aquatic life use sub-categories may be included in future revisions to Ch. NR 102, Wisc. Administrative Code. However, until new names are promulgated in code, current names will continue to be used.

Table 1. Example Guidance for Fish and Aquatic Life Use Sub-Category Minimum Expectations. Modified from Appendix 2 of “*Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters*” (WDNR PUBL-WT-807-04).

Fish and Aquatic Life Subcategory with Proposed New Names in <i>Italics</i>	Minimum Dissolved Oxygen	Minimum Stream Community Expectations
Coldwater Community (<i>Coldwater A</i>)	6 mg/L or 7 mg/L during periods of spawning or nursery activity	<p>Potential to meet all expectations</p> <ol style="list-style-type: none"> 1. Naturally reproducing salmonid community containing more than one age group above the age of one year. 2. Year-to-year salmonid survival. 3. Will typically maintain good water quality and habitat. 4. Generally continuous stream flow. 5. More than 2 individual salmonids per 100 meters. 6. Maximum daily mean temperature approximately 22° C (77° F)
Coldwater Community (<i>Coldwater B</i>)	6 mg/L	<p>Potential to meet all expectations</p> <ol style="list-style-type: none"> 1. No natural salmonid reproduction with community sustained by stocking or migration. 2. More than 2 individual salmonids per 100 meters. 3. Will typically maintain good water quality and habitat. 4. Maximum daily mean temperature approximately 22° C (77° F)
Warmwater Sport Fish Community & Warmwater Forage Fish Community (<i>Diverse Fish & Aquatic Life</i>)	5 mg/L	<p>Potential to meet one or more expectations</p> <ol style="list-style-type: none"> 1. Game fish community with more than 2 individuals per 100 meters (except Green Sunfish, Black Bullheads and Yellow Bullheads). 2. Non-game fish community with 5 to 25% or more of the individuals present characterized as being not tolerant of low dissolved oxygen. 3. Macroinvertebrate community with a significant number of individuals (5 to 25% or more) belonging to taxa with HBI tolerance values of 5 or less. 4. Any fish, macro-invertebrates or other aquatic or semi-aquatic species listed as endangered, threatened or special concern species.
Limited Forage Fish (<i>Tolerant Aquatic Life</i>)	3 mg/L	<p>Potential to meet one or more expectations</p> <ol style="list-style-type: none"> 1. No potential to meet above criteria. 2. Non-game fish community dominated by individuals (75 to 100%) belonging to species that are tolerant to low dissolved oxygen. 3. Macroinvertebrate community with a significant number of individuals (numerically 75 to 100%) belonging to species with HBI tolerance values of greater than 5.
Limited Aquatic Life (<i>Very Tolerant Aquatic Life</i>)	1 mg/L	<ol style="list-style-type: none"> 1. No potential to meet the above criteria. 2. No potential to contain a fish community. 3. Any macroinvertebrate community is dominated (75 to 100%) by individuals belonging to species with an HBI tolerance value of greater than 8.

Department biologists conduct field studies to document the condition of a lake, river or stream. These field studies include, but are not limited to the collection of community data for fish, macroinvertebrates, plants, algae and bacteria. They collect data on water chemistry, flow, temperature, habitat condition, and surrounding land use. With these data, Department staff can document whether or not a designated use is being met by comparing what is present to what is expected in a waterbody with a specific designated use. For purposes of determining whether a designated use is being met, the following procedure is used.

- The *existing use* is compared to the codified *designated use*. By definition in the Clean Water Act, the existing use is the attained use in the specific waterbody *on or after* November 28, 1975. Water quality standards are not being met if data are available that show that the existing water quality is not supporting the designated use. This could be indicated by a fish and aquatic life community being present that is not representative of the type of community that would be expected. This could also be indicated by finding a chemical in the water that is persistent and not within the acceptable range for a particular use. Regardless, if it is demonstrated that the existing use is not achieving the goals of the designated use, the Department will recommend that the waterbody be added to the impaired waters list.
- Water quality standards are being met if data are available that show that the existing water quality is supporting a codified designated use. These waters will not be recommended to be added to the impaired waters list.

Threatened Waters

The Clean Water Act also requires each state to identify any surface waters that are “threatened” if there are reasons to believe that the waterbody will not meet water quality standards by the next 303(d) listing cycle. The applicable federal requirements of this category are described in 40 CFR 130.7(b)(4) where it is stated that all *water quality-limited* segments are to be included on the 303(d) list. A water quality-limited segment does not meet applicable water quality standards and/or is not expected to meet applicable water quality standards. U.S. E.P.A. has indicated in the past that a reasonable time-frame for considering a waterbody threatened for purposes of listing would be the next listing cycle.

To determine which waters meet this federal definition, the Department review “State of the Basin Reports” or other information from throughout the state to flag all waters noted by field staff as being “threatened” with a “declining trend.” Staff may have identified these waters because of known changes in the watershed that have the potential to increase pollutants of the water. Some of the noted changes may be temporary, such as road maintenance, while others, such as major changes in land use, may be permanent.

Characterization of a waterbody with a “declining trend” can only be determined through actual water quality monitoring. A trend cannot be determined without having a minimum of two sets of site-specific data. Consequently, a waterbody identified as having a “declining trend” but lacking adequate data will not be considered further for listing. Department staff will use appropriate evaluation methods and professional judgment for waters where adequate data are available to determine whether water quality standards will be exceeded prior to the next listing.

Waters Not to Be Included on the 303(d) List

In Wisconsin's database, many waterbodies are characterized as partially meeting water quality standards. These waterbodies appear to have water quality conditions that meet the minimum requirements for a designated use. However, it may be possible that implementation of certain stream management practices may enhance the overall ecological condition of some of these waterbodies.

Please note that the Department's definition of "partially meeting" differs from the federal definition which uses partially meeting as a degree of non-attainment. In Wisconsin, partially meeting describes a degree of attainment and does not suggest that a water quality standard is not being achieved.

Data Quality

Information Used to Add Waters or to De-list Waters

Information used for purposes of listing must be consistent with the Department's Quality Management Plan or have been obtained using comparable quality assurance /control procedures. For information to be used for the 303(d) list, it must also meet the criteria for monitored data. Monitored data are site-specific and considered representative of 2008 conditions, even if the data are more than five years old.

In general, monitored information contained in the Department's databases will be used, unless more recent information is available. The database identifies waterbodies as monitored if the data are no more than five years old. This information will be used unless Department staff determine that it is not longer representative of current conditions. Department staff will determine if changes in the watershed have occurred, such as significant changes in land use, detrimental changes in the level of nonpoint source controls, or increases in the amount of pollutants discharged from point sources. If significant changes have not occurred, the information will be used.

Department Monitoring Strategy

The Department is in the process of modifying its statewide comprehensive monitoring strategy. The document, entitled *Wisconsin DNR Water Division Monitoring Strategy* (version 2, July 25, 2006) is available for review on the Department's website at <http://dnr.wi.gov/org/water/monitoring/MonitoringStrategyV2.pdf>.

The Department's Water Monitoring Strategy (Strategy) directs monitoring efforts in a manner that efficiently addresses the wide variety of management information needs, while providing adequate depth of knowledge to support management decisions. The Strategy employs a three-tiered approach to information gathering. This careful investment in monitoring effort ensures that the status of Wisconsin's water resources can be determined in a comprehensive manner without depleting the capacity to conduct in-depth analysis and problem-solving where needed. There are three tiers of the monitoring strategy.

Tier 1 – Statewide Baseline Monitoring: *Trend establishment and problem identification*

Tier 1 of this *Strategy* collects baseline physical, chemical and biological information necessary to satisfy Water Division information needs at a broad spatial scale. This level of monitoring determines water quality status and trends in each waterbody type based on ecologically-based indicators, and identifies potential problem areas. For resources that are too numerous to individually evaluate such as streams, a dispersed sampling effort will be implemented to allow information from sampled waters to be used, through inference, to provide technically rigorous and credible information on all of the state's waters. Where environmental problems are discovered through Tier I monitoring or other credible sources of information, these problem areas are identified and prioritized for further study under Tier 2. Broad-scale effectiveness of management actions is determined by comparing groups of waterbodies before and after management actions are implemented to waterbodies of the same type where no management actions are taken.

Tier 2 – Targeted Evaluation Monitoring: *Site-specific monitoring of targeted areas*

Waterbodies identified under Tier 1 as falling below designated minimum levels for the core indicators are prioritized and monitored more intensively under Tier 2. Under this tier, confirmation of the problem is made, along with documentation of the cause(s). Thus, it is a more comprehensive evaluation of individual waterbodies, often requiring cross-program collaboration. The outcome of monitoring under Tier 2 is often the development of comprehensive management plans such as Total Maximum Daily Loads (TMDLs) for specific waterbodies. It also provides the pre-data for determining responses to management under Tier 3. Monitoring in response to episodic events such as fish kills, where the cause and extent of the problem must be determined, also falls under Tier 2, as do short-term, one-time studies, termed Special Projects.

Tier 3 – Management Effectiveness and Compliance Monitoring: *Determining effectiveness of management measures and permit conditions*

Tier 3 monitoring provides follow-up analysis of management plans that have been implemented for problem waterbodies, and evaluate permit compliance and the effectiveness of permit conditions. Monitoring under this tier evaluates the response of core indicators from Tier 1 and 2 to management actions. Effectiveness of waterbody-specific management actions is determined using core indicators from the more intensive sampling designs under Tier 2 that are specific to the problem being addressed. The chosen indicators are compared before and after management actions are implemented.

Regulatory monitoring of permitted entities is included in this category. Effluent monitoring helps WDNR determine whether permitted entities are meeting their permit conditions and state regulations. This type of monitoring is often done through self-reporting by the permitted entities, combined with spot-checks by DNR staff. Monitoring of receiving waters assesses what the effect of an effluent is on the water quality in the receiving waterbody. This monitoring helps determine whether current effluent limits are appropriate or should be altered. Monitoring of public drinking water wells is carried out to ensure that surface and groundwater meet federal public health standards for contaminants in drinking water.

Non-Department Data Sources

In addition to Department-generated data, the Department sought information from federal agencies such as the U.S. Geological Survey, the U.S. EPA and the U.S. Fish and Wildlife Service, other state agencies and Universities, regional planning commission and major municipal sewerage districts. The Department sent a letter on July 26, 2007 to interested parties requesting notification of applicable data no later than September 17, 2007. If an agency had applicable data, Department staff reviewed the data, the procedures used to collect the data and the procedures used to analyze the data.

The Department will review information provided by any individual or group at any time. Data used for listing purposes must have been obtained using adequate quality assurance/control procedures. Outside agencies and individuals submitting data must show that a minimum number of samples were collected at appropriate sites and at critical periods, and that certified laboratories were used for sample analysis. If the quality assurance/control procedures are not adequate, staff will consider collecting additional data in order to list the waterbody in the future. The Department may also assist outside groups in the data quality procedures that are necessary for data to be used by the Department. It is important to note that Department staff will consult with U.S. EPA water quality criteria guidance and use professional judgment to interpret results of field sampling to determine whether or not water quality standards are being achieved.

We anticipate that in the future, data collected by specially trained citizen volunteers may be used to supplement DNR's monitoring efforts. Data would be collected following stringent quality assurance/control procedures and samples would be analyzed by an approved laboratory. If these data show that a waterbody meets the criteria to be placed on the impaired waters list, the Department would add that waterbody during the next listing cycle.

Information Not Used to Add Waters or to De-list Waters

Information that is not considered representative of 2008 conditions or that does not follow the Department's Quality Management Plan cannot be used in preparation of the 303(d) list. This includes information considered to be "evaluated" and not monitored. Evaluation situations are those where:

- Information is provided by groups, other agencies or individuals where the quality of the data cannot be assured.
- Projected stream or lake conditions based on changes in land use only, but with no corresponding in-water data
- Visual observations that are not part of a structured evaluation; and
- Anecdotal reports

Previously Listed Waters

Unless a waterbody is proposed to be de-listed, all previously listed waters will remain on the list even if the water no longer meets this methodology. A waterbody will not be proposed to be taken off the impaired list until the Department has an opportunity to monitor the water or has access to contemporary, representative, and high quality data that warrant a "de-listing."

Specific Methodologies

When a waterbody is added to the impaired list, the sources of pollutants must be identified. Sources include atmospheric deposition of mercury, nonpoint source pollution, point source pollution, NPS/Point source blend, physical habitat, contaminated sediments, and bacteria. In many cases, there are specific methodologies that apply to source categories or to specific pollutants or impairments.

Fish Consumption Advisories

Waterbodies are listed for fish consumption advisories due to atmospheric deposition of mercury, PCBs, dioxin and furan congeners, and Perfluorooctane sulfonate or PFOs. IN 1998, 241 waters were added to the 303(d) list in category 5B “Waters Impaired by Atmospheric Deposition of Mercury,” using the criterion that mercury-based fish consumption advisories had been issued for these specific waterbodies. Since that time, all waters in the state fall under the general fish consumption advisory which recognizes that most fish from most waters in the state contain mercury in at least low levels of concentration. Since 2002, waters have been added to the 303(d) list as they are added to the fish consumption advisory publication, and de-listed where the special fish consumption advisory publication advisory no longer applies.

When waterbody specific data are available for certain game and panfish species, the Department will use the following fish consumption program guidance to include those waters on the impaired list:

- **Mercury:** If a waterbody has special mercury based consumption advice of one meal per month or less frequent for panfish (applied when panfish concentrations reach 0.21 to 1 parts per million (ppm), or is “do not eat” for gamefish (applied when gamefish concentrations exceed 1 ppm).
- **Polychlorinated Biphenyls (PCBs):** if a waterbody has special PCB-based fish consumption advice of one meal per week or less frequent for panfish species or one meal per month or less frequent for gamefish (applied when PCB concentrations reach total PCB concentration in the range of 0.21 ppm or >2 ppm). Some of these sites are due to general residual environmental PCB contamination and some are due to specific deposits of PCBs.
- **Dioxin and Furan Congeners:** if a waterbody has special dioxin/furan based advice of “do not eat” (applied when dioxin equivalents exceed 10 parts per trillion and (ppt) based on 2,3,7,8-substituted dioxin and furan congeners).
- **Perfluorooctane sulfonate (PFOS):** if a waterbody has a special PFOS-based fish consumption advice of one meal per week or less frequent for panfish species or one meal per month or less frequent for gamefish species. A segment of the Mississippi River is being added for PFOs in 2008, making it the only waterbody on the list for PFOs.

Specific waters will be proposed for de-listed where fish are collected and analyzed but no longer meet the criteria for specific fish consumption advice for mercury, PCBs, or other chemicals. The general, statewide fish consumption advisory still applies to these waters but they will no longer be included on the 303(d) list.

More information about the specific consumption advisory can be found in the publication, Choose Wisely, A Healthy Guide for Eating Fish in Wisconsin (PUB-FH-824 2007.) It is available on line at <http://dnr.wi.gov/fish/consumption/>

Contaminated Sediments

The Department will include those waterbodies with sediment deposits that are known to have toxic substances that exceed state water quality criteria for ambient water as specified in ch. NR 105, Wisconsin Administrative Code. These waters may be identified through various monitoring activities, including routine water quality monitoring, sediment core analysis, and collection of fish tissue. In addition to a comparison to the water quality criteria found in NR 105, the Department compares actual sediment concentrations of pollutants to the guidance provided in a document prepared in 2002 entitled *Consensus-Based Sediment Quality Guidelines, WI PUB- 732, 2003*. <http://www.dnr.state.wi.us/org/water/wm/sms/documents.html> These guideline identify the concentration of pollutants that will cause “probable effects” in biological organisms that occupy the contaminated sediments area.

Beaches

Beaches are evaluated for Recreational Uses as opposed to Fish and Aquatic Life Uses. Federal criteria for E. coli are applicable to the open waters of the Great Lakes – including beaches. E. Coli is a bacterium that serves as an indicator of fecal contamination in the water. Monitoring for E. coli at many public beaches along the shorelines of Lake Michigan and Lake Superior is conducted in accordance with the Beach Environmental Assessment and Coastal Health Act of 2000. Data from this effort are used to make decisions on which beaches are impaired – namely due to chronic closure problems due to the presence of high counts of E. coli bacteria.

Although E. coli may not result in illness to humans, its presence suggests that fecal matter may be in the water and that other pathogens may be present. It is often these and other pathogens that result in water borne illnesses in humans. In Wisconsin, inland beaches follow the same monitoring protocol as Great Lake beaches.

When evaluating E. coli data, Department staff will calculate a percent exceedence of the single sample maximum criterion of 235 cfu/100 mL (colony forming units per 100 milliliter sample) when there are 15 or more sample taken in a year. If there are fewer than 15 samples, the year is considered to have insufficient data. This data threshold was selected to represent the number of samples typically collected during a Wisconsin “beach season.” In Wisconsin, the typical swimming season lasts about 15 weeks – Memorial Day through Labor Day. Samples are collected weekly during this time period for beaches that are heavily used. Stream and river samples were not considered due to limited data.

For an example set of 15 consecutive results, 11 geometric means are available. The 1st through 5th results would be used to calculate the first geometric mean, the 2nd through 6th results would be used to calculate the second geometric mean, and so on through the eleventh geometric mean which would be the final five results in the data set (11th through 15th). The resulting geometric means would then be compared to the EPA threshold value using the following table. Only the results from each individual calendar year would be used to calculate geometric means; for

example the last two results from one year and the first three results from the next year would not be used to calculate a geometric mean.

Waters are proposed to be added to the 2008 list where the rolling geometric mean exceeds the U.S. EPA threshold of 235 cfu/100 mL. For purposes of this process, a rolling geometric mean will be calculated for each five consecutive samples analyzed, regardless of sampling frequency (i.e. daily, bi-weekly, weekly etc.).

Years of Information Available	Beaches Were Listed If:
1 year of data	>35% of samples collected exceeded 235 cfu/110 mL
2 years of data	>25% of samples collected exceeded 235 cfu/100 mL
3 years of data	>15% of samples collected exceeded 235 cfu/100 mL

In 2007, 122 monitoring sites at public beaches in Wisconsin were sampled for *Escherichia coli* (*E.coli*) bacteria for implementation of the Beaches Environmental Assessment and Coastal Health (BEACH) Act of 2000. In addition, some inland beaches were also monitored meeting the 15 sample per year minimum sampling requirement.

Priority for TMDL Development

When submitting the impaired waters list for approval by U.S. EPA, the Department must include a “priority rank” indicating the relative timeframe for when a Total Maximum Daily Load (TMDL) report will be developed. A TMDL is a report that shows how much pollution a waterbody can receive without being adversely affected. Federal law requires that a TMDL be developed for each waterbody listed on the impaired waters list.

The 2008 303(d) list includes a rank of “high,” “medium” or “low” for each waterbody identified by the Department. A ranking of “high” indicates likely completion of a TMDL within a two-year period. A ranking of “medium” indicates likely completion of a TMDL within two-to-five years. A ranking of “low” indicates likely completion of a TMDL within five to thirteen years.

Assignment of a priority rank will not always be straightforward, but will consider the following factors:

- **Availability of information:** A large amount of data are needed to develop a TMDL. Some waters already have water quality data that can be used while others have little to no data. Waters with the most readily available data will more likely have a TMDL developed within two years and assigned a “high” priority ranking.
- **Opportunities provided by other activities:** TMDLs can be written using information generated by other water quality management programs such as Priority Watershed Projects, Runoff Management Grants, and other monitoring efforts.
- **Likelihood to respond:** The Department considers the likelihood of the waterbody to respond to management actions when assigning a rank. In some cases, the success of a TMDL and the system response to management is dependent upon the type of impairment and the pollutant sources contributing to the impairment.
- **Severity of the impairment:** The Department will also consider the severity of the impairment and will consider that in assigning a priority. In some cases, extreme conditions may be present that need attention more quickly than those that are not so extreme. Systems with frequent fish kills or acute toxicity issues are examples of this concern.

- **Public health concerns:** Waterbodies with issues that may affect human health may be considered a high priority if development and implementation of a TMDL can result in improving water quality.

Given the number of factors and the varying importance between the short-term and the long-term reporting periods, the process used for assigning priorities is both complex and subjective. High priority waters for TMDL development can be characterized as waters where adequate information for TMDL development is available and generally takes advantage of opportunities provided by other activities. Both high and medium priority TMDLs will also take advantage of Tier 1 and Tier 2 monitoring throughout the state.

In general, waters impaired by atmospheric deposition of mercury provide a special situation. While they are a public health concern and should be addressed, the solution is not local or site-specific and may involve national and international control of air emissions. Therefore, Wisconsin is not scheduling TMDL development for these waters at this time. During the interim, U.S. EPA has suggested that these waters be considered “low” priority.

Environmental Accountability Projects (EAPs)

Alternatives to a TMDL can be prepared for waters on the 303(d) list. These alternatives are referred to as “Environmental Accountability Projects” or EAPs. These are any planned action that will result in a significant reduction or overall elimination of the pollutant loading that is contributing to the impairment for which a waterbody is listed. It is expected that implementation of this plan of action would result in the waterbody meeting standards.

Examples of these types of actions are nonpoint source projects or activities, remedial actions under Superfund, or a dam removal. Acceptable EAPs must meet a minimum of nine required elements prescribed for water quality-based plans in federal program guidance for Section 319 of the Clean Water Act. Wisconsin currently has six projects that may have an EAP prepared to address specific pollutants and impairments instead of a TMDL. In 2008, no waterbodies are proposed to be de-listed based on having implemented an EAP. It is likely that waterbodies will be de-listed in the future from having an EAP project implemented.