# Wisconsin Department of Natural Resources

## 2002 Methodology for Placing Waters on Impaired Waters List

As required by section 303(d) of the Clean Water Act, periodically states are to submit a list of impaired waters to EPA for approval. Wisconsin Department of Natural Resources has submitted a list to EPA every two years up to and including 1998. EPA did not require submittal of a list in 2000. Therefore, the 2002 list is the first submittal since 1998. Wisconsin and all other states are operating under the same federal regulations as used in 1998.

## General Criteria

### 1. Waters To Be Listed

### 1A. Waters Not Meeting Water Quality Standards.

Waters not meeting water quality standards are to be included on the impaired water list. A water quality standard is not met, if either of the following occur:

(1) A numeric or narrative criterion listed in Chapters NR 102, 103 and 105, Wis. Adm. Code is exceeded (e.g. concentrations of dissolved oxygen in a warmwater fishery stream fall below 5.0 mg/l).

(2) The codified designated use of a lake or stream as identified in Chs. NR 102 (categories and reference to 1980 trout stream book) and 104 (variances to fish and aquatic life categories), Wis. Adm. Code, is not being achieved (e.g. a stream that could support a trout fishery is only supporting a forage fishery).

(1) Numeric or Narrative Criterion Exceedances.

Except where specific procedures are specified in administrative rules, Department staff review all available data relating to numeric and narrative criteria taking into account:

- The applicability of data to critical periods (e.g. for lakes with severe algae conditions, at a minimum, data should be collected during the summer).

- The frequency and duration of an exceedance (e.g. is the exceedance the result of diurnal swings or is the exceedance for short periods of time during a runoff event).

- The likelihood of stress on aquatic communities.

The use of fecal coliform data, as specified in s. NR 102.04(5)(a), Wis. Adm. Code, requires the collection of 5 samples per month and calculation of a geometric mean to account for the high level of variability in the data for streams. However, for the purpose of placing waters on the 303(d) list, additional procedures will be used. The existing fecal coliform data base includes a number of DNR/USGS evaluation monitoring sites where research techniques are being used and often 10 to 20 samples collected in a 24-hour period of a single, high flow runoff event. For purposes of comparing these data to the criterion in s. NR 102.04(5)(a), the mean of the concentrations collected during the runoff event will be used as a single sample when calculating a geometric mean. If the event is a multi-day event, mean values are calculated for 24-hour period.

(2) Designated Uses Not Being Achieved.

In 1998, except for those waters identified as having fish consumption advisories, the majority of the waters listed was due to the lake or streams designated fish and aquatic use not being met. Procedures for determining designated uses are stated in the draft "Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters" (WDNR December 2001). These guidelines identify the monitoring techniques that should be used, the number and percent of game and other fish that must be found for each category or sub-category. Table 2 from the draft guidelines below illustrates the information gathered to assess designated uses:

Table 2. Fish and Aquatic Life Use Sub-category Minimum Expectations[1]

[From draft "Guidelines for Designating Fish and Aquatic Life Uses for Wisconsin Surface Waters" (WDNR December 2001)]

| SUB-CATEGORY | DO | MINIMUM EXPECTATIONS |
|---|---|---|
| SALMONID A | 6 and 7 mg/l | 1. Naturally reproducing salmonid community.<br>2. Year to year survival.<br>3. More than 2 individuals per 100 meters<br>Potential to meet all expectations |
| SALMONID B | 6 | 1. No natural reproduction with population sustained by stocking or migration.<br>2. More than 2 individuals per 100 meters.<br>Potential to meet all expectations |
| FULL FISH AND AQUATIC LIFE [2] | 5 | 1. Game fish community with more than 2 individuals per 100 meters (except Green Sunfish and salmonids). |

[1] The table uses Salmonid A and B in anticipation of future changes to administrative rules. Under present administrative rules, both Salmonid A and Salmonid B come under the coldwater designated use. Department staff uses the procedural portions of the guidelines for purposes of assessment, but are not authorized to use Salmonid A and B as separate designated uses.

| | | |
|---|---|---|
| | | 2. Non-game fish community with a significant number of individuals (5 to 25% or more) belonging to species that are not tolerant to low dissolved oxygen.<br>3. Macroinvertebrate community with a significant number of individuals (5 to 25% or more) belonging to taxa with an HBI value of 5 or less.<br>4. Any fish or macroinvertebrates listed as endangered, threatened or special concern species that are not tolerant to low dissolved oxygen or other factors with inadequate protection provided by the limited use sub-categories.<br>Potential to meet one or more expectations |
| LIMITED FORAGE FISH | 3 | 1. No potential to meet above criteria.<br>2. Non-game fish community dominated by individuals (numerically 75 to 100%) belonging to species that are tolerant to low dissolved oxygen.<br>3. Macroinvertebrate community with a significant number of individuals (numerically 75 to 100%) belonging to taxa with an HBI value of greater than 5.<br>Potential to meet one or more expectations |
| LIMITED AQUATIC LIFE | 1 | 1. No potential to meet the above criteria.<br>2. No potential to contain a fish community.<br>3. Any macroinvertebrate community is dominated (75 to 100%) by individuals belonging to species with an HBI value of greater than 8. |

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**. The existing use is the attained use in the specific waterbody on or after November 28, 1975.

- If the **existing use** is "less" than the **codified designated use**, the water is considered to not meet water quality standards.
- If the **existing use** is the same as the **codified designated use**, the water is considered to be meeting water quality standards.
- If the **existing use** is "greater" than the **codified designated use**, the water is considered to be meeting water quality standards

Under appropriate circumstances, the designated uses listed below can be used in a hierarchical manner with coldwater fishery and warmwater sport fishery being at the highest level in the hierarchy. For example, if a stream is supporting a warm (or cool) water forage fishery, but the designated used is a coldwater sport fishery, the existing use is considered to be "less" than the codified use.

[2] Full Fish and Aquatic Life, as used in this table, applies to both warm water sport fisheries and warm water forage fisheries.

- Coldwater fishery or community, including surface waters capable of supporting a community of cold water fish and other aquatic life or that serve as a spawning area for cold water fish species.[3]

- Warmwater sport fishery or community includes waters capable of supporting a community of warm water sport fish or serving as a spawning area for warm water sport fish.

- Warmwater forage fishery or community includes surface waters capable of supporting an abundant, diverse community of forage fish and other aquatic life.

- Limited forage fishery (intermediate surface waters) includes surface waters of limited capacity due to low flow, naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of tolerant forage fish and aquatic life.

- Limited aquatic life (marginal surface waters) includes waters severely limited because of low flow and naturally poor water quality or poor habitat. These surface waters are capable of supporting only a limited community of aquatic life.

**Codified designated use** is one of the following:

- Referenced as a coldwater fishery in the 1980 Trout Streams of Wisconsin publication.

- Specifically identified by name and location in administrative rule in Chs. NR 102 or 104, Wis. Adm. Code.

- Fish and Aquatic Life by default. (Fish and Aquatic Life includes coldwater fishery, warmwater sport fishery or warmwater forage fishery.)

For purposes of the 2002 303(d) list, where the full fish and aquatic life "default" applies a designated use will be determined in one of the two following ways:

(1) For waters considered to have an attainable[4] (although not designated use) of a coldwater fishery (class I or class II only) "Wisconsin Trout Streams" (WDNR publication FH-806-202) will be used as the default. This publication is also available at the http://www.dnr.state.wi.us/org/water/fhp/fish/pubs/troutstreams.pdf.

(2) For waters considered to have an attainable warmwater fishery, the potential use from State of the Basin Report watershed tables will be used as the default.

[3] Where a stream is codified as a coldwater fishery, an existing use of warmwater sport fishery is not considered to be meeting the codified use. Not all warmwater sport fishery streams have the potential to be a coldwater fishery stream.

[4] Attainable in the context of this methodology is a use that can be attained when legally required point source controls are applied and when cost-effective nonpoint source best management practices are installed. Attainable use differs from potential use in that potential use may take into account restoration of habitat and/or greater control of point and nonpoint sources without regard for the provisions of s. 283.15(4)(a)1, Wis. Stats.

For purposes of including waters on the 303(d) list, Class III trout streams are to be included on the list where the attainable use is Class I or Class II coldwater water fishery.

## 1B. Threatened Waters

Threatened waters will be listed when they meet the following "federal definition":

> According to 40 CFR 130.7(b)(4) all ***water quality-limited*** segments are to be included on the 303(d) list. 40 CFR 130.2(j) defines a water quality limited segment as waterbodies "where it is known that the water quality does not meet applicable water quality standards ***and/or is not expected to meet applicable water quality standards***. In the "National Clarifying Guidance For 1998 State and Territory Clean Water Act Section 303(d) Listing Decisions" EPA explained that a reasonable time frame for considering a water body threatened for purposes of listing would be the next listing cycle. The next anticipated listing period is April 2004.

To determine whether a water meets this federal definition, the Department will consider all waters identified on the watershed tables of the State of the Basin Reports as "threatened" with a "declining trend". Waters may have been identified as threatened and declining due to changes in the watershed that have the potential to increase pollutants to the water – either temporary, such as road maintenance, or permanent, such as a change in land use. However, to meet the data quality requirements identified below, only those waters with a minimum of two sets of site-specific data where the monitoring methods used, show a declining trend will be considered. Department staff will then use professional judgment as to whether water quality standards will be exceeded prior to the next listing.

## 2. Waters Not To Be Listed

2A. Partially supporting waters -- Meeting Designated Uses, But Could Be Improved

> In the State of the Basin Reports' watershed tables, the Department lists waters as partially meeting water quality standards. According to Department guidance, these waters are meeting their designated use, but could be improved. Specifically, these waters are meeting both their existing and codified uses, but the implementation of management practices could enhance the overall ecological health of the biological community. This definition of "partially meeting" designated uses differs from the federal definition which uses partially meeting as a degree of non-attainment. In Wisconsin, partially meeting is a degree of attainment.

## Data Quality

### 1. Information Used to Add Waters to List or to De-List

Information used for purposes of listing must be consistent with the Department's Quality Management Plan. The Department uses information from its own files, US Geological Survey, U. S. Environmental Protection Agency, U. S. Fish and Wildlife Service, U. S. Army Corps of Engineers, various Wisconsin universities, regional planning commissions. An extensive list of references is included in each of the State of the Basin Reports.

It must also meet the criteria for monitored data. Monitored data is site-specific and considered representative of 2002 conditions. Department staff use professional judgment to interpret data results to determine whether water quality standards are being met. In general, information contained in the most recent State of the Basin Report will be used, unless more recent information is available. The State of the Basin Reports contain data no more than five years old when the report was prepared.[5] For example, a State of the Basin report prepared in 1999 will use would use data since 1994 as "monitored" data.

### 2. Information Not Used to Add Waters to List or to De-List.

Information not used includes information not considered representative of 2002 conditions or that does not meet the intent of the Department's Quality Management Plan. This includes information contained in the watershed tables of the State of the Basin Reports considered to be "evaluated" and not monitored. Evaluated 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 (no corresponding in-water data).
- Best professional judgment based on:
    - visual observations that are not part of a structured evaluation; and
    - anecdotal reports.

[5] The actual publication date may be one to two years later than the preparation date.

- Monitored data more than 5 years old when the State of the Basin Report was prepared.

### 3. Previously Listed Waters

Unless a water is proposed to be de-listed, all previously listed waters will remain on the list even if the data is "older" than described in subsection 1 above.

## Methodology Specific to Categories

### Atmospheric Deposition

This category includes waters with fish consumption advisories caused by atmospheric deposition of mercury. To a very limited extent, is also includes waters with advisories due to PCBs where there are no discharge sources. In 1998, 241 waters were listed in this category. In 2002, in accordance with EPA guidance Wisconsin switched to statewide "Safe Eating Guidelines" advisory coupled with the specific listing of 92 waters for mercury.

Waters with appropriate game and panfish species of fish included in the following fish consumption advisory categories are to be included on the 303(d) list:

For mercury:

- 1 meal/month
- Do Not Eat

For PCBs:

- 1 meal/month
- 1 meal/2 months
- Do Not Eat

Use of these categories will result in specific waters listed in the latest Wisconsin fish consumption advisory being listed on the 303(d) list.

In preparing the Wisconsin fish consumption advisory, Department staff uses the following ranges of concentrations for the advisory categories:

| Mercury Concentration in Fish (ppm) | | | | |
|---|---|---|---|---|
| Consumptive Advice -- Sensitive Group | Unlimited | 1 meal/week | 1 meal/month | Do not eat |
| Range | < 0.05 | 0.05 – 0.22 | 0.22 – 1.0 | >1.0 |

| Total PCB Concentration in Fish (ppm) | | | | | |
|---|---|---|---|---|---|
| Consumptive Advice | Unlimited | 1 meal/week | 1 meal/month | 1 meal/2 months | Do not eat |
| Range | < 0.05 | 0.06 – 0.2 | 0.21 – 1.0 | 1.1 – 1.9 | >2 |

| Dioxin and Furan Congeners (ppt) | | |
|---|---|---|
| Consumptive Advice | No advisory | Do Not Eat |
| Range | < 10 | > 10 |

The values used in the advisories are derived as follows:

- For Mercury

  The values are based on EPA guidance. Sensitive group includes pregnant women, women of childbearing age, and children under age 15. Others include women beyond childbearing age and men. For the statewide general advisory, the RfD for the sensitive group is 0.1 ug/kg/day (EPA RfD) and for others it is 0.3 ug/kg/day (Irag 1990 RfD). Average Meal size = 227 g uncooked fish. Consumer = 70 kg adult (for others, meal size is assumed proportional to body size). Meal rates defined in the advisory ranging from unrestricted (>225/yr) to none.

- For PCBs

  The Health Protection Value is from the "Protocol for a Uniform Great Lakes Sport Fish Consumption Advisory. Great Lakes Sport Fish Task Force. September 1993. Health Protection Value of 0.05 ug PCB/kg/day. Average Meal size = 227 g uncooked fish. Consumer = 70 kg adult for others, meal size is assumed proportional to body size). Meal rates defined in the advisory ranging from unrestricted (>225/yr) to none. Skinning/trimming/cooking reduction factor = 50%.

- For Dioxin and Furan Congeners

Sum of total dioxin equivalence expressed as 2,3,7,8 TCDD based on dioxin and furan congeners and EPA human health TEFs.

Mean concentrations and maximum concentrations are calculated for each water using data from 1990 to present. A high mean or maximum concentration serves as a flag for a water specific evaluation of the fish tissue concentrations, the type of fish, growth rates and other appropriate factors. For the statewide general advisory, species were placed in a meal-category considering the distribution of concentrations for each species in the tissue criteria for each meal category, angler harvest, bag and size limitations, and other factors pertinent to consumption.

- **Contaminated Sediment**

  Waters listed in this category have "toxic substances in toxic amounts". Specific water column concentrations for many toxic substances are listed in chapters NR 102 and 105, Wis. Adm. Code. Waters may have been identified by DNR, EPA or other agencies through water column, fish tissue or sediment analysis.

  In addition to the water column criteria in the administrative rules, the Department uses guidelines for sediment concentrations. Specifically, the Department uses the "probable effects concentration" from the tables in the publication, "Consensus – Based Sediment Quality Guidelines: Recommendations for Use and Application" (WDNR 2002).

- **Physical Habitat**

  This category includes waters where codified designated uses are not being met due to a physical structure, such as a dam. For example, if a codified designated use is not being met in an upstream segment due to the presence of a dam preventing fish movement, some portion of the segment is deemed to be impaired.

## Priority for TMDL Development

The section 303(d) list of impaired waters must include the priority for TMDL development. In addition, the priority ranking must give preference to the most severely impaired waters.

The rankings are in terms of "high", "medium" and "low". 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 a three to four year period. A ranking of "low" indicates likely completion of a TMDL for a period from five to 13

years. The ranking is not an indication of the starting point for TMDL development. That time varies greatly as described below.

The priority ranking to waters on the 2002 303(d) list is based on the following factors (not ranked in terms of importance):

- **Severity of the impairment.**

  According to federal law and federal regulation the most severely impaired must be considered.

- **Likelihood to respond.**

  To achieve the greatest public benefit, the likelihood of water's response preference is a factor.

- **Public health concerns**

  Waters with public health concerns, such as waters with fish consumption advisories should be considered.

- **Availability of information**

  Proper TMDL development is data intensive. In the short-term, particularly with the severe budget cuts severely limiting the collection of necessary data, the availability of data is virtually an absolute requirement for waters to be given a "high" priority (TMDL development within a two-year period).

- **Opportunities provided by other activities**.

  Given the many different types of impaired waters and the many different needed to address the programs, TMDL development is not handled as a single, "one-size-fits-all" approach. Many impaired waters are being addressed through ongoing programs, such as through nonpoint source priority watershed projects, contaminated sediment remediation, etc.

- **Time to develop TMDL**

  The schedule on the 303(d) list represents an estimate of TMDL completion. TMDL development time varies greatly. It does not represent current workload. For example, a contaminated sediment impaired water may have a span of five to ten years between initial work and completion of a TMDL. Even if the water appears to be more than four years away in terms of completed TMDL, work may be ongoing.

In general, waters impaired by atmospheric deposition of mercury provide a special situation. Obviously, they are a public health concern and, therefore, should be a high priority for TMDL development. However, in most cases, the solution is not a local site-specific solution. The solution is national and international control of air emissions. During recent Quicksilver Caucus TMDL discussions, EPA and states concluded that site-by-site TMDL development for these waters is not efficient use of limited funds and staff resources. TMDLs developed by EPA for waters in Georgia concluded that more than 90% of the mercury deposited came from emissions outside the state. EPA and states are considering options, such as multi-state regional TMDLs and emission reductions in lieu of TMDL development. Therefore, given the ongoing national dialogue, waters in the atmospheric deposition category are not considered appropriate for scheduling TMDL development at this time. During the interim, EPA has suggested that these waters be given a low priority for TMDL development as a placeholder.

Given the number of factors and the varying importance between the short-term (e.g two years) and the long-term, 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. Many of the waters with information also have severe water quality and may address public health concerns. Using waters where TMDLs were developed in 2001 or 2002 as an example, below is a short description of how the TMDLs developed address the various factors listed above.

- In the nonpoint source dominated category of listed waters, TMDL development addressed a number of severely impaired waters. Eagle Creek and Joos Valley did not support a fishery. TMDLs were developed based on the Waumandee Creek Priority Watershed Plan. Similarly, Jug Creek did not support a fishery and a TMDL was developed based on the Middle Kickapoo River Priority Watershed Plan.

- In the contaminated sediment of listed waters, the Department is working on clean-up projects for the most significant PCB sites, including Lower Fox River, Sheboygan River and Hayton Millpond (including Pine and Jordan Creeks). The Department is also working on remedial actions for sites contaminated with heavy metals and PAHs. Work on Grubers Grove Bay is nearly completed. Work on the Manitowoc River near its mouth, the PAH site with the highest concentrations in the state, is not likely to be worked on in the next two years due to the information first becoming available in 2002 and staff are already working on other severe sites in the northeastern part of the state.

Long-term scheduling of TMDLs will focus on the severity of the impairment and the public health concerns.