

Wisconsin's 2018 Water Quality Report to Congress

Integrated Report of Water Quality – Executive Summary

Prepared by the Wisconsin Department of Natural Resources
Division of Environmental Management
Bureau of Water Quality



Governor

Scott Walker

Natural Resources Board

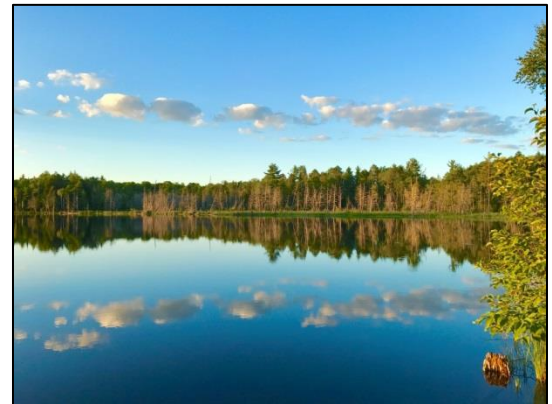
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Cover photo: Edith Lake in Florence County, taken by Luke Ernster.



Editor:

Ashley Beranek

Authors and contributors of this report include:

Tim Asplund, Jim Amrhein, Ashley Beranek, Dave Bolha, Camille Bruhn, Heidi Bunk, Jacob Dickmann, Matt Diebel, Mary Gansberg, Kevin Gauthier, Shawn Giblin, Sue Graham, Ilana Haimes, Mark Hazuga, Katie Hein, Craig Helker, Lisa Helmuth, Andy Hudak, Ted Johnson, Kevin Kirsch, Jon Kleist, Jim Klosiewski, Jim Kreitlow, Paul LaLiberte, Jodi Lepsch, Kristi Minahan, Brenda Nordin, Amanda Perdzock, Scott Provost, Kurt Rasmussen, Craig Roesler, Rachel Sabre, Mike Shupryt, Alex Smith, Amanda Smith, Mike Sorge, Pam Toshner, Jean Unmuth, Josh Weid, Michele Wheeler, and all Water Quality Biologists, Water Resources Specialists, and Water Program Managers. All photos courtesy of Wisconsin DNR unless otherwise credited.

Previous reports were published in 2016, 2014, 2012, 2010, 2008 (data submittal only), 2006, 2004, 2002, 2000, 1996, 1994, 1992, 1990, 1988, 1987, and earlier. WDNR’s earlier documents are available for review at the GEF II building, 101 S. Webster Street, Madison. Later versions are available electronically.

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INTRODUCTION

Wisconsin hosts bountiful natural resources, including a variety of Great Lakes, inland lakes, rivers, streams, wetlands, aquifers, and springs. Every other year the Wisconsin Department of Natural Resources (WDNR) assembles water quality information and reports status and trends to the United States Environmental Protection Agency (EPA), which in turn shares this information with the United States Congress.

This executive summary report highlights the process and results of this 2016 Biennial Water Quality Report to Congress, which was last published April 2014. The Water Quality Report to Congress fulfills reporting requirements under Sections 303(d), 305(b), and 314 of the Clean Water Act.

KEY POINTS

- The majority of assessed waterbodies in the state are healthy (82%, Figure 1). During the 2018 cycle a greater focus was placed on quantifying the state’s healthy waters in addition to the ones determined to be impaired. The use of automated assessment packages, which are specific calculations done by a computer, and access to a large amount of data has allowed for the assessment of more waterbodies. A waterbody is determined to be healthy if it meets at least one of its designated uses (recreation, aquatic life, fish consumption) and is not impaired for any use. Healthy waters are found all across the state (Figure 2).

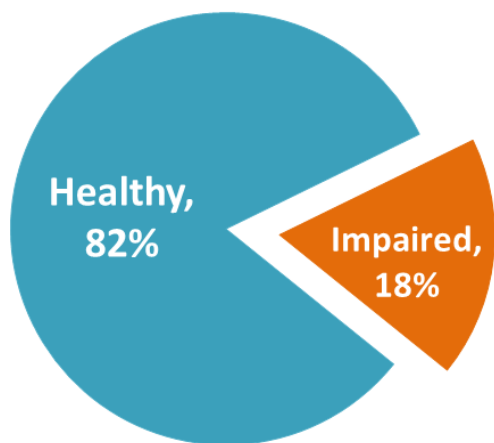


Figure 1: Percentage of healthy waters.

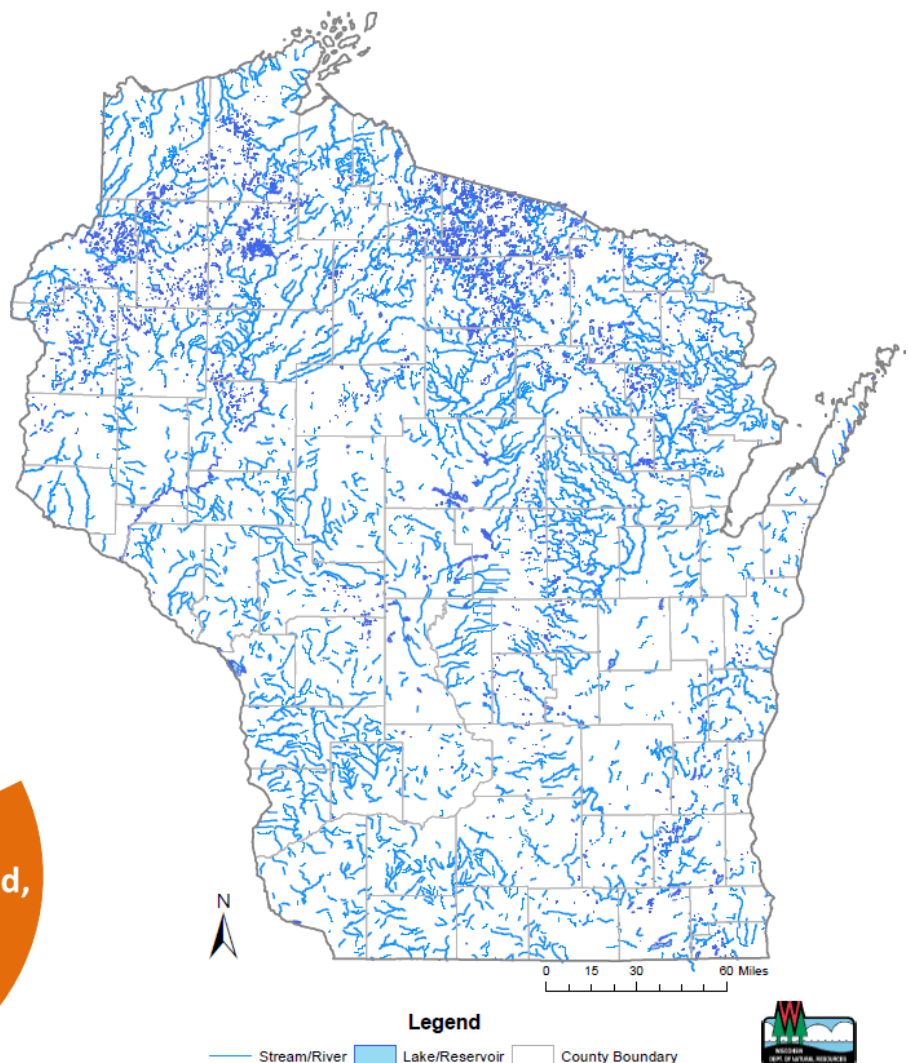


Figure 2: Map of healthy waters across Wisconsin.

- Over 159,000 lake acres had their PCB listings removed. Lakes Winnebago, Butte des Morts, Winneconne, and Poygan all had their specific fish consumption advisories for PCBs removed based on new fish tissue data. This is one of the largest lake acreage pollutant deletions for fish consumption since 2008. An effort was put forth during the 2018 cycle to determine which lakes were supporting Fish Consumption (FC) use because in the past only impaired waters and waters delisted for a pollutant related to FC were reported. With the large number of acres delisted and healthy waters identified, the percentage of lake acres supporting FC use increased to 30% of lakes in the database. This update lets Wisconsin citizens know which lakes have had fish tissue tested.

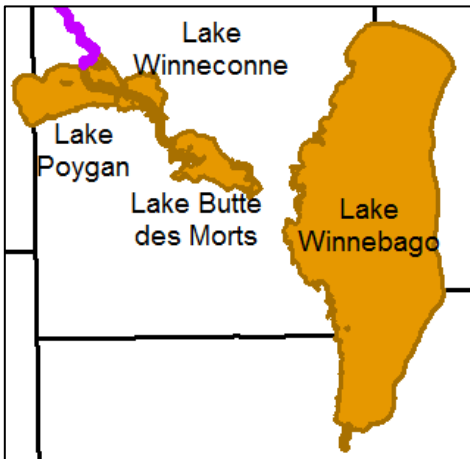


Figure 3: Lakes Winnebago, Butte des Morts, Winneconne, and Poygan had their PCB listings removed.

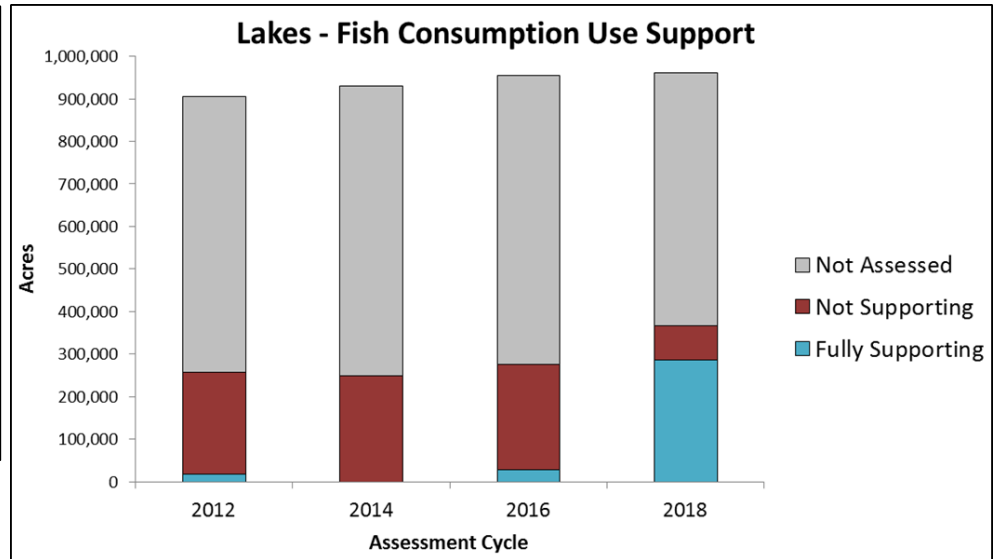


Figure 4: Fish Consumption Use support for lakes for the past four assessment cycles.

- There were a total of 35 waterbodies removed from the impaired waters list, the most since 2010. The majority of these delistings were for total phosphorus and mercury.
- The 2018 draft 303(d) impaired waters list has proposed the listing of 242 waterbodies with 244 new pollutant observations, and 43 previously listed waterbodies with 45 pollutant occurrences added.

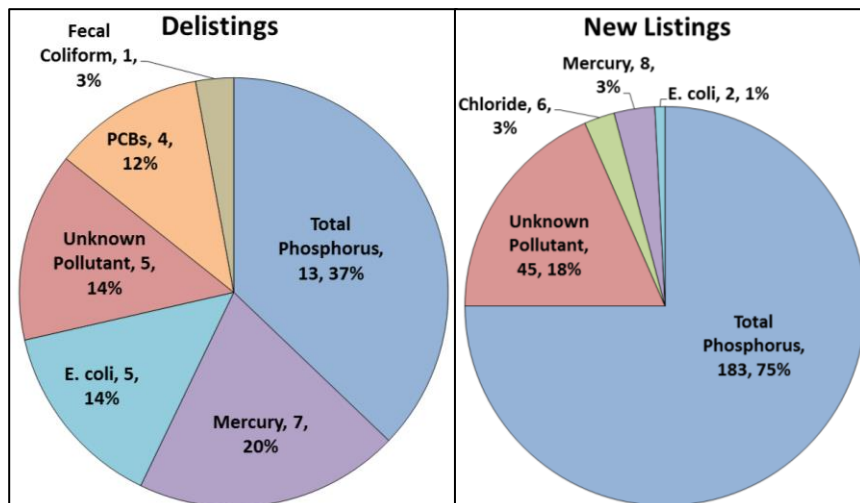


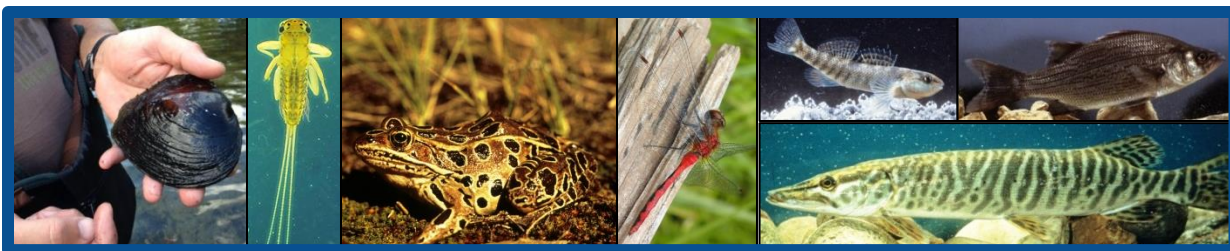
Figure 5: Delisting and listings for the 2018 impaired waters list by pollutant.

WATER QUALITY STANDARDS

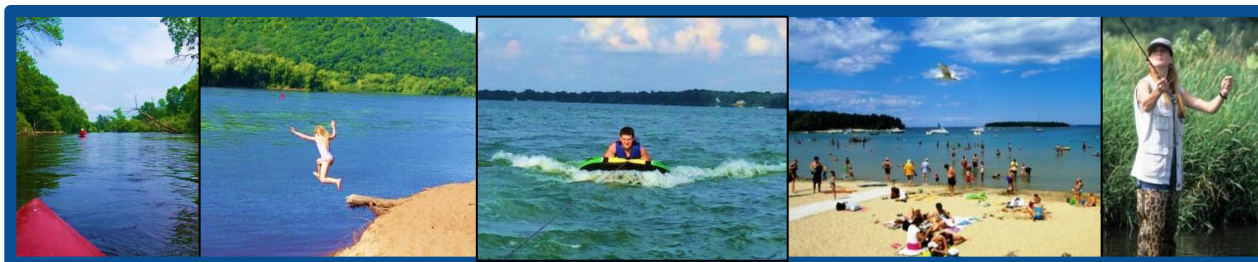
DESIGNATED USES

As part of water quality standards, each waterbody is assigned a designated use. Classifying waters into each designated use category involves science that reflects an evaluation of the resource and its natural characteristics. Wisconsin's designated uses are:

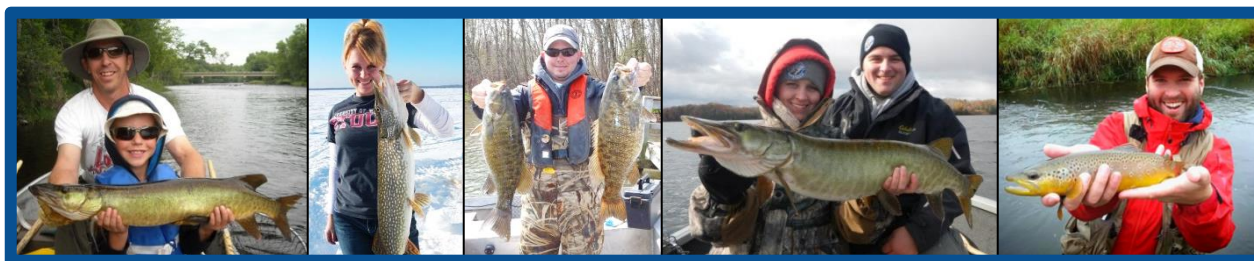
- **Fish and Aquatic Life:** All surface waters are considered appropriate for the protection of fish and other aquatic life. Surface waters vary naturally with respect to factors like temperature, flow, habitat, and water chemistry. This variation allows different types of Fish and Aquatic Life communities to be supported. Five subcategories for fish and aquatic life uses are outlined in s. NR 102.04, Wis. Adm. Code.



- **Recreational Use:** All surface waters are considered appropriate for recreational use unless a use assessment has been completed to show that humans are unlikely to participate in activities requiring partial or full body immersion.



- **Public Health and Welfare (including Fish Consumption):** All surface waters are considered appropriate to protect for incidental contact and ingestion by humans. Fish caught for human consumption in surface waters are part of this protected use.



- **Wildlife:** All surface waters are considered appropriate for the protection of wildlife that relies directly on the water to exist, or relies on it to provide food for existence.

ASSESSMENT METHODOLOGY

Chapter NR 102, Wisconsin Administrative Code, establishes water quality standards for surface waters of the State, and describes the designated use categories and the water quality criteria necessary to support these uses. The state is responsible for assigning designated uses and conducting periodic assessments of these uses on individual waterbodies. Implementation of our surface water quality standards is described in various guidance documents, including guidance on assessment of surface water quality data using applicable water quality standards.

WDNR's water quality assessment goal is to use clearly defined and publicly accessible methods for collection and analysis of data to ensure scientifically defensible assessment decisions. Wisconsin's Consolidated Assessment and Listing Methodology (WisCALM) was updated in 2016. A full version of the 2016 WisCALM guidance document is provided on WDNR's webpage.

WISCALM – YEAR 2018 CHANGES TO ASSESSMENT METHODOLOGY

- New numeric criteria quick-reference section at the beginning of the document. This includes tables of numeric criteria and links to further descriptions within WisCALM.
- Added language on Chloride assessments; a clarification, not a change in criteria or assessment methods.
- Total Phosphorus (TP) targets in lakes for Fish and Aquatic Life (FAL) use were updated to match the Recreation (REC) use criteria. This update does not impact the number of lakes listed for TP or impact permitting.

DATA USED FOR ASSESSMENT

Data submitted by the public and data collected through WDNR's monitoring program are used for assessments. The monitoring data used to make assessment decisions are stored in the Surface Water Integrated Monitoring System (SWIMS) and the Fisheries Database. Assessment data for the State's Integrated Report are stored in the State's Water Assessment, Tracking and Electronic Reporting System (WATERS). The public can view spatial (or GIS) data and written information about each waterbody using the WDNR's interactive mapping tool, the [Surface Water Data Viewer \(SWDV\)](#), and the searchable water detail pages (<http://dnr.wi.gov/water/watersearch.aspx>).

Agencies and individuals submitting data for assessments must: meet minimum data requirements, demonstrate that sample collection occurred at appropriate sites during appropriate periods, and use certified laboratories for sample analysis. If the quality assurance procedures are not adequate, staff



Biologists collect aquatic plants and insects to assess the health of Little Pokegama Bay in the St. Louis River Estuary. Photo: Sue O'Halloran.

may use this data to initiate further investigations by Department staff. If quality assurance procedures are adequate, WDNR may use this data to assess the water for possible impairment listing.

WDNR may assist outside groups in the design and implementation of data quality procedures necessary for data to be used for assessments. WDNR staff will consult with EPA water quality criteria guidance, state Water Quality Standards (WQS), and use professional judgment to interpret the results of field sampling to determine whether or not WQS are achieved. Groups outside of WDNR who regularly collect and submit data to WDNR may work with staff at Central Office to upload data into the SWIMS database to be considered as part of our evaluation and assessment process.

WDNR also supports a Citizen Based Monitoring Program for [rivers, streams](#) and [lakes](#). As stated in the WDNR's Water Resources Monitoring Strategy for Wisconsin, "If citizens follow defined methodology and quality assurance procedures, their data will be stored in a Department database and used in the same manner as any Department-collected data for status and trends monitoring defined in the Strategy." Citizen data are currently used for water quality assessments, including broad-scale statewide assessments.

STATEWIDE CONDITION ASSESSMENTS

The vast number of water resources in the state precludes monitoring and assessing all waters within a reasonable timeframe. WDNR generally prioritizes the collection of water quality data for waters within targeted watershed areas, or waters within areas that are showing degradation or impairment. Over time, additional waters will be monitored, assessed, and updated in the assessment database to ensure the documentation of the state's water conditions are as comprehensive as possible.

A major goal of the federal Clean Water Act—securing water quality so that our resources are fishable and swimmable—is represented by Wisconsin's designated uses for recreation and fish and aquatic life. A third designated use, public health and welfare, was assessed mostly in the form of fish consumption. Waters are placed in one of the following condition groups, depending on results:

- Fully supporting
- Not supporting
- Not assessed

When water quality criteria for the protection of a designated use are not met, the water is considered "**not supporting**" or "**impaired**". Fish consumption is considered "not supporting" where specific consumption advice is in effect due to elevated contaminants in fish tissue.



Boardwalks protect fragile sand dunes while also providing access to Lake Michigan at Kohler Andre State Park. Photo by Jeffrey Ewig.

RIVER AND STREAM ASSESSMENTS FOR DESIGNATED USES

The state contains an estimated 88,000 stream miles from approximately 54,000 discrete rivers and streams. Nearly 43,000 miles are delineated and documented in the Department’s WATERS database. The database contains a majority of the larger streams and rivers in the state.

Fish and aquatic life (FAL) use is the primary use assessed in streams/rivers – 25,151 stream miles (58% of stream miles in the WATERS database) have

Table 1. Summary of Designated Use Support for Rivers/Streams - Miles.

Use Category	Fully Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption	479	1,407	41,032	42,917
Fish and Aquatic Life	17,167	7,984	17,766	
Recreation	43	154	42,721	

been assessed for FAL use support (Table 1 and Figure 6). Of the stream miles assessed, approximately 40% are supporting FAL uses. The FAL use assessments are primarily based on Indices of Biotic Integrity (IBIs) calculated from macroinvertebrate sample and fish survey data. A very small amount of stream

miles have been assessed for fish consumption and recreational uses, as these assessments are often conducted in response to a known problem or specific program need, such as a county health department monitoring program for swimming uses.

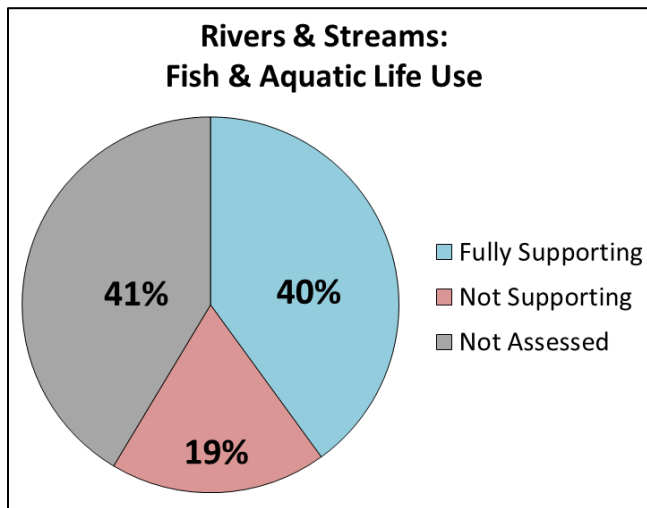


Figure 6. Percentage of river/stream miles by use support for the 2016 Fish and Aquatic Life use assessments.

LAKE ASSESSMENTS FOR DESIGNATED USES

Recreation (REC) and fish and aquatic life (FAL) uses are the primary designated uses assessed for lakes (Table 2). WDNR assessed FAL use of 813,747 lake acres using a combination of in-lake water quality samples and water clarity data gathered from satellite imagery. Based on these assessments, approximately 52% of lake acres are supporting the FAL use (Figure 7). An effort was put forth during the 2018 cycle to determine which lakes were supporting Fish Consumption (FC) use because in the past only impaired waters and waters delisted for a pollutant related to FC were reported. With the large number of acres delisted and healthy waters identified, the percentage of lake acres supporting FC use increased to 30% of waters in the database (Figures 4 and 7). This update lets Wisconsin citizens know which lakes have had fish tissue tested.



Good fishing is driven by a healthy aquatic community. Photo of Amanda Smith.

Table 2. Summary of Designated Use Support for Lakes - Acres.

Use Category	Fully Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption	283,293	80,552	594,581	960,398
Fish and Aquatic Life	500,893	312,857	146,648	
Public Health and Welfare	131,942		828,456	
Recreation	158,481	332,561	469,356	

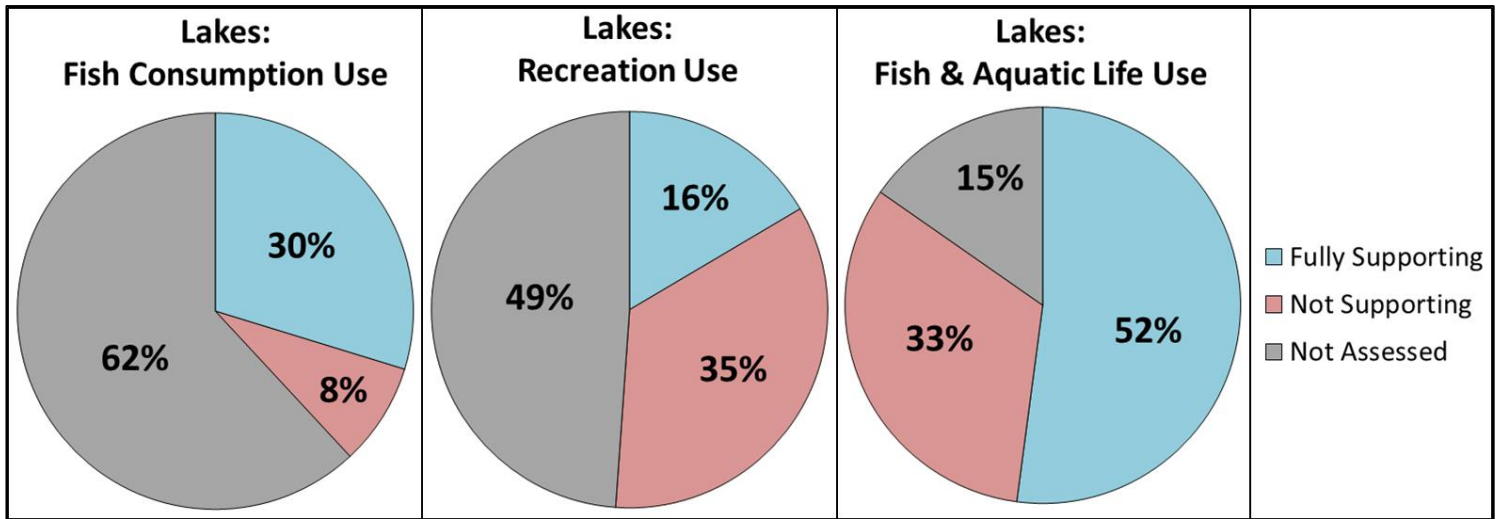


Figure 7. Support status for three different uses by percentage of lake acres.

IMPOUNDMENT ASSESSMENTS FOR DESIGNATED USES

Impoundments are bodies of water created by structures (dams) which hold water either permanently or in a controlled fashion. Many of Wisconsin’s large impoundments provide electricity service by water flow over the dam, controlled by the Federal Energy Regulatory Commission (FERC). Similar to natural lakes, WDNR primarily assesses the recreation (REC) and fish and aquatic life (FAL) uses for impoundments. Due to landscape and morphological features of impoundments (sediment transport, collection of nutrients and algal debris) a majority of impoundment acres do not support fish and aquatic life use (74,837 acres, 60%) or recreation use (79,781 acres, 63%) (Table 3 and Figure 8). Due, in part, to the accumulation of sediment behind riverine structures and proclivity of pollutants (organic contaminants and metals) to attach to sediment, a large proportion of impoundments (61,264 acres or 49%) do not support fish consumption (i.e., these waters have specific advice that recommends strict limits on the number and type of fish consumed).



Willow Flowage Scenic Waters Area. Willow Flowage is part of the 49% of impoundment acres impaired for mercury in fish tissue, most likely from atmospheric deposition. Photo by Mike Schueller.

Table 3. Summary of Designated Use Support for Impoundments - Acres.

Use Category	Fully Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption	32,163	61,264	32,159	125,587
Fish and Aquatic Life	40,839	74,837	9,910	
Recreation	4,528	79,781	41,277	

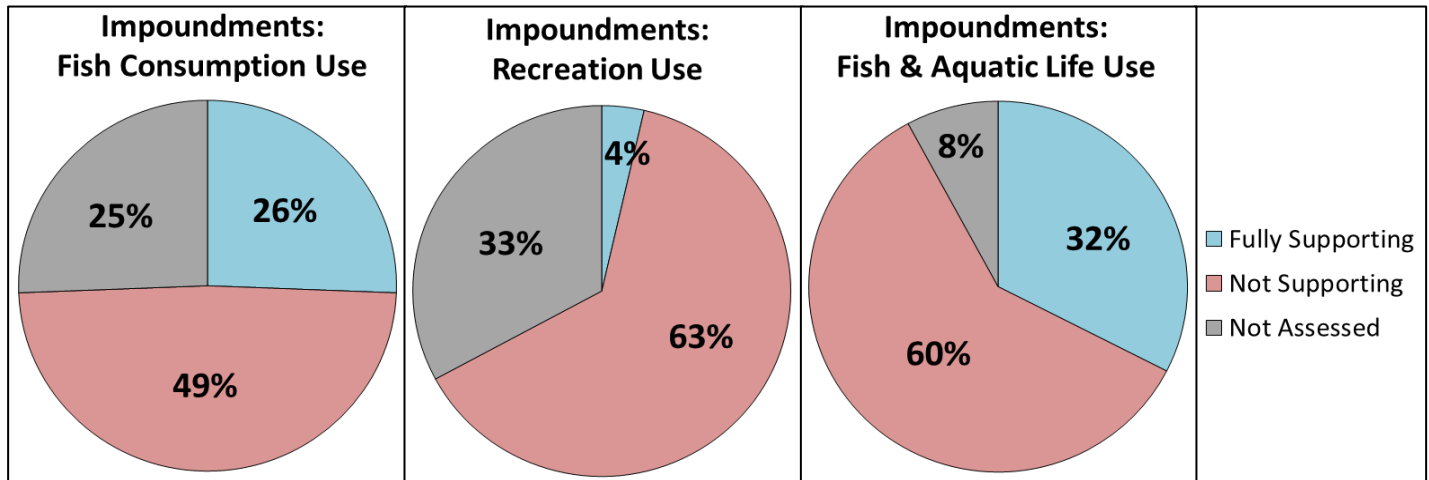


Figure 8. Percentage of impoundment acres supporting three different designated uses.

BEACHES ASSESSMENTS FOR DESIGNATED USES

Wisconsin’s beaches provide wildlife habitat, recreation areas, and tourist destinations. Beaches are especially vulnerable to agricultural,

urban and industrial land uses, and some of our beaches are showing the effects of improper land management practices. Still, of the approximately 117 miles of Great Lake and inland beaches assessed, 105 miles (83%) supported recreation use. Conversely, 12 miles (9%) of assessed beaches did not support recreation use, primarily due to elevated levels of *E. coli* – a bacterial indicator of potential risks to human health (Table 4).

Table 4. Summary of Designated Use Support for Great Lake and Inland Beaches - Miles

Assessed Uses	Fully Supporting	Not Supporting	Not Assessed	Total Size
Recreation	105	12	9	127



Children enjoying Lake Michigan at Bradford Beach in Milwaukee. Photo by Marc Ponto.

INTEGRATED REPORT FIVE-PART CATEGORIZATION

EPA encourages States/Tribes to use a five-category system for classifying all waterbodies (or segments) within its boundaries regarding the waters' status in meeting the State's/Tribe's water quality standards (Table 5). The classification system is based on designated uses for reporting on water quality. Each waterbody and designated use combination is assigned a reporting category.

Table 5. EPA Integrated reporting categories.

Category/ Subcategory	Description
Category 1	All designated uses are supported , no use is threatened.
Category 2	Available data and/or information indicate that some, but not all, designated uses are supported .
Category 3	There is insufficient available data and/or information to make a use support determination.
Category 4	Available data and/or information indicate that at least one designated use is not being supported or is threatened, but a TMDL is not needed .
Category 4a	A State developed TMDL has been approved by EPA or a TMDL has been established by EPA for any segment-pollutant combination.
Category 4b	Other required control measures are expected to result in the attainment of an applicable water quality standard in a reasonable period of time.
Category 4c	The non-attainment of any applicable water quality standard for the segment is the result of pollution and is not caused by a pollutant.
Category 5	Available data and/or information indicate that at least one designated use is not being supported or is threatened, and a TMDL is needed .

Source: <http://water.epa.gov/learn/training/standardsacademy/page7.cfm>

WDNR has further refined subcategories. Category 5 (waters not meeting water quality standards and a TMDL is needed) subcategories distinguish among differing types of impaired waters and TMDL priorities. WDNR created 5B to identify waters impaired by mercury mainly from atmospheric sources. Within the last three assessment periods, WDNR has added additional subcategories under Category 5. These additional subcategories are defined in Table 6.

Table 6. WDNR's Integrated Reporting subcategories for impaired waters requiring TMDLs.

Subcategory	Definition
Category 5A	Available information indicates that at least one designated use is not met or is threatened and/or the anti-degradation policy is not supported, and one or more TMDLs are still needed. This is the default category for impaired waters.
Category 5B	Available information indicates that atmospheric deposition of mercury has caused the impairment and no other sources have been identified.
Category 5C	Available information indicates that non-attainment of water quality standards may be caused by naturally occurring or irreversible human-induced conditions .
Category 5P	Available information indicates that the applicable total phosphorus criteria are exceeded; however, biological impairment has not been demonstrated (either because bioassessment shows no impairment or because bioassessment data are not available).
Category 5W	Available information indicates that water quality standards are not met; however, the development of a TMDL for the pollutant of concern is a low priority because the impaired water is included in a watershed area addressed by at least one of the following WDNR-approved watershed plans : adaptive management plan, adaptive management pilot project, lake management plan, or Clean Water Act Section 319-funded watershed plan (i.e., nine key elements plan).

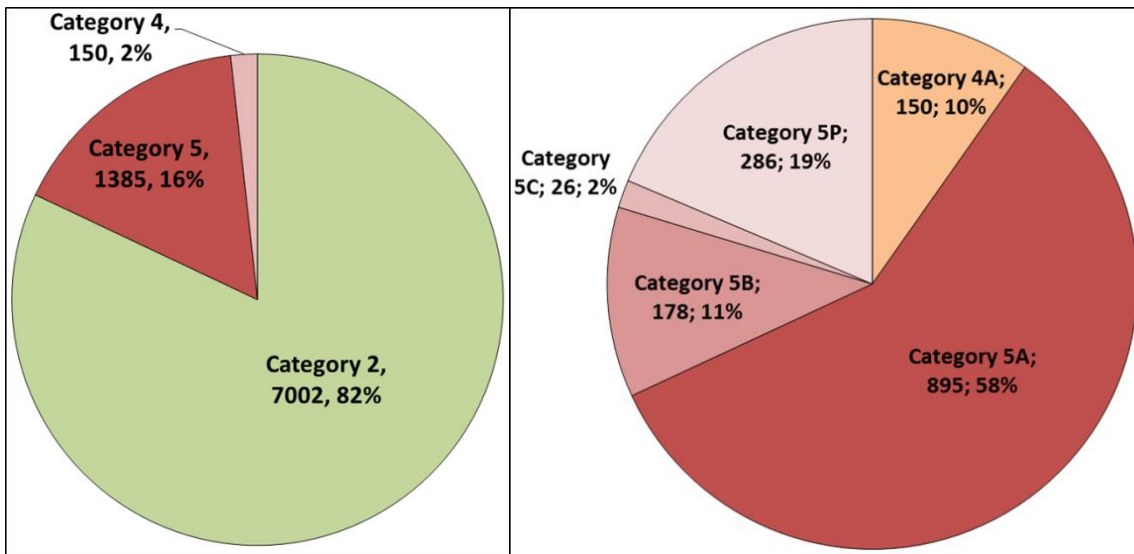


Figure 9. The percentage by count of waters in each category.

During the 2018 cycle a greater focus was placed on quantifying the state’s healthy waters in addition to the ones determined to be impaired. The use of automated assessment packages, which are specific calculations done by a computer

script, and access to a large amount of data has allowed for the assessment of more waterbodies. A water is determined to be healthy if it meets at least one of its designated uses (recreation, aquatic life, fish consumption) and is not impaired for any use. The majority of assessed waterbodies in the state are healthy (82%, Figure 9).

There are 1,533 waterbody segments that do not meet at least one designated use, Categories 4 & 5, and are on the impaired waters list. Of the impaired waters, most fall into Category 5A, 59%, which is the general placement for impaired waters (Figure 9). Waters that are listed for phosphorus alone account for 19% of listings by count. These are waters that are either missing data to assess for an impairment or do not have an impairment (“Impairment Unknown”) and require further investigation. Mercury listed waters due to atmospheric deposition of mercury account for 11% of waters. These listings are low priority for TMDL development. Listed waters where natural conditions are suspected account for 2% of listings. In these cases further investigation is also warranted.

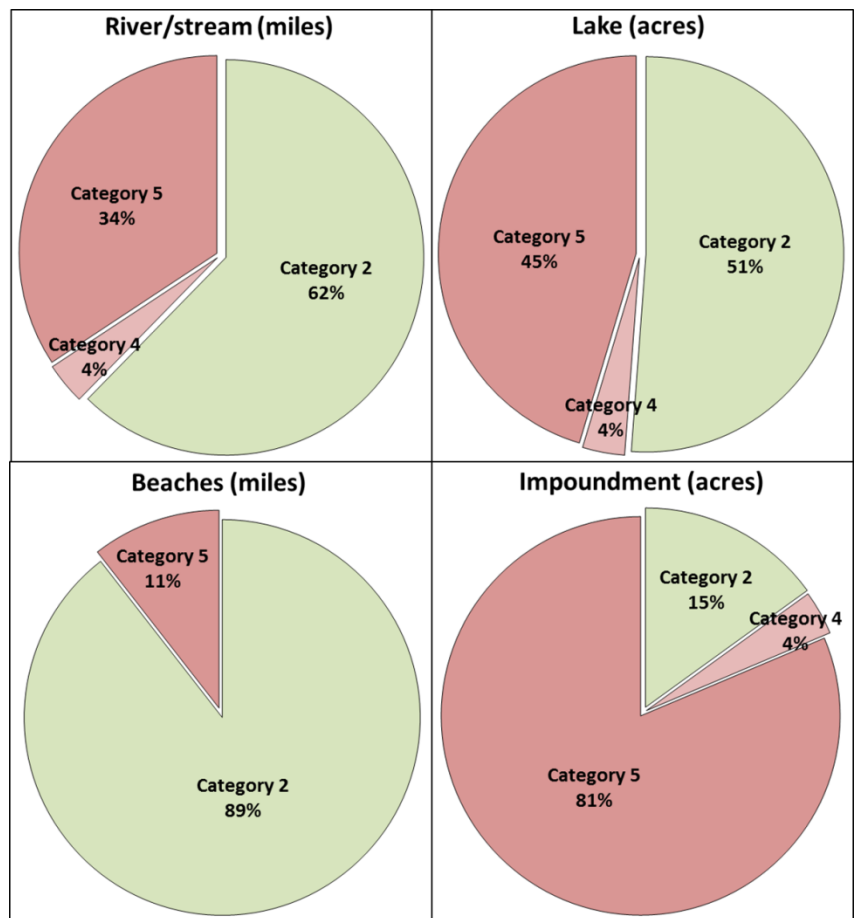


Figure 10. The percentage of each water type by size that is meeting at least one use (“healthy”, Category 2), are impaired but have a TMDL approved (Category 4), or are impaired and still need a TMDL (Category 5).

The amount of Category 2 waters versus impaired waters (Categories 4 & 5) depends on the water type (Figure 10). Over 50% of assessed river/stream miles, beach miles, and lake acres have been placed in Category 2. Impoundments only have 15% of acres in Category 2, but this is because at least one use is usually impaired due to landscape and morphological features of impoundments that promote sediment transport, collection of nutrients and algal debris, and sediment accumulation with attached organic contaminants and metals.

CWA SECTION 303(D) LIST (IMPAIRED WATERS)

Assessing waterbodies against water quality standards and identifying impaired waters that do not meet standards is part of the overarching federal CWA framework for restoring impaired waters. Waters that do not meet their designated uses because of water quality standard violations are impaired. Waterbodies are removed from the list when new data indicates that water quality standards are attained.

The full 2018 draft impaired waters list contains 1,535 waterbody segments with more than 1,900 pollutant/water listing combinations. The primary pollutant listings are total phosphorus, total suspended solids (sediment), and mercury, representing 73% of the current listings (Figure 11).

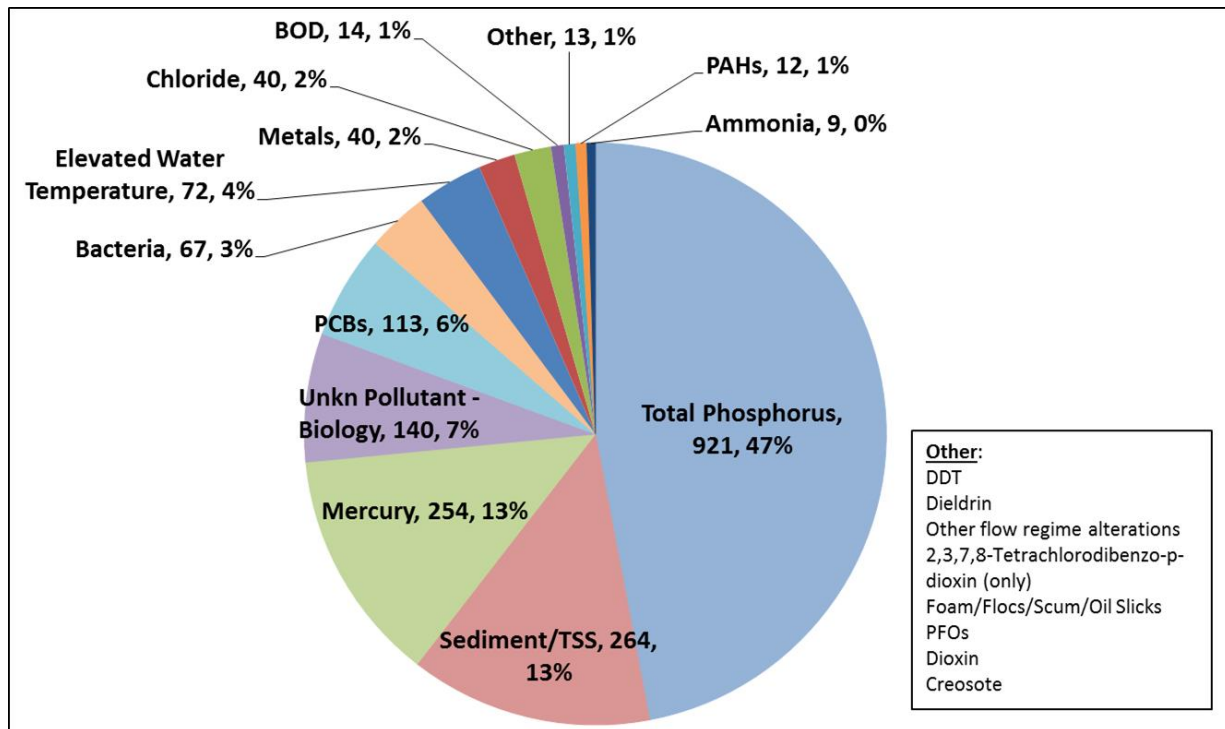


Figure 11. 2018 Impaired Waters List Pollutant counts.

During the 2018 cycle there were a total of 35 waterbodies removed from the impaired waters list, the most since 2010 (Table 7). The majority of these delistings were for total phosphorus and mercury (Figure 12). The 2018 list proposed the listing of 240 waterbodies with 242 new pollutant observations and the majority of listings were for total phosphorus. All of the Unknown Pollutant delistings and deletions were associated with the biological condition of the waterbody; new information showed the biology was

healthy. Removal of fish consumption advisories resulted in the delisting and deletion of PCB and mercury listings for several waters. One of the largest PCB listing removals was for Lakes Winnebago, Winneconne, Poygan, and Butte des Morts, which accounts for over 159,000 acres (Figure 3). Fish Barrier (Fish Passage) deletions were due to the removal of a dam along a stream, which removed the barrier to fish passage.

There were 19 new chloride listings, 6 for newly listed waterbodies and 13 listings added to previously listed waters. The new chloride listings were primarily in the southwestern portion of the state, near larger cities. Chloride listings can result from use of road salt, an important part of winter road safety in Wisconsin, and a larger issue in areas where there are more roads.

Table 7. 2018 Impaired Waters List pollutant changes.

2018 Changes			
35 Delistings	26 Deletions	244 Listings	45 Additions

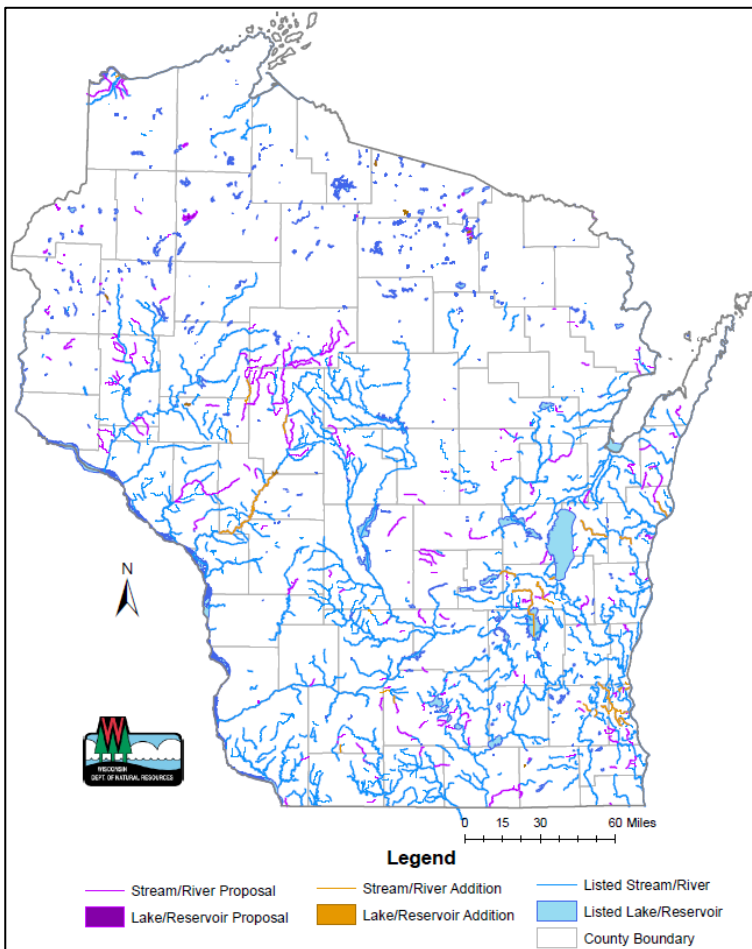
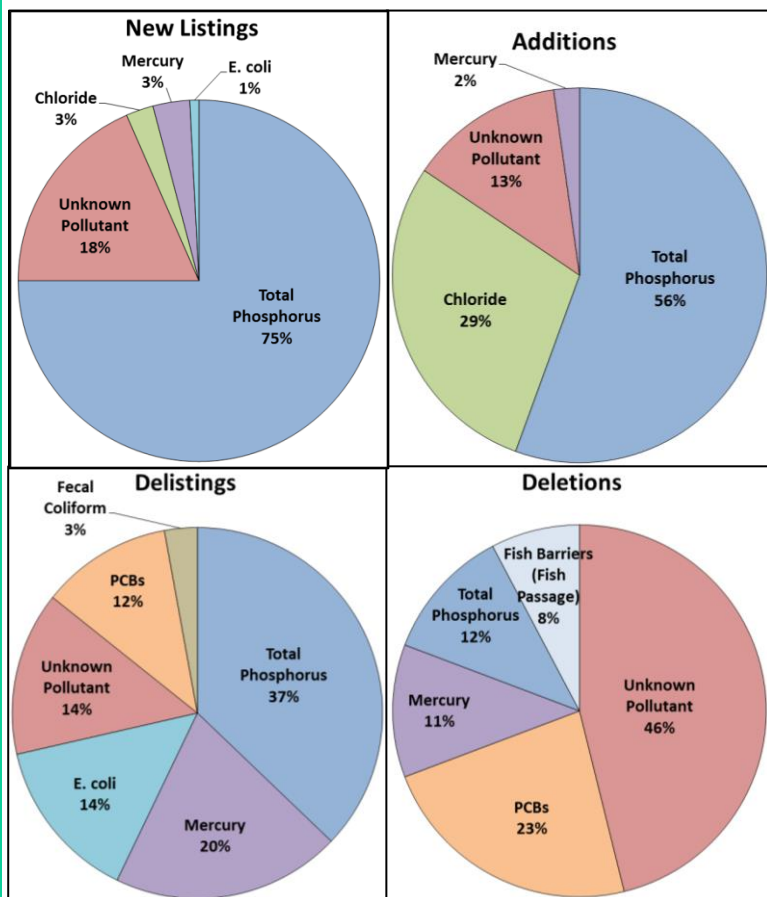


Figure 12. 2018 impaired waters list changes by pollutant. The ‘Unknown Pollutant’ listings are associated with either elevated water temperature or degraded biological community.

Figure 12. Map of full 2018 final draft impaired waters list.

RESTORATION OF WISCONSIN'S WATERS

Section 303(d) of the CWA requires delegated states to determine on a biennial basis whether waterbodies are impaired (not meeting designated uses or water quality criteria). One of the underlying goals of the CWA is to restore all impaired waters so they meet applicable water quality standards. One of the key tools to meet this goal is the development of a TMDL.

A TMDL assesses all the sources of a pollutant that is causing or contributing to the impairment of a waterbody and determines the amount of pollutant that the waterbody can assimilate and still meet water quality standards. TMDL pollutant loads are determined in consideration of in-water targets that must be met for the waterbody to respond favorably. Targets may be based on promulgated numeric water quality criteria or may be based on promulgated narrative criteria developed in consideration of local data and/or nearby reference sites.

Once targets are set for the waterbody, the TMDL is established by allocating the allowable load between the point sources (WLA) and the nonpoint sources (LA) with some amount of the allowable load set aside as a margin of safety (MOS). Thus, three components make up the TMDL: WLA + LA + MOS.

- The wasteload allocation (WLA) is the total allowable pollutant load from all permitted point sources (e.g. municipal, industrial, CAFOs, permitted MS4 stormwater). Reserve capacity may either be built into the WLA or be a separate component of the total loading capacity to allow for future growth in the watershed.
- The load allocation (LA) is the allowable pollutant load from nonpoint sources (agricultural, CAFO off-site land spreading, residential runoff, etc.). Natural sources (e.g., runoff from non-disturbed areas) are typically covered under the load allocation, and whenever possible nonpoint source loads and natural background loads should be distinguished.
- The margin of safety (MOS) accounts for uncertainty in monitoring, modeling, and the development of the allocations.

Once the TMDL is developed and approved, federal and state regulations then require implementation of TMDLs to meet water quality standards where there are implementation mechanisms in place and supported by law. For [point source discharges](#), WLAs delineated in the TMDL need to be expressed in Wisconsin Pollutant Discharge Elimination System (WPDES) permits. [Nonpoint source implementation](#) is an adaptive process, requiring the collaboration of diverse stakeholders and the prioritization and targeting of available programmatic, regulatory, financial, and technical resources.



Figure 13. TMDL source visualization.

NEWLY APPROVED TMDLS

MILWAUKEE RIVER BASIN

The Milwaukee Metropolitan Sewerage District (MMSD) developed TMDLs as a third party on behalf of the WDNR for the Menomonee River, Kinnickinnic River, and Milwaukee River Watersheds, and for the Milwaukee Harbor Estuary. The pollutant causes of impairment addressed by the TMDLs are fecal coliform bacteria, *E. coli* bacteria, phosphorus, and sediment.

The Milwaukee River Basin TMDLs were submitted to EPA toward the end of 2017 and approval was given March 9, 2018.

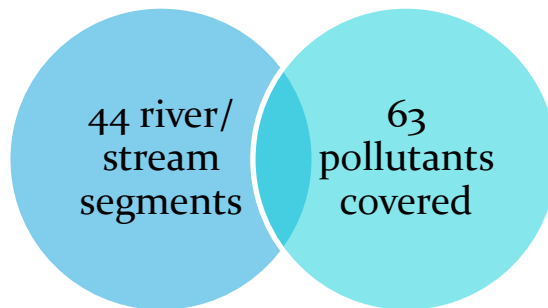


Figure 14: Number of listed waters and individual pollutant listings addressed by the Milwaukee River Basin TMDLs.



The Milwaukee River Harbor (left) and the Menomonee River (right) are both addressed in the newly approved TMDLs.

TMDLS IN DEVELOPMENT

WISCONSIN RIVER BASIN

Several reservoir lakes and tributaries in the Wisconsin River Basin are impaired because of excessive phosphorus loading. As a result, a comprehensive study of the Wisconsin River Basin (WRB) was undertaken by the WDNR that culminated in the development of a TMDL to meet water quality standards of the river, its impoundments and tributaries.

The Wisconsin River TMDL study area spans Wisconsin’s central corridor from the rivers in Vilas County to Lake Wisconsin in Columbia County, covering 9,156 mi² – approximately 15 percent of the state.

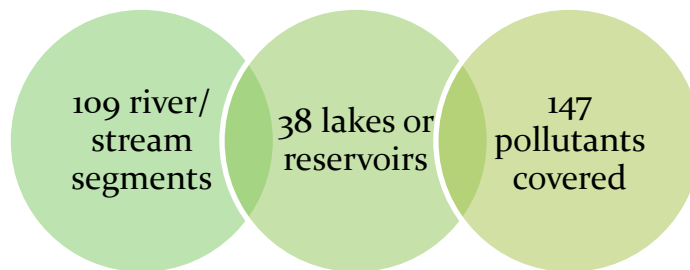


Figure 15: Number of listed waters and individual phosphorus pollutant listings to be addressed by the Wisconsin River Basin TMDLs.

The Wisconsin River Basin TMDL has been drafted and is currently proceeding through the required comments periods. The TMDL is expected to be completed in 2018.

UPPER FOX AND WOLF RIVER BASINS

The Upper Fox River (UFR) Basin and the Wolf River (WR) Basin are two separate basins that converge within a series of pool lakes in Winnebago County before finally flowing collectively into Lake Winnebago. All of the surface water drainage to Lake Winnebago is contained within these two basins. Lake Winnebago outlets into the Lower Fox River Basin where it eventually flows into Green Bay. A TMDL has been developed for the Lower Fox River and Lower Green Bay Area of Concern (AOC) for phosphorus and total suspended solids.

The Upper Fox River and Wolf River Basins are important environmental and economic resources for the state and the local community. People have long used the Fox River and Wolf Rivers for transportation, commerce, energy, food, and recreation. However, the waters located within the Upper Fox and Wolf River Basins are impaired due to excess phosphorus and total suspended solids (TSS). To restore waters within the Fox and Wolf Basins, TMDLs will be developed for total phosphorus and TSS. The TMDL will identify the sources of the pollutants and the reductions necessary to address water quality impairments. In addition, addressing water quality in the Upper Fox and Wolf basins may be necessary in restoring water quality in the Lower Fox basin.

The Upper Fox and Wolf River Basins TMDLs are currently being drafted and are slated for completion in calendar year 2018.

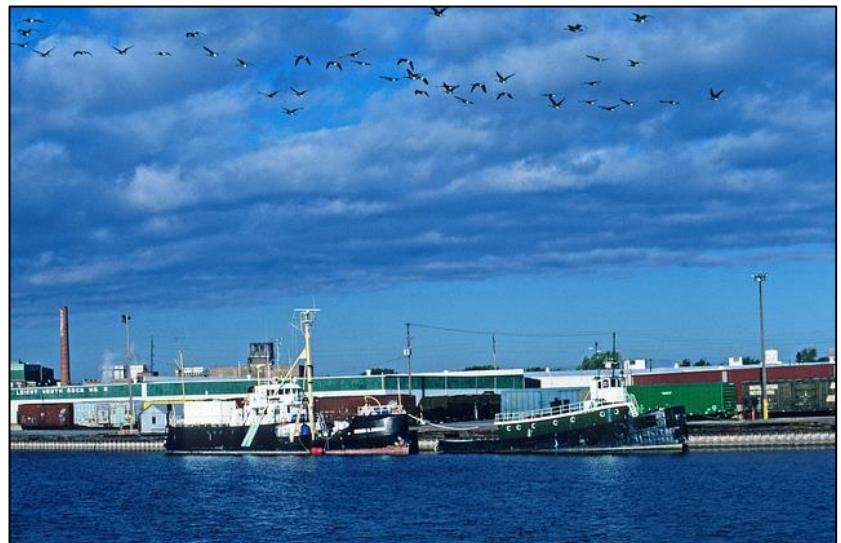
NEWLY PROPOSED TMDLS

NORTHEAST LAKE SHORE TMDL

The state legislature appropriated funds for a TMDL study for the eastern part of Wisconsin covering areas that drain into Lake Michigan from the Ahnapee River watershed south to the Sauk Creek watershed (Figure 18). The TMDL is being developed to address impairments due to nutrients and sediment. The project is currently in the data collection and monitoring phase to identify waters



Figure 16: Number of listed waters and individual phosphorus pollutant listings to be addressed by the Upper Fox and Wolf River Basins TMDLs.



Boats on the Fox River.

impaired due to phosphorus and sediment and to characterize and quantify the nutrients, including nitrogen, coming from nonpoint sources relative to climate, land use, soil type, and drainage patterns. It is anticipated that this project will take three to four more years to complete.

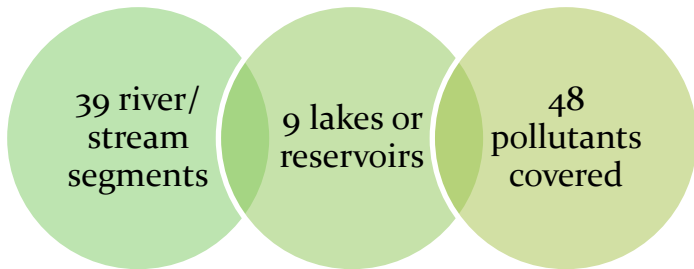
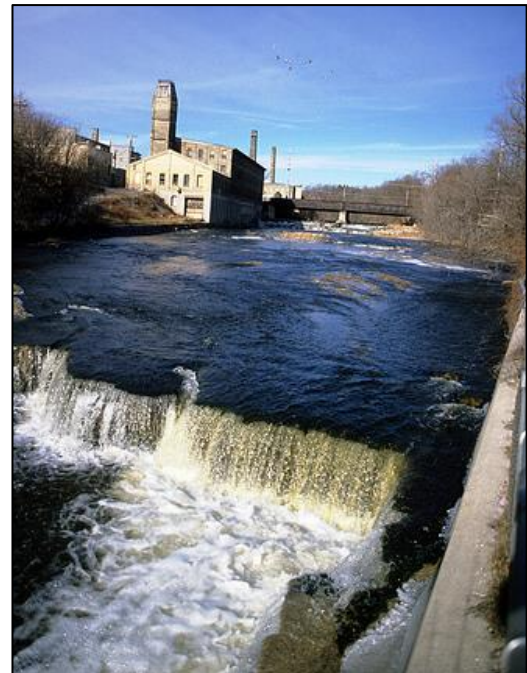


Figure 17: Number of listed waters and individual phosphorus pollutant listings estimated to be addressed by the Northeast Lake Shore TMDLs.



The Sheboygan River is part of the new Northeast Lake Shore TMDL.

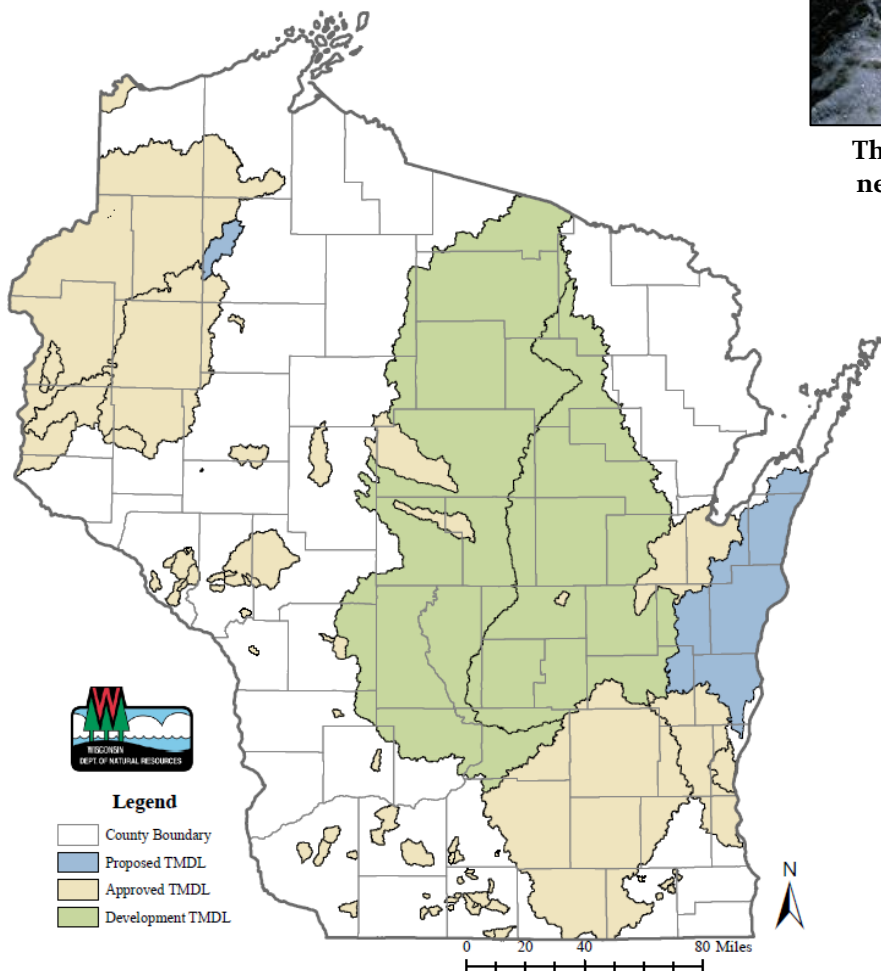


Figure 18. Map of TMDL Approved and TMDL Development areas in Wisconsin. For more information on these TMDL areas visit the online map: <http://dnr.wi.gov/topic/tmdls/tmdlMap.asp>.

