

WISCONSIN WATER QUALITY

REPORT TO CONGRESS 2026



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Wisconsin Department of Natural Resources



Division of Environmental Management



Water Quality Bureau

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WISCONSIN'S WATER QUALITY REPORT

The Federal Clean Water Act (CWA) requires all states to prepare a Water Quality Report to Congress every two years. This “Integrated Report” combines the CWA sections 305(b), 303(d), and 314. The report contains an overall summary of water quality conditions in the State and an updated Impaired Waters List. Wisconsin data are also provided electronically to the United States Environmental Protection Agency (EPA) as part of the Integrated Reporting Process.

Wisconsin's 2026 Wisconsin Water Quality Report to Congress summarizes assessment progress and activities related to water quality protection during the past two years. This document is an online publication only that can be accessed at the Wisconsin Department of Natural Resources (DNR) website: dnr.wisconsin.gov.



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***Evening Sailboat Race
on Lake Onalaska*** by
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Great Waters 2024
Photo Contest

Previous reports were published in 2024, 2022, 2020, 2018, 2016, 2014, 2012, 2010, 2008 (data submittal only), 2006, 2004, 2002, 2000, 1996, 1994, 1992, 1990, 1988, 1987, and earlier. DNR's earlier documents, prior to 2000, are in the process of being digitized and uploaded. Later versions are available electronically.

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INTRODUCTION

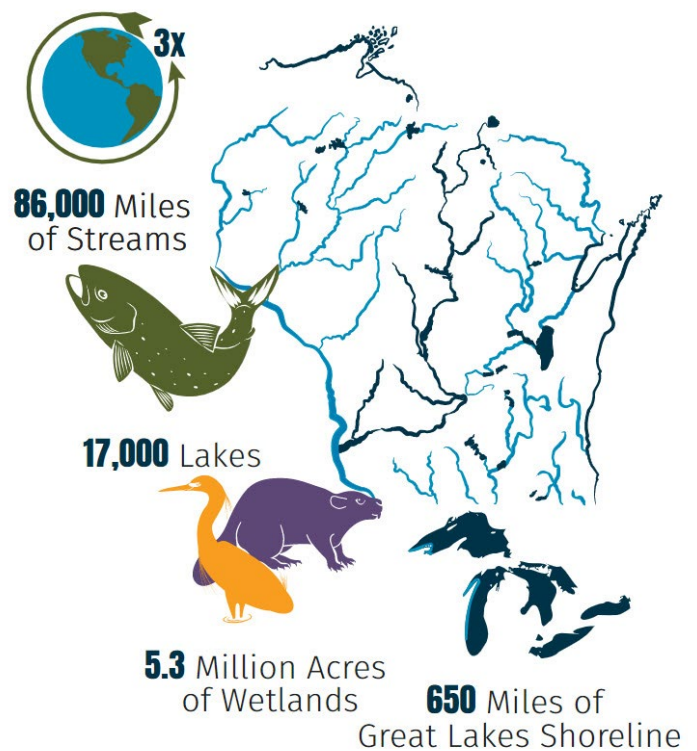
Anderson Dock Sunset, Lake Michigan, Door County

Photo: Lisa and Paul Schultz 2017

Wisconsin is a state with bountiful natural resources, including many and varied lakes, streams, wetlands, aquifers, and springs. Every other year, the Wisconsin Department of Natural Resources (DNR) provides reports on the quality of the State's water resources to the United States Environmental Protection Agency (EPA), which in turn, shares this information with the United States Congress. The information provided may be considered as a tool for rule making, budget appropriations, and program evaluation by federal legislators.

Key Findings

- 81% of evaluated waters are healthy, by waterbody/assessment unit (AU) count
- 102 listings on 93 waters were added to the Impaired Waters List and Waters in Restoration List.
- The top four newly listed pollutants were: phosphorus (40%), *E. coli* (16%), PFOA (15%), and "Unknown" (evidence of degraded aquatic vegetation; 12%).
- 16 listings were removed and 8 waterbodies were moved to the Waters Attaining Standards list.
- 10 new listings were covered by existing TMDLs.





WISCONSIN'S WATER QUALITY

Fisher Lake, Florence County

Photo: Luke Ernster 2018

Total Waters

There are over five and a half million people in Wisconsin that share the state's bountiful water resources. Wisconsin has approximately 1.2 million lake and impoundment acres and approximately 88,000 river and stream miles. Despite the abundance of water resources in Wisconsin, many are threatened by human-induced stressors.

Tribal Nations and Water Quality Protection

The state of Wisconsin shares its geography with 11 federally recognized Tribes and one Tribe that is seeking Federal recognition. The DNR is committed to honoring the sovereignty of the Tribes and their Reserved Rights, including with respect to water resources.

According to information in the DNR WATERS database, there are 146 water bodies that straddle a border between the exterior boundaries of Tribal Nation reservations and other jurisdictions. Thus, restoration and protection of these waters depend upon close collaboration among the Tribes, State, and other stakeholders.

Treatment in a Similar Manner as a State

Just as states may receive authority to administer Clean Water Act programs, Tribes may apply for authorization for "treatment in a similar manner as a State" (TAS). Once approved by EPA, Tribes can use TAS to establish water quality standards that are more stringent than state or federal standards and that protect specific Tribal uses that are unique to their needs. In instances in which waterbodies have overlapping jurisdictions between Tribes and the State, DNR must consider downstream uses and the respective Tribal water quality standards when issuing permits for activities that will impact these waters. The EPA implements the Clean Water Act where Tribes have not been approved for TAS.

The Ceded Territories and Reserved Rights

In two treaties known as the Treaties of 1837 and 1842, the Lake Superior Chippewa (Ojibwe) Tribes ceded land in what is approximately the northern one-third of Wisconsin to the United States government but

reserved rights to hunt, fish, and gather within the Ceded Territories (Treaty Rights, 2018). Tribal Nations are interested in protecting water quality on Tribal lands and collaborating with the state to protect water quality in the Ceded Territories.

Clean water is important to Tribal Nations in order to sustain traditional ways of life that are dependent on clean water, like subsistence fishing and wild rice gathering. The DNR values input and collaboration with the Tribes in efforts to restore and protect water quality for all.

Tribal References:

Great Lakes Indian Fish and Wildlife Commission, *A Guide to Understanding Ojibwe Treaty Rights*, Great Lakes Indian Fish and Wildlife Commission, 2018 [Treaty Rights 2018.pdf](#)

US EPA, OITA. *Tribes Approved for Treatment as a State (TAS)*. Data and Tools. 23 May 2017, <https://www.epa.gov/tribal/tribes-approved-treatment-state-tas>.

“Water Quality Standards Regulatory Revisions To Protect Tribal Reserved Rights.” *Federal Register*, 2 May 2024, <https://www.federalregister.gov/documents/2024/05/02/2024-09427/water-quality-standards-regulatory-revisions-to-protect-tribal-reserved-rights>.

The Assessment Process

This document highlights assessment findings from the 2026 reporting cycle (2026 cycle), and considers data from 2015-2024, depending on the parameter. New data considered this cycle are from the years 2023-2024. The 2026 cycle began on April 1, 2024, after the submission of the 2024 Integrated Report and Water Condition Lists. The first task of the new assessment cycle is to make updates to the assessment methodology (below). Then data are assembled in preparation for evaluation according to the updated methodology.

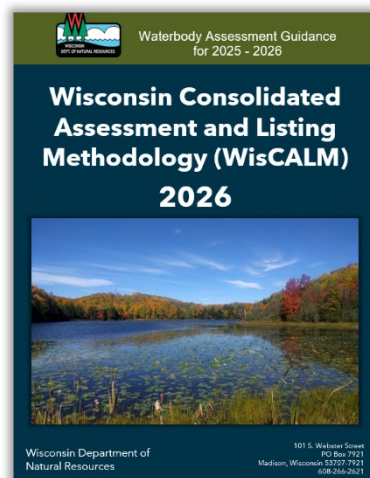
The Clean Water Act asks that all readily available data are used to assess a state’s water quality. Before the assessments are done the DNR sends out a request for water quality data. Waters are assessed using quality-assured data originating from DNR’s monitoring program, county and state partners, university partners, and the public. All data used for assessment meet DNR’s quality assurance requirements and local DNR staff determine whether available data were representative of a water’s condition.

Assessment Methodology

DNR’s water quality assessment goal is to use clearly defined, publicly accessible methods for collection and analysis of data to ensure defensible assessment decisions. To this end, the DNR built upon its 2024 assessment methodology work by creating a revised [Wisconsin Consolidated Assessment and Listing Methodology \(WisCALM\)](#) to conduct assessments in 2026 for determining the attainment of designated uses.

The most significant updates were:

- Clarifying which PFAS compounds are assessed and their associated parameters in SWIMS.
- Noting that assessments of aquatic plant communities are not appropriate for reservoirs.
- Clarifying that qPCR tests for *E. coli* cannot be used for assessment purposes.



Wisconsin DNR Data

Chemistry data collected by staff, volunteers, and grant recipients, among others, go to the State Lab of Hygiene (SLOH), which sends its data to the SWIMS database through the Laboratory Data Entry System (LDES). Data in SWIMS are considered readily available and are used in assessments when they meet assessment requirements. Data in SWIMS were assessed using automated assessment packages that are programmed to follow assessment protocols outlined in [Wisconsin Consolidated Assessment and Listing Methodology \(WisCALM\)](#). Other data sets not in SWIMS such as fish and aquatic plant surveys were manually assembled and summarized for review.

Public Data

In addition to DNR's monitoring data described above, public data were gathered and considered for use in assessments through an active data solicitation process. Every two years, the DNR requests that citizens and interested groups submit their surface water data (biological, chemical, and physical). Data meeting specified requirements were evaluated, along with DNR-collected data, to assess the quality of the state's water resources. Data were accepted from the public from March 3 to April 1, 2025, and the department received information/data submittals from three entities. With newer updates to SWIMS, more partners are able to submit their data electronically outside of the formal public data solicitation period.

Milwaukee Riverkeepers

Milwaukee Riverkeepers has a Community Science Monitoring Program for *E. coli* monitoring; data from this project was submitted to DNR along with sampling methods. The submitted data was for 2024 and was used in this assessment cycle.



Courte Oreilles Lake Association (COLA)

Every year a member of COLA submits water quality data for Lac Courte Oreilles in Hayward, WI. These data are included in the subsequent assessment cycle. Parameters include phosphorus, temperature, and dissolved oxygen, among others.



Milwaukee Metropolitan Sewerage District (MMSD)

MMSD uploads their entire surface water quality monitoring data set into the Lab Data Entry System (LDES), which connects to SWIMS. DNR staff reviewed the data prior to its inclusion in the 2026 assessment.



Public Comment Periods

Public comments were sought during multiple points of the assessment process. First, the public was given the opportunity to comment on the Draft WisCALM from March 26th to April 24th, 2025. The department documented and responded to all comments; these can be found on the [WisCALM web page](#). Then, the public was offered the chance to comment on the 2026 Draft Water Condition Lists and TMDL updates from February 16th to March 18th, 2026. These comments and DNR responses can be found on the [Water Condition Lists web page](#).

Statewide Water Quality

Assessed Parameters

The single most assessed parameter during the 2026 cycle was Fish Index of Biotic Integrity (fIBI), followed by total phosphorus and Macroinvertebrate Index of Biotic Integrity (mIBI). The fIBI and mIBI are multi-metric indices that synthesize information about a community of fish or invertebrates into a single number. The metrics making up the fIBI or mIBI might include the proportion of individuals in the sample that require high dissolved oxygen, the proportion of individuals from a certain feeding guild, or a measure of diversity. Biotic indices are a valuable tool for assessments because they reflect the sum of the environmental conditions across the lifespans of all the individuals in the sample.

Total phosphorus is the most evaluated chemical parameter. DNR released its [Nutrient Reduction Strategy](#) in 2013 (currently updating and now called Nutrient Loss Reduction Strategy) and numeric water quality criteria for assessments were established in 2010. In this cycle, about two-thirds of phosphorus assessments attained standards. Wisconsin’s assessment methodology places the greatest weight on assessments with results from both biological and chemical parameters.

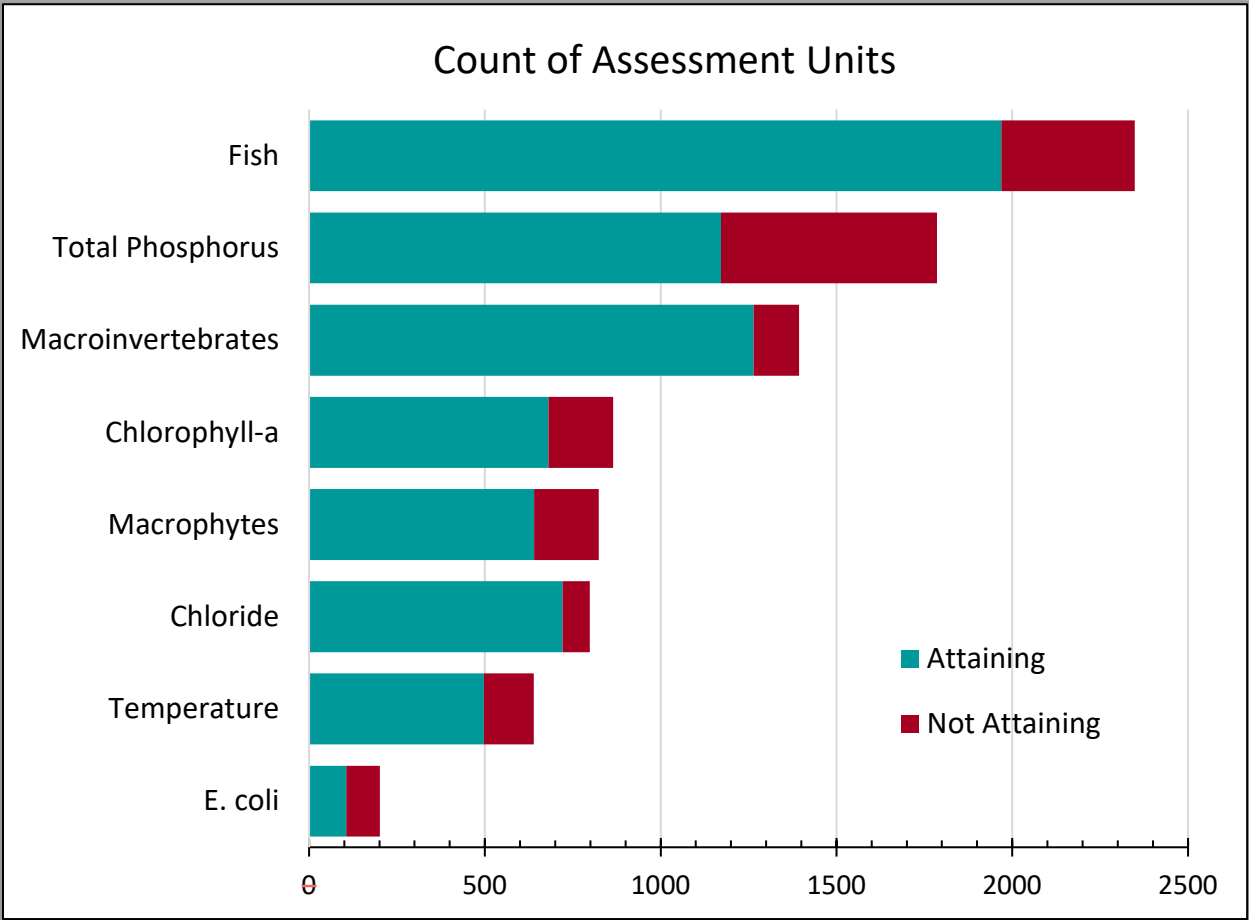


Figure 1. Number of AUs assessed for common parameters during development of the 2026 Water Condition Lists. Parameters showing attainment are from the years 2015-2024. Parameters showing non-attainment may be from 1998 or later; these data are considered current until new data show improved conditions. Some compounds like PFAS and metals are not shown due to the low number of waters assessed.

2026 Water Condition Lists

These Water Condition Lists serve as a record of water quality across the state and are a starting point for water resource management. Changes in the Water Condition Lists are the result of restoration planning work, advances in monitoring and assessment technology, additional monitoring data, and water quality restorations.

The department makes a distinction between the *pollutant* listing category and the *AU* or water listing category. Suppose a water is evaluated for phosphorus, total suspended solids, and PFOS. If the PFOS assessment is found to be meeting standards, it is not listed as a pollutant. If the total phosphorus levels are above standard but covered by a TDML, that pollutant listing category is 4A. If the total suspended solids are above standard but *not* covered by a TMDL, that pollutant listing is category 5A. The overall listing category for the AU or water is the *most severe* of the pollutant listings, or in this case 5A. This hypothetical water body would be placed on the Impaired Waters List.

In the 2026 cycle the Waters Attaining Standards List saw the greatest increase in number of waters. Some waters were moved from this list to the Impaired Waters or Waters in Restoration Lists as conditions changed or new problems were documented, however there were enough newly-assessed waters in good condition to increase the total.

Table 1. Summary of waters (AUs) and listing counts on each of the Water Condition Lists.

2026 Water Condition Lists	No. of Waters	No. of Pollutant Listings
Attaining	8010	-
(change from 2024)	+76	-
Impaired	1325	1573
(change from 2024)	+60	+82
In Restoration	447	679
(change from 2024)	+3	+8

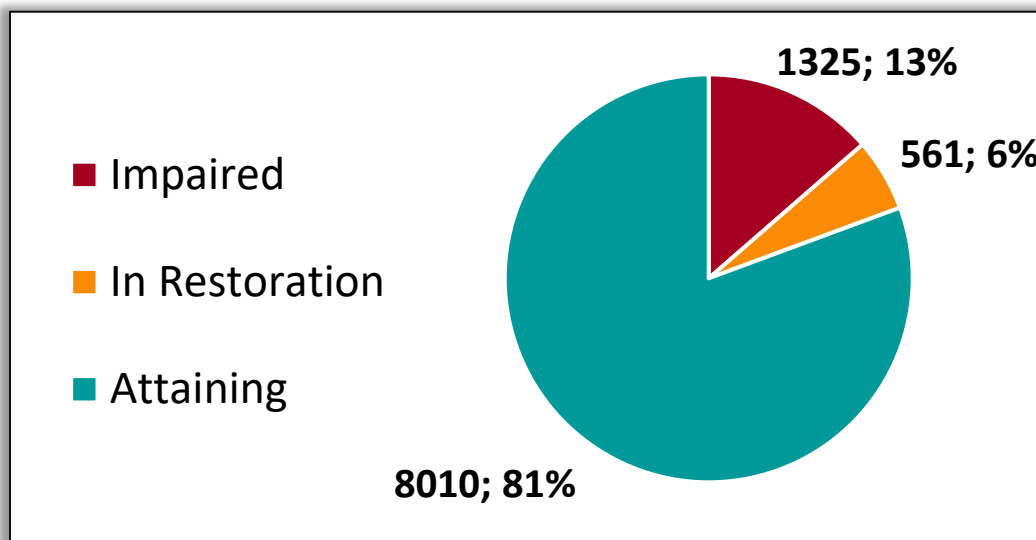


Figure 2. Number and percentage of AUs assessed in the 2026 cycle on each condition list.

Lists by Waterbody Type

When summarizing the Water Condition Lists an AU count is most often used because it allows a summary across all waterbody types. AU count summaries do not account for size differences, which can be informative. Figure 3 shows the percentage of assessed waters on each list based on AU count (top) and size (bottom) for four waterbody types. In the 2024 assessment cycle the waterbody type Reservoir was added to the primary list of waterbody types; in past cycles Reservoir was a subtype of Lakes and Impoundments.

Differences between AU count and waterbody size are starkest for Lakes, Reservoirs, and Impoundments because a single AU can range from 1 acre to over 131,000 acres (lakes average 209 acres and median 33 acres; reservoirs average 455 acres and median 84 acres; impoundments average of 296 acres and median 68 acres). For rivers and streams the sizes range from less than a mile to over 70 miles (average of 6 miles; median 4 miles).

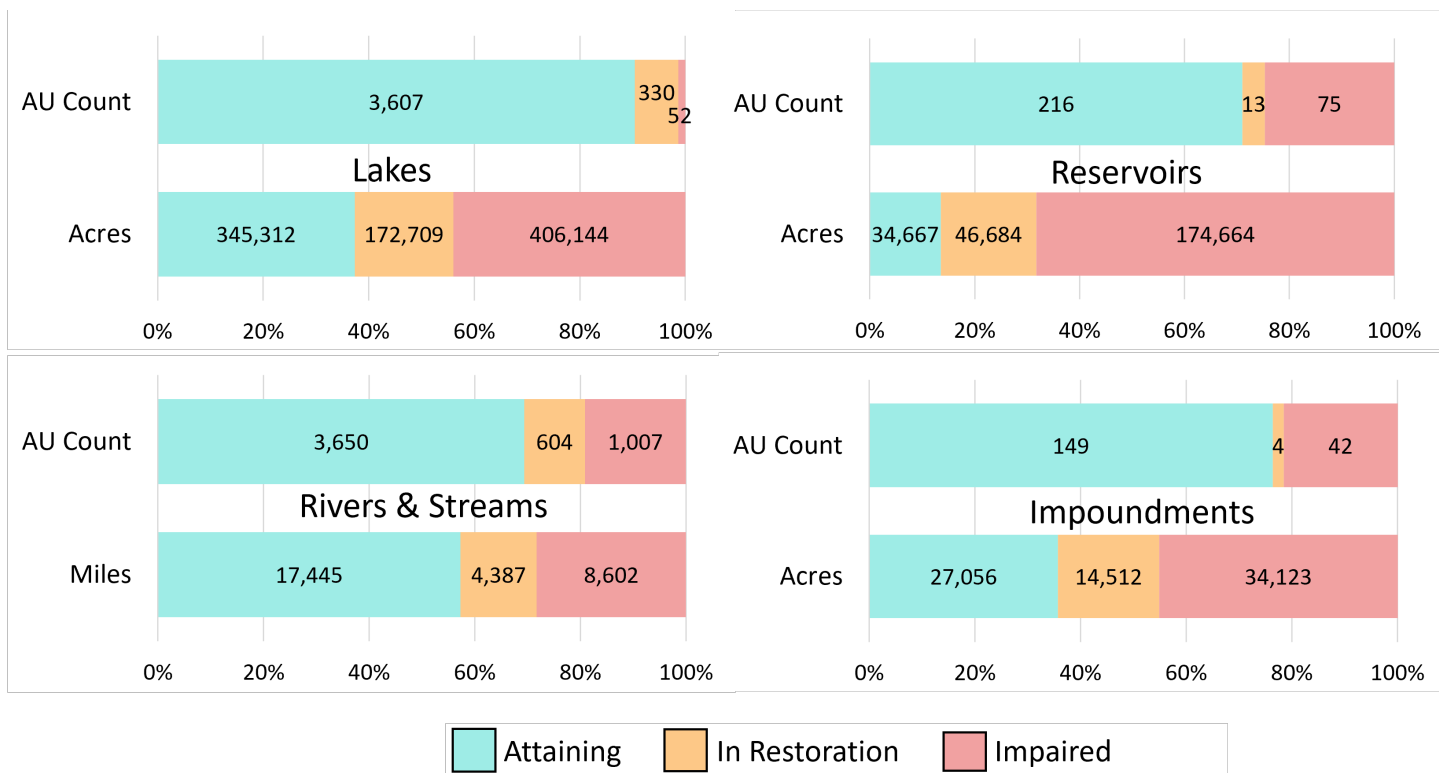


Figure 3. Water Condition List breakdown in percentages by waterbody type, size, and count. Reservoirs are waterbodies with an outlet structure that raises water depth by more than two times the previous depth and has a mean residence time of 14 days or more (defined in WI Admin. Code NR 102.03).

Waters Attaining Standards List

The Waters Attaining Standards List (formerly named Healthy Waters List) contains 81% of assessed waters. A total of 137 waters were newly assessed during the 2026 cycle and determined to be on the attaining standards list. Of these, 120 were river segments, 15 were lakes or reservoirs, and 2 were beaches or bays. New river segments most often appeared on the Waters Attaining Standards list because of a new fIBI score in the “Fair” category or better, whereas new lakes were usually assigned to this list based on attainment of phosphorus standards.

The full list of Waters Attaining Standards can be found in [Appendix E](#).

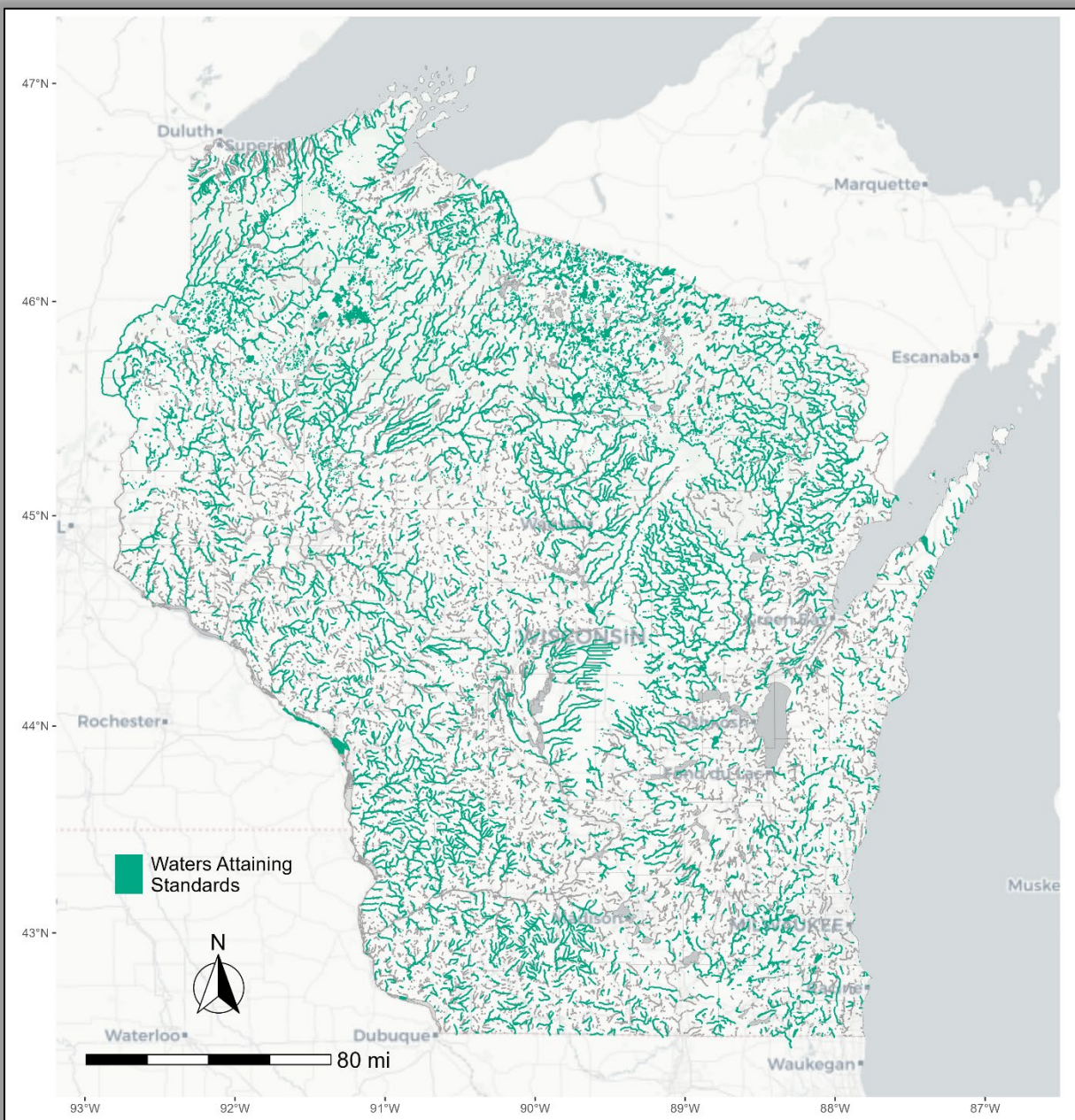


Figure 4. Location of all waters on the Waters Attaining Standards List across the state of Wisconsin.

Impaired Waters List

The majority of pollutant listings, nearly 50%, are for phosphorus (Nutrients in Figure 5). This corresponds with the state's focus on nutrient reduction in our waterways (see [Wisconsin's Nutrient Loss Reduction Strategy](#)). The full Impaired Waters List can be found in [Appendix A](#).

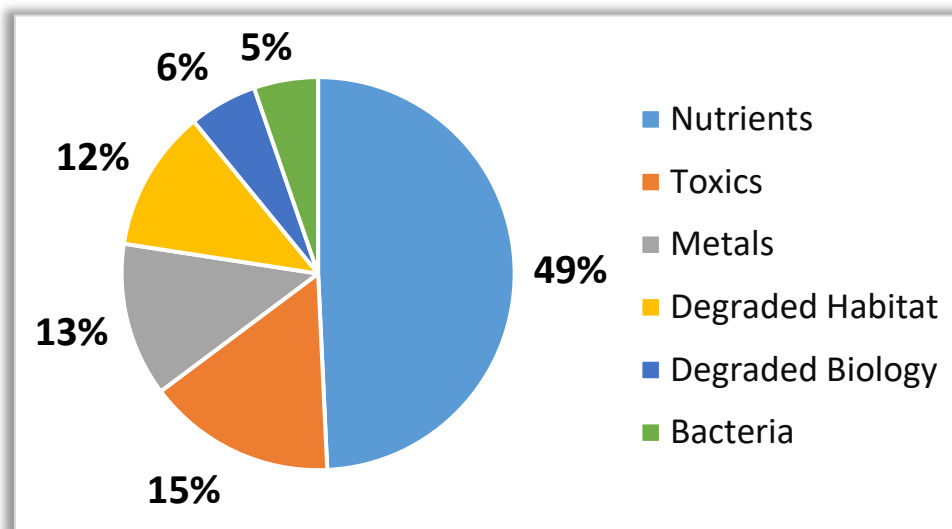


Figure 5. Categories of pollutant listings on the 2026 Impaired Waters List.

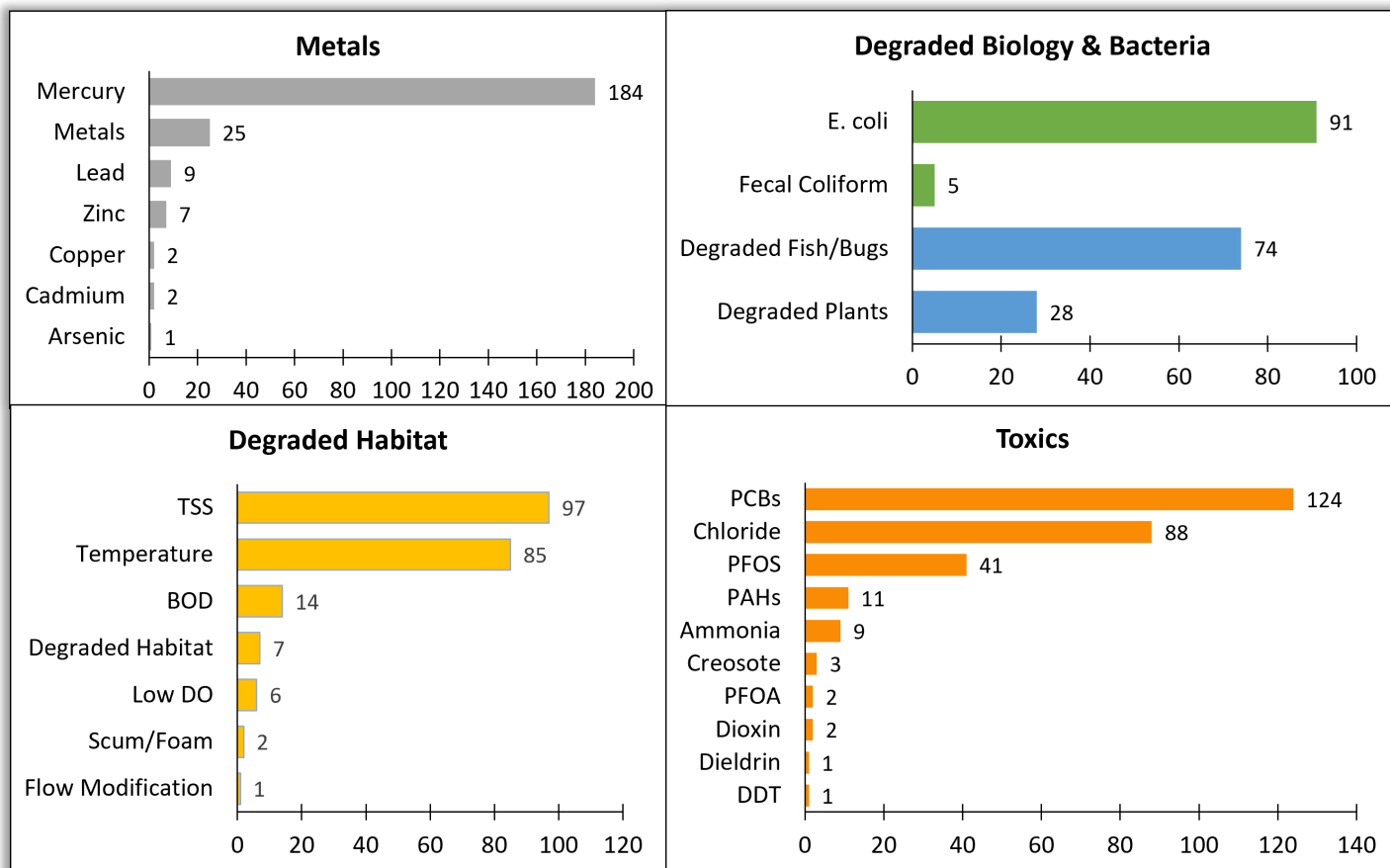


Figure 6. Breakdown of pollutants by category on the 2026 Impaired Waters List. Degraded biology listings are those with a Cause Unknown.

Mercury and PCBs are at the next most commonly listed pollutants. These listings typically reflect historic contamination that is difficult to remediate rather than ongoing release of these substances.

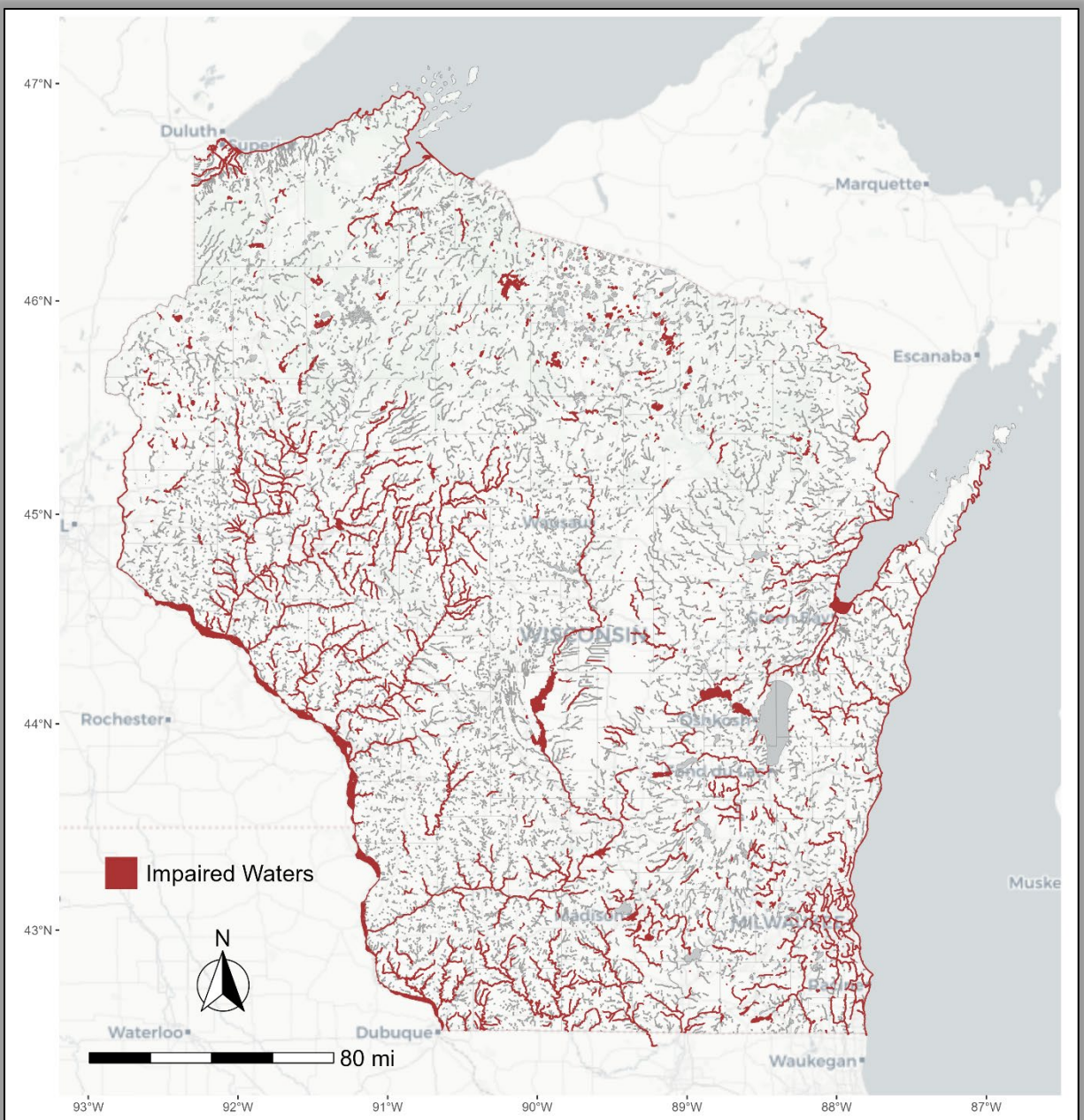


Figure 7. Location of waters on the Impaired Waters List across the state.

Waters In Restoration List

Phosphorus (Nutrients) and TSS (Degraded Habitat) make up the majority of impairments covered by TMDLs (Figure 8). This is partly because areas of the state with more waters impaired due to these pollutants are assigned higher priority for TMDL development. Full implementation of a TMDL can take a long time, but when achieved, these waters are expected to meet water quality standards and may be candidates for delisting. More information about current and future TMDL development is available later in this document.

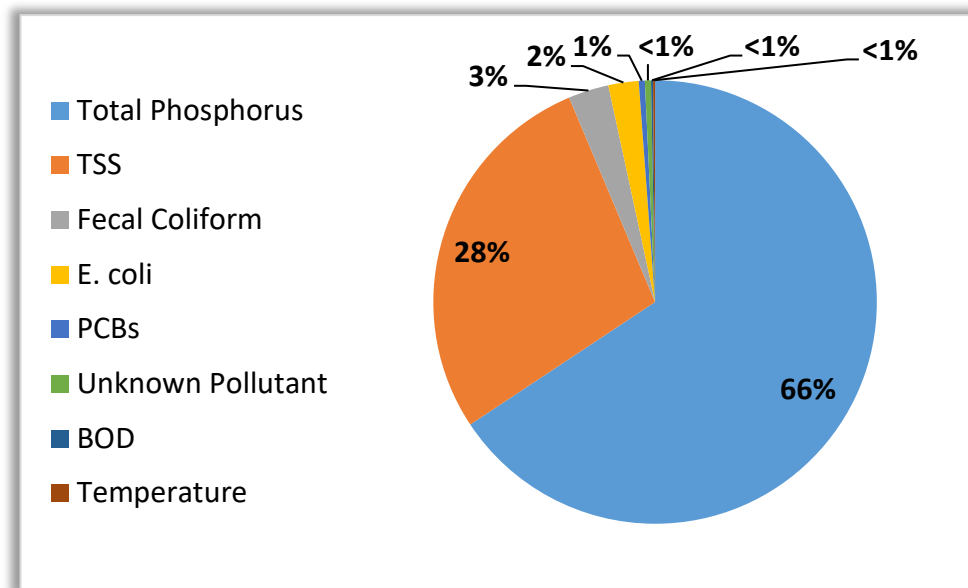


Figure 8. Types of listings on the 2026 Waters in Restoration List.

The full Waters In Restoration List can be found in [Appendix B](#).

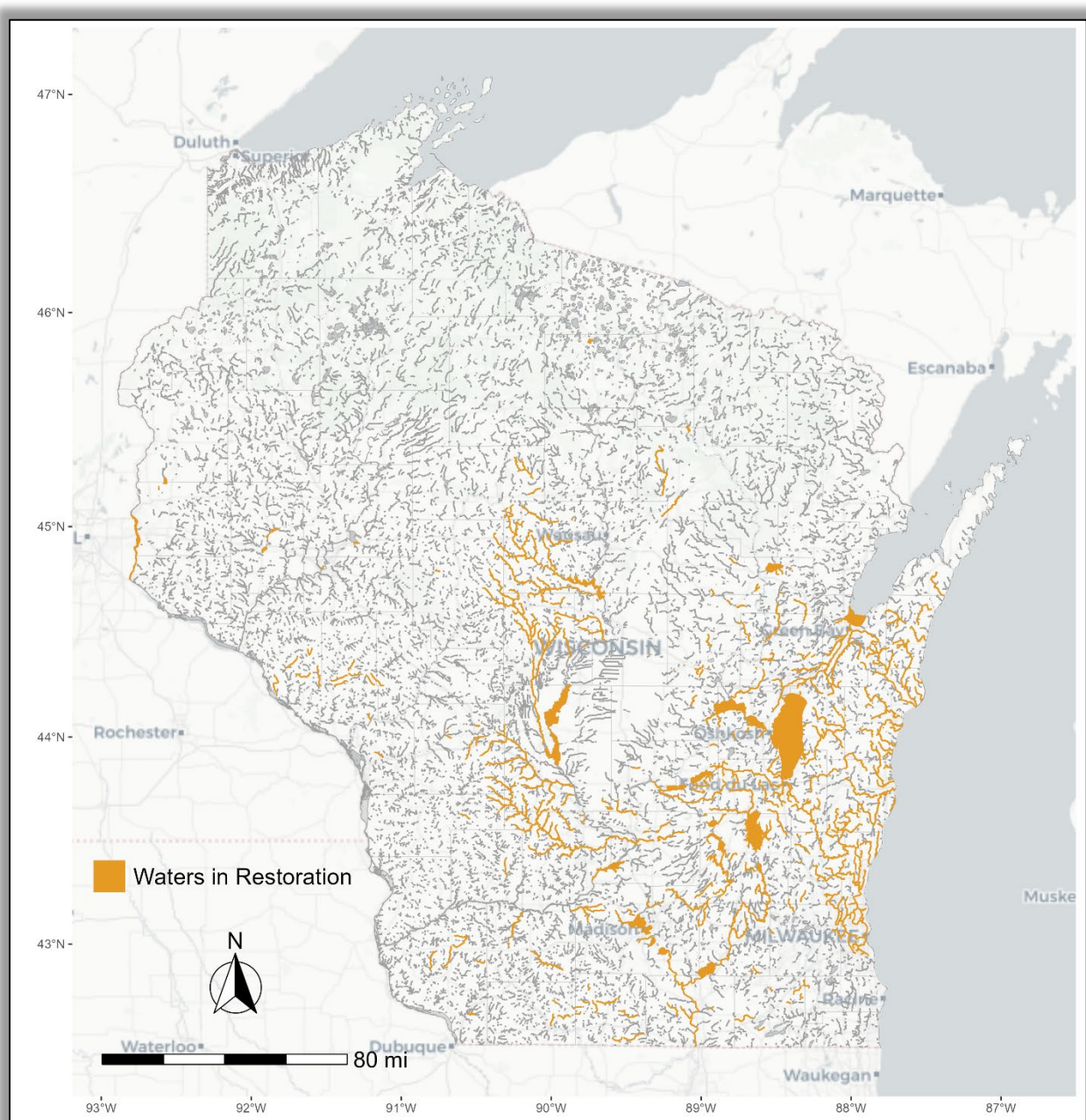


Figure 9. Location of waters on the Waters In Restoration List across the state.

New Pollutant Listings

In the 2026 assessment cycle there were 102 listings added to the Impaired Waters and Waters in Restoration Lists). Figure 10 breaks down the listings by parameter and the available restoration plans. As in past cycles, high phosphorus makes up a large proportion of new pollutant listings. The increase in number of listings for PFOA reflects increased surface water and fish tissue sampling in response to new science and public interest. There were no new listings covered by a Nine Key Element Plan in this cycle. There were 10 listings that were part of existing TMDLs, making them part of the 2026 Waters In Restoration List.

The full list of new listings can be found in [Appendix C](#).

Table 2. Number of new listings added to the Impaired Waters and Waters in Restoration Lists during the 2026 cycle.

2026 Water Condition Lists	No. of New Listings
Impaired	92
In Restoration	10

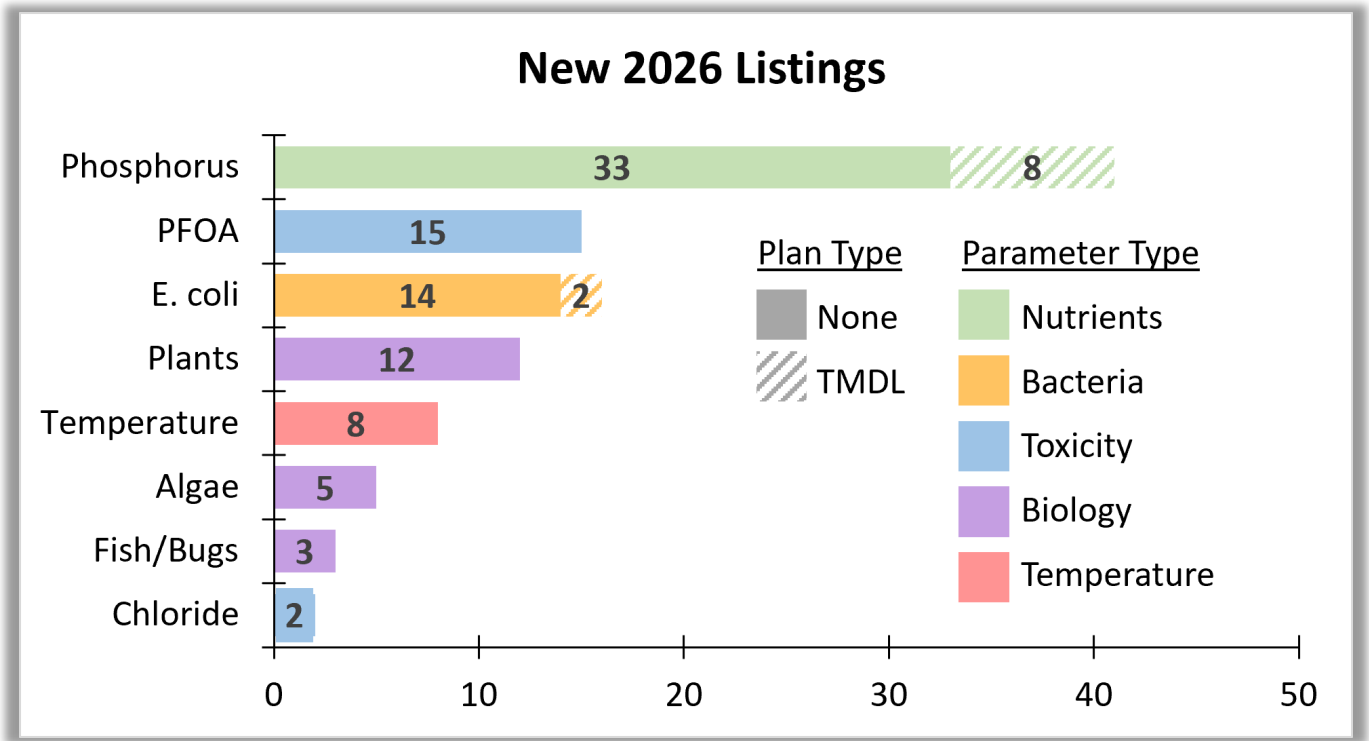


Figure 10. Number of new listings by parameter and plan type.

New Listings in TMDL Areas

This cycle ten new listings were covered by four different existing TMDLs: The Milwaukee River Basin (4), Northeast Lakeshore (1), Rock River Basin (1), and Upper Fox and Wolf Basins (4). New appendices were made for each basin TMDL to outline which waters were now included and which allocations applied. These appendices were given to the public for comment prior to review and approval by EPA. This was the second assessment cycle where TMDL updates were included in the process. Several additional listings in TMDL areas (not shown) were determined to not be covered, i.e. while full TMDL implementation would probably improve water quality, DNR cannot be certain that water quality standards would be achieved.

Table 3. New 2026 listings covered by existing TMDLs.

Waterbody Name	DNR AU ID	WBIC	EPA AU ID	Listing Status	TMDL
Unnamed Stream	6920414	793700	WI10042077	Proposed for List	Rock River Basin
Neenah Creek	10729	173800	WI10026186	Proposed for List	Upper Fox-Wolf Basin
Willow Creek	10768	243700	WI10034820	Proposed for List	Upper Fox-Wolf Basin
Sawyer Creek	11003	139800	WI10000954	Proposed for List	Upper Fox-Wolf Basin
Fox River (At Oshkosh)	352759	117900	WI10008466	Proposed for List	Upper Fox-Wolf Basin
Cedar Creek	1437248	21300	WI10023201	Impairment Addition	Milwaukee River Basin
Menomonee River	6876527	16000	WI6876528	Impairment Addition	Milwaukee River Basin
Unnamed Creek	10082	30900	WI10000269	Impairment Addition	Milwaukee River Basin
Unnamed Stream	5481196	5030968	WI10031323	Impairment Addition	Milwaukee River Basin
Wolf Lake	11367	60800	WI10026366	Proposed for List	Northeast Lakeshore

PFAS Compounds

This cycle, 15 new pollutant listings are proposed for either PFOS or PFOA, the two PFAS compounds for which Wisconsin has developed criteria for concentrations in surface waters or fish tissue. The majority of these listings are [fish consumption advisories](#) based upon fish tissue analysis from the area around the town of Stella, Oneida County. When it is unsafe to consume fish from a waterbody, the water does not meet one of its designated uses and the water is impaired (Figure 11).

Snowden Lake in Onieda county has both a PFOS impairment based upon fish tissue analysis and a PFOA impairment based upon samples taken from the water column. Unlike PFOS, the primary exposure pathway for PFOA is through accidental ingestion during recreation; concentrations in the lake water were high enough to warrant this additional impairment from PFOA.

Several impairments were also added for streams around General Mitchell Airport in Milwaukee (Table 4). In this case, the PFOS impairments originate from water column samples. There is a reliable relationship between concentrations of PFOS in water and concentrations in fish tissue, thus we have high confidence that fish caught in these waters would be unsafe to consume.

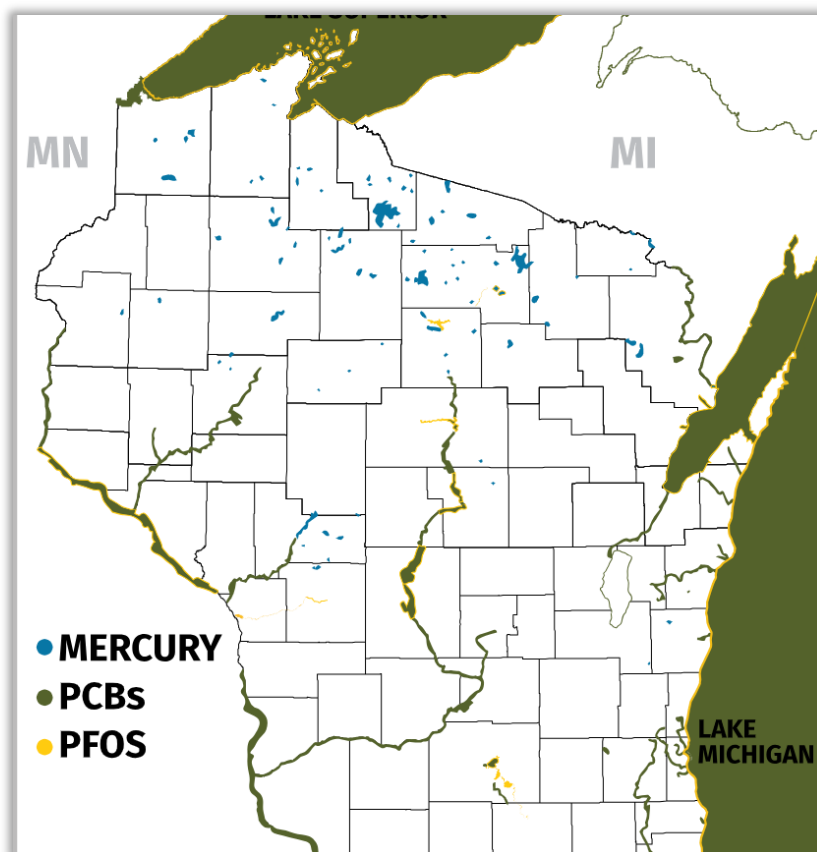


Figure 11. Fish consumption advisories for PFOS (yellow) from the 2024 – 2026 “Choose Wisely: A Health Guide for Eating Fish in Wisconsin”

Table 4. New listings in the 2026 cycle for PFOS or PFOA.

Waterbody Name	Water Type	WBIC	DNR AU ID	EPA AU ID	Counties	Impairment / Source
Fifth Lake	LAKE	1571100	128111	WI10007280	Oneida	PFOS / Fish Tissue
Fourth Lake	LAKE	1570000	128115	WI10007284	Oneida	PFOS / Fish Tissue
Moen Lake	LAKE	1573800	128230	WI10008940	Oneida	PFOS / Fish Tissue
Second Lake	LAKE	1572300	128279	WI10007424	Oneida	PFOS / Fish Tissue
Snowden Lake	LAKE	1572300	128279	WI10007424	Oneida	PFOS / Fish Tissue
Snowden Lake	LAKE	1018600	128292	WI10007437	Oneida	PFOA / Water Column
Starks Creek	RIVER	1572400	12817	WI10026735	Oneida	PFOS / Fish Tissue
Starks Creek	RIVER	1572400	12818	WI10002289	Oneida	PFOS / Fish Tissue
Starks Creek	RIVER	1572400	18417	WI10006369	Oneida	PFOS / Fish Tissue
Starks Spring	SPRINGS-LAKE	1573700	128306	WI10007449	Oneida	PFOS / Fish Tissue
Sunset Lake	RESERVOIR	1572500	128312	WI10007454	Oneida	PFOS / Fish Tissue
Third Lake	LAKE	1572200	128317	WI10007459	Oneida	PFOS / Fish Tissue
Mitchell Field Ditch	RIVER	14800	9968	WI10008035	Milwaukee	PFOA / Water Column
Mitchell Field Ditch	RIVER	14800	9968	WI10008035	Milwaukee	PFOS / Water Column
Wilson Park Creek	RIVER	15200	9976	WI10000204	Milwaukee	PFOS / Water Column

Pollutant Removals

There were 15 pollutant listings removed during the 2024 cycle (Figure 12). Seven of those waterbodies are now moved to the Waters Attaining Standards List, the other eight still have other impairments that must be addressed. Eight of the delisted pollutants were on rivers, the other seven were on lakes. One delisting this cycle was the result of a mistaken listing in 2024, the others represent tangible improvements in water quality due to restoration efforts.

The most common pollutant removed was total phosphorus, as addressing this pollutant continues to be a primary focus for both Wisconsin DNR and many partner organizations. Much of the state is now covered by TMDLs to address both total phosphorus and total suspended sediment, and as implementation progresses we can hope to see more delistings for both pollutants.

The full list of delistings is available in [Appendix D](#).

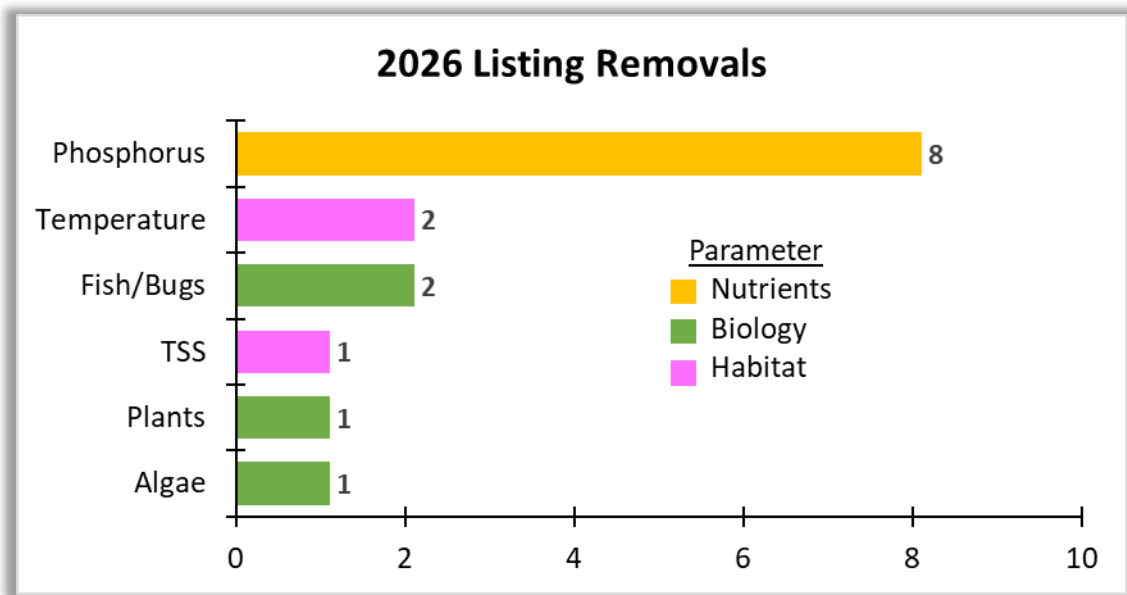


Figure 12. Listings removed in the 2024 cycle.

Spring Creek, Green County

Spring Creek is a 10.6-mile waterbody in Green County in southern Wisconsin. The creek meanders through pasture and farmland, flowing northeast, then east, before its confluence with the larger Sugar River. Spring Creek is managed through a partnership between Green County and the DNR.

In 1998, Spring Creek was placed on the state's 303(d) list of impaired waters for degraded habitat due to sedimentation from nonpoint sources. It was recommended that buffer strips and bank stabilization would enhance this stream. In 2005, a Total Maximum Daily Load (TMDL) was approved which outlined steps for sediment control.

The Green County Office of the Natural Resources Conservation Service (NRCS) approached the department with a proposal to use

National Water Quality Initiatives (NWQI) funding to implement best management practices (BMPs). From 2016 through 2019, almost \$900,000 was spent in the watershed. Nearly 8,000 acres were planted in cover crops, three waste storage facilities were built, and grassed waterways and stream (cattle) crossings were put in. Almost a mile of streambank protection was funded through NWQI with an additional 6,000 feet paid for by a landowner.

In 2021, biologists monitored Spring Creek to assess habitat and determine whether it was meeting its attainable biological use. Through the project, very steep banks (some greater than 2 meters high) that had been susceptible to erosion were sloped, grassed and stabilized, ultimately mitigating the bedload of sediment that was coming in from bank erosion. Young-of-year smallmouth bass were found at multiple sites along the creek, indicating that adult bass had migrated upstream into Spring Creek to spawn. Several specimens of brown trout, a coldwater indicator species, were found and one specimen of redbelly darter, a state threatened species, was found. This was the first time this species had been reported in this stream.

Spring Creek is now meeting its attainable use from a fishery standpoint. While there is still "legacy" sediment present in the stream, it is no longer overwhelming the substrate, and improvements are expected as time passes. Thanks to cooperation with Green County and willing landowners, Spring Creek has now been removed from the state's 303(d) list of impaired waters.



Spring Creek in Green County. Photo credit: WDNR



PUBLIC PARTICIPATION

The Clean Water Act depends on public involvement and Wisconsin lakes and rivers are public resources, owned in common by all Wisconsin citizens. Throughout the process of assessing and addressing water quality problems there are many opportunities for public comment, including input on proposed water quality standards, updates to the impaired waters listings, and TMDL creation. In Wisconsin, citizen-based monitoring data are used in water quality assessments if minimum data requirements are met, and there are several opportunities for citizens to volunteer.

Monitoring

Citizens provide a vital resource for gathering water quality data across the state of Wisconsin. There are multiple programs available for training and monitoring through the DNR, University of Wisconsin, and environmental groups.

Citizen Lake Monitoring Network (CLMN)

Wisconsin's Citizen Lake Monitoring Network (CLMN) provides a bond between the Wisconsin Department of Natural Resources, University of Wisconsin Extension Lakes Program, and about 1,000 volunteer citizens. DNR and Extension staff provide training, support and equipment, and cover the cost of laboratory analysis of water samples. CLMN volunteers enter their own data into a statewide online database. An online data exploration tool called the Water Explorer (WEx) provides interactive displays of volunteer-collected data. CLMN recently launched an Application Programming Interface (API) service that can be used by the public to generate PDF or HTML reports of various types of lake water quality data and ice cover data.



Starting with just over 100 volunteers in 1986, CLMN participants collected water clarity data on around 113 lakes. Participation has trended upward since then, and many additional parameters have been available to volunteers. Volunteer responsibilities range from simple bi-weekly water clarity readings to more frequent monitoring of clarity, total phosphorus, chlorophyll- α , water temperature profiles, dissolved oxygen, aquatic invasive species, and more.

As of January 2026, 728 CLMN volunteers had entered their data into the database. The Citizen Lake Monitoring Network requests that data be entered by November 1st, but data tend to come in through early spring of the following year for various

reasons. A new online login system was launched in May 2025 and many volunteers had still not created their new username and password needed to enter their 2025 data. Data was entered for 891 distinct monitoring sites in 2025 (1,044 in 2024), with water clarity data being the most common. Over 500 volunteers also collected data on total phosphorus, chlorophyll- α , and temperature profiles. Wisconsin is very lucky to have such a devoted network of volunteers partnering with DNR to monitor conditions on our lakes to provide a wealth of assessment data.

CLMN chemistry volunteers (who collect phosphorus, chlorophyll- α , temperature, and clarity data) follow strict protocols to ensure consistency and high-quality data. About 10% of them are selected annually for extra Quality Assurance sampling. Through this robust QA/QC program, we are able to proudly demonstrate the impressive quality and reliability of our volunteers' work.

The Citizen Lake Monitoring Network embraced the world of digital training media since 2019 and recently created additional demonstration videos to recruit and train volunteers. The CLMN video series is available on YouTube and on our [program website](#), and walks volunteers through everything from creating a database login name to collecting measurements and water samples to retrieving a data report to share with their friends and neighbors. In-person training on monitoring protocols is still the standard for new volunteers, but the video series is useful to refresh volunteers on protocols and details after a long winter season.



Sampling Wisconsin's waters.

Table 5. 2024 and 2025 Citizen Lake Monitoring Network participation. As of this publication, reported data for 2025 is not complete.

	Total Volunteers	Lakes	Sites	Clarity Volunteers	Chemistry Volunteers	AIS Volunteers	Ice Volunteers
2024	892	712	1044	774	~500	54	165
2025	728	619	891	632	~500	54	131

Water Action Volunteers (WAV)

Participants in the Water Action Volunteers (WAV) volunteer stream monitoring program range far and wide across the state of Wisconsin. WAV is a collaboration of the Wisconsin DNR and the University of Wisconsin–Madison Division of Extension. The participatory science program relies heavily on partnerships with local WAV coordinators at participating organizations to help recruit, train and support volunteers in their local area on the WAV methods. Since its founding in 1996, volunteers have collected data in all 72 counties. In 2024, WAV supported over 500 volunteers and 42 partner groups in stream monitoring statewide.



Baseline Monitoring

Volunteers enter the WAV program by training to do baseline stream monitoring. Each year, baseline volunteers journey to their monitoring sites once per month from May to October to collect four baseline parameters: dissolved oxygen, instantaneous temperature, transparency, and streamflow. During at least two of these months (May/June and September/October), volunteers also collect macroinvertebrates to calculate a biotic index score. Once per season, some advanced volunteers also conduct a habitat assessment. In 2024, volunteers collected this baseline data at 507 unique monitoring sites.

Special Projects Monitoring

After at least one season of baseline monitoring, some WAV volunteers will support special projects monitoring. Special projects monitoring is designed to either use the same methods as DNR professionals for data collection or to meet specific data needs. Recently these special projects have included monitoring with meters, aquatic invasive species monitoring, nutrient monitoring, and deploying continuous temperature monitors.

Nutrient monitoring is the most widespread of these special projects. Volunteers sample for total



Stream monitoring volunteers learn how to measure stream flow

phosphorus concentrations in rivers and streams. In some instances, volunteers also collect suspended solids samples and/or nitrogen panels. These samples contribute to follow-up monitoring, Local Needs Projects, Nine

Key Element Projects, TMDL area monitoring, and Targeted Watershed Approach Projects. In 2024, volunteers coordinated by WAV and local partners collected nutrient samples at over 198 sites across the state. This monitoring included not only DNR projects but also projects for businesses, watershed groups, and counties extending from Trempealeau to Waukesha and beyond.

Volunteers also assist in deploying continuous temperature monitors, called thermistors. Temperature affects oxygen availability and demand, and it can predict the types of organisms able to survive in a stream. Each season volunteers with WAV and partner organizations deploy and monitor thermistors at over 90 sites.

AIS Snapshot Day

University of Wisconsin-Madison Division of Extension, in partnership with UW Extension Lakes and DNR, hosts a joint lake, stream, and wetland invasive species Snapshot Day. This event organizes citizen scientists around the state to monitor priority bridge-stream crossings, boat landings and roadsides/trails for AIS of concern on a given day in August.

In 2024, 159 participants visited 115 sites. Aquatic invasive species were reported at 64% of those sites.



Volunteers are critical to many of DNR's monitoring efforts, whether they participate for one day or several years!

Lake Monitoring Protection Network for Aquatic Invasive Species

The Lake Monitoring Protection Network (LMPN) program was developed to provide stable funding to counties and ensure statewide coverage for AIS work. This program transformed an unpredictable, competitive grant process into a consistent funding model dividing approximately \$1 million to the 72 counties of our state. Counties can now rely on non-competitive funding from year to year to perform core network activities.

A few of these activities include:

- Citizen Lake Monitoring Network (CLMN)
- Early detection monitoring for aquatic invasive species
- Participating in the Clean Boats, Clean Waters (CBCW) Program
- Participating in the Purple Loosestrife Biocontrol program
- Participating in other aquatic invasive species prevention campaigns and lake protection activities as approved by the Department

Wisconsin's Aquatic Invasive Species Management Plan takes a proactive prevention approach by addressing the "Pathways", which are the ways AIS can enter and move throughout the state. The LMPN partners are a major component in this type of work by educating dock service providers, monitoring pet stores, and reaching out to pond and wetland gardeners regarding AIS.

In the first year of LMPN (2021) approximately 40 counties participated, and in 2025 we had 69 counties involved. The LMPN model is evaluated each year to note what's working and what's not quite there, yet. The department and program (CBCW, Snapshot Day, etc.) leads continue to examine the model to identify improvements and new tools that could increase program success. Input from our LMPN partners is also welcome and important to the process.

The LMPN partners have significantly and successfully increased AIS monitoring efforts throughout the state. Under the competitive grant model, some counties had no ability to perform consistent AIS monitoring. At that time the partners performed and led over 500 monitoring events, which included early detection monitoring and leading citizen monitoring through events such as AIS Snapshot Day. Since 2024 there has been 95% statewide coverage through the LMPN program and accounts for at least 50% of the statewide monitoring events that occurred.



Figure 13. Maps show the increased participation in the LMPN program from 2021 to 2025. Counties in dark blue are those participating in the LMPN program. Counties in light blue are those that participated in the previous grant program.



MONITORING, RESTORATION & PROTECTION

Indian Slough, Pool 4, Mississippi River

Photo: Sara Strassman 2020

Monitoring and restoration work are on a continuous cycle. Monitoring and restoration for the 2026 cycle were guided by the:

- [2021 – 2025 Wisconsin Water Quality Monitoring Strategy](#);
- [2013 Nutrient Reduction Strategy and its progress reports](#); and the
- 2022 – 2032 Water Quality Restoration and Protection Prioritization Framework

Monitoring Strategy

Wisconsin's Water Quality Monitoring Strategy represents DNR's vision to fulfill Wisconsin's Clean Water Act (CWA) monitoring responsibilities. The strategy supports our statewide commitment to protecting and improving water quality through monitoring that is structurally integrated with waterbody assessments and management needs across multiple water programs. DNR is going through a process to update and refine previous iterations of our monitoring strategy to build upon the 2015 and 2021 versions. During 2025-2026, the Water Resources Monitoring Strategy Team, comprised of representatives from across all Water Resources districts, sections, and monitoring teams, will lead a process to engage DNR staff in evaluating and assessing strengths, weaknesses, opportunities, and challenges associated with our current strategy. This team will then suggest and develop refinements and shifts that the Monitoring program will focus on implementing and improving from 2027-2032. DNR plans to have the strategy finalized by the end of 2026, with implementation of the updated strategy to begin in 2027.

Total Maximum Daily Loads (TMDLs)

Per DNR's 2022 – 2032 Water Quality Restoration and Protection Prioritization Framework (Vision 2.0), DNR continues to develop TMDLs prioritizing impairments caused by nutrients and sediments. With the submittal and subsequent approval by U.S. EPA of the NE Lakeshore TMDL, DNR initiated its next TMDL development project addressing impairments due to total phosphorus and sediment in the Sugar Pecatonica Basin in southwestern Wisconsin. Below is a summary of ongoing TMDL restoration and protection projects:

Fox Illinois TMDL

Located in Southeast Wisconsin, this TMDL will cover TSS and phosphorus impairments in the Fox (IL) River, the Des Plaines River, and other smaller basins in the region. River, stream, and lake impairments will be addressed. The TMDL addresses impairments caused by total phosphorus and sediment evaluating both local water quality criteria and the potential impact of downstream TMDLs located in Illinois immediately south of the Wisconsin border (previously approved by U.S. EPA). The Fox River flows into a series of lakes in Illinois that are both listed as impaired for phosphorus and have criteria lower than that of the Fox River and thus must be factored into the TMDL allocation analysis.



Des Plaines River near Highway K crossing.

A multi-year monitoring and data collection effort for the TMDL development process has been completed, as well as watershed modeling. Draft wasteload and load allocations are currently being reviewed and provided to stakeholders for input. In addition, DNR is finalizing a draft TMDL report for stakeholder input. DNR is targeting late summer or fall of 2026 for submittal of the TMDL to U.S. EPA.

Lake Pepin TMDL

Lake Pepin is located along the Mississippi River bordering Wisconsin and Minnesota and has water quality impairments stemming from total phosphorus. This TMDL will address total phosphorus reductions needed to meet water quality criteria for Lake Pepin and its contributing waterbodies in Wisconsin. Lake Pepin and two small Wisconsin streams that drain directly to it, Lost and Bogus Creeks, are listed on Wisconsin's 303(d) list as impaired due to excessive phosphorus, which leads to nuisance algae growth, oxygen depletion, fish kills, reduced submerged aquatic vegetation, water clarity problems, and degraded habitat. This TMDL is designed to complement the TMDL prepared by the Minnesota Pollution Control Agency (MPCA) for Lake Pepin by addressing Wisconsin's portion of the Lake Pepin basin. MPCA's TMDL report, "Lake Pepin and Mississippi River Eutrophication Total Maximum Daily Load Report" was approved by U.S. EPA on May 19, 2021, and can be found on MPCA's website. In reviewing the MPCA TMDL, DNR considered additional data affecting allocations and loadings for the watersheds in Wisconsin that necessitated an update to the analysis. Wisconsin DNR has conducted new watershed modeling incorporating the necessary wasteload allocations and refining the load allocations and reductions identified in the MPCA TMDL to cover the Wisconsin portion of

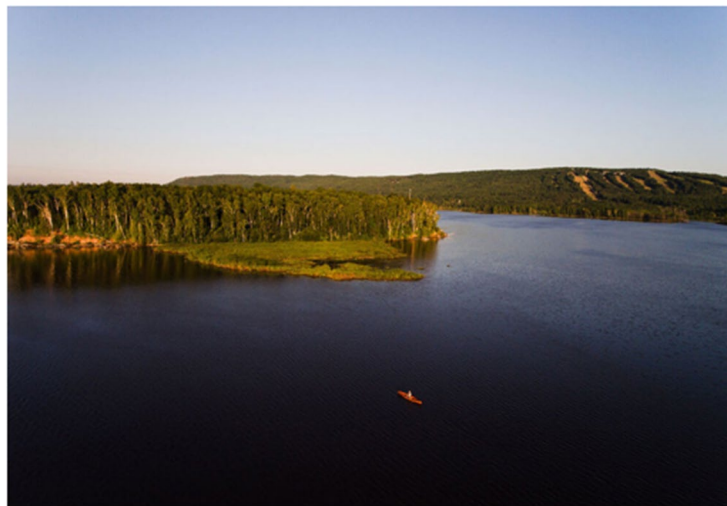


Lake Pepin at sunset.

the Lake Pepin drainage basin. DNR also worked with an U.S. EPA funded contractor to refine the load allocations, develop edge of field targets to aid agricultural implementation, and identify critical areas and fields that could be prioritized for nonpoint implementation. The TMDL allocations and report have been completed and are slated for public notice and submittal to U.S. EPA in early summer of 2026.

St. Louis River Watershed and Estuary TMDL

DNR is providing technical support and modeling review to MPCA for the development of a mercury TMDL for the St. Louis River and Estuary. The TMDL will determine the mercury reductions needed for lakes and rivers in the St. Louis River watershed to meet the water quality standard for mercury and support healthy consumption of fish. Mercury is toxic to humans; people can be exposed to mercury when eating fish pulled from waters with mercury contamination. MPCA is undertaking this TMDL study for many reasons, including the cultural and economic importance of fishing in the watershed and the exercise of tribal treaty rights. The St. Louis River forms part of the border between Minnesota and Wisconsin and both states have a shared interest in addressing the mercury impairments.



St. Louis River Estuary Source: St. Louis River Alliance

Sugar-Pecatonica Basin TMDL

The Sugar River is a tributary to the Pecatonica River, and together they form the Sugar-Pecatonica Basin. These waters are located in the southwest portion of Wisconsin in the Driftless Area of the state, an area not covered by the last glacier. Farming occurs on the ridgetops or in the stream valleys with the region's steep hillsides often left wooded. Streams in the Driftless Area have a higher gradient than those in other parts of southern Wisconsin. Agriculture predominates land use in the basin, with urbanizing areas closer to Madison. Besides portions of the city of Madison, larger municipalities in the basin include Verona, Monroe, parts of Fitchburg, Mt. Horeb, Dodgeville and Darlington. The proximity to major population centers often places heavy pressure on aquatic and water-related resources. While water quality in the Grant-Platte/Sugar-Pecatonica

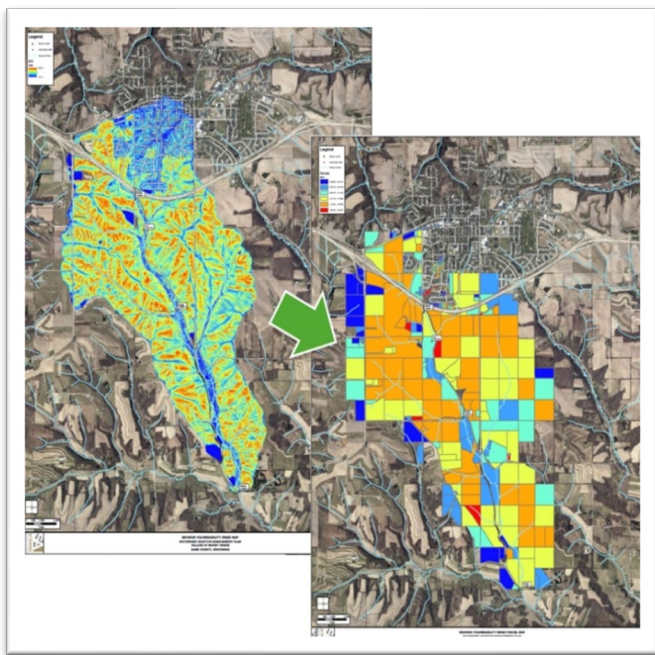
basin is generally fair to good, the primary water quality problems are the result of nonpoint sources of pollution, particularly from agricultural operations and urban runoff. A TMDL is being developed to protect high quality waterbodies and address impairments caused by total phosphorus and sediment with current work emphasizing the collection of additional water quality data over the next two to three years to support subsequent watershed modeling efforts and to better quantify water quality stressors. TMDL watershed modeling is slated to be initiated in mid to late 2027.



Pecatonica River

Adaptive Management

Adaptive management is a phosphorus compliance option that allows point and nonpoint sources (e.g. agricultural producers, storm water utilities, developers) to work together to improve water quality in those waters not meeting phosphorus water quality standards. Landowners, municipalities, and counties work within their watersheds to target major sources of phosphorus runoff. If successful, point sources can avoid costly treatment upgrades while helping achieve greater water quality outcomes and landscape-level benefits.



Mount Horeb's adaptive management plan employs DNR's erosion vulnerability assessment tool to rank agricultural parcels for outreach priority.

The City of Waupun is employing a combination of advanced biological nutrient removal (ABNR) technology and partnerships with agricultural producers to achieve targets set by the Rock River TMDL. Throughout the early 2020s, Waupun worked to install a novel, algae-based nutrient recovery system at their wastewater treatment facility. While the technology shows the potential for sustainably achieving ultra-low phosphorus effluent limits, performance challenges arose during early operation of the system. Waupun has pivoted to a two-pronged compliance approach that employs agricultural partnerships and nonpoint phosphorus reductions to obtain operational flexibility for the wastewater treatment system.

All permittees engaged in adaptive management monitor the receiving water to track implementation progress, which is reflected in monitoring requirements found in the WPDES permit. New partnerships between municipalities, agricultural producers, and environmental organizations have formed around adaptive management, as common restoration interests bring resources to the table to achieve common goals.

Statewide, adaptive management plans target over 239,000 lbs/year of nonpoint phosphorus reduction.

Throughout the 2024-2025 biennium, 21 Wisconsin Pollutant Discharge Elimination System (WPDES) permittees continued to implement adaptive management efforts in their local watersheds. DNR approved two new adaptive management plans in 2024. The Village of Mount Horeb is working to restore a 3,800-acre headwaters catchment of the Sugar River. Situated on the periphery of the state's Driftless Region, the watershed is characterized by steep slopes, dendritic drainage patterns, and heavy agricultural use. The Village will partner with Dane County Land & Water Resources Department and the Upper Sugar River Watershed Association to promote adoption of continuous cover and barnyard/feedlot BMPs. The plan estimates that 695 lbs/year of phosphorus reduction will achieve water quality goals.



Applied Technologies Inc. staff evaluate the photobioreactor's operating conditions inside the greenhouse which contains the ABNR system.

Water Quality Trading



Cow in a state river.

Water Quality Trading (WQT) may be used by WPDES permit holders to demonstrate compliance with water quality-based effluent limits.

Generally, water quality trading involves a point source facing relatively high pollution reduction costs compensating another party to achieve a less costly pollution reduction with the same or greater water quality benefit. In other words, water quality trading provides point sources with the flexibility to acquire pollutant reductions from other sources in the watershed to offset their point source load so that they will comply with their own permit requirements. In Wisconsin, stringent phosphorus and TSS limits drive interest in WQT. Agricultural sources of phosphorus and TSS are prevalent in many Wisconsin watersheds. As such, the majority of trades involve nonpoint source pollutant reductions.

Statewide, WPDES permittees and their consultants, along with the statewide WQT Clearinghouse, are continuing to establish relationships with credit generators. Through quantification of nonpoint source pollution offsets and significant cost savings for permittees, WQT is emerging as a significant ecosystem services marketplace within Wisconsin. At the

conclusion of 2025, over 80 permittees had a WNDR-approved water quality trade for compliance with phosphorus limits.

A new water quality trading partnership for the 2024 – 2025 biennium is the Watertown Waterways Improvement Program. This program ultimately seeks to supply phosphorus and TSS credits to the Watertown Municipal Separate Storm Sewer System (MS4) for the purposes of meeting wasteload allocations under the Rock River TMDL. Local farms will benefit from an array of practices including filter strips and grassed waterways. The Rock River Coalition and Jefferson County Land and Water Conservation Department are key partners. Agricultural practices as an alternative to traditional MS4 solutions (detention basins, treatment devices, etc.) will yield equivalent or better environmental outcomes at a fraction of the cost.



Projects designed to reduce nonpoint source pollution for WQT purposes provide several ancillary benefits. A commonly employed WQT practice, conversion of fields from high-intensity agriculture to perennial prairie vegetation, may also provide atmospheric carbon sequestration, habitat for insects and wildlife, and improve hydrology. Pollutants other than the traded pollutant, such as nitrogen and sediment, may also be kept from entering waterways. Projects occurring in years 2024 and 2025 restored hundreds of acres of perennial vegetation and resulted in adoption of lower-impact agricultural practices (e.g. cover crops, no-till, or nutrient management). Five water quality trades restored eroding streambanks, stabilizing over two miles of streambank in total. In-stream habitat benefits also stem from WQT practices, particularly those that reduce sediment loading to waterways. Several WQT projects employed in-stream habitat restoration practices to further mitigate the effects of excess sediment in the system.

The provisions of all water quality trades are incorporated into the discharger's WPDES permit, with a monthly accounting process for the use of pollutant credits. All nonpoint source best management practices are inspected regularly and conform to a NRCS or DNR performance standard. Many wastewater dischargers throughout Wisconsin look to WQT for long-term compliance solutions. These nonpoint source pollution control efforts leverage new partners and funding to address runoff issues.

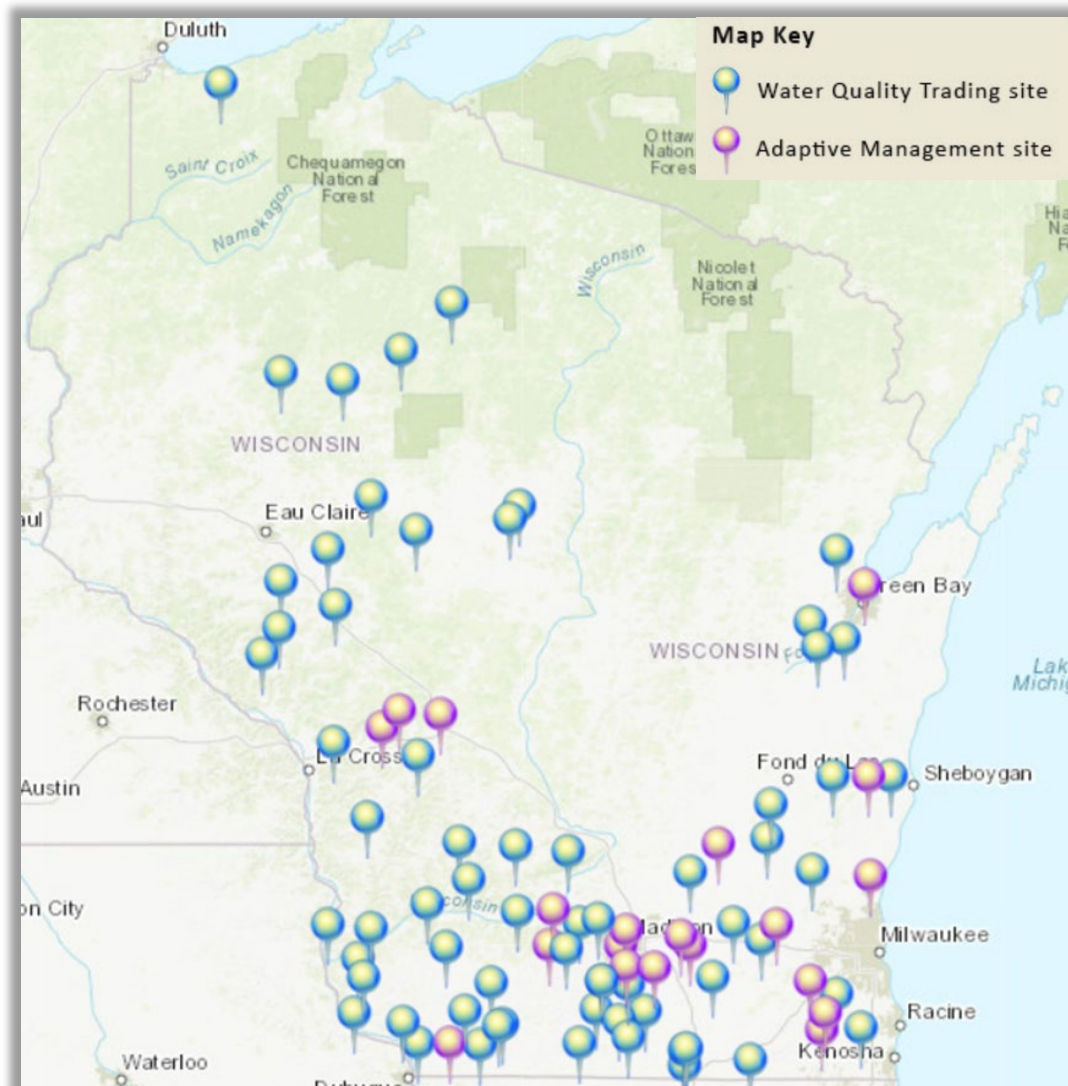


Figure 14. Locations of Adaptive Management Plans and Water Quality Trading sites across the state as of 2024.

Water Quality Management Planning & Watershed Assessments

Wisconsin's water quality management planning program continues the tradition of Clean Water Act plans from the early 1970s that identified priorities for federal funding under the State Revolving Grant Program. Local water quality planning is integrated with Targeted Watershed Assessment (TWA) monitoring projects and statewide initiatives like Healthy Watersheds, High-Quality Waters (HWHQW).

Targeted Watershed Assessments

Targeted Watershed Assessment Projects often inform watershed planning efforts such as US EPA Nine Key Element Plans, DNR Water Quality Planning, or NRCS National Water Quality Initiative. County conservation agencies and local coalitions work with the department to identify areas with impaired waters, and in recent years, HWHQW watershed protection priorities. Areas with runoff grants that fund best management practices (BMPs) are a high priority for DNR monitoring efforts. Pre- and post-installation monitoring of BMPs provide science-based “snapshots” of resource condition before and after restoration activities. Water Quality Plans conducted pre-implementation can recommend specific BMPs that would address conditions found on the landscape.

In 2024 and 2025, DNR staff started or completed TWA monitoring projects in the Upper Yellow River, Upper Tamarack, Belle Fountain, Chemical Creek, Bear Creek, Middle Branch Embarrass River, Scarboro Creek, Renard Creek-Sugar Creek, Ames Branch of the Pecatonica River, Lower Wisconsin River backwaters monitoring, North Branch of the Milwaukee River, Ashippun River, Webster Brewer Creek, Little La Crosse Watershed, Little Lemonwier, and Four Mile Creek

Wonderful Waters of Wisconsin

To draw attention to the state's finest waterbodies, the DNR's Water Quality Program launched the Wonderful Waters of Wisconsin (WWOW) initiative in 2022. This new focus on “already healthy” waterbodies and watersheds is intended to celebrate these treasures and provides a road map for how to strike an improved balance between restoration and protection. The Wonderful Waters of Wisconsin Action Plan (2022) includes actions suggested by a majority of partner groups, including businesses, lake, river, and watershed groups, local units of government, and fish and wildlife conservation organizations.

Partners will work together through 2030 to implement specific strategies with a goal of keeping 100% of the watersheds prioritized for protection, and the high-quality waters within them, healthy. These geographic protection priorities were identified through the 2021 modeling and assessment effort, also known as Healthy Watersheds, High-Quality Waters (HWHQW). The HWHQW data can be explored through ready-made maps, information dashboards, and mapping tools available on the DNR's webpage.



Wisconsin's Action Plan to keep 100% of the watersheds identified as priorities for protection--and the high-quality waters within them—healthy through 2030.

The [2025 Progress Report](#) describes accomplishments during year three of this exciting initiative. Ongoing Action Plan implementation efforts include linking WWOW to monitoring projects and local and regional planning efforts, creating alternative watershed-based planning guidance for protection, and expanding grant funding eligibility and review/ranking criteria for HWHQW projects.

In 2026, the DNR will complete the first update of the High-Quality Waters list which was originally published in 2021. The DNR aims to update the High-Quality Waters list every two years in accordance with the Clean Water Act assessment cycle.

Great Lakes

In the DNR Office of Great Waters (OGW) the Great Lakes team is responsible for implementing the Areas of Concern, Lakewide Action and Management Plans, and Beach programs. For a full review of the responsibilities and objectives for the Great Lakes see our [Wisconsin's Great Lakes Strategy](#) (PDF, 1.46 MB).

Lakewide Action and Management Plans (LAMPs)

The development of [Lakewide Action and Management Plans](#) (LAMPs) is required under Annex 2 of the Great Lakes Water Quality Agreement Protocol of 2012, which is a commitment between the United States and Canada to restore and protect the waters of the Great Lakes. The LAMP provides the framework for prioritizing issues, defining lakewide objectives, and identifying actions for each of the five Great Lakes. The LAMP is comprehensive and Wisconsin's Great Lakes restoration and protection projects contribute to meeting LAMP goals for Lake Michigan and Lake Superior.



*Trees on the Rocks, Big Bay State Park, Lake Superior.
Photo credit: Norma Larrabee Gabriel 2017*

Wisconsin has made significant progress on LAMP goals thanks in part to resources available through the Great Lakes Restoration Initiative (GLRI). Through GLRI Focus Area grant opportunities from EPA, the State of Wisconsin along with partners has secured over \$24 million in grant funds since 2016 which is being used to (among other things) protect and restore coastal wetland habitat, prevent the introduction and spread of invasive species, implement agricultural best management practices to address nonpoint source pollution, and monitor for emerging contaminants.

Lake Superior Management

Wisconsin is included in a partnership with the U.S. and Canada to share responsibility for Lake Superior management. The DNR's Lake Superior Coordinator and other staff from DNR's Office of Great Waters contributed to the development of the [2020-2024 Lake Superior LAMP](#). An updated Lake Superior LAMP is anticipated to be released in the coming years.

The LAMP lays out a five-year binational strategy for taking action to restore and protect the Lake Superior ecosystem. This plan supports the development and implementation of lake-specific strategies and initiatives including biodiversity, cooperative science and monitoring, and nutrient management strategies. For more information, also refer to the [Lake Superior LAMP Annual Reports](#), which highlight accomplishments and progress in achieving LAMP goals during the past year.

Lake Michigan Management

The Lake Michigan LAMP is currently being developed and is anticipated to be released in the coming 1-2 years.

Other current activities include assessing the state of the lake,

measuring progress, and promoting action to address identified problems. For more details, see the [Lake Michigan LAMP Annual Reports](#). They highlight accomplishments and progress in achieving LAMP goals during the past year and identify LAMP-related activities including outreach, monitoring, and protection and restoration actions.

Areas of Concern

Forty-three Areas of Concern (AOCs) were designated by the U.S. and Canada under the Great Lakes Water Quality Agreement in 1987. They are areas requiring special attention for cleanup and restoration due to contamination of sediments by toxic pollutants from past industrial practices or other pollution sources. In the Areas of Concern program, problems arising from toxic pollution are described as “beneficial use impairments” or BUIs.

Wisconsin had five AOCs at the time of designation: St. Louis River (shared with Minnesota), Lower Menominee River (shared with Michigan), Lower Green Bay and Fox River, Sheboygan River, and Milwaukee Estuary. Lower Menominee River was delisted in 2020 and now Wisconsin has four active AOCs. The DNR’s Office of Great Waters provides leadership for cleaning up these areas by:

- Developing policies and procedures for removing BUIs and delisting AOCs.
- Establishing Beneficial Use Impairment (BUI) delisting targets; assessing the status of the AOCs relative to the targets (e.g., evaluate data); and identifying and implementing actions that will lead to achievement of the targets if they have not yet been met.
- Engaging technical experts and citizens via communication, education, outreach, and/or advisory committees to ensure the consideration of diverse stakeholder perspectives in AOC decision-making.
- Ensuring that partners (internal and external) who are involved in sediment clean up, habitat restoration, and water quality and ecosystems monitoring for the AOCs are coordinating as needed to ensure proper sequencing of activities and taking advantage of efficiencies (e.g., sharing data) where possible.



A recently completed project on Interstate Island in the St. Louis River between Duluth and Superior restored critical nesting habitat for Common Terns and stopover habitat for Piping Plovers—helping to increase populations of these rare birds in the St. Louis River Area of Concern. Photo credit: J.F. Brennan Company, Inc.

DNR has developed Remedial Action Plans for each of the active Wisconsin AOCs, and they are updated periodically. These plans describe the beneficial use impairments, the end goals for each impairment, the projects needed to achieve those goals, as well as current and future activities. Opportunities are provided for AOC stakeholders and partners to review drafts of the Remedial Action Plans and to provide feedback in the update process.

The OGW maintains webpages for each of the five AOCs containing background about each AOC, details on the status of beneficial use impairments, remedial action plans, community engagement, projects, maps, and resources. For detailed information about these AOCs, visit their webpages:

- [Lower Green Bay and Fox River](#)
- [Lower Menominee River](#)
- [St. Louis River](#)
- [Sheboygan River](#)
- [Milwaukee Estuary](#)

Lower Green Bay and Fox River

In 2025, the *restrictions on drinking water consumption, or taste and odor problems* BUI was removed in the Lower Green Bay and Fox River AOC. Following completion of active remediation efforts for the Fox River PCB cleanup in 2020, the habitat restoration projects, as established in the management action list agreed upon by DNR and EPA, became the focus for AOC efforts. These habitat activities include post-restoration monitoring for the Ken Evers Nature Area in 2024 and 2025 (this project was substantially completed in 2021). The Cat Island Fisheries Enhancements project broke ground on construction in fall 2025, starting with placement of various rock and wood habitat structures to support musky, walleye, and sunfish. Final designs were completed for the Tank Farm Marsh, Heritage Hill State Park, Ashwaubenon & Dutchman Creek, and Joliet Park projects with construction anticipated to begin for these projects in 2026. The designs for several other habitat projects are in progress. Additionally, a mussel population enhancement project is underway in collaboration with U.S. Fish and Wildlife Service which includes native Unionid mussel surveys, broodstock collection, propagation and placement.



Construction on Cat Island in Green Bay. Photo credit: Brian Schuh, Ducks Unlimited (above and right).





Setting nets for fish monitoring in Green Bay. Photo credit: DNR.



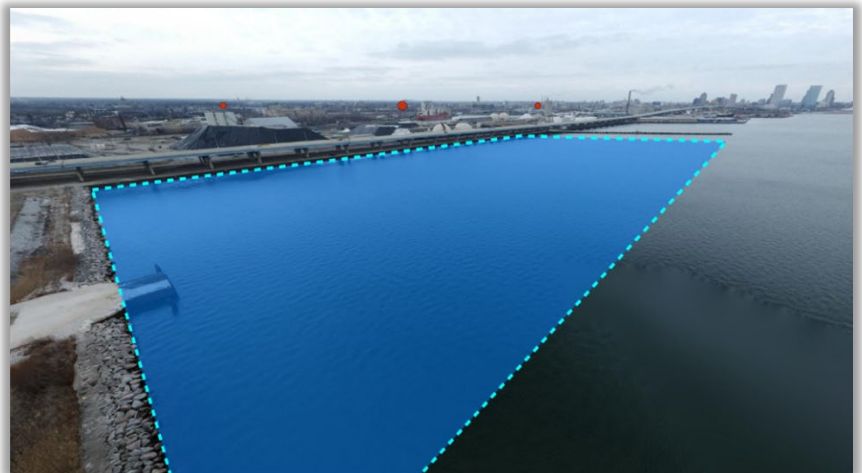
Aerial view of the Cat Island Chain in Green Bay. Photo credit: Steve Seilo, Photodynamix.

Milwaukee Estuary

Remediation projects in the Milwaukee Estuary AOC are moving at unprecedented speed due to finalizing critical coast-share components necessary for the restoration of this AOC.

In spring of 2021, the non-federal project sponsors (NFS) consisting of Wisconsin DNR, Milwaukee Metropolitan Sewerage District (MMSD), the City of Milwaukee, Milwaukee County Parks (MCP), and We Energies (WEC) - executed the *NFS Funding Contribution Agreement* that define contributions, roles, and responsibilities for the NFS portion of the project agreement (PA) signed in early 2020. These financial commitments have paved the way for the full development and construction of a Dredged Material Management Facility (DMMF), the most critical component for a cost-effective sediment remedial strategy for the AOC.

Construction of the DMMF was started in spring of 2024 and will be completed in summer of 2026. This new facility is located adjacent to the current dredge material disposal facility at Jones Island. The new DMMF is 42-acres in size and is designed to hold roughly 1.9 million cubic yards of contaminated sediments from Milwaukee's waterways as part of the AOC cleanup. The proximity of this managed disposal facility to the river and harbor work zones will significantly reduce cleanup costs and reduce truck traffic, transport accident risk, and carbon emissions.



Dredged Material Management Facility Location & Footprint for the Milwaukee AOC. Photo credit: Ramboll & MMSD

In-river cleanup of manufactured gas plant (MGP) waste in Milwaukee's "Third Ward" area was led by We Energies and was completed in late 2023. This was the first project to be completed as part of the Great Lakes Legacy Act agreement. The project removed approximately 60,000 cubic yards of MGP impacted sediments from the river. We Energies also completed the remediation of MGP waste in the Solvay Car Ferry Slip on the Kinnickinnic River in 2024. The completion of this project allowed for the Milwaukee Harbor district to start construction of a riverwalk along the Kinnickinnic River which includes a bridge that spans the Solvay Car Ferry Slip. The riverwalk and bridge are expected to be completed in 2026.



Milwaukee River Third Ward MGP Cleanup Project.

Another successful project in the Milwaukee River AOC is the Kletzsch Dam Repair and Fish Passage project, which reached substantial completion in December 2023. The fishway is now open and will allow native fish species, such as Lake sturgeon, Northern Pike, and Smallmouth Bass to reach 25 miles of the river north of the dam, 29 miles of tributary streams that feed into the river and 2,400 acres of wetlands – reconnecting river habitats and allowing the fish to migrate throughout the region.

Not only are fish habitat and river connectivity being improved in the AOC, but also habitat for important wildlife focal species. Restoration work continues in portions of the Little Menomonee River Parkway, which totals roughly seven miles of river and hundreds of acres of Milwaukee County Parks property. Due to the large scale of the project area, the work was divided into several sub-projects, each on their own timeline. One upland restoration sub-project is nearing completion, and another is scheduled to begin restoration work in 2026. The remaining sub-projects for upland restoration and in-river improvements are currently in the design phase.



Kletzsch Dam Repair and Fish Passage project. Photo credit: Resolution Studio, LLC

St Louis River

Progress continues towards delisting the **St. Louis River AOC**, with 66 of 80 management actions completed and all the remaining actions underway. Notably, polluted sediment remediation at the C. Reiss Dock was completed in 2024. 28,000 cubic yards of contaminated sediment was dredged, allowing commercial shipping operations to return to a site that had been idle for thirty years. Removing the contaminated material spurred redevelopment of the shipping terminal to boost economic opportunities in the Port of Duluth-Superior. Remedial action efforts are also underway for four other shipyard slips on the Superior waterfront in the next few years. The [Pickle Pond Restoration Project](#) in Superior created 17 acres of diverse fish and wildlife habitat features, connected water flow with Barker's Bay and improved recreational opportunities along the waterfront.

The Little Balsam Creek Fish Passage Project reconnected 5.07 miles of fish habitat along this Class I trout stream with Lake Superior Creek, as part of a larger ongoing effort to restore fish and wildlife habitats in the St. Louis River AOC. Culverts under roads crossing Little Balsam Creek in the Town of Summit, Douglas County, were replaced with structures that better handle higher flood waters and allow fish to swim through at any water level, even in very low flows. With these obstacles removed, trout and other species now have a clear path for over five miles to swim upstream from Lake Superior to the headwaters of the creek, creating a healthy and thriving fishery. The Town of Summit roads are also now more resilient against floods. Watch the [Little Balsam Creek Fish Passage Project in the St. Louis River Area of Concern video](#) to learn more.



Replacement culvert for improved fish passage and flood water conveyance at Little Balsam Creek. Photo credit: DNR.

The [St. Louis River Estuary Manoomin Restoration and Stewardship Plan](#) was updated in 2024 to address emerging challenges and guide collaborative efforts. Wild rice restoration continued with seeding 15,959 pounds on 77.2 acres at six sites in 2025. Wild rice restoration monitoring shows that density and biomass indicators are increasing at restoration sites.

DNR worked with Audubon Great Lakes and local partners to restore 19 acres of coastal wetlands in Allouez Bay in the St. Louis River estuary. The site is a high priority for restoration to improve populations of marsh birds. Species such as American and Least Bitterns, Black Terns, Pied-billed Grebes and Yellow-headed Blackbirds have declined over recent decades due to habitat degradation. Marsh birds need patchwork habitat with an even mix of open water and vegetation for nesting and foraging. This habitat has been in decline due to historical and ongoing stressors, such as invasive plants and rapidly changing water levels. The project created habitat features, controlled invasive cattails and restored native vegetation.



Restored hemi-marsh in Allouez Bay one year after construction. Photo credit: GEI Consultants.

Efforts to ensure the successful establishment of the restoration sites will continue in 2026. This work will also improve fish spawning habitat, coastal resiliency and recreational opportunities.



The St. Louis River Alliance coordinated volunteers to assist DNR with planting manoomin (wild rice) in Allouez Bay and other sites in the St. Louis River Estuary. Photo credit: St. Louis River Alliance.



Construction at the Gandy Dancer State Trail was completed in fall 2024 to replace the deteriorating 315-foot-long concrete box culvert structure with a trail bridge over Little Balsam Creek. With this final barrier removed, 5.07 miles of class 1 trout waters are now reconnected, allowing fish to travel from Lake Superior throughout the upper reaches of the creek. Photo credits: DNR.

Beach Program

The Wisconsin Beach Health Program manages the [Beaches Environmental Assessment and Coastal Health \(BEACH\) Act](#) funds from the EPA and collaborates with coastal communities and County Health Departments to carry out beach monitoring and restoration projects. Beaches are a vital resource for Wisconsin tourism and bring economic vitality to the communities in which they are located. The Beach program works to ensure continued safe use of public beaches that may be impacted by issues including bird waste, aging sewerage infrastructures, agricultural and urban runoff, weather events, and fluctuating water levels.

The [Wisconsin Beach Health website](#) lists up-to-date beach status and water quality data for monitored beaches and includes an interactive map of current beach status, including advisories, closures, and re-openings. This website shows beach advisories for Great Lakes Beaches and some inland beaches (those that report their data to the website or for which water samples are analyzed by the Wisconsin State Lab of Hygiene (SLH)). Current and historical water quality data for monitored beaches are accessible through a public portal to the Beach Health database. The website also includes a wide variety of information on beach monitoring, health and safety, and contacts for the public. Funding from the EPA under the federal BEACH Act supports beach water quality monitoring and posting of public health advisories on Great Lakes beaches. Funding for monitoring at State Park beaches and select inland beaches comes from the DNR. More details on monitoring and program updates are available on the program's website.

Highlights of recent Beach Program activities include:

- Funded monitoring at 106 coastal beaches in 2025.
- Funded EPA Freshwater Annual Sanitary Surveys at 54 coastal beaches in 2024 and 49 in 2025.
- Added four new coastal beaches to the Beach List at the request of County Health Departments.
- Began implementing qPCR analysis for E. coli at 3 City of Milwaukee beaches for same-day results and timely public notification.
- Worked with coastal beach managers, Wisconsin Department of Health Services, and Wisconsin Coastal Management Program to develop new signage placards with QR codes directing to the Beach Health website and incorporating risks due to both water quality and dangerous wave and currents. Documented a policy for posting signage comprising both placards and electronic “stoplight” notification systems and defining the procedure and responsibility for posting.



The beach at Barker's Island in the city of Superior now has cleaner water thanks to added native plants and improved access for people to enjoy the water through ecologically sound parking and beach upgrades. This project is part of the larger effort to restore the St. Louis River Area of Concern. To learn more watch: [Restoring Barker's Island Beach in Superior](#).

- Updated the [Beach Monitoring Requirements](#) and posted on the DNR website.
- Funded attendance at the Great Lakes Beach Association Conference in 2024 by beach managers from 7 coastal counties.
- Published statewide news releases in May 2024 and May 2025 to invite public comments on proposed changes to the Wisconsin Beach List and program information. For example, see the May 2025 news release: [DNR Seeking Public Input On Great Lakes Beach Listings](#).
- Continued enhancements to the [Wisconsin Beach Health database and website](#) on the DNR website.
- Expanded partner monitoring and use of the website for several additional inland beaches.
- Submitted the [Annual Beach Monitoring Report](#) for 2024 to EPA and published it on the DNR beach website.

Collaboration on Great Lakes Policies and Priorities

DNR provides leadership for addressing important Great Lakes issues. Wisconsin and its partners integrate and implement priorities of the LAMP, Great Lakes Regional Collaboration, internal program priorities, and the priorities of internal and external Wisconsin Great Lakes partners. Wisconsin brings its voice to regional Great Lakes discussions by participating in Great Lakes Water Quality Agreement subcommittees as assigned and ensuring participation and engagement in regional activities related to the International Joint Commission, Great Lakes Commission, Council of Great Lakes Governors, the Great Lakes Protection Fund, and other Great Lakes forums to ensure Wisconsin's perspective is considered in regional policy-making.

The DNR Office of Great Waters also manages Wisconsin's allocation of the Great Lakes Protection Fund, the Great Lakes Harbors and Bays funds, EPA grants for the Great Lakes, and other Great Lakes funds.

Mississippi River

In the DNR Office of Great Waters (OGW) the Mississippi River team is responsible for developing Upper Mississippi River (UMR) policy, coordinating grant funds, monitoring, and research.

Mississippi River Backwaters Eutrophication and Habitat Quality Research

Expanding human populations are contributing globally to increased wastewater, more intensive agriculture and other activities that contribute to increased loading of nitrogen (N) and phosphorus (P) to surface waters. Within the UMR anthropogenic eutrophication is contributing to: increased algal productivity and resulting hypoxia following bloom die-off, mats of free-floating plants (FFPs; duckweeds and filamentous algae) impeding recreation and diminishing ecosystem health, reductions in species diversity, and shift from clear to turbid ecosystem states. These changes have broad impacts on important services to surrounding communities (e.g., fisheries, wildlife, recreation). As the negative consequences of eutrophication develop, it is becoming increasingly important to develop management strategies to make ecosystems resilient to these changes.

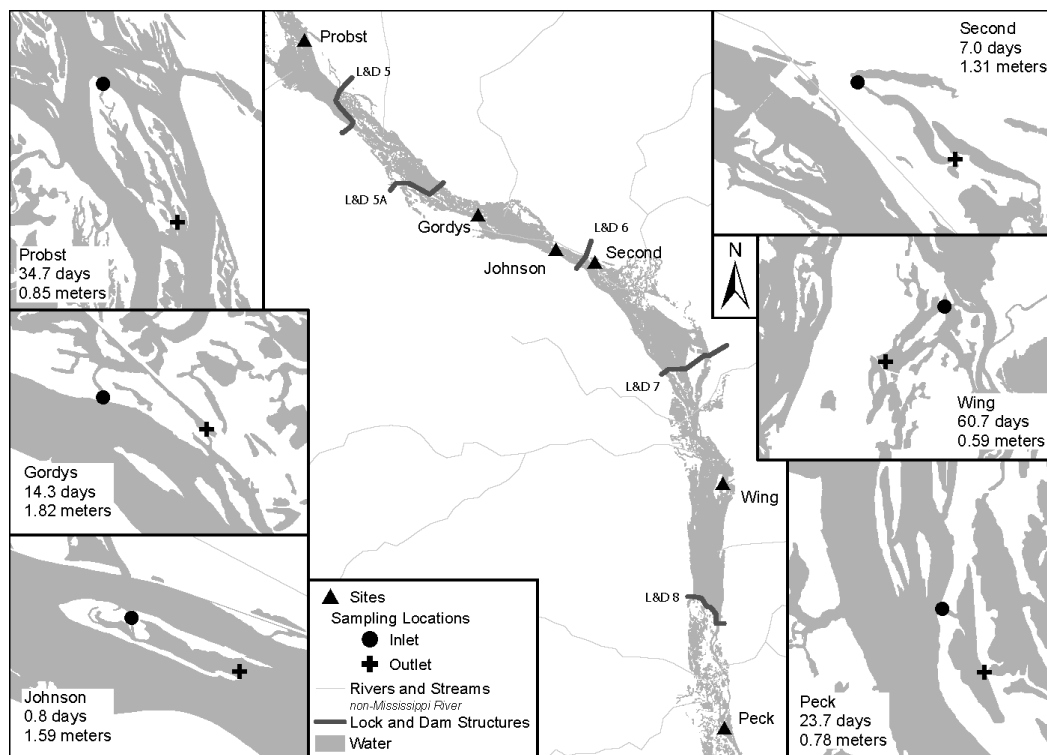


Figure 15. Locations of study backwaters and sampling sites within Navigation Pools 5-9 of the Upper Mississippi River. The average water residence time (in days) and average backwater depth (meters) for all sampling events are reported under each backwater name.

Eutrophication research and policy has focused largely on lakes, but rivers present distinct challenges and opportunities for mitigating and controlling eutrophication. The UMR ecosystem is characterized by a main channel that connects via a network of side channels to backwater habitats. Backwaters have a mosaic of conditions as a result of variation in connectivity to the main channel, with connectivity driving temperature, dissolved oxygen and nutrient biogeochemistry. UMR backwater water residence times (WRTs) are often measured in days to weeks versus natural lakes that typically have WRTs of months to years. Low-cost management actions that reduce or increase inflow into backwaters can influence a variety of abiotic and biotic

endpoints (e.g., dissolved oxygen concentration, overwintering fish habitat, cyanobacteria bloom reduction, reduced duckweed and filamentous algae proliferation, denitrification) and overall ecosystem health.

Water residence time has profound impacts on N uptake and removal, P retention and ultimate release to the water column, and phytoplankton assemblage and cyanobacteria dominance. WRT can also be a driver of ecological stable state status (i.e., clear vs. turbid water) and the prevalence of FFPs. Mississippi River discharge appears to be increasing, which in turn alters backwater WRT. Many backwaters are flushing faster as river discharge increases and backwaters become shallower due to sediment deposition. Other backwaters are becoming more disconnected as sediments fill inflowing channels.

Connectivity between UMR backwaters and main and side channel inputs presents a significant opportunity to mitigate and minimize problems associated with excessive nutrient loading and create high-quality aquatic habitat. Targeted management of channel water delivery to backwaters of the Mississippi may be able to 1) enhance denitrification, 2) minimize internal P loading, 3) alleviate problems associated with cyanobacteria and cyanotoxin production, and 4) reduce excessive accumulation of FFPs. Relative to reducing external N and P loads, managing backwater connectivity to reduce eutrophication problems is of interest to water managers since it requires fewer resources and can be rapidly implemented. Management of backwater connectivity can be implemented in concert with larger, more complex, efforts geared toward watershed N and P load reduction.

A growing body of evidence is emerging that shallow polymictic lakes and backwater lakes are frequently N limited while deep lakes are more likely to exhibit P limitation. While the reduction of P and N both appear to be important to improve water quality, shallow lakes tend to have a higher sediment area to water volume ratio which increases the importance of sediment denitrification and P release on the water column. Additionally, seasonal differences among nutrient limitation tend to exist, whereby early-season P limitation gives way to N limitation later in the growing season. The tendency for N limitation to be prevalent among shallow and riverine lakes is problematic for UMR backwaters because many of the backwaters are now very shallow and many exhibit fast-flushing (riverine with WRT < 30 days) characteristics. For the UMR Basin, this is problematic against a backdrop of increasing flow normalized N flux. The movement of water high in N into UMR backwaters is likely to exacerbate eutrophication problems further degrading aquatic habitat.

In research published in *River Research and Applications*, six backwater lakes in the UMR that varied in water residence time and water depth, were studied. Increasing backwater residence time was associated with more nitrate removal and more likelihood of N limitation, as well as greater accumulations of duckweed (Giblin and Larson et al, 2025).

Backwaters with greater depth and lower N concentration had less likelihood of filamentous algal accumulations. The median water residence time of backwaters with low duckweed (11.7 days) and no filamentous algae (16.9 days) approached the 12-day target to maintain overwintering conditions in backwaters for fisheries survival, supporting that water residence times in this range would likely improve both winter and summer water quality. Mean depth in backwaters with low duckweed and no filamentous algae was ~1.3 meters, while shallower backwaters were more likely to produce duckweed and filamentous algae mats.

Developing local management strategies to make ecosystems resilient to regional and global changes such as increasing discharge and eutrophication are increasingly important for natural resource managers to achieve their goals. Thus, there is a need to pursue adaptive actions to lessen the impacts of these larger trends. Designing habitat restoration projects to target WRT thresholds (e.g., 12 days) to reduce algal blooms, reduce the proliferation of FFPs, and enhance winter fisheries habitat can serve to maximize ecosystem services. The loss of backwater water depth is also contributing to negative consequences for water and habitat quality on the UMR. In our data, a mean backwater depth > 1.28 m appeared to dampen the likelihood of negative

eutrophication endpoints (e.g., intense algal blooms and dense FFP mats). Mean backwater depth > 1.28 m could be a useful target for managers attempting to alleviate these endpoints when designing habitat restoration and preservation projects. Here we have also shown that backwaters are generally N sinks that become N limited during periods of high biological activity, which reinforces the conclusion that N availability, rather than P alone, plays a critical role in driving eutrophication impacts in UMR backwaters. Therefore, N load reduction (in addition to P) will be required to reach water quality and habitat goals.

Evaluation of Surface Water, Groundwater, and Sediment Quality within the Trempealeau Lakes

The Trempealeau Lakes are downgradient of the Trempealeau Terrace in southern Trempealeau County. Groundwater flows in a southwest direction from the Trempealeau Terrace toward the Trempealeau Lakes with substantial groundwater upwelling into First, Second, and Third Lakes. The Trempealeau Terrace consists of glacial outwash and is characterized by coarse-grained soils that are very permeable and susceptible to groundwater contamination. The Trempealeau Terrace topography is extremely flat for the Driftless Area and thus is a popular area for row cropping agricultural activities that can involve significant addition of N and P.

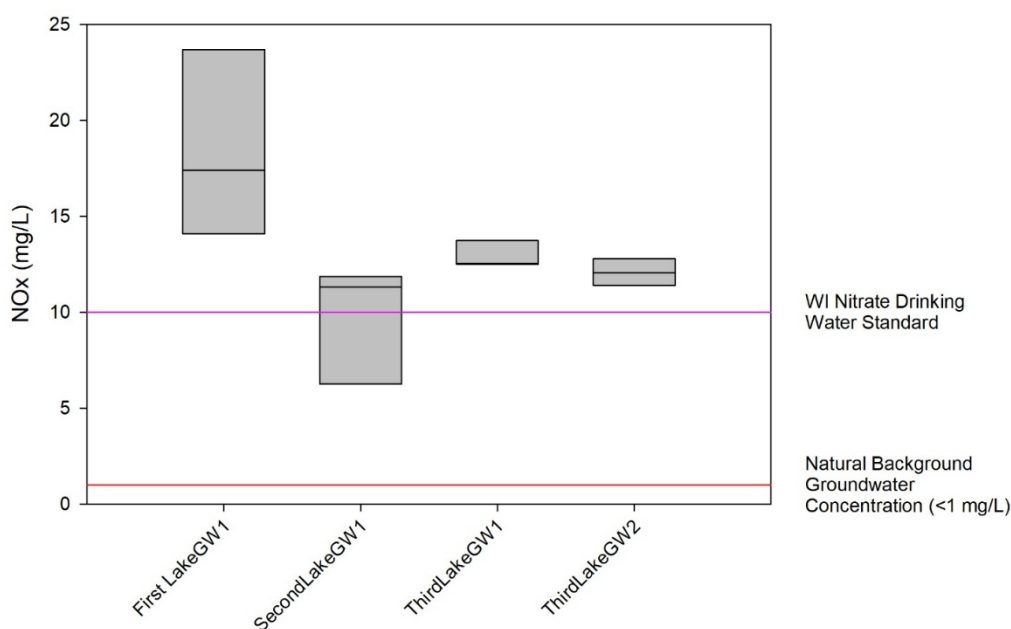


Figure 16. Groundwater nitrate + nitrite (NOx) entering the Trempealeau Lakes collected from five sampling events August 2023 to September 2024. The boxplots represent the 25th, 50th, and 75th percentiles. The pink line represents the nitrate maximum contaminant level for public drinking water in WI (10 mg/L). The red line represents the upper limit for natural background groundwater nitrate in WI groundwater (1 mg/L).

Numerous complaints from the public and resource managers regarding water quality, fisheries, and wildlife habitat have been made regarding this area in recent years. Traditional forms of outdoor recreation such as paddling, fishing, boating, and swimming can be severely hampered by dense mats of filamentous algae and duckweed on the lakes during the summer months. A non-profit organization, Friends of Trempealeau Lakes, has recently formed to address excessive N and P loading, the excessive growth of algae and duckweed, and habitat decline within the complex. Surface water, groundwater, and sediment quality evaluations were conducted from 2021-2024 to provide a comprehensive assessment of current habitat and water quality stressors. The study results were recently summarized in a 2025 report (Giblin and King, 2025).

Examination of water quality over time is important to determine if actions occurring on the landscape are resulting in improved water quality, habitat quality, and ecological outcomes. Comparison of data collected in Second Lake in 2021 to data collected in 1975-1976 suggests considerable backsliding in regard to lake surface water N concentrations. Total N in Second Lake during the 2021 survey indicated concentrations ranging from 3.5-6.5 mg/L, whereas total N in the mid-1970s hovered around 1.5-2 mg/L. It is very likely that the growth of planktonic algae, filamentous algae, and duckweed was N limited during prior decades. Under 2021 N loading rates, data were analyzed using nutrient limitation metrics. This evaluation indicated that likely limitation of algal and duckweed growth by N isn't occurring. Excessive loading of N has likely shifted the Trempealeau Lakes from their natural N-limited state toward a more P-limited or non-nutrient limited (neither N nor P limited) state. This is becoming a common phenomenon among lakes in the Northern Hemisphere as N pollution has increased.



Second Lake during typical July conditions. Mats of filamentous algae and duckweed restrict traditional outdoor recreational activities (fishing, swimming, paddling, and boating) under these conditions.

The reduction of both N and P loading to the Trempealeau Lakes will be required to improve water quality and habitat within the lakes. Particular emphasis should be placed on N reductions in southern Trempealeau County to address both ecosystem and human health impacts. The Trempealeau Lakes are currently receiving a N load sufficient to cause excessive growth of planktonic algae, filamentous algae and duckweed, impacting habitat and recreational opportunities. Exceedances of the groundwater nitrate drinking water limit (>10 mg/L) are occurring with increasing regularity in southern Trempealeau County resulting in negative implications for human health. Government agencies, non-government organizations, and the public will all have to work together to improve the watershed and lake habitat to improve conditions within these lakes and backwaters.

Whitman Bottoms Water Quality Evaluation

The Whitman Dam Wildlife Area was established in 1965 through a donation of land made to the State to be used by citizens for outdoor recreational activities. Numerous complaints from the public and resource managers regarding water quality, fisheries, and wildlife habitat have been made regarding Whitman Bottoms in recent years. Water quality sampling was conducted in 2023 and 2024 to document baseline conditions and to develop management recommendations.

During 2023 and 2024, 17 sites were sampled for an extensive suite of water quality parameters. Water discharge entering Whitman Bottoms was gaged at the main water control structure at the north end and at a second water control structure known as Hole in the Wall. Various flow modifications were made at the water control structures during the study to determine optimal flow rates to improve water quality and aquatic habitat.

A report published in 2025 summarizes the findings and established habitat management recommendations (Giblin and King, 2025) Analysis of data revealed that the Hole in the Wall backwater presents an area of opportunity for management

modifications. Currently the opening at Hole in the Wall is a free-flowing culvert allowing limited opportunity to optimize inflow to the downstream backwater to improve water quality and aquatic habitat. Adding a slotted stoplog structure could allow for seasonal flow settings to improve water quality. Reducing the inflow during floods could prevent clogging and habitat damage. Reducing inflow during the winter months could also create fisheries overwintering habitat, which is nearly non-existent under current



Main channel side of Hole in Wall inlet flowing into Whitman Bottoms.

conditions. Optimal winter water quality for backwater fish (water temperature $>1^{\circ}\text{C}$ and dissolved oxygen $>3\text{ mg/L}$) is produced when cold, high oxygen channel water is pulsed into a backwater at a conservative water residence time of 12 days. The estimate of the inflow through Hole in the Wall required to produce water residence time of 12 days is ~ 0.2 cubic feet per second (CFS). Typical inflow at Hole in the Wall is oftentimes 40x or greater than optimal inflow, making the backwater unsuitable as winter aquatic habitat.

Seasonal operation of the main water control structure entering Whitman Bottoms from the north could also be conducted to improve water quality. Study findings indicated that operation of the water control structure at 100% open is resulting in more optimal water quality during the growing season. A routine operation of closing the structure (90% closed) when high river stage/discharge conditions exist will reduce habitat damage and reduce the likelihood of extreme debris clogging at the structure.

The study findings suggest that a mix of simple inflow modifications, ideally coupled with more structural habitat restoration measures will result in improvements of water quality and aquatic habitat within Whitman Bottoms. The recommended inflow modifications were implemented during fall of 2025.

Intrinsic and Extrinsic Regulation of Water Clarity in a Large, Floodplain River Ecosystem

Ecosystem processes in rivers are thought to be controlled more by extrinsic than intrinsic factors, that is, the result of processes that occur upstream or within their watersheds. However, large floodplain rivers have a diverse assemblage of aquatic areas spanning gradients of connectivity with the main channel and internal controls may at times regulate long-term dynamics. When and where internal controls are important has not been widely explored in rivers. The UMR provides a unique opportunity to assess regulation of ecosystem processes in a large floodplain river as water clarity has increased in several reaches over the last two decades. To better understand when and where intrinsic variables (e.g., aquatic vegetation and common carp) and extrinsic variables (e.g., upstream main channel total suspended solids (TSS) concentration and discharge) regulate water clarity, a recent study published in 2024 describes 24-year trend of TSS in six study reaches of the UMR. We evaluated the degree to which trends were shared across aquatic areas within each study reach and identified potential drivers of long term TSS dynamics (Carhart et al., 2024). Results varied

across and within UMR reaches, but common carp abundance was the strongest predictor in nearly all study reaches. Several models indicated associations with both intrinsic and extrinsic factors, and the marginal model r^2 values (0.26–0.61) suggest that additional environmental factors may have influenced water clarity. Knowledge of the degree to which intrinsic and extrinsic processes regulate water clarity is important for understanding and managing large, floodplain rivers worldwide.

Macrophytes in the Upper Mississippi River

Macrophyte (aquatic plant) recovery has occurred in rivers worldwide, but assemblage patterns and habitat requirements are generally not well understood. A study published in 2023 examined patterns of species composition and macrophyte abundance in the UMR, spanning 22 years of monitoring and a period of vegetation recovery (Carhart et al., 2023). Non-metric multidimensional scaling (NMDS) ordination revealed a gradient of macrophyte abundance and diversity for 25 species, which were associated with water velocity, depth, wind fetch, and water clarity. Three macrophyte genera of ecological and restoration interest (*Zizania aquatica*, *Vallisneria americana*, and *Sagittaria* spp.) occupied different ecological niches. Trends of NMDS values showed that *Z. aquatica* first cooccurred in shallow areas with *Sagittaria* spp. but then expanded into deeper, lotic habitats where *V. americana* often resided. Curve Fit regression analysis identified large areas of significant increases in the relative abundance of *V. americana* and percent cover of *Z. aquatica* in several reaches of the UMR from 1998–2019. *Sagittaria* spp. were more spatiotemporally dynamic, which may indicate specific habitat requirements and sensitivity to environmental gradients. Analysis showed that these three ecologically important genera are spatiotemporally dynamic but have somewhat predictable habitat associations, which can guide macrophyte management and restoration in the UMR and other large, floodplain rivers.



Flowering rush (*Butomus umbellatus*). Source: USGS, Photo credit: M.J. Warman, 2017

Flowering rush, a perennial plant native to Eurasia, made a widespread appearance in the UMR in 2020, following extremely high river discharge during the previous year. A recent publication found that this non-native species expanded rapidly and was found at 1–10% of sites ($n = 6,630$ total sites) across a 400 km river reach

within the first 4 years of invasion (Carhart, 2025). Flowering rush invaded at least 12 of 31 wetland vegetation classes, including submersed aquatic, rooted-floating, deep marsh, and shallow marsh. Analysis of long-term macrophyte data and a targeted field study revealed that plant diversity declined with greater abundance of flowering rush over a 4-year early invasion period, suggesting that native species were displaced. Furthermore, species correlation plots showed a significant negative correlation ($r < -0.1$) between flowering rush and several native species, including wild celery, water stargrass, and wild rice. NMDS ordination placed flowering rush near the center of the plot, which may indicate tolerance to a wide range of environmental conditions such as water depth, flow, and substrate. Centering on the NMDS plot also shows that flowering rush invades many types of vegetated aquatic land cover classes, which was also supported by our geographic information systems analysis of land cover invasion. These habitat associations and ecological impacts of the recent, widespread invasion of flowering rush in the UMR can help inform restoration and management actions during early invasion. Continuing long-term data collection can break limitations on modeling cause-effect relationships and provide insights to the future ecological trajectory of the macrophyte community to this non-native invasive species.

Long Term Resource Monitoring and Habitat Restoration

The U.S. Army Corps of Engineers' (USACE) Upper Mississippi River Restoration (UMRR) Program - Long Term Resource Monitoring (LTRM) element is implemented by the U.S. Geological Survey - Upper Midwest Environment Sciences Center (UMESC), in cooperation with the five UMR states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The USACE provides guidance and has overall Program responsibility. The UMRR-LTRM program has been collecting data since 1988 and assesses water quality, vegetation, fisheries, land-cover/land-use, and other resource information to determine the trends and ecological health of the UMR. The program utilizes stratified random sampling carried out within select trend pools of the UMR, and for water quality it also samples a network of fixed sites along the mainstem and tributaries. DNR's LTRM field station at La Crosse, WI carries out this monitoring on Navigation Pool 8 and tributaries to Pools 7 – 9 of the UMR.

The DNR's LTRM 2024 Status Report provides a comprehensive summary of discharge, water quality, fisheries, and vegetation monitoring data collected by the DNR LTRM field station for the years 1993 to 2024 (Giblin and King, 2025). The level of sampling effort and rigor in this program are unique to the UMR and allow for deeper examination of environmental drivers, a high degree of confidence in deriving trends, and an overall knowledge of ecological interactions.

This UMRR program provides a balanced combination of habitat restoration, monitoring, and research. The habitat restoration activities of the UMRR have improved critical fish and wildlife habitat on over 121,000 acres through 63 projects since 1986. Currently, the UMRR Program has 26 additional projects in various stages of construction and design. These projects will benefit another 60,000 acres of habitat when completed. These projects improve water quality and provide protection, nesting, and feeding areas for a highly diverse set of fish, birds, mussels, reptiles, amphibians, and mammals, including many rare and endangered species.

UMRR is a national leader and pioneer in large-river restoration, emulating natural processes, and restoring mosaics of wetlands, channels, and forests. UMRR's restoration techniques are tested and proven to address the most significant stressors to the ecosystem by:

- Protecting riverine wetlands and lakes from fluctuating water levels and high sedimentation.
- Recreating islands to provide refuge, food, and improved water quality for many species of fish and wildlife.
- Restoring the natural mosaic of water velocities and depths to improve fish and wildlife habitat.
- Restoring forest health and diversity, resulting in habitat for a variety of wildlife.



Child fishing on Mississippi River. Photo credit: Shawn Giblin

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Large River Biological Monitoring

In 2016, the DNR implemented a non-wadeable Rivers Monitoring Program to track long-term changes in biotic indices at selected reference sites across Wisconsin's large warmwater rivers. Large rivers are defined as having at least 1.9 miles of contiguous river channel too deep to be sampled effectively by wading. This generally coincides with 5th order stream size or greater (Figure 17). By this definition, Wisconsin has at least 46 large rivers with a combined length of over 2,500 miles. Large rivers are highly dynamic in nature and generally have complex heterogeneous habitat leading to high biodiversity in undisturbed reaches. As water quality and habitat begin to degrade due to anthropogenic disturbance, changes begin to occur in the fish and macroinvertebrate communities. Riverine specialist species and intolerant species begin to disappear while habitat generalists and tolerant species increase in abundance. The DNR has been monitoring for various physical and chemical stressors on large rivers dating back to the 1970s and 1980s as part of the Long-term Trend (LTT)



Figure 17. Large rivers across the state.

monitoring program to assess water quality. More recently, Indices of Biotic Integrity (IBIs) for fish and macroinvertebrates have been used to assess the health of riverine systems in addition to chemical parameters. The DNR began a rotational basin approach to sampling large rivers statewide on a five-year cycle beginning in 2017. Two major river basins that correspond approximately to the HUC 6 level were intensively monitored each year for fish, macroinvertebrates, and mussels.

Multi-metric IBIs use fish communities to assess the status of rivers relative to their impacts (Karr 1981, Fausch et al. 1990, Karr and Chu 1997) and have been modified and calibrated for Wisconsin's large rivers (Lyons et al. 2001). Regional modifications to the IBI help to strengthen the original IBI concept based on regional differences in the fish communities and geography (Miller et al. 1988). IBIs provide a quantitative bioassessment of the biotic community by which to gauge riverine health and compare across rivers of similar size. The overall goals of fish surveys were to determine the status of the existing riverine fish community and evaluate if there were any changes in the fish community that may be related to stressors on the riverine biological community.

Macroinvertebrates are a vital part of the aquatic food chain. Macroinvertebrates have been widely used to assess stream health in wadeable waters. Recently, indices have been developed for use on nonwadeable waters of Wisconsin (Weigel and Dimick 2011). There are several aspects of macroinvertebrates that make them a good choice for assessing ecological conditions of rivers. These include their limited migration patterns, sensitivity to human impacts, sensitivity to pollutants with a range of tolerance values, and broad range of

habitat requirements. In addition, they can be sampled and identified with relative ease. Macroinvertebrate communities may respond differently than fish communities under different stressors, providing an additional component to evaluate river health.

Freshwater mussels are one of the most imperiled faunal groups on a national and global scale and play an important role in riverine ecosystems providing many ecological benefits. Freshwater mussels are sensitive to a variety of environmental disturbances and are a suitable indicator of ecosystem health (Grabarkiewicz and Davis 2008). Freshwater mussels are widespread, long-lived, sedentary filter feeders that can provide a historical record by the spent valves left behind. Most mussel species have an obligate fish host during their glochidia life phase and their presence within a river is dependent upon viable host populations inhabiting or having access to river reaches. Freshwater mussels are sensitive to physical habitat alterations, water quality and chemical contaminants during various life stages and have been found to be particularly sensitive to ammonia (Newton et al. 2003).

Fish

Non-wadeable fisheries data were collected in accordance with IBI sampling protocols established and calibrated for Wisconsin's large warmwater rivers by Lyons et al. (2001). In 2024, a total of 57 Large River IBI (LRIBI) surveys were completed. Forty sites, including 5 trend sites were monitored within the Wisconsin River Basin, along with 12 additional trend sites at or near LTT water quality sites (Figure 18). Fish surveys captured 7618 individual fish representing 75 species and weighed a total of 5040 pounds. The number of species

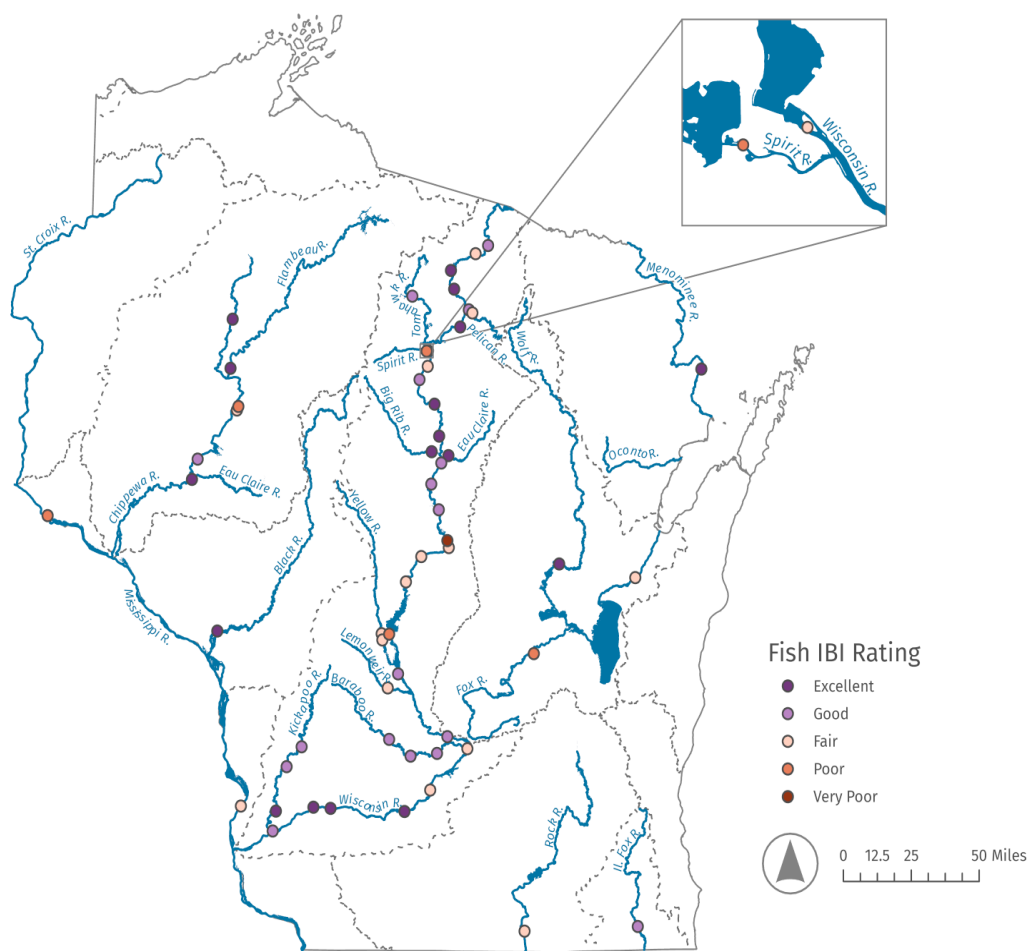


Figure 18. Large river fish IBI ratings for 2024 LTT monitoring sites.

captured per site ranged from 5 to 26 with a mean of 14 species. The number of individuals captured per survey ranged from 9 to 702 fish with a mean of 134 fish. Five state listed species were captured in the Wisconsin River Basin, including Lake Sturgeon (State Special Concern Species); Blue Sucker, Black Buffalo, and River Redhorse (State Threatened); and Crystal Darter (State Endangered). Large River IBI scores ranged from 15 to 100 and averaged a score of 66. The median LRIBI score was 65 with one survey rating as very poor (2%), five rated as poor (9%), sixteen rated as fair (28%), seventeen rated as good (30%) and eighteen rated as excellent (31%). Based on fish community surveys, 39 percent of sites surveyed were not meeting their biological potential, with IBI ratings of fair, poor, or very poor. Comparing biological communities, at a majority of sites, the fish community rated similar to or higher than (median score = 65) the macroinvertebrate community (median score 65) at corresponding sites. In 2025, fish surveys were conducted at 44 sites within the Fox/Wolf basin and 15 sites Black/LaCrosse River basins, along with 17 LTT sites.



**Large River species surveyed in 2024-2025,
with DNR Water Quality Biologists:**

Left, top to bottom:

- Blue Sucker, Wisconsin River, with Mike Sorge.
- Channel Catfish, Rock River, with Miriam Burgos Febus.
- Lake Sturgeon, Black River, with Brandon Thill.

Right, top to bottom:

- Musky, LaCrosse River, with Kurt Rasmussen.
- Greater Redhorse, Embarrass River, with Angelo Cozzola



Macroinvertebrates

Non-wadeable macroinvertebrate data were collected in accordance with macroinvertebrate IBI (mIBI) sampling protocols established and calibrated for Wisconsin's large warmwater rivers by (Weigel and Dimick 2011) utilizing Hester-Dendy artificial substrate samplers. In 2024, a total of 17 mIBI samples were collected, most from within

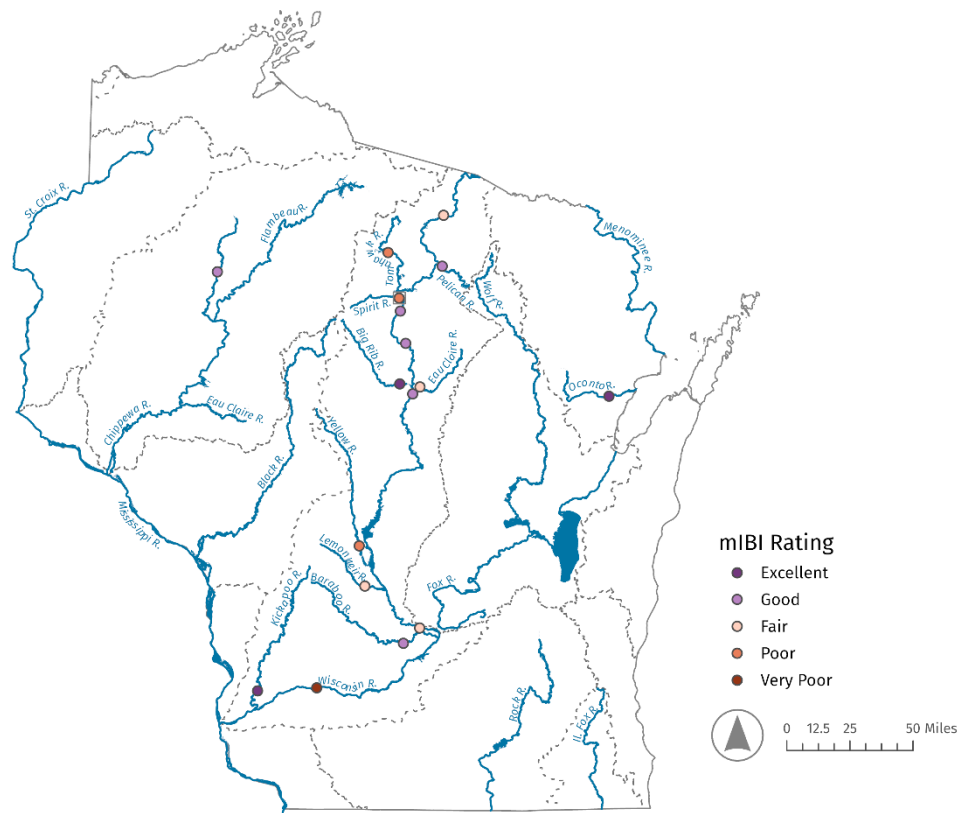


Figure 19. Large river macroinvertebrate IBI ratings for 2024 LTT monitoring sites.

the Wisconsin River Basin HUC 6. Scores ranged from 15 to 90 and averaged 58.0. The median mIBI score was 65. One sample rated as very poor (6%), three rated poor (18%), four rated fair (23%), six rated good (35%), and three rated excellent (18%). Based on macroinvertebrate community samples, 47 percent of Wisconsin River Basin sites were not meeting their biological potential, with mIBI scores rating fair, poor, or very poor. Some macroinvertebrate IBI ratings in the Wisconsin HUC6 were similar to the fish IBI rating at corresponding sites. However, at a number of locations the mIBI rated lower than the fish IBI ratings within the same river reaches indicating that macroinvertebrate communities were responding differently to the water quality and habitat present within the reach (Figure 19). In 2025, macroinvertebrate surveys were conducted at 18 sites within the Fox and Black/LaCrosse River Basins. Summary and analysis of data collected in 2025 is currently in progress.

Freshwater Mussels

Mussel surveys were not conducted in 2024 due to staff vacancies; however, in 2025, mussel survey work resumed and was conducted at numerous sites within the Fox/Wolf and Black/LaCrosse River HUC6 Basins. Summary and analysis of the data collected in 2025 is currently in progress.

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Water Quantity

The DNR's Water Use Section works with other DNR programs, federal partners, universities, and local organizations to implement a water quantity monitoring program. The monitoring program involves the collection of water quantity data across all of Wisconsin's landscapes including groundwater levels, stream flows, and springs flow. This shared approach expands monitoring coverage, strengthens data quality, and ensures that information reflects conditions statewide. By coordinating monitoring activities and sharing data through publicly accessible databases, the Water Use Section is able to connect local observations to broader watershed and regional patterns. These partnerships are critical to building a comprehensive picture of water quantity, availability and movement across Wisconsin.

Understanding water quantity and its influence on groundwater and surface water features including streams, rivers, lakes, and springs is essential for sustainable use for human health, the economy and ecological diversity. With respect to ecological health, water quantity directly influences water quality by shaping temperature, habitat availability, and pollutant concentrations. The water quantity monitoring program tracks stream flows and water levels statewide at surface waters as well as groundwater wells. Across Wisconsin, these are the hydrologic building blocks needed to interpret water quantity settings, identify emerging issues, and support informed management decisions.

Groundwater

Groundwater plays a vital role in Wisconsin, supplying drinking water for 70% of Wisconsin residents, irrigating crops and sustaining streams, lakes, and wetlands. A partnership between the Water Use Section, United States Geological Survey (USGS) and the Wisconsin Geological and Natural History Survey (WGNHS) maintains a statewide groundwater level network currently made up of 100 wells. Wells are distributed across many different hydrogeologic setting, in a dedicated groundwater monitoring network where water levels are measured on a regular schedule and recorded continuously using automated sensors.

Collection of water levels from the statewide groundwater level network is coordinated by the USGS. The USGS conducts site visits to collect manual measurements, maintain instrumentation, and verify data quality. Continuous water-level recorders capture short-term fluctuations and long-term trends, allowing the Water Use Section and other water resource managers to evaluate how aquifers respond to precipitation, droughts, floods, and groundwater withdrawals. These measurements support interpretation of streamflow, lake levels, and water quality conditions that depend on these groundwater inputs. The USGS stores this network data on their publicly accessible database.



Well associated with Wisconsin's groundwater monitoring network.

Springs

Springs are direct points of groundwater discharge at the surface and springs provide some useful insight into groundwater conditions and aquifer parameters. DNR, along with many partners, maintains a statewide inventory of springs, recording information such as location, flow characteristics, and surrounding landscape features. The springs inventory was established as part of a comprehensive inventory of water resources required by the Great Lakes Compact to support water quantity management in the Great Lakes basin. Emphasis has been put on private landowner communication concerning springs ecology, conservation and ecosystem management.



Fennimore Fork (Grant County) fractured hillslope spring, discharging from a cave.

Spring monitoring is especially important for cold-water systems, where consistent groundwater inputs support temperature-sensitive aquatic species and influence water quality conditions.

The Wisconsin Springs inventory currently includes nearly 500 springs across diverse hydrogeologic settings, generally with flows of approximately 0.25 cubic feet per second (around 85 gallons per minute) or greater. The initial springs inventory was conducted by the Wisconsin Geological and Natural History Survey through a contract with the Wisconsin DNR and completed in 2017. Since 2019, the DNR Water Use Section has revisited 339 springs, visiting 40 and 50 springs every field season. The inventoried springs are visited on a five to ten year rotating schedule, to measure discharge and water quality parameter at the

discharge location. The measurements track changes over time to flow and springs characteristics. Private landowner participation has been essential for site access, verification, and identification of new springs.

Streams and Rivers

Water quantity-based stream monitoring focuses on collecting discharge measurements on Wisconsin's groundwater dependent streams. Stream discharge data are collected through continuous stream gages as well as instantaneous field measurements made during different flow conditions, with a focus on baseflow conditions. These measurements capture both long-term flow patterns and short-term responses to storms, snowmelt, and drought as well as other environmental factors. A long-term effort is focused on groundwater dependent streams in Central and West Central Wisconsin with approximately 60 sites visited yearly. In addition, the Water Use Section staff monitor around 100 discrete streamflow sites statewide each year.

The Water Use Section has a long-standing partnership with University of Wisconsin Stevens Point Center for Watershed Science and Education (UWSP CWSE). UWSP CWSE monitors approximately 50 stream sites throughout central Wisconsin. Every August, UWSP CWSE also completes synoptic stream survey to monitor streams at baseflow conditions of important coldwater streams. This stream flow data as well as the data collected by DNR Water Use Section is uploaded into publicly accessible databases.

Conclusion

Water quantity data collected across Wisconsin are compiled into centralized databases and mapping tools that make information accessible to water managers, researchers, and the public. These tools allow users to explore where monitoring occurs, visualize trends, and connect hydrologic conditions with water quantity measurements and water quality observations of both surface water and groundwater. Working together continues to be a solution for sustainable use of these resources for human health, the economy and ecological diversity.

As Wisconsin experiences a changing precipitation pattern, increasing water demands, and ongoing land use change, water quantity monitoring will remain a critical component towards our understanding of the water budget. Continued collaboration, data sharing, and long-term monitoring will build a strong foundation of water quantity monitoring across Wisconsin.

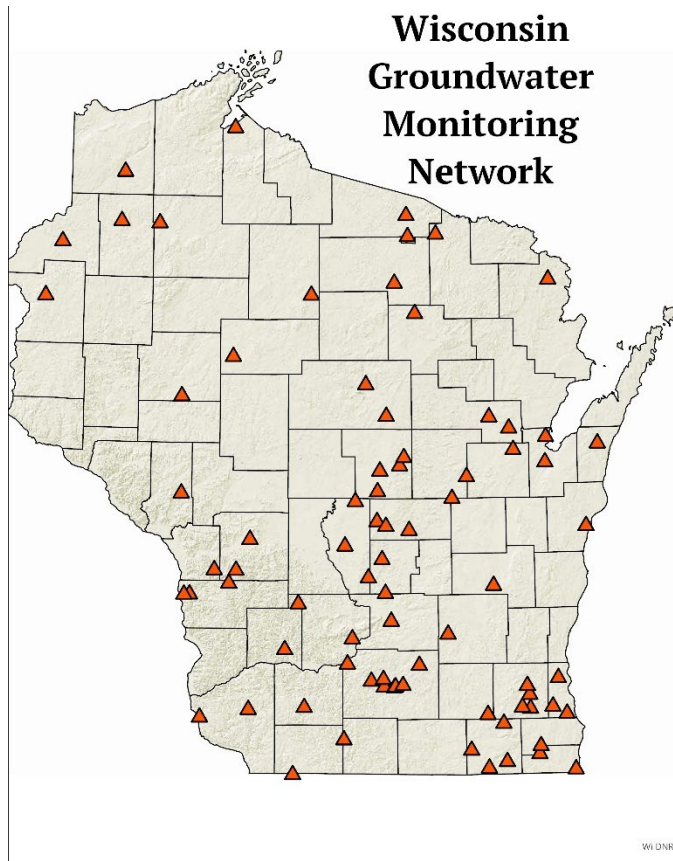


Figure 20. Wisconsin Groundwater Monitoring Network Distribution, January 2026

Aquatic Invasive Species

Wisconsin's aquatic ecosystems are experiencing impacts from aquatic invasive species (AIS) that are already present within the state, and the state's waters and cultural resources are balancing effects of continued introductions of regulated species. The introduction of AIS into the Great Lakes and inland state waters is a source of biological pollution that has altered natural resources, human health, recreational opportunities and other ecosystem services throughout the state and region.

To help mitigate these effects, [Wisconsin's AIS Management Plan](#) (Initially created in 2003) was updated and approved in 2019 to guide the implementation of activities to prevent, contain, and control the harmful impacts of AIS. The Wisconsin AIS Management Plan fulfills the requirements of the National Invasive Species Act (NISA) of 1996 which provides guidance for the development of state program documents. It makes Wisconsin eligible to request federal assistance for up to 75% of the cost incurred to implement the statewide AIS program. The plan also provides specific details regarding AIS to the overarching *Wisconsin Invasive Species Strategic Plan*, [Looking Forward: A Statewide Strategic Plan for Invasive Species](#),

that was drafted by the Wisconsin Invasive Species Council in 2013. This is a comprehensive document addressing WI's overall approach to invasive species prevention/management, both terrestrial and aquatic.

In addition to meeting new opportunities and fulfilling federal requirements, the *Wisconsin Aquatic Invasive Species Management Plan* is designed to provide guidance to all DNR staff and partners working on AIS issues in Wisconsin. Following the plan increases efficiencies and reduces redundancies for everyone managing AIS on Wisconsin's more than 15,000 lakes, 13,500 miles of navigable streams and rivers, and approximately five million acres of wetlands. It also includes Wisconsin's border waters, which consist of more than 800 miles of Great Lakes coastline and nearly 200 miles of Mississippi River shoreline.

The plan includes three main goals:

GOAL 1: Prevent the introduction of new AIS into Wisconsin

GOAL 2: Contain the spread of AIS within Wisconsin

GOAL 3: Control existing populations of AIS to minimize harmful impacts

One important difference between the 2019 and 2003 plans is that the newer version organizes strategies and actions by invasion pathway. This new way of thinking aims to take a proactive approach by exploring specific pathways that are applicable to the state and then to provide guidance, outreach, and resources needed to close these gaps. The seven priority pathways identified in Wisconsin's plan include recreational activities and service providers, non-recreational fishing and aquaculture, organisms in trade, transportation and utility

WISCONSIN AQUATIC INVASIVE SPECIES

Management Plan



WISCONSIN GOALS:

- Prevent introduction of new species
- Contain the spread of existing species
- Control existing populations to minimize harmful impacts

JULY 2018



corridors, state and federal agencies, maritime commerce, and canals, dams, and diversions. A complete description of these pathways and the [WI AIS Management Plan](https://apps.dnr.wi.gov/lakes/invasives/AquaticInvasive.aspx) can be found at <https://apps.dnr.wi.gov/lakes/invasives/AquaticInvasive.aspx>.

Sites targeted for Early Detection monitoring by Regional DNR AIS Biologists on inland lakes, streams/rivers, and wetlands follow DNR approved protocols. The sites will be selected using tools such as scientifically defensible suitability models and prioritization models that target high-risk recreational pathways (such as the [Where Boaters Have Been Tool](#) and popular fishing destinations) and proximity to new or recently found populations.

Clean Boats, Clean Waters

Educating boaters and anglers through the Clean Boats, Clean Waters (CBCW) watercraft inspection program is a vital part of Wisconsin's aquatic invasive species prevention efforts. With so many waterbodies and so few state resources, the success and continuation of CBCW is reliant upon its enthusiastic, highly motivated participants. These watercraft inspectors have educational conversations with landing visitors about how to help prevent the spread of AIS and assist them in taking prevention steps, while also collecting valuable data.



While most CBCW participants are part of a lake organization, participation is open to anyone interested in AIS outreach and includes volunteers, student interns, and partners from counties, tribes, and non-profits.

CBCW began as a grassroots effort in 201, when three middle school students from northern WI decided to take on the challenge of solving a community problem – the spread of AIS across the state. In partnership with the DNR and Extension Lakes, the students created an educational campaign for boaters and anglers and recruited volunteers from local lake organizations to help. Since the statewide adoption of the CBCW program in 2024, thousands of people have been trained on how to initiate boater

education efforts at their local boat landings.

Today, CBCW is coordinated by Extension Lakes, based at the University of Wisconsin-Stevens Point, and funded by the DNR. In 2025, DNR grant funds totaling almost \$900,000 were distributed around the state to support organizations in their CBCW outreach. Lake Monitoring and Protection Network partners across the state provide integral support for CBCW, conducting trainings and assisting CBCW participants locally. While engaging boaters and anglers in taking AIS prevention steps, CBCW participants collect important data about the actions of boaters and anglers and track their overall outreach efforts.

In each year of 2024 and 2025, CBCW participants:

- Contacted over 250,000 people.
- Inspected over 130,000 boats.
- Spent 80,000 hours conducting inspections.



Clean Boats, Clean Water inspector at Rock Lake in Jefferson County. Photo credit: Jeanne Scherer

Pathway Work performed by Regional AIS Biologists in 2024/2025

Aquatic Surveying and Monitoring Activities

- Completed AIS monitoring at over 1,000 fieldwork events annually.
- Provided annual in-person training for DNR and partners for early detection monitoring.
- Maintain public webpage [Aquatic and Wetland Invasives Species Monitoring | Wisconsin DNR](#) with resources for identification, known AIS locations, reporting instructions, and protocols for citizens and staff.
- Provided resources and training to other DNR staff on proper equipment decontamination and disinfection.
- Provided a public webpage with disinfection manual code and resources for Best Management Practices: [Boat, Gear and Equipment Decontamination and Disinfection Manual Code 9183.1 | Best Management Practices | Wisconsin DNR](#).
- Literature review of any new decontamination research to update best management practices.
- To align efforts ecotypes and reduce redundancy, we merged protocols and created the [Department Invasive Species Monitoring on Lakes, Streams, Wetlands and Roadsides](#) protocols for deployment in 2026.

Organisms in Trade (OIT)

- Continued to co-lead the OIT Work Group with the Statewide Organisms in Trade Program Coordinator. This work group consists of both DNR and partner staff, to provide direction on statewide OIT Program efforts, development of protocols/guidance for partners, identification of future OIT pathway direction, policy recommendations, and collaboration between programs (Natural Heritage Conservation, Law Enforcement, AIS, etc.) to help prevent invasive species from entering WI and the Great Lakes Region.
- Finalized a protocol for DNR staff and partners to conduct OIT education and outreach, and to monitor for regulated species sales at pet stores to prevent invasive species entering Wisconsin. Trained various partners on protocol implementation and recording/tracking findings.
- Visited pet stores to provide education and outreach, monitor for regulated species sales, and inform protocol development, as part of pilot project.
- Continue to work closely with Law Enforcement, providing ID assistance.
- Participated on a GLRI Interjurisdictional Crayfish Project led by Michigan State University.
- Continued to work closely with partners in outreach and trainings to Wisconsin Dock Service Providers (DSPs). To date, out of 135 DSPs 99 have received mailings in an outreach effort. More recently, 4 of these DSPs have been trained and received decontamination kits. Federal funding has been acquired to enhance the program.

2024 and 2025 AIS Early Detection Efforts

DNR's AIS program works with a network of citizens, partners, and DNR staff. Each year, we exceed the goal of monitoring 1,000 locations for AIS. In 2024, these efforts identified roughly 173 new AIS populations and as of February 2026, 95* new populations were verified in 2025 (Table 6).

**Data is still being processed/verified so these counts may be low.*

Table 6. Counts of fieldwork events conducted by citizens, partners, and DNR during 2024 and 2025.

Project	Count of Fieldwork Events in 2024	Count of Fieldwork Events in 2025
Citizen Lake Monitoring Network	164	153
Water Action Volunteers	337	327
Project Riverine Early Detection	6	6
AIS Snapshot Day - Citizen	124	136
Incident Report - Citizen	5	2
Total from Citizen Groups	636	624
Early Detection – LMPN	309	306
Citizen Lake Monitoring Network	136	93
Project Riverine Early Detection	5	4
Incident Report - LMPN	203	103
Total from Partner Groups	653	506
DNR Early Detection/Response Monitoring	59	27
National Aquatic Resource Assess	41	0
Incident Report - DNR	28	16
Total from DNR	128	43
Annual Total	1,417	1,173

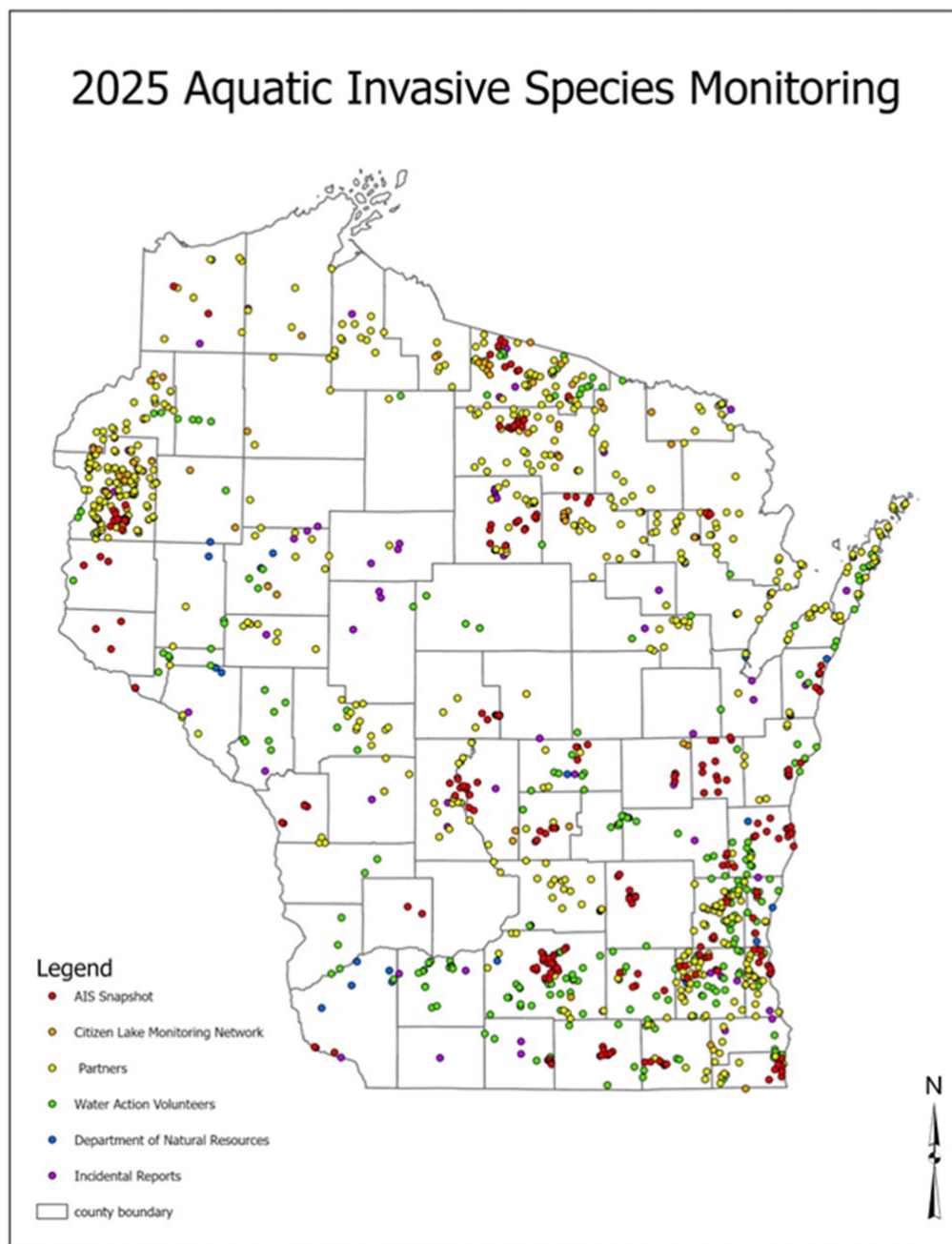


Figure 21. Locations of aquatic invasive species early detection and response monitoring efforts by citizens, partners, and DNR in 2025.

Regional AIS Biologists also lead and coordinate all response efforts, which include monitoring, management, and communication, while implementing the Department's [Invasive Species Response Framework \[PDF\]](#). Most new detections (Figure 22) are common invasive species like mystery snails and purple loosestrife. Only a handful of populations of rare invasive plants were detected, such as European frogbit (*Hydrocharis morsus-ranae*), java water dropwort (*Oenanthe javanica*), pennywort (*Hydrocotyle ranunculoides*), common reed grass (*Phragmites australis*), starry stonewort (*Nitellopsis obtusa*) and they appear to be assimilating in systems that have healthy shorelines and robust native communities. There were multiple New Zealand mudsnail (*Potamopyrgus anitpodarum*) populations verified. There is little evidence to suggest that mudsnails are leading to reductions in growth rates of the brown trout that consume them in southern Wisconsin, however, it

is unclear what impacts they may have in less productive systems or over the long term. We also observed round goby in Lake Winnebago and have enacted a large response effort led by fisheries and partnered with various stakeholders, including researchers. All new verified aquatic invasive species can be viewed on the DNR AIS tabular webpages for [2024](#) and [2025](#) findings, and spatial records can be viewed on the [Lakes and Aquatic Invasive Species Mapping Tool](#).

There are still many unverified new detections of commonly reported species and efforts were continued to expand verification capacity by offering a virtual Do It Yourself testing opportunity. This allowed more collectors to be certified AIS verifiers, thus streamlining the verification process.

Additionally, the Surface Water Integrated Monitoring System (SWIMS) Team has been working hard and we now offer the ability for all collectors to attach photos when entering data. Understanding how difficult it can be to collect specimens and bring them to the local specialist, this new photo upload has helped streamline the verification process. The AIS Monitoring Lead is working with Citizen Lake Monitoring Network Education and Water Action Volunteer Education to promote how to collect photos and submit them to the SWIMS database with fieldwork events.

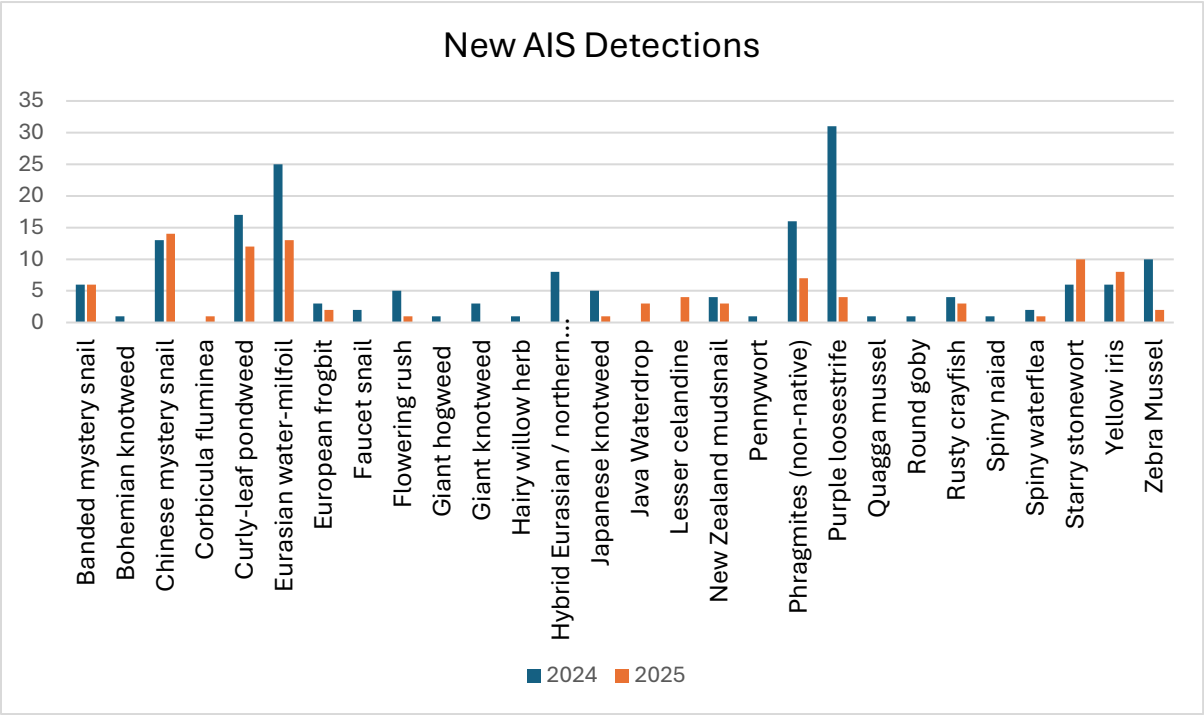


Figure 22. New detections of aquatic invasive species in 2024 and 2025.

Aquatic Invasive Species Rate of Spread

Since 2016, aquatic invasive species (AIS) monitoring has been integrated into the National Aquatic Resource Surveys on lakes, streams, and wetlands to assess AIS spread in Wisconsin. In 2024, 42 non-wadable streams were surveyed for AIS during the National Rivers Assessment. Crews found it difficult to monitor for AIS during surveys on non-wadable rivers as it was not safe for the small crews to navigate boats in high flows and also look for AIS in the water and along shorelines. The crews in 2024 only observed four AIS in the 42 rivers assessed. In 2025, AIS were not assessed during the National Coastal Assessment, as crews only had gear to assess fish and were unable to take on additional tasks.

EMERGING CONTAMINANTS & WATER QUALITY STANDARDS

Lake Mendota at sunrise.

Perfluoroalkyl and polyfluoroalkyl substances (PFAS)

PFAS are human-made, organic compounds that have been manufactured for use in non-stick coatings, waterproof fabrics, firefighting foams, food packaging and many other applications since the 1940s. PFAS are highly resistant to degradation and have been detected globally in water, sediment, and wildlife. This global distribution is of concern as PFAS have documented toxicity to animals and because epidemiological studies have suggested probable links to several human health effects.

Wisconsin's PFOS & PFOA Surface Water Quality Criteria

In 2022, surface water quality criteria were promulgated for two toxic chemicals commonly known as PFOS and PFOA. These criteria define levels of public health significance for these two types of PFAS based on preventing adverse effects from contact with or ingestion of surface waters of the state, or from ingestion of fish taken from waters of the state.

- For PFOS, the level of public health significance is 8 ng/L for all waters except those that cannot naturally support fish and do not have downstream waters that support fish.
- For PFOA, the level of public health significance is 20 ng/L in waters classified as public water supplies under ch. NR 104, and 95 ng/L for other surface waters.

More information is available on the DNR's [PFAS webpage](#).

Why Should I Care?

PFAS persist in the environment and the human body for long periods of time. Recent findings indicate that exposure to certain PFAS may have harmful health effects in people.

- certain types of cancers
- thyroid & heart issues
- developmental delays
- infertility & low birth weight

Monitoring

Since 2020, DNR staff have collected surface water PFAS samples from 300 different sites statewide which have included inland rivers, lakes and coastal areas of the Great Lakes (Figures 23 & 24). This sampling effort has given widespread coverage of the state, and although some areas of the map may not have a symbol, many of the rivers sampled drain large upstream watershed areas that incorporate potential sources of contamination. These results are publicly available and regularly updated to the [DNR PFAS Interactive Data Viewer](#).

Samples have been analyzed by the WI State Laboratory of Hygiene for 33-40 different PFAS, with particular attention to the concentrations of perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate acid (PFOS). As of August 2022, these two compounds have WI Surface Water Standards of PFOS = 8 ng/L (or parts per trillion, ppt) and PFOA = 95 ng/L (ppt) in surface waters not classified as public water supplies (most waters) or PFOA = 20 ng/L (ppt) in surface waters classified as public water supplies. The majority of sites statewide are lower than these standards, as shown by lighter color shades on the maps (Figures 23 & 24).

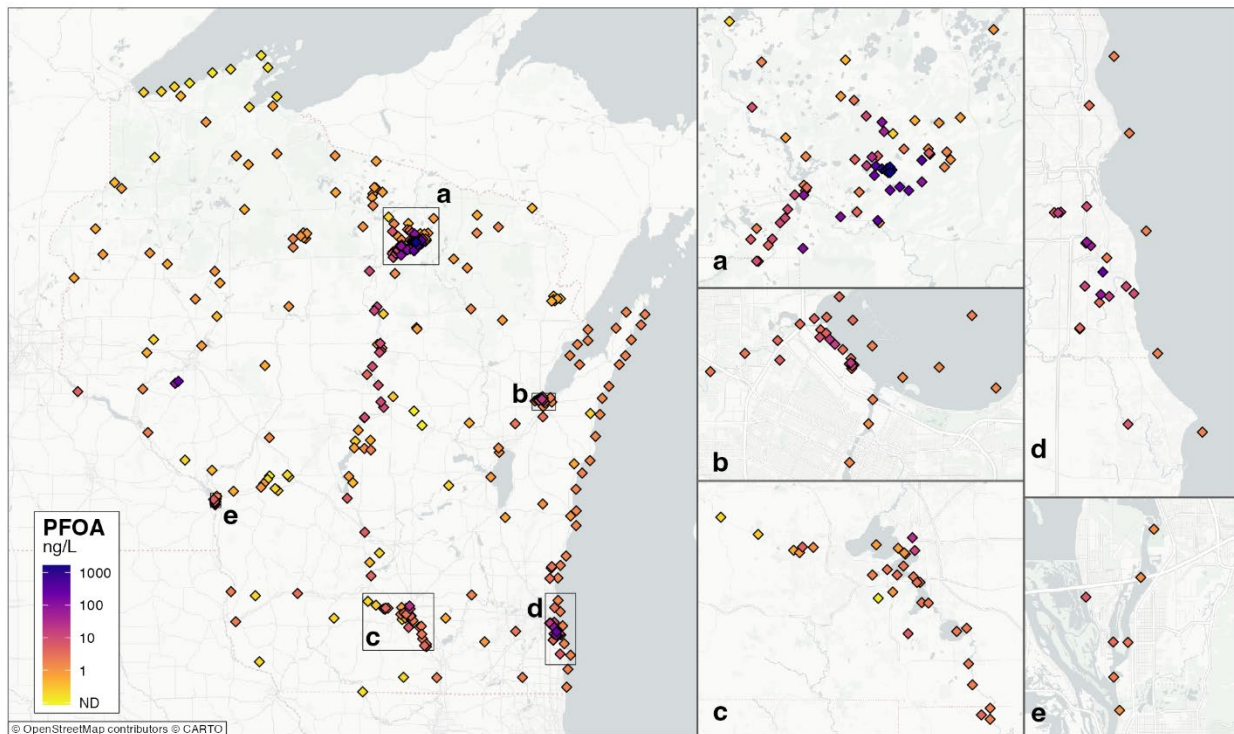


Figure 23. Statewide surface water concentrations of PFOA (ng/L or ppt). More intensive sampling has occurred around the following areas: a) Town of Stella, East of Rhinelander, b) Lower Bay of Green Bay, c) Yahara River chain of lakes in Madison, d) Downtown Milwaukee, and e) Black River and Mississippi River around French Island by La Crosse.

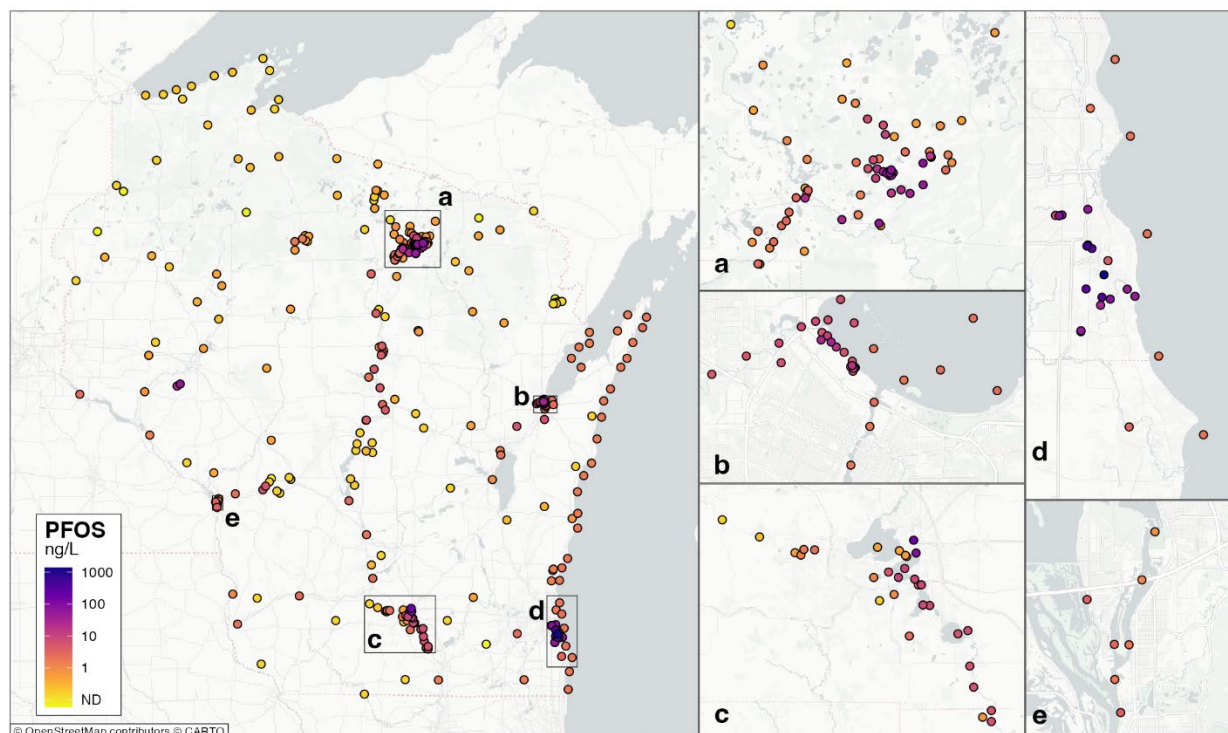


Figure 24. Statewide surface water concentrations of PFOS (ng/L or ppt). More intensive sampling has occurred around the following areas: a) Town of Stella, East of Rhinelander, b) Lower Bay of Green Bay, c) Yahara River chain of lakes in Madison, d) Downtown Milwaukee, and e) Black River and Mississippi River around French Island by La Crosse.



PFAS surface water sample from Fifth Lake which is part of the Moen Chain of Lakes near the Town of Stella. Photo credit: Patrick Gorski

When concentrations of PFOS or PFOA were measured above Wisconsin's surface water standards, follow-up samples were taken to delineate and investigate the extent of the high-PFAS concentration areas. This has been done in several areas of the state, such as the Town of Stella (Figures 23a & 24a), the Bay of Green Bay (Figures 23b & 24b), the Yahara River chain of lakes in Madison (Figures 23c & 24c), downtown Milwaukee (Figures 23d & 24d), and around French Island in La Crosse (Figures 23e & 24e).

In the Town of Stella, high-PFAS surface water concentrations were found to be mostly in Snowden Lake, Sunset Lake, the Moen Chain of Lakes and the North Branch of the Pelican River. In general, the highest PFAS levels are in waterbodies adjacent to agricultural fields in the Town of Stella. Snowden Lake has the highest PFOA concentrations in the state which are consistently > 1,000 ng/L PFOA. These surface water results have motivated the DNR Drinking and Groundwater Program to expand new private wells sampling in the area and the Fish Wildlife and Parks Program to discover high levels in sport fish and deer in the area. Several of the lakes and streams in the area

are new additions to the 2026 Impaired Waters List due to high levels of PFAS compounds in fish tissue or surface water.

For the Bay of Green Bay, highest levels were along the southernmost shoreline and there were also high levels of PFAS found in ducks in this area. As for Madison, it was discovered that Starkweather Creek, originating from the Dane County Airport/Truax Field, had the highest PFAS concentrations, and these elevated concentrations were traced into Lake Monona, down the Yahara River, and into the Rock River. Fish have subsequently been sampled from the Yahara Chain of lakes and fish consumption advisories have been issued. In Milwaukee, the highest PFAS levels are in small creeks nearest to Milwaukee Mitchell Airport, such as Wilson Park Creek and Oak Creek, that do not support major fish populations. The creeks near Mitchell have had the highest PFOS concentrations in the state, often > 500 ng/L PFOS. Off-shore concentrations of PFAS in Lake Michigan are detectable, but low. As for French Island, although there is groundwater contamination of PFAS in private wells, elevated PFAS concentrations from groundwater are not found in the surface water (Black River and Mississippi River) surrounding the island, or in their fish.

Besides PFOS and PFOA, the relative percentage of all PFAS in a sample can be used to characterize the source of PFAS contamination at a site, also known as source-tracking (Charbonnet et al., 2021). Different areas of WI have shown distinctive compositions of PFAS (Figure 25). Starkweather Creek (Figure 25a) typifies an area contaminated by Aqueous Film Forming Foam (AFFF) used to fight fires (Houtz et al. 2013). AFFF is mostly comprised of longer-chain perfluoroalkyl sulfonic acids (PFSA), such as PFOS, which are shown in red and yellow-orange colors. This composition of PFAS, or 'PFAS signature,' has also been found in streams around Milwaukee Mitchell Airport and Silver Creek, which is an outflow of the Volk Field Air National Guard Base. The Town of Stella (Figure 25b) typifies an area where PFAS is mostly comprised of perfluoroalkyl carboxylic acids (PFCAs), such as PFOA, shown in blues and purple. This area was contaminated by industrial paper plant sludge that was land-spread by paper companies, which have since been named as responsible parties (DNR BRRTS on the Web, BRRTS No. 02-44-591257). Samples taken from the National Lakes Assessment (NLA, Figure 25c) were mostly short-chain PFCAs, including PFBA. PFBA is a four-carbon compound that is highly mobile in the environment and has been detected at relatively high concentrations in rainwater (Pfortenauer et al., 2022). Because the 25 NLA lakes in this sampling effort

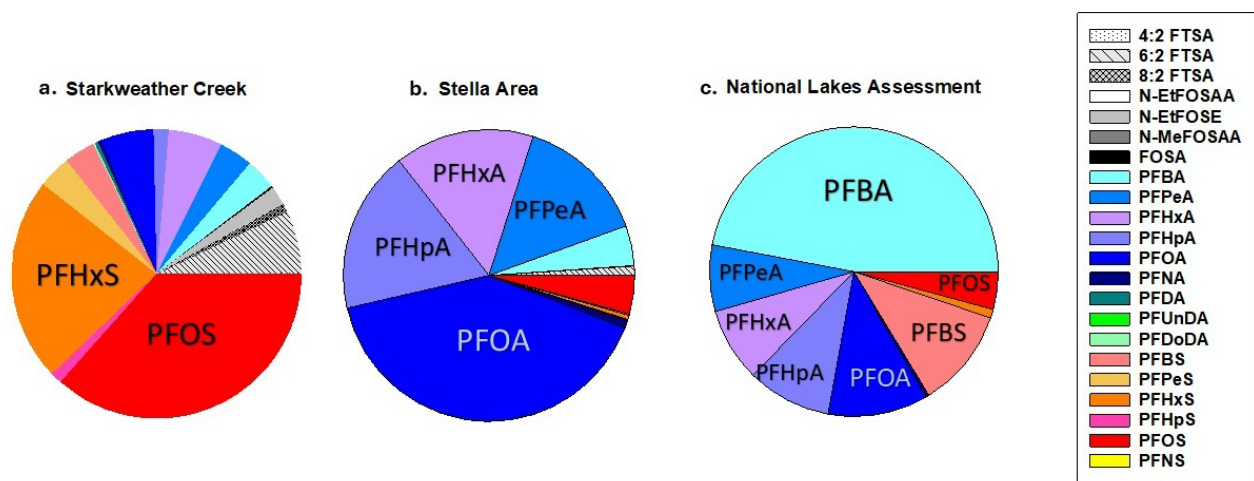


Figure 25. The relative percent of PFAS in representative areas or studies in WI. These are not concentrations, but proportions. All PFAS detected are listed on the right, with most PFAS listed in increasing carbon chain length. The perfluoroalkyl carboxylic acids (PFCAs) are in shades of blue or green with darker shades having a longer carbon chain (PFBA to PFDODA). The perfluoroalkyl sulfonic acids (PFSAs) are in shades of red or yellow with darker shades having a longer carbon chain (PFBS to PFNS). Starkweather Creek (a) is mostly PFSAs, like PFOS and PFHxS. The town of Stella Area (b) is dominated by the perfluoroalkyl carboxylic acids (PFCAs) such as PFOA. Samples from the National Lakes Assessment (c) were mostly PFBA.

were randomly selected across the state and are not located near any known PFAS contamination sources, atmospheric deposition through rainfall is believed to be the primary source of PFBA in these lakes.

EPA Monitoring Initiative grant dollars were used to assess the distribution of PFAS in the water column of a lake to verify our surface water monitoring methodology of PFAS. Multiple samples were taken during summer stratification of a eutrophic lake, Lake Monona, including a surface water “grab” sample and sequential samples deeper in the water column via special equipment (see photo). While many of the physical and chemical parameters varied greatly from top to bottom of the lake, the concentrations of PFOA and PFOS were relatively consistent across these depths. Not shown are the other PFAS measured that also had consistent concentrations top to bottom of the lake. Based on these findings (Gorski, 2025), we concluded that a surface water grab sample has similar PFAS concentrations to the water column concentrations below it, justifying our approach of taking surface water grab samples to monitor waterbodies as a whole.

To develop a simplified approach to predicting PFOS concentrations in fish tissue, we compiled PFOS concentrations from three different states where sites had both surface water and fish tissue samples (Williams et al., in review, Figure 26).

Using 3,831 paired fish–water samples from 185 sites in Colorado, Minnesota, and Wisconsin (2006–2023), we showed that routine surfacewater monitoring reliably predicts PFOS concentrations in edible fish fillets. Average PFOS in fish tissue, regardless of species, scaled log-linearly with surface water PFOS ($R^2 = 0.57$) ($p < 0.001$). Adding fish taxonomy modestly improves fit ($R^2 = 0.70$) while fish length, feeding guilds, and habitat preferences contribute little compared with water concentration. Since these two parameters are significantly correlated, we propose that surface water PFOS concentrations are practical, defensible proxies for fish tissue PFOS concentrations that could reduce costs, limit fish mortality, and enable timely, consistent advisories.



Sampling the vertical water column of Lake Monona during PFAS study. Photo credit: Patrick Gorski

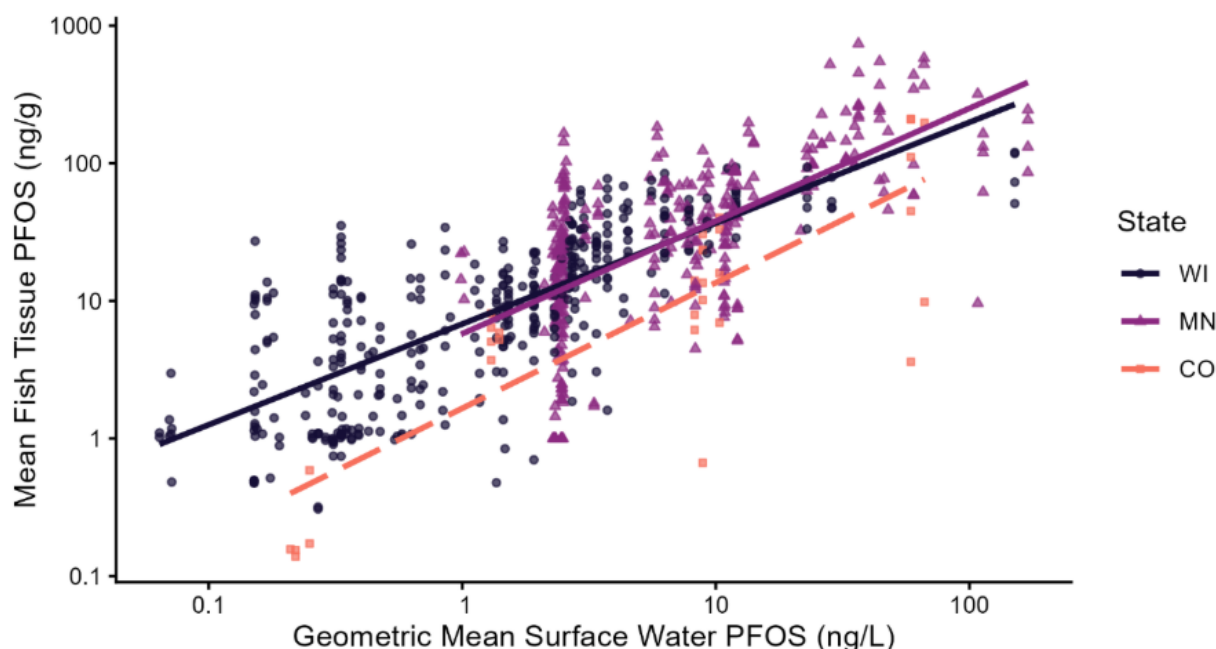


Figure 26. A scatterplot of the mean surface water PFOS concentration by mean species-specific fish tissue PFOS concentration from three different states: Wisconsin (WI), Minnesota (MN) and Colorado (CO). Lines represent linear regression estimates for each state with the dashed line indicating a statistically different y-intercept for CO assessed through ANCOVA. Williams et al., in review.

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Pesticide Use in Wisconsin

Over ten thousand pesticides products are registered for use in Wisconsin and are applied extensively in agricultural and urban landscapes to manage pests and plant pathogens ([DATCP2024](#)). The large quantities and often indiscriminate use of pesticides has raised concerns about widespread environmental contamination due to the mobility of pesticides and the impacts on non-target organisms. Data gaps limit the understanding of the environmental fate and effects of pesticides (as individual compounds or in mixtures) on aquatic and terrestrial animals, necessitating research and monitoring to elucidate the magnitude of the problem and inform management decisions.

Pesticides Monitoring in Wisconsin's Inland Streams

Through processes like runoff, leaching, aerial drift, and volatilization, pesticides often spread far beyond their intended treatment areas and may persist and accumulate in aquatic or terrestrial environments over time due to repeated applications. A recent statewide random sample of Wisconsin streams and rivers revealed that pesticides were detected at all sites, including stream samples taken in the forested north. The fewest number of pesticides detected at a site was 9; the average was 28; and the highest was 89. In total, 135 different pesticides were identified during this survey (Figure 27).¹ While corn and soybean production accounts for the highest pesticide use in the state given the millions of acres of grain crops grown, vegetable production has higher application rates of pesticides, particularly insecticides, that are generally more toxic to aquatic life than herbicides and fungicides. Samples from streams in urban areas also indicate the concentrated use of insecticides, plausibly because of pest control applications for structures and green spaces.

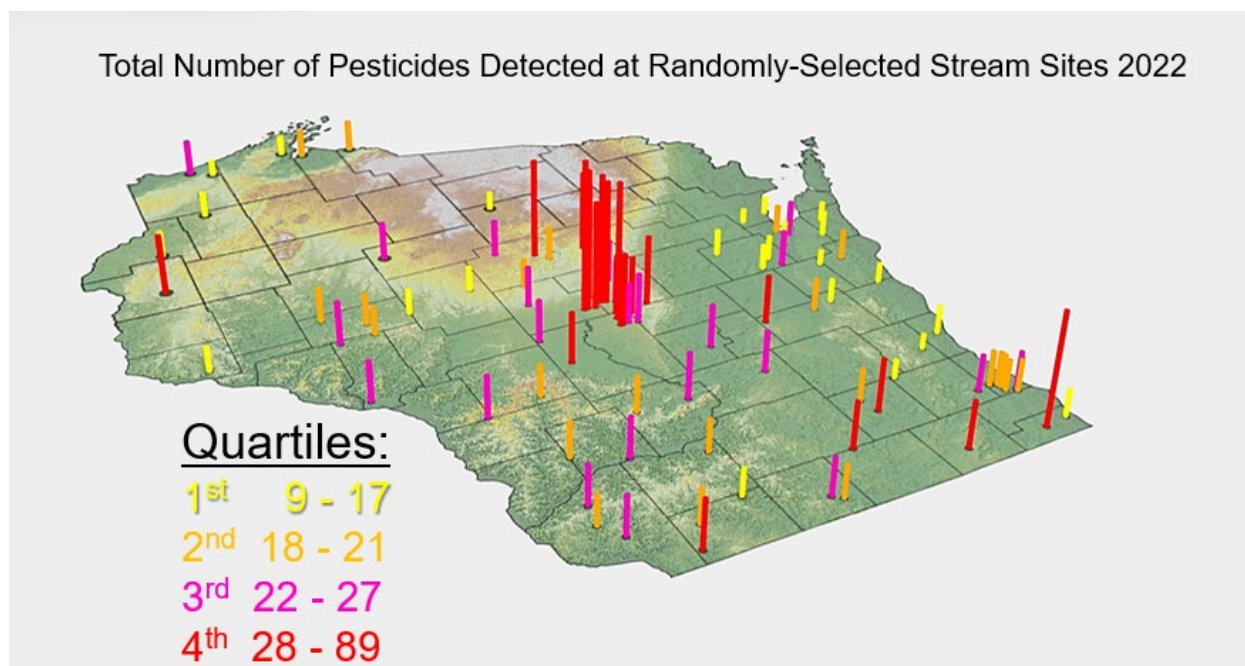


Figure 27. Number of pesticides detected in randomly selected stream sites displayed by quartiles.

¹ Data referenced in this report are provisional and further analyses and reporting of this research is forthcoming. Data can be made available upon request to the DNR Water Quality Program Monitoring Section.

Neonicotinoid Insecticides

Neonicotinoids, or “neonics”, are a class of insecticides used to control pests in both agriculture and urban settings. They first became available commercially in the early 1990s and are now the most widely used insecticides in Wisconsin and worldwide. They are synthetic derivatives of nicotine, which some plants, such as tobacco and potatoes, produce to repel insect pests. Neonics are applied in various ways, such as foliar sprays, granular forms, root drenches, and topical treatments for pets and livestock. However, about 90% of neonics used in Wisconsin and worldwide are applied as coatings to crop seeds like corn and soybeans before planting. Several studies indicate limited effectiveness of seed coatings at increasing crop yields (Grout et al. 2020, Grout 2020) and cite evidence of transport of neonics to unintended ecological reservoirs like soil, waterbodies, and biota (Krupke and Tooker, 2020; Krupke 2020).

Neonics have demonstrated toxicity to invertebrates at low concentrations. Toxicity reference values are measured in parts per trillion for some neonics, raising a concern for the ecological health of surface waterbodies. The number of scientific studies conducted in the U.S. and elsewhere reporting significant environmental contamination by neonics is increasing rapidly. A limited number of studies have been conducted on Wisconsin streams, rivers, and groundwater by the USGS, the Wisconsin Department of Agriculture, Trade and Consumer Protection, state universities, and the department¹ showing neonic contamination of surface and groundwater. As with other pesticides, agricultural and urban land use strongly influences the spatial extent and severity of neonicotinoid contamination.

Pesticide and Sentinel Bioindicators on the Mississippi River

Burrowing mayflies (*Hexagenia* spp.) are sentinel bioindicator species that play a critical ecological role in the Mississippi River, providing trillions of calories annually for fish, birds, and other wildlife. Recent observations (including hatch strength estimates derived from weather radar, benthic invertebrate surveys, and public reports) suggest widespread and substantial population declines over the past 15–20 years. During this same period,

several ecosystem drivers have shifted, including increasing river discharge, changes in habitat conditions, and evolving pesticide use patterns. A growing body of scientific literature has established links between rising concentrations of current-use pesticides in surface water and sediment and declines in aquatic invertebrate populations. Consequently, monitoring pesticide concentrations in both surface water and sediment is essential to ensure that ecological and toxicological thresholds are not being exceeded.

Recognizing the ecological importance of burrowing mayflies in the Mississippi River ecosystem, department staff initiated pesticide monitoring in 2021 to establish baseline concentrations in surface water and sediment. During 2021 and 2022, water samples were collected for a broad suite of pesticides at ten major Wisconsin tributaries to the Mississippi River as well as at the ten Mississippi River Lock and Dam locations along Wisconsin border waters. This monitoring revealed complex mixtures of pesticides occurring across sites, with concentrations varying widely depending on location. This is a relevant finding given the growing body of scientific evidence indicating that mixtures of pesticides in surface water and sediments can produce additive, and in some cases synergistic,



Figure 28. Upper Mississippi River Restoration – Long Term Resource Monitoring: six study pools with field stations

ecological effects (Barata et al., 2006; Cedergreen 2014; Maloney et al., 2017; Maloney et al., 2018; Macaulay et al., 2021; Schmidt et al., 2022).

Beginning in 2023, the department partnered with the Upper Mississippi River Restoration- Long Term Resource Monitoring (LTRM) program to conduct a paired study examining pesticide contamination in surface water, sediment, and burrowing mayfly tissue. The LTRM program operates six field stations (five on the Mississippi River and one on the Illinois River) that collect long-term water quality and biological data (Figure 28).

Results from this expanded effort continued to show complex mixtures of pesticides in both surface water and river sediments (Figure 29). Additionally, numerous pesticide compounds were detected in burrowing mayfly tissue collected from the Mississippi and Illinois Rivers. Neonicotinoid insecticides, specifically clothianidin and imidacloprid, were frequently detected in tissue samples. In 2023, clothianidin was detected in 100% of burrowing mayfly tissue samples, while imidacloprid was detected in 59% of samples.²

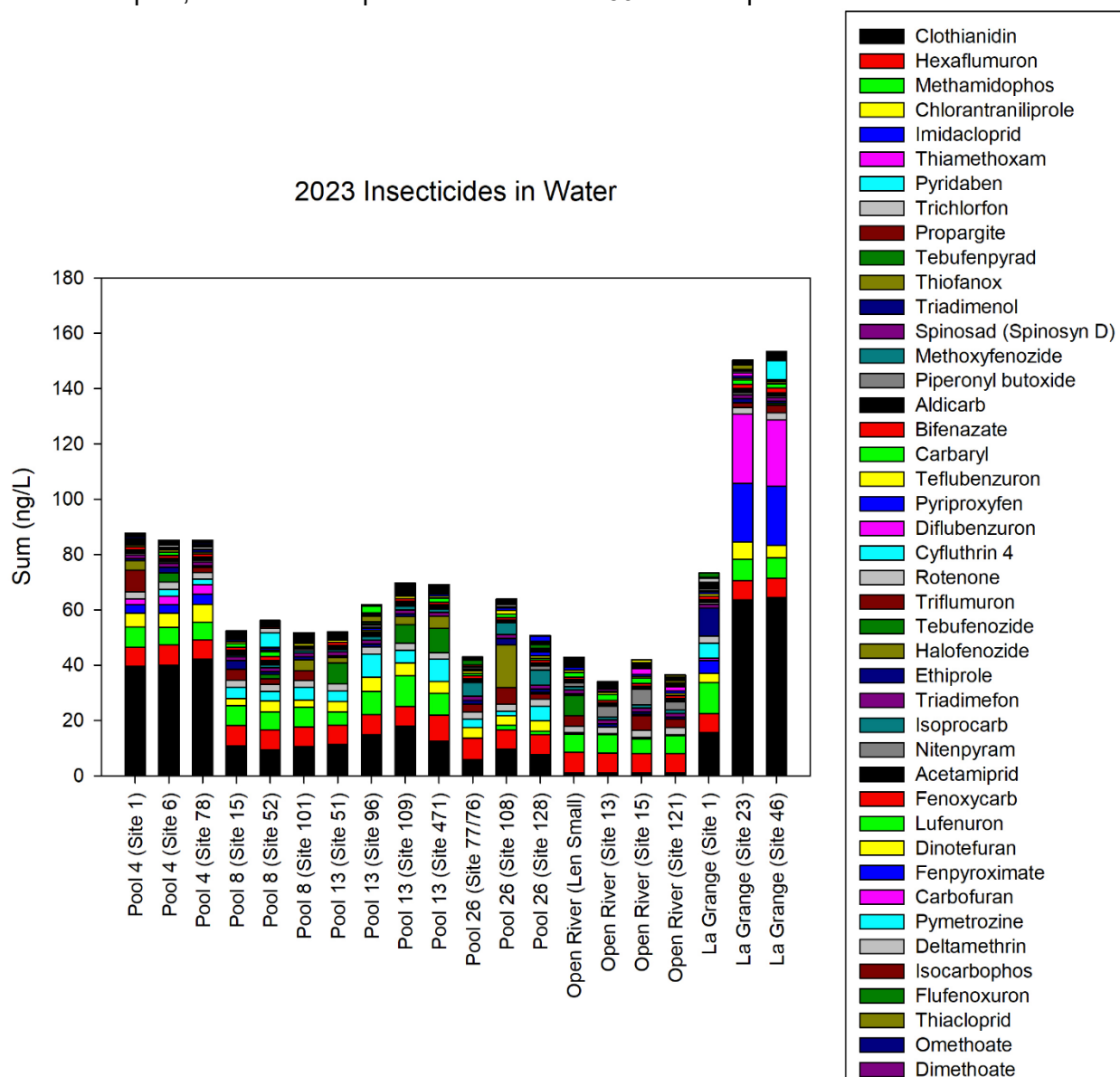


Figure 29. Insecticides (n=44) in surface water samples from the Long-Term Resource Monitoring sampling pools during May-June 2023.

² Data referenced in this report are provisional and further analyses and reporting of this research are forthcoming. Data can be made available upon request to the Office of Great Waters Mississippi River Unit.

Bifenthrin in Sediment

Another noteworthy finding involves elevated concentrations of the insecticide bifenthrin. Bifenthrin is a synthetic pyrethroid insecticide that is hydrophobic and strongly binds to sediment. Burrowing mayflies inhabit U-shaped burrows in soft sediments of the Mississippi and Illinois Rivers, making sediment contamination a direct and ecologically relevant exposure pathway for these organisms and other benthic invertebrates. Numerous recent studies identify bifenthrin as posing substantial risk to benthic invertebrate communities and as a potential limiting factor for their populations (Moran et al., 2017; Nowell et al., 2024; Rogers et al., 2016).

Initial monitoring results have revealed frequent exceedances of published toxicological reference values. Sediment surveys conducted in 2024 and 2025 within Mississippi River border waters identified repeated exceedances of the 10-day median lethal concentration for 50 percent of the test organism *Hyalella azteca* (LC50; Amweg et al., 2005). At some sites, bifenthrin concentrations exceeded the Amweg et al. (2005) LC50 by more than fivefold (>5 toxicity units), with many sites greater than 2 toxicity units (Figure 30).²

These findings are particularly noteworthy given the documented decline in burrowing mayfly populations in the Mississippi River over the past 15–20 years. During the same timeframe, the use of bifenthrin has increased substantially, further highlighting the need for continued monitoring and evaluation of pesticide exposures within the river system.

2024 Mississippi River Sediment Data

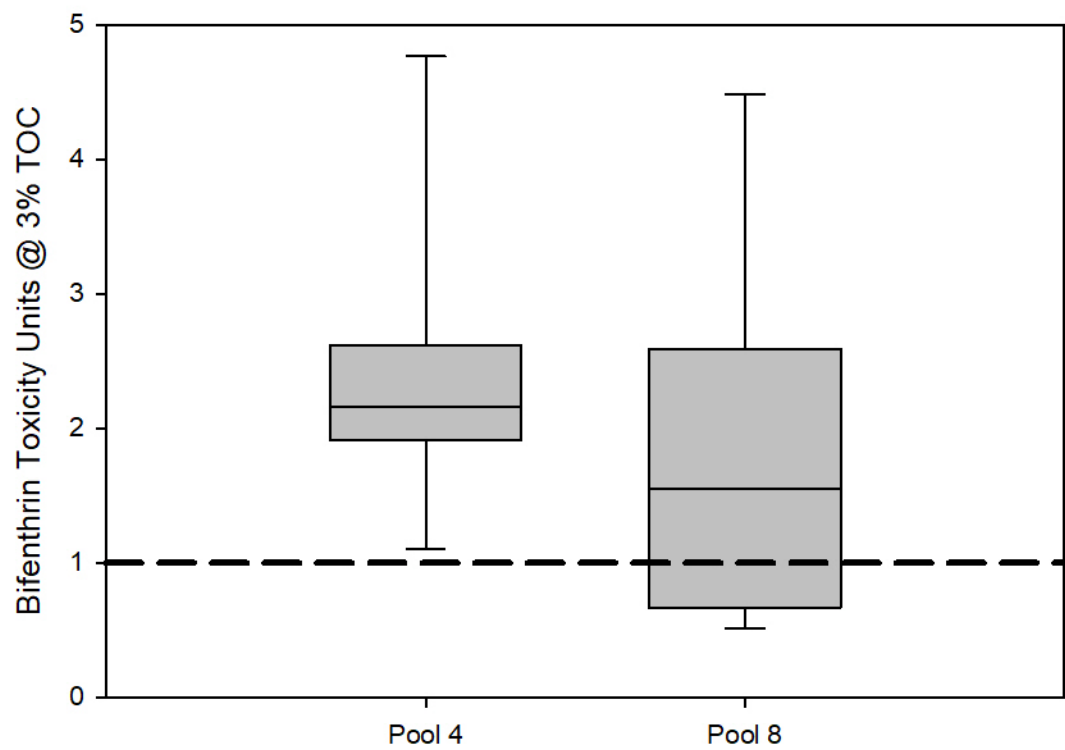


Figure 30. Sediment bifenthrin concentrations in 2024 from Pool 4 (near Alma, WI) and Pool 8 (near La Crosse, WI) of the Mississippi River. Toxicity units were calculated from Amweg et al. 2005 by estimating sediment total organic carbon (TOC) at 3%. The dashed line represents 1 toxicity unit (average 10-day median lethal concentration for 50 percent (LC50) of *Hyalella azteca*) reported from Amweg et al. 2005. The boxplots represent the 10th, 25th, 50th, 75th, and 90th percentiles.

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Water Quality Standards (WQS)

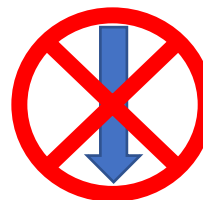
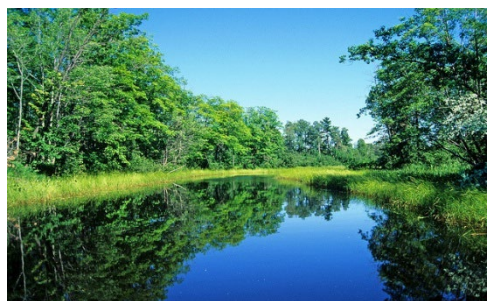
The DNR strives to update components of its water quality standards on an ongoing basis. Updates and a list of WQS that have been established or revised in recent years are available on the [Surface Water Quality Rule Update](#) webpage.

Triennial Standards Review

The Wisconsin DNR initiated its Triennial Standards Review (TSR) in May of 2024 and the final 2025-2027 workplan was accepted by EPA in July 2025. In addition to public noticing the required public comment period, DNR staff conducted direct outreach to all federally recognized Tribes in the state, requesting comments on the TSR workplan. The DNR received several comment letters, some citing 40 CFR 131.20, otherwise known as the Tribal Reserved Rights Rule, that discusses “tribal reserved rights” as they relate to clean water dependent resources and associated treaty rights. The Tribal Reserved Rights Rule ensured that states consider the use and values of their waters for protecting the Tribal reserved rights in adopting or revising water quality standards. Although the Tribal Reserved Rights Rule is no longer being defended by EPA, DNR continues to use the framework for the consideration of water quality standards revisions that may impact the reserved rights of Tribes in Wisconsin.

Based on comments received through the external engagement process, including an assertion of Tribal Reserved Rights for wild rice protection and water quality standards protective of subsistence fish consumption by the Great Lakes Indian Fish and Wildlife Commission representing 11 Ojibwe Tribes, DNR adjusted and [finalized its TSR workplan](#). These top priorities were identified for water quality standards revision and development:

Antidegradation Policy and Implementation Procedures: During this cycle, DNR finalized updates to the administrative codes containing Wisconsin’s Antidegradation policy and implementation procedures. The updated regulations were promulgated in January 2026 with a delayed effective date of July 1, 2026. Antidegradation policy and procedures are required elements of the Clean Water Act, with the goal of protecting state waters from degradation over time. The updates were necessary for consistency with revisions to federal antidegradation regulations that were enacted in 2015. Along with updating the state’s existing antidegradation policy and the implementation procedures for wastewater individual permits, the updated code establishes new implementation procedures for storm water individual discharge permits, and general permits for both wastewater and storm water.



Images depicting what may happen to a waterbody if antidegradation policies are not in place.

Additionally, work is underway to create antidegradation implementation guidance. There will be opportunities for stakeholder input including a dedicated public comment period. It is estimated the guidance will be finalized close to the July 1st effective date.

Designated Use Structure/Process Revisions: DNR has initiated a scoping process to consider establishing two new designated use categories: one for waterbodies used for subsistence fishing, and one for waterbodies that support wild rice populations.

Human Health Criteria Revision/Development: DNR has initiated a scoping process to update Wisconsin's toxics criteria to be consistent with federal revisions enacted in 2015. In a related effort, DNR has continued to partner with other state, tribal, and federal agencies to explore fish consumption rates for populations that practice subsistence fishing and may accordingly establish more protective toxics criteria for those waterbodies.

Biological Thresholds for Streams and Rivers: Data gathering for this work remains ongoing.

Other Work in Progress

- DNR partnered with U.S. EPA and TetraTech through the federal Nutrient Scientific Technical Exchange Partnership & Support program, which provides technical assistance to states and tribes to help them work towards development of numeric nutrient criteria. The team conducted exploratory analysis on DNR's data related to nitrogen and eutrophication, with two focal areas: the relationship of total nitrogen to chlorophyll-a in Wisconsin's large rivers, and application of U.S. EPA's Lake Nutrient Models to Wisconsin's lake data for total nitrogen, chlorophyll-a, and related factors.
- Additionally, the DNR has initiated further work on PFAS. In 2022, water quality criteria were promulgated for surface waters for two toxic chemicals commonly known as PFOS and PFOA. Since that time, the Drinking Water and Groundwater program has also initiated related standards for PFAS in drinking water and groundwater, which are currently in the rulemaking process.
- Pesticides Monitoring including Neonicotinoid Pesticides: DNR is partnering with the Wisconsin Department of Agriculture Trade and Consumer Protection (DATCP) for pesticide monitoring in surface water. Exceedances of chronic aquatic life benchmarks for two neonicotinoid pesticides, imidacloprid and clothianidin, were found at multiple locations statewide using a pesticides screening method at the DATCP laboratory. Method development for testing neonicotinoid and other select pesticide compounds at lower limits of quantification and in additional matrices like sediment, soil, and plant/animal tissue, is underway at the Wisconsin State Laboratory of Hygiene.



FINANCIAL ASSISTANCE TO MEET WATER QUALITY GOALS

Lower Peshtigo River

Environmental Improvement Fund (EIF)

Wisconsin's Environmental Improvement Fund (EIF) consists of two separate financial assistance programs: the Clean Water Fund Program (CWFP) for wastewater treatment and storm water projects, and the Safe Drinking Water Loan Program (SDWLP) for drinking water projects. The programs are administered jointly by the DNR and the Department of Administration. Financial Assistance is provided by purchasing the general obligation or revenue bonds of municipal governments to finance eligible projects; these transactions are referred to as loans in this section of the report and in program informational materials. Funding sources for both programs include annual capitalization grants awarded by EPA, state match to the capitalization grants, and repayments from previous loans. In addition, both the CWFP and SDWLP are leveraged programs.

The EIF is an excellent tool for Wisconsin to meet its responsibilities under both the Clean Water Act (CWA) and the Safe Drinking Water Act (SDWA). EIF programs provide financial assistance to local units of government in the form of subsidized loans and in some cases, principal forgiveness.

Clean Water Fund Program (CWFP)

The CWFP provides financial assistance to municipalities for planning, design, and construction of surface water and groundwater pollution abatement facilities to process wastewater and storm water. Projects typically are constructed to maintain compliance with existing permit limits, but other eligible projects achieve compliance with new limits, or provide wastewater treatment in areas previously not served.

From 1991 through June 30, 2025, the CWFP entered into 1,450 financial assistance agreements with Wisconsin municipalities totaling \$6.5 billion—\$6.1 billion in loans and \$400 million in grants and principal forgiveness. The amount of financial assistance provided for individual CWFP projects ranges from \$18,851 to over \$138 million. To be qualified for CWFP funding, a project must meet eligibility requirements as outlined in [s. 281.58 \(7\) \(b\), Wis. Stats.](#)



The CWFP provides financial assistance to municipalities in the form of loans at or below market interest rates. In addition, principal forgiveness is an additional subsidization that may be provided to disadvantaged municipalities. Repayments of principal and interest from CWFP loans will make up the primary source of funding for future CWFP projects.

Each CWFP project is prioritized using a system established by Wisconsin Administrative Code. The criteria used to evaluate projects are based on human health, regionalization, water quality impacts (based on a facility's discharge permit limit), and the financial need of the municipality served by the project. The priority system assigns a score to every project based on these criteria. Projects are ranked numerically, so in the event funding is not available for all requested projects in a given year, awards will be offered by the order in which they are ranked. Historically, funding each biennium has been sufficient to fund all eligible CWFP projects. However, due to a record-breaking year in the number of applications submitted, the CWFP was not able to fund all application in SFY25 due to loan capacity issues. The state 2025-2027 biennial budget increased the EIF revenue obligation bonding authority by \$732 million, which allowed for a higher loan capacity in SFY26. In SFY26, the CWFP was able to fund all applications, despite another record-breaking year in application submittals.

Safe Drinking Water Loan Program (SDWLP)

The SDWLP was enacted in 1997 to provide financial assistance to municipalities for the planning, design, construction, or modification of public water systems. Project examples include developing a new water source, installing or upgrading treatment facilities, and replacing aging watermain.

From the beginning of the program in 1998 through June 30, 2025, the SDWLP entered into 818 financial assistance agreements with Wisconsin municipalities totaling \$1.5 billion—\$1.2 billion in loans and \$300 million in principal forgiveness. Projects must meet eligibility requirements, as outlined in [s. NR 166.06, Wis. Adm. Code](#), to qualify for SDWLP funding.

In 2016, a subprogram was added to target private lead service line replacements. From December 2016 through June 30, 2025, this program has entered into 236 financial assistance agreements to provide \$143,561,620 of principal forgiveness funding.

The Emerging Contaminants subprogram was added in 2023 that aimed to address PFAS contamination issues in public water systems. This program has entered into 14 financial assistance agreements to provide \$97,938,000 in combined loan and principal forgiveness funding.

The SDWLP provides financial assistance to municipalities in the form of loans below market interest rates. Since 2009 the SDWLP also provides principal forgiveness for a portion of the project costs to qualified municipalities; principal forgiveness methodology is detailed in Wisconsin's annual SDWLP Intended Use Plan.

Each SDWLP project is prioritized using a system established by Wisconsin Administrative Code. The criteria used to evaluate projects include risks to human health from acute and chronic contaminants, system compliance issues, system capacity issues, and financial need, among others.

The priority system assigns a score to every project based on the criteria. Projects are ranked numerically, so in the event funding is not available for all project applicants in a given year, awards will be offered by the order in which the projects are ranked.

Surface Water Grants Program

The surface water grant program provides cost-sharing grants for surface water protection and restoration. Funding is available for education, planning, management plan implementation, and aquatic invasive species prevention and control activities. For the 2025 season the following totals were awarded:

- **Aquatic Invasive Species (total \$4,115,743)**
 - Lake Monitoring and Protection Network: \$960,457
 - Clean Boats Clean Waters: \$911,590
 - AIS Education: \$28,505
 - AIS Prevention: \$152,202
 - AIS Planning: \$569,342



A State Lab of Hygiene employee demonstrates the proper procedure to collect a clean water sample (2020).



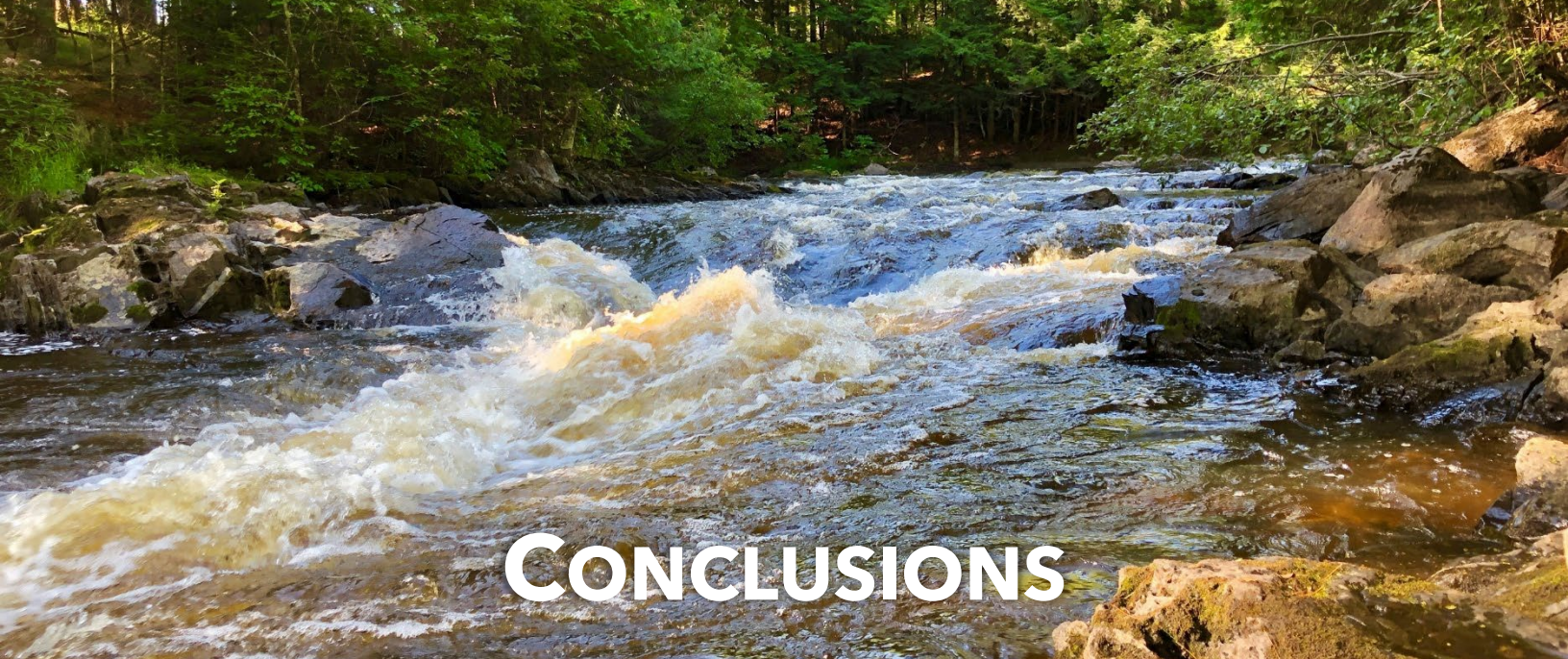
Rice Lake in Barron County. The Rice Lake Protection and Rehabilitation District received a small-scale AIS population control grant.

- AIS Comprehensive Planning: \$0
- AIS Early Detection and Response: \$249,303
- AIS Research & Demonstration: \$169,924
- AIS Large-Scale Population Control: \$569,902
- AIS Small-Scale Population Control: \$504,518
- **Lakes (total \$1,794,253)**
 - Lakes Education: \$33,701
 - County Lakes: \$90,797
 - Comprehensive Planning: \$149,644
 - Lake Planning: \$149,171
 - Lake Land Acquisition: \$0
 - Ordinance Development: \$0
 - Healthy Lakes & Rivers: \$101,000
 - Lake Surface Water Restoration: \$242,928
 - Lake Management Plan Implementation: \$1,027,012
- **Rivers (total \$289,500)**
 - River Education: \$14,475
 - River Planning: \$58,275
 - River Surface Water Restoration: \$116,750
 - River Management Plan Implementation: \$100,000



Additional details can be found on the [Surface Water Grant website](#).

Before (top) and after (bottom) photos of the road/stream crossing on the North Branch Beaver Creek (Marinette Co.) that was completed using Surface Water Grant Funding. Photo credit: Andy Hudak (DNR)



CONCLUSIONS

Popple River, Jennings Falls, Florence County. Luke Ernster 2019

With bountiful water resources, over 5 million residents, and up to 112 million annual visitors, the State of Wisconsin works diligently to protect water quality, biological integrity, and recreation opportunities. The Water Condition Lists are a first step in managing Wisconsin's waters, determining if protection or restoration is required. Monitoring was conducted across the state, resulting in new pollutant listings and delistings. The majority of new listings were based upon high levels of phosphorus and bacteria. There were 16 listing removals for seven different parameters. A total of 137 waters were newly assessed and determined to be on the Waters Attaining Standards List.

Guided by the DNR mission, staff continue to complete critical planning, monitoring, restoration and protection work for the public waters of the state, working across departments and alongside partners and volunteers. In 2024 volunteers gathered water quality data for almost 900 sites (CLMN program) and over 500 stream sites (WAV program). DNR staff collected long-term trend and project data across the state, including starting or completing more than one dozen Targeted Watershed Assessments. This year, DNR staff also initiated an update of Wisconsin's Water Quality Monitoring Strategy to find efficiencies, leverage new technologies, and respond to changing data needs of programs and the public. TMDL staff also made impressive progress: the Fox-Illinois TMDL will be submitted to EPA in fall 2026 and allocations for the Lake Pepin TMDL will be submitted this summer. Two new Adaptive Management plans were approved for the Village of Mount Horeb and City of Waupun, as well as a new water quality trading partnership with the City of Watertown. The Clean Water Fund Program, Safe Drinking Water Load Program, and Surface Water Grants Program continue to directly impact the lives of Wisconsinites by providing financial assistance for pollution abatement, drinking water infrastructure, and surface water protection and restoration.

Taken together, the data and activities reported herein demonstrate Wisconsin's commitment to a future of clean, available water resources for the citizens of the state, present and future.

COMPLEX FIGURE DESCRIPTIONS

Figure 1

Overview: The chart shows the amount of assessment units attaining and not attaining standards for each common parameter type. Fish has the most assessment units of either category, followed by total phosphorus, then macroinvertebrates, then chlorophyll-a, then macrophytes, then chloride, then temperature, then E. coli. All common parameter types have more assessment units attaining standards than not attaining standards.

Data: Fish (1969 assessment units attaining standards, 379 assessment units not attaining standards); Total Phosphorus (1172 attaining, 614 not attaining); Macroinvertebrates (1264 attaining, 130 not attaining); Chlorophyll-a (681 attaining, 184 not attaining); Macrophytes (640 attaining, 184 not attaining); Chloride (721 attaining, 77 not attaining); Temperature (497 attaining, 142 not attaining); E. coli (106 attaining, 95 not attaining).

Figure 2

Overview: The pie chart shows the number of assessment units on each conditions list. The majority of assessment units are on the Attaining Standards List, followed by the Impaired List, and then the In Restoration List.

Data: Attaining (8010 assessment units, 81%); Impaired (1325, 13%); In Restoration (561, 6%).

Figure 3

Overview: There are two, 100% stacked bar charts for four Assessment Unit types (Lakes, Reservoirs, Rivers & Streams, and Impoundments) showing the Assessment Unit Count and Acres of Attaining, In Restoration, and Impaired waterbodies. Together the charts show that while the Assessment Unit Count of Impaired waters is relatively low, Impaired waters acreage is quite high, suggesting that larger waterbodies tend to be Impaired. This is especially true for Lakes, Reservoirs, and Impoundments.

Data: Lakes (Total Assessment Unit Count 3,989 Assessment Units; 90.4% Attaining, 8.3% In Restoration, 1.3% Impaired). Lakes (Total Acreage 924,165 acres; 37.4% Attaining, 18.3% In Restoration, 42.9% Impaired). Reservoirs (Total Assessment Unit Count 304 Assessment Units; 71.1% Attaining, 4.3% In Restoration, 24.7% Impaired.) Reservoirs (Total Acreage 256,105 acres; 13.5% Attaining, 18.2% In Restoration, 68.2% Impaired). Rivers & Streams (Total Assessment Unit Count 5,261 Assessment Units; 69.4% Attaining, 11.5% In Restoration, 19.1% Impaired.) Rivers & Streams (Total Acreage 30,434 acres; 57.3% Attaining, 14.4% In Restoration, 28.3% Impaired). Impoundments (Total Assessment Unit Count 195 Assessment Units; 76.4% Attaining, 2.1% In Restoration, 21.5% Impaired.) Impoundments (Total Acreage 75,691 acres; 35.7% Attaining, 19.2% In Restoration, 45.1% Impaired).

Figure 4

Overview: This is an aerial map of Wisconsin, with its state border outlined in grey. The left border of the map is marked with latitudes, and the bottom boarder is marked with longitudes, both in one-degree increments. Portions of surrounding states and Great Lakes can be seen as well with their borders in grey. Waterbodies that are attaining standards are teal blue in color, including streams, rivers, and lakes. Waterbodies that are not attaining standards are marked in grey. Major cities are also marked on the map in grey. There are a mile scale reference and a north arrow in the bottom right corner of the map.

Figure 5

Overview: The pie chart shows the percentage of each pollutant type that makes up all pollutant listings on the 2026 Impaired Waters List. Nearly half pollutants listings are for Nutrients, followed by Toxics, then Metals, then Degraded Habitat, then Degraded Biology, then Bacteria.

Data: Nutrients (49%); Toxics (15%); Metals (13%); Degraded Habitat (12%); Degraded Biology (6%); Bacteria (5%).

Figure 6

Overview: There are four bar charts for five of the pollutant categories found on the Impaired Waters 2026 List. Each chart is in its own quadrant and has different pollutant types listed that are within the chart's pollutant category. Each pollutant type has a corresponding value for how many times it is listed on the Impaired Waters 2026 List. The Metals category is in the upper left quadrant; the majority of listings are for pollutant type Mercury, followed by Metals, Lead, Zinc, Copper, Cadmium, and finally Arsenic. The Degraded Biology and Bacteria categories are combined on the same bar chart in the upper right quadrant. E. coli has accounts for the majority of Bacteria listings, followed by Fecal Coliform. Degraded Fish/Bugs account for three-quarters of Degraded Biology listings, followed by Degraded Plants. The Degraded Habitat category is in the lower left quadrant; Total Suspended Solids (TSS) has the most listings in this category, followed by Temperature, Biochemical Oxygen Demand (BOD), Degraded Habitat, Low Dissolved Oxygen (DO), Scum/Foam, and finally Flow Modification. The Toxics category is in the lower right quadrant; PCBs has the most listings in the category, followed by Chloride, PFOS, PAHs, Ammonia, Creosote, PFOA, Dioxin, Dieldrin, and DDT.

Data: Metals: Mercury (184 listings); Metals (25); Lead (9); Zinc (7); Copper (2); Cadmium (2); Arsenic (1).

Bacteria: E. coli (91); Fecal Coliform (5).

Degraded Biology: Degraded Fish/Bugs (74); Degraded Plants (28).

Degraded Habitat: TSS (97); Temperature (85); BOD (14); Degraded Habitat (7); Low DO (6); Scum/Foam (2); Flow Modification (1).

Toxics: PCBs (124); Chloride (88); PFOS (41); PAHs (11); Ammonia (9); Creosote (3); PFOA (2); Dioxin (2); Dieldrin (1); DDT (1).

Figure 7

Overview: This is an aerial map of Wisconsin, with its state border outlined in grey. The left border of the map is marked with latitudes, and the bottom boarder is marked with longitudes, both in one-degree increments. Portions of surrounding states and Great Lakes can be seen as well with their borders in grey. Waterbodies that are attaining standards are red in color including streams, rivers, and lakes. Waterbodies that are not impaired are marked in grey. Major cities are also marked on the map in grey. There are a mile scale reference and a north arrow in the bottom right corner of the map.

Figure 8

Overview: This pie chart shows the percentages of types of impairments on the Waters In Restoration List. Total Phosphorus is the most common impairment and makes up about two-thirds of the total. Total Suspended Solids (TSS) is the second most prevalent pollutant, while all others make up less than five percent of the total.

Data: Total phosphorus (66% of impairments); TSS (28%); Fecal Coliform (3%); E.coli (2%); PCBs (1%); Unknown, BOD, and Temperature all <1%.

Figure 9

This is an aerial map of Wisconsin, with its state border outlined in grey. Waterbodies that are on the Waters in Restoration List are colored orange including streams, rivers, and lakes. Waterbodies not on this list are marked in grey. Large portions of the Wisconsin River basin in the middle of the state are colored orange. Much of the Upper Fox-Wolf watershed, those waters draining into Lake Winnebago and ultimately Green Bay are also orange. Many of the streams draining eastward into Lake Michigan are also on the Waters in Restoration List due to the recently completed Northeast Lakeshore TMDL. Much of the rest of the state is completely grey.

Figure 10

Overview: This bar chart shows the total number of new impairment listings and whether they appear on the Waters in Restoration or Impaired Waters Lists. Total phosphorus makes up about 40% of the new listings, while PFOA, *E. coli*, and plants are the next most numerous categories and each make up about 10-15% of the 102 new listings.

Data: Total phosphorus (41 new listings total, 33 are not covered by a TMDL and are added to the Impaired Waters List, 8 are covered by an existing TMDL and added to the Waters in Restoration List); PFOA (15 total, 15 and 0); *E. coli* (16 total, 14 and 2); Plants (14 total, 14 and 0); Temperature (8 total, 8 and 0); Algae (5 total, 5 and 0); Fish/Bugs (3 total, 3 and 0); Chloride (2 total, 2 and 0).

Figure 11

This is an aerial map of Wisconsin with county borders outlined in black and waterbodies with site-specific fish consumption advisories due to Mercury highlighted in blue, PCBs highlighted in green, and PFOS highlighted in yellow. Most larger waterbodies, including the Mississippi River, Wisconsin River, Lake Superior and Lake Michigan have PCB and PFOS site-specific consumption advisories indicated. The majority of Mercury-based site-specific advisories are located in the northern third of the map on inland lakes.

Figure 12

Overview: This bar chart shows the pollutant listings removed in 2026, colored by pollutant category. About half of the 15 total listings removed were impaired due to phosphorus.

Data: Phosphorus (8 listings removed); Temperature (2); Fish/Bugs (2); TSS, Plants, and Algae (1 each).

Figure 13

Overview: This figure shows five maps of Wisconsin, labeled with the years 2021 through 2025, each with the 72 county boundaries outlined. In 2021, a little more than half the counties are in dark blue, indicating participation in that year's Lake Monitoring and Protection Network, and a further third of the counties are filled with light blue, indicating participation in the previous version of the grant program. In 2022 about 60 of the 72 counties are in dark blue, indicating widespread adoption of the LMPN grant program. By 2025 only three counties were not participating in LMPN: Price, Trempealeau, and Pierce.

Figure 14

Overview: This map of Wisconsin shows locations of Water Quality Trading and Adaptive Management projects in 2024. Of the almost 20 Adaptive Management projects, the majority are located in the southern third of the state, especially Dane and Kenosha Counties. The Water Quality Trading projects are also concentrated in the southern third of the state but are more numerous (several dozen) and evenly distributed in that area. Outside

of the southern third, Water Quality Trading also occurs around Fond du Lac, Green Bay, and in West Central Wisconsin.

Figure 15

Overview: This figure shows one central map of Navigation Pools 5-9 of the Upper Mississippi River, and five backwater site maps within this stretch of the river. Water is shown in light grey and surrounding land in white. The central map has sites depicted with black triangles and black lines symbolizing lock and dam structures. From north to south down the river, Probst is the northernmost site, followed by Dam 5, Dam 5A, Gordys site, Johnson site, Dam 6, Second, and Peck site. On each backwater site map, there is an inlet, depicted by a black circle, north of an outlet, depicted by a black cross. The water retention time and backwater depth are listed on each site map.

Data: Water Retention Time and Backwater Depth (Probst, 34.7 days and 0.85 meters; Gordys, 14.3 and 1.82; Johnson, 0.8 and 1.59; Second, 7.0 and 1.31; Wing, 60.7 and 0.59; Peck, 23.7 and 0.78).

Figure 16

Overview: The box plot shows groundwater nitrate + nitrite NO_x (mg/L) concentrations at the Trempealeau Lakes (First, Second, and Third Lakes). Third Lake has two separate box plots for two sampling events. The 50th percentile from all sampling events at lakes are above the Wisconsin Nitrate Drinking Water Standard (10 mg/L). First Lake has the highest median concentration (about 17 mg/L, with 25th and 75th percentiles extending to 14 and 24 mg/L), followed by Third Lake (median and 25th/75th percentiles tightly concentrated around 11-13 mg/L) and then Second Lake (median 11 mg/L, 25th percentile 6 mg/L, 75th percentile 12 mg/L).

Figure 18

This is an aerial map of Wisconsin outlined in grey borders, HUC 6s outlined in dashed grey borders, and large rivers and their labels shown in blue. 57 Fish IBI sample sites are shown in circles. Purple, light purple, tan, orange, and red circles depict sites with Fish IBI Ratings of excellent, good, fair, poor, and very poor, respectively. There is a pop-out map of Spirit River off the Wisconsin River showing two sample sites near each other, one on Spirit River and one on the Wisconsin River. A north arrow and 0-50 mile marker are present in the bottom right corner of the image.

Figure 19

This is an aerial map of Wisconsin outlined in grey borders, HUC 6s outlined in dashed grey borders, and large rivers and their labels shown in blue. 17 Macroinvertebrate IBI sample sites are shown in circles. Purple, light purple, tan, orange, and red circles depict sites with Macroinvertebrate IBI Ratings of excellent, good, fair, poor, and very poor, respectively. A north arrow and 0-50 mile marker are present in the bottom right corner of the image.

Figure 21

This is an aerial map of Wisconsin outlined in black with county boundaries outlined in black. Different color dots on the map indicate aquatic invasive species monitoring, detection, and response efforts by citizen, partners, and the DNR. Red dots indicate AIS Snapshot events, orange indicate Citizen Lake Monitoring Network, yellow indicate Partners, green indicate Water Action Volunteers, blue indicate Department of Natural Resources, and

purple indicate Incident Reports. There is a north arrow in the bottom right of the image. Partners, AIS Snapshot, and Water Action Volunteers are the most prevalent on the map, with AIS being especially present in clusters.

Figure 22

Overview: The chart shows new detections of invasive species in 2024 and 2025. New detection amounts tend to be higher in 2024 than 2025 for most, but not all, invasive species. Purple loosestrife, Phragmites, Eurasian water-milfoil, Curly-leaf pondweed, and Chinese mystery snail have particularly high new detection levels compared to other species.

Data: Banded mystery snail 2024, 6 detections; Banded mystery snail 2025, 6; Bohemian knotweed 2024, 1; Chinese mystery snail 2024, 13; Chinese mystery snail 2025, 14; Corbicula fluminea 2025, 1; Curly-leaf pondweed 2024, 17; Curly-leaf pondweed 2025, 12; Eurasian water-milfoil 2024, 25; Eurasian water-milfoil 2025, 13; European frogbit 2024, 3; European frogbit 2025, 2; Faucet snail 2024, 2; Flowering rush 2024, 5; Flowering rush 2025, 1; Giant hogweed 2024, 1; Giant Knotweed 2024, 3; Hairy willow herb 2024, 1; Hybrid Eurasian 2024, 8; Japanese knotweed 2024, 5; Japanese knotweed 2025, 1; Java Waterdrop 2025, 3; Lesser celandine 2025, 4; New Zealand mudsnail 2024, 4; New Zealand mudsnail 2025, 3; Pennywort 2024, 1; Phragmites (non-native) 2024, 16; Phragmites (non-native) 2025, 7; Purple loosestrife 2024, 31; Purple loosestrife 2025, 4; Quagga mussel 2024, 1; Round goby 2024, 1; Rusty crayfish 2024, 4; Rusty crayfish 2025, 3; Spiny naiad 2024, 1; Spiny waterflea 2024, 2; Spiny waterflea 2025, 1; Stary stonewort 2024, 6; Stary stonewort 2025, 10; Yellow iris 2024, 6; Yellow iris 2025, 8; Zebra Mussel 2024, 10; Zebra Mussel 2025, 2

Figure 23

An aerial map of Wisconsin on the left with waterbodies shown in light grey. Small diamonds depict surface water concentrations of PFOA around the state with purple diamonds indicating PFOA concentrations of 1000 ng/L, pink indicating 100 ng/L, orange indicating 10 ng/L, and yellow indicating non-detectable levels. On the right, five close-up maps of areas where intensive sampling has occurred (A-E) following the same diamond-coloring system to depict PFOA surface water concentrations. The areas with intensive sampling have more purple and pink diamonds generally than the rest of the state.

Figure 24

An aerial map of Wisconsin on the left with waterbodies shown in light grey. Small circles depict surface water concentrations of PFOA around the state with purple circles indicating PFOS concentrations of 1000 ng/L, pink indicating 100 ng/L, orange indicating 10 ng/L, and yellow indicating non-detectable levels. On the right, five close-up maps of areas where intensive sampling has occurred (A-E) following the same circle-coloring system to depict PFOS surface water concentrations. The areas with intensive sampling have more purple and pink circles generally than the rest of the state.

Figure 25

Overview: Three pie charts showing proportions of different PFAS compounds at three different locations. The Starkweather Creek chart on the left is about one-third PFOS, one-fourth PFHxS, and the rest is comprised of other various compounds. The Stella Area chart in the middle is just under one-half PFOA, one-sixth PFHpA, one-sixth PFHxA, one-sixth PFPeA, with the rest being comprised of other compounds. The National Lakes Assessment on the right is about one-half PFBA, one-eighth PFOA, one-eighth PFBS, one-twelfth PFPeA, one-twelfth PFHxA, one-twelfth PFHpA, with a relatively small remainder comprising of PFOS and PFHxS.

Figure 27

This is a map of Wisconsin shown at an angle with lines coming vertically up and out of the state in a 3-D view. Each line comes out of a randomly selected stream site in 2022, with taller lines indicating a higher number of total pesticides detected. Lines are also colored differently depending on their quartile. Yellow lines indicate the number of total pesticides detected is in the 1st Quartile (9-17 pesticides detected from these sites), orange lines indicate the total number is in the 2nd Quartile (18-21 pesticides detected from these sites), pink lines indicate the total number is in the 3rd Quartile (22-27 pesticides detected from these sites) and red lines indicate the total number is in the 4th Quartile (28-89 pesticides detected from these sites). There is a larger cluster of tall, red, 4th Quartile lines in the central part of the state, with other lines types being relatively evenly distributed around the state.

Figure 28

A map of Minnesota, Wisconsin, Iowa, Illinois, and Missouri with states outlined in black and the Mississippi and Illinois Rivers shown in blue. Study pools on the rivers are shown in red periodically. From north to south, Pools 4, 8, 13, and 26 are labeled on the Mississippi River, and La Grange Pool is labeled on the Illinois River. One location titled UMESC is shown by a black dot the north end of Pool 8 along the southern Minnesota-Wisconsin boarder.

Figure 29

Overview: A stacked bar chart showing the sum (ng/L) of different neonicotinoids at different sample sites. Results from five different Pools and one Open River sample set are shown, with three-to-four sites sampled from each Pool. Clothianidin and imidacloprid were frequently detected in tissue samples. Site 23 and 26 from La Grange have significantly higher sums— between 140-160 ng/L— than other sites, which range between 30-90 ng/L.

Details on stacked bars, left to right: Pool 4 includes three sites. Total pesticides at each site were around 82 ng/L, with Clothianidin making up about half of each sample. Pool 8 has three sites with total pesticides between 50 and 55 ng/L. Four sites are located in Pool 13, and concentrations of all pesticides ranged from 50 – 65 ng/L. Pool 26 includes three sites, with pesticide concentrations ranging from about 40 – 65 ng/L. The four Open River sites had the lowest concentrations shown on the chart, from about 35 – 45 ng/L. At Pools 8, 13, 26 and the Open River sites no single pesticide made up more than one quarter of the total sample. The final three sites are at La Grange, with two of the three having the highest pesticide concentrations of all sites by far (140-160 ng/L), as mentioned above.

Figure 30

Overview: This is a box plot of 2024 Mississippi River Sediment Data showing Bifenthrin Toxicity Units at 3% Total Organic Carbon (TOC) from Pools 4 and 8 of the Mississippi River. There is a dashed line at 1 toxicity unit and boxes show 10th, 25th, 50th, 75th, and 90th percentiles. All percentiles from Pool 4 are above the dashed line. For Pool 8, the 10th and 25th percentiles are below the dashed line, and the 50th, 5th, and 90th percentiles are above the dashed line. The 90th percentile for both Pools hovers between 4 and 5 toxicity units and the 75th between 2 and 3 units. For Pool 4, the 50th and 25th percentiles hover around 2 toxicity units, and the 10th percentile just above 1 toxicity unit. For Pool 8, the 50th percentile hovers between 1 and 2 toxicity units and the 25th and 10th percentiles sit between 0 and 1 toxicity units.