

Wisconsin's 2022 Water Quality Report to Congress

Executive Summary



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Authors and contributors

Tim Asplund, Jim Amrhein, Brian Austin, Kendra Axness, Ashley Beranek, Luke Beringer, Dave Bolha, Katy Bradford, Camille Bruhn, Heidi Bunk, Matt Clauncherty, Jacob Dickmann, Donalea Dinsmore, Mary Gansberg, Melissa Gibson, Kevin Gauthier, Shawn Giblin, Mark Hazuga, Emily Heald, Katie Hein, Craig Helker, Andy Hudak, Ted Johnson, Kevin Kirsch, Jon Kleist, Jim Klosiewski, Jim Killian, Lisa Kosmond, Jim Kreitlow, Kim Kuber, Jim Lemke, Jodi Lepsch, Madeline Magee, Kristi Minahan, Brenda Nordin, Patrick Oldenburg, Randal Piette, Emily Punke, Kristen Rathbun, Mark Riedel, Craig Roesler, Rachel Sabre, Mike Shupryt, Paul Skawinski, Alex Smith, Mike Sorge, Casey Sweeney, Susan Tesarik, Pam Toshner, Scott Van Egeren, and all Water Quality Biologists, Water Resources Specialists, and Water Program Managers. All photos courtesy of Wisconsin DNR unless otherwise credited.

Previous reports were published in 2020, 2018, 2016, 2014, 2012 (online only), 2010, 2008 (data submittal only), 2006, 2004, 2002, 2000, 1996, 1994, 1992, 1990, 1988, 1987, and earlier. WDNR's earlier documents, prior to 2000, are available for review at the GEF II building, 101 S. Webster Street, Madison. Later versions are available electronically.



Cover photo: *Wave Battered Shores*
by Adam Smith 2018,
Whitefish Dunes State Park, Lake Michigan

Perseverance and Safety During COVID-19

At the start of the COVID-19 global pandemic state offices closed, staff were sent home and all water resource monitoring activities were suspended. During this time, the WDNR-Water Resources Policy and Management Team formed a COVID-19 workgroup that developed Water Resources and Office of Great Waters return to fieldwork standard operating procedures (SOP) for field season 2020. It was recognized that the priority during this time was staff safety but also that certain monitoring activities could resume.

Prior to resuming monitoring activities, the workgroup defined essential work that could be completed under COVID-19 restrictions. A few activities were identified as either non-essential or unable to be performed under restrictions. COVID restrictions, under the Department's COVID Phase 2 Internal Operating Procedures (IOPs), included restricted travel by multiple individuals in a vehicle, social distancing, wearing a face covering, and disinfection of equipment.

Activities that were suspended in 2020 included:

- Checking or deploying temperature/ dissolved oxygen buoys in lakes
- Fish surveys using tow barges on wadable streams and rivers
- Fish surveys using netting methods on the Mississippi River
- Winter limnology surveys using air boats on the Mississippi River
- Wetland survey site preparations
- Snorkel-Scuba surveys for invasive species, plant management, or mussels
- In-Person training support for volunteers as individuals or small groups

The finalized list of essential work, approved monitoring activities, and SOP's to conduct these activities were not approved until mid-June of 2020. Most approved monitoring activities resumed by mid-July of 2020 across the state. The restrictions to activities for the field season of 2020 were put in place out of extreme caution.

For field season 2021, a review of the SOP was conducted to re-evaluate the ability to resume activities that were suspended in 2020. As Department COVID guidelines shifted, the updated Phase 2-IOP's allowed for activities suspended in 2020 to resume in field season of 2021. The impacts to monitoring activities during the COVID-19 pandemic has been minimized to the extent practicable while exercising extreme caution to protect the health of staff and citizens of the state.



Working with a mask.



Masked outdoor activity with friends.

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Introduction

Wisconsin is a state bountiful with natural resources, including many and varied lakes, streams, wetlands, aquifers, and springs. Every other year, the Wisconsin Department of Natural Resources (WDNR) 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.

The Clean Water Act celebrates 50 years in October 2022!

Key Findings

- 82% of evaluated waters are healthy, by waterbody/assessment unit (AU) count (Figure 3).
- 126 listings on 122 waters were added to the Impaired Waters List and Restoration Waters List.
- Top three newly listed pollutants: phosphorus (49%), bacteria (30%), and PFOS (14%).
- 22 listings were removed; 3 Total Suspended Solids (TSS) listings were removed due to long-term restoration projects.

Wisconsin's Water Quality

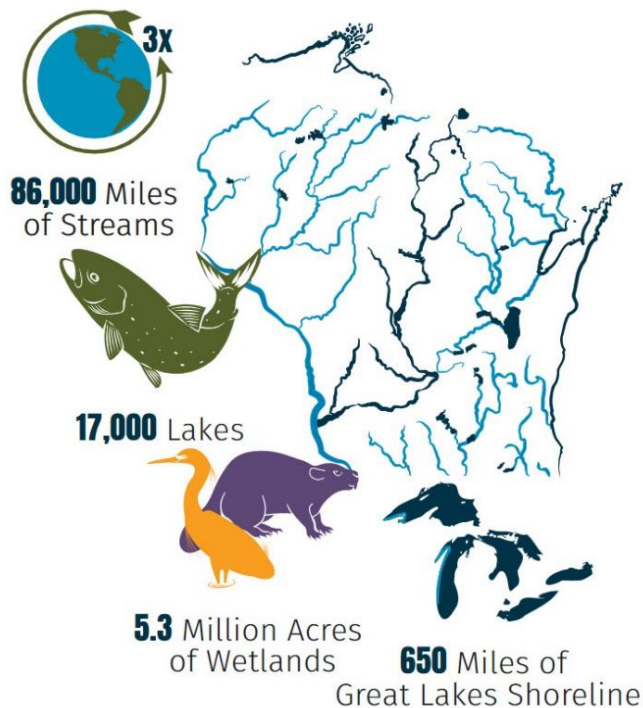
There are over five and a half million people in Wisconsin that share the state's bountiful water resources. Wisconsin has approximately 1.2 million lake and impoundment acres and approximately 88,000 river and stream miles. Despite the abundance of water resources in Wisconsin, many are threatened by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

Data Used for Assessments

Waters were assessed using quality-assured data originating from WDNR's monitoring program, county and state partners, university partners, and the public. All data used for assessment met WDNR's quality assurance requirements and local WDNR staff determined whether available data were representative of a water's condition.

Assessment Methodology

WDNR built upon its 2020 assessment methodology work by creating a revised [Wisconsin Consolidated Assessment and Listing Methodology \(WisCALM\)](#) to conduct assessments in 2022 for determining the attainment of designated uses. The most significant update made to the methodology was incorporating finalized *E. coli* criteria.



Indian Slough Pool 4 Mississippi River

Sara Strassman 2020

Percentage of Waters Assessed

Wisconsin has a large amount of water resources to assess and over time has evaluated at least one metric on 31% of rivers and stream miles and 87% of lake and impoundment acres (Figure 1). While it appears like a low percentage of stream and river miles have been evaluated, it can be seen in the accompanying map that all major rivers and streams across the entire state have been evaluated. Water quality information is available for more waters than are assessed, but minimum data requirements were not met.

There are many lakes, by count, that have not been evaluated; for context, Lake Winnebago accounts for 13% of all lake and impoundment acres. Summaries for lakes are often done by count to avoid any size skew.

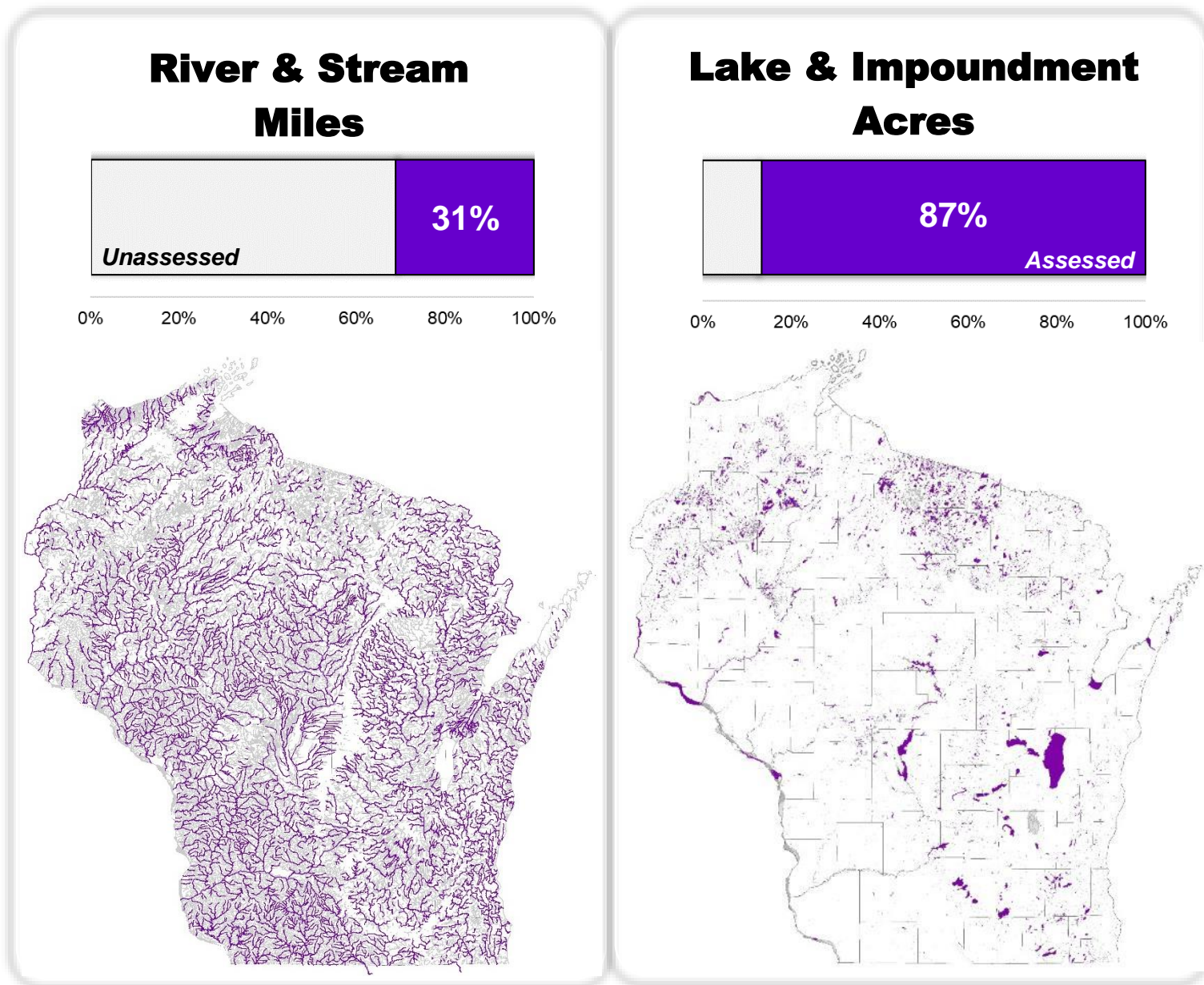


Figure 1. Percentage of waters assessed by size and maps of rivers/streams and lake/impoundments.

Assessed Parameters

Trophic State Index is the single most assessed parameter across the state (*Figure 2*); this is made possible by the combination of multi-year satellite lake image processing and volunteer clarity sampling (secchi and chlorophyll-a). The high percentage of assessed lakes (*Figure 1*) can be in part attributed to general assessments based on TSI. TSI and Aquatic Plants were used for general assessments, not impairment determination.

Combined bioassessments of fish and macroinvertebrate ('bug') communities account for the most evaluated parameters in rivers and streams. The number of AUs with these parameters meeting criteria far outweighs those where they did not meet criteria (*Degraded Biology, Figure 2*).

Total phosphorus is the most evaluated chemical parameter. WDNR released its [Nutrient Reduction Strategy](#) in 2013 and the numeric water quality criteria for assessments were established in 2010. The combination of focus and benchmarks allowed for many AUs to be evaluated for phosphorus, with about half not meeting criteria.

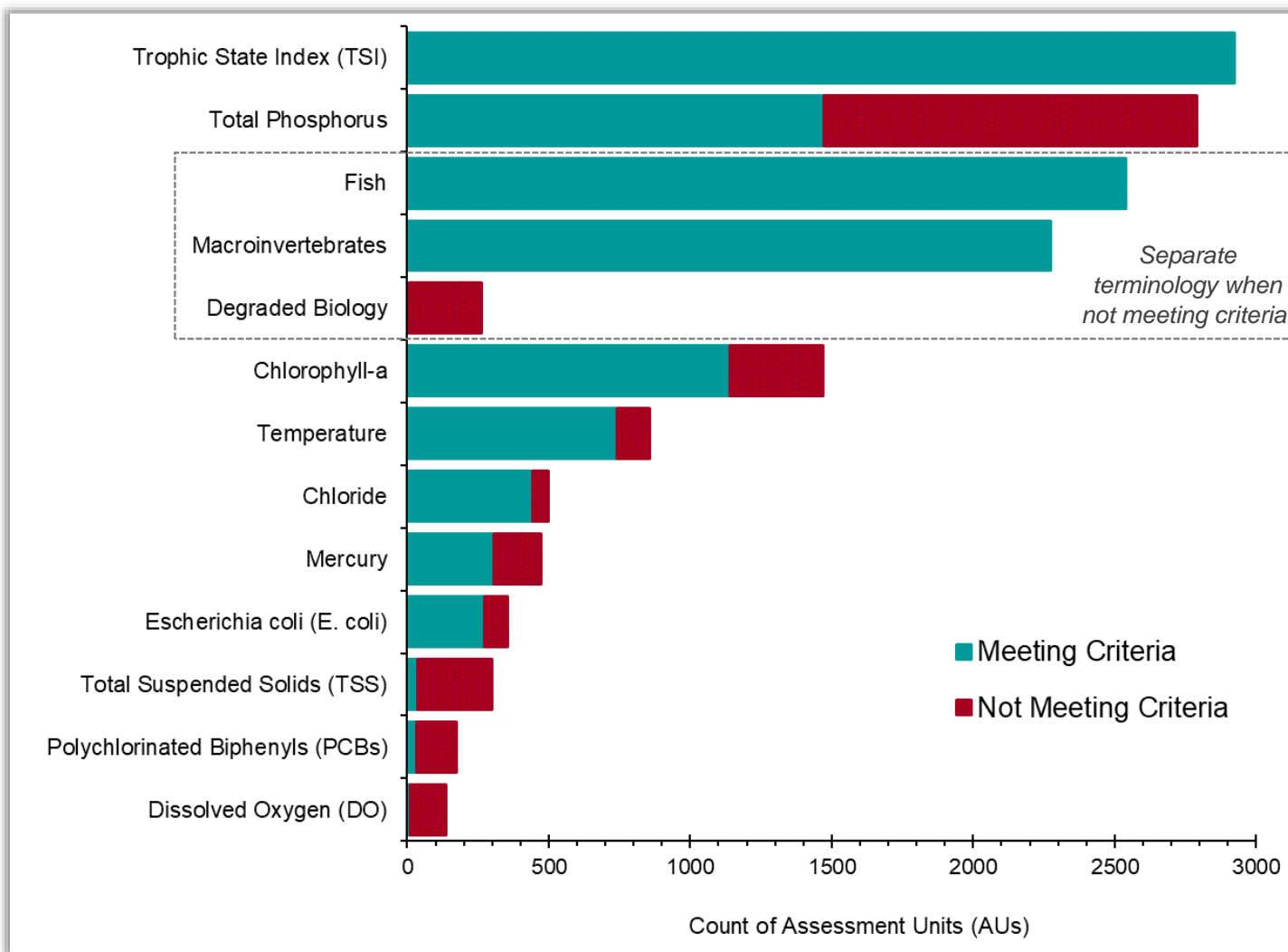


Figure 2. The most assessed parameters by count of assessment units (AU); only showing those with more than 100 AUs. The majority of these parameters were assessed over the course of five cycles (2014 – 2022); unless new information is collected a parameter’s status determination is kept cycle to cycle. Parameters not meeting criteria have assessments back to the 1998 cycle. Degraded Biology is a listing term used for fish and/or macroinvertebrate bioassessments that did not meet criteria.

2022 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.

In the 2022 cycle the list with the greatest net increase was the Impaired Waters List (*Table 1*). The list with the largest overall increase of AUs was the Healthy Waters List (see [Healthy Waters List](#) section). The percentage of waters on each list didn't significantly change, with the majority of AUs, 82%, on the Healthy Waters List (*Figure 3*). Nearly a quarter of all impairment listings have a TMDL or equivalent and these are designated as Restoration Waters.

Table 1. Summary of AUs and listings on each of the Water Condition Lists.

2022 Water Condition List	# Waters Net Change	# Listings Net Change
Healthy	7,737 +39	NA
Impaired	1,300 +54	1,542 +65
Restoration	377 +34	568 +41

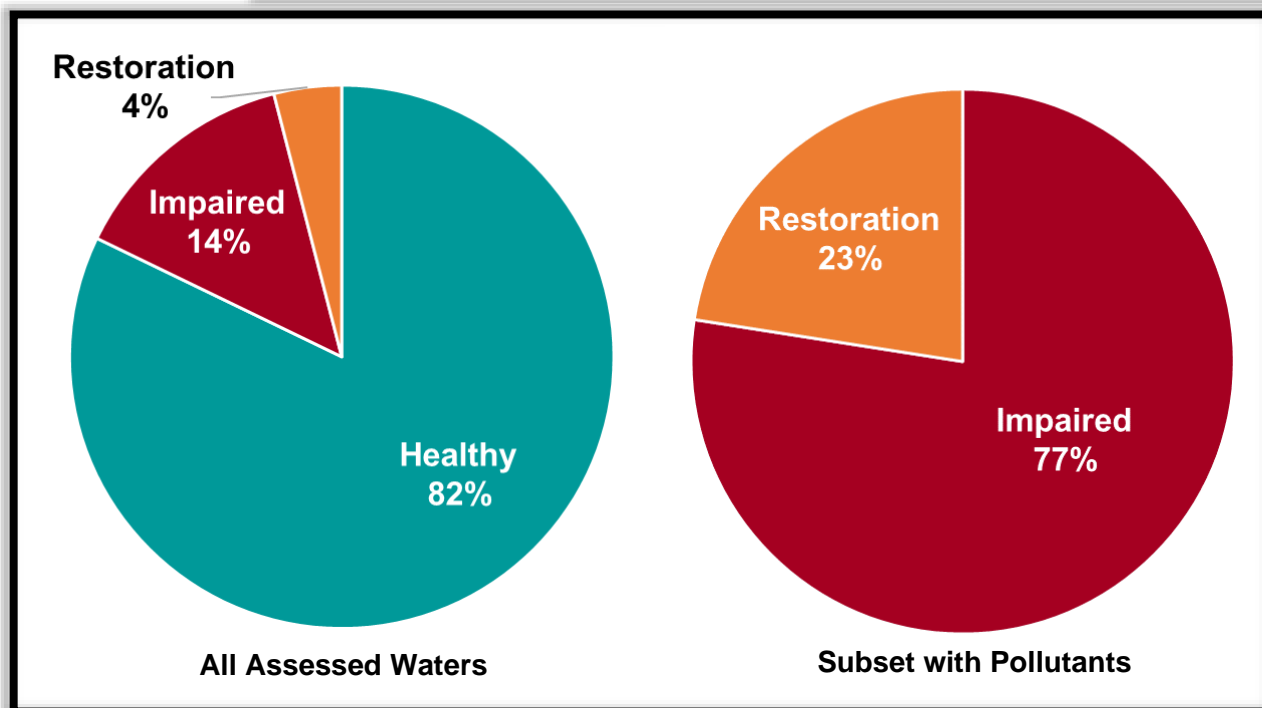


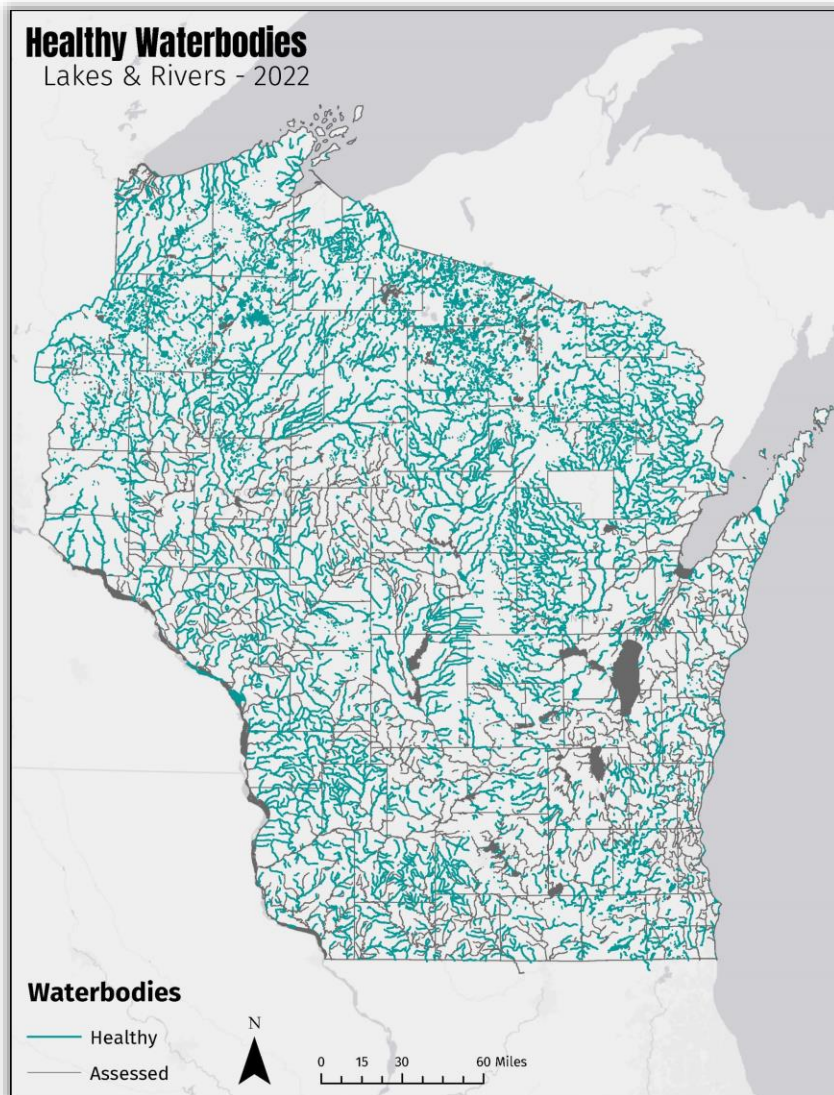
Figure 3. Percentage of assessed AUs on each list. Of the AUs with a pollutant listing, 23% have a restoration plan.

Healthy Waters List

The Healthy Waters List increased by about 1% by AU count between the 2020 and 2022 assessment cycles. This increase was due to monitoring on new waterbodies and some delistings. Placement on the healthy waters list is determined by general and in-depth water quality evaluations. General water quality evaluations include review of satellite photos, single bug or fish samples, and chemistry samples. Waters with only a general assessment may have unknown issues with water quality.

A total of 244 waters were newly assessed and determined to be on the Healthy Waters List. There were 228 river and stream segments evaluated with biological and/or phosphorus samples, 2 beaches evaluated for *E. coli*, and 14 lakes and impoundments evaluated for multiple parameters.

Figure 4. Location of all waters on the Healthy Waters 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 Reduction Strategy](#)).

Mercury and PCBs are at the next highly listed pollutants (Figure 6). The majority of these are based on fish consumption advisories.

Figure 5. Types of listings on the 2022 Impaired Waters List.

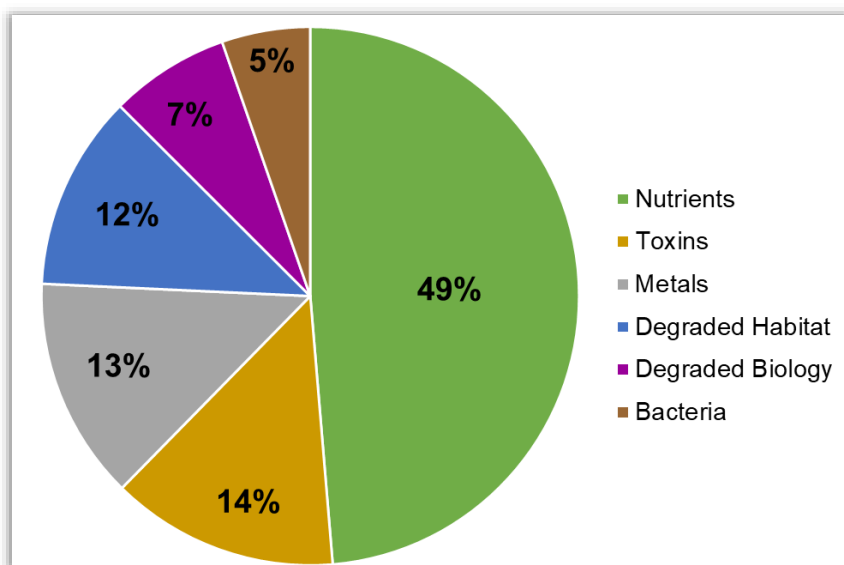


Figure 6. Breakdown of pollutants in each group on the 2022 Impaired Waters List. Degraded Biology listings are those with an Unknown Pollutant.

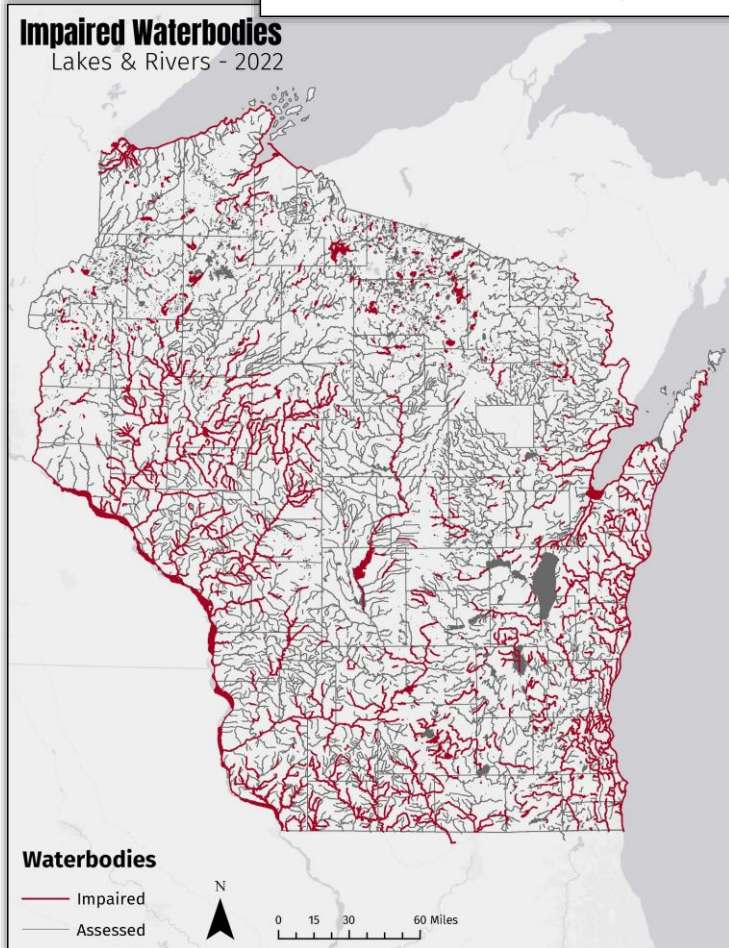
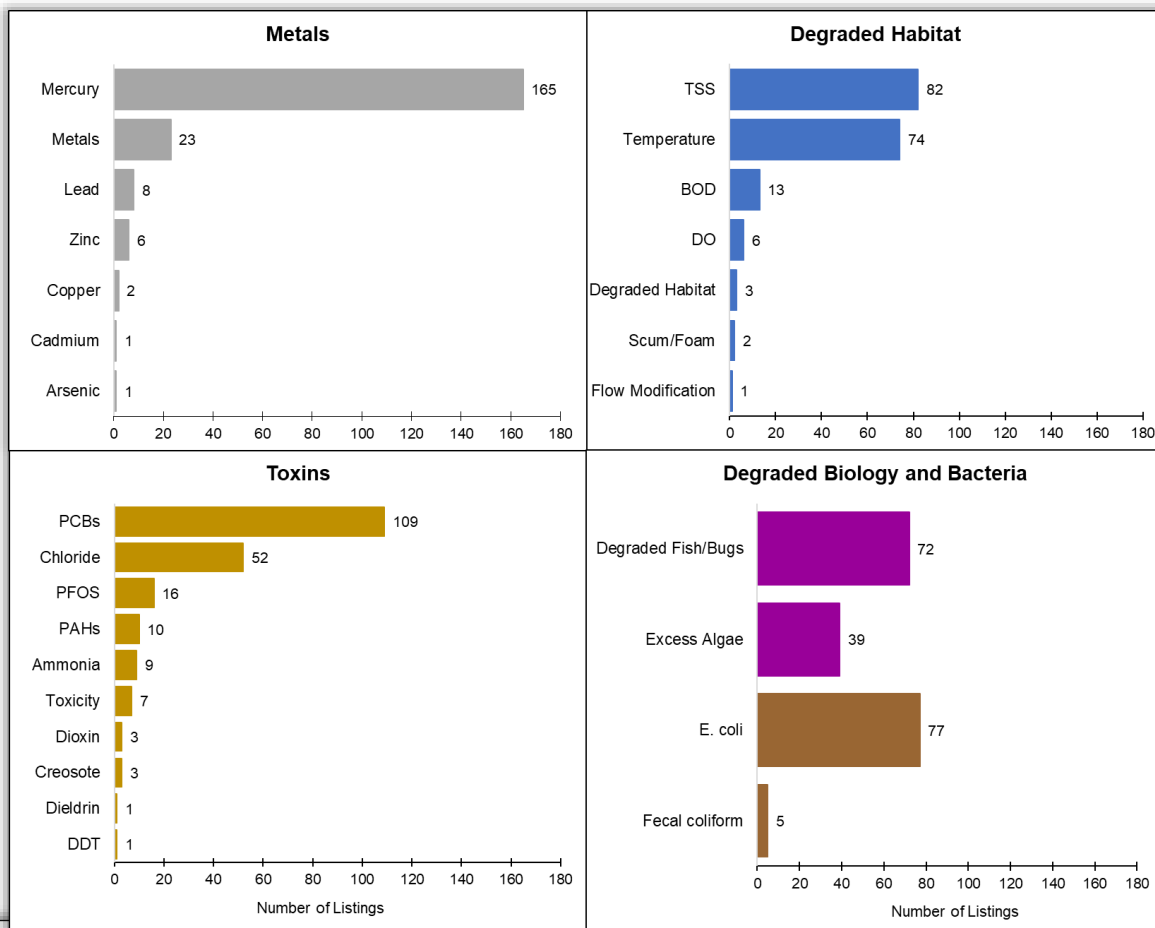


Figure 7. Location of impaired waters across the state in the 2022 cycle

Restoration Waters List

Phosphorus (Nutrients) and TSS (Degraded Habitat) make up the majority of parameters covered by TMDLs (Figure 8). Additions to the Restoration Waters List were all waters within three basin TMDLs: Milwaukee River, Wisconsin River, and Upper Fox-Wolf River.

Figure 8. Types of listings on the 2022 Restoration Waters List.

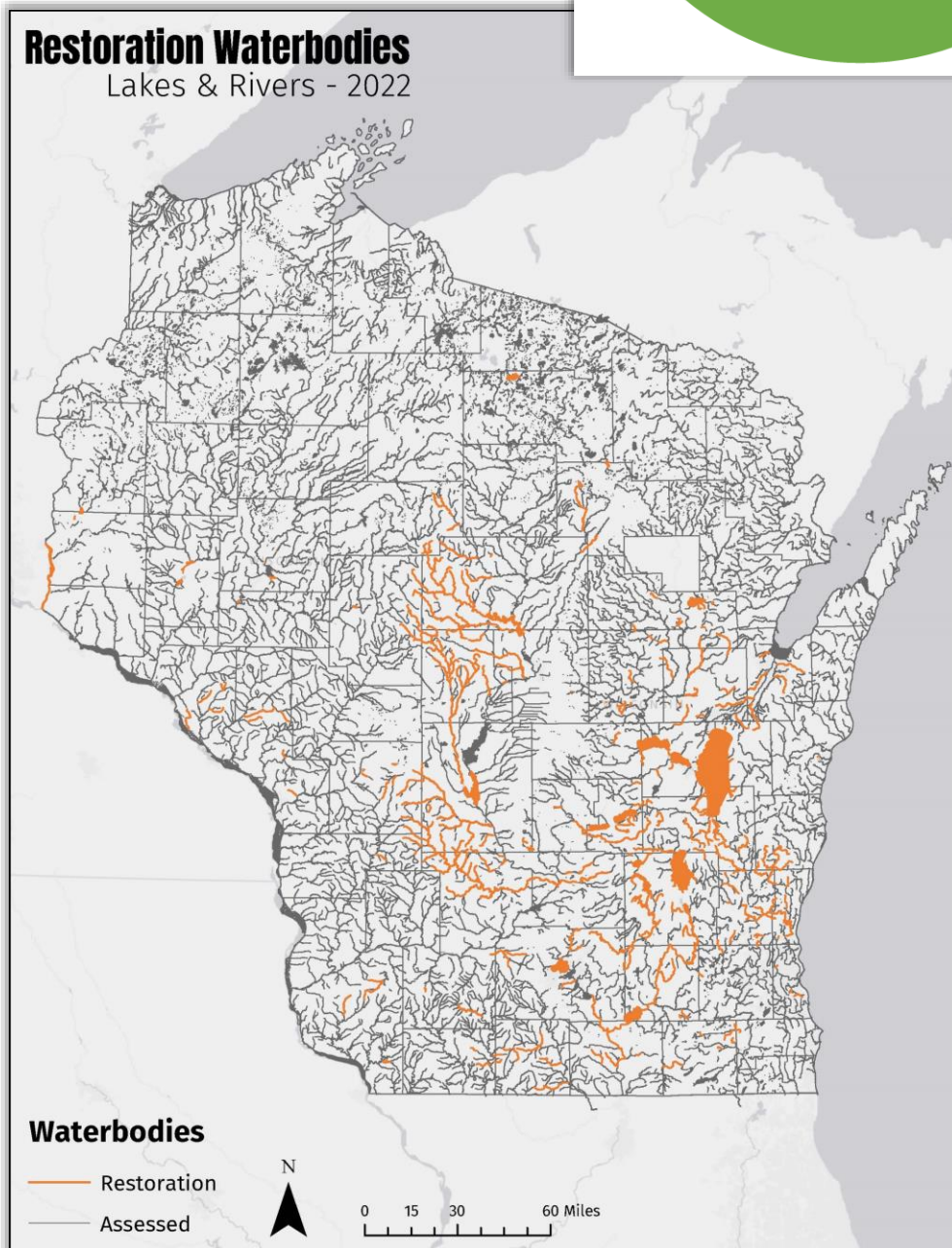
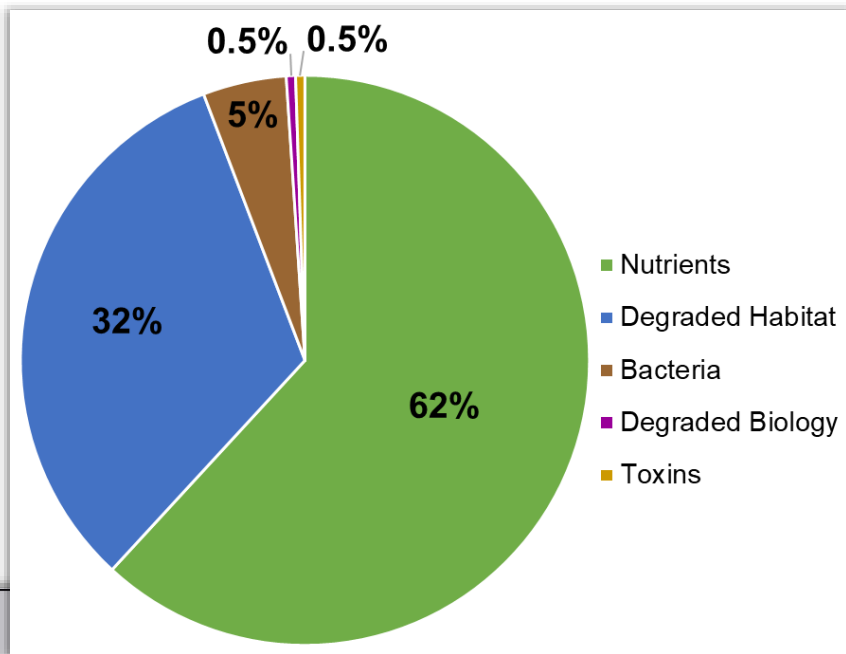


Figure 9. Location of waters on the Restoration Waters List across the state in the 2022 cycle.

New Pollutant Listings

In the 2022 assessment cycle there were 126 listings added to the Impaired and Restoration Waters Lists (*Table 2*). *Figure 10* breaks down the listings by parameter and the available restoration plans (9-Key Element Watershed Plan or a Total Maximum Daily Load (TMDL)). There were 17 listings with a 9-Key Element plan, part of the Impaired Waters List. There were 11 listings that were part of existing TMDLs, making them part of the Restoration Waters List.

Table 2. Number of new waterbodies and listings add during the 2022 assessment cycle.

2022 Water Condition List	# New Waters	# New Listings
Impaired	111	115
Restoration	11	11

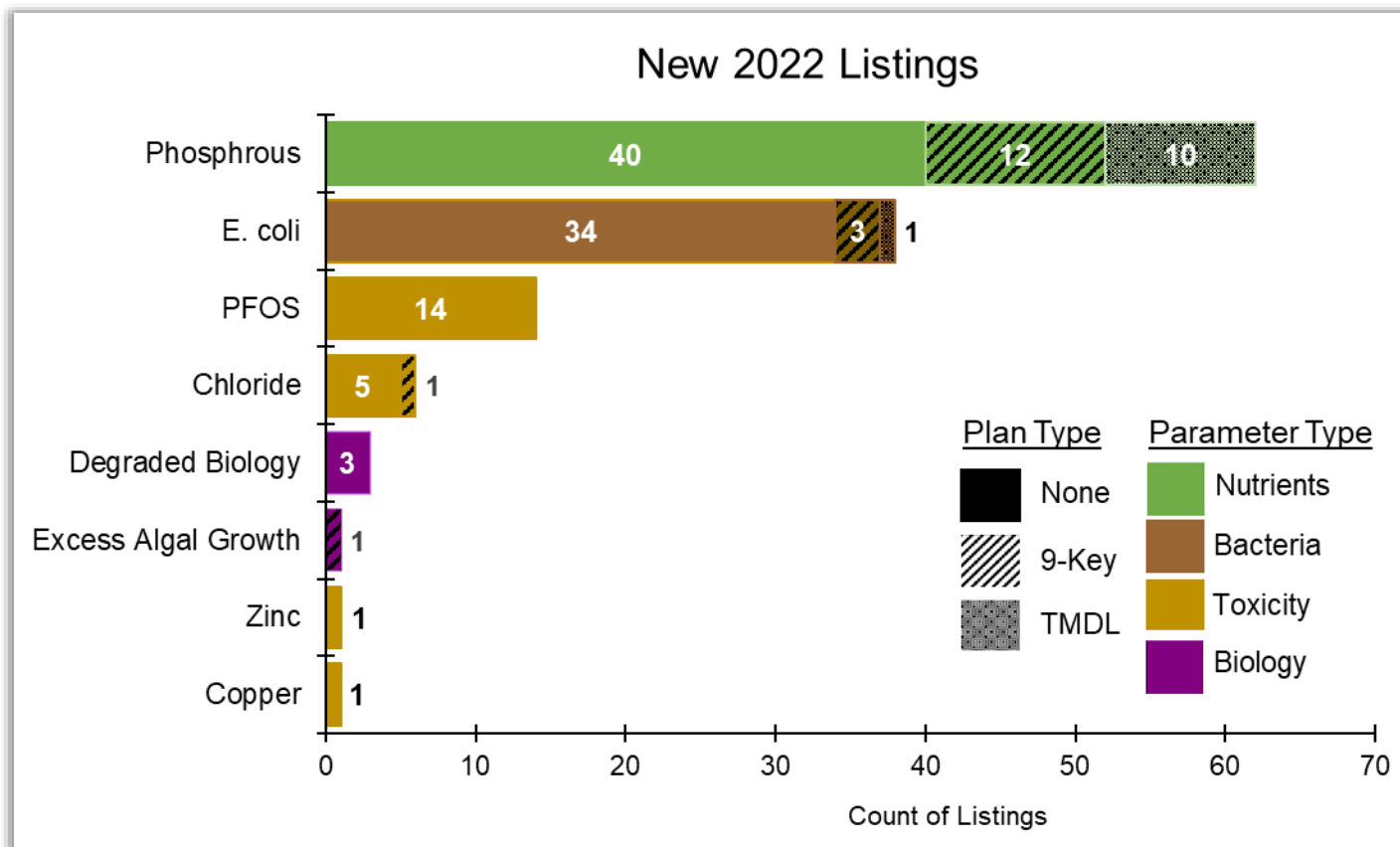


Figure 10. Number of new listing by parameter with available plan type applied.

Phosphorus

The 62 new phosphorus listings were spread across the state and part of many different projects. Some of those projects are briefly outlined below.

Listings in TMDL Areas

Ten of the new phosphorus listings were in basins with TMDLs (*Table 3*). The three basin TMDLs where allocations were already sufficiently outlined for newly listed waters were the Milwaukee, Upper Fox-Wolf, and the Wisconsin. 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 first assessment cycle where TMDL updates were included in the process.

Table 3. 2022 phosphorus listings within TMDL areas.

Waterbody Name	WDNR AU ID	EPA AU ID	Pollutant	Impairment(s)	TMDL Basin
Evergreen Creek	10058	WI10000252	Total Phosphorus	Impairment Unknown	Milwaukee River Basin
Little Menomonee River	8106460	WI10044280	Total Phosphorus	High Phosphorus Levels	
Mole Creek	3993907	WI10028711	Total Phosphorus	Degraded Biological Community	
N. Br. Cedar Creek	10055	WI10008042	Total Phosphorus	Impairment Unknown	
Noyes Creek	3988299	WI10028301	Total Phosphorus	Impairment Unknown	
Silver Creek	10076	WI10000265	Total Phosphorus	Degraded Biological Community	
Fox River	5535277	WI10033740	Total Phosphorus	Impairment Unknown	Upper Fox/Wolf River Basins
Fox River	6778560	WI10039711	Total Phosphorus	Degraded Biological Community	
Unnamed	3993744	WI10028705	Total Phosphorus	Impairment Unknown	
Unnamed Tributary	8110237	WI10044421	Total Phosphorus	High Phosphorus Levels	Wisconsin River Basin

Lake Wissota Stewardship Project

The [Lake Wissota Stewardship Project](#) is a collaboration led by Chippewa County Land Conservation & Forest Management Committee (LCFM) and the Lake Wissota Improvement & Protection Association (LWIPA). The project aims to improve water quality in Lake Wissota by reducing runoff pollution from contributing watersheds. Monitoring data were collected across the Little Lake Wissota sub-watershed and the Moon Bay/Yellow River sub-watershed by volunteers in the Water Action Volunteers (WAV) and Citizen Lake Monitoring Network (CLMN) programs. Two 9-Key Element Watershed plans were created based on collected data: [Little Lake Wissota \(2020\)](#) and [Yellow River Watershed and Moon Bay \(2021\)](#). The plans and data collection establish a baseline of current conditions for evaluation of future BMP effectiveness.



The baseline data were also used for surface water quality assessments and 7 new stream AUs were identified as having phosphorus issues (*Table 4*). Lake Wissota, Moon Bay, Little Lake Wissota, and the Yellow River were all listed for phosphorus in prior cycles (*Figure 11*).

Table 4. New phosphorus listings within the Lake Wissota watershed.

Waterbody Name	WBIC	WDNR AU ID	EPA AU ID
Big Drywood Cr	2154800	16188	WI10004732
Frederick Cr	2152900	16178	WI10004722
Hay Cr	2157700	16198	WI10004740
Little Drywood Cr	2155100	16190	WI10026346
Paint Creek	2153200	16180	WI10004724
South Fk Paint Cr	2153300	18842	WI10006676
Stillson Cr	2153000	16179	WI10004723

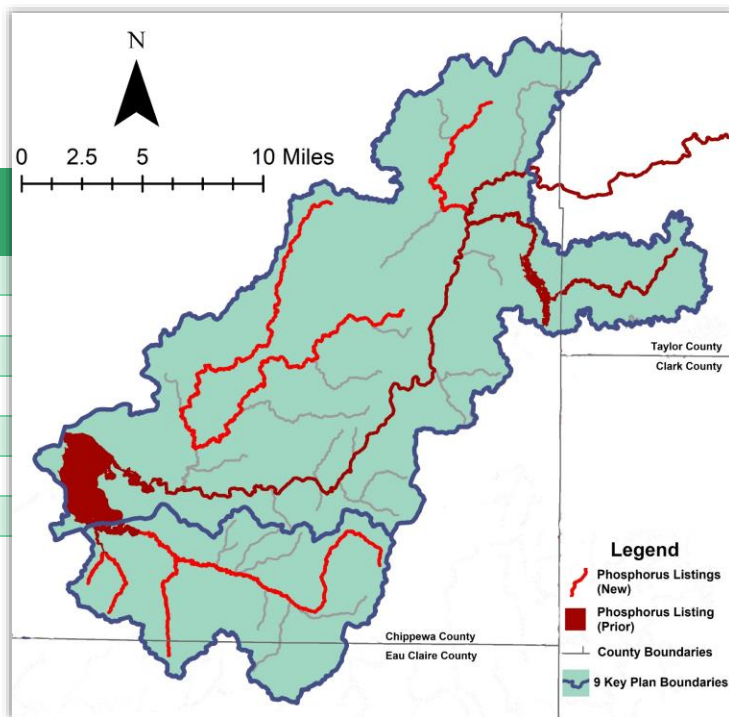


Figure 11. Stream segments added for phosphorus in the Lake Wissota watershed.

Lake Comus Watershed

The Lake Comus Protection and Rehabilitation District (PRD) is working with Southeastern Wisconsin Regional Planning Commission (SEWRPC) to develop a comprehensive lake management plan for Lake Comus. The Lake Comus PRD sent watershed water quality data to WDNR. The data were used for assessments, which resulted in 4 new AUs proposed for phosphorus listing (*Table 5*).

Table 5. New phosphorus listings within the Lake Comus watershed.

Waterbody Name	WBIC	WDNR AU ID	EPA AU ID
Comus Lake	794200	11620	WI10001424
Turtle Creek	790300	18241	WI10006231
Unnamed	794300	6854137	WI10039841
Spring Brook	790500	11613	WI10001418



Spring Brook at Leeson Park Pavilion, May 2019, WAV

Wildcat Creek Watershed

Dodge County Land and Water Conservation Department developed an [implementation plan for the Wildcat Creek watershed](#). Phosphorus data collected were also used for assessments; 4 AUs were proposed for phosphorus listing (*Table 6*).



Table 6. New phosphorus listings within the Wildcat Creek watershed.

Waterbody Name	WBIC	WDNR AU ID	EPA AU ID
Neda Creek	859100	11464	WI10001298
Unnamed Trib to Wildcat Creek	858700	9117494	WI10045180
Wildcat Creek	858600	11461	WI10001296
Wildcat Creek	858600	11462	WI10026119

Polk County

A combination of projects by the Polk County Land & Water Resources (LWR), Citizen Lake Monitoring Network (CLMN) and WDNR resulted in 6 new lake phosphorus listings (Table 7). All of these lakes are covered by the [Lake St. Croix TMDL Implementation 9-Key Plan](#).



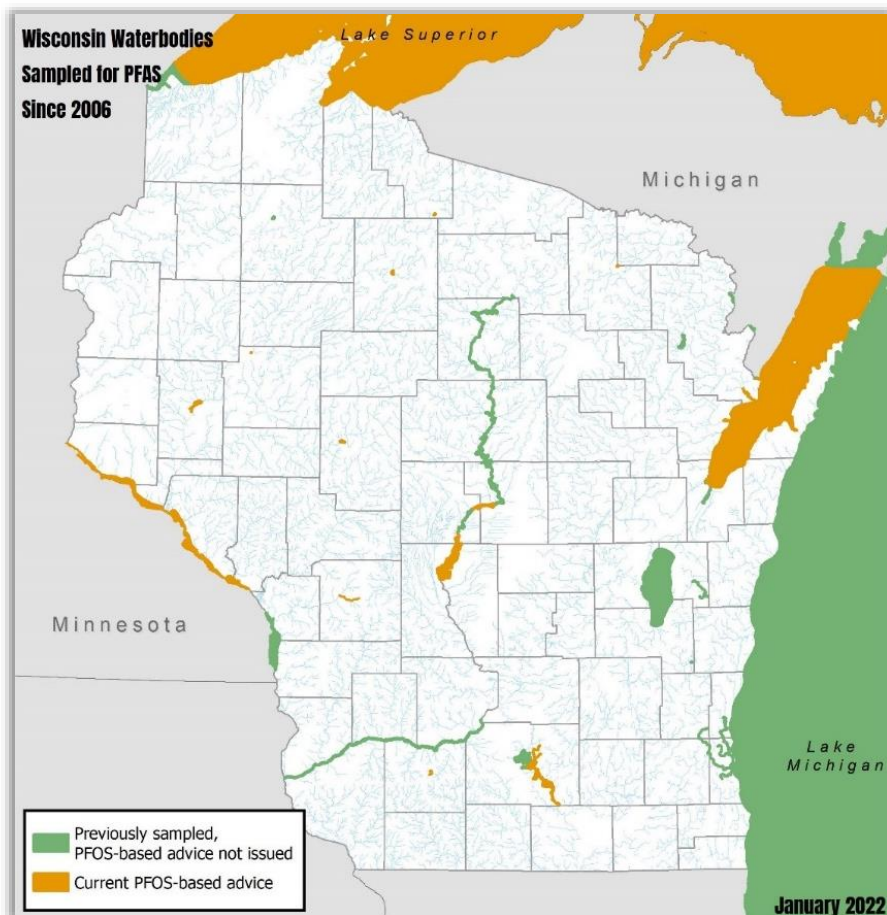
Table 7. New phosphorus listings for lakes in Polk County.

Waterbody Name	WBIC	WDNR AU ID	EPA AU ID	Monitoring
Loveless Lake (Bass)	2620000	18885	WI10006711	CLMN
Crescent Lake (Pickerel)	2458900	16737	WI10005180	CLMN
Bridget Lake (Mud)	2619100	16491	WI10004974	Polk County LWR
Little Butternut Lake	2640700	16679	WI10005132	Polk County LWR
Mud Lake	2615700	16454	WI10004943	Polk County LWR
Long Lake (Helbig)	2631600	16581	WI10005054	WDNR

PFOS

Across the state there were 12 PFOS based fish consumption advisories established based on recent sampling data during the assessment cycle (Figure 12). The 14 impacted waters were added to the Impaired Waters List due to not meeting Fish Consumption use. Consumption advisories for Green Bay and its tributaries were issued in January 2022, outside the assessment period; these will be considered for the 2024 lists.

Figure 12. Fish consumption advisories for PFOS based on monitoring from 2006 – 2021. The majority of PFOS-based advice was issued between 2019 and 2021.



Bacteria

A total of 38 listings were added for *E. coli* in the 2022 cycle; this is largely due to implementation of new *E. coli* criteria. The new criteria consider high spikes in bacteria levels, which resulted in more beaches added to the list. There were also 5 river or stream segments listed for *E. coli*. The sources of bacteria (sewage pipe lakes, septic systems, agriculture, wildlife) have not been identified in most cases.

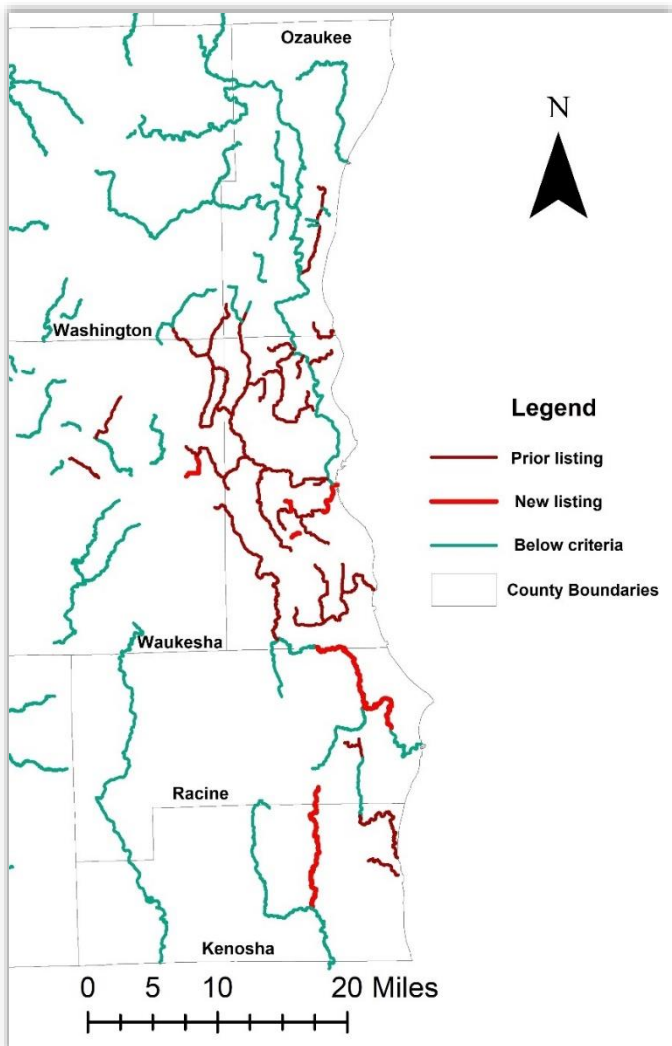
Chloride

The six new chloride listings were concentrated in and around southeastern Wisconsin (Table 8, Figure 13). Chloride is routinely collected as part of the state’s Long-Term Trend monitoring and through a WAV urban road salt study. Increased use of road salt during the winter has correlated with an increase in waters with chloride-related aquatic toxicity. Chloride pollution can also come from sidewalk salt and water softeners.

Figure 13. Rivers and streams in the southeastern corner of the state evaluated for chloride. Red shades are chloride listings, with the bright red indicating addition in 2022. The teal AUs have chloride levels evaluated to be below criteria.

Table 8. New chloride listings on river and stream segments.

Waterbody Name	WBIC	WATERS ID	EPA AU ID
Kilbourn Road Ditch	736900	10421	WI10000524
South 43rd Street Ditch	15900	9981	WI10000209
Zablocki Park Creek	5036633	3987849	WI10028282
Kinnickinnic River	15100	9973	WI10008186
Root River	2900	896175	WI10027840
Dousman Ditch	17100	10029	WI10000237



Zinc & Copper

A short segment of Stream C above Copper Park Lane was added to the Impaired Waters List for elevated levels of Copper and Zinc (Figure 14). The lower portion of Stream C, from its mouth to Copper Park Lane, is currently listed for Copper. The source of the metals is currently unknown

Figure 14. Map of Stream C in Rusk County. The dark red portion was listed in the 2014 cycle. The light red segment is proposed for the 2022 Impaired Waters List.



Pollutant Removals

There were 22 listings removed during the 2022 cycle (Figure 15):

- Seven of the eight phosphorus listing removals were for lakes, with two being removed based on updated criteria. The other phosphorus listing removal was based on new lake data being below criteria.
- Two lakes listed for excess algal growth (pollutant unknown) were removed based on new chlorophyll-a data being below impairment thresholds.
- Three listings of excess algae growth with no known pollutant were changed from “pollutant unknown” to “total phosphorus” due to identification of Total Phosphorus as the pollutant causing the impairment.
- Three streams were delisted for degraded habitat from sedimentation (Total Suspended Solids (TSS)) based on habitat restoration.
- Lake Mendota and Green Lake had their PCB fish consumption advisory removed based on new fish tissue data; in response the PCB listing was removed.
- One beach segment was delisted for *E. coli* based on new data showing levels below criteria.
- One stream segment was delisted for Fecal coliform because it was on Tribal lands, outside of State jurisdiction.
- One stream segment had its chloride listing removed based on data below criteria.
- One stream segment was delisted for elevated water temperature based on data below criteria.

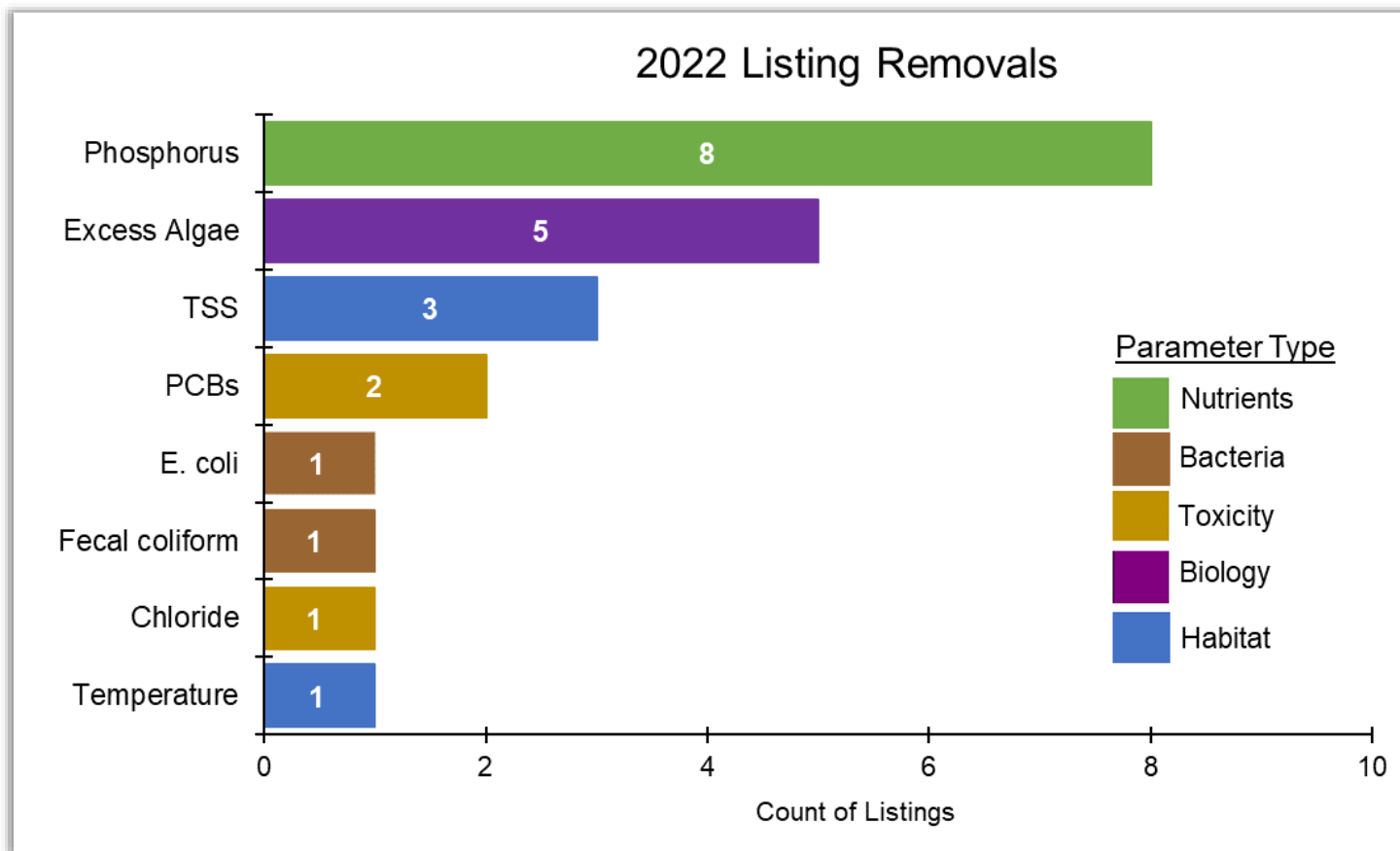


Figure 15. New listings for the 2022 cycle.

Legler School Branch and Pioneer Valley Creek, Green County

Legler School Branch and Pioneer Valley Creek were placed on the Impaired Waters List in 1998 for degraded habitat caused by sedimentation. Beginning in fall, 2012 and continuing over the next 2 years, the Green County Land Conservation Department spent nearly \$630,000 on installation of Best Management Practices (BMPs) throughout the 2 sub-watersheds. Nearly 6,500 feet of livestock fencing, 320 feet of stream crossing, and 17 acres of critical area stabilization were implemented. Additionally, over 16,500 feet (3.12) miles of stream was rehabilitated: 8,500 feet on Legler School Branch and 3,325 feet on Pioneer Valley. This rehabilitation included removal of dense stands of nuisance (box elder) trees which tend to shade out undergrowth and destabilize the banks as they fall in the stream. After tree removal, the banks were sloped, shaped, and seeded in native grasses. Habitat structures were placed in bends on the stream and rock weirs were used on straight sections to create plunge pools for generating deeper water areas.

In 2017 WDNR water resource biologists sampled along both streams for fish and qualitative habitat. Based on the results, outlined in a [2020 Targeted Watershed Assessment \(TWA\) report](#), riparian stream corridor improvements on Legler School Branch and Pioneer Valley Creek resulted in reducing streambank erosion and improved fish habitat. Soft sediment was reduced, and biological communities were generally in fair to good condition. These two stream segments were proposed for delisting in the 2022 cycle based on these findings.



Legler School Branch 2017

Becky Creek, Rusk County

Becky Creek is part of the Soft Maple and Hay Creeks Watershed in Rusk County. This creek is an Exceptional Resource Water and a Class I Trout water, listed in the 2004 cycle for degraded habitat caused by sedimentation. The administered a watershed project at the local level over an 11-year period from 1996 through 2007. The goal of the project was to reduce nonpoint source impacts to waterways by working with landowners to install various agricultural BMPs throughout the watershed. A total of 68 BMPs were reported installed by 35 different property owners. The BMPs implemented on Beck Creek included stream bank improvement, shaping, and seeding.

In 2015 WDNR water resource biologists sampled the watershed for fish, macroinvertebrates, habitat, and chemistry. The stream banks of Beck Creek were well vegetated and riffle areas were mainly gravel and cobble. Biological communities, both fish and macroinvertebrates, scored high biological integrity. Based on these results, the full summary available in the [2020 Soft Maple and Hay Creek TWA report](#), Becky Creek was proposed for delisting.



Becky Creek 2015

Public Participation - Monitoring

Citizens provide a vital resource for gathering water quality data all 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 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



In 2021 volunteers gathered monitoring data for 1,106 distinct sites.

water samples. CLMN volunteers enter their own data into a statewide database, which automatically generates public-facing, annual summary reports for each lake on a daily basis.

In 2021, 978 CLMN volunteers had entered their data into the database as of January 19th, 2022. The Network requests data to be entered by November 1st, but data tend to come in through early spring of the following year for various reasons. Data was entered for 1,106 distinct monitoring sites in 2021, with water clarity data being the most common, but over 560 volunteers also collected data on total phosphorus, chlorophyll-A, and temperature profiles. We are very lucky in Wisconsin to have such a devoted network of volunteers partnering with us to monitor conditions on our lakes, and to provide a wealth of assessment data.



Sue Ristow assisting with WAV youth education.

Water Action Volunteers (WAV)

Participants in the WAV volunteer stream monitoring program range far and wide



In 2021, WAV celebrated its 25th anniversary.

across the state of Wisconsin. WAV is a collaboration of the Wisconsin DNR and the University of Wisconsin–Madison Division of Extension. The citizen 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. In 2021, WAV celebrated its 25th anniversary. Since its founding, volunteers have collected data in all 72 counties. In 2020, WAV supported over 460 volunteers statewide, and in 2021, WAV supported over 500 volunteers.

Public Participation - Comment Periods

Public comments were sought during multiple points of the assessment process. These included for updated assessment methods (Wisconsin Consolidated Assessment & Listing Methodology (WisCALM) 2022 Draft, October 12 – November 20, 2021), the draft 2022 water condition lists (August 16 – October 1, 2021), and listing updates to three basin TMDLs (November 29, 2021 – January 7, 2022). A full summary of comments and WDNR responses can be found on the WDNR webpage (dnr.wi.gov).

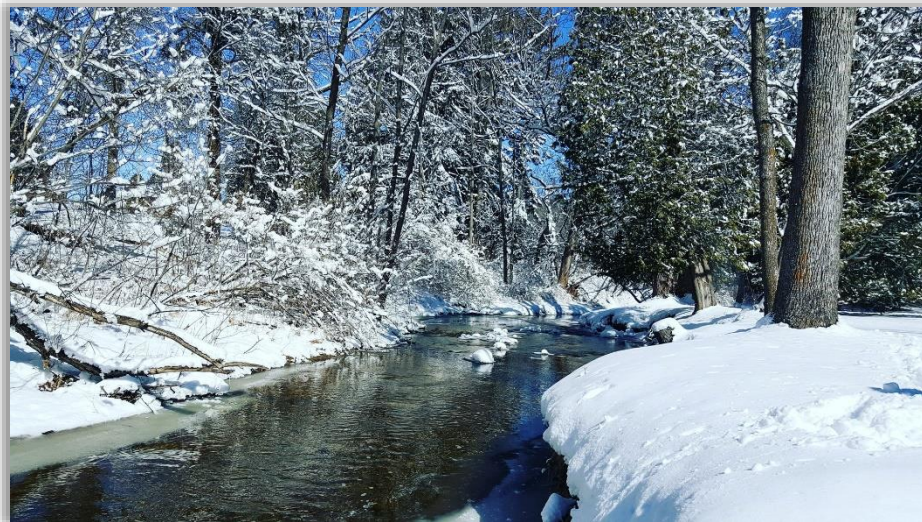
Restoration of Wisconsin's Waters

One of the underlying goals of the Clean Water Act is to restore all impaired waters. Wisconsin uses multiple tools to achieve this goal including TMDLs, Adaptive Management Plans, Water Quality Trading, and sediment remediation, among others.

TMDLs in Development

Northeast Lakeshore TMDL

Located along the shore of Lake Michigan in the northeast part of Wisconsin, this TMDL covers sediment, TSS, and phosphorus impairments for the streams, rivers, and lakes in the aforementioned area but does not address the nearshore area of Lake Michigan or explicitly address beach impairments. However, it is expected that the TMDL will aid in addressing nutrient related impairments associated with the nearshore area or beaches. The TMDL development process was supported by the EPA contractor [Cadmus](#) that in collaboration with DNR developed a SWAT watershed model. Results of the watershed model were fed into an allocation database and draft allocations were released at the end of 2021. Currently, stakeholder comments regarding the allocations are being addressed, the edge of field agricultural targets are being developed to aid in implementation of the load allocation for agricultural sources, and the report documentation is being prepared. It is anticipated that the TMDL will be submitted to EPA for approval toward the end of 2022.



Silver Creek with snowy banks in Manitowoc County

Fox Des-Plains TMDL

Located in Southeast Wisconsin, this TMDL will cover sediment, TSS, and phosphorus impairments in the aforementioned basins. River, stream, and lake impairments will be addressed. A multi-year monitoring and data collection effort for the TMDL development process is wrapping up and watershed modeling is slated to begin toward the end of 2022. Stakeholder groups are currently being assembled to provide input and allow for a robust stakeholder process throughout the development process. In addition, the WDNR has evaluated the potential impact of downstream TMDLs located in Illinois immediately south of the Wisconsin border. 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 analysis. WDNR is targeting the end of 2024 as a completion date for the TMDL.



Des Plaines near Highway K crossing.

Lake Pepin TMDL

Located along the Mississippi and above Lake Pepin, this TMDL will address sediment, TSS, and phosphorus reductions needed to meet water quality criteria and targets for Lake Pepin. Utilizing the TMDL for Lake Pepin, recently submitted by Minnesota Pollution Control Agency (MPCA) and approved by EPA, WDNR will incorporate the necessary wasteload allocations identified in the MPCA TMDL and refine the load allocations and reductions that are vaguely laid out in MPCA’s TMDL to cover the Wisconsin portion of the Lake Pepin drainage basin. Currently, DNR is working with an 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. It is expected that this work will be completed in 2022 with the goal of submitting a TMDL to EPA in 2023.

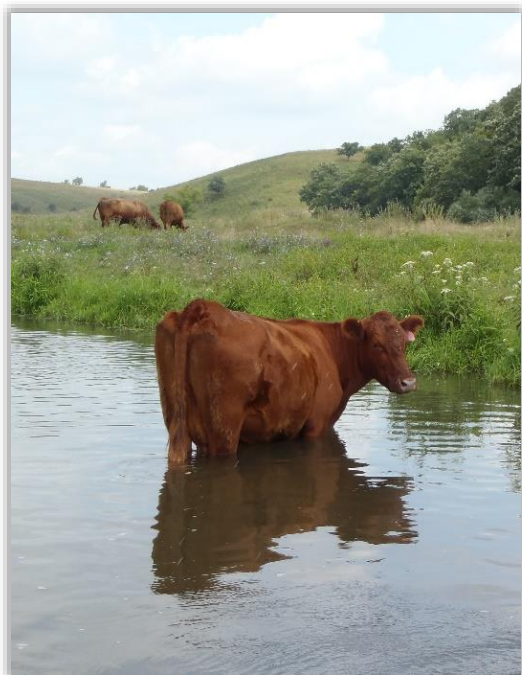


Lake Pepin at sunset.

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. This option recognizes that the excess phosphorus accumulating in our lakes and rivers comes from a variety of sources, and that reductions in both point and nonpoint sources are frequently needed to achieve water quality goals. By working in their watershed with landowners, municipalities, and counties to target sources of phosphorus runoff, point sources can minimize their overall investment while helping achieve compliance with water quality-based criteria and improve water quality.

Four new plans target a total phosphorus reduction of 23,155 lbs/year.



Cow in a state river.

Throughout the 2020-2021 biennium, a number of WPDES permittees established adaptive management efforts in their local watersheds. WDNR approved four adaptive management plans, bringing the total number of permittees approved for adaptive management to 21 since the program’s conception. The four new plans of the biennium target a total phosphorus reduction of 23,155 pounds/year to be achieved within four WPDES permit terms. In the permittees’ first permit term, these four projects have committed to a minimum offset of 1,086 pounds/year of phosphorus, collectively. Each permittee will begin formally monitoring 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.

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Water Quality Trading

Water Quality Trading (WQT) may be used by WPDES permit holders to demonstrate compliance with WQBELs. 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.

A total of 21 plans were approved, curtailing 15,537 lbs/year of nonpoint source phosphorus loading.

Statewide, WPDES permittees and their consultants are gaining experience in establishing relationships with credit generators, quantifying nonpoint source pollution offsets, and executing projects in tandem with permit deadlines. At the conclusion of 2021, over 60 permittees formally indicated that WQT will be used to comply with phosphorus limits. Of these, 46 permittees have submitted an approvable water quality trading plan to DNR. During the 2020-2021 biennium, 21 water quality trade plans were approved. These plans, with associated agreements and permit conditions, ensure that 15,537 pounds/year of nonpoint source phosphorus pollutant loading is curtailed. Pollutant reductions are subject to a trade ratio based on factors such as modeling certainty and project location. After trade ratios, WPDES permittees will receive 9,209 pounds/year of total phosphorus credits that may be used to demonstrate compliance with WQBELs.

Great Lakes Areas of Concern

Notable accomplishments for the Great Lakes Areas of Concern in this reporting period include the following:

- After 17 years, the **Lower Fox River PCB remediation project**, the largest PCB sediment cleanup in the world, was completed in Summer 2020. While this massive project spanned the entire 39-mile length of the Fox River, most of the remedial efforts occurred within the

The largest PCB sediment cleanup in the world! Summer 2020, 17 years in, the Lower Fox River PCB remediation project was completed; a total of 6.5 million cubic yards of contaminated sediment was removed.



Aerial view of the Lower Fox River flowing into the bay of Green Bay. Photo by Wisconsin Department of Transportation.

Lower Green Bay and Fox River AOC. A total of 6.5 million cubic yards of contaminated sediment was removed and safely disposed, and 275 acres of riverbed were covered with engineered caps to further protect the aquatic ecosystem from remnant PCBs. Sediment dewatering and processing resulted in approximately 10 billion gallons of treated water returned to the river. A long-term trend monitoring program will now be used to

evaluate the degree and rate of the decline of PCBs in the water, sediment, and fish throughout the entire river.

- For the **St. Louis River AOC**, the **Howards Bay** contaminated sediment cleanup began in late 2020 and was completed in summer of 2021. The project was conducted under a partnership between EPA, U.S. Army Corps of Engineers (USACE), the City of Superior and Fraser Shipyards, and focused on the removal of sediment contaminated with lead, mercury, tributyl tin, and polycyclic aromatic hydrocarbons (PAH) throughout

A total of 119,000 cubic yards of contaminated sediment was removed from Howards Bay.



Dredging at Howards Bay, in the St. Louis River AOC. Photo by Fraser Shipyards.

a 300-acre embayment located at the mouth of the St. Louis River. Howards Bay is home to the only U.S. shipyard on Lake Superior, and yard services remained active during remedial operations. Remediation was done in two phases; USACE contractors first conducted navigation dredging of the federal channel within the bay using Strategic Navigation funding authority, removing 34,000 cubic yards of sediment. Following the SND action, 85,000 cubic yards of more heavily contaminated material was dredged from the remainder of the bay. In-water work was conducted using a combination of both hydraulic and mechanical (environmental bucket) dredges, and a post-dredge cover of clean sand

was placed over the bed to control any residual contamination and enhance habitat recovery. Disposal took place at local landfill facilities, with the City providing nearby facility space.

- Wisconsin and Michigan initiated the delisting process for the **Lower Menominee River Area of Concern** in 2019 and provided the U.S. Environmental Protection Agency's Great Lakes National Program Office with a final delisting report summarizing the cleanup and restoration actions. As part of the delisting process, Wisconsin and Michigan held a public comment period from March 9 - April 24, 2020 and hosted a public meeting on April 9, 2020. The EPA then took the final step with the U.S. and Canadian governments to officially remove the AOC designation, effective August 14, 2020.

Protection of Wisconsin's Waters

New in 2022 was the launch of Wisconsin's statewide water resources protection program Healthy Watersheds, High-Quality Waters. A guiding principle of the just-released HWHQW Action Plan is that watershed scale protection is essential for high-quality waters to thrive. Tasked with answering the big question of "where are the healthy waters of Wisconsin?" the DNR Healthy Waters Team completed a multi-year, peer-reviewed modeling and assessment project that relied heavily on EPA's Recovery Potential Screening Tool. Partner engagement took place in spring 2021, and the feedback collected was used to formulate the Action Plan, which will go through 2030. Cross-program and partner enthusiasm to balance historical restoration efforts with the HWHQW protection initiative is high.

More information may be found at <https://dnr.wisconsin.gov/topic/SurfaceWater/HQW.html>

Conclusions

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 done across the state, resulting in new pollutant listings and delistings. The majority of new listings were for phosphorus and *E. coli*. There were 22 listing removals for eight different pollutants. A total of 244 waters were newly assessed and determined to be on the Healthy Waters List.

Many DNR programs and partners continue to work together to manage the state's water resources; with safety measures in place, a significant amount of work was done during the 2022 reporting cycle. In 2020 volunteers gathered water quality data for over 1,000 lake sites (CLMN) and nearly 400 stream sites (WAV). WDNR staff collected long-term trend and project data across the state. Monitoring for the Fox Des-Plaines TMDL was undertaken. Modeling for the Northeast Lakeshore TMDL was nearly finished. Sediment remediation work in the Lower Fox River, a 17-year project, was completed in summer 2020; a total of 6.5 million cubic yards of contaminated sediment was removed. Four new Adaptive Management plans targeted a total phosphorus reduction of 23,155 lbs/year. A total of 21 Water Quality Trading plans were approved, curtailing 15,537 lbs/year of nonpoint source phosphorus loading. The full magnitude of monitoring, restoration, and protection work done in Wisconsin was briefly summarized in the [full 2022 Water Quality Report to Congress](#).



Sign up for GovDelivery emails for real-time updates via email or text message. The topic 'Water Quality Standards and Assessments' under 'Water' will provide information regarding standards, changes to water quality condition, WisCALM updates, and general TMDL updates.

<https://public.govdelivery.com/accounts/WIDNR/subscriber/new>.

