Wisconsin Water Quality Report to Congress 2014

WISCONSIN DEPARTMENT OF NATURAL RESOURCES

WATER QUALITY BUREAU

WATER DIVISION

Wisconsin's 2014 Water Quality Report to Congress was a web-based report comprised of many different webpages. Over time some of these pages have become outdated and broken. In an effort to better organize the website these pages will be removed. In order to maintain the report it has been copied to this document as best as possible. Links to program pages, project searches, and other search windows were not included as this information is not specific to the 2014 report.

- April 2019

Contents

Water Quality Strategic Plan

Our mission is to provide clean, safe water and the highest quality protection and treatment of water for the citizens of Wisconsin, by adhering to state and federal requirements for water quality and environmental protection.

- Water Quality Bureau Strategic Plan 2012-2016 [PDF]
- Environmental Performance Partnership Agreement 2011-2013 [PDF]
- Water Quality Bureau Goals, 2013-2014 [PDF]
- Water Quality Bureau Teams, 2013 [PDF]
- Water Quality Bureau Database List, 2013 [PDF]
- Water Quality Bureau Goals Summary Flyer, July 2013 [PDF]
- Water Quality Program Budget Update - April, 2014 [PDF]

Water Atlas

Lakes 15,000 lakes	Great Lakes Shoreline Miles 1,000	Beaches Coastal 192 miles
Streams 88,000 miles	Groundwater Gallons 1.2 quadrillion	Wetlands 5 million Acres
Springs Thousands of springs		

Emerging Issues and Initiatives

Water Monitoring Strategy

Wisconsin Department of Natural Resources (WDNR) is in the initial stages of refining our statewide water quality monitoring strategy. A WDNR workgroup was formed to developing a comprehensive (water quality, biology, habitat, hydrology) cross-media (lakes, streams, rivers, wetlands) Water Resources Monitoring Plan that is driven by assessment and management needs, adequately resourced (staffed and funded), and incorporates strategic partner and volunteer resources and shared goals. The workgroup will oversee the development of a Water Resources Monitoring Strategy for 2015-2020, including outlining an over-arching strategy design, identification of fiscal dependencies, study designs, decision protocols, documentation standards, and strategies to meet reporting requirements. Revised monitoring strategy proposals are currently being developed and reviewed by WDNR technical teams, and the proposals will be considered for implementation during the 2015 monitoring field season.

Phosphorus Standards Implementation

Phosphorus has long been recognized as a controlling factor in plant and algae growth in Wisconsin lakes and streams. Small increases in phosphorus can fuel substantial increases in aquatic plant and algae growth, which in turn can reduce recreational use, property values, and public health. To protect human health and welfare, revisions to Wisconsin's Phosphorus Water Quality Standards for surface waters were adopted on December 1, 2010. These revisions:

- Created water quality standards for phosphorus in surface waters. These standards set maximum thresholds for phosphorus in Wisconsin's surface waters. See Chapter NR 102 [PDF].
- Set procedures to implement these phosphorus standards in WPDES permits issued to point sources discharging to surface waters of the state. See Chapter NR 217 [PDF].
- Helped to curb nonpoint sources of excess phosphorus by tightening agricultural performance standards. See Chapter NR 151 [PDF].

WDNR has put a commensurate level of effort and resources in the implementation of these

phosphorus standards. WDNR Water Division sponsored a "Phosphorus Summit" on June 27, 2013, in Madison, WI and invited key stakeholders to listen to each other's concerns about the implementation of the phosphorus rules. Approximately 60 people attended the summit.
Department staff has developed supporting resources to assist in phosphorus rule implementation including Guidance for implementation of Wisconsin's phosphorus water quality standards [PDF]. This document may evolve as the Department addresses more of the many unique circumstances related to phosphorus implementation. WDNR has also developed guidance that describes options for regulated point source dischargers for compliance with phosphorus permit limits, including adaptive management and water quality trading.

Phosphorus criteria are also being implemented in watershed restoration projects, known as Total Maximum Daily Load (TMDL) studies. WDNR is currently working on two large watershed studies that include the development of TMDLs for phosphorus - the Wisconsin River and Milwaukee River watersheds. These TMDLs will establish reductions needed from each source of phosphorus in the watersheds to meet water quality goals.

Site-specific factors may influence relationships between phosphorus concentrations and environmental responses. The statewide phosphorus water quality criteria are appropriately protective in most cases. However, there may be some instances for specific waterbodies where the applicable statewide phosphorus criterion is more stringent than necessary to protect the designated uses of the waterbody in question. Alternatively, there may be waterbodies, such as impounded flowing waters, that may not be adequately protected by the current phosphorus criteria. In such cases, federal and state law allow for development of site-specific criteria - criteria that are applicable only to a specific waterbody or waterbody segment, based on site-specific circumstances - which are more appropriate for certain waterbodies. WDNR is currently developing guidance for deriving site-specific phosphorus criteria that are compatible with Wisconsin's statewide water quality criteria for phosphorus.

In addition, based on preliminary statewide assessments of phosphorus and biological data, some waters that exceed numeric phosphorus criteria have been found to support healthy biological communities. Therefore, to avoid placing waters on the Section 303(d) list that support aquatic life and recreation uses, WDNR is in the process of revising applicable administrative rules in order to incorporate confirmation of an aquatic life or recreational use impairment using biological indicators, prior to listing a water body that exceeds numeric TP criteria. Corresponding assessment methods will be updated when the administrative rules are revised.

Harmful Algal Blooms

The WDNR, along with other state and local partners, works to protect human health, domestic animals, and wildlife from harmful algal blooms. In order to achieve this goal, the Department is committed to monitoring and sampling suspected harmful algal blooms, informing the general public about the causes and potential risks of harmful algal blooms, and finding opportunities to improve and expand the harmful algal bloom protection program in

the future. Below, is the Manitowoc River Eutrophication and Algae, Photo by Mary Gansberg.

The WDNR's current activities, which address harmful algal blooms in Wisconsin, include a partnership with the Department of Health Services (DHS) in conducting algal bloom and toxin sampling, and disseminating results as part of the DHS's Algal Bloom Surveillance System (HABISS), funded by a grant to the DHS from the Centers for Disease Control. The aim of the HABISS project is to track cases of human and animal illnesses possibly related to algal bloom exposure. The HABISS project has also funded additional DNR sampling efforts in areas with chronic algal bloom problems, including Lakes Tainter and Menomin in Dunn County, and the Petenwell and Castle Rock Flowages in Juneau County and Adams County.

Other WDNR efforts to inform Wisconsin residents about harmful algal blooms include outreach to individual citizens and lake associations, press releases in the summer to alert citizens to peak algal blooms, press releases in late summer and fall to alert hunters to the risks of algal blooms to waterfowl-retrieving dogs, and information posted on the WDNR's website. The website includes a page on blue-green algae, which addresses citizens' concerns about the health and aesthetic impacts of algal blooms, information on personal protective measures and control of blooms, and links to the DHS website and algae-related illness reporting portal.

For the past several years, large quantities of decaying algae, called Cladophora, have been fouling Wisconsin Lake Michigan shoreline. As the algae and organisms trapped in the algae rot, they generate a pungent septic odor that many people confuse with sewage. Nutrient sources like phosphorus and nitrogen, zebra mussels and declining lake levels have been implicated in the recent increase in nuisance algae. The presence of rotting Cladophora on Lake Michigan beaches presents aesthetic and odor problems that impair recreational use of Lake Michigan. Cladophora is a green algae, and does not produce toxins the way blue green algae can. Cladophora itself does not present a risk to human health. However, Cladophora rotting on a beach promotes bacterial growth that can pose a risk to human health. In addition, crustaceans that wash up with the algae can attract large flocks of gulls, resulting in high concentrations of fecal material and bacteria. WDNR plans to form a workgroup charged with developing a robust method for assessing the recreation use of Great Lakes nearshore waters. Because Lakes Michigan and Superior are large, interjurisdictional waters, the development of assessment protocols for the Great Lakes will be a collaborative effort with external partners, other waters quality agencies and the USEPA.

Mississippi River Unit Summary

Upper Mississippi River Restoration – Environmental Management Program – Long Term Resource Monitoring Program (LTRMP)

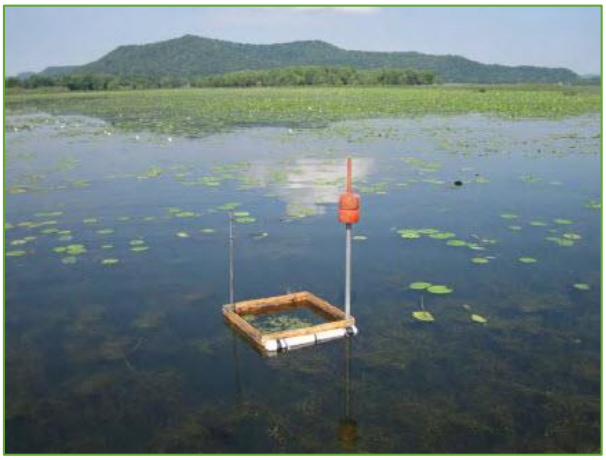
The Long Term Resource Monitoring Program (LTRMP) Exit DNR was authorized by Congress in 1986 as part of the U.S. Corps of Engineers' Environmental Management Program on the Upper Mississippi River (UMR). This program is being implemented by USGS with assistance and field support by the five UMR States (MN, IA, WI, IL and MO). It has been in place since 1988 and provides information on water quality, vegetation, fisheries and land-cover/land-use and other resource information used to assess the trends and ecological health of the Upper Mississippi River System (UMRS). The Department's LTRMP field station at La Crosse, WI carries out this monitoring program on navigational Pool 8 of the Mississippi River.

Pool 8 State of the Ecosystem Report [PDF]. This report provides a summary of water quality, fisheries and vegetation monitoring data collected by the LTRMP field station for years 1993 to 2012. Pool 8 underwent a change from a turbid, low submersed aquatic vegetation (SAV) system to one with greater water clarity and SAV frequency. This change was associated with notable changes in the fisheries community during the monitoring period. View the charts and graphs for the Mississippi River progress [PDF].

Submersed Macrophyte Index for the UMR. There is increased interest by state and federal resource managers to use bioassessment as a tool to assess the health of the Upper Mississippi River (UMR). In 2006-2008, aquatic macrophyte (plant) data was collected in main channel border (MCB) and side channel (SC) areas of Pools 1 to 11, UMR through the EPA's Environmental Monitoring and Assessment Program – Great Rivers Ecosystem (EMPA-GRE) Exit DNR. The data was used to develop a bioassessment tool – the Submersed Macrophyte Index (SMI). The index includes four metrics: percent frequency, abundance, species richness, and maximum depth of submersed plant occurrence. The index score ranges from 0 to 110 with higher scores reflecting environmental conditions favorable for the growth of aquatic macrophytes.

LTRMP samples aquatic plants in two UMR navigation pools along the Wisconsin border (Pool 4 near Pepin, WI and Pool 8 near La Crosse, WI). Although the sampling design was not identical to that utilized by EMAP-GRE, there was a desire to derive SMI values based on LTRMP vegetation surveys since this sampling program has a long monitoring record and to help support planned assessment activities that have been proposed by the Upper Mississippi River Basin Association (UMRBA Exit DNR) Water Quality Task Force Clean Water Act Monitoring Plan for the UMR. Currently, the LTRMP has a 14 year stratified random sampling (SRS) aquatic plant dataset. The SMI was calculated using the LTRMP data for main channel border and side channel strata (Figure 1). In general, the SMI has increased from 1998 to 2012

in upper and lower Pool 4 (above and below Lake Pepin, respectively) and Pool 8 in the main channel sampling stratum indicating submersed plants are improving in main channel areas. SMI values in all three side channel areas increased from 1998 and followed a temporal pattern that was roughly similar to what was observed in the main channel. We anticipate using LTRMP vegetation data in future Clean Water Act assessment reports since it provides annual information and it will help integrate information collected as part of LTRMP with data collected under the proposed UMRBA Water Quality Task Force Clean Water Act Monitoring Plan for the UMR.



Great River Fish Index for the Upper Mississippi River - Fish communities provide an excellent indicator of aquatic habitat and water quality conditions. As a result, fish are a key biological indicator for assessing aquatic life use in streams and rivers. The US EPA's EMAP- GRE project developed a biological index for fish for the UMR called the Great River Fish Index or GRFin. The UMRBA Water Quality Task Force recommend using this biotic index as part of their proposed Clean Water Act Monitoring Plan for the UMR. Substantial fisheries data are available for several study reaches on the Upper Mississippi and lower Illinois Rivers based on annual sampling conducted by LTRMP since the early 1990s.There was interest to see if GRFin scores could be derived from LTRMP data. Although LTRMP fish collection sampling procedures were not identical to those developed by EMAP-GRE, method comparisons revealed that reasonable estimates of the GRFin could be obtained using LTRMP fish data. This required combining five-200 m long electro fishing shoreline sampling runs from multiple sites using a random process to yield a relatively equivalent sampling effort to EMAP- GRE methods, which sampled 1000 m of shoreline. Further, in order to increase the sample size, data were compiled for summer (June-September) sampling runs over multiple years. In addition, fish weights were not routinely recorded in LTRMP sampling, but were required for GRFIn calculations, so they were estimated using length-weight relationships from other studies. More specific documentation of these methods are available by contacting our department's LTRMP fish component specialist in La Crosse. LTRMP-derived GRFin scores for the UMR navigation Pools 4, 8, 13 and 26 for the 2009 to 2011 period are illustrated in Figure 1. The range of scores ranged from about 3 to 9 on a 0 to 10 scale. Scores less than 4 generally indicate of poor water quality or habitat conditions. Pool 8 yielded the highest scores while Pool 26 had the lowest scores suggesting that unidentified water quality or habitat stressors were accounting for the difference in scores between the two pools.

LTRMP-derived GRfin scores were calculated for each study pool for three different aquatic areas or strata including the main channel border, side channels and contiguous backwater areas. This was done at varying yearly intervals for the 1994 to 2011 period. Comparisons of

GRFin scores for the main channel versus side channel borders indicated very similar results for a specific study pool suggesting similar water quality and habitat conditions for these two aquatic areas (Figure 3A). A similar GRFin score comparison between main channel border to contiguous backwaters also revealed a strong correlation between the two aquatic areas with the exception of Pool 26. The reason for this response was not determined but suggests habitat or water quality factors may be contributing to either high backwater scores or lower main channel scores in scores in this pool. Additional evaluations of LTRMP data are warranted to see what factors or stressors are contributing to longitudinal differences in GRFin scores.

Studies of duckweed and other free-floating plants (FFP) – These plants may form dense surface mats that reduce ecosystem health, and can impair public use of aquatic resources. The UMR has experienced a large increase in free-floating plants comprised of duckweeds and filamentous algae in recent years (Figure 4). Dense mats of FFP have been shown to create low oxygen conditions, reduce fish and invertebrate biomass, and decrease property values (Shawn do we have a reference for the last item?). During many years, a large proportion of backwater habitat is covered by these mats resulting in poor fish and wildlife habitat and reduced recreational opportunities. While much of the emphasis regarding excessive phosphorus and nitrogen loading to the UMR has focused on "The Dead Zone" in the Gulf of Mexico, it is becoming increasingly evident that high nutrient concentrations can have effects on the local ecosystem as well. The objective of these studies was to better understand the factors that are associated with the formation of dense surface mats of these plants. Favorable environmental conditions for FFP include abundant nitrogen and phosphorus, warm water temperature, shallow water depth, and low water velocity. Additionally, the presence of rooted aquatic plants (submersed, rooted floating-leaved, and emergent), which act as a substrate to hold FFP in place, has been associated with high FFP biomass. Studies indicated that relatively small changes in drivers such as water velocity, rooted aquatic plant cover, water depth, and nitrogen and phosphorus concentrations can produce relatively large changes in FFP biomass. The study also estimated thresholds of causal factors that were important in influencing FFP abundance. These factors included nutrient concentrations, water depth, current velocity, and rooted aquatic plant abundance.

Management actions on the Upper Mississippi River are often designed to alter water velocity and hydraulic connection between channel and off-channel areas. (e.g., constructing islands to reduce wind fetch and create shallow, sheltered areas). Factors influencing FFP development, along with observed patterns in nitrogen and phosphorus limitation, will help managers and project planners understand likely effects of rehabilitation project design on FFP abundance. Furthermore, the estimated phosphorus threshold is consistent with the numeric phosphorus criterion of < 0.1 mg/L total phosphorus for Wisconsin non-wadeable rivers (Wisconsin Administrative Code NR 102.06(3)); achieving this value may reduce the frequency of occurrence of large FFP mats in the UMR.

Recent published manuscripts and other reports evaluating duckweeds and free-floating plants prepared by LTRMP and Mississippi River Unit water quality staff include:

- Giblin, S.M., Houser, J.N., Sullivan, J.F., Langrehr, H.A., Rogala, J.T., and Campbell, B.D. 2014. Thresholds in the Response of Free-Floating Plant Abundance to Variation in Hydraulic Connectivity, Nutrients, and Macrophyte Abundance in a Large Floodplain River. Wetlands In Press
- Houser, J.N., Giblin, S.M., James, W.F., Langrehr, HA., Rogala, J.T., Sullivan, J.F., and Gray, B.R. 2013. Causes and consequences of abundant duckweed and filamentous algae in backwater lakes of the Upper Mississippi River near La Crosse, Wisconsin. River Systems 21:71-89
- Sullivan, J. and S. Giblin. 2012. Growth, Tissue Composition and Stoichiometry of Duckweed Grown in Low Nutrient Backwaters of the Upper Mississippi River [PDF]. Wisconsin Department of Natural Resources, La Crosse, Wisconsin.
- Sullivan, J. and S. Giblin. 2011. Continuous Dissolved Oxygen and Water Temperature Monitoring in Pool 8 Backwaters of the Upper Mississippi River May-September, 2010. Wisconsin Department of Natural Resources, La Crosse, Wisconsin. [PDF]
- Upper Mississippi River Restoration – Environmental Management Program – Habitat Rehabilitation and Enhancement Program (HREP)

Upper Mississippi River Basin Association (UMRBA) Water Quality Task Force Activities

The UMRBA Water Quality Task Force provides a forum for water resource management program coordination and consultation among the five state (IA, IL, MN, MO, and WI) water quality management agencies and US EPA Regions 5 and 7. The focus of the Task Force's activities in the past two years has been on the development of Clean Water Act Strategy and Recommended Monitoring Plan for the UMR [PDF]. The plan has been approved by the UMRBA Board and was endorsed by the UMRBA Water Quality Executive Committee at their recent meetings in February 2014. The plan, if funded, provides a consistent and coordinated interstate monitoring approach for assessing the water quality of UMR including the use of new biological assessment methods. This new monitoring initiative would enhance states' ability to track changes in water quality, provide consistency in identify water quality problems, help track nutrient reduction strategies and provide information assessing attainment of designated uses. Current efforts are now focused on the development of an assessment methodology which will provide guidance for evaluating attainment of the four major Clean Water Act designated uses for the UMR including: aquatic life, drinking water, human health (fish consumption) and recreation.

The CWA Monitoring Strategy for the UMR will not only consider water quality assessments of the main channel, which is the primary initial focus, but will also consider the need for developing assessment procedures for lateral aquatic areas including: side channel, contiguous backwater and impounded strata. Monitoring data collected as part federal Long Term Resource Monitoring Program is expected to facilitate this effort since this program has physical, chemical and biological information for major aquatic areas in several study reaches

in the UMR System. Part of this evaluation has begun as described previously where we are developing procedures to derive CWA Monitoring Plan biological indicators (fish and submersed macrophyte indices) using data collected by LTRMP.

LaCrosse Marsh Lead Studies

The La Crosse Gun Club operated a large trap shooting range on the southern edge of the La Crosse Marsh (Figure 6) for about 30 years (1932-1963). Cursory evaluations by the Department in 1989 and by an undergraduate student at the University of Wisconsin La Crosse (UW-La Crosse) in 1994 revealed moderate to high lead pellet densities in the upper foot of sediment in areas adjacent to the trap range. More detailed investigations by researchers at the UW-La Crosse in 2011 indicated maximum sediment lead concentrations of approximately 20,000 ug/g (ppm) with pellet densities exceeding 40,000 /m2. UW-La Crosse was successful in obtaining an USEPA Urban Waters Small Grant to conduct additional research and public outreach to describe that fate of this legacy lead contamination and potential threats to aquatic resources, wildlife and the public. The Department is cooperating with the UW-La Crosse in this effort and has undertaken additional monitoring to evaluate this site. The primary goals of this investigation include:

- Determine the extent and level of lead contamination in the La Crosse Marsh and identify threats to aquatic life, wildlife the public and determine the need for sediment remediation.
- Cooperate and provide assistance to University-lead research and monitoring efforts
- Educate the public and strengthen partnerships of marsh stakeholders
- Provide assessment methods for evaluating similarly impacted wetland

Monitoring conducted by the department in 2012 and 2013 confirmed the presence of very high sediment lead concentrations (~3,800 to 5,400 ppm) in the area where lead shot fall out was expected to be greatest (Figure 5). Time-composited sediment trap samples were collected in the spring and early summer of 2012 and 2013 to provide estimates of lead concentrations in suspended particulate matter. This sampling also revealed very high lead levels (~1,300-3,700 ppm) suggesting bed sediment levels were likely contributing to high water column lead concentrations due to sediment resuspension, bioturbation and other processes. Water sampling in the zone of highest sediment lead concentrations in 2013 indicated elevated lead concentrations ranging from about 8 to 68 ppm with a 4-day rolling average concentration of 12.3 ppm based on daily sampling from August 6th to 13th. This average concentration of lead was about one-third the chronic toxicity threshold (36 ppm) assuming a total water hardness of 130 ppm.

Sediment bioassays were performed by the Wisconsin State Laboratory of Hygine on samples collected from the Marsh in July 2012. Although sediments were found to have very high lead concentrations, sediment toxicity evaluations using the midge, Chironomus tentans, and the amphipod, Hyalella aztetca, were negative. The department is waiting for the results of additional studies that are being completed by the UW-La Crosse in addition to fish tissue samples collected by our department. Once this information is received and evaluated, a determination will be made concerning an impaired waters status (303d listing) and the need sediment remediation.

Beach Summary

USEPA National BEACH Act applies to coastal beaches which include the Great Lakes freshwater beaches. Along 55 miles of Wisconsin coastline, there are approximately 190 identified beaches that have been eligible for BEACH Act funding. Monitoring is the cornerstone, providing data-driven decision-making, including shoreline restorations and water quality impairment decisions (303D listing and delisting). These resources provide crucial underpinning for community investments in the water resources and tourism-related businesses generating billions of dollars along our coasts.

- List of Coastal Beaches and priority for monitoring
- Annual Reports and Monitoring Requirement

The grant funding has never covered the full cost of program operation and implementation so WDNR relies on its partners to implement the on-the-ground activities of Wisconsin's program. Inland lakes are not covered by the grant program. Beach monitoring or public notification activities for inland lakes are entirely voluntary. WDNR invests resources to monitor beaches at popular state parks.

Wisconsin's beach program is recognized nationally for its leadership and innovation. Through strong partnerships with county public health and parks departments, University of Wisconsin-Oshkosh and Milwaukee, Northland College and Wisconsin's Coastal Program (NOAA-funded),the beach program and its partners have leveraged limited grant resources to develop sanitary surveys, foster local adoption of same-day public notifications using predictive modeling, implement best management practices, and identify beaches with the best potential for restoration projects to improve water quality. Beach restorations in Racine and Door County provide shining examples of how an effective beach program benefits communities.

- http://dnr.wi.gov/topic/Beaches/predicting.html
- http://dnr.wi.gov/topic/Beaches/tools.html

As counties balance competing demands, budget cuts and funding uncertainties have destabilized the beach monitoring program. Operation and maintenance of the Beach Health website and public notification systems (like new smart phone applications) tied to it provide critical outreach mechanisms that are valued by the public. These established systems represent an opportunity for effective communication when dangerous coastal conditions like rip currents exist. Beach Health Public notification and data

Great Lakes Year in Review

Report for Great Lakes Commission Annual Summary, March 1, 2013 through February 28, 2014. The information below highlights significant accomplishments, unique partnerships, innovative project approaches, and other information that may be of interest to the Great Lakes community.

Area of Concern projects & progress

Lower Green Bay and Fox River AOC: The wave barrier, side dikes, and off-loading facility for the Cat Island Chain Restoration Project were completed in 2013. The islands will be filled using clean dredge material from the maintenance of the Green Bay Harbor over the next 20 to 30 years. Restoring the islands will lead to recovery of a significant portion of the lower bay habitat and will benefit sport and commercial fisheries, colonial nesting water birds, shorebirds, waterfowl, marsh nesting birds, amphibians, turtles, invertebrates and fur-bearing mammals. BUIs addressed include Degradation of Fish & Wildlife Populations and Loss of Fish & Wildlife Habitat.

Sheboygan River AOC: More than 400,000 cubic yards of contaminated sediment were removed from the Sheboygan River in 2012. In May, 2013 an additional 494 tons of PAH contaminated sediment was removed from an area near the Pennsylvania Avenue bridge. To address lower level residual contamination after dredging, approximately 9 acres of river bottom was covered with 6 inches of clean sand between May 28 and July 10, 2013. Due to flooding and ice flows in the winter of 2013, maintenance and some minor repair of the 2012 habitat restoration projects occurred in June and July, 2013. The habitat projects restored native plants to approximately 34 acres along more than 18,000 feet of shoreline. Assessment and evaluation of the habitat projects continues. Treatment of invasive plant species is on-going along the river. A draft fish and wildlife restoration plan for the Area of Concern was presented to the Technical Advisory Committee in January, 2014. The Sheboygan River "Eutrophication or Undesirable Algae" BUI and the "Dredging Restrictions" BUI are targeted for removal in 2014 after pending public input sessions. A BUI verification monitoring plan has been developed to further assess progress towards removal of other BUI's in the Sheboygan River AOC. The US Fish & Wildlife Service, NOAA and Wisconsin DNR are the NRDA Trustees for the Sheboygan River. The trustees are working with responsible parties to address natural resource damages on the Sheboygan River. Restoration criteria have been developed by the trustees for future NRDA restoration projects.

Milwaukee River Estuary AOC: In 2013, the Milwaukee Estuary received funding for two important habitat projects. The Milwaukee Metropolitan Sewerage District received $767,000 in federal funds from NOAA, the National Fish and Wildlife Foundation (Sustain our Great Lakes), and the Great Lakes Fishery Trust to restore fish passage to approximately 34 river miles on the Menomonee River. The River Revitalization Foundation received $496,000 to

stabilize stream bank, remove shoreline structures, control invasive species, and restore native riparian habitat on a 4-acre site along the Milwaukee River. The estuary also received nearly $1.25 million from EPA to conduct assessments necessary to remove impairments related to benthos and plankton, recreational restrictions, and fish and wildlife populations.

St. Louis River AOC: A strong bi-state effort continues in the St. Louis River AOC. The 2013 *RAP Update: The Road map to Delisting* was finalized in July 2013. The Roadmap includes 58 actions necessary to meet the BUI removal targets and delist the AOC by 2025. The Wisconsin DNR is partnering with USEPA Great Lakes National Program Office (GLNPO) for sediment characterization in Crawford Creek and the Nemadji River under the Great Lakes Legacy Act. A removal package for the Aesthetics BUI is being drafted and the first BUI removal in the AOC is anticipated in 2015. Additionally, the 21st Ave West pilot project was initiated in Duluth-Superior harbor in 2013 to demonstrate how wetland habitat can be restored in the harbor using dredge materials containing acceptable levels of contamination. The project started in June 2013 and around 90,000 cubic yards of dredge material was placed during the first year of the pilot to restore shallow water habitat. This project will continue for 2 more years and has many partners conducting restoration and monitoring including MPCA, USACE, WDNR, MDNR, EPA, Port Authority, UM-Duluth and others.

Lower Menominee River AOC: The Wisconsin DNR and partners documented actions needed to restore the AOC in the 2014 RAP and Fish and Wildlife Plan Updates. The recommendations of the 2014 RAP and Fish and Wildlife Plan Updates were initiated through science-based monitoring of the avian and fishery communities. Intensive invasive plant management activities were conducted on four islands, one of which is a colonial-nesting waterbird rookery significant to the entire Bay of Green Bay ecosystem. Public outreach continued through community events and production of the *Menominee River Area of Concern: Changing Waters*video. Continued high levels of activity are expected in the AOC leading up to the completion of all management actions necessary for delisting. WPSC former MGP Site Marinette, WI

Additional progress on sediment cleanups within AOCs

Fox River Cleanup (Lower Green Bay & Fox River AOC):The Fox River PCB remediation project is now entering its 10th year. During the 2013 field season, remediation of contaminated sediments took place in Operational Unit 4 (OU-4) between the Depere Dam and the Chicago and North Western Railroad Bridge, including the Fort Howard Turning Basin. High-volume dredging and sand capping took place simultaneously throughout the four river miles comprising the above described work area. A total of 584,266 cubic yards of sediment were dredged during this time. Hydrocylonic separators removed 89,450 tons of sand from dredge spoils and this sand, having an average PCB concentration less than .072 ppm, was beneficially incorporated into the reconstruction of Hwy. 41 in Green Bay. The remaining spoils were mechanically dewatered and resulted in 274,970 tons of dry sediment cake that was hauled by truck to the Advanced Disposal Landfill in Chilton. Filtration and treatment of interstitial and

carriage water resulted in 876 million gallons of clean water returned to the Fox River. Clean sand and armoring gravel was used to create single and multi-layer caps placed over 113 acres of the river bed. Dredge and capping performance during the 2013 calendar year served as assurance to the DNR/EPA Agency Oversight Team that the project will meet its goal of completion by 2017.

Ansul/Tyco arsenic contaminated site (Lower Menominee River AOC): Dredging began in 2012 and continued through November 2013 with just under 260,000 cubic yards of sediment removed from the Lower Menominee River. Tyco is currently negotiating with USEPA and DNR on a Great Lakes Legacy Act Betterment Project. The Betterment Project will remove another 40,000 cubic yards of sediment down to 20 ppm total arsenic during the 2014 dredge season. This will enable the AOC to reach its goals before the 10-year Monitored Natural Recovery period (normal process) without a Betterment Project.

Menekaunee Harbor (Lower Menominee River AOC): After years of planning, the City of Marinette and WDNR with financial support through the GLRI are poised to begin Menekaunee Harbor Restoration activities this spring. 2014 activities include removal of the failing seawall, removal of contaminated and excess sediment, and habitat restoration. All work is expected to be completed in 2015. The City and WDNR share a vision for the Harbor which includes better public access, improved economic and recreational opportunities, a cleaner environment, and spawning habitat vital to fish and wildlife like the Great Lakes Musky.

WPSC former MGP Site Marinette, WI: EPA led Superfund project to remove coal tar contaminated sediments at the former manufactured coal gas plant located east of the State HWY 41 Bridge in Marinette. A total of 15,028 cubic yards of PAH contaminated sediment was removed from the Menominee River, processed and delivered to Waste Management Landfill in Menominee, Michigan for disposal. Dredging was completed in March, 2013. Confirmation sampling indicates PAH's above the clean-up goal in an area near Nestegg Marine and the adjacent cove. EPA approved a 10" sand cover design and contractors have installed the sand cover. EPA & WDNR approved "The Residual Sand Cover Monitoring Plan". A reactive core mat was installed to control the upland source of contamination from surface water impacts. In addition, soil and vapor intrusion are currently under investigation to determine potential future remediation in the upland areas.

Lincoln Park (Milwaukee Estuary AOC): The USEPA, Wisconsin DNR and Milwaukee County continue work on the Lincoln Park EPA Great Lakes Legacy Project. Final design is underway for the final Phase 2 portion of the site to address 35,000 cubic yards of PCB and PAH contaminated sediment. This will eliminate what was once the largest source of PCBs to the Milwaukee River. Next the project will be sent for bidding by EPA pre-approved contractors with construction planned to begin in mid-2014. The estimated cost is $18 million.

Howard's Bay (St. Louis River AOC): Wisconsin DNR is collaborating with Fraser Shipyards, the City of Superior, U.S. Army Corps of Engineers (USACE), and U.S. EPA's Great Lakes National Program Office (GLNPO) on a project for dredging contaminated sediments in Howards Bay.

Sampling was completed in 2013 to align dredging of the navigation channel by USACE with environmental dredging. The sampling was a successful collaboration between Fraser Shipyards, WDNR and EPA with USACE and EPA picking up the analytical costs. A joint application was submitted for Great Lakes Legacy Act assistance to complete a feasibility study and remedial design (FS/RD) and a project agreement is expected soon. The FS/RD will be done during 2014. Dredging of the selected design is scheduled to be carried out in 2015 and is expected to include beneficial reuse of dredge material.

Sediment remediation and toxic contaminant cleanup projects outside of AOCs

Ashland MGP Site (Northern States Power, Wisconsin): Currently the Ashland EPA Superfund Site is split into two Phases (I and II), representing the land and off-shore remediation, respectively. The on-land portion has a selected remedy that is currently in design, which is expected to continue through 2013 with implementation starting in 2014. The off-shore (Phase II) portion has a selected remedy that is being challenged by the responsible party. Extensive geotechnical testing and expert peer review is underway to evaluate the constructability of the ROD selected remedy of dry excavation. As allowed under the ROD the RP has elected to implement an alternative wet dredge pilot test to demonstrate that the alternative can meet the ROD performance standard. The design of the pilot is currently underway; implementation is planned for 2014.

Hayton: The Hayton Area Remediation Project (HARP) is a multi-year cleanup of PCB sediment in tributaries of the South Branch of the Manitowoc River, Calumet County. Over the past two years, the responsible party has been performing recovery monitoring on six miles of cleaned stream and floodplain. It is the Department's intent to have cleanup construction restarted for the remaining three miles of stream in 2014.

Portage Canal: The Department is currently working with City of Portage ad-hoc committee to develop a solution for the contaminated sediment. The Department has collected sediment cores for a detailed evaluation of the contaminated sediment. Ecological and human health risks are being evaluated. Next will be a feasibility study of remedial options and costs.

Rippon MGP site (Alliant Energy): Alliant's contractors implemented the sediment cleanup action at the site in the winter of 2013-14. 4,000 tons of MGP waste contaminated sediment were removed and the site was capped with a patented ebullition-controlling cap to prevent the upward migration of deeper contamination. The millpond contours and shoreline were restored with a backfill of sand and gravel and riprap. Site monitoring will continue for three years to verify the performance of the remedy.

Beaches/coastal health

Restorations: Door County continues to lead in its efforts to restore beaches along its

coastline, completing another restoration early this year at Washington Island's Gislason Beach. Capitalizing on the efforts to identify the sources of contamination at impaired beaches, Racine Health Department and University of Wisconsin – Oshkosh secured funding to provide engineering designs and implementation strategies to make beach restoration more affordable and do-able for local communities along the Lake Michigan and Superior coasts. As a result, more restorations will be completed along the coasts this year. The partnerships formed through these efforts enabled Wisconsin's beach health program to maintain a monitoring presence at many beaches in the face of current fiscal challenges.

Nowcasting: In an award winning effort to make science accessible to local decision-makers, Wisconsin partnered with USGS to create automated systems for retrieving National Weather Service and NOAA data into Virtual Beach, the application used to predict water quality exceedances at beaches. To date, 21 Wisconsin beaches have operational Nowcasts and with the streamlined data retrieval, the time needed to develop a Nowcast in Virtual Beach has been cut 80% and local beach managers can generate daily Nowcasts in a matter of minutes.

Nutrients

Wisconsin's Nutrient Reduction Strategy: completed and submitted to EPA in December 2013.

Phosphorus Rule: Wisconsin adopted a phosphorus rule in 2010 that resulted in the need to integrate new standards into WPDES permits. WDNR is working with partners to find economically viable compliance options for phosphorus that achieve our water quality and watershed goals. Innovative compliance approaches including adaptive management and water quality trading are being investigated, and several resources have been developed to assist in their implementation including guidance documents, factsheets, and a webinar series. WDNR is also supporting the Fox P Trade project to investigate trading in the Lower Fox basin. The Department along with its partners continues its effort to grapple with this very important complex environmental issue.

Fox-Wolf Watershed: As the largest source of phosphorus from Wisconsin to Lake Michigan, the Fox-Wolf Watershed is critically important for addressing nutrient-related problems in the lake. In 2013, the Great Lakes Commission hired a Field Coordinator to support a 3-year initiative to design a water quality trading program for phosphorus in the Lower Fox River watershed. NRCS allocated $3 million for conservation practices in P reduction areas (which include a large part of the Lower Fox watershed). The Department is in implementation planning stages for the Lower Fox River TMDL and has formed committees to assist with the following activities: preparation of agricultural inventory; water quality monitoring; and outreach. EPA used GLRI funds to hire a consultant that will develop total P and TSS TMDLs in cooperation with DNR and EPA for the Upper Fox & Wolf Basins. USGS will perform the modeling requirements for four (4) of the lakes contained within the basins (Lake Winnebago, Lake Poygan, Lake Winneconne, Lake Butte des Morts); CADMUS to model/address the remaining impaired lakes in the basin.

Great Lakes Compact

With Compact implementation, annual water withdrawal reporting has risen to 95% of all registered withdrawal sources. Wisconsin is improving its tools for evaluating whether proposed withdrawals will result in significant adverse impacts to water resources. These tools include:

- An updated model that predicts streamflow statistics for all stream reaches in the state.
- An improved hydrogeologic dataviewer that pulls together a variety of data sources in a spatial viewer.
- A pilot groundwater flow model to evaluate management alternatives in a water stress stream basin.
- Initiating an updated springs inventory for the state verifying location, flow and establishing reference springs for long term monitoring.

The Department continues to participate in promoting Fix a Leak Week – an EPA sponsored week in March encouraging home owners to check for and fix leaks. The Department also participates annually at an exhibit in the DNR Park at the Wisconsin State Fair promoting water efficient fixtures, understanding of where drinking water comes from and finding and fixing leaks. Development of water conservation and efficiency education and outreach trainings for teachers is also ongoing. In addition, the Wisconsin DNR continues to review the City of Waukesha application for a diversion of Great Lakes water. Additional information was submitted to the DNR in October 2013.

Aquatic Invasive Species

Phragmites control: The US Fish and Wildlife Service (Great Lake Restoration Initiative – GLRI) provided $200,000 to control invasive Phragmites in the Lake Michigan basin. Wisconsin DNR is using the funds to find the leading western edge of the population and chemically controlling pioneering infestations. A priority is to keep Phragmites out of the lake rich areas of northern Wisconsin. Treatment is targeted for the fall of 2014. Two hundred acres are expected to be controlled.

Clean Boats, Clean Waters program: Volunteers and paid staff throughout the state spent nearly 69,000 hours inspecting over 114,000 boats and talked to over 228,000 boaters at boat launches in 2013. Boaters are reminded to take the necessary steps to prevent the spread of AIS (Inspect, Remove, Drain and Never move live fish). This program is one of the foundations of the states AIS program and continues to be a major source of AIS information for boaters.

AIS monitoring: DNR is in the midst of a five year study (2011 through 2015) to understand how widespread aquatic invasive species are in lakes with public boat landings, and how fast they are spreading. The study will also provide insight as to whether the education and outreach that has been done with partners is working to slow the spread of invasive

species. Preliminary results show that of the ~15,000 lakes in Wisconsin, only 164 lakes are invaded by zebra mussels and only 6 lakes are invaded by spiny water fleas. Out of 184 invasive species introduced to Lake Michigan over the past century, just 29 have made it to inland Wisconsin lakes. More than 90 percent of boaters in Wisconsin say that they are aware of AIS laws. Wisconsin is also developing an AIS stream monitoring program to increase our knowledge of the distribution of AIS in streams.

Boater survey: In 2012 and 2013 the DNR collected information from boaters at the Sturgeon Bay boat launch on the Lake Michigan shoreline to learn if boaters would be interested in having their boats and trailers cleaned of AIS. Decontamination equipment was stationed at the launch and staffed with Department employees. Staff contacted boaters to learn about their AIS knowledge, compliance with AIS laws and their willingness to have their equipment cleaned before leaving the launch. Boaters showed a strong interest in having their equipment cleaned if it didn't cost too much or take too long. Most boaters felt the equipment would be effective at preventing the spread of AIS to inland waters. Thirteen percent of boaters were considered high risk because they stated they would be boating on an inland water body in the next five days. This effort will be used to guide the Department's prevention efforts along the Great Lakes.

Interstate cooperation – Wisconsin cooperated with Minnesota and Michigan to produce a Public Service Announcement that informs boaters about the steps they should take to prevent the spread of AIS. Wisconsin is also initiating talks with the other Great Lake states to coordinate early detection, rapid assessment and rapid response planning in the Great Lakes. Interstate cooperative efforts will improve the regions ability to prevent, contain and control AIS.

New Zealand Mudsnails – In 2013, New Zealand Mudsnails were found in Black Earth Creek, which is a trophy trout stream in south central Wisconsin. The snail is the first inland location in Wisconsin and the Midwest. The snail is believed to have been brought to Wisconsin on the waders of an angler that visited a trout stream out west. The finding is prompting Wisconsin to increase its outreach to trout anglers, trappers and waterfowl hunters.

Ballast Water

Continued Compliance: Department ballast water staff conducted 58 compliance inspections of vessels (32 for Lake Superior, 26 for Lake Michigan), which is nearly one quarter of all ballast water permittees, the highest inspection rate in the wastewater program. Each vessel inspected received a follow-up letter, which often included recommendations to improve ballast water management plans or best management practices. At the end of the shipping season, inspectors reviewed arrival logs and sent effective Notices of Noncompliance to all companies that operated without permits.

Supporting research: The Department continues fostering positive working relationships with

research institutions that are making progress in ballast water treatment system development and testing. In addition to reviewing proposals, writing support for research projects and doing peer reviews for National Parks Service, United States Geological Survey and Great Ships Initiative projects, program staff continued to lend a hand to critical university research, occasionally participating in ballast water sampling during inspections.

Outreach and Education: The Department continues to conduct outreach and educational activities regarding ballast water at various conferences throughout the state and for crew members during inspections.

Collaboration: The Department continues to participate in the Ballast Water Collaborative with the U.S. Saint Lawrence Seaway Development Corporation, International Joint Commission, the shipping industry and other state and federal regulators on ballast water and invasive species issues in the region.

Fisheries

Lake Michigan Integrated Fisheries Management Plan: The Lake Michigan Integrated Fisheries Management Plan guides the management of sport and commercial fisheries in Wisconsin waters of Lake Michigan. The current ten-year plan expires in 2013 and a new plan is under development for 2014-2023. We are engaging fisheries and law enforcement personnel working on Lake Michigan, the interested public, DNR staff in all related programs, and external partners in developing the plan. After final internal review we will be bringing the draft plan out for public comment late this spring.

Updated fish consumption advisories: Every year DNR, in consultation with Department of Health Services, examines new data and data from recent years to re-evaluate fish consumption advice. Updated advice released in August 2013 suggests that ongoing cleanup of PCBs from the Fox River is beginning to pay off, with anglers able to eat more of some fish species from stretches of the river and from Green Bay. Also, fish consumption advice was relaxed for five fish species from Lake Superior

Passing Lake Sturgeon above the first upstream dam on the Menominee River: WDNR Fisheries program staff were instrumental in finalizing an agreement between North American Hydro Power Company, the State of Michigan, The River Alliance of Wisconsin and the U.S. Fish and Wildlife Service that governs operation and construction of a trap and transport-type “fish ladder” to be constructed on the first upstream dam on the Menominee River, which forms the Wisconsin-Michigan border at Marinette. After years of negotiations, GLRI monies will construct this passageway and spawning lake sturgeon will have access to their historical spawning grounds. Construction on the first stage of downstream passage is anticipated to be completed in 2014 with construction beginning this spring. Other stages are under development with construction planned for 2015

Fisheries BUI-setting activities in Menominee River AOC

Department staff investigated the development and assessment of the "degradation of fish and wildlife populations" BUI in the Lower Menominee River AOC and developed criteria for fish species of interest, as established by citizens and technical experts. Preliminary results of sampling suggest that relative abundance for most species exceeds the established target, but additional surveys are considered necessary.

This work resulted in an article entitled "Decision Criteria Development and Methodology for the Degraded Fish Population Beneficial Use Impairment in Wisconsin's Lower Menominee River Area of Concern" in the December 2013 issue of *Environmental Practices* (Vol. 15, Issue 4, pages 393 - 400).

Lake trout quotas: Department staff held negotiations with tribal governments (Red Cliff and Bad River) to establish quotas for Lake Trout in the Apostle Islands region of Lake Superior. These negotiations used to occur once every three years. However, recently we have been meeting annually because the stock has been in decline.

Fish Tumor Beneficial Use Impairment Evaluation: Two hundred white suckers were sampled for liver tumor presence and stable isotopes. Isotopes are used to determine the relative time spent in the AOC compared to the lake. The following AOCs were sampled in partnership with USGS, EPA and the University of Wisconsin –Madison: Sheboygan, St Louis (2 separate years), and Milwaukee. White suckers were also collected from the reference site of Kewaunee River and collected previously in Mountain Bay Ontario (reference site in L. Superior for St. Louis AOC). White sucker tumor incidence rates were found to be slightly higher than target levels in all sampled AOCs. However, additional collection of reference site information (e.g. Root River in 2014) as well as analysis of white sucker isotopic ratios may change the picture from barely too high to barely acceptable. Results are expected in Winter 2014/2015. Overall, results are better than expected given most of the sediment remediation has only recently occurred.

Whitefish population growth in Great Lakes tributaries**:** Whitefish are re-establishing in a number of Lake Michigan tributaries. Department fisheries managers recorded strong year classes of younger whitefish as well as fish in spawning condition in the Fox, Peshtigo, and Oconto Rivers. (Whitefish had previously recolonized the Menominee River.) Water quality and habitat improvements are factors in the population growth, but may not tell the whole story. The Department is providing funding through a Great Lakes Protection Fund grant to UW Green Bay and DNR Fisheries staff to investigate the extent of the whitefish resurgence and additional factors that may be involved.

Lake Michigan fish stocking reductions: Concern related to the depletion of forage fish in Lake Michigan has resulted in lakewide stocking reductions based on quantitative modeling and substantial public involvement. Stocking plans resulted from a collaborative effort between the states surrounding Lake Michigan.

Runoff Program Summary

Nonpoint source (NPS) pollution, also known as polluted runoff, is a leading cause of water quality problems in Wisconsin. WDNR's Runoff Management Program focuses on managing nonpoint source pollution through reductions of urban stormwater pollution, agricultural runoff, and large farms (Concentrated Animal Feeding Operations, or CAFOs).

- Nonpoint Website
- Stormwater website
- CAFO website

The Runoff Management program coordinates several types of grants for entities dealing with nonpoint source management, described here:

- Targeted Runoff Management (TRM) grants are for local governments for controlling nonpoint source pollution
- Urban grants reimburse local governments for the costs of planning or construction projects controlling urban nonpoint source and storm water runoff pollution
- Notice of Discharge (NOD) grants offer cost-share funding to governmental units working with owners and operators of livestock operations to meet pollution control requirements imposed by the DNR

A synopsis of grant funding distributed by the WDNR for these programs (2012 and earlier) can be found at the Land and Water Conservation Annual Report Website

Wastewater Management Program Summary

The WDNR regulates municipalities, industrial facilities and significant animal waste operations discharging to surface waters or groundwater of the State of Wisconsin through the Wisconsin Pollution Discharge Elimination System (WPDES) Permit Program (See Runoff Management Section E3 for discussion of WPDES permits for stormwater and animal waste). No person may legally discharge to surface waters or the groundwater of the State without a permit issued under this authority. All permits issued under the WPDES permit program are either specific permits or general permits and may contain the following:

- Effluent limits for conventional pollutants and toxic substances in the discharge
- Limitations on the quality and disposal practices for sludge (biosolids) and by-products solids
- Pretreatment requirements, where applicable

- Compliance schedules for facility improvements
- Monitoring and reporting requirements
- Management practices that minimize the release of pollutants

Specific permits are issued to individual facilities that have unique, complex issues. WDNR imposes unique requirements where necessary, and tailors standard requirements to fi t circumstances as appropriate. General permits (GPs) are issued to cover a group of facilities with similar discharges which may be located anywhere in the State. Coverage under a general permit is conferred to each individual facility. The WDNR makes a determination on whether a particular facility is appropriately covered by a general or specific permit. There are 25 separate general permits that may be used to cover applicable discharges ranging from non-contact cooling water, to land application, to non-metallic mining operations. Approximately 5650 facilities are covered under all general permits. The newest general permits issued in 2011 were four pesticide GPs and a Large Dairy CAFO GP.

Timely Permit Issuance

Timely issuance of WPDES permits is an important goal for WDNR. However, in some instances staff are not able to reissue permits before the 5-year term expires. In 2011, new phosphorus and thermal regulations were adopted significantly increasing the complexity of WPDES permits. These regulations along with staff vacancies had an impact on WDNR's permit backlog. On January 1, 2012, the backlog of industrial and municipal permits, including both surface and groundwater discharges, was 34%. The goal of the WPDES permit program is to ensure that the Department does not exceed a statewide backlog of more than 10% at any time. WDNR has recently hired new staff to help meet the backlog, and they are in the process of learning the WPDES permit program. These resources have reduced the permit backlog to 29% as of February 13, 2014, and is expected to continue to decrease. Under Wisconsin law, any permit that has expired continues in effect until it is reissued or revoked. A facility with an expired permit, therefore, is still restricted in the amount of pollutants that it can discharge, as if the permit has not expired. There are several reasons that a permit may not be issued prior to the expiration date, including: awaiting additional data from the permittee, public or other comment necessitating additional review, or a permittee is not in substantial compliance with the terms of the expired permit, and enforcement action is underway.

Effluent Limitations

Each permit contains effluent limitations based on the type of facility or water quality-based effluent limitations calculated to meet water quality standards. Effluent limitations may regulate the allowable amounts of biochemical oxygen demand, suspended solids, pH, nutrients, chlorine, temperature, other toxic substances, or other conditions, depending on the type of facility and the water to which it is discharged. The need for whole effluent toxicity testing is evaluated for permits that discharge to surface waters.

Biosolids and Sludge Disposal

Most municipal in Wisconsin land apply their wastewater treatment biosolids (or treated sludge) on agricultural land as a soil conditioner or fertilizer. Biosolids either applied to farmland, or distributed for individual use as an exceptional quality product, are generated from approximately 98 percent of Wisconsin's permitted municipal facilities. In 2012, 213 facilities disposed of solids: 208 of these facilities either beneficially reused the material or hauled the material to a facility that beneficially reused it, one incinerated the material, and four disposed of the material by only disposing into a licensed landfill. In addition to these facilities that dispose of biosolids annually, there are 375 permitted facilities which treat wastewater in lagoon systems or other systems which only require removal of sludge on an infrequent basis (10-20 year cycles). Nearly all of the generators that infrequently dispose of their material land apply their biosolids. Almost 50 percent of the costs incurred to construct, operate and maintain a municipal wastewater treatment facility are directly related to processing, handling, treating and recycling the wastewater sludges or biosolids. Phosphorus concentrations in biosolids have increased, and may continue to increase as Wisconsin continues to limit the concentration of phosphorus in the effluent that is discharged directly to surface waters. Removing the phosphorus in the effluent in wastewater transfers the phosphorus to the biosolids. It is therefore important that biosolids be managed in ways that keep biosolids on the land and minimize the potential for phosphorus runoff to surface waters. Regulations and permit conditions control the amount of biosolids that may be land-applied depending on the soil, slope, time of year, proximity to residences and wells, and other factors. Current application rates are limited by hydraulic rates and nitrogen agronomic needs of the crop to be grown, using 4-year soil testing results to establish baselines. While phosphorus application rates are not currently required by applicable biosolids code requirements, P-based nutrient management is encouraged and is being promoted as one alternative to more stringent effluent concentrations of phosphorus. Many industrial facilities such as paper mills and food processors recycle their wastewater and sludge to reuse nutrients and/or to improve soil conditions. Industrial sludges, by-product solids and industrial wastewaters are land applied providing use of nutrient rich and/or carbon based additives improving the fertility of soils. Facilities conduct monitoring of wastewater streams and land apply after meeting stringent requirements. Wisconsin also regulates all septage pumped from approximately 700,000 septic systems and approximately 30,000 holding tanks. Approximately 80% of the septic systems currently serviced are maintained pursuant to required maintenance schedules, while the other half of the septic systems will have required maintenance schedules prior to Oct of 2019. Septage removed from septic or holding tanks must either be taken to a wastewater treatment plant for further treatment, or directly land- applied following stringent treatment or barrier application methods. The same land application site criteria apply to septage as to sludge. Wisconsin uses a licensing and certification system for approximately 500 septage servicing businesses and nearly 1200 septic servicing personnel. Servicing businesses are required to maintain service and disposal records. Personnel are required to obtain continuing education.

Pretreatment

Pretreatment dischargers are industrial facilities that do not discharge their wastewater directly to the waters of the State, but instead discharge into a municipal sewerage treatment plant. The WDNR has been delegated the authority to administer this federal program. Twenty-six municipal governments in the State are responsible for meeting state and federal requirements for implementation of pretreatment requirements. These "control authorities" regulate discharges to their systems from 545 users through the issuance of permits and other local controls. Industrial discharges that are subject to the pretreatment requirements of the State, but are not within the systems of these municipal control authorities, must obtain permits directly from WDNR. There are a total of 144 facilities that receive permits directly from WDNR.

Compliance Maintenance Program

The Compliance Maintenance program is one of the successful cornerstones of the Wisconsin Department of Natural Resources regulatory municipal point source watershed management, and WPDES program. The only program of its kind in the country, the web-based Compliance Maintenance Annual Report (eCMAR) is a self-evaluation report and grading system for Wisconsin's domestic wastewater treatment plants and sanitary sewer systems. Since its beginning in 1987, the compliance maintenance program has been extremely successful in achieving its purpose of "encouraging and, where necessary, requiring owners of publicly and privately owned domestic wastewater treatment works to take necessary actions to avoid water quality degradation, and prevent violations of WPDES permit effluent limits and conditions. Compliance maintenance has promoted an owner's awareness and responsibility for wastewater conveyance and treatment needs; maximized the useful life and performance of treatment works through improved operation and maintenance, and initiated formal planning, design and construction to prevent WPDES permit violations". Through a conventional and readily understandable grading system, the eCMAR brings awareness and understanding to governing officials about wastewater capital and management needs. Most importantly, it fosters communication among governing officials, operators, and the Department about the wastewater treatment plant and collection system. Governing bodies must review each year's CMAR and pass a resolution regarding it. Low grades require recommendations or action plans by the community to address the cause of any problems or deficiencies, and improve the wastewater treatment system. Owners of wastewater treatment facilities, as well as collection systems, including satellite systems, are required by the compliance maintenance requirements of ch. NR 208, Wis. Adm. Code, to electronically submit an annual report. The eCMAR has thirteen sections, a grading section, and resolution. Wastewater treatment plants complete various sections of the CMAR depending on their type of treatment system and their effluent limits. Satellite collection systems complete two sections of the CMAR: Sanitary Sewer Collection Systems, and Financial Management. Performance indicators and trend graphs are automatically generated as part of this section of the CMAR to help operators evaluate the success of their Capacity, Management, Operation &

Maintenance (CMOM), or Operation & Maintenance (O&M) program. The questions in the collection system sections of the annual report are to guide operators in developing a CMOM program, and in the operation & maintenance, and financial management of their collection system.

Enforcement and Compliance Assistance

The WDNR monitors permitted discharges to assure permittees are complying with the terms and conditions of their permits. This "compliance assurance process" takes several forms and includes:

- Compliance maintenance - working with and assisting facilities to remain compliant
- Compliance assessment - conducting inspections of facilities and on-site assessments, reviews of discharge monitoring reports and other reports for compliance, follow-up on self-reported violations
- Enforcement - formal actions taken when a significant violation is identified, including notification of violation of a permit condition, formal enforcement conferences and/or contacts, and referral to the State Department of Justice (DOJ).

A SWAMP-based inspection checklist and detailed guidance were developed so that wastewater treatment plant inspections are done consistently, and documented in the Department database. A special computer program was developed and is being used that allows inspectors to write and package inspection reports including supporting documentation. Once completed, inspection reports are available to municipal officials and operators through the DNR *SwitchBoard*.

Science Services Research Summary

Science Services: partners in managing our water resources

Much of the cutting edge research on key water assessment parameters and scientific findings occurs in an arm of the DNR that works in cooperation with the Water Quality and Watershed Management Programs: Science Services. Below are key links to areas of critical concern and interest to DNR for current and future understanding of water resources.

Videos

- Mississippi River Island Restoration at Capoli Slough near Ferryville, Wisconsin You Tube
- Wisconsin DNR Fish Mapping Tool You Tube
- Little Rock Lake Acidification Research Experiment You Tube

Projects - Read Summaries

Landscape Dynamics; Restoration Ecology; Invasive Species; Great Lakes; Mississippi River; Groundwater/Drinking Water and Water Use; Inland Lakes; Rivers, Streams and Wetlands; Dam Removal and Fish Passage; Sustainable Fisheries; Nongame Species; Fish, Wildlife and Plant Genetics; Nutrient Impacts to Surface Waters; Contaminated Sediments; Vapor Intrusion; Pesticides; Mining Impacts; Beach Pathogens; Harmful Blue-Green Algae; Fish & Wildlife Contaminants; fisheries and Wildlife Impacts; Fish Population Modeling and Regulations Monitoring; Biological Criteria and Designated Uses; Baseline Assessment and Monitoring; Customer Satisfaction and Behavior; Long-Term Monitoring and Foundational Science.

Technical Papers

- Introduction to Standardized Collection and Assessment of Macroinvertebrates in Nonwadeable Rivers of Wisconsin, 2011- Brian Weigel.
- Identifying Biotic Integrity and Water Chemistry Relations in Nonwadeable Rivers of Wisconsin: Toward the Development of Nutrient Criteria, 2011 - Brian Weigel, Dale Robertson.
- Influence of Riffle and Snag Habitat Specific Sampling on Stream Macroinvertebrate Assemblage Measures in Bioassessment, 2006 - Weigel, et al.
- Buffer Width and Continuity for Preserving Stream Health in Agricultural Landscapes, 2005 - Brian Weigel.
- Development of Stream Macroinvertebrate Models that Predict Watershed and Local stressors in Wisconsin, 2003 - Brian Weigel.
- Using the Index of Biotic Integrity (IBI) to Measure the Environmental Quality of Warmwater Streams, 2002 - John Lyons.
- Development, Validation, and Application of a Fish-Based Index of Biotic Integrity for Wisconsin's Large Warmwater River, 2001- John Lyons, Randal Piette, and Kent Niermeyers
- Development, validation, and application of a Macroinvertebrate-Based Index of Biotic Integrity for Nonwadeable Rivers of Wisconsin, 2001 - Weigel and Dimick
- Guidelines for Collecting Macroinvertebrate Samples in Wadeable Streams, 2000 - Michael Miller
- Development and Validation of an Index of Biotic Integrity for Coldwater Streams in Wisconsin, 1996 - John Lyons, Li Wang, Tim Simonson.
- Macroinvertebrate Data Interpretation Guidance Manual, 2003 - Lillie, Szczytko, Miller

Assessments and Reporting

Methods

- Wisconsin 2014 Consolidated Assessment and Listing Methodology (WisCALM)
- Assessment units – definitions, delineations [PDF]
- Public webinar on impaired water list [PDF]

2014 Impaired Waters List

- Spreadsheet version [XLS]
- Print-friendly version [PDF]

Public Comments

- Public comments and DNR responses to comments [PDF]
- Public webinar on impaired water list [PDF]

Total Maximum Daily Load Prioritization

Waters on the Clean Water Act Section 303(d) List (i.e. Impaired Waters List) are ranked by priority for Total Maximum Daily Load (TMDL) development. A TMDL is an analysis that determines how much of a pollutant a waterbody can assimilate before it exceeds water quality standards. Federal law requires that TMDLs be developed for impaired waters.

Waters are ranked "high," "medium" or "low." Rankings are evaluated during each listing cycle to determine if TMDL development can be completed based on staff and fiscal resources. If a TMDL is in development, we will rank the waterbody as a "high" priority. A ranking of "medium" indicates that information is currently being gathered that may be used for future TMDL development. All Category 5B waters (waters impaired by atmospheric deposition of mercury) will be assigned a "medium" priority. A ranking of "low" indicates that a TMDL will be completed in the future. The following factors are considered when selecting waters for TMDL development:

- Availability of information: Large amounts of data are needed to develop a TMDL. Waters with readily available data will more likely be a candidate for TMDL development within two to five years and assigned a "medium" or "high" priority ranking.
- Likelihood to respond: WDNR may consider the likelihood of the water to respond to management actions when assigning a rank.
- Severity of the impairment: WDNR will also consider the severity of the impairment in assigning a priority. In some cases, extreme conditions may be present that need attention more quickly than those that are not so extreme. Waters with frequent fish kills or acute toxicity issues are examples of this concern.

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

TMDL Development Schedules

Low priority waters are those for which TMDL development is proposed for to occur within 6-13 years from the date of listing. Medium priority waters are proposed for TMDL development to occur within 3- 5 years from the date of listing. High priority waters are those for which a TMDL is currently in development, and resources are invested to see these projects through to completion. Typically, TMDL projects are completed within 2-3 years.

Table 1. Number and priority of impaired waters requiring TMDL development.

TMDL Prioritization

A new, long-term vision and associated goals for the federal Clean Water Act Section 303(d) Program has been developed with input from individual states. Prioritization is one of the main goals of the long- term vision. The goal is for states to review, systematically prioritize, and report priority watersheds or waters for restoration and protection in their biennial integrated reports to facilitate strategic planning for achieving water quality goals. National implementation of this goal is aimed for the 2016 integrated reporting cycle.

Wisconsin's prioritization of impaired waters for TMDL development will evolve to adapt to the new vision for the Section 303(d) program with some changes proposed to be implemented during the 2016 integrated reporting cycle. Future prioritization of impaired waters will incorporate the identification of waters suited for TMDL alternatives, modeling tools to predict water quality and restoration potential, and protecting healthy waters.

TMDL Alternatives

Alternatives to a TMDL have been prepared for waters on the Wisconsin's 303(d) list. These alternatives are referred to as "Environmental Accountability Projects" or EAPs. These are any planned implementation actions on the impaired water that will result in that water meeting WQS. EAPs are commonly used when the source of an impairment and the appropriate management action are readily identifiable. EAP listings are designated when of the sources and pathways of pollutants do not require a TMDL analysis to identify management actions. Wisconsin may begin to more systematically identify impaired waters for which this approach is best suited.

Pollutant Summary by Waterbody Type and Use

Bays and Harbors

FAL

Name	Total Size (ACRES)	Percentage(%)
Foam/Flocs/Scum/Oil Slicks	18.51	.03%
Lead	140.57	.25%
PAHs	5954.11	10.78%
PCBs	13867.36	25.1%
Sediment/Total Suspended Solids	14231.23	25.76%
Total Phosphorus	14956.18	27.07%
Unknown Pollutant	11.35	.02%
Unspecified Metals	6066.51	10.98%

FC

Name	Total Size (ACRES)	Percentage(%)
Mercury	6067.94	23.3%
PCBs	19971.73	76.7%

REC

Name	Total Size (ACRES)	Percentage(%)
Total Phosphorus	301.77	35.23%
Unknown Pollutant	554.82	64.77%

Great Lake Beaches

FAL

Name	Total Size (MILES)	Percentage(%)
E. coli	0.23	100%

REC

Name	Total Size (MILES)	Percentage(%)
E. coli	31.49	100%

Inland Beaches

REC

Name	Total Size (MILES)	Percentage(%)
E. coli	3.77	100%

Pollutant Summary by Waterbody Type and Use

Great Lakes Shoreline

FC

Name	Total Size (MILES)	Percentage(%)
Mercury	259.39	49.15%
PCBs	268.33	50.85%

Lakes & Reservoirs

FAL

Name	Total Size (ACRES)	Percentage(%)
Chloride	13.72	0%
Mercury	375.06	.06%
PCBs	4222.69	.71%
Sediment/Total Suspended Solids	203472.01	34.05%
Total Phosphorus	382938.63	64.09%
Unknown Pollutant	6490.47	1.09%

REC

Name	Total Size (ACRES)	Percentage(%)
E. coli	395.29	.1%
Total Phosphorus	397813.35	97.07%
Unknown Pollutant	11618.22	2.83%

PHW

Name	Total Size (ACRES)	Percentage(%)
Mercury	284.8	100%

FC

Name	Total Size (ACRES)	Percentage(%)
Mercury	255590.68	57.99%
PCBs	184510.02	41.87%
Unknown Pollutant	612	.14%

Pollutant Summary by Waterbody Type and Use

Rivers and Streams

FAL

Name	Total Size (MILES)	Percentage(%)
Ammonia (Unionized) - Toxin	54.86	.71%
Arsenic	9.88	.13%
BOD	50.37	.65%
BOD, sediment load (Sediment Oxygen Demand)	43.58	.56%
Cadmium	2.25	.03%
Chloride	44.49	.57%
Copper	0.39	.01%
Creosote	18.12	.23%
Degraded Habitat	10.45	.13%
Elevated Water Temperature	31.44	.41%
Fish Barriers (Fish Passage)	3.25	.04%
Foam/Flocs/Scum/Oil Slicks	1.76	.02%
Lead	15.3	.2%
Other flow regime alterations	4.96	.06%
PAHs	32.97	.42%
PCBs	257.92	3.32%
Sediment/Total Suspended Solids	1897.68	24.45%
Total Phosphorus	5023.6	64.72%
Unknown Pollutant	154.7	1.99%
Unspecified Metals	84.46	1.09%
Zinc	19.44	.25%

REC

Name	Total Size (MILES)	Percentage(%)
E. coli	45.85	36.25%
Fecal Coliform	80.62	63.75%

FC

Name	Total Size (MILES)	Percentage(%)
Cadmium	2.25	.09%
Dioxin	29.13	1.16%
Mercury	873.42	34.85%
PCBs	1504.38	60.02%
PFOs	97.3	3.88%

Pollutant Summary by Waterbody Type and Use

Impoundments

FAL

Name	Total Size (ACRES)	Percentage(%)
BOD, sediment load (Sediment Oxygen Demand)	2953.37	2.85%
Mercury	5480.58	5.3%
PAHs	1.26	0%
PCBs	37.11	.04%
Sediment/Total Suspended Solids	4286.26	4.14%
Total Phosphorus	90314.13	87.28%
Unknown Pollutant	284.31	.27%
Unspecified Metals	125.2	.12%

REC

Name	Total Size (ACRES)	Percentage(%)
E. coli	64.55	.08%
Total Phosphorus	78508.96	94.44%
Unknown Pollutant	4554.65	5.48%

FC

Name	Total Size (ACRES)	Percentage(%)
Dioxin	35386.44	19%
Mercury	98187.69	52.73%
PCBs	52631.77	28.27%

Impairment Summary by Waterbody Type and Use

Bays and Harbors

FAL

Name	Total Size (ACRES)	Percentage(%)
Chronic Aquatic Toxicity	6094.48	12.45%
Contaminated Sediment	14024.55	28.66%
Degraded Habitat	13867.36	28.33%
Elevated pH	363.87	.74%
Eutrophication	724.95	1.48%
Low DO	13867.36	28.33%

REC

Name	Total Size (ACRES)	Percentage(%)
Excess Algal Growth	554.82	64.77%
Water Quality Use Restrictions	301.77	35.23%

FC

Name	Total Size (ACRES)	Percentage(%)
Contaminated Fish Tissue	19971.73	100%

PHW

Name	Total Size (ACRES)	Percentage(%)
Contaminated Sediment	5902.36	100%

Great Lake Beaches

FAL

Name	Total Size (MILES)	Percentage(%)
Recreational Restrictions - Pathogens	0.23	100%

REC

Name	Total Size (MILES)	Percentage(%)
Recreational Restrictions - Pathogens	31.49	100%

Inland Beaches

REC

Name	Total Size (MILES)	Percentage(%)
Recreational Restrictions - Pathogens	3.77	100%

Impairment Summary by Waterbody Type and Use

Great Lakes Shoreline

FC

Name	Total Size (MILES)	Percentage(%)
Contaminated Fish Tissue	268.33	100%

Lakes & Reservoirs

FAL

Name	Total Size (ACRES)	Percentage(%)
Acute Aquatic Toxicity	13.72	0%
Chronic Aquatic Toxicity	5983.47	1.02%
Contaminated Fish Tissue	375.06	.06%
Contaminated Sediment	4222.69	.72%
Degraded Biological Community	120	.02%
Degraded Habitat	39490.2	6.71%
Elevated Water Temperature	390.23	.07%
Elevated pH	3528.35	.6%
Eutrophication	183760.41	31.21%
Fish Kills	72.61	.01%
Impairment Unknown	18561.72	3.15%
Low DO	159937.65	27.16%
Turbidity	156630.96	26.6%
Water Quality Use Restrictions	15776.89	2.68%

REC

Name	Total Size (ACRES)	Percentage(%)
Degraded Biological Community	120	.03%
Eutrophication	612	.15%
Excess Algal Growth	223522.37	54.64%
Impairment Unknown	17956.11	4.39%
Low DO	8404.93	2.05%
Recreational Restrictions - Pathogens	395.29	.1%
Water Quality Use Restrictions	158059.16	38.64%

PHW

Name	Total Size (ACRES)	Percentage(%)
Contaminated Fish Tissue	284.8	100%

FC

Name	Total Size (ACRES)	Percentage(%)
Contaminated Fish Tissue	289524.53	99.79%
Eutrophication	612	.21%

Impairment Summary by Waterbody Type and Use

Rivers and Streams

FAL

Name	Total Size (MILES)	Percentage(%)
Acute Aquatic Toxicity	71.61	.97%
Chronic Aquatic Toxicity	177.71	2.4%
Contaminated Fish Tissue	62.5	.85%
Contaminated Sediment	205.78	2.78%
Copper	0.39	.01%
Degraded Biological Community	810.03	10.96%
Degraded Habitat	1525.86	20.64%
Degraded Submerged Aquatic Vegetation (SAV)	48.1	.65%
Elevated Water Temperature	253.31	3.43%
Elevated pH	14.06	.19%
Eutrophication	68.16	.92%
Excess Algal Growth	8.09	.11%
Fish Barriers (Fish Passage)	3.25	.04%
Impairment Unknown	2427.23	32.83%
Low DO	860.26	11.64%
Low flow alterations	6.15	.08%
Sediment/Total Suspended Solids	19.47	.26%
Turbidity	17.51	.24%
Water Quality Use Restrictions	814.23	11.01%

REC

Name	Total Size (MILES)	Percentage(%)
Recreational Restrictions - Pathogens	120.97	100%

FC

Name	Total Size (MILES)	Percentage(%)
Acute Aquatic Toxicity	2.25	.12%
Contaminated Fish Tissue	1800.69	99.24%
Contaminated Sediment	11.5	.63%

Impairment Summary by Waterbody Type and Use

Impoundments

FAL

Name	Total Size (ACRES)	Percentage(%)
Chronic Aquatic Toxicity	347.54	.34%
Contaminated Fish Tissue	5193.44	5.09%
Contaminated Sediment	263.54	.26%
Degraded Habitat	3022.52	2.96%
Elevated Water Temperature	1.26	0%
Elevated pH	4734.7	4.64%
Eutrophication	32542.71	31.87%
Impairment Unknown	2823.24	2.77%
Low DO	40199.61	39.37%
Turbidity	24.74	.02%
Water Quality Use Restrictions	12942.5	12.68%

REC

Name	Total Size (ACRES)	Percentage(%)
Excess Algal Growth	20052.93	24.12%
Impairment Unknown	2967.74	3.57%
Recreational Restrictions - Blue Green Algae	9000	10.83%
Recreational Restrictions - Pathogens	64.55	.08%
Water Quality Use Restrictions	51042.94	61.4%

FC

Name	Total Size (ACRES)	Percentage(%)
Chronic Aquatic Toxicity	353.64	.36%
Contaminated Fish Tissue	97480.41	99.28%
Contaminated Sediment	353.64	.36%

Source Summary by Waterbody Type and Use

Sources of Impairments Summary for Impaired Waters Waterbody Type: BAY/HARBOR Designated Use: Fish and Aquatic Life

Name	Total Size (ACRES)	Percentage(%)
Contaminated Sediments	13919.11	35%
Crop Production (Crop Land or Dry Land)	727.74	1.83%
Discharges from Municipal Separate Storm Sewer Systems (MS4)	13867.36	34.87%
Grazing in Riparian or Shoreline Zones	1088.82	2.74%
Legacy/Historical Pollutants	6076.17	15.28%
Non-Point Source (Rural or Urban)	727.74	1.83%
On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	1088.82	2.74%
Site Clearance (Land Development or Redevelopment)	1088.82	2.74%
Source Unknown	95.55	.24%
Streambank Modifications/destablization	1088.82	2.74%

Sources of Impairments Summary for Impaired Waters Waterbody Type: IMPOUNDMENT Designated Use: Fish and Aquatic Life

Name	Total Size (ACRES)	Percentage(%)
Atmospheric Deposition - Toxics	265.9	.31%
Channelization	620.54	.71%
Contaminated Sediments	649.29	.75%
Crop Production (Crop Land or Dry Land)	3169.53	3.65%
Discharges from Municipal Separate Storm Sewer Systems (MS4)	52	.06%
Legacy/Historical Pollutants	19.99	.02%
Municipal (Urbanized High Density Area)	1387.21	1.6%
Non-Point Source (Rural or Urban)	49358.49	56.83%
On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	310.27	.36%
Permitted Runoff from Confined Animal Feeding Operations (CAFOs)	1993.71	2.3%
Sediment Resuspension (Clean Sediment)	2953.37	3.4%
Site Clearance (Land Development or Redevelopment)	620.54	.71%
Source Unknown	310.27	.36%
Streambank Modifications/destablization	2142.3	2.47%
Upstream Source	23000.81	26.48%

Source Summary by Waterbody Type and Use

Sources of Impairments Summary for Impaired Waters

Waterbody Type: LAKE Designated Use: Fish and Aquatic Life

Name	Total Size (ACRES)	Percentage(%)
Atmospheric Deposition - Toxics	148	.1%
Contaminated Sediments	5261.53	3.66%
Crop Production (Crop Land or Dry Land)	1534	1.07%
Discharges from Municipal Separate Storm Sewer Systems (MS4)	21191.24	14.74%
Grazing in Riparian or Shoreline Zones	1534	1.07%
Internal Nutrient Recycling	289.12	.2%
Legacy/Historical Pollutants	4222.69	2.94%
Livestock (Grazing or Feeding Operations)	168.63	.12%
Natual Conditions - Water Quality Standards Use Attainability Analyses Needed	153	.11%
Non-Point Source (Rural or Urban)	82129.78	57.12%
Non-irrigated Crop Production	21191.24	14.74%
On-site Treatment Systems (Septic Systems and Similar Decencentralized Systems)	188.6	.13%
Permitted Runoff from Confined Animal Feeding Operations (CAFOs)	1534	1.07%
Site Clearance (Land Development or Redevelopment)	2135.56	1.49%
Source Unknown	436.59	.3%
Streambank Modifications/destablization	1534	1.07%
Total Retention Domestic Sewage Lagoons	60.01	.04%
Transfer of Water from an Outside Watershed	72.61	.05%

Attainment Summary by Waterbody Type and Use

Number and Size of Waters in Wisconsin's WATERS Database

Type of Water	Number of Waters	Size of Waters	Units
Bays and Harbors	60	26,862.74	Acres
Coastal Waters (Beaches)	85	10.89	Miles
Great Lakes Shoreline	6	1,014.22	Miles
Freshwater Lake	19,542	960,332.75	Acres
Impoundment	358	123,155.00	Acres
River	6,260	42,469.32	Miles
Springs	243	1500.79	Acres
Wetlands	11	5,011,450.45	Acres

Water Quality Standards Designated Use Summary Tables Waterbody Type: BAY/HARBOR

Note: All numbers are in ACRES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption				19971.73	6891.01	26862.74
Fish and Aquatic Life	918.56	82.95		20827.36	5029.32	26858.19
General					26862.74	26862.74
Public Health and Welfare		140.57		5902.36	20819.81	26862.74
Recreation				856.59	26006.15	26862.74

Water Quality Standards Designated Use Summary Tables Waterbody Type: GREAT LAKES BEACH

Note: All numbers are in MILES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption					45.89	45.89
Fish and Aquatic Life					45.89	45.89
General					45.89	45.89
Public Health and Welfare					45.89	45.89
Recreation	27.51	4.07		14.26	0.05	45.89

Attainment Summary by Waterbody Type and Use

Water Quality Standards Designated Use Summary Tables Waterbody Type: INLAND BEACH

Note: All numbers are in MILES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption					11.08	11.08
Fish and Aquatic Life					11.08	11.08
General					11.08	11.08
Public Health and Welfare					11.08	11.08
Recreation	6.69	0.54		2.3	1.55	11.08

Water Quality Standards Designated Use Summary Tables Waterbody Type: GREAT LAKES SHORELINE

Note: All numbers are in MILES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption				268.33	700	968.33
Fish and Aquatic Life		112.32			856.01	968.33
General					968.33	968.33
Public Health and Welfare					968.33	968.33
Recreation					968.33	968.33

Water Quality Standards Designated Use Summary Tables Waterbody Type: LAKE

Note: All numbers are in ACRES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption	7436.64	17557.78		247951.76	682631.22	955577.40
Fish and Aquatic Life	187203.98	359606.48		247088.18	161678.76	955577.40
General					955577.4	955577.4
Public Health and Welfare					955577.4	955577.4
Recreation	126796.07	68		261905.97	566807.36	955577.40

Water Quality Standards Designated Use Summary Tables Waterbody Type: IMPOUNDMENT

Note: All numbers are in ACRES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption		9654		80906.32	32594.68	123155.00
Fish and Aquatic Life	19173.99	24877.62		75139.19	3964.2	123155.00
General					123155	123155
Public Health and Welfare					123155	123155
Recreation	4130.84	64.55		83063.61	35896	123155.00

Attainment Summary by Waterbody Type and Use

Water Quality Standards Designated Use Summary Tables Waterbody Type: RIVER

Note: All numbers are in MILES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption	11.43	122.25		1249.74	41085.6	42469.02
Fish and Aquatic Life	10299.45	3679.14		5665.79	22821.37	42465.75
General				230.7	42238.32	42469.02
Public Health and Welfare					42469.02	42469.02
Recreation	4.24	9.33		119.73	42335.72	42469.02

Water Quality Standards Designated Use Summary Tables Waterbody Type: RIVERINE BACKWATER

Note: All numbers are in ACRES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption					4755.35	4755.35
Fish and Aquatic Life		395.55			4359.8	4755.35
General					4755.35	4755.35
Public Health and Welfare					4755.35	4755.35
Recreation					4755.35	4755.35

Water Quality Standards Designated Use Summary Tables Waterbody Type: SPRINGS-LAKE

Note: All numbers are in ACRES

Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption					1500.79	1500.79
Fish and Aquatic Life	193.52	590.64			716.38	1500.54
General					1500.79	1500.79
Public Health and Welfare					1500.79	1500.79
Recreation					1500.79	1500.79

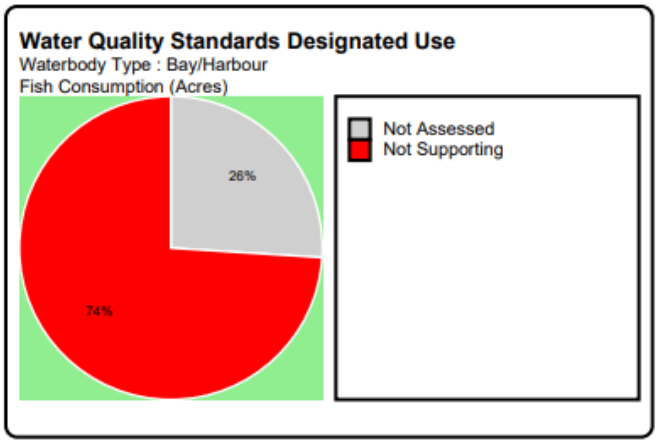
Water Quality Standards Designated Use Summary Tables Waterbody Type: WETLANDS

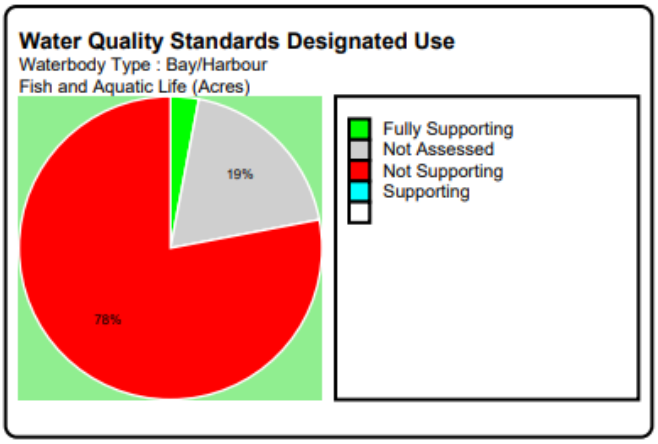
Note: All numbers are in ACRES

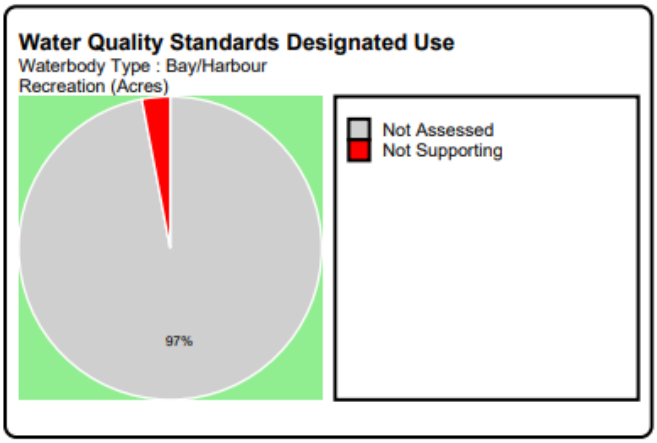
Use	Fully Supporting	Supporting	Partially Supporting	Not Supporting	Not Assessed	Total Size
Fish Consumption					5011450.45	5011450.45
Fish and Aquatic Life		5009989		1000	461.45	5011450.45
General					5011450.45	5011450.45
Public Health and Welfare					5011450.45	5011450.45
Recreation					5011450.45	5011450.45

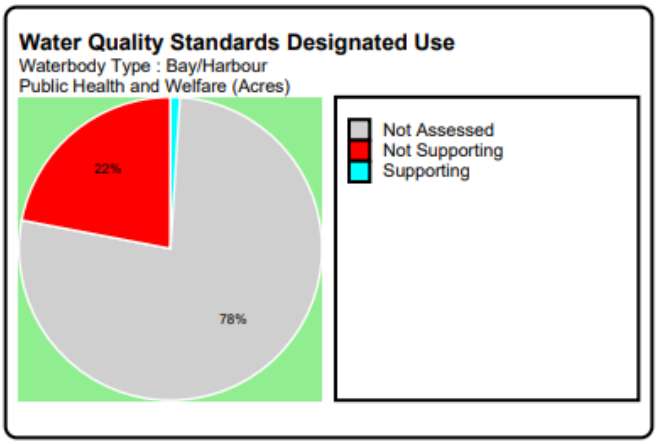
Attainment Summary by Waterbody Type and Use

Bays and Harbors

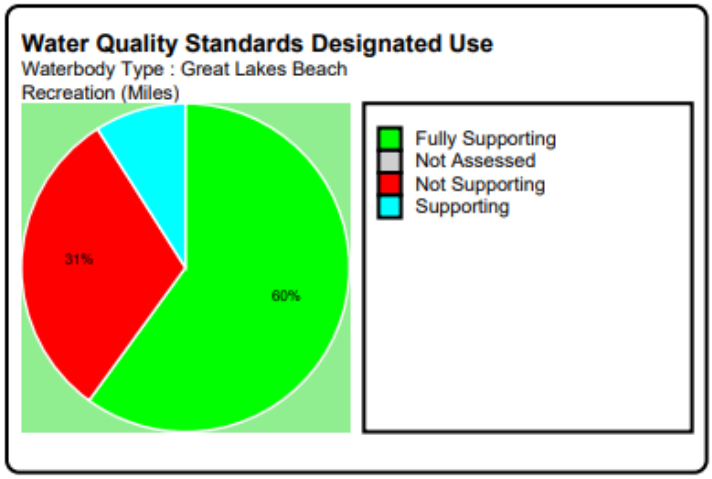






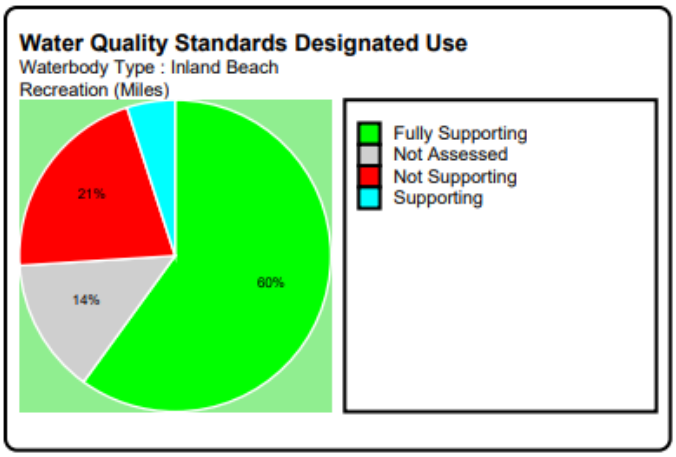


Great Lake Beaches

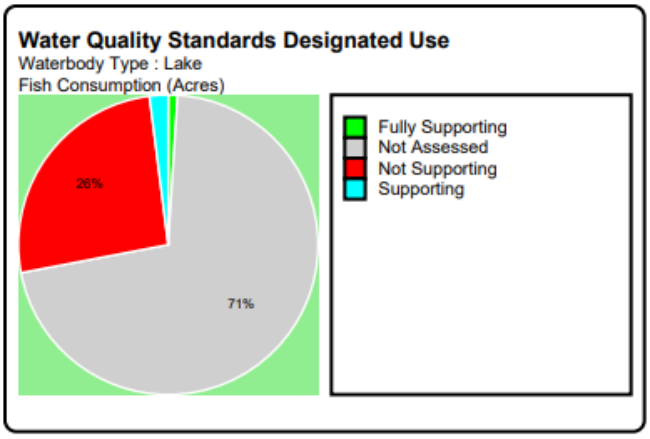


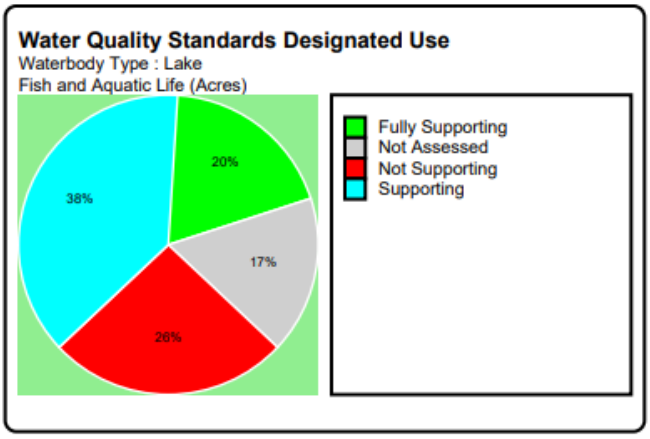
Attainment Summary by Waterbody Type and Use

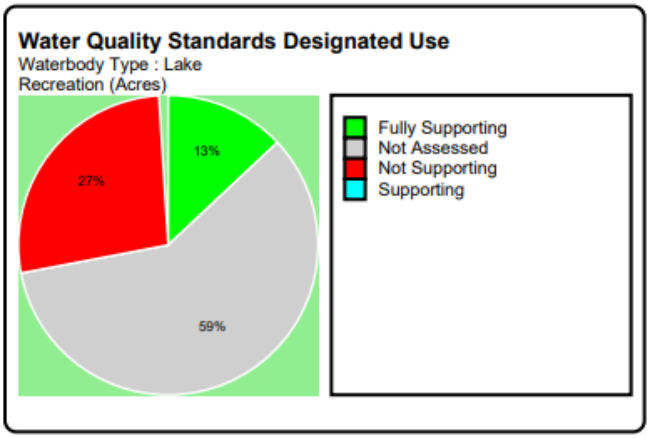
Inland Beaches



Lakes & Reservoirs

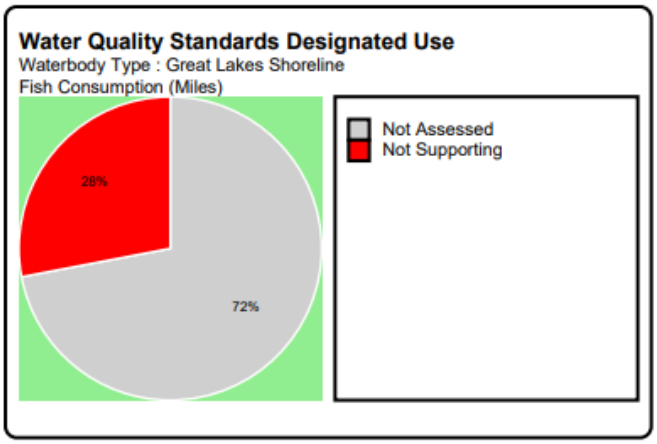


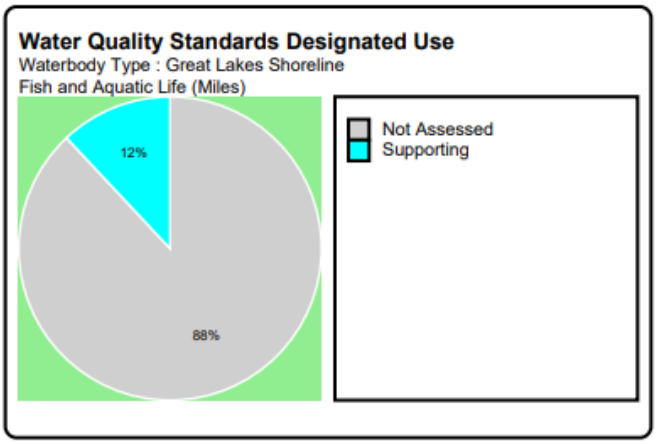




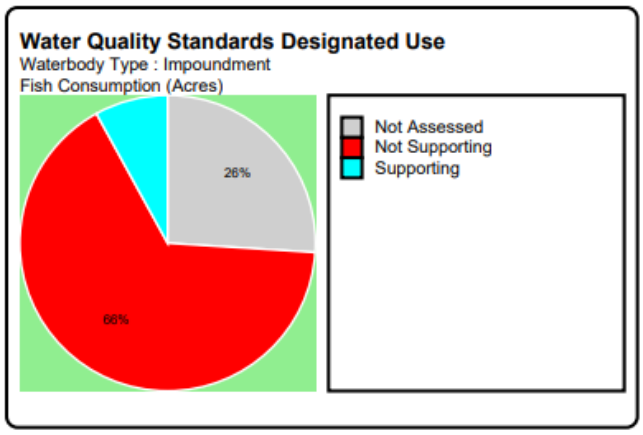
Attainment Summary by Waterbody Type and Use

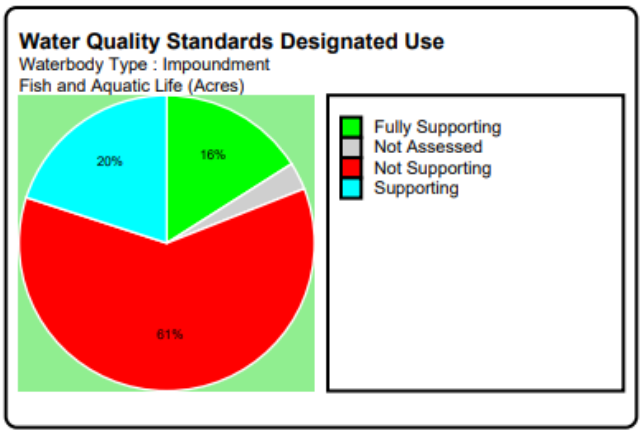
Great Lakes Shoreline

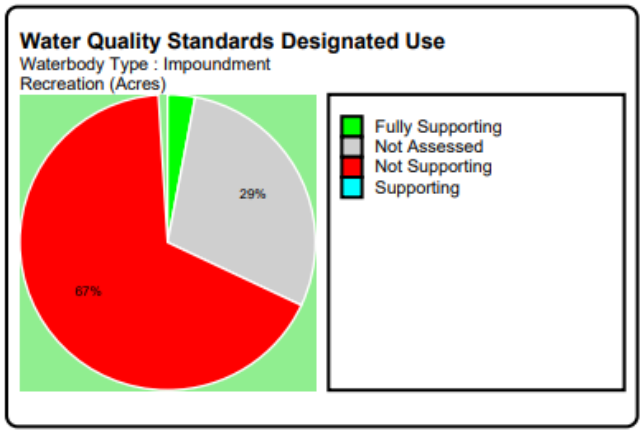




Impoundments

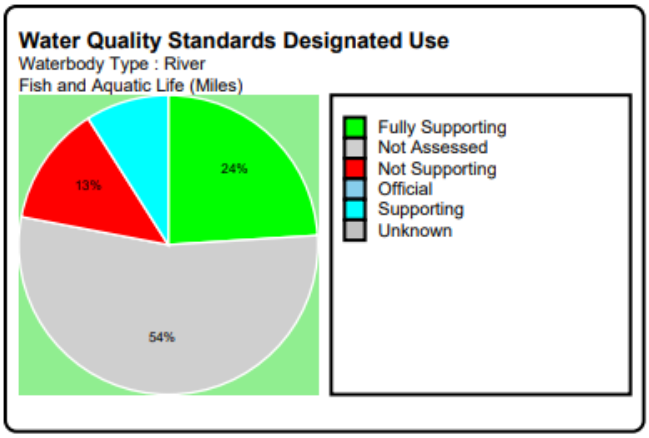


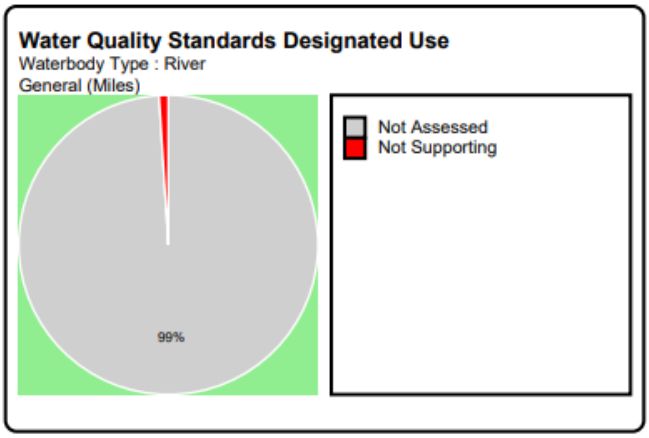




Attainment Summary by Waterbody Type and Use

Rivers and Streams



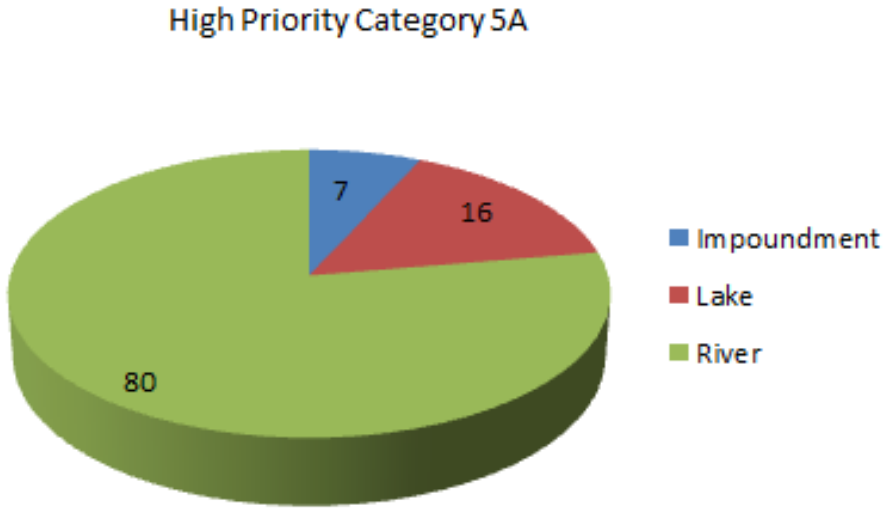


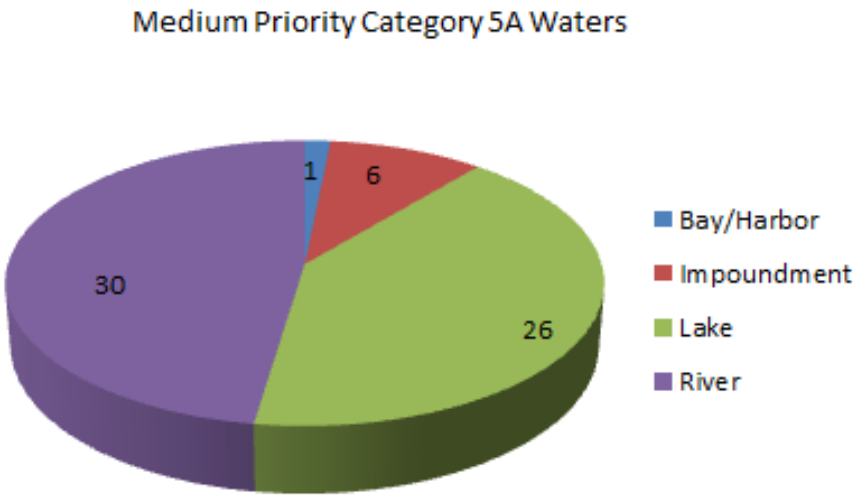
EPA 5-Part Categorization

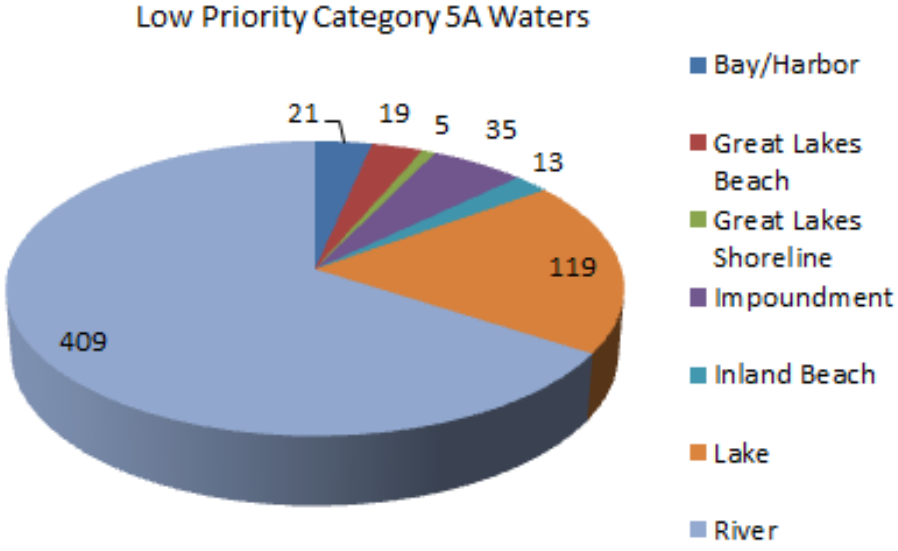
Water Type	Category 2	Category 3	Category 4A	Category 5A	Category 5B	Category 5C	Category 5P	Grand Total
Bays and Harbors	3	50	1	12				66
Great Lakes Beaches	99	1		19				119
Inland Beach	89	21		13				123
Great Lakes Shoreline		1		3				4
Impoundment	49	249	4	29	25		1	357
Lake	4,036	15,098	10	123	160	5	24	19,456
River	782	6,579	132	376	3	1	151	8,024
Slough	4	51						55
Springs	14	233						247
Wetlands		11	1					12
Grand Total	5,076	22,294	148	575	188	6	176	28,463

Category 5A Waters

Impaired Waters for which a TMDL or equivalent restoration will be developed. The charts below show the distribution of impoundments, lakes, bays & harbors, and rivers among the groups of high, medium and low priorities for TMDL Development.



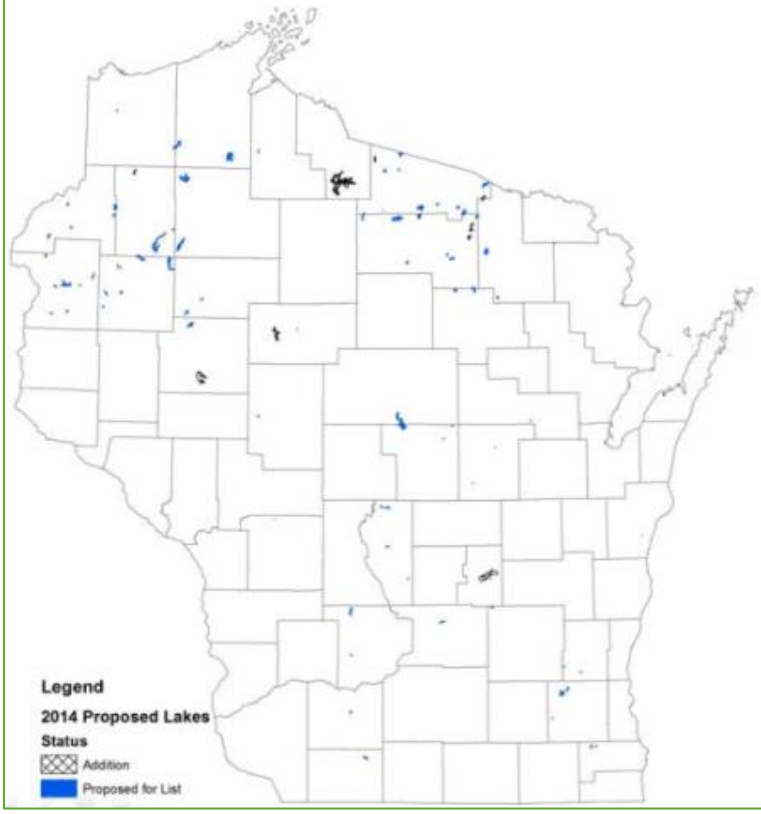




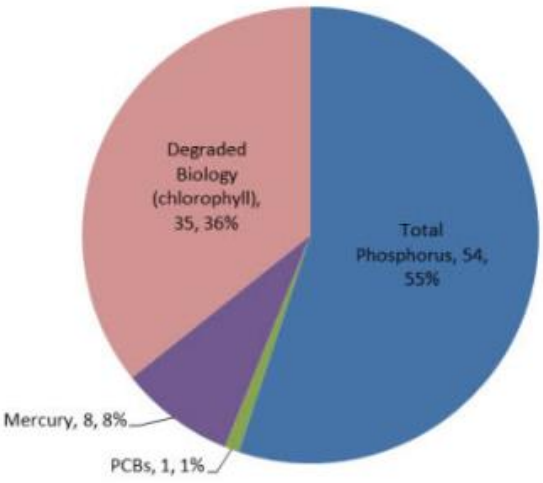
2014 Listing Changes

Lakes and Impoundments

New 2014 Proposed Listings

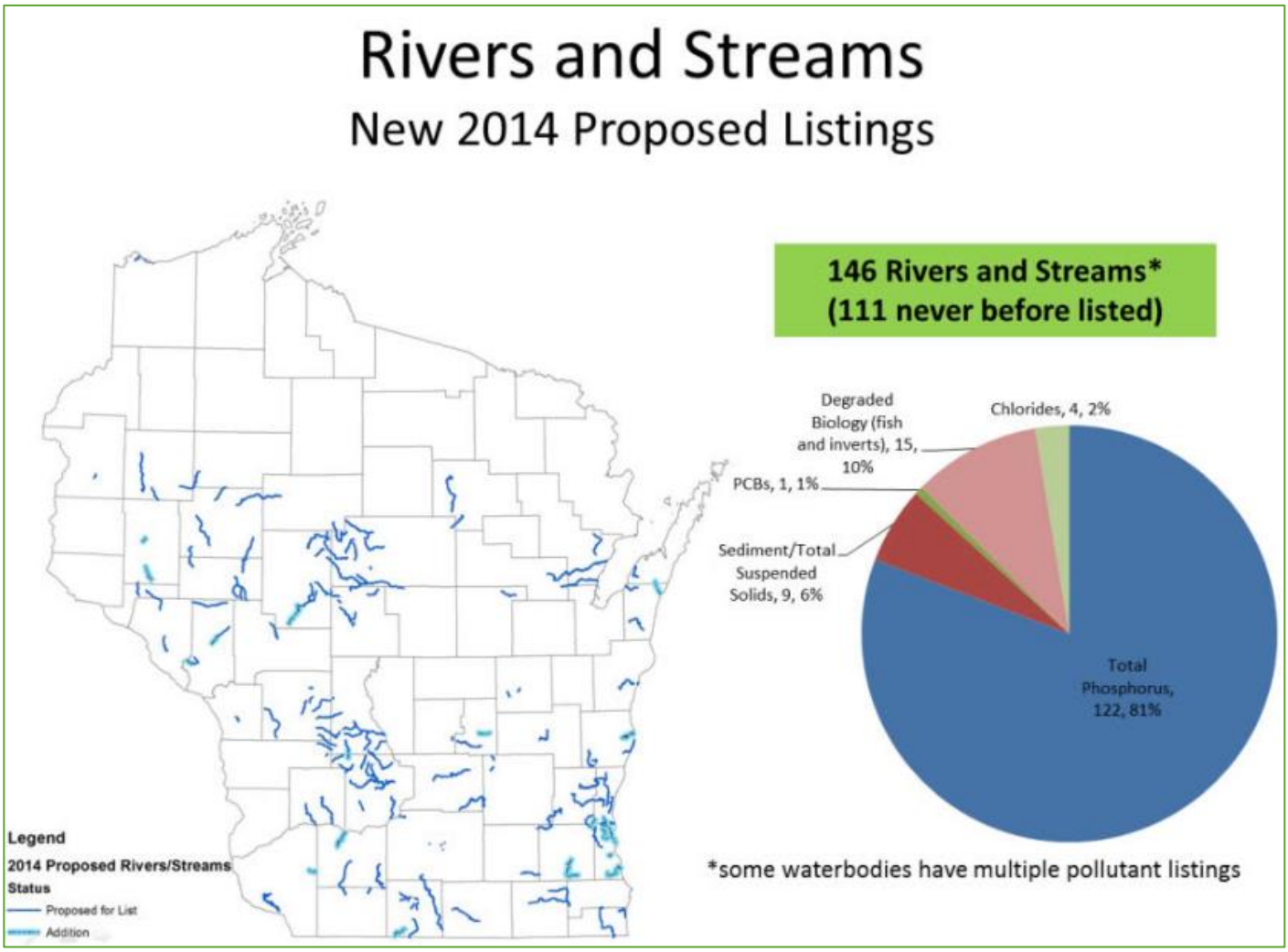


96 Lakes and Impoundments*
(80 never before listed)



*some waterbodies have multiple pollutant listings

2014 Listing Changes



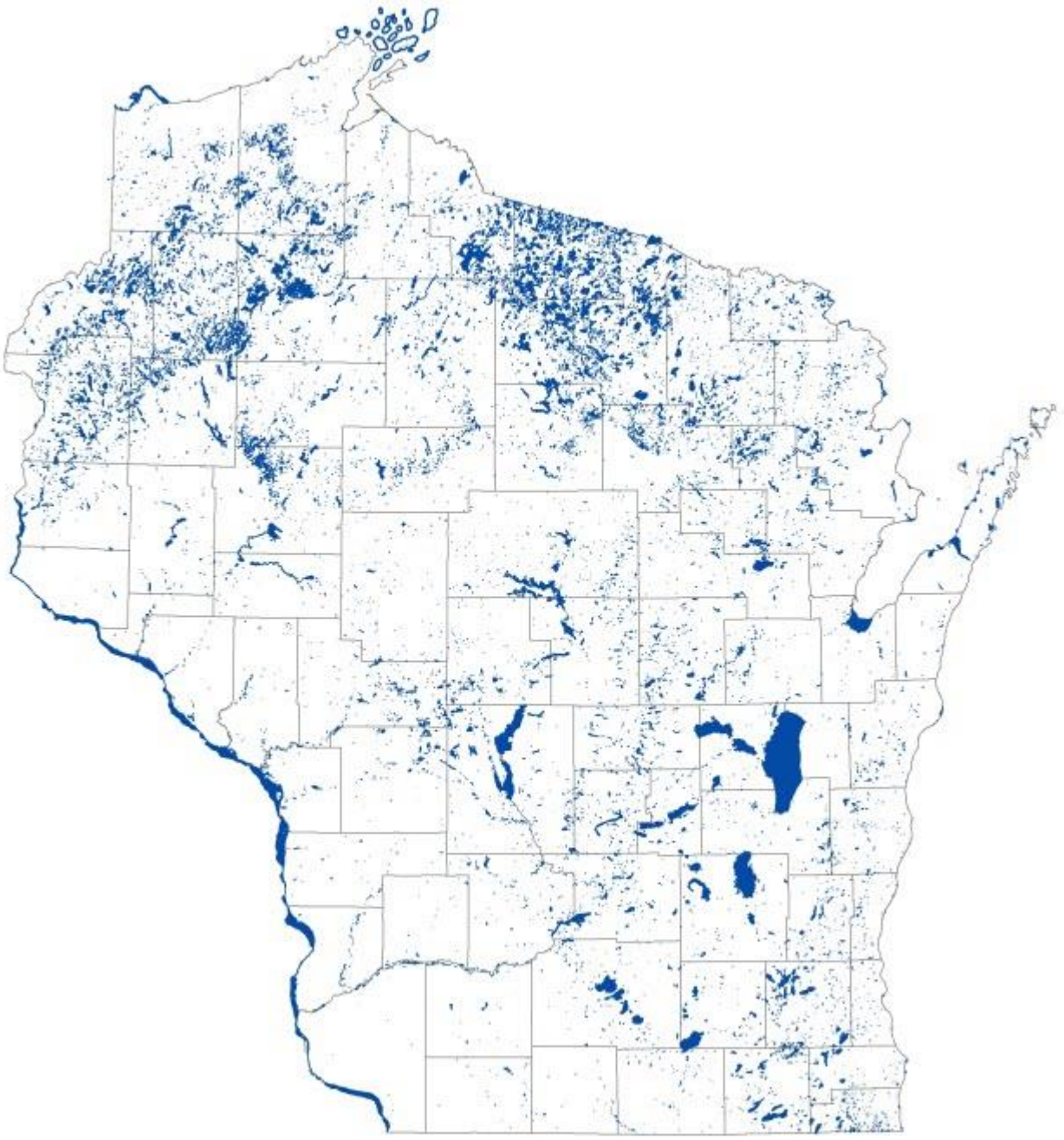
2014 Maps

Wisconsin's Rivers and Streams

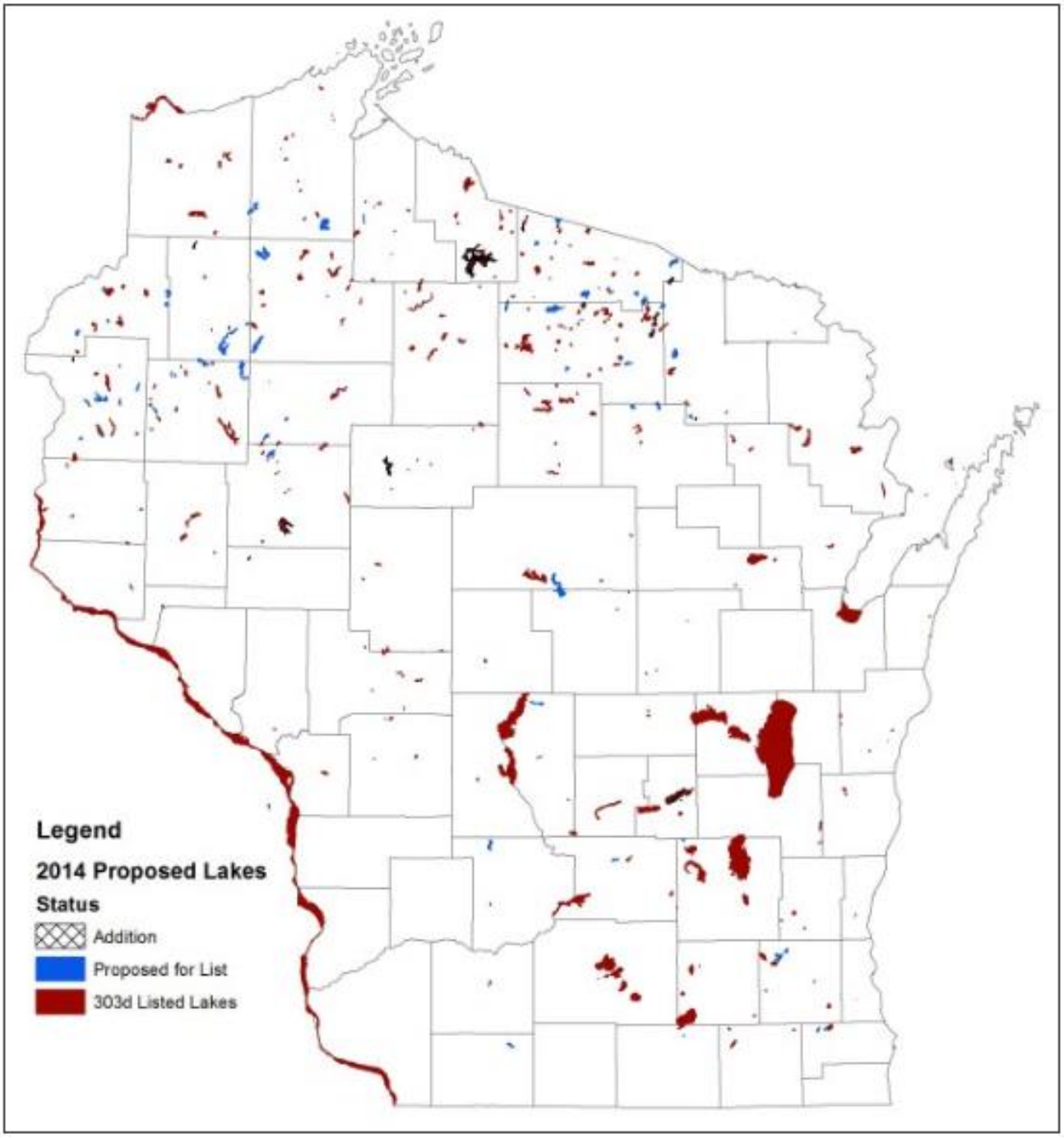
1:24,000 Scale Hydrography Dataset

Wisconsin's Lakes and Impoundments

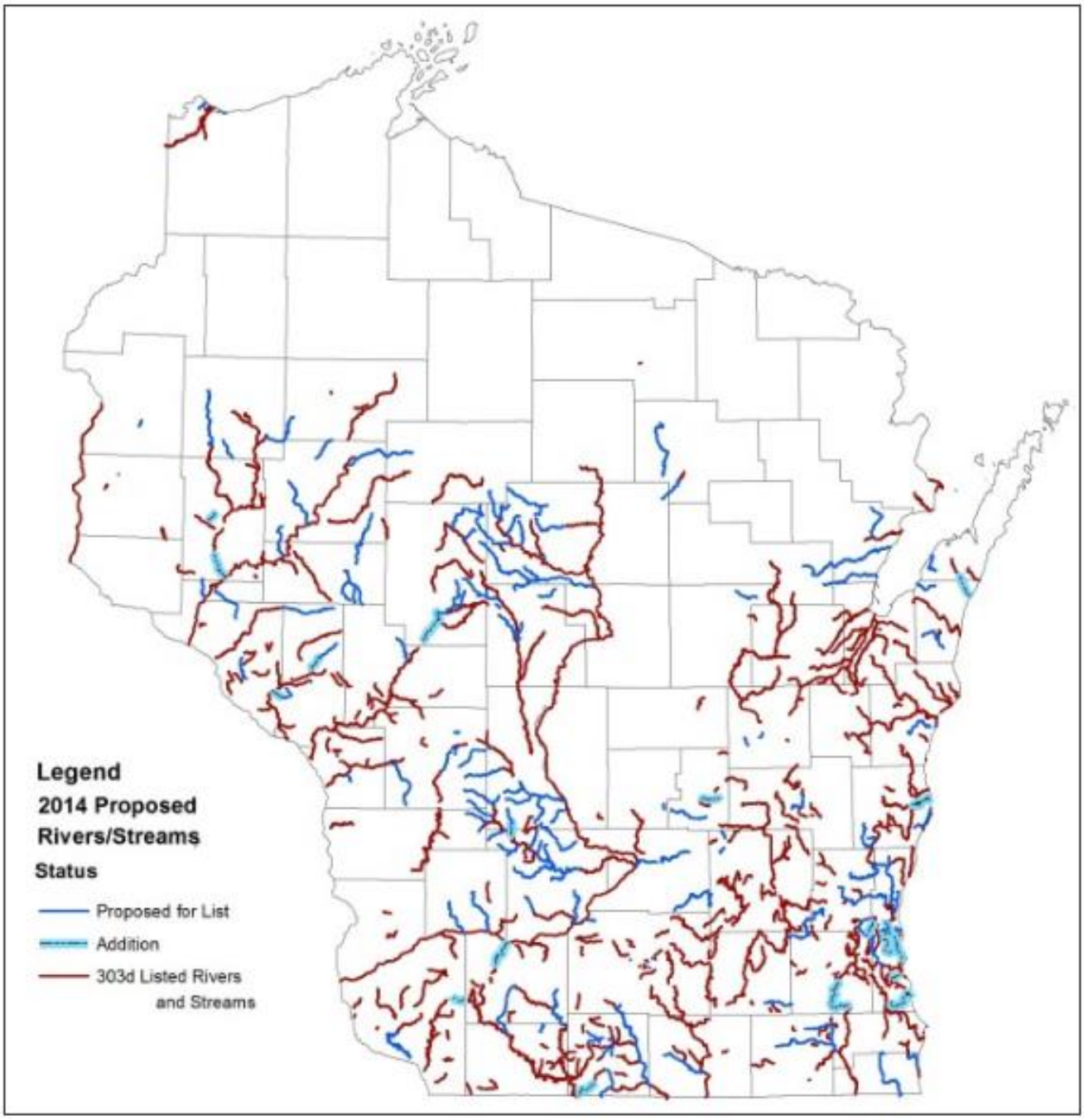
1:24,000 Scale Hydrography Dataset



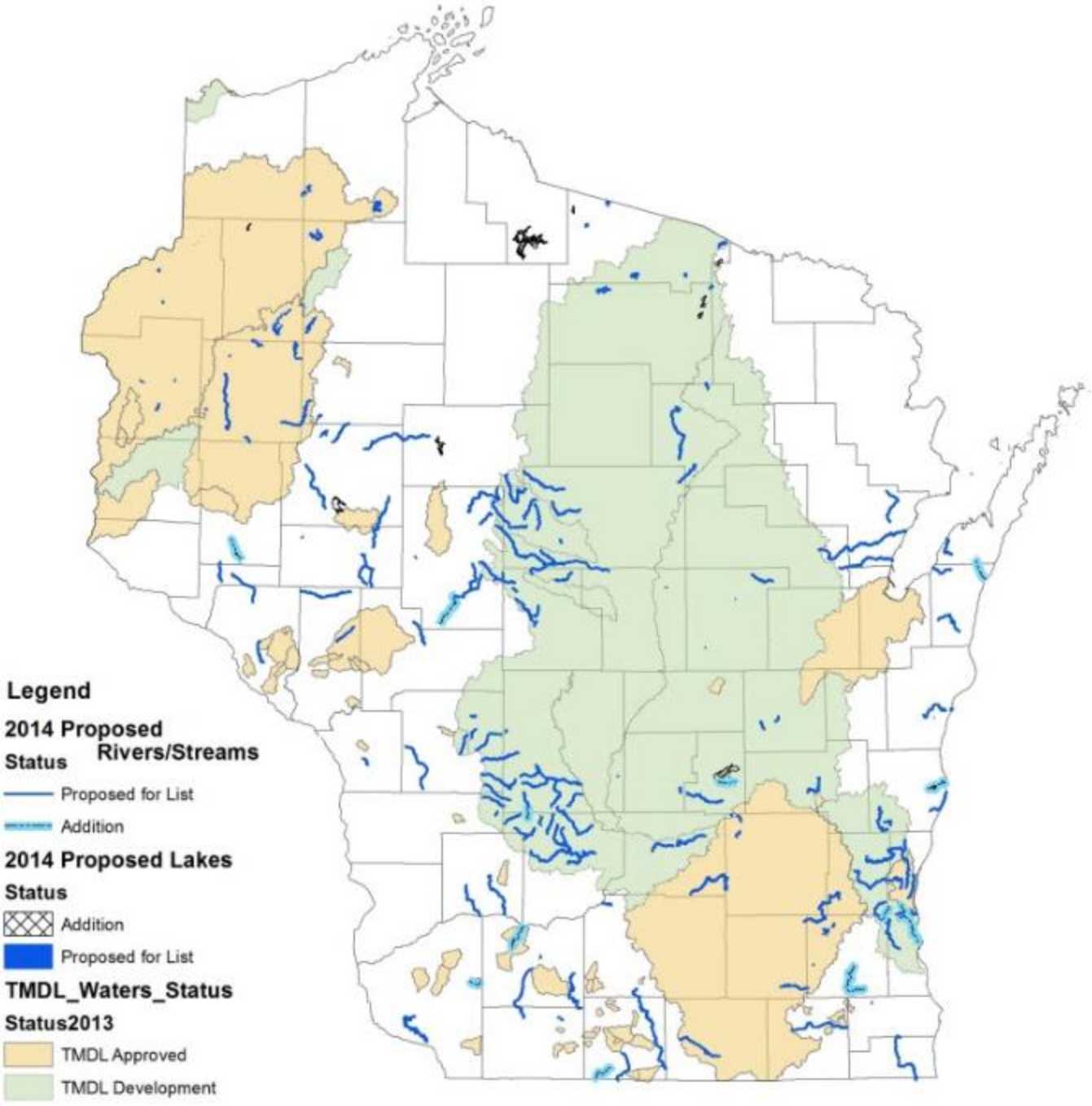
All Listed Impaired Lakes in Wisconsin



All Listed Impaired Rivers in Wisconsin

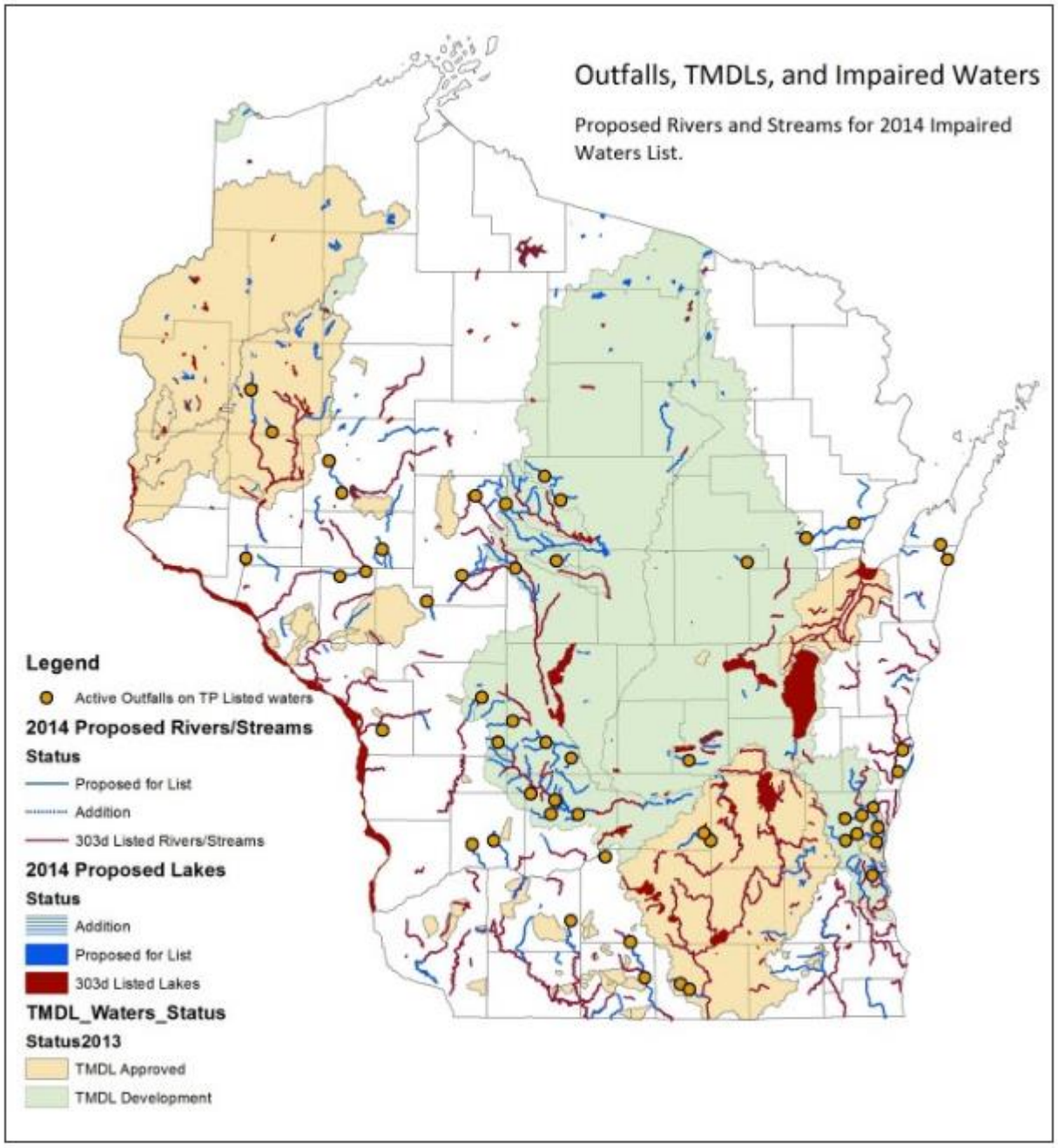


All Proposed Listings and TMDL Areas



Total Phosphorus Discharger Outfalls, TMDLs and Proposed New Listings for Impaired Waters

This map shows existing outfalls with phosphorus limits and waters that are added during the integrated reporting period 2014.



All Outfalls, TMDLs, and Impaired Waters

This map shows the locations of all outfalls and waters that are added during the integrated reporting period 2014.