



Cave Walk. 2018 Great Waters Photo Contest. Sheri Erickson

Wisconsin Department of Natural Resources Lake Superior Action Plan

2022-2024



June 2022

If you have any questions, please write to Equal Opportunity Office, Department of the Interior, Washington, D.C. 20240. This publication is available in alternate format (large print, Braille, audio tape, etc.) upon request. Call 608-267-7694 for more information.

Wisconsin Department of Natural Resources

101 S. Webster Street • PO Box 7921 • This document is available electronically on the DNR's website. The Wisconsin Department of Natural Resources provides equal opportunity in its employment, programs, services, and functions under an Affirmative Action Plan.



3200-2022-14

Table of Contents

The Current Status of Lake Superior	3
The Lake Superior LAMP and the WDNR Action Plan Purpose	4-5
WDNR Lake Superior Priorities and Actions	5
Priority 1: Restore the St. Louis River Area of Concern (SLRAOC)	6-7
Priority 2: Monitor and Address Contaminants of Concern	8-9
Priority 3: Reduce Nutrient and Bacterial Pollution to Restore & Protect Coastal and Near-shore Health	10-11
Priority 4: Slow the Flow and Restore Hydrologic Connectivity	12-13
Priority 5: Restore and Protect Representative High-Quality Habitats & Native Species	14-15
Priority 6: Reduce & Prevent the Impact of New & Existing Invasive Species	16-17
Priority 7: Build Ecosystem & Community Resiliency	18-19
Appendix A: Source Documents and Implementation Plans	20
Appendix B: WDNR Programs & Professionals	21
Appendix C: Partners	22
Appendix D: Great Lakes Water Quality Agreement General Objectives	23

A Vision for Lake Superior—developed by the Lake Superior Partnership

As citizens of Lake Superior, we believe... that water is life and the quality of water determines the quality of life. We seek a Lake Superior watershed...

- that is a clean, safe environment where diverse life forms exist in harmony; where the environment can support and sustain economic development and where the citizens are committed to regional cooperation and a personal philosophy of stewardship;*
- that is free of toxic substances that threaten fish, wildlife and human health; where people can drink the water or eat the fish anywhere in the lake without restrictions;*
- where wild shorelines and islands are maintained and where development is well planned, visually pleasing, biologically sound, and conducted in an environmentally benign manner;*
- which recognizes that environmental integrity provides the foundation for a healthy economy and that the ingenuity which results from clean, innovative and preventive management and technology can provide for economic transformation of the region;*
- where citizens accept the personal responsibility and challenge of pollution prevention in their own lives and lifestyles and are committed to moving from a consumer society to a conserver society; and*
- where there is greater cooperation, leadership and responsibility among citizens of the basin for defining long term policies and procedures which will protect the quality and supply of water in Lake Superior for future generations.*

The Current Status of Lake Superior

The [State of the Great Lakes \(SOGL\) Assessment](#) is conducted regularly through Annex 10 – Science of the [Great Lakes Water Quality Agreement \(GLWQA\)](#). This regular assessment informs the governments of Canada and the United States of the current and emerging threats on the Great Lakes and the effectiveness of work being completed. Lake Superior continues to be in overall good condition and is the least environmentally impacted of all the Lakes.

However, there are some deteriorating and undetermined trends that are being monitored and addressed ([2019 SOGL Report](#)). The SOGL Assessment includes assessments of nine great lakes indicators and forty sub-indicators. Below is a table that shows Lake Superior's status and trend for the nine Great Lakes Indicators. There is variability under each indicator based on the sub-indicator assessment, and the full report can be found [here](#).

Great Lakes Indicator	Status and Trend for Lake Superior (pending on sub-indicators) See report for more details.
Drinking-Water	Status: Good; Trend: Unchanging
Beaches	Status: Good; Trend: Unchanging
Fish Consumption	Status: Fair; Trend: Unchanging
Toxic Chemicals	Status: Fair to Good; Trend: Unchanging to Improving
Habitat & Species	Status: Poor to Good; Trend: Deteriorating to Improving
Nutrients and Algae	Status: Good; Trend: Undetermined to Unchanging
Invasive Species	Status: Poor to Good; Trend: Deteriorating to Unchanging
Groundwater	Status: Undetermined; Trend: Undetermined
Watershed Impacts and Climate Trends	Status: Undetermined to Good; Trend: Undetermined to Unchanging
Overall Lake Assessment for Lake Superior	Status: Good; Trend: Unchanging

The Lake Superior LAMP and the WDNR Action Plan Purpose

The [Lake Superior Lakewide Action and Management Plan](#) (LAMP) is a binational ecosystem-based strategy for protecting and restoring Lake Superior. The Lake Superior LAMP is developed and implemented by the Lake Superior Partnership (LSP) to facilitate information sharing, set priorities, and coordinate binational environmental protection and restoration activities. Partners include federal, First Nation, provincial, and state governments from the U.S. and Canada. The Lake Superior LAMP outlines the commitments made by Canada and the United States under the GLWQA. The Lake Superior LAMP is revisited and updated every five years and organized by the significant threats facing Lake Superior. The major threats to Lake Superior identified by the Lake

Superior Partnership are chemical contaminant pollution, nutrient & bacterial pollution, invasive species, habitat degradation, and climate change impacts ([LS LAMP, 2020](#)).

Department staff strongly value partnering with other agencies and initiatives to protect and restore basin resources. This is a WDNR action plan, but these actions would not be possible without the many partners we collaborate with. We do everything through partnerships, and none of the work described in this action plan would be possible without the strong collaboration with landowners, communities, and other agencies and organizations. A comprehensive list of Lake Superior Basin partners can be found in Appendix C.

This Action Plan was developed to accomplish several purposes:

- Synthesizes the on-the-ground work agency staff will conduct in 2022-2024 to restore and protect Lake Superior providing a comprehensive picture of the agency's efforts as a whole;
- Communicates the agency's activities to partners and provides a platform for discussion with them about agency priorities and roles;
- Identifies specific projects and programs for which there are needs or gaps where funding will be sought; and

- Promotes cross-program integration and collaboration among department staff.

This Plan identifies seven Lake Superior priorities that outline a vision, the status, and actions for each. All priorities are essential and are not numbered in order of importance. Each section can serve as a stand-alone document, or the Plan can be viewed in its entirety. The first two pages provide a broad overview of Lake Superior, followed by a more in-depth, and then we will dive into each priority identified by a team of Lake Superior resource professionals.

WDNR Lake Superior Priorities and Actions

WDNR has established priorities for Wisconsin's portion of the Lake Superior basin and identified actions WDNR will take to accomplish objectives in the Lake Superior LAMP and GLWQA. Below are the priorities identified by the WDNR's resource managers for the next three years. These priorities and actions also align with existing regional plans such as the [Wisconsin](#)

[Wildlife Action Plan](#) (WDNR, 2016), [Lake Superior Fisheries Management Plan](#) (WDNR, 2020), [Wisconsin Forest Action Plan](#) (WDNR, 2020), the [Lake Superior Biodiversity Conservation Strategy](#) (Lake Superior Binational Program, 2015), the [St. Louis River AOC Remedial Action Plan](#), the WDNR Office of Great Waters Strategic Plan, and others referenced in [Appendix A](#).



WDNR Lake Superior Team installing fencing to exclude geese from wild rice restoration sites in the Saint Louis Estuary.

2022-2024 WDNR Lake Superior Priorities

- 1) Restore the St. Louis River Area of Concern
- 2) Monitor and Address Contaminants of Concern
- 3) Reduce Nutrient and Bacterial Pollution to Restore & Protect Coastal and Nearshore Health
- 4) Slow the Flow and Restore Hydrologic Connectivity
- 5) Restore and Protect Representative High-Quality Habitats & Native Species
- 6) Reduce & Prevent the Impact of New & Existing Invasive Species
- 7) Build Ecosystem & Community Resiliency

Priority 1: Restore the St. Louis River Area of Concern (SLRAOC)

VISION: Remove all beneficial use impairments and delist the St. Louis Estuary as a Great Lakes Area of Concern by 2030. with completion of all construction projects by 2024.



A rainbow over the Howard's Bay contaminated sediment clean-up.

STATUS: Historical actions such as unregulated municipal and industrial waste disposal and unchecked land-use practices, including dredging and filling of aquatic habitat and damaging logging and manufacturing practices, contributed to the complex set of issues and impairments facing the SLRAOC. Efforts to restore the river have brought together local, state, tribal, and federal partners with funding support from the Great Lakes Restoration Initiative (GLRI) since 2010. SLRAOC projects have significantly reduced the risks associated with contaminated sediments and improved the environmental quality of this area ([SLRAOC RAP](#), 2021).

The WDNR with numerous partners developed a Remedial Action Plan (RAP) or "roadmap" to identify and implement management actions that address beneficial use impairments (BUIs). To date, significant progress has been made with removal of three of the nine BUIs and more than half (59%) of the management actions complete. The remaining management actions in progress include eleven remediation projects, eleven restoration projects, and eleven other actions encompassing studies, plans, data tracking, and data management.

Recent efforts include:

- Ongoing wild rice restoration,
- Common Tern and Piping Plover habitat restoration,
- Howard's Bay contaminated sediment clean-up,
- Barker's Island beach restoration,
- WI Point dune restoration, and
- Removal of the Excessive Loading of Sediment and Nutrients impairment in 2020.

ACTIONS: Much progress has been made to implement actions outlined in the RAP, but there is still more work to do. Our goal is to complete all construction projects by 2024 and remove the fourth BUI for Degradation of Fish and Wildlife Populations in 2022. To learn more about these projects and the SLRAOC RAP, visit the [WDNR website](#).

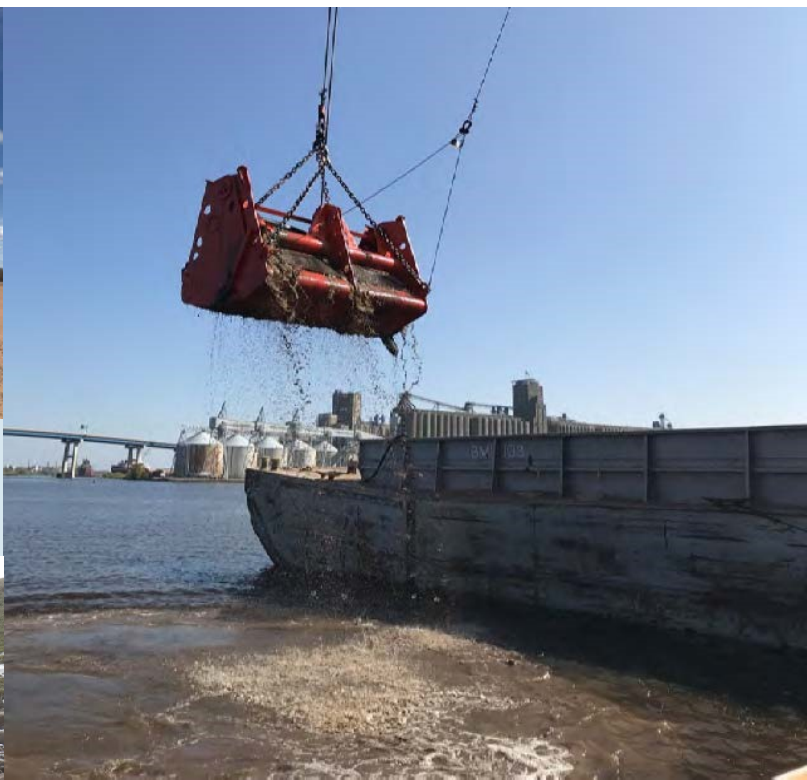
WDNR will continue efforts with partners to:

Restore the St. Louis River Area of Concern (SLRAOC) Actions 2022-2024

1. Remove the Degraded Fish and Wildlife Populations BUI.
2. Complete three management actions investigating sources of PCB and Mercury in fish tissue under the Fish Consumption Advisory BUI.
3. Complete the seven remaining WI contaminated sediment actions to remove the Restrictions on Dredging BUI along Superior's waterfront.
4. Remove body contact restrictions at the Crawford Creek restoration site under the Beach Closings and Body Contact Restrictions BUI.
5. Complete the five remaining WI management actions for the Loss of Fish and Wildlife Habitat BUI.



Above: 15 acres of beach habitat restored for the endangered Piping Plover bird at WDNR's Bird Sanctuary along WI Point.



Above: First bucket from Howard's Bay dredging of contaminated sediment.

Left: Restoring fish connectivity on Little Balsam Creek.

Priority 2: Monitor and Address Contaminants of Concern

VISION: Lake Superior is a source of safe, high-quality drinking water. Levels of toxic pollutants will not contribute to restrictions on fish and wildlife consumption by humans. The waters will be free from contaminants and groundwater impairments that could harm people, wildlife, or ecosystems (GLWQA 2012; LAMP 2020).



Photos from left to right: 1) Lake Superior Team sampling contaminants in sediment in the St. Louis Estuary. 2) Rainbow Smelt PFAS Sampling. 3) Little girl holding her catch on Lake Superior. 4) Dredging at Ashland superfund site.

STATUS: Lake Superior continues to be a good source of high-quality drinking water ([LS LAMP](#), 2020). Overall, toxic chemicals monitored in Lake Superior are lower than in the other Great Lakes, and long-term trends indicate that concentrations are declining. Due to Lake Superior's 191 year water retention/replacement rate, residual contaminants can stay in the ecosystem for a long time after remediation is complete. However, fish consumption advisories are still necessary, mainly due to mercury and polychlorinated biphenyls (PCBs) ([LS LAMP](#), 2020). Emerging contaminants such as per- and polyfluoroalkyl substances (PFAS) are also concerns. PFAS are a family of manufactured chemicals used for their water- and stain-resistant qualities in products like clothing and carpet, nonstick cookware, packaging, and firefighting foam. Accumulation of these chemicals in the body has been linked to cancer or other adverse health effects ([Wisconsin PFAS Action Plan](#), 2020). The 2022 State of the Great Lake assessments determined Lake Superior to have the lowest concentration of perfluorinated surfactants and brominated flame retardants. Lake Superior also has the lowest levels of mercury in water and sediment but the highest levels of mercury in fish tissues. Most mercury contamination in Lake Superior is due to atmospheric deposition, but these concentrations are improving ([GLC](#), 2021; [LS LAMP](#), 2020).

Many efforts have occurred over the years to achieve this priority, below are a few recent highlights:

- Cleaned-up contaminated sediments at the Ashland Superfund site.
- Sampled and analyzed smelt for PFAS. As a result, a [new smelt fish consumption advisory](#) was issued for Lake Superior in 2021.
- Sampled Lake Superior nearshore waters and sediment for dioxin and PFAS.
- Sampled and characterized sediment in the St. Louis River estuary to confirm AOC sediment clean-up sites. Also sampled sediments for PCB analysis to inform the Fish Consumption BUI.

ACTIONS: WDNR establishes and monitors science-based environmental standards with many agency programs actively involved in addressing contaminants within the Lake Superior Basin.

WDNR will continue efforts with partners to:

Monitor and Address Contaminants of Concern 2022-2024 Actions

1. Complete remaining sediment remediation actions in the St. Louis River AOC RAP.
2. Assist MPCA with mercury TMDL for the St. Louis River AOC.
3. Continue implementation of the Wisconsin PFAS Action Plan.
4. Continue implementing the chemicals of mutual concern binational strategies within the Lake Superior basin.
5. Continue monitoring and assessing fish tissue for fish consumption advisories.
6. Undertake, support, and promote innovative approaches and technologies that reduce releases of harmful chemicals beyond required compliance levels.
7. Identify and promote priority actions through the Wisconsin Pollutant Discharge Elimination System (WPDES) program to reduce contaminants and pathogens from industrial and municipal wastewater treatment plants and biosolids land application.
8. Identify contaminated sediment sites that warrant further investigation and management, including Newton Creek, Iron River, Ashland waterfront, and possibly Barksdale waterfront.
9. Operate and maintain National Atmospheric Deposition Program (NADP) sites in northern Wisconsin to assess PFAS air deposition in rainfall.
10. Support science associated with food chain dynamics to identify problematic contamination areas.
11. Continue outreach and education to the public on impacts of chemical contaminants, focusing on mercury, pharmaceuticals, PFAS, and dioxins; the pathways of pollutants into fish, wildlife, and humans; and actions that can be taken to help remove contaminants from the basin.



Ashland Superfund site cleanup.

Priority 3: Reduce Nutrient and Bacterial Pollution to Restore & Protect Coastal and Nearshore Health

VISION: Lake Superior will be free from excess nutrients that may promote unsightly and toxic algal blooms. Environmental concerns will not restrict swimming and other recreational uses of the Lake (GLWQA 2012; LAMP 2020).



"Footloose and Fancy Free" 2014 Great Lakes Photo Contest. Chris Kuhlow

STATUS: Lake Superior is known for its clean and clear water and beaches. Since 2012, there have been sporadic algal blooms documented along the south shore of western Lake Superior. These blooms are not at the point of being a severe or chronic issue. These low-nutrient bloom species, and the species we see in the Lake Superior blooms, are not the same species found in the Lake Erie and Green Bay blooms, which are driven by high nutrients. Climate change appears to be driving the Lake Superior blooms, rather than nutrient inputs, as is the case with Lake Erie. We can't fix this without addressing the climate crisis. Lake Superior is warming the fastest of the Great Lakes. Nearshore monitoring is completed throughout the summer months to monitor and assess the health of the nearshore system. A partnership called the Lake Superior Collaborative (LSC) formed a Slow the Flow workgroup to evaluate and improve runoff concerns. Lake Superior's ten-year trend of bacterial pollution had been deemed "unchanging" to "slightly deteriorating." Local beaches are tested for *E. coli*, an indicator of human or animal feces in the beach water ([LS LAMP](#), 2020). Partners conduct regular sampling to look for bacterial pollution at recreation beaches.

Many efforts have occurred over the years to achieve this priority, below are a few recent highlights:

- Conducted nearshore monitoring along the south shore of Lake Superior in 2019 & 2020 to identify potential drivers of algal blooms. Collaborated with partners on Lake Superior Algal Subgroup.
- Restored Barker's Island Beach to reduce beach closures and increase public use.
- Implemented WI's Beach Program and funded partners to conduct beach monitoring.
- Conducted St. Louis River Clay Influence Bay Study to inform SLRAOC Sediment and Nutrient Beneficial Use Impairment.
- Conducted Targeted Watershed Assessments for the Black River, Pokegama River, Bluff & Bear Creek, and Fish Creek to analyze current conditions and make recommendations for future management actions.
- Developed [Superior Coastal Plain Master Plan](#).

ACTIONS: WDNR staff work with partners to actively monitor and assess nearshore health and trends, as well as identify and eliminate pollution sources that are a concern to public health. This includes potential beach closings due to high bacterial counts and impacts to native flora and fauna.

WDNR will continue efforts with partners to:

Reduce Nutrient and Bacterial Pollution to Restore & Protect Coastal and Nearshore Health 2022-2024 Actions

1. Monitor and assess Lake Superior nearshore health in WI.
2. Develop a Wisconsin Great Lakes Nearshore Monitoring Strategy.
3. Determine drivers and extent of algal blooms along WI's south shore.
4. Reduce impacts of nutrient and bacterial pollution through the WPDES program and the monitoring of surface and groundwaters.
5. Continue implementing the nutrient and algal bloom framework.
6. Improve Lake Superior predictive modeling for swim advisories.
7. Implement WI's Beach Program.



Top photos from left to right: 1) Partners beach monitoring near Barkers Island. Matt Steiger, WDNR 2) Community members enjoying a day at the beach on Barker's Island. 3) Nearshore monitoring efforts. Bottom photos from left to right: 1) Elevated boardwalk on Barker's Island so area can still be used during highwater and foot traffic disturbances are kept to a minimum. 2) Nearshore monitoring efforts 3) Healthy Lake Superior beach.



Priority 4: Slow the Flow and Restore Hydrologic Connectivity

VISION: Lake Superior will allow swimming and other recreational use, unrestricted by environmental quality concerns. Lake Superior will also support healthy and productive habitats to sustain native species (GLWQA, 2012; LS LAMP, 2020). Drinking waters should not be impaired from increased sedimentation.



Northland College led effort to stabilize bluff locations along WDNR property on Fish Creek in Bayfield County.

STATUS: Partners have identified increased runoff flows across the landscape that enters Lake Superior tributaries as the primary cause of sedimentation in the basin. This increased flow is resulting in channel erosion, channel degradation, and excessive sedimentation into Lake Superior, as well as burying critical habitat for fish and other aquatic organisms. With increased storm frequency and intensity predicted, additional impacts are anticipated.

Many efforts have occurred over the years to achieve this priority, below are a few recent highlights:

- Replaced 3 culverts on Little Balsam Creek, a class 1 brook trout stream, to restore fish passage.
- Partnered with Northland College to stabilize two bluff locations on DNR property along Fish Creek.
- Assisted partners with Marengo River watershed efforts, including wetland functional assessments, natural flood management restoration, and 9-key element planning.



The Wisconsin portion of the Lake Superior Basin was impacted by historic flood events in 2012, 2016, & 2018. We learned many lessons from those events and are working towards building more resiliency in the Basin. From left: 1) Highway 2 after 2016 flood. Ashland County Hwy Dept 2) Highway 13 after 2016 flood, near Highbridge. Ashland County Hwy Dept

ACTIONS: Local partners have been working to "slow the flow" for many years. Current efforts continue this work and strategically install best management practices to prevent accelerated runoff and associated nutrients and sediment from urban and rural nonpoint sources.

WDNR will continue working with partners to:

Identify & Implement Land Conservation Measures to Slow the Flow and Increase Landscape Scale Hydrologic Connectivity 2022-2024 Actions

1. Encourage and support investments in green infrastructure and nature-based solutions that help to manage stormwater runoff.
2. Encourage and support projects that improve soil health and forest health with a focus on increasing resilience to climate change, decreasing excessive runoff, and reducing excessive erosion and nutrient loading from Lake Superior tributaries.
3. Support local initiatives to help communities develop and/or implement watershed plans and/or climate change adaptation plans.
4. Complete the Slow the Flow white paper with partners.
5. Co-lead the Lake Superior Collaborative Slow the Flow Work Group to develop an implementation plan for Slow the Flow white paper recommendations and identify target locations to implement the Slow the Flow actions.
6. Provide continued partner support and assistance for the Lake Superior Natural Flood Management Initiatives in the Marengo River Watershed and elsewhere.
7. Provide support to counties and partners to complete and implement the Marengo River 9 Key Element plan update.
8. Provide support to counties and partners to start developing the Fish Creek 9 Key Element plan process.
9. Provide support to implement land conservation measures to reduce surface runoff sedimentation and increase infiltration.



Learning about in-stream restoration projects in Lake Superior tributaries from Lake Superior Partners.

Priority 5: Restore and Protect Representative High-Quality Habitats & Native Species

VISION: Lake Superior will support healthy and productive wetlands and other habitats to sustain resilient populations of native species (GLWQA, 2012; LAMP, 2020).



The Michelle Wheeler Wetland Restoration Site started as Port Wing wastewater pond seen on the left. The photo on the right was taken in 2021 after the site saw a couple seasons of growth. Map Aerials

STATUS: Most habitats are in good condition; however, there are threats and stressors resulting in habitat degradation. The Great Lakes serve as one of the “most ecologically diverse ecosystems in the world ([2019 SOGL report](#), pg. 13). As a result, efforts are focused on protecting high quality habitats, as well as restoring degraded habitats. This priority is inclusive of aquatic and terrestrial habitats and species found along the Lake Superior coast and across Lake Superior basin and watersheds including, lakes, streams, wetlands, forests, barrens and others. This priority covers coastal wetlands all the way to the offshore aquatic food web. Coastal wetland invertebrates are in good status but the trend is deteriorating on Lake Superior, coastal wetland fish communities are improving.

Many efforts have occurred over the years to achieve this priority, below are a few recent highlights:

- Reconstructed the nesting platform for the endangered Common Tern in Chequamegon Bay.
- Restored the Town of Port Wing abandoned wastewater ponds to wetlands and reconnecting to the Flag River estuary. The Michele Wheeler Wetland Restoration is visited by many.
- Constructed a boardwalk to protect coastal wetlands at Big Bay State Park on Madeline Island.
- Partnered with USFS and others to capture and translocate 160 sharp-tailed grouse from NW Minnesota to the Moquah Barrens to bolster local populations and provide genetic rescue.
- Inventoried more than one hundred road-stream crossings to identify fish passage barriers on Lake Superior cold-water tributaries in 10 watersheds in Douglas and Bayfield counties.
- Conducted native mussel survey in St. Louis River to create a baseline for future survey work.
- Awarded Lake Protection Grants to Village of Lake Nebagamon, Nebagamon Lake Association, Lake Minnesuing Sanitary District, Lake Owen, and Douglas County to implement Healthy Lakes Initiative practices including fish sticks, stormwater management, restoring native shoreline vegetation, rain gardens, and boat decontamination stations.

ACTIONS: The WDNR has numerous ongoing efforts to protect and restore high-quality habitats in the Lake Superior Basin. WDNR will continue working with partners to:

Restore and Protect Representative High-Quality Habitats & Native Species 2022-2024 Actions

1. Continue implementation of the [Wisconsin Wildlife Action Plan](#) priorities.
2. Continue advancement of the [Lake Superior Biodiversity Conservation Strategy](#).
3. Continue implementation of the [Wisconsin Lake Superior Fisheries Management Plan](#).
4. With partners, rehabilitate indigenous aquatic species such as brook trout, lake sturgeon, muskellunge, walleye, etc.
5. Support fish passage projects in priority brook trout watersheds.
6. With partners, assess the lower food web health in Lake Superior.
7. Improve cisco and whitefish population models to quantify habitat's role as a restoration impediment and inform potential management actions.
8. Continue implementation of the [Great Lakes Fishery Commission Lake Superior Committee's Environmental Priorities](#).
9. Continue monitoring and management of common terns, colonial waterbirds, and Lake Superior shorebirds.
10. Continue wood turtle monitoring and habitat protection projects.
11. Continue the bird habitat improvement projects at Fish Creek Sloughs and Allouez Bay.
12. Protect and support the protection of high-quality habitats, including the Port Wing State Natural Area, the Brule River State Forest, and the Whittlesey Creek Watershed.
13. Update the Lake Superior Important Habitat Map.
14. Implement [Healthy Watersheds, High-Quality Waters Action Plan](#) in the Lake Superior Basin



Photos from left to right: 1) St. Louis River muskellunge survey 2) Tern Island Restoration in Ashland. 3) Lake Superior Cisco Survey.
Below: Cattail control efforts in Michelle Wheeler Wetland Restoration site.



Priority 6: Reduce & Prevent the Impact of New & Existing Invasive Species

VISION: Lake Superior will be free from adverse impacts of aquatic and terrestrial invasive species (GLWQA, 2012; LAMP 2020).



Life cycle and rearing of purple loosestrife beetles.

STATUS: Invasive species have already had a drastic impact on the native species and habitats within the Lake Superior basin. They come to the basin through numerous pathways, including commercial shipping, recreational activities, and dispersal from other waterways. To build ecosystem resilience, we must mitigate these impacts and minimize the risk of future introductions ([LS LAMP](#), 2020).

Many efforts have occurred over the years to achieve this priority, below are a few recent highlights:

- Protected 15 high quality coastal wetlands through aquatic invasive species (AIS) early detection surveys and implementing AIS recommendations including control actions in partnership with the Lake Superior Research Institute (LSRI).
- Raised and released over 100,000 biocontrol beetles with citizen volunteers to control purple loosestrife across the basin.
- Controlled buckthorn on Clough Island and the White River Fishery Area to restore habitat.
- Mapped and controlled invasive knotweed across the basin in partnership with the NCWMA.
- Controlled yellow iris and cattail in the Brule River estuary and seeded wild rice in partnership with the LSRI.



ACTIONS: The WDNR will work with partners to reduce and prevent the impact of new and existing invasive species. WDNR will work towards this vision by implementing the [Wisconsin Aquatic Invasive Species Management Plan](#), [Lake Superior Aquatic Invasive Species Complete Prevention Plan](#), utilizing the [Great Lakes Aquatic Nuisance Species Information System for reporting](#) and completing the following actions.

The WDNR will continue working with partners to:

WDNR Identified Actions to Reduce & Prevent the Impact of New & Existing Invasive Species 2022-2024

1. Maintain early detection efforts that are critical to minimizing impacts.
2. Work with partners to contribute to the elimination of European Common Reed (*Phragmites australis*) from the Lake Superior Basin.
3. Contribute to the protection of wetlands from the negative impacts of Emerald Ash Borer (EAB).
4. Continue implementation of buckthorn control strategy along priority brook trout streams.
5. Continue and improve Aquatic Invasive Species (AIS) pathway monitoring.
6. Implement the Coastal Wetland Invasive Species Management Recommendations.
7. With partners, continue treatment and control efforts of regulated invasive species – including purple loosestrife, knotweed, and yellow iris.
8. Assess sea lamprey, Viral Hemorrhagic Septicemia (VHS), and fish passage concern on Lake Superior tributaries.
9. Continue aquatic invasive species prevention outreach and education within the basin.
10. Continue to assist partners in the development and submission of response grants related to monitoring and control of pioneering invasive species populations in the Lake Superior Basin.
11. Help develop new national rules with federal and regional governments aimed at reducing risks from new or expanding invasive species transported by ballast water.



Pictures from left to right: 1) Douglas County Partner assisting with Yellow Iris Control on Brule River. 2) Controlling cattails in a wetland restoration site. 3) Early detection monitoring in coastal area White River Fisheries Area.

Bottom of Pg. 16. captions left to right: Pulling of yellow iris from Loon Lake, Brule River Yellow Iris. Curly Leaf Pondweed Removal in Lake Superior.

Priority 7: Build Ecosystem & Community Resiliency

VISION: Lake Superior will allow for swimming and other recreational use, unrestricted by environmental quality concerns, allow for human consumption of fish & wildlife, be free of pollutants that could be harmful, and be able to sustain resilient populations of native species (GLWQA General Objectives, 2012).



Building climate resiliency through underplanting efforts in black ash dominated wetlands impacted by EAB.

STATUS: Climate change has not only impacted habitats and species within the Lake Superior basin but has also impacted the human communities. Significant storm events, increased runoff and coastal erosion, invasive species, and water level fluctuations are just a few examples of these changes that impact and impose costs onto local communities. We want to be proactive and help build resiliency for the ecosystem and the local communities.

Many efforts have occurred over the years to achieve this priority, below are a few recent highlights:

- Conducted long-lived conifer underplanting in the Port Wing Boreal Forest with Port Wing High School students to encourage regeneration following a blowdown event.
- Conducted understory plantings in black ash wetland forests across the basin to increase resiliency to the impacts of the invasive emerald ash borer and climate change.
- Completed WICCI Report update and included specific Great Lakes impacts with partners.
- Piloted Great Lakes Coastal Adaptation Menu for Allouez Bay Marsh Breeding Bird Project.



Photos from left to right: 1) Exploring headcutting after 2016 flood event. Wisconsin Wetlands Association. 2) Road damage Ashland County Highway C after the 2016 flood. Wisconsin Emergency Management (WEM) 3) Native plantings that occurred along the shoreline of Barker's Island.

ACTIONS: The mission of the WDNR is to provide a healthy, sustainable environment and provide a full range of outdoor activities. The WDNR works collaboratively with many partners and local communities to fulfill this mission by:

Actions to Build Ecosystem & Community Resiliency 2022-2024 Actions

1. Support climate change initiatives that increase the resilience of the Lake Superior ecosystem's habitats, species, and communities.
2. Chair the Wisconsin Initiative on Climate Change Impacts (WICCI) Great Lakes Work Group.
3. Continued support for regional partnerships completing the culvert inventory in the Lake Superior Basin to enhance flood resiliency best management practices (BMPs).
4. Plant trees best suited for a changing climate along cold-water streams, rivers, and lake shorelines.
5. Support development of green infrastructure projects and nature-based solutions that are suited to future extreme weather events.
6. Improve understanding of the impacts of physical changes (e.g., water levels, water temperature, etc.) and changing climate on water quality, habitat, and species.
7. Collaborate with partners, landowners, and other governmental entities to maintain and enhance the function and resilience of watershed headwater features, streams, forests, and wetlands in the face of a changing climate.
8. Develop and implement projects to make beaches more resilient to high and low water levels and impacts from extreme storm events.
9. Conduct a coastal wetland resiliency study to identify and implement adaptation actions for priority coastal wetlands.
10. Maintain active involvement on the Lake Superior Collaborative steering team and workgroups to accomplish more resiliency projects in the Wisconsin Lake Superior Basin and build stronger partnerships.
11. Encourage or support projects that improve soil health and forest health, focusing on increasing resilience to climate change, decreasing excessive runoff, and reducing excessive erosion and nutrient loading from Lake Superior tributaries.



Photos from left to right: 1) Building an understanding of head cutting in Marengo River Watershed. Wisconsin Wetlands Association 2) Discussion of shoreline restoration options with partners. 3) Boardwalk completed from Lake Superior to Big Bay State Park lagoon.

Appendix A: References

1. Environment and Climate Change Canada and US Environmental Protection Agency. 2022. [Lake Superior Lakewide Action and Management Plan](#), 2020-2024.
2. Environment and Climate Change Canada and US Environmental Protection Agency. 2019. [State of the Great Lakes 2019 Highlights Report](#). An overview of the status and trends of the Great Lakes ecosystem
3. [Great Lakes Water Quality Agreement: An Evolving Instrument for Ecosystem Management](#). Washington, DC: The National Academies Press. <https://doi.org/10.17226/18933>.
4. Great Lakes Restoration. 2019. [Great Lakes Restoration Initiative Action Plan III](#). Fiscal Year 2020 – Fiscal Year 2024.
5. Lake Superior Binational Program. 2014. [Lake Superior Aquatic Invasive Species Complete Prevention Plan](#).
6. Lake Superior Binational Program. 2015. [A Biodiversity Conservation Strategy for Lake Superior: A Guide to Conserving and Restoring the World's Largest Freshwater Lake](#).
7. Lake Superior Fishery Committee. 2019. [Lake Superior Committee Environmental Priorities](#).
8. Great Lakes Commission. 2021. [Issue Brief: Mercury Contamination in the Great Lakes Basin](#).
9. [St. Louis River AOC 2021 Remedial Action Plan](#).
10. University of Wisconsin Madison Division of Extension. 2018. [Wisconsin Aquatic Invasive Species Management Plan](#). Madison, WI.
11. Wisconsin Department of Natural Resources. 2015. [2015-2025 Wisconsin Wildlife Action Plan](#). Madison, WI.
12. Wisconsin Department of Natural Resources. 2019. [Superior Coastal Plain Regional Master Plan](#). Madison, WI.
13. Wisconsin Department of Natural Resources. 2020. [Lake Superior Fisheries Management Plan 2020-2029](#). Administrative Report no. 93. Madison, WI.
14. Wisconsin Department of Natural Resources. 2020. [Statewide Forest Action Plan 2020-2030](#). Madison, WI.
15. Wisconsin Department of Natural Resources. 2022. [The Wonderful Waters of Wisconsin: An Action Plan to Protect Wisconsin's Healthy Watersheds & High-Quality Waters](#). Madison, WI.
16. Wisconsin PFAS Action Council. 2020. [Wisconsin PFAS Action Plan](#). Madison, WI.

Appendix B: WDNR Programs & Professionals

Below is a list of the 12 WDNR programs and numerous resource professionals who are implementing the actions in this Plan. This list is expected to grow and evolve over the duration of this Plan.

Air Management

Katie Praedel

Environmental Analysis & Sustainability

Amy Cronk

Jon Simonsen

Shawn Haseleu

Fisheries Management

Brad Ray

Chris Sands

Dray Carl

Kari Fenski

Paul Piszczek

Sean Strom

Zach Lawson

Division of Forestry

Colleen Matula

Eric Serrine

Joseph LeBouton

Kara Oikarinen

Matt Blaylock

Mike Mattson

Nicky Martin

Terry Asleson

Natural Heritage Conservation

Amy Staffen

Andrew Badje

Jesse Weinzinger

Rori Paloski

Ryan Brady

Ryan Magana

Shari Koslowsky

Sumner Matteson

Office of Emerging Contaminants

Jason Lowery

Office of Great Waters

Alex Selle

Cherie Hagen

Dara Fillmore

Dave Grandmaison

Devin Edge

Donalea Dinsmore

Ellen Cooney

Kendra Axness

Lacey Hill Kastern

Madeline Magee

Matt Steiger

Steve Galarneau

Remediation & Redevelopment

Joe Graham

Wastewater

Michael Goettel

Water Quality

Jon Kleist

Kevin Gauthier Sr.

Michelle M Balk Ludwig

Pam Toshner

Watershed Management

Liz Osborne

Ruth King

Wildlife Management

Eddie Shae

Greg Kessler

Jenna Malinowski

Appendix C: Partners

We do everything through partnerships, and none of the work described in this action plan would be possible without the strong collaboration with landowners, communities, and other agencies and organizations. The list below is just a snapshot of the numerous partners the WDNR works with to restore and protect Lake Superior.

- [1854 Treaty Authority](#)
- [Ashland County Land & Water Conservation Department](#)
- [Bad River Band of Lake Superior Chippewa](#)
- [Bayfield County Land & Water Conservation Department](#)
- [City of Ashland](#)
- [City of Superior](#)
- [Douglas County Land & Water Conservation Department](#)
- [Fond du Lac Band of Lake Superior Chippewa](#)
- [Great Lakes Indian Fish & Wildlife Commission \(GLIFWC\)](#)
- [Iron County Land & Water Conservation Department](#)
- [Lake Superior Binational Program Partnership](#)
- [Lake Superior Collaborative \(LSC\)](#)
- [Lake Superior National Estuarine Research Reserve \(LSNERR\)](#)
- [Lake Superior Research Institute \(LSRI\)](#)
- [Landmark Conservancy](#)
- [Minnesota Department of Natural Resources \(MN DNR\)](#)
- [Minnesota Pollution Control Agency \(MPCA\)](#)
- [National Oceanic Atmospheric Administration \(NOAA\)](#)
- [National Park Service – Apostle Islands National Lakeshore \(NPS APIS\)](#)
- [Natural Resources Conservation Service \(NRCS\)](#)
- [Northland College](#)
- [Red Cliff Band of Lake Superior Chippewa](#)
- [St. Croix Chippewa Indians of Wisconsin](#)
- [St. Louis River Alliance \(SLRA\)](#)
- [Superior Rivers Watershed Association \(SRWA\)](#)
- [Trout Unlimited \(TU\)](#)
- [United States Environmental Protection Agency \(EPA\)](#)
- [United States Fish & Wildlife Service \(USFWS\)](#)
- [United States Forest Service \(USFS\)](#)
- [University of Wisconsin- Madison Division of Extension \(UW-Ext\)](#)
- [Wisconsin Coastal Management Program \(WCMP\)](#)
- [Wisconsin Initiative on Climate Change Impacts \(WICCI\)](#)
- [University of Wisconsin Sea Grant](#)
- [Wisconsin Wetlands Association \(WWA\)](#)

Wisconsin Department of Natural Resources
Lake Superior Action Plan 2022-2024



Appendix D: Great Lakes Water Quality Agreement General Objectives

The following general objectives were used to develop the vision statement for each priority and are also referenced for each objective in the 2020 Lake Superior Action Plan developed by the Lake Superior Partnership. More information can be found here: <https://www.ijc.org/en/who/mission/glwqa>

The Waters of the Great Lakes should:

- i) be a source of safe, high-quality drinking water;
- ii) allow for swimming and other recreational use, unrestricted by environmental quality concerns;
- iii) allow for human consumption of fish and wildlife unrestricted by concerns due to harmful pollutants;
- iv) be free from pollutants in quantities or concentrations that could be harmful to human health, wildlife, or aquatic organisms, through direct exposure or indirect exposure through the food chain;
- v) support healthy and productive wetlands and other habitats to sustain resilient populations of native species;
- vi) be free from nutrients that directly or indirectly enter the water as a result of human activity, in amounts that promote growth of algae and cyanobacteria that interfere with aquatic ecosystem health, or human use of the ecosystem;
- vii) be free from the introduction and spread of aquatic invasive species and free from the introduction and spread of terrestrial invasive species that adversely impact the quality of the Waters of the Great Lakes;
- viii) be free from the harmful impact of contaminated groundwater; and
- ix) be free from other substances, materials or conditions that may negatively impact the chemical, physical or biological integrity of the Waters of the Great Lakes;

