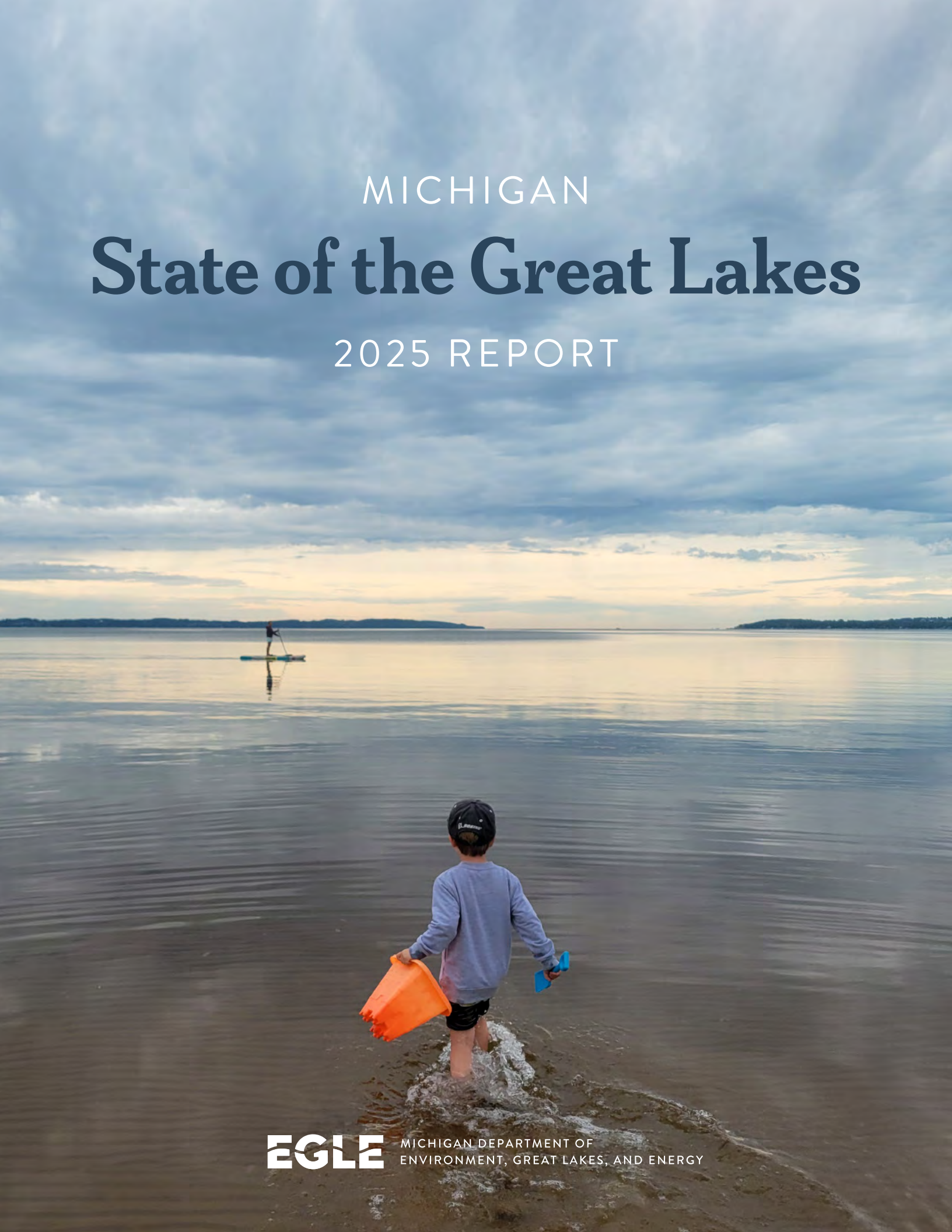
MICHIGAN

State of the Great Lakes

2025 REPORT



EGLE
MICHIGAN DEPARTMENT OF
ENVIRONMENT, GREAT LAKES, AND ENERGY

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A note to readers of the printed report:

The digital version of this report includes hyperlinks to external content.
Print readers may scan the QR code above with a smart device to access the digital report and its links.

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Prepared by the Michigan Department of Environment, Great Lakes, and Energy
on behalf of the Office of the Governor (December 2025)

On the cover: Grand Traverse Bay near Traverse City, Michigan. Photo courtesy of EGLE.

Michigan waters are our shared bond

From the shores of Superior to the banks of the Detroit River, clean and fresh water defines every corner of Michigan. As Governor of the Great Lakes State and a proud, lifelong Michigander, I will always protect the waters that power our economy, enrich our lives, and sustain our environment.

Our Great Lakes supply drinking water to 40 million people, support hundreds of thousands of jobs, drive tourism and commerce, and make us all proud to be from Michigan. They are, however, vulnerable. From invasive species to pollution to climate change to growing resource demands, there are a lot of challenges, but we will always protect our water. Our lakes will always bring us together.

In this report, you'll learn about not only challenges but innovative cleanup technologies, thoughtful sustainability strategies, dedicated conservation efforts, and other wins we can celebrate together.

We are pursuing a first-ever Michigan Maritime Strategy to make our maritime industry and economy cleaner and more efficient. We are investing in our ports to make them more sustainable; producing more clean, homegrown energy; and training people for jobs of the future. Together, we are growing our Great Lakes economy.

Last year's State of the Great Lakes report detailed the Brandon Road Interbasin Project, a crucial multi-state initiative on the Illinois Waterway to help keep invasive carp out of the Great Lakes. I was proud to work with partners in other states and our federal government to move the project forward, and work officially started this year. This is a huge win for Michigan and the entire Great Lakes basin.

The Brandon Road win builds on the work we've been doing since I took office. Since 2019, Michigan has invested more to build up our water infrastructure than ever before. We replaced tens of thousands of lead service lines, rebuilt aging sewer systems, and modernized wastewater treatment facilities. To ensure every family has access to safe water from their taps, Michigan enforces the strongest Lead and Copper Rule in the nation, and we have implemented health-based standards for PFAS.

In the wake of the Flint water crisis, we all saw the long-overdue need not only to rebuild our water infrastructure but also to restore the community's trust in their public services. With local input and bipartisan support, the majority of our water infrastructure dollars are helping historically underserved communities in big cities and small towns. Together, we are building a Michigan where every resident, no matter who they are or where they live, has clean water.

As a leader, I am always focused on finding ways to bring people together to solve big problems. My compass always points to teamwork, and for two years now I've chaired the Great Lakes St. Lawrence Governors and Premiers (GSGP). This unique organization brings together leaders of eight U.S. states and two Canadian provinces, who together are stewards of the largest surface freshwater system on Earth. Together, we are entrusted with safeguarding 21% of the world's fresh surface water and shaping a regional economy worth more than $9.3 trillion.

At our Leadership Summit in Québec City in October, GSGP set out its forward-looking Agenda for Growth, a bold strategy to strengthen our regional economy and safeguard our environment across borders. Our shared waters demand shared responsibility.

I'm proud to help lead the way, and Michigan is proud to lead by example, showing the country how to grow an economy and protect the environment.

Let's keep working to protect our Great Lakes today and for generations to come.

Forward,

Governor Gretchen Whitmer

Dune grass and sunset over Lake Michigan.

Future vision comes into clearer view

As director of the Michigan Department of Environment, Great Lakes, and Energy (EGLE), I'm proud to present this 2025 Michigan State of the Great Lakes Report. It highlights the people and partnerships dedicated to studying, restoring, managing, and safeguarding our freshwater ecosystem – the world's largest.

That's an impossibly broad scope for a single report to capture in full, but the stories collected here suggest the range this work covers. The vital efforts to protect and preserve waters and the health of people and ecosystems explored herein include researching microplastics and reducing plastic waste, understanding PFAS contamination, assessing groundwater use, ensuring dam safety, and working toward sustainable ports and a Michigan Maritime Strategy.

You'll learn about statewide efforts to safeguard natural treasures like manoomin (wild rice), lake whitefish, and the piping plover while fighting invasive parasites like the sea lamprey. You'll see a new urban nature park along the Detroit River and find out how we're preventing harmful algal blooms in western Lake Erie through agricultural innovations.

And you'll learn how decades of hard work restoring and revitalizing Muskegon Lake have paid off – not only with its historic removal from the list of contaminated Areas of Concern in the Great Lakes region, but with the creation of a vibrant waterfront where opportunities for recreation and economic development abound. It's hard to overstate the importance of this long and transformational journey for a vital body of water and the communities that surround it. EGLE and all of the agencies and community organizations who made it happen have been in it for the long haul.

In that same spirit, our dedicated staff continue the journey along our all-of-EGLE "Vision 2027" strategic roadmap to reinforce Michigan's national leadership in water protection and implement the MI Healthy Climate Plan – supporting the health of the Great Lakes and all Michiganders.

And while practically all aspects of environmental protection are interrelated, water is a common denominator that's called out by name in the missions of four out of EGLE's 10 program divisions and offices: the Drinking Water and Environmental Health Division, the Office of the Clean Water Public Advocate, the Office of the Great Lakes (coordinator of this annual report), and the Water Resources Division.

Governor Gretchen Whitmer's leadership is key to our efforts, as is support from the Michigan Legislature, the federal government, and private and nonprofit partners.

And you, personally, are part of this success story. I invite you to read this report for inspiration and engage with our shared responsibility to protect and preserve these waters — for ourselves and generations to come. I'm honored to lead an agency whose mission resonates with my own heritage and passion. My connection to Michigan's natural beauty and bounty runs deep: Michigan has been my family's home since the 1820s, from farms near Cadillac and Traverse City to the industrial heart of Flint to the "Tree Town" of Ann Arbor.

Cycling, canoeing, hiking – wherever I go and whatever I do, I'm reminded of the allure, power, and importance of our state's freshwater treasures. If you're anything like me, they're part of how you define Michigan and who you are as a Michigander.

Together, let's shape a future where every one of us can thrive in the healthy embrace of our Great Lakes.

Phillip D. Roos
Director, Michigan Department of Environment, Great Lakes, and Energy

Staying strong and stretching at 40

Office of the Great Lakes keeps up its stewardship mission at home and abroad

By Emily Finnell, Michigan Department of Environment, Great Lakes, and Energy

It's a milestone celebration for the Office of the Great Lakes (OGL): 40 years since the office was created in 1985 under the Great Lakes Protection Act to carry out the mission of leading policy and program development to protect and promote the health of the Great Lakes for current and future generations.

This was also the year the OGL began producing the Michigan State of the Great Lakes Report. The first report featured articles on topics such as wastewater treatment plants, Michigan's then-14 Areas of Concern (AOCs), toxic substances, nonpoint source pollution, lake level fluctuations, fisheries management, commercial shipping, and ports.

The first report also highlighted a major step in regional governance and safeguarding Great Lakes water supply: the signing of the Great Lakes Charter, a good-faith agreement among the governors of the Great Lakes states and premiers of the provinces of Ontario and Quebec.

The Charter outlines a series of principles to collectively manage use of the Great Lakes Basin's water supply and a process for notice and consultation about proposals to divert large amounts of water out of the basin and for large in-basin uses. It laid the foundation for the future Great Lakes Compact and Agreement and for our continued work together regionally to sustainably manage and steward the waters of the basin against future threats.

Many topics in this year's report bring issues like those from the first report full circle. The past year featured many successes derived from long-term restoration efforts in Michigan and the Great Lakes, such as removing Muskegon Lake from the list of AOCs and witnessing a recovery for Great Lakes piping plovers. These efforts are vulnerable, though, and require vigilance, partnerships, funding, research, and work to advance or even maintain. Eighty-eight pairs of nesting piping plovers is a milestone to celebrate but a small number to rely on for the survival of a species.

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Michigan's Office of the Great Lakes has led policy and program development to protect and promote the health of the lakes and their timeless beauty for 40 years. Photo courtesy of EGLE.

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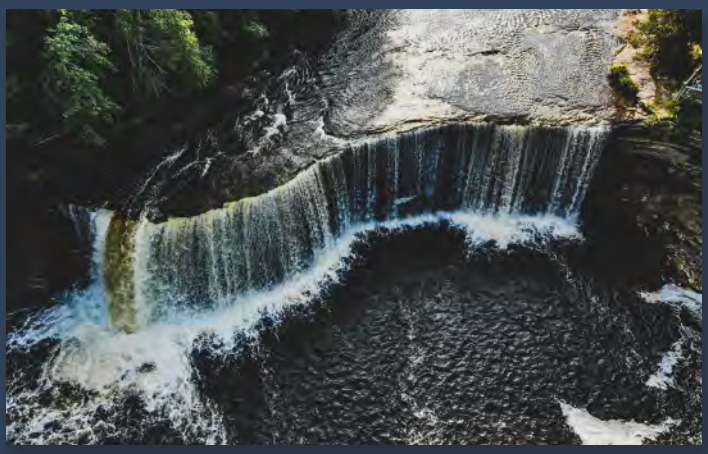
It's been a year for engaging with diverse groups to develop long term strategies to guide Michigan's collective work on pressing issues and opportunities to grow a more sustainable, bluer economy. Two examples in this year's report are the development of the Michigan Maritime Strategy and laying groundwork with state partners to develop long-term strategies for microplastics.

In 2025, the Ox Creek Collaborative Partnership, convened by OGL and involving more than 15 local, state, and federal partners, completed the Ox Creek Revitalization Plan. The Benton Harbor City Commission approved the plan as a roadmap for restoration and revitalization. This year also marked progress for on-the-ground Ox Creek projects including the start of cleaning up the contaminated Modern Plastics site for redevelopment, completing the first phase of the Hall Park restoration, and laying the groundwork for stream habitat restoration.

Protection of Michigan's Great Lakes calls for all hands and all ages at all scales, so OGL prioritizes collaboration, stewardship, and education. The office represents the State of Michigan in national and international forums, including several Great Lakes governmental organizations involving interstate compacts, treaties, and agreements that underpin a complex set of relationships and governance for co-management of the Great Lakes.

EGLE Great Lakes Senior Advisor and Strategist Emily Finnell and Great Lakes St. Lawrence Governors & Premiers Deputy Director Peter Johnson brought Michigan's and the Laurentian Great Lakes' perspective to the 2025 World Lake Conference in Brisbane, Australia. Photo courtesy of EGLE.



Michigan's precious water wonders include iconic sights like Tahquamenon Falls in the Upper Peninsula. Photo courtesy of EGLE.

In July, OGL presented at the 20th World Lake Conference in Brisbane, Australia, on Michigan's long-term efforts in stewardship, community collaboration, and binational governance, promoting Michigan's work on the Laurentian Great Lakes on an international stage.

The first World Lake Conference was hosted in 1984 by Japan's Shiga Prefecture – Michigan's sister state since 1968. The second was hosted on Mackinac Island. Since then, the conference has been convened every two years to bring policymakers, scientists, engineers, and citizens together to collaborate and share knowledge, experiences, and achievements for sustainable lake management across the globe.

This year's World Lake Conference also brought nations together to promote, coordinate, and celebrate the establishment of an annual World Lake Day. The United Nations General Assembly designated the day to celebrate lakes and spotlight their importance amid challenges such as habitat loss, pollution, climate change, and water quality impacts. Michigan observed its first annual World Lake Day on Aug. 27.

On a personal note, reflecting back over more than 25 years during my tenure with OGL, one thing remains constant: The people, their passion for the Great Lakes and Michigan's waterways, and the relationships and partnerships across so many organizations and agencies are how we have achieved successes together. I look forward to continuing this incredibly meaningful and impactful work in the year ahead and beyond to ensure our freshwater ecosystem is everlasting. ◆

Michigan's 14 AOC locations. Four are now delisted, including Muskegon Lake, just south of White Lake on Lake Michigan.

RESTORING THE HEART OF A COMMUNITY

Muskegon Lake transforms from Area of Concern to comeback success story

By Stephanie Swart, Michigan Department of Environment, Great Lakes, and Energy

When Muskegon Lake was named a Great Lakes Area of Concern (AOC) in 1985, it was a shadow of its pristine self. Its waters, wetlands, and tributaries had endured more than a century of abuse from industrial and municipal waste discharges.

By the mid-20th century, its sediments were laced with heavy metals, PCBs, and other chemicals, pesticides, and nutrients that fueled algal blooms. Shoreline wetlands were filled in, fish populations suffered, and anglers were warned against eating their catch.

That was then. Now, after decades of coordinated cleanup and community engagement, Muskegon Lake celebrates its status as a newly delisted AOC – removed in September 2025 from the list of the Great Lakes' most polluted places. It's a milestone among environmental turnarounds in Michigan history.

A shoreline once ringed by waste outflows now features appealing public spaces like Heritage Landing, Veterans Park, Muskegon Lakeshore Trail, and the Muskegon Lake Nature Preserve. Marinas and boat launches facilitate recreational sailing, boating, and sport fishing, and people flock to the lakeshore to hike, picnic, and attend concerts and festivals.

A BINATIONAL COMMITMENT

AOCs are designated areas in the Great Lakes Basin marked by high levels of legacy pollution requiring cleanup. The Great Lakes AOC Program was established in 1987 under the U.S.-Canada Great Lakes Water Quality Agreement to tackle the worst pollution hot spots.

There were originally 26 AOCs in the U.S. (including 14 in Michigan), 12 in Canada, and five shared between the two countries. Four of Michigan's have now been cleaned up and removed from the list because they are no longer considered to be impaired. Deer Lake in the Upper Peninsula and White Lake along Lake Michigan were delisted in 2014, and the Lower Menominee River, shared with Wisconsin, was delisted in 2020.

Now that Muskegon Lake has joined them, 10 remain in Michigan: Torch Lake, Manistique River, and St. Marys

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(Left) With the S.S. Milwaukee Clipper in the background, mill debris piles up on the Muskegon Lake shoreline during removal. Photo courtesy of MLWP.

Aerial views show drastic changes at the Amoco Fish and Wildlife Habitat Restoration site. Before restoration, a concrete wall cut the lake off from wetlands and the eroding shoreline. The view after restoration includes restored coastal wetlands and a trail compliant with the Americans with Disabilities Act. Photos courtesy of Ramboll Americas Engineering Solutions, Inc.

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River in the Upper Peninsula; Kalamazoo River in West Michigan; Saginaw River and Bay in the Thumb area; and St. Clair River, Clinton River, Rouge River, Detroit River, and River Raisin in the Detroit metropolitan area.

Each AOC has its own set of problems from a list of up to 14 Beneficial Use Impairments (BUI), mostly associated with harmful contaminants in sediments, loss of habitat for fish and wildlife, and impacts from human activity.

MOMENTUM FOR CLEANUP

As early as the 1970s, communities surrounding the lake began to invest in wastewater treatment upgrades and sewer system improvements, drastically reducing bacterial pollution flowing into the lake.

The Muskegon Lake Public Advisory Council was formed in 1991. Six years later, sediment remediation projects for AOCs received $9.4 million from the Clean Michigan Initiative. Over the next 28 years, additional funding would come from the Great Lakes Legacy Act, the Great Lakes Restoration Initiative (GLRI), the American Recovery and Reinvestment Act, and more. By 2008, the state had established clear criteria for BUI removal – a road map for restoration.

From there, progress accelerated. A Remedial Action Plan (RAP) updated over the years and a Fish and Wildlife Habitat Restoration Strategy guided the AOC team through numerous projects, from dredging and capping polluted sediments to reconnecting wetlands, improving fish habitat, and restoring shoreline buffers.

By 2024, all management actions were complete, and each Muskegon Lake BUI was formally removed. Signoff by the U.S. State Department on Sept. 26, 2025, made the delisting official.

COLLABORATION AT EVERY LEVEL

Remediation and restoration took more than $84 million, including $67 million in federal funds, largely through the GLRI, and $17 million in state, local, and private contributions.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) coordinated with the U.S. Environmental Protection Agency, local governments and tribes, and partners including Grand Valley State University, the Muskegon Conservation District, the West Michigan Shoreline Regional Development Commission, and other federal agencies like the National Oceanic and Atmospheric Administration, the U.S. Army Corps of Engineers, and the U.S. Fish and Wildlife Service.

Crucially, local residents had a voice. The Public Advisory Council, since renamed the Muskegon Lake Watershed Partnership (MLWP), brought together concerned citizens, business owners, environmental advocates, and government representatives who together built trust, identified local priorities, and maintained momentum.

NO STOPPING NOW

Delisting means these areas have environmental conditions and support uses comparable to other areas across the Great Lakes. It does not mean all is permanently well.

Emerging issues like PFAS "forever chemical" contamination and harmful algal blooms are outside the AOC program's scope but remain active concerns for the watershed. Ongoing monitoring programs led by EGLE, local partners, and the Michigan departments of Natural Resources and Health and Human Services will track water quality, fish populations, and habitat health in the years ahead.

The community-developed Muskegon Lake Action Plan, soon to be updated, guides the next phase: not just cleaning up but enhancing the lake for future generations. Priorities include managing nutrient runoff, supporting fisheries, and maintaining restored habitats with the help of local volunteers.

The benefits of restoration extend beyond ecology. A 2020 study in the Journal of Great Lakes Research estimated a 5.8-to-1 return on Muskegon Lake AOC investments, with improvements fueling outdoor recreation, residential development, commerce, and tourism. Muskegon Lake, once written off as polluted and industrialized, is now a community asset, natural sanctuary, and economic engine.

CHECKING ALL THE BOXES

The former Muskegon Lake AOC – the 4,100-acre lake and navigation channel to Lake Michigan plus portions of Ruddiman, Ryerson, Four Mile, Bear, and Green Creeks and Bear Lake – has successfully addressed all nine of its Beneficial Use Impairments:

- Restrictions on dredging activities.
- Restrictions on drinking water or taste and odor problems.
- Restrictions on fish and wildlife consumption.
- Beach closings.
- Degradation of aesthetics.
- Loss of fish and wildlife habitat.
- Degradation of fish and wildlife populations.
- Eutrophication (excess nutrients) and undesirable algae.
- Degradation of benthos (bottom-dwelling aquatic life).

Before-and-after images show the transformation at Heritage Landing. Photos courtesy of MLWP.

Making space for recreation *down by the riverside*

Detroit's newest park shows what community-minded partnerships can achieve

By JJ Tighe, Ralph C. Wilson, Jr. Foundation

The opening of the Detroit Riverfront Conservancy's Ralph C. Wilson, Jr. Centennial Park in fall 2025 marked another transformative step for the City of Detroit's waterfront revitalization.

It features the city's first Huron-Clinton Metropark and proves that community-driven design and strategic alignment can deliver multiple benefits to the region, including shoreline resilience, habitat enhancement, recreational access, and economic development.

The Ralph C. Wilson, Jr. Foundation supported the development of the 22-acre park and regional trails with a $100 million investment in 2018 to honor the 100th anniversary of the birth of Wilson, a lifelong Detroiter and founder and longtime owner of the Buffalo Bills.

The conservancy's extensive community engagement strategy included more than 26 community meetings and sent 21 Detroiters to Chicago, Philadelphia, and New York to study successful urban parks. The resulting community vision integrated technical expertise with community knowledge about local challenges and recreational needs.

Facilities include a year-round sport house, a play garden, and a hill and lawn for gatherings and sledding. Pathways connecting to adjacent trails and the broader riverfront improve equitable regional access. A water garden hosts environmental education through a partnership between the conservancy and Huron-Clinton Metroparks.

The park integrates flood protection, addressing climate resilience. Water management systems enhance habitat while improving waterfront access, demonstrating how engineered solutions can serve both environmental and community functions.

(Above) Ralph C. Wilson, Jr. Centennial Park takes shape in July 2025 on the Detroit Riverfront. Photo courtesy of Detroit Riverfront Conservancy.

Families came out to enjoy the fall 2025 park opening. Photo courtesy of Detroit Riverfront Conservancy.

Reclaiming a resource

For much of Detroit's history, the Detroit Riverfront was more industrial resource than natural asset. Only relatively recently have community partners reclaimed and improved public spaces and access along the urban stretch of river, such as Tri-Centennial State Park (renamed Milliken State Park) in 2004, the Detroit International RiverWalk in 2007, and the Dequindre Cut Greenway in 2009.

Additional Wilson Foundation funding in partnership with the Michigan Department of Natural Resources Trust Fund and the Michigan Department of Transportation supported the Southwest Greenway and Riverfront Towers Boardwalk connecting the east and west Detroit Riverfront. The greenway links the park to Michigan Central Station and serves the Corktown and Mexicantown neighborhoods. There are also connections to the cross-state Iron Belle Trail, Dequindre Cut, and Joe Louis Greenway.

Once fully funded through the Unified Greenway Campaign, endowments will generate permanent revenue to maintain and operate the park and greenways. It's a funding model other Great Lakes communities can replicate.

Local labor and construction companies' commitment to the project reflects community interest in establishing this free, world-class public space that will serve not only Detroiters but visitors from the region and beyond.

A wealth of partners

In addition to the Ralph C. Wilson, Jr. Foundation and countless individual donors and volunteers, organizations with a hand in the park project include:

- City of Detroit
- William Davidson Foundation
- Gilbert Family Foundation
- Fred and Barbara Erb Family Foundation
- Community Foundation for Southeast Michigan
- U.S. Environmental Protection Agency
- Michigan Natural Resources Trust Fund
- Michigan Department of Transportation
- Delta Dental
- DTE Energy Foundation
- Michael Van Valkenburgh & Associates
- Michigan Department of Environment, Great Lakes, and Energy's Brownfield Program

Testament to teamwork

The partnership model demonstrates how Great Lakes communities can leverage diverse funding sources and technical expertise to address complex waterfront challenges. Individual organizations' strengths – from federal environmental regulatory knowledge to building capacity for community engagement – foster comprehensive solutions.

The project's emphasis on authentic community engagement, long-term financial sustainability, and regional connectivity provides a framework that other Great Lakes communities can adapt to local conditions and priorities.

As Great Lakes communities face increasing pressure from climate change, aging infrastructure, and demand for waterfront access, Detroit's experience demonstrates that collaborative planning and strategic investment can deliver multiple community benefits while advancing regional environmental and economic goals.

The park is "proof of concept" for responsible Great Lakes stewardship that serves residents and regional economic development. ◆

DIGGING INTO DETAILS OF **GROUNDWATER MANAGEMENT**

New software promises better process for large-quantity water withdrawal requests

By Lena Pappas, Michigan Department of Environment, Great Lakes, and Energy

Preserving the Great Lakes is a collaborative endeavor, where each state and province within the basin adheres to the Great Lakes Agreement and Compact to protect this vital shared water resource. Sometimes, protection also requires new perspectives and new tools.

Historically, management efforts have often considered each Great Lake in isolation, overlooking the critical hydrologic connection between these surface waters and groundwater.

But groundwater within Michigan is comparable in volume to Lake Huron. It's not a separate system but an essential and unifying component of the earth-and-water puzzle that defines the Great Lakes Basin. In Michigan alone, more than half of all residences and businesses depend on groundwater.

Ensuring the long-term viability of state water resources including groundwater requires tools flexible enough to account for diverse hydrogeologic conditions and accessible enough to ensure transparency and reliability for those who use them.

Local, state, and federal partnerships are critical to co-developing tools that can encompass these needs. Recognizing this, the Michigan Department of Environment, Great Lakes, and Energy (EGLE) collaborated with the U.S. Geological Survey (USGS) and the Wisconsin Department of Natural Resources (WDNR) to develop a new software tool called pycap-dss. This tool fills the current gap by providing insights into how surface water and groundwater interact: pycap-dss can estimate both groundwater drawdown and related reductions to streamflow.

In addition to providing robust, accurate information to agencies responsible for ensuring the long-term sustainability of Michigan's water supply, these tools must help build trust with users.

The USGS published pycap-dss in line with open software principles for transparency and regulatory accountability that help ensure these goals are met. Michigan's Water Use Program, which regulates large-quantity water withdrawals, works with the Water Use Advisory Council (WUAC) to advance and improve the Michigan Water Conservation and Efficiency Program established in 2008 to meet the state's obligations

Michigan agriculture like this blueberry farm relies on groundwater for irrigation. Photo courtesy of EGLE.

Beneath Michigan's surface is water equivalent to a sixth Great Lake.

under the Great Lakes Compact and Agreement. The WUAC and its Water Conservation and Efficiency Committee play key roles in water management and water conservation and efficiency in Michigan. WUAC Tri-Chair Pat Staskiewicz said the release of open-source decision support software is a great example of USGS leadership in water management.

Staskiewicz, public utilities director of the Ottawa County Road Commission, also said improvements to the speed and accuracy of decision making by regulators are important, and doing so openly and transparently is vital for trust among regulated communities.

ASSESSING GROUNDWATER WITHDRAWALS

Large-quantity withdrawals (defined as 100,000 gallons or more per day) from Michigan groundwater or surface waters are prohibited from adversely impacting the waters of the state.

When someone applies to EGLE to establish or enlarge a large-quantity withdrawal, the Water Withdrawal Assessment Tool (WWAT) models the potential impact on nearby water resources. It's central to Michigan's process for regulating large-quantity withdrawals.

In the fall of 2025, EGLE announced the release of the redeveloped WWAT that integrates the pycap-dss software. This updated WWAT will serve as the interface for more than half of Michigan's large-quantity water withdrawal registrations. Water users who register pumps that can draw more than 2 million gallons a day are required to apply for a 327 Permit as opposed to registering within the WWAT. This updated tool will make it easier for users who are interested in evaluating their registration options and integrating public or privately collected data into the process.

Its streamlined, user-friendly platform not only visualizes resource availability but also supports data-driven, collaborative decision making, aligning regulatory requirements with recommendations from the WUAC.

Stakeholders include the agricultural community. Michigan produces more than 300 commodities, making it the second-most agriculturally diverse U.S. state, according to the Michigan Farm Bureau. The group supports transparent, science-based management of water resources to protect natural resources and provide the water needed to grow crops and raise livestock.

Laura Campbell, Farm Bureau senior conservation and regulatory relations specialist and WUAC tri-chair, said she's encouraged by the implementation of software tools like pycap-dss to improve the WWAT and increase flexibility in water withdrawal decisions. WUAC Tri-Chair Dr. Bryan Burroughs said the new tool reinforces the integrity of important regulation, bolstering trust and confidence in outcomes.

The challenge of groundwater science and resource management is not unique to Michigan. Every state and province within the Great Lakes Basin must estimate local groundwater levels as part of efforts to protect the sustainability of shared water resources.

Originally developed for WDNR and EGLE, pycap-dss shows promise for increasing regional coordination. Since its release, the tool has garnered interest from the Minnesota Department of Natural Resources for use in its water resource assessments.

EGLE remains committed to collaborative, science-based regulation of Michigan's water resources – work that continues to play a critical role in supporting the state's economy, environment, and communities. ◆

STARVING HARMFUL ALGAL BLOOMS

Research and education target agricultural phosphorus in Western Lake Erie Basin

By Dr. Laura Johnson, Michelle Selzer, and Tyler Baird, Michigan Department of Agriculture and Rural Development

The foe is formidable. Harmful algal blooms, or HABs, in the Western Lake Erie Basin (WLEB) fed by phosphorus from wastewater treatment plants, farms, and fertilized lawns impair other aquatic life and threaten a source of drinking water for more than 11 million people in the U.S. and Canada.

For more than a decade, Michigan has partnered with its neighbors in the WLEB to combat these blooms. Five new strategic priorities are stepping up the battle, and Michigan has taken the critical step of appointing a first-in-the-nation chief science officer (article co-author Dr. Laura Johnson) to lead the new Office of Agricultural Science and Research within the Michigan Department of Agriculture and Rural Development (MDARD).

The new office provides guidance for MDARD divisions and programs to direct and evaluate policies, goals, and metrics. Johnson and the office help develop, implement, and evaluate agricultural environmental policy and program initiatives based on the best science available.

HISTORY OF HABS

In the early 2000s, an explosion of HABs in the basin prompted Indiana, Michigan, Ohio, and Ontario to refocus their efforts under the 2012 Great Lakes Water Quality Agreement and commit to a 40% reduction in phosphorus loading into the lake from a 2008 baseline. Federal, state, and provincial governments agreed to develop domestic action plans (DAP) aimed at achieving that reduction.

MDARD and Michigan's departments of Environment, Great Lakes, and Energy (EGLE) and Natural Resources (DNR) – together known as the state's Quality of Life (QOL) agencies – banded together to develop plans, identify barriers, and implement strategies to reduce phosphorus loading in the WLEB. The departments united behind the 2018 DAP for Lake Erie. This innovative plan outlined strategies to move the needle on phosphorus levels and set the stage for a 2021 Adaptive Management Plan.

PROGRESS AND NEXT STEPS

Two broad categories describe where environmental pollution comes from: point sources, or single locations, and nonpoint sources (NPS), or many places at once. Under the DAP and Adaptive Management plans, QOL agencies achieved early success in reducing phosphorus from point sources, which contributed 72% of Michigan's phosphorus loads in the baseline year of 2008. Mitigation at the Great Lakes Water Authority wastewater treatment plant in metro Detroit and at other point sources have contributed to a 20% reduction in phosphorus loads from Michigan.

NPS are now the critical challenge. Although NPS phosphorus from Michigan represented only 5% of the total phosphorus load in the Western and Central

Lake Erie Basins in 2008, it remains stubbornly resistant to change.

An updated 2025 Michigan DAP introduced approaches based on years of study, stakeholder feedback, and performance analysis. To mitigate the flow of phosphorus from agricultural lands into the WLEB over the next five years, the 2025 Michigan DAP highlights five strategic priorities:

- **Implement and track conservation practices:** State-developed tools will help county Conservation Districts and producers prioritize agricultural conservation where it matters most. MDARD is also funding projects through partners such as the Michigan State University Institute of Water Research (MSU-IWR). These include a new program to allocate funding to producers based on nutrient loss reductions achieved through performance-based conservation. The Great Lakes Watershed Management System (GLWMS) Nutrient Tracking Dashboard monitors progress.
- **Measure water quality results:** MDARD is partnering with the Alliance for the Great Lakes, consulting firm LimnoTech, and MSU-IWR to implement a water quality monitoring network in five priority sub-watersheds within the WLEB watershed. Through 2029, this project will provide a detailed picture of nutrient loading in relation to land use, weather patterns, and other real-world factors.
- **Conduct research and improve modeling:** Michigan's QOL agencies are funding research and modeling efforts including in-field soil health and edge-of-field drainage water management projects by the University of Michigan (U-M) and MSU Extension, respectively. Gathering information about soil health, hydrology, and agricultural phosphorus loading, these projects will help update models like the Soil and Water Assessment Tool for use in the updated GLWMS.
- **Expand outreach and education:** Since programs to reduce NPS phosphorus loading and implement conservation practices are voluntary, outreach and education are crucial. Conservation Districts are being supported by MDARD's Regenerative Agriculture Program to educate more farmers with state-of-the-art conservation practices, and social scientists have assessed these outreach and education efforts through the U-M Water Center.
- **Maintain and expand collaboration:** There's too much for any one organization to learn, plan, and implement. Collaborative bodies such as the WLEB Community Advisory Group and the WLEB Project Directory consolidate diverse perspectives and projects into reliable and actionable information and inform DAP efforts.

Conservation technicians employed through a Conservation Technical Assistance Grant from the Michigan Department of Agriculture and Rural Development assess soil health in the Western Lake Erie Basin. Photo courtesy of MDARD.

CHALLENGES AHEAD

The updated DAP revitalizes state efforts to improve water quality, but significant challenges remain. Noncompulsory program participation, economic considerations for farmers, and the complicated science of land-water interactions have historically hampered success. Still, persistent programming is yielding signs of progress, including recent evidence of reductions in dissolved phosphorus loads from the Maumee River.

After a decade of tedious work, the resolve of Michigan and its WLEB partners to achieve healthy and sustainable outcomes for Lake Erie has only grown stronger. Using the updated DAP as a guide, Michigan continues to drive toward a more sustainable agricultural landscape and improved water quality. ◆

POWERING UP MICHIGAN'S SUSTAINABLE BLUE ECONOMY

Maritime strategy prioritizes development, innovation, research, and ecosystems

By Simon Belisle, Michigan Department of Environment, Great Lakes, and Energy

The maritime sector is vital to our state's economy, culture, and way of life. It connects communities, fuels trade, and supports industries from manufacturing to tourism. Freight transportation contributes $3.3 billion a year to Michigan's economy and supports more than 17,000 jobs, while Michigan's water-based tourism has an economic impact of close to $12 billion annually, supporting about 45,000 jobs.

When released in early 2026, a new Michigan Maritime Strategy (MMS) promises to give this powerful blue economy a boost.

Michigan's departments of Environment, Great Lakes, and Energy (EGLE), Transportation (MDOT), and the Office of Future Mobility and Electrification (OFME) in the Michigan Economic Development Corporation (MEDC) are spearheading the effort. Built on a strong foundation of existing transportation, mobility, and climate plans, the strategy will outline plans for action, collaboration, and investment.

It will cap a year-long process led by a team from two University of Michigan schools: Naval Architecture and Marine Engineering, and Environment and Sustainability. The team studied existing plans, researched Michigan's maritime assets, and engaged maritime stakeholders and interests throughout the state, region, and U.S.

This comprehensive engagement process involved input from 130 participants: state, local, federal, and tribal governments; port authorities and terminal operators; ship owners and recreational boaters; marina operators; harbor communities; tourism and community organizations; and more. The team held an in-person workshop, conducted interviews, visited key facilities, and sought and incorporated feedback on strategy drafts.

The strategy addresses ports and their operations for intermodal transport and supply chains, cargo handling equipment and supporting infrastructure for fueling and operations, fuels and electricity, vessels that provide freight and passenger transportation – including freighters and ferries, and boats for recreation and fishing – as well as recreational harbors and marinas.

The MMS provides a unified vision for sustainable, innovative, equitable, and collaborative maritime solutions, ensuring a robust maritime economy and healthy Great Lakes ecosystem.

(Above) A Lilypad solar-powered low-speed leisure cruise boat motors on the Kalamazoo River in Saugatuck. Renewable energy will be part of the sustainable Michigan Maritime Strategy. Photo courtesy of EGLE.

This vision builds on a package of clean energy laws and a foundation of existing plans including the MDOT's Michigan Mobility 2045 Plan, the MEDC's MI Future Mobility Plan, and the statewide MI Healthy Climate Plan. It aligns maritime priorities with statewide goals for a transportation transformation and carbon neutrality by 2050. The maritime strategy's four draft objectives are:

- Support economic development by modernizing maritime infrastructure.
- Accelerate the maritime sector's clean energy transition.
- Invest in maritime research, innovation, education, and workforce development.
- Enhance the sustainability, resilience, and revitalization of ports, harbors, and waterfronts.

The 10-year strategy will capitalize on Michigan's key position in the Great Lakes region. It will leverage the state's maritime assets; align state policy, strategies, and plans; foster collaboration with industry, business, and academia; support research and development; and drive coordinated action.

The goal is to guide and inform policy, decision-making, and statewide actions in the commercial and recreational maritime sector to support social, environmental, and economic resilience while protecting the Great Lakes as Michigan's greatest natural asset.

Expanding global export markets and diversifying cargo – through containerization and port infrastructure modernization for resilience and accommodating alternative marine fuels – will drive business growth and economic development, along with workforce development through leading maritime institutions.

Carbon neutrality will be prioritized by expanding adoption of clean fuels, powering vessels with electricity and other clean energy alternatives, and upgrading shipbuilding and manufacturing with advances in maritime technology and autonomous vessels.

The strategy will also encourage investments in port and harbor sustainability and enhance environmental stewardship with pollution prevention and emission reductions for tourism and recreational boating.

Dr. Thomas McKenney of the University of Michigan leads a small-group discussion at a Michigan Maritime Strategy stakeholder workshop in March 2025. Photo courtesy of U-M.

Michigan's blue economy is valued at more than $15 billion a year. Photo courtesy of EGLE.

All told, the MMS will provide a roadmap for collective activity and investment positioning Michigan at the forefront of sustainable maritime innovation and environmental stewardship.

After agency and stakeholder review, the draft strategy will be posted online in early 2026 for public review. ◆

Respecting a relationship with *manoomin*

Stewardship Guide offers tribal perspective on protecting wild rice

By Katie Lambeth, Michigan Department of Environment, Great Lakes, and Energy

We all live together in a good way with manoomin: it's an expression of harmony with nature, centered on the Anishinaabe term for wild rice.

It's also the name of a new stewardship guide developed through the Michigan Wild Rice Initiative (MWRI).

"We All Live Together in a Good Way with Manoomin: Stewardship Guide" tells the story of manoomin through an Anishinaabe perspective.

The document uses the language and phrasing of relationship and care among relatives -- reflecting the significance of manoomin as a relative of the Anishinaabe people.

It presents an overview of manoomin, its preferences for living places, and its place among nonhuman relatives. The guide also explores the socio-ecological context of manoomin restoration and revitalization. This includes physical limitations, such as competitive newcomers (commonly known as invasive species), as well as governance factors, such as water law.

To approach these challenges, the guide offers goals and objectives that partners can help support as they choose. The goals are not standards or prescriptions across the manoomin community, as community members favor decentralized local efforts.

Relationships at heart

The Anishinaabe people and manoomin have nurtured a sacred relationship for many generations. Therefore, restoration efforts center on support for Anishinaabe communities to reconnect and grow their relationships with manoomin.

The guide shares personal stories from members of the manoomin community, offering messages from a variety of voices to enable readers to see themselves building a transformative relationship with manoomin. The storytellers highlight how manoomin has helped them flourish in face of difficulty and offer advice on how manoomin can help others.

A significant portion of the guide focuses on building relationships between and among the manoomin community and its allies. Although this may not be common among stewardship plans, having strong braids of relationship is central to these restoration and revitalization efforts, especially in the long term.

About the initiative

The MWRI is a collaboration among several State of Michigan agencies and the 12 federally recognized Anishinaabe nations that share geography with the state of Michigan. Together with federal and nongovernmental organizations and academic partners, they are working together to restore and revitalize manoomin.

They are also spreading awareness and education to encourage people of all communities to connect with

People canoe in a manoomin bed on a sunny day. Photo courtesy of University of Michigan Water Center.

manoomin in a good way and seek ways to sustain and protect it.

The Stewardship Guide is a living document. It will change with later editions as manoomin shares more knowledge with MWRI and initiative members learn to better work together in a good way.

The best available research, funding, and equipment are only as effective as the strength of kinship. To help braid communities and partners, this document respectfully introduces readers to some core Anishinaabe moral teachings to ground the collaboration. It then offers extensive advice promoting ideas and practices to kindle and nurture healthy relationships to grow the manoomin community in a positive way.

The manoomin community invites all people across these two peninsulas to grow in relationship and strengthen each other.

Making progress on the Plan

In coordination with the MWRI, the Inter-Tribal Council of Michigan was awarded a U.S. Environmental Protection Agency Community Change Grant to help support the initiative and tribes with their manoomin work. As of fall 2025, the Inter-Tribal Council was fighting the federal government's termination of that grant and seeking other potential funding sources.

The MWRI continues to meet bi-monthly. Its three subcommittees – Education and Outreach, Monitoring and Restoration, and Policy and Protection – are moving forward on their goals to increase awareness, knowledge, research, respect, and stewardship over the next two years and beyond.

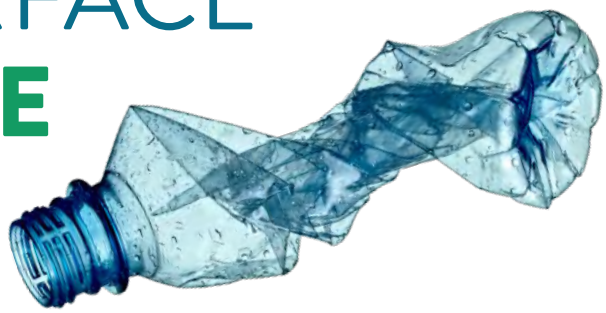
Stewardship steps

Near-term priorities identified by the Michigan Wild Rice Initiative include:

- Identify, collect, and assess manoomin education and other resources developed by tribes or tribal groups that provide appropriate cultural, spiritual, and ecological context, including Anishinaabe cultural and/or spiritual identity.
- Identify and find alignment with state, federal, and regional wildlife, habitat, and other stewardship and management plans where implementation can affect manoomin.
- Develop a website for resources and materials.
- Find local contacts in lake associations to champion manoomin and expand reach beyond state and tribal groups.
- Develop metrics for analyzing the health of manoomin beds and restoration success.
- Involve youth in restoration activities with tribal youth programs and manoomin restoration partners.
- Develop legal safeguards to protect manoomin beds from threats ranging from individual disturbance to commercial exploitation or degradation.
- Develop a map that identifies tribal contacts for various regions of the state.
- Work with state government and legislators to expand tribal oversight and enforcement authority over manoomin beds.
- Work with state government to establish processes for raising funds from manoomin-related activities, such as licensing fees and sales tax, to fund the mission.

SKIMMING THE SURFACE FOR **PLASTIC WASTE**

Study of bubble technology launched for Michigan's Grand River



By Janelle Grech, Dr. Joan Rose, and Aja Witt, Michigan State University

Every year, an estimated 22 million pounds of plastic waste enters the Great Lakes, some through rivers in the U.S. and Canada. The Grand River, which flows through the heart of Michigan's capital, connects city life to one of the world's largest freshwater systems – and serves as a pathway for plastic pollution.

Now, city officials and environmental partners in Lansing are exploring air bubble curtain technology designed by a Dutch company, The Great Bubble Barrier, to capture plastic pollution in waterways. The technology was a 2022 finalist for the global environmental Earthshot Prize.

Pumping air through a perforated tube on the bottom of a waterway creates a bubble curtain. The resulting upward current directs plastic to the surface. By placing the barrier diagonally across a river, the natural flow of the water will push the plastic waste to the side and into a catchment system.

This system has been applied in places like Amsterdam and Harlingen in the Netherlands, where it effectively captured up to 86% of test materials – ranging from 0.04 inches to 39 inches – without disrupting fish migration or boat traffic.

Lansing offers a new opportunity to explore how the technology performs under different environmental conditions. The Grand River has moderate depth, urban and agricultural runoff, high foot traffic through the downtown area, and faces greater amounts of debris washed in from nearby roads during heavy storms. If the Bubble Barrier Lansing project is approved, these conditions would offer a chance to test the system in ways not previously explored in the Netherlands.

An aerial view shows the diagonal Bubble Barrier in Katwijk, Netherlands, that guides trash into a catchment area for removal but does not block watercraft or wildlife. Photo courtesy of The Great Bubble Barrier.

TESTING THE WATERS IN BURCHARD PARK

A 2024 feasibility study funded by Meijer, Inc., and facilitated by the water science and engineering firm LimnoTech identified Burchard Park, just downstream from downtown Lansing, as a preferred location for the possible installation of the technology. Dock access, recreational trails, and major roads nearby make it suitable for maintenance and public education opportunities.

Through a donation to the City of Lansing, Meijer is funding the full-scale design and feasibility of potential installation of this technology as a pilot. If the project is found to be feasible and passes an environmental review, the total cost for installation and monitoring would be determined after the design and bidding phase. If permitting is successful and the project is approved and funded, construction could begin within 12 to 14 months.

COLLABORATING FOR CLEAN WATER

The Bubble Barrier Lansing project brings together a diverse network of collaborators.

A pilot study led by the Michigan State University Water Alliance in partnership with Grand Valley State University aims to evaluate and advance technology and knowledge for plastic control in aquatic environments, as well as create opportunities for public engagement. The project includes efforts to:

- Understand types of plastic waste in the Grand River and its hydrology and ecology.
- Evaluate the potential effectiveness of the Bubble Barrier technology and assessing any environmental impacts.
- Use art to engage the community in learning about plastic pollution.
- Conduct community engagement about pollution prevention to ensure healthy rivers and stewardship.

Funding for the pilot study is through the Michigan Great Lakes Protection Fund by the Office of the Great Lakes in the Michigan Department of Environment, Great Lakes, and Energy. Other key Bubble Barrier Lansing partners include the City of Lansing; the Michigan Department of Natural Resources; and Michigan Waterways Stewards.

A Bubble Barrier installation collects plastic trash in Amsterdam. Photo courtesy of The Great Bubble Barrier.

Together, these organizations combine strengths in scientific research, policy, and community engagement to ensure the Bubble Barrier would be not only effective but supported by the community it's meant to benefit.

BUILT ON COMMUNITY STEWARDSHIP

While the Bubble Barrier technology is new to the U.S., local enthusiasm for cleaning the river is longstanding. This project builds on years of grassroots cleanup efforts in the Lansing area and rising public concern about plastic pollution in Michigan's waterways. Community-led events like the Lansing Rivers and River Trail Cleanup, organized annually by Michigan Waterways Stewards, mobilize thousands of volunteers to remove litter from riverbanks and trails. These efforts emphasize how plastic waste affects not only wildlife, but public spaces, recreation, and community pride.

Exploring innovative technologies such as the Bubble Barrier complements longstanding community work to improve water quality and make riverside areas cleaner and safer for residents, kayakers, runners, and families using trails.

Local advocates have long noted that the Grand River is more than a waterway – it's a defining feature of the city and a shared resource that should be protected. The pilot study represents a new opportunity to improve water quality and ecological and human health.

If successful, Bubble Barrier Lansing could serve as a model for other communities in Michigan and beyond. For now, the study represents a growing interest in innovative, noninvasive solutions to plastic pollution and a commitment to protecting freshwater ecosystems for future generations.

MEETING THE **MACRO-CHALLENGE** OF MICROPLASTICS

EGLE takes a closer look at a growing concern all around us

By Eddie Kostelnik, Michigan Department of Environment, Great Lakes, and Energy

Imagine strolling beside Lake Superior. You grab a handful of sand, and as it runs through your fingers, you see something red that feels unlike the sand grains. Not sure what you saw, you grab another handful and let it slowly sift through your fingers, watching carefully as each grain falls to the beach below. As the sand stops pouring, four small pieces of multicolored plastic remain in your hand.

Unfortunately, this scenario is all too real throughout Michigan and the Great Lakes. Plastics are found from the most remote to the most urban areas of the state. Plastic does not break down easily in the environment. When it does, it merely crumbles into smaller pieces called microplastics and even smaller nanoplastics.

Microplastics also can be released during manufacturing (for example, “nurdles,” microbeads, or plastic in wastewater) or the use of plastic products (such as synthetic clothing and vehicle tires).

Microplastics are found in surface waters across Michigan including rivers and streams, inland lakes, and the Great Lakes as well as in flora and fauna across the Great Lakes including mussels, birds, fish, and algae.

While some research exists on microplastics throughout the Great Lakes, knowledge is lacking when it comes to its distribution and impacts in drinking water and surface waters across Michigan. There are also knowledge gaps relating to the most effective sampling and analysis methods and the health effects of microplastics on humans and the environment.

Now, new cross-team research within the Michigan Department of Environment, Great Lakes, and Energy (EGLE) is focusing on these tiny fragments and fibers and the many difficulties they present. The department has ramped up its capacity to address microplastics over the past two years, including one new hire each in EGLE’s Water Resources Division (WRD) and Drinking Water and Environmental Health Division (DWEHD).

(Above) Microplastics in abundance at Michigan lakes and beaches come from many different sources, including waste and manufacturing. Photo courtesy of the U.S. Environmental Protection Agency.

The DWEHD, WRD, and EGLE's Office of the Great Lakes (OGL) are teaming up to fill in some of the knowledge gaps using a one-time state appropriation of $2 million for microplastics research from 2025-29. These partners have created a plan with four major parts:

1. **Establishing a better understanding of concentrations of microplastics in surface waters:** WRD incorporated sampling water for microplastics into an existing river and stream monitoring program starting in summer 2025. So far, microplastics have been found at these locations at widely varying concentrations. These data will help establish a benchmark for future measuring of microplastic concentrations in surface waters throughout the state. Areas of high concentration found in initial monitoring may be targeted for follow-up sampling.
2. **Improving understanding of microplastics in public drinking water supplies:** The DWEHD's recent hire will help plan and administer collaborative efforts to assess microplastics' impact on Michigan's drinking water.
3. **Identifying critical areas for future microplastics research:** EGLE held a virtual Great Lakes Microplastics Summit in October 2025 where experts shared knowledge on microplastics and provided insights on the most important data gaps to focus on for the future. Information from this summit will inform ongoing planning to develop a request for proposals (RFP) to fund grants for innovative microplastics research starting in 2026 or 2027.
4. **Developing a comprehensive statewide microplastics strategy:** Starting in 2026, EGLE will develop an RFP to select a contractor to help the department develop a statewide comprehensive microplastics strategy that will inform and guide approaches to policy, legislation, research, monitoring, detection, education and outreach, and pollution prevention. The strategy will be developed in collaboration among multiple departments and informed by meaningful engagement with Michigan stakeholders and diverse interests.

A team from the Great Lakes Environmental Center collects microplastics samples from a Michigan stream. Photo courtesy of EGLE.

Microplastic pieces are found almost everywhere in and around Michigan waters, including on this beach at Muskegon State Park. Photo courtesy of EGLE.

Taken together, these steps will further Michigan's understanding of the extent of microplastic contamination throughout the state and offer insights into prevention and innovative strategies to remedy existing contamination.

Change is already happening. In October 2025, EGLE hosted not only the summit but its first Microplastics Awareness Week, calling attention to this challenge and encouraging industries, businesses, and the public to explore and use alternatives to plastics in products, manufacturing, and waste management and to find ways to act, such as participating in beach or community cleanups and reducing single-use plastics.

Microplastics are not going away anytime soon. In fact, global plastic production is expected to only increase in the coming years. The research, communications, and planning efforts of EGLE and others are imperative to staying fully prepared for the challenges ahead.◆

SOLVING THE PUZZLES OF PFAS

Michigan steps up to face the 'forever chemicals' in our midst

By Abigail Hendershott and Amy Peterson, Michigan Department of Environment, Great Lakes, and Energy

PFAS is short for per- and polyfluoroalkyl substances, and PFOS is short for perfluorooctane sulfonate, a specific type of PFAS. These man-made chemicals are used in firefighting foam, stain repellants, nonstick cookware, and many other products. PFAS don't break down easily in the environment, and some PFAS can build up in our bodies and affect our health. In the environment, PFAS can travel easily through groundwater and surface water and are found frequently in fish tissue.

Seven state agencies including the Michigan Department of Environment, Great Lakes, and Energy (EGLE) formed the Michigan PFAS Action Response Team (MPART) in 2017 in response to a gubernatorial executive directive to coordinate responses to PFAS contamination. The goal is to protect public health by identifying sources of PFAS, addressing PFAS contamination at those sources, and working with local health departments to protect people in areas where groundwater is impacted by PFAS.

In 2025, MPART continued identifying new sites of PFAS groundwater contamination and issuing "do not eat" advisories for fish and game for certain locations.

In the year ahead, MPART will award and administer grants to airports where firefighting foam has contaminated groundwater or surface waters. The grants will support testing, studying best ways to address contamination, and cleaning out fire trucks to use newer firefighting foam. MPART also will continue sampling drinking water wells near fire training centers and MPART sites and encouraging private drinking water well owners to sample for PFAS.

(Above) A contractor for the State of Michigan uses a tablet to document potential PFAS contamination. Photo courtesy of EGLE.

IDENTIFYING SOURCES OF PFAS

EGLE has tested for PFAS at landfills, airports, industries, metal platers, wastewater treatment plants (WWTP), and other locations that received or used the substances. EGLE has also conducted routine monitoring of lakes and streams, finding elevated levels of PFAS that are then traced to sources. Identifying many of these locations has allowed EGLE, working through regulatory programs, to require source locations to use treatment technologies to remove PFAS from discharges to WWTPs, stormwater, and groundwater.

(Left) PFAS foam in Van Ettan Lake in Oscoda. Photo courtesy of EGLE.

PROTECTING MICHIGANDERS' WELLS

MPART coordinates across state agencies to investigate PFAS groundwater contamination. For every site where groundwater is found to be over PFAS criteria, a team composed of EGLE, the Michigan Department of Health and Human Services (MDHHS), and local health staff evaluate nearby drinking water wells that could be affected. EGLE collects any needed sampling, and MDHHS coordinates the health response, which includes education and possibly filters. MPART also proactively samples around likely sources of PFAS. To date, more than 7,000 drinking water wells have been sampled and residents protected from PFAS. EGLE has a list of certified PFAS laboratories offering test kits for private residential drinking water wells among other resources at Michigan.gov/PFASresponse.

(Left) PFAS samples at a state lab. Photo courtesy of EGLE.

PFAS IN MICHIGAN FISH POPULATIONS

From 2020-24, EGLE collected 5,163 fish to test for PFAS and other contaminants of concern. These data help EGLE, MPART, and MDHHS understand, target, and eliminate PFAS exposures and also inform the state's Eat Safe Fish Program. Most fish contain some concentration of the chemical PFOS, which, like some other forms of PFAS, bioaccumulates in living tissue over time. PFOS typically constitutes 75% of the total PFAS concentration in fish.

(Left) Aquatic biologist Mike McCauley collects fish from the Carp River near Negaunee. Photo courtesy of EGLE.

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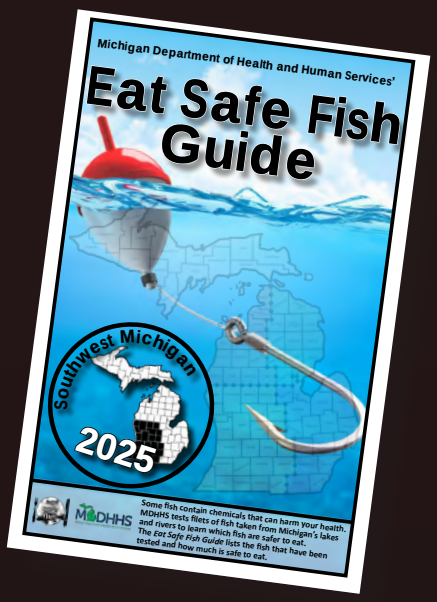
EAT SAFE FISH PROGRAM

Michigan's Eat Safe Fish Guides are based on levels of chemicals found in the portions of fish that people eat – typically the fillets – analyzed by MDHHS labs. A recent scientific review found PFOS a greater threat to health than previously thought. This resulted in changes to the 2025 Eat Safe Fish Guides. Additional guidelines are included now for some entire water bodies and specific fish species because of PFOS, including additional Do Not Eat guidelines. For more information, visit Michigan.gov/EatSafeFish and select Find Your Area, or call MDHHS' Environmental Health division, 800-648-6942.



(Right) 2025 Eat Safe Fish guide

PFAS AND DREDGING

Sediments can be a significant reservoir and potential long-term source of PFAS contamination in aquatic ecosystems. But many harbors and channels need to be dredged regularly, disturbing the sediments, to allow safe passage for ships and boats. MPART's collaboration across agencies has streamlined a process to screen proposed sediment dredging permits for potential impacts from PFAS sites. EGLE and the U.S. Army Corps of Engineers have evaluated all 64 proposed Great Lakes dredging projects for the next three years for the possible need for PFAS testing of sediments and found 14 that may require PFAS testing as part of the permit. This process will ensure the necessary data is submitted to decide about placement of any dredged sediments containing PFAS.

SURFACE WATER INTAKE TESTING

EGLE's PFAS Surface Water Intake Monitoring (SWIM) program collects data on PFAS in surface waters often used as public water supplies. This effort has helped EGLE understand seasonal fluctuations in impacts and differences in impact between untreated and treated water. SWIM also provides participating public water suppliers with site-specific information on source water quality. Most Michigan surface water supplies have had no detectable levels of PFAS or values below regulatory thresholds. But with the ever-changing regulatory framework for PFAS and unpredictable weather patterns and climate affecting surface waters, it is important to continue evaluating source waters for PFAS and other contaminants.

INTERIM BIOSOLIDS STRATEGY

Biosolids are the solid organic material left over after sewage treatment, sometimes used as fertilizer. Lacking federal criteria for PFAS in biosolids, EGLE has implemented and updated an interim strategy to protect public health with thresholds for how biosolids may be applied to land (along with other requirements for WWTPs) based on concentrations of PFAS. EGLE identifies and controls industrial PFAS sources to WWTPs to decrease concentrations in biosolids and prohibits land application of industrially impacted biosolids. EGLE also investigates areas known to have received industrially impacted biosolids in the past – areas with PFOS concentrations 1,000-10,000 times greater than non-industrially impacted biosolids. For reports of sampling from land application sites, search "PFAS in biosolids" at Michigan.gov/EGLE. ◆

(Left) Western Michigan University students gather to learn about PFAS hydrogeology at a contaminated site in Belmont. Photo courtesy of EGLE.

Going the distance for piping plovers

Concerted efforts in Northern Michigan are helping to save endangered shorebird

By Vince Cavalieri, National Park Service

Towering 450 feet above Lake Michigan, the famous sand dunes of Sleeping Bear Dunes National Lakeshore are a familiar symbol of our state's natural resources to many Michiganders. Fewer know that this lakeshore is also the summer home of more than one-third of the population of the critically endangered Great Lakes piping plover.

This small, sand-colored, migratory shorebird breeds only on Great Lakes beaches – nowhere else in the world.

Once locally common across many of the wide sandy beaches of the Great Lakes, decades of decline caused mainly by habitat loss and pressure from recreation left the Great Lakes piping plover a hair's breadth from extinction by the 1980s.

But Michiganders have stepped up for this symbol of the wild Great Lakes. Recent successes show that with continued intensive efforts, recovery of the Great Lakes piping plover is an achievable goal.

Saving a species

Historically, plovers lived on all five Great Lakes and had breeding populations in eight states plus Ontario. The population once numbered 500 pairs or more, but a decline across the 20th century left a tiny population of

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(Above) An adult Great Lakes piping plover forages at North Manitou Island in Sleeping Bear Dunes National Lakeshore. Uniquely colored bands on the plovers' legs allow biologists to track them throughout their life cycle, aiding in adaptive plover management. Photo courtesy of National Park Service. (Inset) Olivia Hanson (left) weighs a piping plover chick as part of a banding crew. Photo courtesy of Great Lakes Piping Plover Conservation Team.

Continued from Page 28

fewer than 20 pairs, breeding only in northern Michigan. The plovers were placed on the Federal Endangered Species list in 1986, and soon a group of partners came together to try to save the species.

In an effort led by state and federal agencies, university researchers, tribal governments, and nongovernmental organizations, biologists fan out across the Great Lakes each season attempting to locate every single Great Lakes piping plover pair and nest.

Once found, nesting areas are protected with roped-off areas of beach called psychological fencing to give plovers more space, and small wire cages that keep out predators while allowing the tiny plovers access to their nests. At many locations, nest site monitors protect the sites all summer. They talk to beach visitors and watch for predators and potential signs of nest abandonment.

In an important part of the recovery program, if plover nests appear abandoned, the nest monitors work with supervising biologists who decide if the eggs should be taken into captivity. When this happens, the monitors quickly and carefully transport the eggs to the University of Michigan Biological Station in Pellston, Michigan.

The Detroit Zoo leads the biological station's Great Lakes Piping Plover Captive Rearing Center. Zookeepers recruited from zoos around the country take shifts staffing the center, where abandoned plover eggs are incubated and hatched. The chicks are raised until they "fledge" – that is, become capable of flight and independence.

At the end of the summer breeding season, the captive-raised chicks are released at plover habitats around the Great Lakes.

Dedication in the dunes

Sleeping Bear is home to the largest concentration of breeding Great Lakes piping plovers. Here, a team of National Park Service staff and volunteers maintain one of the most intensive endangered species recovery efforts in the country. These plover monitors spend thousands of hours each summer shepherding plovers through the breeding season.

They watch and protect them from the first arrival of plovers in April, through nest establishment in May, hatching in June, and chick fledging in July and August.

Meet the piping plover

- Adults are about 7 inches long with a 15-inch wingspan. They weigh an average of 2.3 ounces.
- Plovers generally live about 5-6 years but have been documented at up to 16 years.
- Eggs incubate for up to 28 days.
- From year to year, plovers breeding with the same mate will often nest within 128 feet of their previous nesting site.
- Piping plovers are masters of camouflage. They can even hide in tire tracks or footprints in the sand.
- Plovers are strong fliers: One flew 1,400 miles in 48 hours.
- As winter approaches, plovers migrate south to warmer climates along the Atlantic, Gulf, and Pacific coasts.

Each plover at Sleeping Bear Dunes and across the Great Lakes is banded with a uniquely colored band, allowing researchers and staff to track individual plovers throughout their life cycle. This has led to many important discoveries that have helped managers guide plover recovery efforts, including that this work is making a difference: Many of the young plovers that have founded new nesting sites elsewhere were hatched right here at Sleeping Bear Dunes.

Signs of success

This intensive conservation work has slowly but surely shown results. From a low of 12 pairs in 1990, the plover

population has gradually risen. The population jumped from 81 pairs in 2024 to 88 pairs in 2025 – a new record. At 88 pairs, the population is well above halfway to the recovery goal of 150 pairs throughout the Great Lakes, a level that seemed hardly achievable even 20 years ago.

It's not just a numbers game: The population's range has gradually expanded from its northern Michigan core to once again breeding on all five Great Lakes in Wisconsin, Illinois, Pennsylvania, and Ontario, with nesting also occurring in Ohio and New York in recent years.

Challenges remain. Predators, weather, and perhaps even air quality could all be to blame for recent struggles with chick survival. And plover chicks are precocial, meaning they leave the nest immediately after they hatch. While plover monitors do their best to protect them during their vulnerable first weeks, it's hard to completely control a wild environment.

Still, Michiganders and others around the Great Lakes have shown that they value this symbol of the wild and are willing to go to great lengths for their survival and recovery. ◆

Plover protocol

If you visit Sleeping Bear Dunes National Lakeshore and encounter Great Lakes piping plovers or their nests, take the following precautions:

- Observe from a distance, and respect protective fences.
- Keep dogs leashed.
- Do not feed the birds, as it increases predators.
- Plover chicks are small and can easily hide in sand. Give plenty of space, as they are easily stepped on.
- Report any harassment of plovers to Sleeping Bear Dunes Headquarters, 231-326-4700, ext. 5010.
- At the same phone number, you can volunteer to join the Piping Plover Patrol.

(Left) Piping plover chicks raised in captivity for protection are released once they fledge. Photo courtesy of U.S. Fish and Wildlife Service. (Right) Rachel Fields releases captive-reared piping plovers. Photo courtesy of Mary Lundeberg.

GUIDING LAKE WHITEFISH THROUGH TROUBLED WATERS

Invasive mussels present an ongoing challenge to an iconic Great Lakes species

By Stephen Lenart, Michigan Department of Natural Resources

The Great Lakes are the cultural lifeblood of this region, influencing the economy, recreation, and the collective well-being of Michiganders.

People may connect with these magnificent lakes in different ways, but the health of the Great Lakes impacts everyone.

Special connections with the fish that the lakes support date back thousands of years. Throughout history, the lake whitefish (atikameg to local Indigenous peoples) has maintained a special status in the Great Lakes region, providing a source of sustenance and livelihood that remains important today.

Whitefish have survived in the face of numerous challenges to the ecology of the Great Lakes, including the establishment of invasive species such as the sea lamprey, which wreaked havoc on fish populations throughout the Great Lakes beginning in the 1950s.

More recently, the quagga mussel has emerged as a major disrupter. This small bivalve first became established in the Great Lakes in the late 1980s.

Despite its small size (an average adult measures roughly an inch) and an appearance far less frightening than the sea lamprey, the quagga mussel has nonetheless been linked to the widespread disruption of the Great Lakes food web.

The proliferation of quagga mussels has coincided with a significant decline in whitefish populations in the Great Lakes, particularly in large parts of lakes Michigan and Huron. The situation points to the delicate equilibrium necessary to sustain the Great Lakes and the fish that define the region.

Whitefish are part of the “salmonid” group of fishes that includes trout and salmon. They are found throughout the Great Lakes, with lakes Michigan and Huron historically supporting the most abundant populations and the most productive fisheries.

Prized for its mild flavor, the lake whitefish has long played an important role in supporting tribal culture, commercial fisheries, and the locally sourced food economy, including the many fish shops, markets, and restaurants that offer customers this familiar staple of the Great Lakes experience.

Unfortunately, too few young whitefish are surviving to the adult stage. The problem: Quagga mussels filter out algae from the water column that would otherwise feed zooplankton, the microscopic animals most juvenile fish feed on.

A diver checks equipment on Lake Michigan's Good Harbor Reef at Sleeping Bear Dunes National Lakeshore, where millions of mussels were scraped off rocks in 2016 and monitoring continues. Photo courtesy of Invasive Mussel Collaborative.

How can such a small mussel cause such a problem? Sheer numbers.

Unlike their smaller cousin, the zebra mussel, quagga mussels can occupy deeper areas and are less reliant on rocky habitat, meaning their habitat range encompasses nearly the entire lake bottom, with populations in the trillions.

Except in Lake Superior, which is less hospitable to quagga mussels and where whitefish populations have so far remained stable, quagga mussels are now the dominant feature of the benthic (bottom) zone of the Great Lakes. Their filtering has completely changed the flow and availability of energy in the system, resulting in uncharacteristically clearer water and fewer resources being available for fish.

Whitefish have proven particularly sensitive to this disruption. Prey fish populations that support other fish species have also declined in lakes Michigan and Huron, but the impacts to other game fish species have thus far been less significant.

And while efforts to revitalize historic river runs of whitefish continue and more productive areas of lakes Huron and Michigan, such as Saginaw Bay and Green Bay, still produce young whitefish, that does not lessen the concern.

Consistent funding and research on the dynamics of maintaining the smallest pieces of the food chain are just as important as research on iconic species such as lake whitefish to inform adaptive management. Despite being established for many decades, quagga mussel populations remain dynamic. Continued monitoring of their populations and research into control options are critical.

There is still much to learn, and the clock is ticking. The vulnerability of lake whitefish – these unique freshwater marvels – is a cautionary tale: Without proper care and continuing to grow our understanding of these fish and how they depend on a complex ecosystem to survive, the path is perilous for valuable resources that define the heritage of the Great Lakes. ◆

TACKLING A LARGE-SCALE PROBLEM TOGETHER

Research into controlling invasive quagga and zebra mussels is critical to restoring and sustaining a healthy, balanced Great Lakes ecosystem that can support species such as lake whitefish. While controlling these mussels poses a more complex problem than sea lamprey, we can look there for a model.

A multinational intervention aimed at controlling sea lamprey in the Great Lakes commenced in the 1960s, helping numerous Great Lakes fish species that had collapsed after sea lamprey became established.

Similar partnerships such as the Invasive Mussel Collaborative – a consortium of federal, state, provincial, and tribal agencies and nongovernmental entities – seek to advance the science of mussel control.

The Great Lakes Spawning Whitefish and Invasive Mussel (SWIM) Project, a multi-agency working group, was formed in 2022 to prioritize the implementation and assessment of invasive mussel control technologies that show promise for improving spawning and nursery habitats for lake whitefish.

STIFLING A SEA LAMPREY COMEBACK

Consistent management is key to keeping fishery-destroying invader in check

By Dave Caroffino, Michigan Department of Natural Resources, and Mike Siefkes, Great Lakes Fishery Commission

The Great Lakes are one of Michigan's greatest assets. They attract millions of local residents and visitors each year, many of whom partake in or benefit from its world-class fishery.

But few know the real story of the management that keeps the fragile fishery intact and benefitting the public. Without intense annual intervention by fisheries professionals, the Great Lakes fishery as we know it – generating $5.1 billion a year in economic activity – would collapse in less than a decade. Why is that?

The Welland Canal bypassing Niagara Falls forever changed fisheries management in the Great Lakes by allowing passage of organisms from the Atlantic Ocean. Sea lamprey used that connection, spreading throughout the lakes nearly 100 years ago, and are still at large.

Sea lamprey have the potential to devastate the Great Lakes fishery. It takes dedicated teamwork by multiple state, tribal, federal, and Canadian agencies to keep this invasive species under control.

While the sea lamprey resembles an eel, it is a jawless, parasitic fish that feeds on other fish species. One sea lamprey can kill up to 40 pounds of fish during its life. After colonizing the Great Lakes, sea lamprey nearly wiped out lake trout, causing their catches to decline by 98%. Similar destruction has occurred to other species.

(Above) Sea lamprey control treatment crews apply lampricides to Great Lakes tributaries to kill larval sea lamprey before they can grow to feed on fish. Photo courtesy of GLFC.

It took a coordinated, binational effort to find a solution, made possible by the formation of the Great Lakes Fishery Commission (GLFC) in 1955 – the treaty organization responsible for sea lamprey control.

A chemical selectively toxic to sea lamprey (lampricide) was discovered that takes advantage of a vulnerability. Like many species that live in the Great Lakes, sea lamprey are migratory, spawning in rivers and streams that are connected to the Great Lakes. Larval sea lamprey bury themselves in the soft sediment of a streambed for three to six years before changing into parasitic juveniles and swimming downstream. Entering the Great Lakes, they begin to parasitize fish and rapidly grow for 12-18 months before returning to streams to spawn and then die. When they are confined to rivers as larvae, they are vulnerable to lampricide treatments that dramatically reduce their populations.

The peak of the sea lamprey invasion in the mid-20th century collapsed the Great Lakes fishery, but hope for restoration was found once sea lamprey control began. Decades of focused work by professionals with support from the public, as well as consistent federal funding and agency support, has led to the rebuilding of the Great Lakes fishery that continues to face challenges from the cumulative impact of a multitude of invasive species now prevalent in the Great Lakes.

Each lake is different in its physical characteristics and ecology, but recovery of fish populations has occurred in each. In a 2024 milestone, Lake Superior's interjurisdictional management committee declared lake trout to be "fully restored" in the lake – a success story impossible without effective sea lamprey control.

MAINTAINING MANAGEMENT PRACTICES

Current management practices are highly effective at control but cannot eradicate sea lamprey, so control must be continued every year to keep their population in check. This was confirmed during the 2020-21 Covid pandemic, when sea lamprey control did not occur in Lake Ontario because of travel restrictions.

Sea lamprey numbers and the mortality rates of fish they attacked increased dramatically when the parasitic juveniles grown from larvae not treated in those missed years arrived in the Great Lakes. The economic loss associated with this two-year pause in Lake Ontario was conservatively estimated to be nearly $90 million. Across all the Great Lakes, the economic loss associated with reduced control during the pandemic was nearly $270 million. The lesson was learned: Sea lamprey control mustn't stop. It's just as important as ever.

Sea lamprey invaded the upper Great Lakes in the early 1900s. They feed on fish by attaching to them with their suction cup mouth lined with teeth. Photo courtesy of GLFC.

That's why the control program spends substantial time and money researching additional ways to control sea lamprey. Exploring new techniques to manage sea lamprey is just as important as continuing the current, effective control methods and could lead to advances. In human medicine, bacteria can develop resistance that makes antibiotics less effective as treatments for illness. The same risk exists if sea lamprey were to evolve resistance to lampricide. The threat to the Great Lakes fishery is real if control is no longer effective.

A DELICATE SYSTEM

The Great Lakes fishery exists in a fragile balance that underscores the importance of ongoing federal, state, and local support for the agencies and partnerships that control the invasive sea lamprey and support this critical natural resource.

Funding to ensure the sea lamprey control program can effectively carry out its mission is vital to ensuring continuation of the benefits that the Great Lakes fishery brings to Michigan residents, visitors, and the health of the aquatic environment.◆

Holding back dam disasters

Michigan ramps up oversight, confronts risks and costs

By Luke Trumble, Michigan Department of Environment, Great Lakes, and Energy

Memories of May 2020 still weigh heavily on countless Michiganders. It was then that record flooding pushed the century-old Edenville Dam in Midland County past its breaking point, unleashing a torrent of water that soon overtopped the Sanford Dam downstream, compounding the impact. Ten thousand people fled their homes, and damages totaled more than $200 million. For many, it was the moment they realized how fragile the state's aging dam infrastructure had become.

The disaster focused attention on the problem, but solutions are not easy. Decisions about repairing, replacing, or removing dams can divide communities, and costs can tie the hands of owners and regulators.

And the scale of the challenge is large. Michigan has more than 2,600 publicly and privately owned dams.

The state regulates more than 1,000 of them, while the Federal Energy Regulatory Commission oversees another 90 hydroelectric dams. Many of these structures date back to the early 20th century, long past their intended design life. More than 140 Michigan dams are classified as "high hazard potential," meaning their failure could cause loss of life and severe property damage. About 15% of those high-hazard dams are either in poor condition or lack a current safety rating.

Neglect any infrastructure long enough, and it will fail. Dams that have lasted a lifetime can fail in an instant – with catastrophic consequences. In the U.S., dam collapses have claimed at least 140 lives in the past 50 years.

A stronger safety net

In the wake of the Edenville and Sanford disasters, the Association of State Dam Safety Officials and a Michigan Dam Safety Task Force called for urgent reforms. The task force issued 86 recommendations, spanning funding, compliance, enforcement, and emergency response.

The Michigan Department of Environment, Great Lakes, and Energy (EGLE) expanded its Dam Safety Unit from two staff members to eight – more boots on the ground for inspections and compliance work. Enforcement practices were standardized to create consistent oversight. The state also established a $6 million Dam Safety Emergency Action Fund, with about $3 million still available through 2026 for urgent repairs and removal projects.

Perhaps most significantly, Michigan lawmakers created the Dam Risk Reduction Grant Program (DRRGP) in 2022. Over three years, the program invested nearly $44 million in 57 projects to repair or remove unsafe dams across the state. The program wrapped up in May 2025 with its final round of awards and no new funding in its place.

Success stories

The DRRGP helped communities tackle some of the toughest infrastructure challenges they faced. In Arenac County, for example, $2.3 million in DRRGP funding announced in 2023 supported upgrades to secure the Forest Lake Dam for decades to come after heavy rains in 2020 damaged the dam's spillway, forcing officials to lower water levels for safety.

(Above) The Michigan departments of Natural Resources and Environment, Great Lakes, and Energy celebrate the restoration of the former contaminated Morrow Dam site on the Kalamazoo River in Plainwell in 2025. Photo courtesy of EGLE.

In Flint, the program provided $1.5 million to remove the Hamilton Dam on the Flint River, a crumbling structure more than a century old. Its removal not only reduced safety risks but opened up 25 miles of river and tributaries for fish passage, improved spawning habitat, and boosted prospects for riverfront redevelopment.

All told, projects funded under the program reduced risks to nearby residents, restored natural river systems, and set the stage for new recreational opportunities.

Challenges ahead

Even with these wins, the urgency of dam safety remains high. The end of the DRRGP leaves a funding gap while many dams remain structurally deficient or functionally obsolete.

Local governments and private dam owners often lack financial resources or the ability to address decades of deferred maintenance.

With so many dams having reached or surpassed their design life expectancy, action is needed now. Increasing age only accelerates deterioration of dams, sometimes necessitating immediate action such as lowering of impoundments – the lakes or ponds formed behind dams – or emergency stabilization or removal. The urgency of these actions is often clouded by loss of recreational use of impoundments and can result in public opposition to taking actions necessary to protect the safety of dams.

Future risks such as flooded streets and homes, destroyed infrastructure, and even potential loss of life can seem abstract compared to current tangible benefits like fishing, boating, or enjoying waterfront property.

Michigan's dam safety staff focus on identifying and assessing the structures that pose the greatest risks, reviewing construction plans, analyzing inspection reports, enforcing compliance, and responding to emergencies. But more awareness and support are needed.

Call for resilience

Dams were built for a wide range of purposes – hydropower, flood control, water supply, recreation – but most were never meant to last forever. And as climate change fuels more intense storms, they are under mounting stress.

Resilient infrastructure is essential to the state's safe and successful path forward. That means investing not only in repairing critical structures but also in removing obsolete ones to restore river systems, improve fish passage, and create safer, more natural waterways. It means helping communities navigate the balance among recreation, habitat, and – most importantly – safety. Above all, it means doing our best to ensure that Michigan never again faces a disaster like the one that struck in 2020.

Dams can provide beauty and recreation, but when aging or neglected, they can unleash devastation. As Michigan weighs next steps, the lesson from Edenville and Sanford is clear: Proactive, preventive action must remain the top priority.◆

1

The partially dismantled Hamilton Dam in Flint awaits removal in 2023. Photo courtesy of EGLE.

2

With the University of Michigan-Flint campus in the background, work crews remove crumbling concrete and place rock at the site where the dam once stood. Photo courtesy of EGLE.

3

Gentle rapids now run where the dam once blocked fish passage upstream. Photo courtesy of EGLE.

About the Authors

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Michigan Department of Agriculture and Rural Development (MDARD) Science and Research Analyst Tyler Baird co-authored "Starving harmful algal blooms." He provides analysis to support evidence-backed program and policy implementation regarding agricultural resilience, emerging contaminants, and other focus areas. Baird grew up on Lake Michigan and strives to instill a love of nature in his young children.

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National Park Service wildlife biologist at Sleeping Bear Dunes National Lakeshore Vince Cavalieri authored "Going the distance for piping plovers." He has been working with Great Lakes piping plovers for 15 years. Cavalieri was born and raised in the Upper Peninsula, where he was fascinated by Michigan's abundant and varied wildlife from an early age.

EMILY FINNELL

EGLE Great Lakes Senior Advisor and Strategist Emily Finnell authored "Staying strong and stretching at 40." Finnell leads EGLE's OGL. She is constantly inspired working with passionate partners and communities across the state, region, and around the world to steward freshwater lakes. She spends time with family and her dog exploring and hiking in the woods and along the shores of the Great Lakes in all seasons.

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Recent Michigan State University graduate Janelle Grech co-authored "Skimming the surface for plastic waste." She earned bachelor's degrees in international relations and environmental studies and sustainability, and her work for the City of Lansing focuses on environmental policy, sustainability initiatives, and public engagement. She is passionate about protecting Michigan's waterways, which she enjoys exploring through biking, swimming, and kayaking.

ABIGAIL HENDERSHOTT

Michigan PFAS Action Response Team (MPART) Executive Director Abby Hendershott, a 33 -year EGLE veteran, co-authored "Solving the puzzles of PFAS." She has focused on PFAS response activities since 2017 and led the team responsible for Michigan's largest PFAS contamination response to date: the investigation into the former Wolverine Worldwide tannery in Rockford. She has many years of experience with complex environmental investigations and cleanups.

DR. LAURA JOHNSON

MDARD Chief Science Officer Dr. Laura Johnson co-authored "Starving harmful algal blooms." She is establishing the department's Office of Agricultural Science and Research to focus on issues facing the food and agricultural industry. A leading expert on agricultural conservation and Great Lakes water quality, she has conducted research in the region for over a decade.

JEFF JOHNSTON

EGLE Public Information Officer Jeff Johnston edits and helps coordinate the annual Michigan State of the Great Lakes Report. He enjoys taking in Michigan's natural beauty from behind the wheel of his convertible and has a special affinity for travel in the Upper Peninsula.

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EGLE Environmental Quality Analyst Eddie Kostelnik authored "Meeting the macro-challenge of microplastics." Kostelnik works on emerging pollutants throughout Michigan surface waters with a focus on microplastics, harmful algal blooms, and PFAS. Whenever time allows, you can find him birdwatching on the Great Lakes, wetlands, inland lakes and streams, and forests throughout the state.

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EGLE Tribal Liaison Katie Lambeth authored "Respecting a relationship with manoomin." She coordinates EGLE's work with tribal governments and spends her spare time in the Upper Peninsula kayaking, hiking, fishing, and exploring the beautiful natural environment.

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OGL Great Lakes Stewardship Coordinator Katie Mika, Ph.D, helps coordinate the annual Michigan State of the Great Lakes Report and develop collaborative strategies to educate Michiganders about the Great Lakes ecosystem and stewardship. She is happy to be in a career where she can support and protect Michigan lakes while occasionally jumping in for a swim.

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EGLE Geologic Resource Management Division’s Groundwater and Geologic Services Section Manager Lena Pappas authored “Digging into details of groundwater management.” She has a background in groundwater modeling and hydrogeologic sciences and oversees the development of the new Groundwater Section. She enjoys kayaking and traveling each summer with her family to enjoy each of the Great Lakes.

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EGLE PFAS Operations Manager Amy Peterson co-authored “Solving the puzzles of PFAS.” She works daily with MPART Executive Director Abby Hendershott and the rest of the MPART team, helping connect people to discuss PFAS issues, tracking projects, and maintaining operational flow. She is an avid angler and nature photographer.

DR. JOAN ROSE

Homer Nowlin Chair in Water Research at Michigan State University and director of the MSU Water Alliance, Dr. Joan Rose co-authored “Skimming the surface for plastic waste.” Rose says water sustains life, and water quality sustains health. The health, beauty, and sustainability of the Great Lakes is of the upmost importance to all of us.

MIKE SIEFKES

Great Lakes Fishery Commission Director of Sea Lamprey Control Mike Siefkes, Ph.D, co-authored “Stifling a sea lamprey comeback.” He is also an adjunct associate professor in the Michigan State University Department of Fisheries and Wildlife and spends as much time as possible outside enjoying Michigan’s natural wonders.

MICHELLE SELZER

MDARD Senior Environmental Strategist Michelle Selzer co-authored “Starving harmful algal blooms.” Selzer helps advance restoration of Michigan’s portion of the Western Lake Erie Basin. She works with people who share a passion for protecting, restoring, and enhancing the Great Lakes for future generations.

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Muskegon Lake Area of Concern Coordinator Stephanie Swart in EGLE’s Water Resources Division authored “Restoring the heart of a community.” Swart is also EGLE’s coordinator for Lake Superior and the Torch Lake Area of Concern. She loves getting to know the nooks and crannies of Michigan’s Upper Peninsula and feels that any day spent on a Great Lake is a good one.

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Senior director of Parks & Trails at the Ralph C. Wilson, Jr. Foundation, JJ Tighe authored “Making space for recreation down by the riverside.” He moved to Michigan 15 years ago, driving over the Ambassador Bridge and along the Detroit Riverfront, and is inspired by how far the riverfront has come in such a short time. Tighe loves exploring the riverfront and trails throughout the region with his wife and four boys and finding time to escape to lakes up north.

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MSU Water Alliance Communications Manager Aja Witt co-authored “Skimming the surface for plastic waste.” She develops stories, social media posts, and outreach that highlight the impact of MSU’s water research. She enjoys photographing Michigan’s rivers and lakes throughout the year, capturing the various ways water connects communities and landscapes across the state.

Thank you.

Many thanks to the experts, contributors, partners, writers, editors, and designer who contributed their time and efforts to this 2025 Michigan State of the Great Lakes Report. The contents reflect the dedication of our region's natural resource stewards and community voices within our state who all share a passion for Michigan's Great Lakes water resources. The views and opinions expressed within this publication are those of the individual authors and do not necessarily reflect the official policy or position of the Michigan Department of Environment, Great Lakes, and Energy; the Office of the Great Lakes; or their partners.

Gretchen Whitmer, Governor

Phillip D. Roos, Director, EGLE

This report is available digitally at the Michigan Office of the Great Lakes webpage, Michigan.gov/OGL.